2.1 DEVELOPMENT OF ALTERNATIVES

As discussed in Section 1, Dairyland needs additional transmission capacity and intends to apply to RUS for financing assistance for its 11 percent ownership interest in the Proposal. RUS' decision is whether or not to provide the financing assistance for Dairyland's Proposal.

2.1.1 NEPA Evaluation Process and Criteria

Under the CEQ regulations established to implement NEPA,[74] RUS is required to identify and evaluate reasonable alternatives to the Proposal, as well as the no action alternative. Reasonable alternatives are those that are "practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant" (CEQ 1981, Question 1). In determining reasonable alternatives, RUS is required to consider a number of factors that may include, but are not limited to "the proposed action's size and scope, state of the technology, economic considerations, legal considerations, socioeconomic concerns, availability of resources, and the timeframe in which the identified need must be fulfilled."[75]

2.1.2 Previous Studies

RUS has established procedures for determining if a proposed project for which a loan or loan guarantee is sought is both technically and financially feasible. Following RUS' procedures, Dairyland prepared several studies prior to this EIS, including an Alternatives Evaluation Study (AES) and a Macro- Corridor Study (MCS) that were subject to RUS' review and approval (Dairyland 2009a and 2009b). The studies were made available for public and agency comment and review during the scoping period. The information and analyses from the AES and the MCS are incorporated by reference into this Draft EIS.

[74] 40 CFR 1500 - 1508
[75] 7 CFR 1794.12

2.2 ALTERNATIVES CONSIDERED BUT NOT STUDIED IN DETAIL

2.2.1 Demand Side Management

The AES evaluated the two components of demand side management, load management and conservation. Demand side management is important for reducing the need for both new generation and transmission facilities. However, as explained in the AES, demand side management and energy efficiency are measures that are already incorporated into utility's projections and therefore are not available to further reduce load (Dairyland 2009b, pp. 3-14 and 3-15).

In any case, demand side management would not address the need for generation outlet.

2.2.2 Use of Existing Generation

The AES also evaluated the use of the RPU's existing generating units in the Rochester area. Use of these internal units could reduce some of the demand on the incoming, overloaded lines. These facilities consist of old coal-burning units and gas combustion turbines, plus two very small hydroelectric plants. The oldest gas combustion unit is scheduled to be retired by 2015, as are the three oldest coal-burning units. Furthermore, the capacity on the remaining coal unit may need to be reduced by approximately 10 MW based on new emissions controls (Dairyland 2009b, pp. 3-15 and 3-16). Regardless, because of the long ramp-up times required for coal units, the coal units are not useful to address peaking needs, which is when the reliability issues occur.

In his testimony in the PUC hearings on behalf of the Midwest ISO, Jeffrey Webb explained that the Midwest ISO considered the local RPU generation in its analysis. He reported that in the 2011 peak period study, "even with all the local generation on we found numerous line overload conditions will result for various combinations of facility forced outages" (Webb 2008, p. 27). Outages do occur and need to be accounted for. The Midwest ISO is required by NERC standards to consider the potential for transmission line and generator forced outages in its reliability analyses.

Of course, the system overloads were greater in the modeled scenarios that did not include all the local generation (Webb 2008, p. 27). In summary, as Webb stated, "there

are no local generation dispatch options that will provide solutions into the future" (Webb 2008, p. 29).

The use of existing RPU generation is relevant only to the community reliability component of need, and, as summarized above, it is not adequate to address that need. Use of the existing RPU generation would not address the need for regional reliability or for generation outlet.

2.2.3 New Generation

The AES considered the potential for new peaking units in the Rochester area, and concluded that would not be a cost-effective solution. New generation would also require new transmission lines (Dairyland 2009b, pp. 3-21). Generating units also have environmental impacts, particularly air emissions.

As noted in the AES, new generating units would also not address the need for regional reliability or generation outlet (Dairyland 2009b, pp. 3-25). As discussed in Section 1.1.2.3, inadequate generation is not the concern in the Proposal area; the concern is with the inability to get the electricity where it is needed. Adding generation would be counterproductive to meeting the need for generation outlet (and, unless it is renewable, for meeting the current Minnesota and Wisconsin renewable energy standards). Also, because the Midwest ISO has full responsibility for transmission reliability, it has to have full control of access to the transmission grid within the Midwest ISO footprint. Any new proposed generator would need to apply through the Midwest ISO generator interconnection queue, which may require approximately two years.

New renewable energy sources are not available in the Rochester or La Crosse metropolitan areas sufficient to address the community reliability need. Importing renewable energy from outside the area would not address the community transmission reliability concerns.

2.2.4 Decentralized Generation Systems

Decentralized generation systems can provide local power through connections to lower-voltage lines (138 kV or less), and, in theory, can reduce the loads on the high-voltage lines. This is analogous to the use of local roads to reduce traffic on the

Interstate system. Decentralized generation can be used primarily at a site (usually referred to as distributed generation), or it could potentially be developed solely for the purpose of supply the electric grid (dispersed generation). In either case, generators would need to apply to the Midwest ISO for interconnection. Decentralized generation systems are evaluated by category below.

2.2.4.1 Net Metering

EPAct 2005 encourages decentralized generation by requiring utilities to allow customers the opportunity for a two-way movement of electricity from the grid, and compensation to the customer for its supply. Net metering is defined in EPAct 2005, Section 1251 as:

> Service to an electric consumer under which electric energy generated by that electric consumer from an eligible on-site generating facility and delivered to the local distribution facilities may be used to offset electric energy provided by the electric utility to the electric consumer during the applicable billing period.

The DOE's Energy Information Administration (EIA) the number of net metering customers, but not the quantity of electricity provided. In Minnesota in 2008, the latest year for which data is available, 588 electric utility customers participated in net metering. This represents approximately 0.02 percent of Minnesota utility customers. In Wisconsin 344 customers participated in net metering (EIA 2010a Table 5.2; MDC 2008 Table 2). Based on participation, without additional incentives, net metering would not be expected to have an impact on transmission needs.

2.2.4.2 Distributed Generation

The AES addresses distributed generation, which is generation that is intended primarily to serve on-site needs, with the excess going to the transmission system (EIA 2011a). The AES notes that the most likely fuel for distributed generation would be diesel, which introduces concerns for air quality impacts. The assessment included in the AES found that distributed generation as an alternative to the Proposal would also not be cost-effective. Distributed generation would also address only the community reliability component of the need, and would not address regional reliability or generation outlet.

2.2.4.3 Dispersed Generation

The potential for dispersed renewable generation has been studied in Minnesota, based on legislative mandate. In May 2007 the Minnesota Legislature approved the Next Generation Energy Act of 2007, which, among other things, directed the MDC to manage a statewide transmission study of dispersed renewable generation (DRG) potential. The study, which was done by the MTO for the MDC, was divided into two phases of 600 MW each. The study evaluated renewable generation projects in the 10 to 40 MW range, and interconnected on the lowest voltage level transmission that exists in the vicinity of the projected generation sites. The DRG study was part of an effort to advance effective development of renewable energy, to help meet Minnesota's renewable energy standard (RES) requiring 25 percent of the energy produced by the state's utilities to come from renewable sources by 2025 (MTO 2008, 2009). The study focused on wind energy, which is by far the primary renewable energy source in Minnesota, in terms of both capacity and actual generation (EIA 2010b). [Wisconsin's primary renewable source is hydroelectricity (EIA 2010c)].

The study found that even dispersed generation can have substantial impacts to the grid. While the first phase of the study found that 600 MW of new generation projects in the 10 to 40 MW range could potentially be sited without significantly affecting any transmission infrastructure, it did not account for other energy projects already in the Midwest ISO queue. In the second phase of the study, an analysis of the Midwest ISO queue suggested "that the transmission system has limited opportunities for new DRG requests since the outlet capability identified in the first phase will likely be consumed by the prior queued generation requests" (MTO 2008, p. 13; MTO 2009 pp. 5 and 15).

In 2010, the Midwest ISO reported 41 gigawatts (GW) (41,000 MW) capacity in its queue for projects planned to go on line between 2010 and 2019, including 34 GW of wind capacity (Midwest ISO 2010a Table 5.3-10). While the Midwest ISO queue process has since undergone reform for streamlining, wind projects in the Buffalo Ridge area alone – Minnesota's prime wind energy location - were seeking to transmit 23 GW in 2008 (NREL 2008).

In his cover letter to the legislature and the PUC for the 2009 DRG report, William Glahn, the then MDC Office of Energy Security Acting Reliability Administrator, reported (in bold text): “The bottom line of the Phase II study is that, after rigorous expert engineering assessments, the lower and higher voltage transmission grid is essentially constrained in Minnesota when viewed in aggregate statewide” (MTO 2009, p. 5). Glahn concluded with the following:

> In conclusion, when the Governor’s Next Generation Energy Initiative was enacted, the 2007 legislature established nation-leading renewable electricity requirements and greenhouse gas emissions reduction goals. These targets must be met, and must be met in timely, reliable, and cost-effective ways. It is a fundamental policy of the Minnesota Office of Energy Security that, in order to do so, we must employ the dual strategy of:
>
> - Using our existing transmission infrastructure more efficiently, through increased energy conservation and efficiency, demand response, emerging efficiency technologies and dispersed renewable generation where it can be interconnected reliably, and
> - Significantly increasing high-voltage transmission capacity in the state (MTO 2009, p. 6).

2.2.5 Alternatives Considered by the Midwest ISO

The Midwest ISO considered other new 161 kV transmission line alternatives for the Rochester area; however, they were comparable in cost to the Rochester upgrades included in the Proposal and did not address the needs in La Crosse (Webb 2008, p. 29).

For the La Crosse area, the Midwest ISO considered the effects of adding two oil-fired peaking units (at French Island). However, this option did not relieve all the 2011 overload conditions. It also considered a rebuild of the 161 kV lines in the area at a cost of approximately $173 million. This would not provide the same level of support as the Proposal, and would not accommodate future load (Webb 2008). This option would also not address the need for regional reliability or generation outlet.

2.3 DEVELOPMENT OF ALTERNATIVE ROUTES

During the development and scoping processes, through public and agency input and additional engineering studies, some alternative alignments were dropped from further consideration and some were added. This section describes the process of alternative route development from the macro-corridors presented in the MCS (Dairyland 2009a) to the alternatives evaluated in detail in this Draft EIS. This Draft EIS evaluates in detail those alternatives evaluated in detail in the MN DEIS and FEIS (MDC 2011b and 2011c) and those included in the final CPCN Permit Application (Xcel et al. 2011), which will also be evaluated in detail in the Wisconsin EIS.

The final macro-corridor as presented in the MCS was based on RUS guidance for macro-corridors and Minnesota and Wisconsin requirements for siting transmission lines. Further development of route alternatives was guided by public and agency input and Minnesota and Wisconsin criteria, summarized below. In particular, at the Mississippi River crossing, the Minnesota Route Permit (MRP) Applicants and the CPCN Applicants worked closely with the MDNR, the WDNR, and especially the USFWS to identify feasible crossing options that minimize impacts to the important state and federal ecological, aesthetic and recreational resources along the Mississippi River in the Proposal area.

Minnesota Criteria. In Minnesota, an applicant identifies a "route," which, based on Minnesota regulations, can be up to 1.25 miles wide.[76] The MRP application requests a 1,000-foot wide route for the majority of the route with the exception of specific locations where it is wider to allow for the avoidance of MnDOT interchanges or county conservation easements. The narrower right-of-way (ROW) within the route is defined as "the land interest required within a route for construction, maintenance, and operation of a high voltage transmission line."[77] A high voltage transmission line, by definition, operates at 100 kV or more.[78] The applicant must identify at least two routes.[79]

[76] Minn. Rules ch. 7850.1000 Subpart 16
[77] Minn. Rules ch. 7850.1000 Subpart 15
[78] Minn. Rules ch. 7850.1000 Subpart 9
[79] Minn. Stat. 216E.03 Subd 3

Minnesota law requires the PUC, in its evaluation of a Route Permit Application, to consider locating a route for a high-voltage transmission line on an existing high-voltage transmission route and the use of parallel existing highway right-of-way.[80] The PUC is also required to consider survey lines and "other natural division lines of agricultural land so as to minimize interference with agricultural operations."[81] In considering a route permit, the PUC is further charged with being "guided by the state's goals to conserve resources, minimize environmental impacts, minimize human settlement and other land use conflicts, and ensure the state's electric energy security through efficient, cost-effective power supply and electric transmission infrastructure."[82]

Minnesota regulations prohibit routing through state and national wilderness areas. State or national parks or state scientific and natural areas are also excluded from routing "unless the transmission line would not materially damage or impair the purpose for which the area was designated and no feasible and prudent alternative exists. Economic considerations alone do not justify use of these areas for a high voltage transmission line."[83]

Wisconsin Criteria. The Wisconsin CPCN Application identifies a specific ROW location for the transmission line, unlike the Minnesota application, where a route of a certain width is identified within which the ROW can be located.

Following is the Wisconsin policy for siting high voltage transmission lines:

> It is the policy of this state that, to the greatest extent feasible that is consistent with economic and engineering considerations, reliability of the electric system, and protection of the environment, the following corridors should be utilized in the following order of priority:
>
> (a) Existing utility corridors.
>
> (b) Highway and railroad corridors.

[80] For Route Permit Applications filed after May 1, 2010, the Commission must make specific findings that it considered locating a route on an existing high voltage transmission line route and along an existing highway. If a route along these corridors is not selected, the Commission must identify the reasons. Minn. Stat. 216E.03 Subd 7(e)
[81] Minn. Stat. 216E.03 Subd 7(b)(9)
[82] Minn. Stat. 216E.03 Subd 7
[83] Minn. Rules ch. 7850.4300

(c) Recreational trails, to the extent that the facilities may be constructed below ground and that the facilities do not significantly impact environmentally sensitive areas.[84]

2.3.1 Minnesota - Changes from the Final Macro-Corridors to the MN EIS

The route alternatives that were evaluated in the MN EIS, and are evaluated in this Draft EIS for the Minnesota part of the Proposal, are shown in Figure 2-2. As a comparison of Figure 2-1 and Figure 2-2 shows, some route options/corridor segments that were included in the RUS MCS final macro-corridor are no longer included and some new route options have been added, including some outside the RUS MCS final macro-corridor. These are discussed below, beginning with MCS final route options/corridors that were eliminated from further consideration.

[84] Wis. Stat. 1.12(6). A "high voltage transmission line" is defined at 196.491(1)(f) as "a conductor of electric energy exceeding one mile in length designed for operation at a nominal voltage of 100 kilovolts or more, together with associated facilities, and does not include transmission line relocations that the commission determines are necessary to facilitate highway or airport projects."

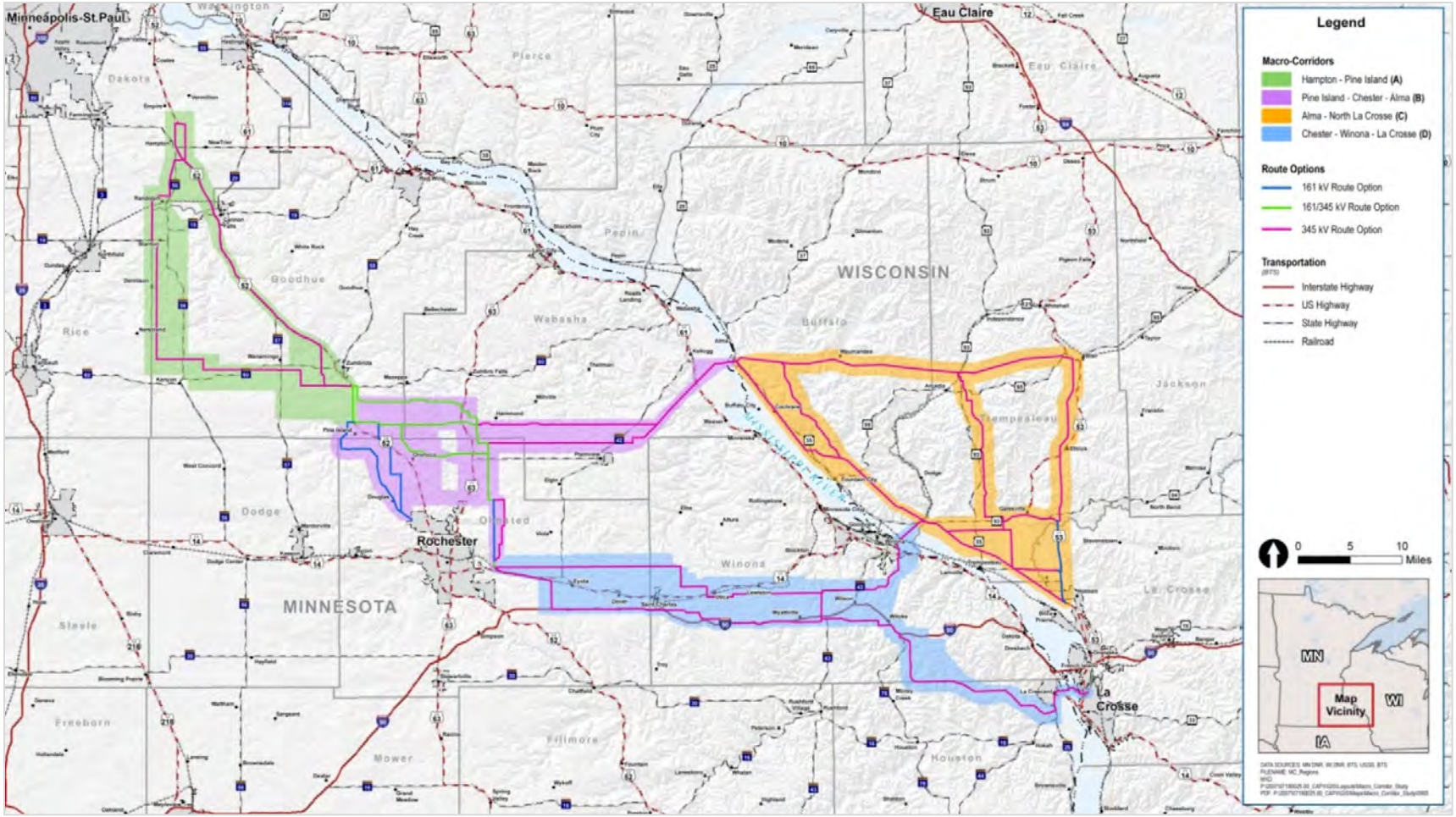

Figure 2-1: Final Macro-Corridors
Source: Dairyland 2009a, Figure 7-1

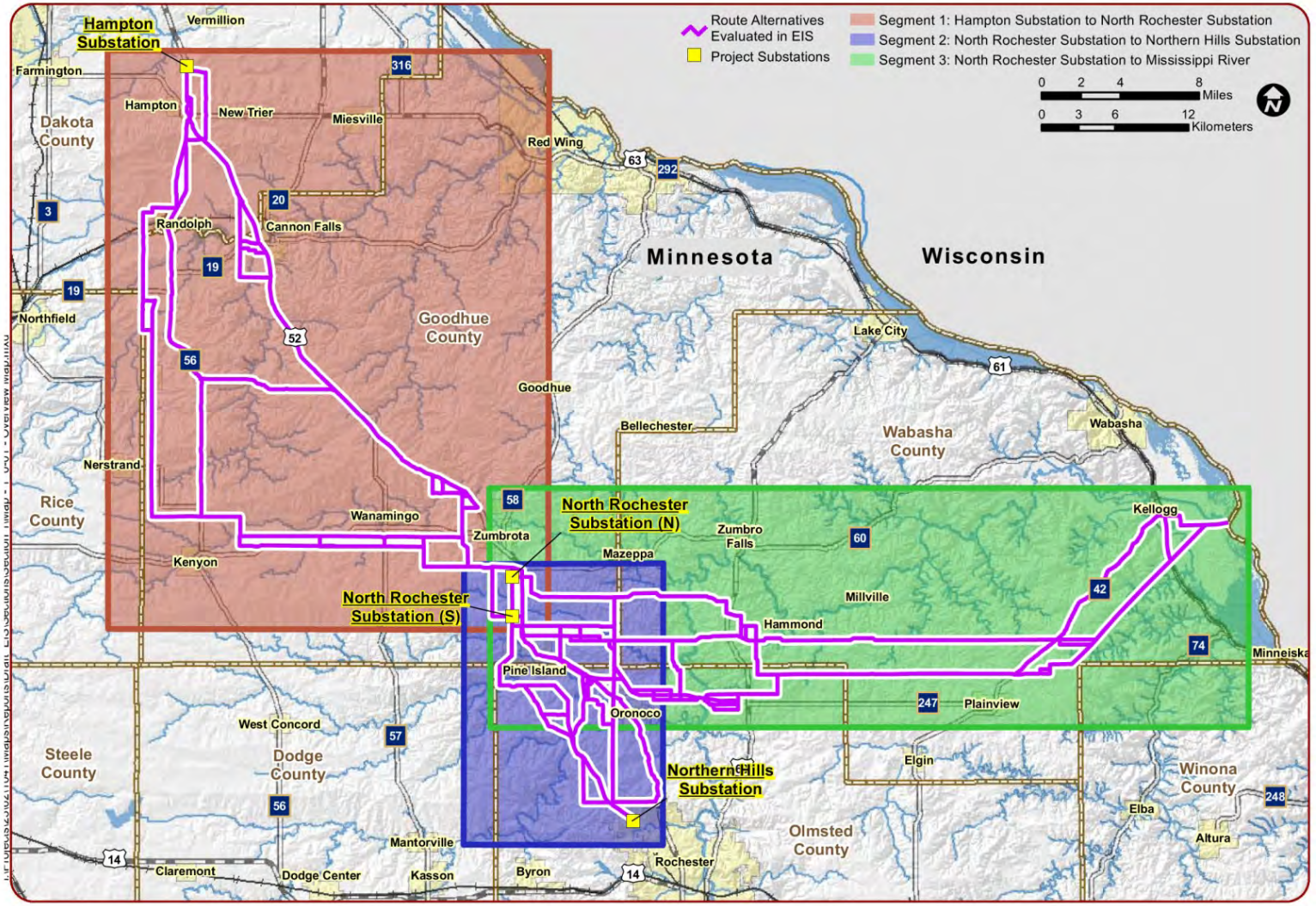

Figure 2-2: MN EIS Route Summary

Source: MDC 2011b, p. 1

2.3.1.1 Route Options and Corridor Segments Eliminated From Further Consideration

Mississippi River Crossings

Two of the original three Mississippi River crossing alternatives under consideration in the MCS were eliminated from detailed consideration: the crossings at Winona (the middle option) and the crossing at La Crescent (the southern option). Aerial photographs of these two crossings are included as Figures Figure 2-3 and Figure 2-4.

The three crossing alternatives are compared in Table 2-1. All three alternatives cross the Mississippi River at an existing transmission line crossing - that was the basis for identifying these alternatives. However, on the Minnesota side, the existing transmission corridors at Winona and La Crescent are not available to the west for many miles. Furthermore, there are no major roadways within the MCS final corridors at either Winona or La Crescent on the Minnesota side. On the Wisconsin side at La Crescent/La Crosse, alignment options are limited to heavily developed land or wetlands (Figure 2-4).

The existing ROW at all three crossings is at least partially on USFWS Wildlife Refuges; however, the Winona crossing requires a much greater length through Refuge property, and crosses large areas of marshland (Table 2-1). Winona and La Crescent have much smaller available existing ROWs than Alma. While the Alma crossing has nearby eagles' nests, the crossing is not located near known bird concentration points. The Winona crossing is located near bird concentration points, and the La Crescent crossing is located near a very large active rookery.

Substation locations may not be feasible for the La Crescent crossing.

Table 2-1: Comparison of Preliminary River Crossing Alternatives.

Alma Crossing	Winona Crossing	La Crescent Crossing
Use of Existing Corridors, MN		
No new corridor required.	10 miles new corridor required.	15 miles new corridor required.
Use of Existing Corridors, WI		
Two feasible route options that follow existing transmission lines.	Two feasible route options: 1) an existing transmission line and 2) property boundaries/roads.	Route options may not be feasible due to potentially unpermittable wetland impacts and/or displacement of business
Length in Floodplain		
1.4 miles	3.25 miles	2.5 miles
Information on ROW within Refuge Land (USFWS 2009a)		
Existing 125 feet, permitted 180 feet, established 12/23/1948; indefinite, general stipulations.	Existing < 100 feet, permitted 100 feet. New metal poles installed 2003.	Existing < 100 feet, permitted width 100 feet, issued 6/6/1967 and expires 6/5/2017; general stipulations.
Length through Refuge Property		
2,900 feet	13,540 feet	2,790 feet
Area of Refuge Open Water/Marsh within 150 ft. of Centerline (USFWS 2009a)		
10 acres open water/1.9 acres marsh. Marshes: silver maple and green ash with Eastern cottonwood and swamp white oak.	45.7 acres. No description.	15.5 acres. No description.
Forested Refuge Area within 150 ft. of Centerline (USFWS 2009a).		
9.6 acres. Mature floodplain forest dominated by silver maple and green ash with Eastern cottonwood and swamp white oak.	7.8 acres. No description.	19.9 acres. No description.
Estimated Number of Poles in Wetlands[85]		
7	28	15
Estimated Permanent Wetland Impacts, Acres (80 sq ft per pole)		
0.01	0.05	0.03

[85] 600-foot spacing on USFWS property, 1,000-foot elsewhere, plus open water crossings.

Alma Crossing	Winona Crossing	La Crescent Crossing
Nearby Biological Features (USFWS 1008a, 2009b)		
Two active eagle nests on the Minnesota side: one adjacent to the existing line and one 1,800 ft. from the corridor.	Large numbers of migratory birds that use the open water/marsh area.	Active eagle nest 0.5 mile from line; active rookery with hundreds of great blue heron, great egret, and double-crested cormorant nests is located 0.3 mile upriver on the WI side.
USFWS Position (USFWS 2008a, 2009a)		
Alma crossing may pose least environmental impact because of existing ROWs and because it is least likely to impact migratory birds since it is some distance from known bird concentration points.	Due to the predominantly wetland habitat crossing and the importance of the refuge to migratory birds, this alternate is opposed by the USFWS.	Route is of concern due to proximity of eagle nest and the rookery.
Engineering Considerations		
Narrowest river crossing.	Widest river crossing.	New corridor required in blufflands, limited access. Narrow ROW through refuge property results in tall structures causing greater potential impacts to birds and aesthetics.
Route follows existing transmission corridor through blufflands. Wider ROW through refuge property allows flexibility to design lower structures to mitigate potential impacts to birds and aesthetics.	New corridor required in blufflands, limited access. Narrow ROW in refuge results in tall structures and potential impacts to birds and aesthetics.	
Feasible Substation Locations		
Three potential substation sites.		Wetlands make La Crosse Substation not feasible; other alternatives require business displacement or an upgraded line in the La Crosse Marsh.

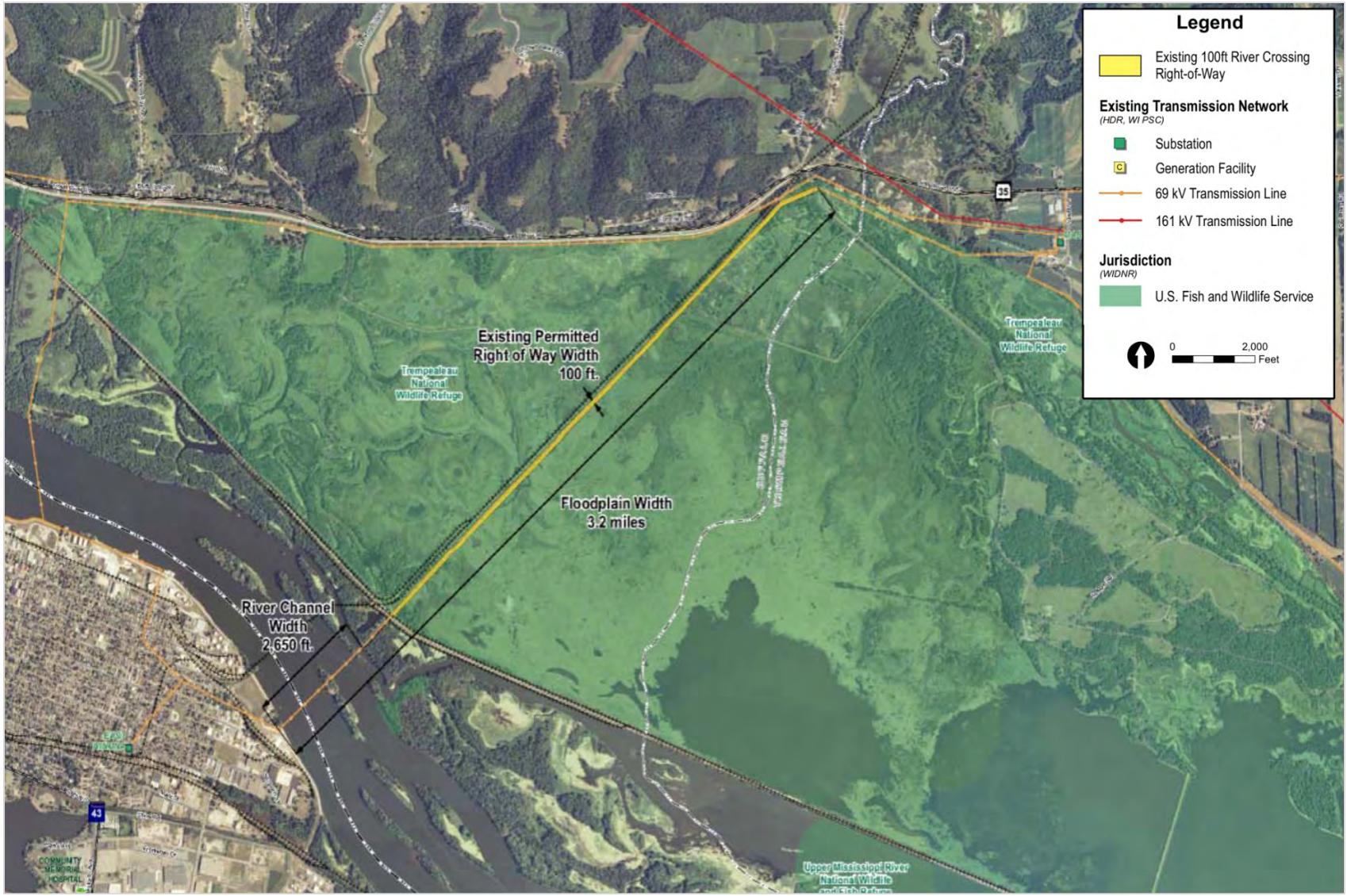

Figure 2-3: Winona Mississippi River Crossing Alternative

Source: Xcel et al. 2010 Appendix E.

Figure 2-4: La Crescent - La Crosse Mississippi River Crossing Alternative
Source: Xcel et al. 2010 Appendix E.

In summary, primarily because the Winona and La Crescent crossings require many miles of new corridor and because they represented the most environmental impact for USFWS refuge resources, they were eliminated from detailed evaluation. In addition, substation alternatives may not have been feasible for the La Crescent alternative, and USFWS found the Winona crossing to be unacceptable. Only the Alma crossing was retained for detailed evaluation.

North Rochester-Chester Alternatives

The North Rochester to Chester 161 kV line (Chester Line) would extent westward from the proposed North Rochester Substation to a point east of the Zumbro River, where it would head south to the existing Chester Substation. The east-west section of the Chester Line would be double-circuited with whichever 345 kV alignment is selected. For the north-south section of the Chester Line, the Applicant has proposed a direct route that follows either existing transmission line or roadway corridors for its full length and has few impacts. This route is included in this Draft EIS for detailed analysis. The Applicant also identified an alternative route that generally parallels the proposed route and has fewer residences within 300 feet of the route centerline. The number of residences within 0-75 feet, 76-150 feet, and 151-300 feet of the route centerline is 0, 8, and 11 for the proposed route and 0, 1, and 6 for the alternate route (Northern States Power Company 2011 Table 5). However, this alternative does not meet the Minnesota siting criteria as well as the proposed alternative and was eliminated from further consideration for the following reasons:

- It is 1.2 miles longer.
- The proposed route follows 6.9 miles of existing transmission line compared to 2.8 miles for the alternative route.
- The alternative route has 10.3 miles that follows neither transmission lines nor roads, while the proposed route follows transmission lines or roads for 100% of its length.

The Applicant also evaluated six sub-alternatives, all of which were rejected either because they did not meet the Minnesota siting criteria as well as the proposed route, or because they resulted in more impacts to residences. More details are included in the

Minnesota route permit application for the Chester Line, the text of which (not appendices) is included as Appendix O. The detailed route maps are included as Appendix P.

2.3.1.2 Route Alternatives Added During MN DEIS Scoping

As discussed in Section 1.4.2.2, a large number of alternatives were added during the scoping process for the MN DEIS. These are addressed in the description of the Proposal, Section 2.4.2.

2.3.2 Wisconsin - Changes From the Final Macro-Corridors to the Final CPCN Routes

The routes included in the finalized CPCN Application (Xcel et al. 2011) are shown in Figure 2-5. The changes from the MCS final corridors and route options center on avoidance options for potential impacts from using the Q1 route, which is Dairyland's existing 161 kV line along the Mississippi River. As shown in Figure 2-5, two options for use of the most of the Q1 route are included: the first uses WI-35 at the south end, and another uses a route through Galesville, then follows US-53. The Arcadia route has two options on the east (Arcadia or Arcadia – Ettrick) and two on the west (Arcadia or Arcadia – Alma). The two WI-88 segments allow for avoidance of the northern part of the Q1 route.

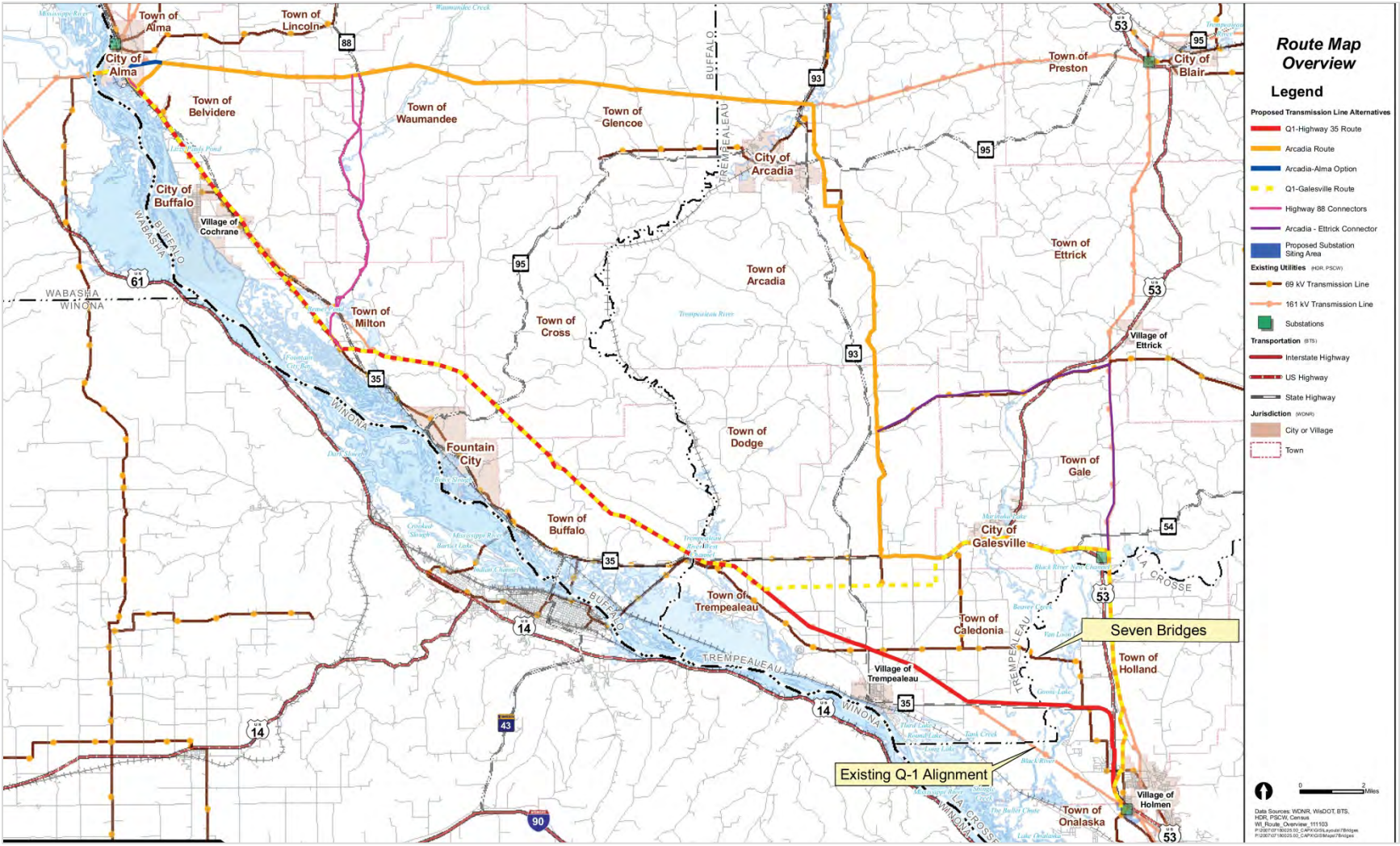

Figure 2-5: Final Wisconsin CPCN Alternative Routes
Source: Dairyland 2011

While it is the most direct and shortest of the Wisconsin routes and meets the criteria of following an existing transmission line, the Q1 also has some potential impacts and agency concerns. The northern 8 miles of this corridor is near Wisconsin Highway 35 (WI-35), which, in this area, is designated as the Great River Road (GRR), an area along which the Wisconsin Department of Transportation (WisDOT) holds scenic easements. The WDNR, WisDOT and USFWS have concerns with the Q1 Route, including aesthetic and environmental impacts along the GRR/WI-35 and the feasibility of permitting the route across federal lands and state wetland areas in the Black River Bottoms.

Dairyland plans to rebuild the Q1 line in its present location (Q1 Rebuild), regardless of where the 345 kV line may be built, except for potentially the southern-most segment, from Trempealeau to Holmen. (The Q1 line needs to stay at or near its present location from Alma to Trempealeau, to provide local service.) As discussed in detail in Section 2.3.2.1 below, the existing Q1 line passes through a portion of the Upper Mississippi Wildlife and Fish Refuge (Upper Mississippi Refuge), in the Black River Bottoms. Rebuilding the Q1 line in its present location through the Refuge would require re-issuing of a permit with the USFWS, which has indicated that it will not issue the permit if there is a practicable alternative to construction of the line through the Refuge. Dairyland has identified and evaluated three additional route alternatives that avoid crossing the Upper Mississippi Refuge at the Black River Bottoms. The technical memorandum evaluating these alternatives, which was reviewed by RUS and revised based on RUS comment, is included as Appendix L. One alternative would be to follow the Q1/Highway 35 Route (Figure 2-5). If this alternative is selected for the 345 kV line, Dairyland proposes to rebuild the Q1 line on this route. Another alternative would be to follow the Q1/Galesville Route (Figure 2-5). A third alternative, called the Seven Bridges Route, is a variation of the Q1/Highway 35 Route and would involve following an existing 69-kV line through the Black River Bottoms (Figure 2-5). All these alternatives for the Q1 crossing of the Black River are included in this Draft EIS. It is Dairyland's opinion that the analysis in this memorandum demonstrates that there is no practicable alternative to rebuilding the Q-1 line on Refuge Property. Each alternative that was considered impacts more homes, increases the length of the line, is

substantially more costly, and has greater environmental impacts. Dairyland Power has submitted a permit application to the U.S. Fish & Wildlife Service to renew the existing Q-1 permit thru the Black River Bottoms.

The following two sections discuss the route options and corridor segments from the MCS final corridors that were removed from detailed consideration in the Draft EIS, and new route alternatives that were added.

2.3.2.1 Route Options and Corridor Segments Not Evaluated in Detail in the Draft EIS

Figure 2-6 uses the final macro-corridor map (from Figure 2-1 above) as the base map, with the final CPCN routes (shown in Figure 2-5) as a layer on top. As shown in Figure 2-6, there are four route option segments from the final macro-corridors that are not included in the final CPCN routes. These segments have also been eliminated from detailed consideration in this Draft EIS. The rationale for the elimination of each is discussed below.

Bluff Route. The Bluff Route was studied to avoid the Great River Road/WI-35 south of Alma. The route was eliminated from detailed consideration primarily because it did not meet the Wisconsin criterion of following an existing linear corridor.

Blair Route. The Blair Route was eliminated because it would require additional length, which in turn, would result in additional impacts and increased cost compared to the Arcadia and Q1 routes. Compared with the Arcadia Route, the Blair Route would add approximately 5 miles of length and cost an additional $13 million. Since the Arcadia Route accomplished the same purpose of avoidance of the Q1 Route at less cost and overall impact, the Blair Route was eliminated and the Arcadia Route was retained. Compared with the Q1 Route, the Blair Route would be 15 miles longer and cost an additional $30 million (Xcel et al. 2011). While the Blair Route is not evaluated in detail in this Draft EIS, the USFWS has indicated that it believes the Blair Route, in addition to the Arcadia Route, is a reasonable and prudent alternative and should be evaluated as part of the NEPA process (Melius 2011).

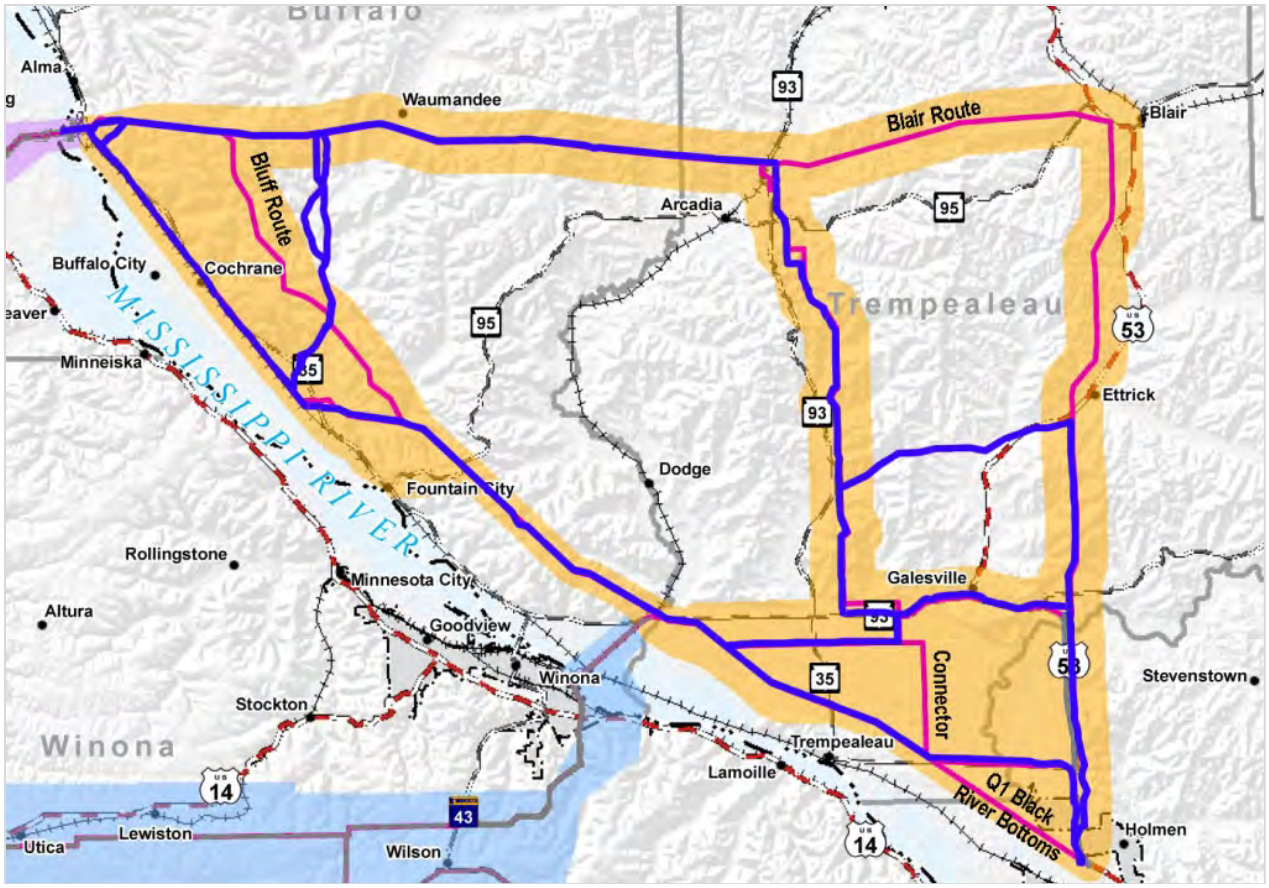

Figure 2-6: Final CPCN Routes (Blue) over Final MCS Route Options
Sources: Xcel et al. June 2011, Dairyland 2009a

Connector. The connector shown in Figure 2-6 was originally considered as an option for the Arcadia Route (Figure 2-5) to use the Q1 Black River Bottoms segment, or the Q1 Highway 35 segment. Because the Q1 Black River Bottoms segment was not retained, as discussed below, the only potential use for the Connector would be to allow use of the Arcadia Route in combination with the Q1/Highway 35 Route. This would combine a major disadvantage of the Arcadia Route (length and cost) with a major disadvantage of the Q1 Route (crossing of the Black River Bottoms), and therefore the Connector was eliminated from further consideration.

Q1 Black River Bottoms. This segment crosses the Black River Bottoms area of forested wetland on the USFWS Upper Mississippi River National Wildlife and Fish Refuge (Upper Mississippi Refuge) and the Van Loon State Wildlife Area. The location of the crossing is shown in Figure 2-7, with a detailed location map in Figure 2-8.

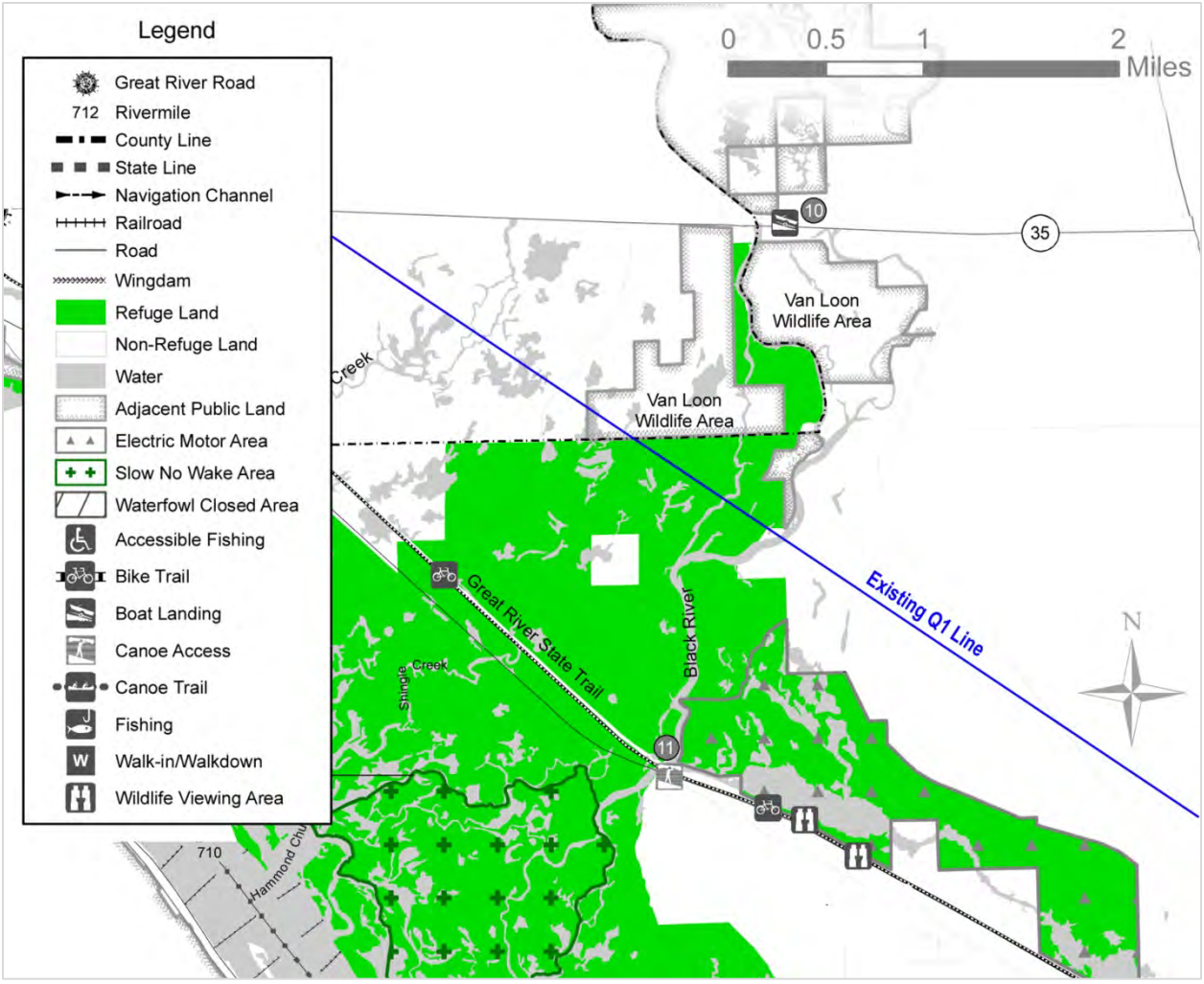

Figure 2-7: Existing Q1 161 kV Line, Black River Bottoms/Van Loon Area
Source: USFWS n.d.

Figure 2-8: Detail - Existing Q1 161 kV Line in Forested Bottomland
Source: USGS 7.5 minute quadrangle, Holmen, WI

The USFWS has identified the Black River Bottoms as a “Classification A” resource, which means that as a habitat for fish or wildlife it is unique or irreplaceable on a national basis or within the ecoregion (USFWS 2009a). The area is one of only a few sites in Wisconsin that provide habitat for the eastern massasauga rattlesnake, Wisconsin’s most endangered reptile. Massasaugas are also a candidate species for federal listing (USFWS 2009a). According to the comprehensive conservation plan (CCP) for the refuge, the massasauga’s habitat (wet sedge meadow, emergent wetland

and shrub-carr wetland) has been lost to natural succession, conversion and changes in hydrology (prolonged saturation of soil) (USFWS 2006, p. 49).

The Black River Bottoms also provide habitat for the Blanding's turtle (Wisconsin - threatened) red-shouldered hawk (Wisconsin - threatened) (USFWS 2009a) and an number of other migratory birds. The biological resources in this area are discussed in more detail in Section 3.5.

The existing permit for the Q1 route has expired, and additional ROW, clearing of forested wetland, and a new permit would be required for this alternative.

The USFWS regulations for land use on refuges state: "No right-of-way will be approved unless it is determined by the Regional Director to be compatible."[86] "Compatible use" is defined as follows:

> …a proposed or existing wildlife-dependent recreational use or any other use of a national wildlife refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the national wildlife refuge.[87]

For a compatibility determination USFWS policy requires "written determination signed and dated by the refuge manager and Regional Chief signifying that a proposed or existing use of a national wildlife refuge is a compatible use or is not a compatible use. The Director makes this delegation through the Regional Director" (USFWS 2000).

While the Regional Director has not made a formal compatibility determination, the Upper Mississippi Refuge Manager stated in a letter that he has concluded that because the "placement of the 345-kV line at this location would lead to further habitat fragmentation and migratory bird impacts" and because "other practicable alternatives exist," the Refuge would recommend to the Regional Director that no expansion of the existing ROW through the Black River Bottoms portion of the Upper Mississippi Refuge be granted (USFWS 2010b).

[86] 50 CFR 29.21-1(a)
[87] 50 CFR 29.21

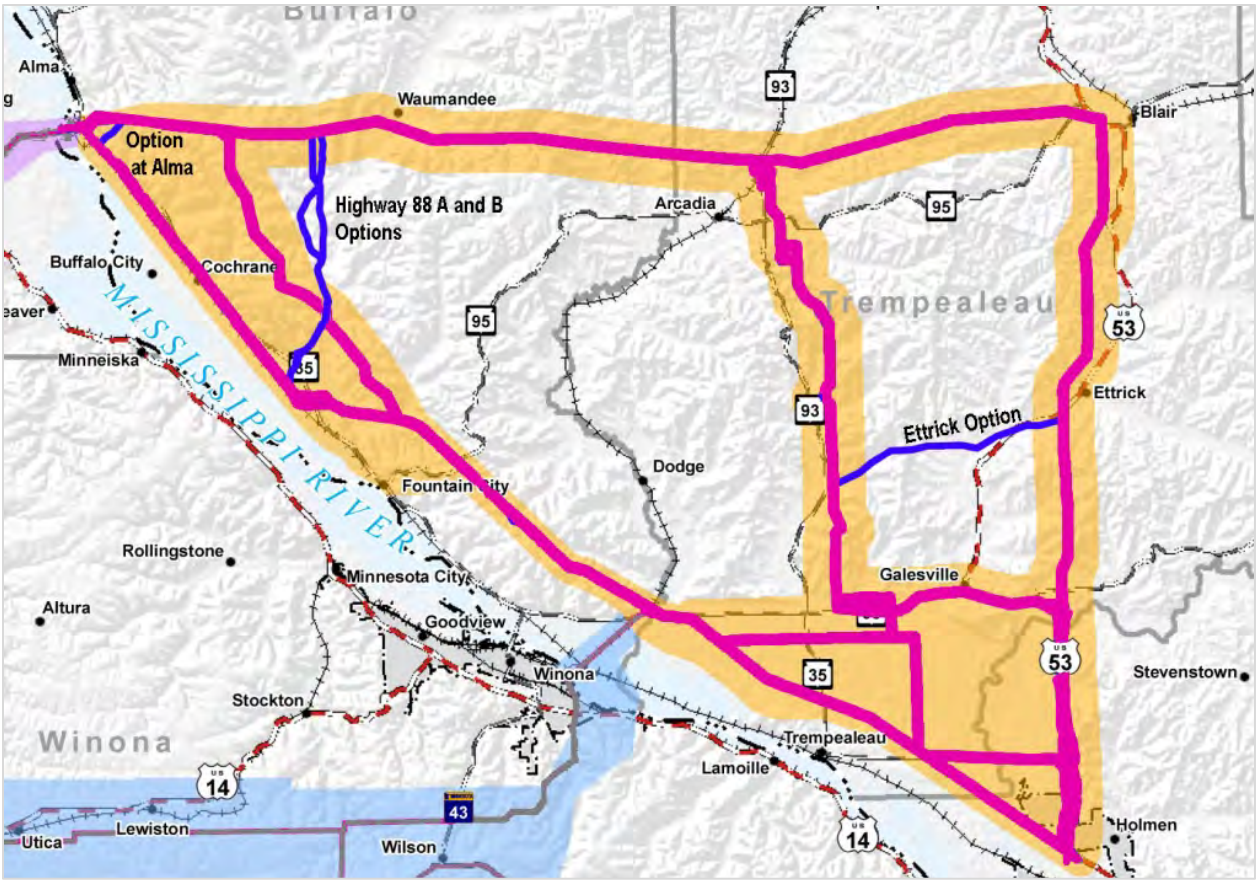

Figure 2-9: Additions to MCS Options in Final CPCN
Sources: Xcel et al. June 2011, Dairyland 2009a.

2.3.2.2 Route Alternatives Added During the CPCN Application Process

Figure 2-9 shows the routes that were added as part of the CPCN application process. These are addressed in the description of the Proposal, Section 2.4.3.5.

2.4 DESCRIPTION OF ALTERNATIVES

2.4.1 No Action

CEQ regulations require consideration of the no action alternative.[88] In this Draft EIS the action alternative evaluated in detail is construction of the Proposal. Therefore, under the no action alternative the Proposal would not be constructed. Dairyland's share is 11 percent, and although Dairyland has the option to find alternate financing, no other no-action scenarios are evaluated.

[88] 40 CFR 1502.14(d)

The no action alternative would result in no impacts to the physical environment at the Proposal area. The Proposal would not be constructed or operated, and therefore, there would be no effects on environmental resources such as air quality, geology and soils, groundwater, surface water, floodplains, farmland, etc.

However, because the Proposal would not be constructed in this scenario, the reliability of the transmission network would likely be negatively impacted. The no action alternative may result in brownouts, blackouts, and/or higher electricity rates for consumers. As discussed in Section 1.1.2.3, the efficiency of the transmission system within the Midwest ISO would also be impacted, resulting in energy losses.

2.4.2 Proposal

In this Draft EIS, the Proposal includes all alternatives evaluated in the DEIS and all alternatives included in the final (June 2011) CPCN Application. The discussion below includes a general description of the transmission lines, ROW acquisition, and construction that is applicable to all alternatives, followed by a description of each of the alternatives included in the Proposal.

2.4.2.1 Transmission Lines

A high-voltage transmission circuit consists of three phases, each at the end of a separate insulator string, all physically supported by structures (poles). Each phase consists of one or more electrical conductors, which are metal cables consisting of multiple strands of steel and aluminum wire wound together. Shield wires are strung above the conductors to prevent damage from lightning strikes. The shield wire can also include fiber optic cable, which provides a communication path between substations for transmission line protection equipment. Typical designs that would be used for most of the Proposal are summarized in Table 2-2

In addition to the structures described in the table, H-frame structures may be used in certain areas. H-frame structures consist of two poles connected with cross-braces and a beam that supports the conductors. These structures may be used where longer spans are desired, such as in environmentally sensitive areas, areas of difficult topography and elevation changes, or in the presence of poor soil conditions. The use of these structures typically minimizes the overall total number of structures required in

an area as well (e.g., minimizing the number of structures in a river's riparian zone); however, the ROW requirement is greater, approximately 180 feet. H-frames also allow all of the conductors to be strung in a single horizontal plane, therefore minimizing the vertical barrier that avian wildlife would cross. H-frame structures consist of two steel poles with cross bracing. Two-pole structures may also be required when the alignment turns at a 45- to 90-degree angle to reduce foundation size and aid constructability. The 345 kV transmission line will have a minimum ground clearance of 34 feet, while the 161 kV lines will be designed with a minimum 26-foot ground clearance.

Steel single-pole structures, also known as monopoles, require only one pole along the ROW, with a relatively narrow footprint compared to steel lattice or other types of structures. This reduces the impact on farming operations and other impacts compared to the two poles required for H-frames, or the wide bases of steel lattice structures. For the Proposal's 345 kV line, most structures would consist of single-pole, self-weathering steel, double-circuit capable structures. Self-weathering steel alloys were developed to eliminate the need for painting and are commonly used throughout the industry. The steel alloy develops a stable, rust-like appearance (dark reddish-brown color) when exposed to the weather for several years. The wetting and drying cycles cause rust to form a protective layer on its surface, preventing further rusting. This layer develops and regenerates continuously when subjected to the influence of the weather. In Minnesota, Proposal structures and substation locations would be designed to accommodate a future second 345 kV circuit on the 345 kV poles and at substation locations. Where the 345 kV line is not co-located with an existing lower voltage transmission line, only one circuit would be strung and the other side of the pole would be available for adding a second 345 kV circuit in the future, if and when conditions warrant. Where the new 345 kV line is co-located with existing facilities, the second position will be built to 345 kV specifications, but operated at the lower voltage.

Table 2-2: Typical Structure Design Summary

Line Type (Design Configuration)	Initial Configuration	Structure Type/Material	ROW Width (ft.)	Structure Height (ft.)	Structure Base Diameter (in.)		Foundation Diameter (ft.)	Span between Structures (ft.)
					Tangent structure	Angle structure		
345 kV/345 kV Double Circuit	345 kV circuit operational	Single-Pole Davit Arm / Steel	150	130-75	36-48	48-72	6-12	700-1,000
	345 kV circuit operational/161 kV circuit operational							
345 kV/345 kV Double-Circuit w/69 kV Underbuild	345 kV circuit and 69 kV underbuild circuit operational			135-185	40-52	48-84		500-1,000
161 kV Single Circuit	161 kV circuit operational		8	70-105	24-36	32-64	4-9	400-700

Source: Xcel et al. 2010 Table 3.1-1

Adding a second 345 kV circuit would require approval from the PUC (in Minnesota) and the PSC (in Wisconsin). In some locations, proposed triple-circuit structures would hold one 345 kV circuit, provide a location for a future 345 kV circuit, and carry an existing 69 kV circuit under the 345 kV transmission lines (a configuration known as "underbuilding"). Representative structures are shown in Figure 2-10 and Figure 2-11.

The foundations are proposed to be made of poured concrete and would typically be 6 to 12 feet in diameter. In sensitive environmental areas, an alternative design may be used to minimize impacts. For example, a lower-impact vibratory caisson may be used in wetland areas to limit ground disturbance. In areas of poor soil strength and for angle and dead-end structures, a rock-filled galvanized steel culvert or drilled pier concrete foundation may also be inserted for additional stability. Support cables (guying) may also be used for angle structures.

When the transmission line parallels existing infrastructure ROW (e.g., existing transmission lines, roads, railroads or other utilities), the new ROW required may be reduced. The Applicant's practice when paralleling existing ROW is typically to place the poles on adjacent private property, approximately 5 feet off the existing ROW. With this pole placement, the transmission line shares the existing infrastructure ROW, thereby reducing the size of the easement required from the private landowner(s). For example, if the required ROW is 150 feet, and the transmission pole is placed 5 feet off an existing road ROW, only an 80-foot ROW easement would be required from the landowner, while the additional 70 feet of required ROW would be shared with the existing road ROW. As discussed in Section 2.4.2.2, additional requirements would apply to US-52.

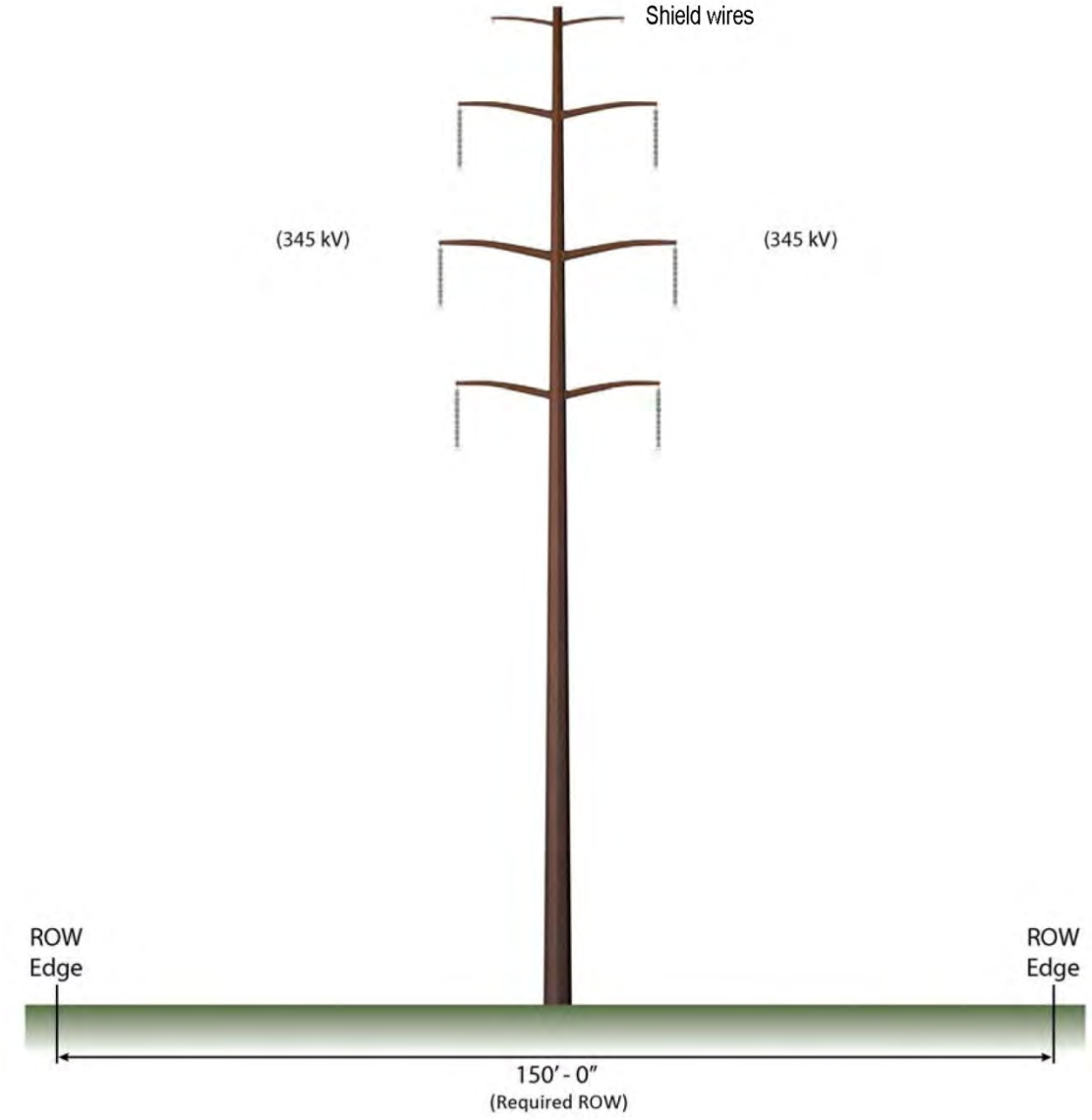

Figure 2-10: Typical Double-Circuit 345 kV Single-Pole Structure (Davit Arm)
Source: Xcel et al. 2010, Figure 3.1-3

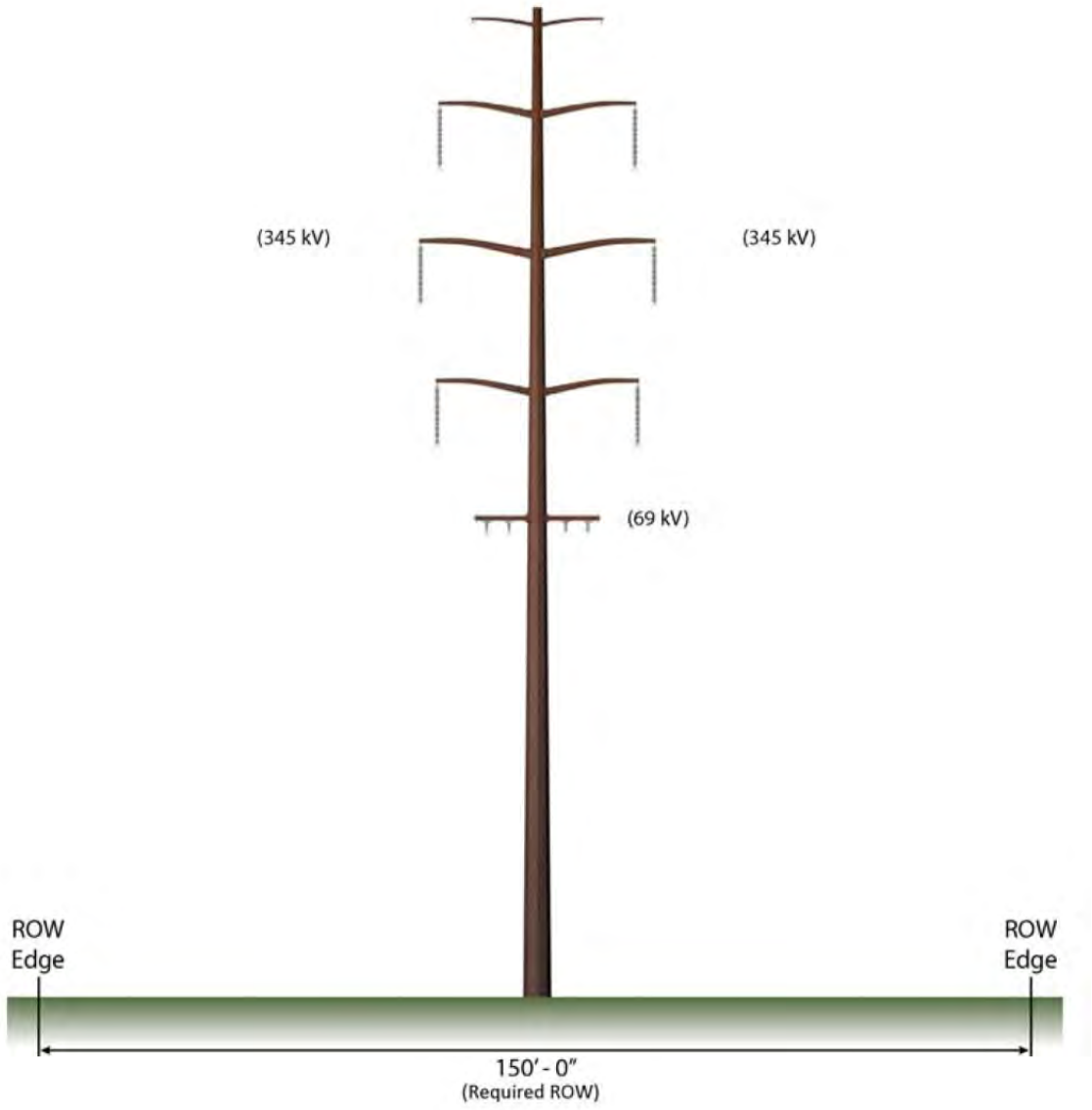

Figure 2-11: Typical Double-Circuit 345/345 kV Structure with 69 kV Underbuild
Source: Xcel et al. 2010, Figure 3.1-2.

The arms on the pole would be approximately 85 feet aboveground, depending on span length, and extend approximately 18 feet from the center of the pole. In each instance of ROW sharing, the Applicant would acquire the necessary approvals from the ROW owner (e.g., railroad company for railways), or the agency overseeing use of a particular ROW (e.g., MnDOT for state trunk highways, including U.S. highways and interstates).

Mississippi River Crossing

The Mississippi River presents unique challenges that will require the use of multiple-circuit specialty structures. A portion of this crossing is on Upper Mississippi River

National Wildlife Refuge lands managed by the USFWS. A Special Use Permit from USFWS will be required to cross the Refuge, and the Applicants (RPA and CPCN Application) will work closely with the USFWS to identify the most appropriate structure design.

An existing double-circuit transmission line crosses the Mississippi River and the Refuge at the Proposal's proposed crossing location. The existing line crosses approximately 0.5 mile of Refuge lands and includes two structures on Refuge property. The line is constructed on a 180-foot-wide permitted ROW. An area approximately 125 feet wide and 1,900 feet long is maintained cleared of trees. The two main river crossing structures are 180 feet tall.

Several possible designs for the proposed river crossing are described in detail in the MRP Application, Appendix E (Xcel et al. 2010) and in the CPCN Application (Xcel et al. 2011). The design options demonstrate compromises between structure height and easement width while maintaining only three structures on refuge lands.

- Option A: A design that stays within the existing 125-foot tree clearing results in main channel crossing structures of 275 feet in height. The Federal Aviation Administration (FAA) requires lighting of poles exceeding 200 feet above ground level, and may also require poles to be painted alternating red and white.
- Option B: The shortest possible pole design keeps the main channel crossing structures less than 200 feet. This avoids FAA lighting requirements and keeps all the conductors in one plane, but requires a 280-foot cleared ROW.
- Options C and D: A combination of options A and B keeps main channel crossing structures of less than 200 feet while using narrower structures elsewhere to minimize the need for additional ROW and tree clearing on Refuge lands.
- Option E: Requested in 2010 by USFWS. This design uses the full 180 foot permitted ROW on refuge property.

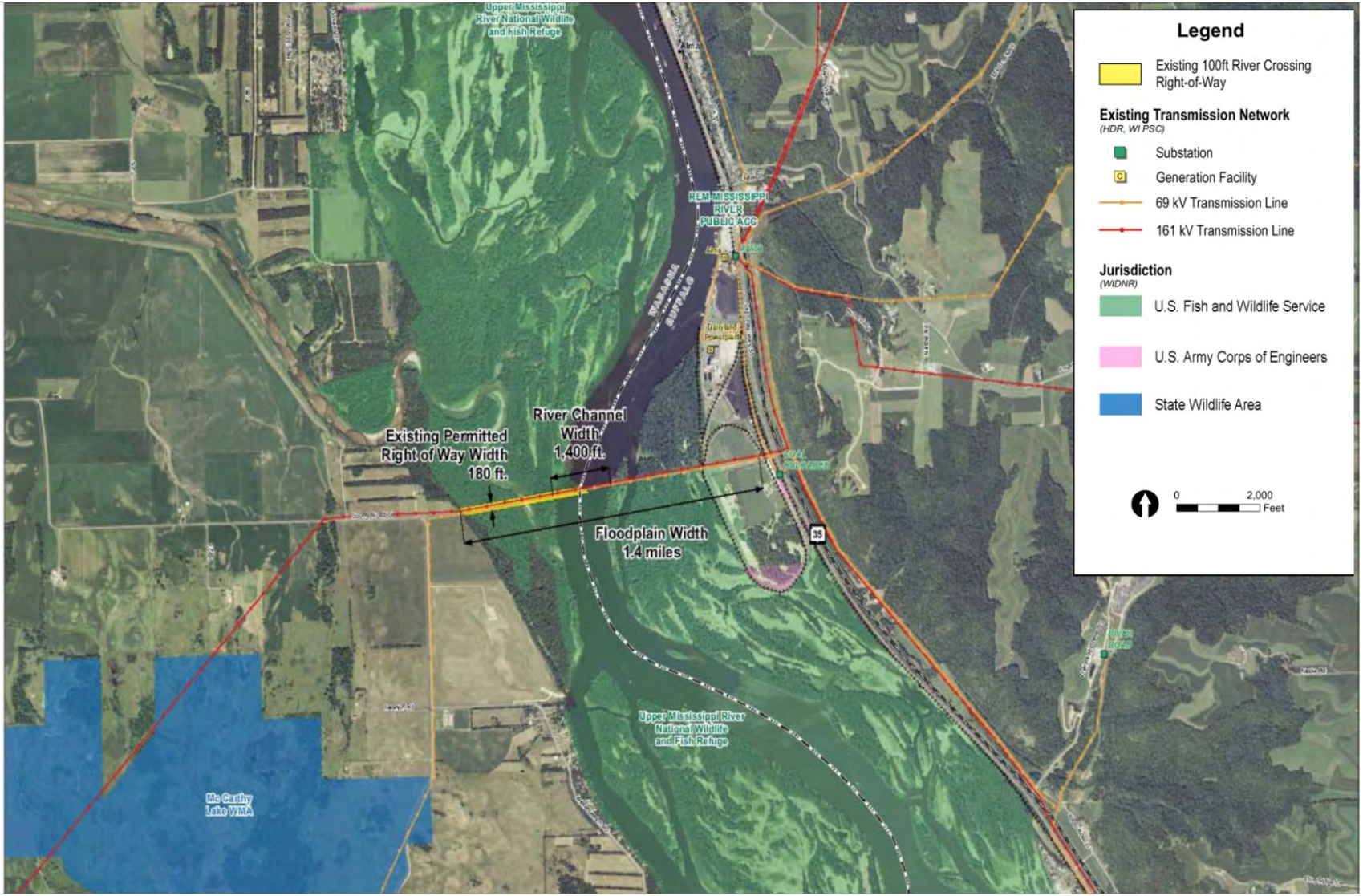

Figure 2-12: Mississippi River Crossing at Alma

Source: Xcel et al. 2010 Appendix E.

Table 2-3: Option C – Mississippi River Crossing

Structure	Height (ft.)	Width of ROW at Structure (ft.)	Location Comment
#1	105	125	Private property
#2	130	125	Wildlife refuge
#3	130	125	Wildlife refuge
#4	199	280	Wildlife refuge, river crossing structure
#5	199	280	Dairyland Power property, river crossing structure
#6	80	280	Dairyland Power property
#7	140	280	Dairyland Power property
#8	140	280	Dairyland Power property
#9	60	270	Private property

Source: Xcel et al. 2010 Appendix E.

The USFWS initially stated they preferred Option C, and is investigating whether the USACE and the Coast Guard would grant a waiver for a lower required clearance over the river. The Alma River Crossing is shown in Figure 2-12 and Option C is summarized in Table 2-3. Later the USFWS requested the Applicants prepare a fifth crossing design, Option E, a combination of components from the previous four designs. The CPCN Application includes drawings from Power Engineering with more detail for the river crossings (Xcel et al. 2011). These drawings are included as Appendix M.

Undergrounding. The MRP Application includes an engineering evaluation of underground construction of two 345 kV circuits at the Mississippi River crossing (Xcel et al. 2010 Appendix E). Underground construction requires a wide ROW, costs approximately $90 million to underground a 1.3-mile length, has environmental impacts of its own, and does not eliminate the existing overhead transmission line. The cost is approximately $70 million per mile for underground double circuit 345 kV compared to approximately $12 million per mile for an overhead triple circuit river crossing. The river crossing costs more per mile than conventional overhead construction because four conductors per phase are required, due to costs associated with constructing an underground duct bank including directional drilling under the river, the higher cost for

underground conductors and more difficult construction access The underground alternative would result in increasing the existing 100 feet of cleared ROW by an additional 235 feet, and the entire ROW would require vegetation control. RUS concurs with the MRP Applicants' conclusion that undergrounding is not feasible. More information regarding the underground assessment, including environmental impacts, is included the MRP application, Appendix E (Xcel et al. 2010).

2.4.2.2 ROW Acquisition

When a transmission line is placed across private land, a ROW agreement, typically an easement (not a fee title), is required. When a transmission line is placed entirely across private land, an easement for the entire 150-foot ROW (for 345 kV transmission lines) or 80-foot ROW (for 161 kV transmission lines) would need to be acquired from the landowner(s). The applicant has indicated a preference for locating poles as close to property division lines as reasonably possible to reduce the amount of ROW on a particular property.

When a transmission line parallels roads, railroads, or other transmission lines, a landowner may be able to have a narrower easement. When paralleling existing roadways, for example, the general practice is to place the poles on the adjacent private property, a few feet outside the existing road ROW. So, although the pole is still located on private property, the transmission line can share some of the public ROW, thereby reducing the size of the easement required from the private landowner. For example, if the normally required ROW width is 150 feet, and the pole is placed five feet off of an existing road ROW, the transmission line shares 70 feet of the roadway ROW and only an 80-foot easement is required from the landowner.

Sharing ROW with railroads requires contractual approval from the railroad company, while sharing ROW with a state or U.S. highway requires permit approval from the MnDOT or the WisDOT.

The MnDOT Utility Accommodation Policy (MnDOT 2005) and the WisDOT Utility Accommodation Policy (WisDOT 2011c) describe the policies and procedures governing use and sharing of state trunk highway ROWs by utilities. The policies were developed in accordance with the requirements of state and federal laws and

regulations.[89] They are designed to ensure that the placement of utilities does not interfere with the flow of traffic and the safe operation of vehicles.

MnDOT and WisDOT have a responsibility to preserve the public investment in the transportation system and to ensure that non-highway uses of the ROW do not interfere with the ability of the state to make long-term highway improvements, such as adding lanes, interchanges, or bridges; or to safely operate and maintain the existing system.

The requirements of each Utility Accommodation Policy vary based on whether the utility is crossing the highway or being installed parallel to it and on the type of highway. For controlled access highways or freeways in Minnesota, "the installation of new utility facilities shall not be allowed longitudinally within the ROW of any freeway, except in special cases under strictly controlled conditions" (MnDOT 2005). This means that the transmission structures–the poles and davit arms–must be completely outside of the freeway ROW. For this Project, this would mean placing a pole approximately 20 to 25 feet outside the ROW. This would be applicable for US Highway 52 (US-52). No freeways would be affected in Wisconsin. The WisDOT requires a permit for utility construction that affects a state or U.S. highway ROW.

2.4.2.3 Transmission Line Construction

Construction activities are summarized below in the general sequence of occurrence: acquiring ROW access, establishing staging and laydown areas, grading (where needed), pole installation, and conductor installation.

The precise timing of construction would take into account factors including permit conditions, system loading issues, and available workforce.

ROW Access. Typically, existing roads or trails that run parallel or perpendicular to the transmission line are used to access the actual transmission line ROW. Where use of private field roads or trails is necessary, permission from the property owner is obtained prior to access. In some cases, new access roads may have to be constructed when no current access is available or existing access is inadequate for the heavy equipment used in construction.

[89] 23 CFR 645 Subpart B

Establishing Staging and Laydown Areas. The materials are stored on-site at staging areas until they are needed for construction. Larger temporary lay down areas may also be needed in some areas depending on access, security, efficiency, and safety for warehousing supplies. Temporary laydown areas outside of the transmission line ROW would not be included in a route permit. Permission would be obtained from land owners through rental agreements.

Grading. Transmission line structures are generally installed at existing grades. However, along areas with more than 10 percent slope, working areas would have to be graded level or fill would be brought in to create working pads. If the landowner permits, it is preferred to leave the leveled areas and working pads remaining in place for future maintenance activities. Otherwise, the site is graded back to its original condition as much as possible and all imported fill is removed. The MnDOT has expressed concern that in areas with more than 10 percent slope, grading and working pads could impact DOT ROW in some areas and has requested further evaluation once specific pole locations are known.

Power Pole Installation. When sites are prepared for installation, the poles are generally moved from the staging areas and delivered to the staked location and placed within the ROW. Insulators and other hardware are attached while the pole is on the ground. The pole is then lifted, placed, and secured using a crane.

In nearly all cases, the poles would be installed using concrete foundations or direct embedment into the soil. Where single pole structures are under higher stress (medium angle, heavy angle or dead-end structures) drilled pier concrete foundations are required.

If concrete foundations are needed, holes 5 to 7 feet in diameter and up to 25 or more feet deep (depending on soil conditions) are drilled. After the concrete is set, the pole is bolted to it. No guy wires are required in this setup.

If the poles are directly embedded, holes approximately six feet in diameter are augured or excavated. The hole is partially filled with crushed rock, the pole is set on top of the rock base, and the hole is backfilled with crushed rock and/or soil. In poor soil

conditions, a galvanized steel culvert may be installed vertically with the structure set inside. No guy wires are required.

Conductor Installation. After pole placement, conductors are installed in stringing setup areas located approximately every two miles along a Project route, either within the ROW or on temporary construction easements. Brief access to each structure is needed to secure the conductor wire to the insulator hardware and the shield wire. Where the transmission line crosses streets, roads, highways, or other obstructions, temporary guard or clearance poles may be installed to protect conductors and to ensure safety during installation.

Helicopters may be used for foundation, conductor and structure installation in environmentally sensitive areas to reduce the time of construction and minimize ground disturbing impacts. Helicopters may also be used to install hardware and conductors in other areas. The CapX 2020 utilities have prepared a detailed description, with photographs, of the use of helicopters for conductor installation (CapX 2020 2011).

Implosive connectors may be used to join conductors and dead-end hardware rather than hydraulic splices. Implosive connectors use a specific controlled detonation to fuse the conductors and hardware together. The process creates noise equivalent to a clap of thunder or commercial fireworks, which lasts only an instant. The implosive process provides for a specific engineered connection, which improves the strength and quality of the connections that can be a potential failure point in the transmission system. In addition, it takes less time than installing hydraulically-compressed connectors and reduces the number of set up areas required on the ground. This further reduces ground-disturbing activities.

2.4.2.4 Substation Construction

The Proposal would require construction of two new substations, the North Rochester Substation in Minnesota and the Briggs Road Substation near La Crosse, Wisconsin. The Hampton Substation has been permitted separately in the Brookings to Hampton CapX 2020 project. The proposed Briggs Road Substation would be permitted in a separate proceeding before the PSCW.

North Rochester Substation

The North Rochester Substation would be located in the area between Zumbrota and Pine Island. The specific location of the new substation will be determined through the route permitting process; however, the proposed siting area lies within a portion of southern Goodhue County west of US-52, south of State MN-60 and north of 500th Street. Approximately 8 acres of fenced and graded land would be required for substation construction; however, the Proposal includes approximately 40 acres to provide adequate buffer and to allow for transmission lines to connect to the substation. Clearing and grading of the site would be required for the new North Rochester Substation, and it would include six 345 kV circuit breakers, a 345 kV/161 kV transformer, three 161 kV circuit breakers, a control house and associated line termination structures, switches, controls, and associated equipment.

Briggs Road Substation

The Briggs Road Substation, which would accommodate the selected route alternative within Wisconsin, would be located near the intersection of US-53 and Briggs Road near the Village of Holmen, WI. Two sites are being considered for this substation: the Briggs Road West Site and the Briggs Road East Site.

The Briggs Road West Site is located west of Briggs Road and south of US-53. The West Site is located near the Marshland and Tremval 161 kV lines, has good road and transmission route access, and is a relatively flat agricultural field that will keep grading costs reasonable. The site provides adequate flexibility for foreseeable future needs, including a potential 69 kV connection to the existing North La Crosse substation and will not adversely impact routing of the proposed American Transmission Company Badger-Coulee 345 kV line. Approximately 40 acres would be acquired to allow for the 10 acre fenced substation area, future substation expansion, area for routing transmission lines, and a buffer area to homes and future development. An active farming operation would be displaced.

The Briggs Road East Site is provided as an alternative and is located east of Briggs Road and south of US-53. The site also is located near the 161 kV lines, has good road and transmission route access, and can adequately facilitate future expansion.

However, the site is hilly and would require extensive grading. The site is also partially wooded and would require fairly substantial tree removal. An equestrian facility would need to be relocated.

Expansion of Existing Substations

The existing Northern Hills Substation would require an approximately 0.5-acre expansion of the graded and fenced area to accommodate the new 161 kV transmission line and related equipment. No additional property would be required to construct the expansion. Improvements would include an expansion of the existing graded area by approximately 30 feet and the addition of equipment for a 161 kV line, including one circuit breaker and associated switches and controls. Construction would include the switches, foundations, steel structures, and control panels.

Modifications to the Chester substation would consist of the addition of a 161 kV circuit breaker, switches, line termination and expanded box structure, electrical bus and associated equipment. The substation yard would be expanded by approximately one acre to accommodate the equipment.

2.4.2.5 Description of the Proposal

The MN EIS evaluates the Proposal as three segments (Figure 2-13). This Draft EIS follows the MN EIS convention, and adds the Wisconsin CPCN alternatives as a fourth segment. Naming conventions from the MN EIS and the CPCN Application are retained throughout. Consistent with the MN EIS, for the Minnesota routes, the route alternatives that the MRP Applicants identified as preferred and alternate are labeled with a two-character code where the first character designates the segment and the second character designates the route. For example, “1P” indicates the MRP Applicants’ preferred route in Segment 1 and “2A” indicates the Applicants’ alternate route in Segment 2. Routes identified in the Minnesota EIS scoping process are designated according to whether they represent an alternative to the Applicants’ preferred route (designated “P”) or alternate route (“A”); if the scoping route can be an alternative to both it is designated “B.” The scoping routes were then numbered in the order in which they were proposed during the MN EIS scoping (MDC 2011b).

The segments are described below. The turn-by-turn descriptions of the Minnesota routes from the MN EIS are included in Appendix D.

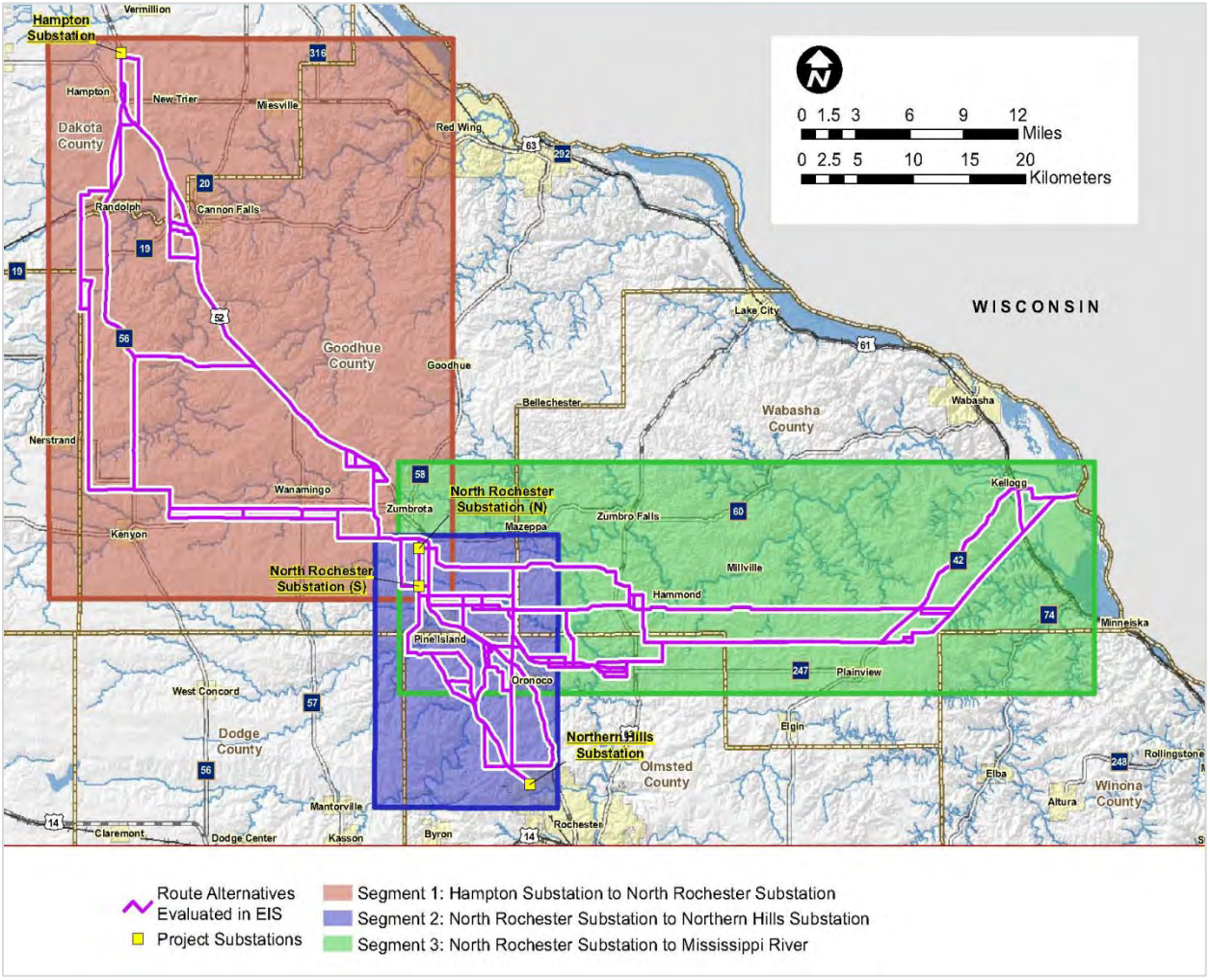

Figure 2-13: Minnesota Route Segments from MN EIS

Source: MDC 2011b, Map 8.0-01.

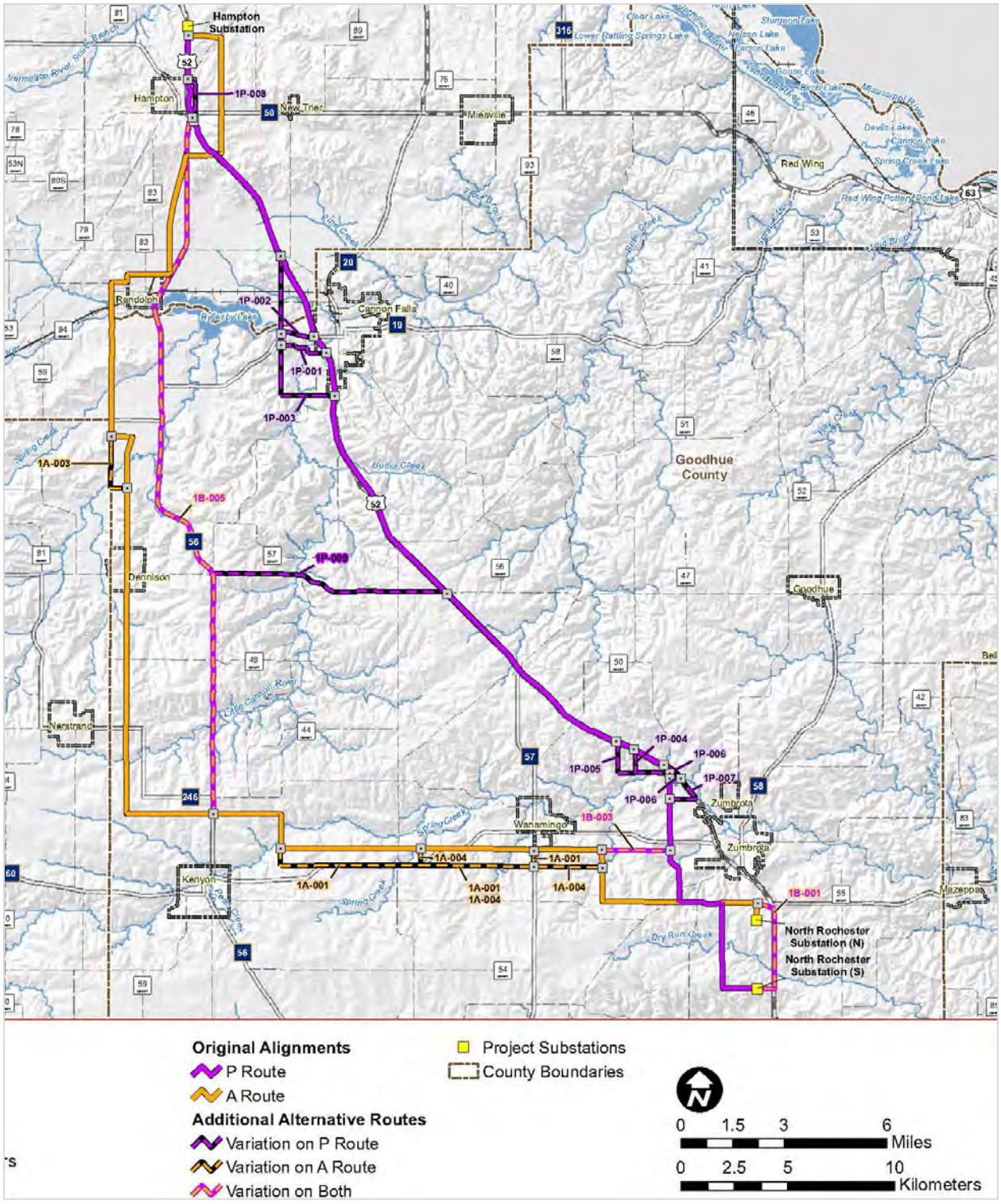

Figure 2-14: Segment 1 Overview from Minnesota DEIS

Source: MDC 2011b, Map 2.6-01.

Segment 1 – Hampton to North Rochester Substation 345 kV Line

Segment 1 is 36 to 49 miles long, depending on the route, and passes through Dakota and Goodhue Counties, MN. A total of 17 route alternatives are considered. Route 1P follows US-52 for most of its length from Hampton Station south, diverging at the south end to bypass the City of Zumbrota (Figure 2-14). It also follows a 69-kV transmission line for 16 miles, from just north of Cannon Falls to just south of Zumbrota.

The northern part of Segment 1 is in the Cannon River watershed and the southern part is in the Zumbro River watershed. All of the routes under consideration in Segment 1 cross the Cannon River near or west of Cannon Falls. Byllesby Lake, a reservoir on the Cannon River, lies west of Cannon Falls. Some of the route alternatives are east (downstream) of the reservoir and some are upstream. Communities near route alternatives are shown in Figure 2-14. Cannon Falls and Zumbrota, both located near US-52, are the largest communities.

Segment 2 – North Rochester Substation to Northern Hills 161 kV

This segment would be 15 to 18 miles long, depending on the route, and would pass through Goodhue and Olmsted Counties, MN (Figure 2-15).

A total of 16 route alternatives are considered for Segment 2. Route 2P follows mainly roadways in this segment. Route 2A follows a mix of transmission lines, county and township roads, and field lines, with some cross-country stretches. In addition to the P, A, and B routes, this segment includes C routes. C routes share a parallel alignment with a Segment 3 route alternative.

Alternatives in this area are in or near the cities of Pine Island and Oronoco. Most of the alternatives proposed during the MN DEIS scoping appear to be related to avoiding impacts on existing and/or future development in this area.

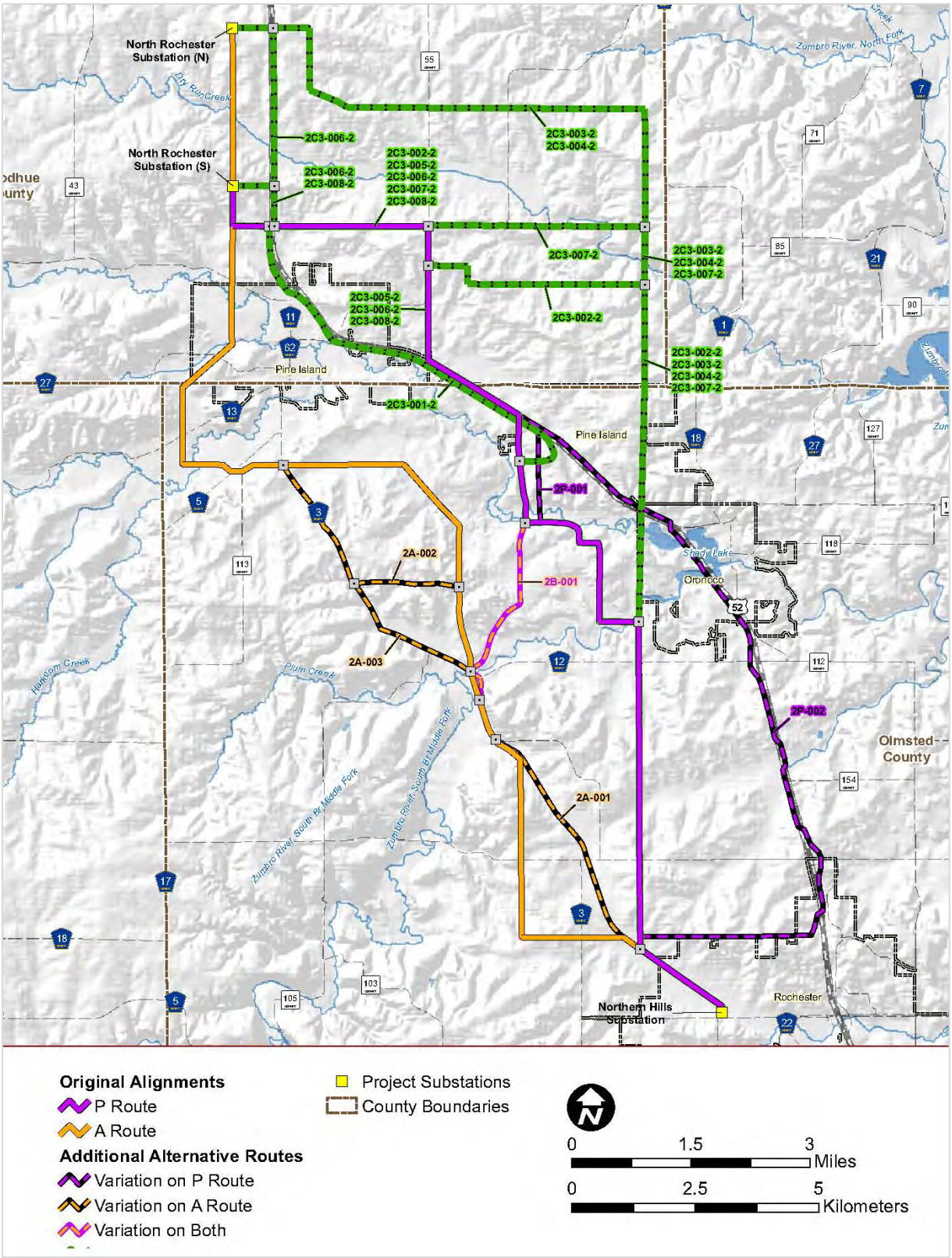

Figure 2-15: Segment 2 Overview from Minnesota DEIS

Source: MDC 2011b, Figure 2.6-02.

Segment 3 - North Rochester Substation to Mississippi River 345 kV

Segment 3 is 42 to 45 miles long, depending on the route, and passes through Goodhue, Olmsted and Wabasha Counties, MN (Figure 2-16). East of the Pine Island area, all alternatives cross the Zumbro River near a reservoir on the river called Zumbro Lake. Three alternative routes are evaluated at the Zumbro River crossing: one upstream (south) of the reservoir, one on the dam, and one downstream of the reservoir. All routes follow a combination of field lines, county and township roads and existing transmission lines. Short segments are cross-country. Routes 3P and 3A share a common existing transmission line alignment, the Dairyland Q3 line, for approximately the last 9 miles. This route traverses the blufflands west of the Mississippi River and several state and federal lands including the Snake Creek Management Area of the Richard J. Dorer Memorial Hardwood State Forest (subject to LWCF requirements as discussed in Section 3.6.1.3), McCarthy Lake Wildlife Management Area (WMA) (subject to Pittman-Robertson Act requirements, as discussed in Section 3.6.1.3), other portions of the Richard J. Dorer Memorial Hardwood State Forest (RJD State Forest), and the USFWS Upper Mississippi Wildlife and Fish Refuge. The Applicant has been conducting ongoing coordination with the MDNR regarding these issues. These resources are discussed in Section 3.6. At the Mississippi River, the existing Dairyland Q-3 line is collocated with the existing Alma-Harmony 69 kV transmission line.

A roughly parallel alternative route through this section, Route 3B-003, follows Minnesota Highway 42 (MN-42). A total of 31 route alternatives are considered for Segment 3.

North Rochester to Chester 161 kV line. The proposed North Rochester to Chester 161 kV line (Chester Line) is in Segment 3. This line would consist of two major sections: an east-west section, with the North Rochester Substation at the west end, which would be co-located with the 345 kV line; and a north-south segment that would extend south from the 345 kV line to the Chester Substation (Figure 2-16).

East-west section. To minimize the amount of ROW needed, the Applicant proposes to place the Chester Line on the same structures as the 345 kV Proposal for approximately 13 to 19 miles from the North Rochester Substation to east of the

Zumbro River. This approach takes advantage of the double-circuit capable design that the State of Minnesota required in the CON. Because the 161 kV circuit would be strung on the same poles as the 345 kV circuit, no additional right-of-way would be required. This double-circuit would be built as a 345kV/345kV double-circuit, but would be energized as a 345 kV/161 kV double-circuit (Northern States Power Company 2011). The east-west portion of the Chester Line is proposed to be co-located on the 345 kV transmission line from the North Rochester Substation to a point southwest of Hammond, Minnesota that is dependent on the 345 kV Route selected. Depending on the 345 kV route selected, the east-west portion of the Chester line would end at one of three locations, referred to as "tap" points. These tap locations are identified Tap 1, Tap 2 and Tap 3 on Figure 2-16. Tap 1 would be the end point for Route 3A and associated sub-routes, Tap 2 would be the endpoint if the Route 3A crossover (connecting the east part of Route 3A with the west part of Route 3P) was used, and Tap 3 would be the endpoint for Route 3P and associated sub-routes.

North-south section.

Tap 1 scenario:

- From Tap 1, the Chester 161 kV line would continue 3.2 miles south and east as 161 single-circuit to 125th Street NE. From there the Chester Line would continue approximately 0.5 miles east along 125th Street NE as a double-circuit with the Peoples Cooperative 69 kV line.
- The Chester Line would then turn south and continue along 50th Avenue NE as a 161 single-circuit line for approximately 5 miles to 75th Street NE.
- From 75th Street NE for approximately 6.5 miles south to the Chester Substation, the Chester Line would be double-circuited with the Peoples Cooperative 69 kV line.

Tap 2 scenario:

- From Tap 2, the Chester Line would continue 0.5 miles south from as 161 single – circuit to 125th Street NE. From there the Chester Line would be identical to that described under Tap 1 scenario.

Tap 3 scenario:

From Tap 3, the Chester Line would continue approximately 0.5 miles east along 125th Street NE as a double-circuit with the Peoples Cooperative 69 kV line. From there the Chester Line would be identical to that described under the Tap 1 scenario.

Segment 4 – Wisconsin Alternatives

Detailed descriptions of the Wisconsin (Segment 4) alternatives are included in Appendix F.

The Wisconsin route alternatives extend from Alma at the Mississippi River to the Briggs Road Substation near the Village of Holmen (Figure 2-5). Segment 4 would be approximately 40 to 55 miles long, depending on the route, and would include parts of Buffalo, Trempealeau and La Crosse Counties, WI.

The primary existing transmission corridor between Alma and La Crosse is the Dairyland 161 kV Q1 transmission line (Q1) corridor, which was identified as a potential route corridor early in the route development process. The northern 8 miles of this corridor is near WI-35, which in this area is designated as the Great River Road, an area along which the WisDOT holds scenic easements. The WDNR, WisDOT and USFWS have concerns with the Q1 Route, including aesthetic and environmental impacts along the GRR/WI-35 and the feasibility of permitting the route across federal (USFWS Refuge) lands and wetland areas in the Black River Bottoms. As discussed in Section 2.1.2.3, the Q1 Galesville Route was developed to avoid potential impacts at the state wildlife areas at the Black River.

In addition to the Bluff Route and the Blair Route, which were eliminated from detailed evaluation as discussed in Section 2.3.1.2, the Arcadia Route was developed as an alternative to the Q1 Route. The Arcadia Route is a combination of existing Dairyland 161 kV transmission corridor, existing Dairyland 69 kV corridor, existing Xcel Energy 161 kV corridor and roadways.

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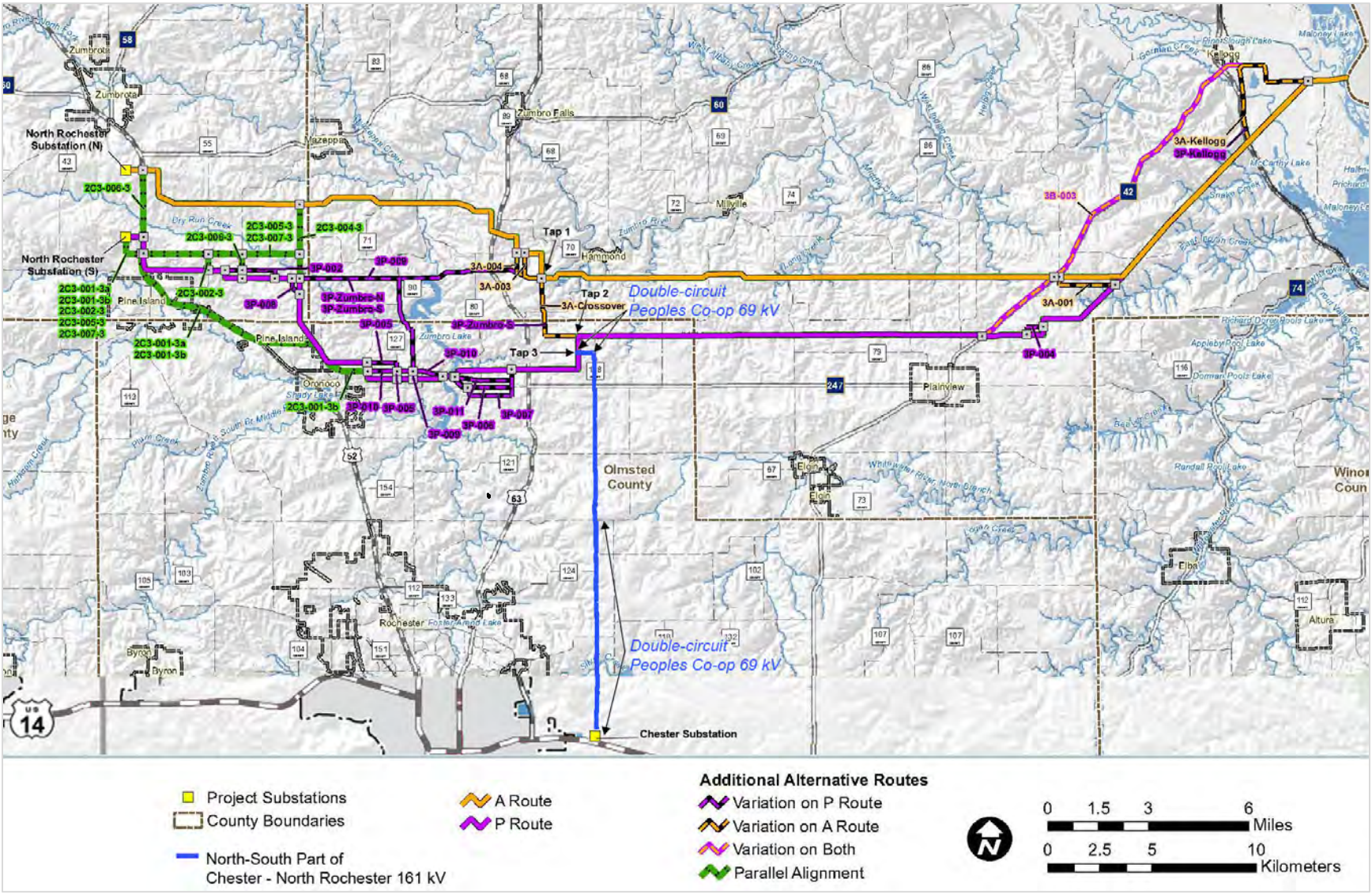

Figure 2-16: Segment 3 Overview from Minnesota EIS with North Rochester – Chester 161 kV Added

Source: MDC 2011b Figure 2.6-03 with North Rochester-Chester 161 kV information added from Northern States Power Company 2011.

The Arcadia-Alma Option is a 1.3-mile segment alternative near the Mississippi River and offers an alternative connection from the river crossing to the Arcadia Route that avoids a residential development at the top of the bluff. It follows a short part of the existing 161 kV corridor then diverts up the bluff through a forested area, some agricultural land and a rural residential development, then connects with the existing 161 kV corridor and the Arcadia Route.

Two additional route options were proposed by the WDNR and WisDOT to address potential impacts to the GRR/WI-35. The WI-88 Connector follows Wisconsin Highway 88 (WI-88) and was suggested by WisDOT as a 15-mile alternative to the northernmost 10 miles of the original Q1 Route. It would connect the Arcadia Route to the Q1 Route and would avoid the northernmost part of the Q1 Route, where it follows the Great River Road/WI-35. The Arcadia-Ettrick Route was suggested by the WDNR as a potential substitute for a portion of the Q1-Highway 35 Route. It relies on an 8-mile connector segment following a 69 kV line between the Arcadia Route and the Blair Route.[90] Using this connector segment yields a route that is approximately 55 miles long.

2.5 COMPARISON OF ALTERNATIVES

2.5.1 Minnesota Segments

Routes 1P and 1A are compared by resource area in Table 2-4. Tabulated information on routes identified in the MN DEIS scoping process is included in Appendix R. Table R-1 lists the routes identified in the MN DEIS scoping process, and, where information is available, notes the reason for including the route. It also includes other routes that were included in the MRP application. Tables R-2, R-3, and R-4 compare the scoping routes and the other routes included in the MRP application with Routes 1P and 1A for selected attributes: proximity to residences, length of route, and length of route on an existing transmission line ROW or following a roadway ROW. In Tables R-2 through R-4 these attributes are compared for each scoping route (or other MRP application route) and for the section of Route 1P or 1A that would be replaced by each scoping route. More comparative analysis of the scoping routes and Routes 1P and 1A is provided by segment below.

[90] Part of what was originally called the Blair Route is now part of the Arcadia-Ettrick Route, since the remainder of the Blair Route was eliminated from consideration.

The Arcadia-Alma Option is a 1.3-mile segment alternative near the Mississippi River and offers an alternative connection from the river crossing to the Arcadia Route that avoids a residential development at the top of the bluff. It follows a short part of the existing 161 kV corridor then diverts up the bluff through a forested area, some agricultural land and a rural residential development, then connects with the existing 161 kV corridor and the Arcadia Route.

Two additional route options were proposed by the WDNR and WisDOT to address potential impacts to the GRR/WI-35. The WI-88 Connector follows Wisconsin Highway 88 (WI-88) and was suggested by WisDOT as a 15-mile alternative to the northernmost 10 miles of the original Q1 Route. It would connect the Arcadia Route to the Q1 Route and would avoid the northernmost part of the Q1 Route, where it follows the Great River Road/WI-35. The Arcadia-Ettrick Route was suggested by the WDNR as a potential substitute for a portion of the Q1-Highway 35 Route. It relies on an 8-mile connector segment following a 69 kV line between the Arcadia Route and the Blair Route.[90] Using this connector segment yields a route that is approximately 55 miles long.

2.5 COMPARISON OF ALTERNATIVES

2.5.1 Minnesota Segments

Routes 1P and 1A are compared by resource area in Table 2-4. Tabulated information on routes identified in the MN DEIS scoping process is included in Appendix R. Table R-1 lists the routes identified in the MN DEIS scoping process, and, where information is available, notes the reason for including the route. It also includes other routes that were included in the MRP application. Tables R-2, R-3, and R-4 compare the scoping routes and the other routes included in the MRP application with Routes 1P and 1A for selected attributes: proximity to residences, length of route, and length of route on an existing transmission line ROW or following a roadway ROW. In Tables R-2 through R-4 these attributes are compared for each scoping route (or other MRP application route) and for the section of Route 1P or 1A that would be replaced by each scoping route. More comparative analysis of the scoping routes and Routes 1P and 1A is provided by segment below.

[90] Part of what was originally called the Blair Route is now part of the Arcadia-Ettrick Route, since the remainder of the Blair Route was eliminated from consideration.

2.5.1.1 Segment 1 - Hampton to North Rochester Substation 345 kV Line

Comparison of Routes 1P and 1A

At 49 miles in length compared with Route 1P's 36 miles, Route 1A is 36 percent longer than Route 1P. Minnesota's two major criteria are siting on an existing transmission line or roadway. Eighty-two percent of the Route 1P follows a transmission line or roadway, compared to 8 percent for Route 1A. In addition, the roadway that Route 1P follows is a major highway, US-52, and Route 1P also follows 16 miles of 69-kV transmission line along US 52. Route 1A has 44 miles that do not follow a transmission line or road, which is 8 miles more than the total length of Route 1P. Route 1A is estimated to cost 15 percent more than Route 1P.

Route 1A appears to parallel the western end of Lake Byllesby Regional Park; it's not clear from available mapping if direct impacts would be completely avoided (Dakota County Parks 2005 p. 6.23).

There are a number of sites designated by MDNR as biodiversity sites of medium, high or outstanding significance and/or Natural Heritage Sites (NHS) within or near the Route 1A 1,000-foot route width. Most of these are associated with stream crossings or areas of remnant prairie. These are discussed in detail in Section 3.5.2.1

Route 1A has an estimated 4.7 acres of forested wetland that would be converted to emergent wetlands, and Route 1P has none. Neither Route 1P nor 1A would have other permanent wetland impacts. Route 1P would require 223 acres of forest removed, while Route 1A requires 74.

Potential impacts to natural communities along Route 1P are discussed in detail in Section 3.5.2.1. The most notable impact is south of Butler Creek where Route 1P crosses approximately 3,000 feet of a BSHS maple-basswood forest (Dunevitz and Epp 1995; MDNR database; MDC 2011c, Appendix A, Sheet NR12).

As an option to avoid the developed area at the US 52/MN 19 interchange on Route 1P, on behalf of the MRP Applicants, Xcel filed an alternative route segment with analysis of impacts with the PUC. This filing was entered into the PUC Docket 09-1448 on August 2, 2011, and is included in Appendix J. [It was included as Appendix L of the MN FEIS (MDC 2011c)].

MN DEIS Scoping Alternatives to Route 1P

Routes 1P-001, -002 and -003 are all western bypasses of the Cannon Falls area and all are longer than part of Route 1P they replace (Table R-2). They all avoid impact to the Cannon Falls Country Club.

All of these routes cross the Cannon River at the same location, just downstream of the Lake Byllesby dam, where an existing substation is located. The Cannon River floodplain crossing is approximately 1,200 feet wide, has an existing transmission line, and no noted biological features (although there do appear to be some trees in the floodplain) (MDC 2011c, Appendix A, Sheet NR8). Based on the Lake Byllesby Regional Park boundaries as shown in the master plan for the park, these alternatives appear to cross the park boundary near the dam (Dakota County Parks 2005 pp. 6.3 and 7.7). Lake Byllesby is subject to the requirements of the Land and Water Conservation Fund, as discussed in Section 3.6.1.3. These route alternatives also parallel a planned Lake Byllesby Regional Park recreational trail and a bridge crossing at the Cannon River (Dakota County Parks 2005 pp. 6.2 and 6.3) that are planned for construction in 2013 (MDC 2011c, p. 106).

Compared to the section of Route 1P they replace, Route 1P-003 has fewer residences within 150 feet of the ROW, Route 1P-002 has more than twice as many, and Route 1P-002 is about the same. While all three alternatives follow a county or township road and field lines for part of the length, Route 1P follows US-52 for its entire comparison length. All three scoping routes are adjacent to a Grassland Bird Conservation Area (GBCA); however, post-construction impacts to these areas are not expected.

Route 1P-001 follows existing transmission lines or roadways for 60 percent of its length, compared to 100 percent for the corresponding section of Route 1P.

Route 1P-002 follows either transmission lines, roadways or both for nearly its full length. It rejoins Route 1P at the US-52/MN-19 interchange just north of the Little Cannon River. While Route 1P-002 complies well with the Minnesota criterion for paralleling existing roadways and utility lines, it is 18 percent longer than the corresponding section of Route 1P (which follows US-52 for its entire length; i.e., it complies equally well with the criterion). Route 1P-002 also has more than twice as

many residences within 150 feet of the estimated alignment centerline (14 compared with 6 for Route 1P).

Route 1P-003 impacts two forest sites, as discussed in detail in Section 3.5.2.1.

The rationales for **Routes 1P-004 and 1P-005**, short options located north of Zumbrota, were not found in the public record. Both routes are a little longer than the comparable section of Route 1P and both have less routing on existing roadways or transmission lines. These routes have a joint 2,500 foot long floodplain crossing of the North Fork of the Zumbro River, at a curve in the river. The joint routes cross the river twice at this curve, and end up on the same side of the river that they started from. Native community impacts are discussed in detail in Section 3.5.2.1.

Routes 1P-006 and -007 are located between Routes 1P-004 and -005 and Zumbrota. Route 1P-007 was proposed to avoid potential impacts to a quarry, and Route 1P-006 is a variation on Route 1P-007. Based on aerial photography, there are active parts of quarries both east and west of Route 1P, but not within the 1P ROW; the road to the western quarry passes beneath the ROW. Routes 1P-006 and -007 are located at the point just north of Zumbrota where Route 1P-001 diverges from US-52 and heads south to the North Rochester Substation. Both allow for more length on US-52 compared to the Route 1P section they replace; however, both are substantially longer, especially Route 1P-007, which is more than twice the length of the comparable Route 1P section. There are also three residences within the 1P-007 ROW, including one within 75 feet, while there are no residences within 300 feet of the ROW of the comparison segment of Route 1P.

Both routes impact the floodplain of the North Fork of the Zumbro River. The Route 1P-007 crossing is 2,300 feet long and Route 1P-006 is located entirely in floodplain for its 1,800-foot length. In addition, Route 1P-006 diverts from Route 1P at right angles (where a post would need to be located, with guy wires or a deep foundation), at a location that appears to be in the river itself, or at least very close (MDC 2011c, Appendix A, Sheet NR18).

Route 1P-008 is a short section at Hampton that goes just outside the city limits to the east. It was proposed by the Hampton to Northern Hills Advisory Task Force (HNH-

ATF) (MDC 2010b). It has fewer residences near the ROW, however, it is all cross-country (i.e., it does not parallel any existing features).

Route 1P-009 is a far western bypass of Cannon Falls that follows MN-56 from a point just south of Hampton, and then follows County Highway 9 back to Route 1P. It was proposed by the HNH-ATF. According to the HNH-ATF report, this route avoids "the top four impacts and issues identified by the ATF for Cannon Falls." These are: future development – land use, health and happiness, environment, and future development – economic (MDC 2010b pp. 2 and 5).

However, it's not clear why this alternative was included in the HNH-ATF report (or in the MN EIS), because the HNH-ATF report notes that the alternative needs to be moved approximately one mile to avoid conflicts with east-west runway at the Stanton Airport (MDC 2010b). Even if that issue is addressed, Route 1P-009 has some serious drawbacks. It is 32 percent longer than the section of Route 1P it replaces. It has 6 residences within 75 feet of the estimated alignment centerline (compared to 1 for the comparable section of Route 1P) and 24 residences between 76 and 300 feet of the estimated alignment centerline (compared to 14 for the comparable section of Route 1P). It also has many potential impacts to biological resources, as discussed in Section 3.5.2.1. Route 1P-009 coincides with Route 1B-005 for the MN-56 portion.

Route 1P-009 crosses Lake Byllesby Regional Park at US 56 (Dakota County Parks 2005 p. 6.4).

One advantage of Route 1P-009 is that is avoids the BSHS forest south of Butler Creek on Route 1P.

MN DEIS Scoping Alternatives to Route 1A

Route 1A primarily follows field lines or goes cross-country, compared to Route 1P, which is almost follows existing transmission lines and/or roads.

Route 1A-001 parallels Route 1A in the area south and west of Wanamingo. The alternative was proposed to reduce impacts on residences and future residential construction. Route 1A-001 does follow transmission lines and roadways along more of its length than Route 1A; however, there are actually more residences near the

proposed ROW with Route 1A-001 than with the section of Route 1A it replaces. There is a zoological NHS on Spring Creek within the 1,000-foot route width, with an area of influence that overlaps most of the route width. Route 1A-001 also crosses 300 feet of a BSOS willow swamp, south of Spring Creek (Dunevitz and Epp 1995; MDNR database; MDC 2011c, Appendix A, Sheet NR41).

Route 1A-002 was not retained in the MN EIS, and is not included here.

Route 1A-003 was proposed to avoid air space conflicts with the Stanton Airport. It has more residences within the ROW than the section of Route 1A it replaces. However, it follows roadways along significantly more of its length. It has four zoological NHSs within the estimated ROW, plus one in the 1,000-foot route width with an area of influence that overlaps the estimated alignment, and another just outside the 1,000-foot route width with an area of influence that overlaps the estimated alignment. One of these NHSs occurs within a BSMS. The route crosses 1,200 feet of this BSMS (MDC 2011c, Appendix A, Sheets NR29 and 30).

Route 1A-004 is located south of Wanamingo. It was proposed to avoid residences and future residential construction. Compared with the section of Route 1A it replaces, it shares more of its ROW with roadways, but has more residences near the alignment. The two segments being compared are the same length. Route 1A-004 is a joint route with 1A-001 for a portion of its length. The short north-south section of Route 1A-004 that forms a connection between Route 1A to the north and the longer east-west portion of Route 1A-004 is 2,500 feet long and passes through a BSOS willow swamp (wetland) along Spring Creek for 1,700 feet of that length (Dunevitz and Epp 1995; MDNR database; MDC 2011c, Appendix A, Sheet NR41).

Scoping Alternatives to Both Routes 1P and 1A

These are alternatives replace either Route 1P or Route 1A.

Route 1B-001 is located south of Zumbrota. The rationale for its inclusion in the MN DEIS was not found in the public record. Compared with the section of Route 1P it replaces, it's longer and has 5 residences within 150 of the alignment centerline, as opposed to one. It follows an existing roadway for the majority of its route, while the comparable section of Route 1P follows an existing transmission line.

Route 1B-002 was not included in the MN EIS and is not included in this Draft EIS.

Route 1B-003 is between Wanamingo and Zumbrota and south of them both. It was proposed to reduce the number of buildings impacted. Compared with Route 1A, it has one more residence within 300 feet of the proposed alignment centerline, and neither have any residences within 150 feet. It is shorter than the comparable section of Route 1A, and neither parallel existing features.

Route 1B-004 was not included in the MN DEIS and is not included in this Draft EIS.

Route 1B-005 is similar to Route 1P-009, except that it continues south past County Highway 9 and joins Route 1A north of Kenyon. It was proposed by the HNH-ATF for the same reasons as Route 1P-009, and has the same concerns regarding the Stanton Airport as Route 1P-009 (MDC 2010b), plus other issues associated with Route 1P-009 north of County Highway 9. For a description of Route 1B-005 north of County Highway 9, see the Route 1P-009 description above. Route 1B-005 is shorter and follows more existing roadway than the comparable section of Route 1B; however, it has many more residences near the ROW.

Like Route 1P-009, Route 1B-005 avoids the BSHS forest south of Butler Creek on Route 1P.

2.5.1.2 Segment 2 – North Rochester Substation to Northern Hills 161 kV

Route 2P has a 1,000-foot floodplain crossing of the Middle Fork of the Zumbro River, along an existing roadway. Five hundred feet of the floodplain crossing is forested, and the area of influence of a zoological NHS in the 1,000-foot route width overlaps the entire route width (MDC 2011c, Appendix A, Sheet NH15). Route 2P crosses 1,000 feet of the floodplain of the South Branch of the Middle Fork of the Zumbro River. No biological resources were noted associated with this crossing. There is no existing route at the crossing. To the east of the crossing, Route 2P intersects a portion of the same floodplain without crossing the river. The intersection covers a distance of 600 feet and occurs at a right angle turn (MDC 2011c, Appendix A, Sheet NH16). Thus, a deep foundation or guy wires would be needed.

Route 2A parallels the Douglas Trail and crosses multiple forested floodplains. The Douglas Trail has received grants through the Land and Water Conservation Fund (LWCF) (see discussion in Section 3.6.1.3).

MN DEIS Scoping Alternatives to Route 2P

Route 2P-001, near Pine Island, was proposed to reduce the number of residences impacted. The comparable section of Route 2P has 1, 0 and 8 residences within 75, 76-150 and 151-300 feet of the alignment centerline, respectively, while Route 2P-001 has one residence within 300 feet of the alignment centerline, and it is in the 151-300 foot interval. However, while the comparable section of Route 2P follows a roadway, most of Route 2P-001 does not parallel existing features (MDC 2011c, Appendix A, Sheets NH14 and NH15).

Route 2P-002 is south and west of Pine Island and Oronoco, just north of the Northern Hills Substation. Route 2P-002 continues along US-52 at a point where Route 2P moves away and heads south. Compared with the section of 2P that it replaces, it is longer and has more residencies near the ROW; however, the entirety of its comparison length follows existing roadway, while Route 2P requires new ROW. Route 2P-002 crosses the Middle Fork of the Zumbro River at the location of the former Shady Lake (also called Lake Shady), with a 1,200-foot floodplain crossing, along US-52. Shady Lake no longer exists: the Olmsted County Board voted to remove the dam that formed the lake it after it was heavily damaged in a flood in September 2010 (Bonestroo 2011a, KTTC 2010). The crossing includes 200 feet of wetland. A botanical NHS with a very large area of influence lies on the ROW in this section, along existing US-52 (MDC 2011c, Appendix A, Sheet NH15). The 2P-002 route continues south along US-52, with a 1,200-foot crossing of the floodplain of the South Branch of the Middle Fork of the Zumbro River, also formerly part of Shady Lake (MDC 2011c, Appendix A, Sheet NH16). The Shady Lake Dam, no longer in use, is just downstream of the confluence of the Middle and South Forks of the Zumbro River. Olmsted County is evaluating options for use of the former lakebed site and has developed conceptual plans for restoring the former lakebed to a park (Bonestroo 2011b, 2011c; Olmsted County 2011a, 2011b).

MN DEIS Scoping Alternatives to Route 2A

Route 2A-001 is just north of the Northern Hills Substation. It was proposed to reduce impacts on residences and future development. Compared with the section of Route 2A it would replace, it has the same number of residences within 150 feet of the centerline of the alignment and two less within 151 to 300 feet of the centerline. It follows the Douglas Trail for most of its length while the comparable section of Route 2A follows a roadway. (A trail meets the Minnesota siting criteria for an underground transmission line, but not an overhead line.) Along the route it shares with the Douglas Trail, Route 2A-001 crosses two areas of forested wetland: one 2,200 feet long and one 1,400 feet long (MDC 2011c, Appendix A, Sheets NH9 and 10).

Route 2A-002 is south of Pine Island. The rationale for its inclusion was not found in the public record. While it is slightly longer than the comparable section of Route 2A and shares slightly more ROW with roadway, the differences in these categories are too small to make much of a difference. However, it does have more residences within 300 feet of the centerline of the alignment than does the comparable section of Route 2A. The east-west section of Route 2A-002 is in an area of an oak forest, part of which is designated as a BSHS and part a BSMS. Route 2A-002 bisects 800 feet of the BSMS forest, then follows the edge of it for another 2,300 feet, then it follows along the edge of the BSHS site for 600 feet. The region of influence for a botanical NHS located within the BSHS oak forest overlaps the alignment centerline of Route 2A-002 (Dunevitz and Epp 1995; MDC 2011c, Appendix A, Sheet NH7).

Route 2A-003 is in the same area as Route 2A-002. It has a constraint at the same BSMS oak forest that is within the Route 2A-002 alignment. The BSMS forest is adjacent to the roadway Route 2A-003 follows, and there are two residences along the road on the opposite side of the oak forest (MDC 2011b,[91] Appendix A, Sheet NH7). The rationale for its inclusion was not found in the public record. It has more residences within 300 feet of the centerline of the alignment than does the comparable section of Route 2A. It is shorter than the comparable section of Route 2A and follows a county highway for its entire length; however, it has more residences within 300 feet of the

[91] These appear to be residences and are shown as such in MDC 2011b; however, they are not shown in MDC 2011c.

centerline of the alignment than both the comparable section of Route 2A and Route 2A-002.

MN DEIS Scoping Alternatives to Both Routes 2P and 2A

Route 2B-001 provides a connection between Routes 2P and 2A in the area between the North and South Forks of the Middle Branch of the Zumbro River. It is in the same general area as Routes 2A-002 and-003. The rationale for its inclusion was not found in the public record. Compared with the section of Route 2P it replaces, it has fewer residences near the ROW, but is both longer and follows less existing roadway. It has a 3,600-foot floodplain crossing at the South Branch of the Middle Fork of the Zumbro River. Two zoological NHS sites near the river crossing have areas of influence that overlap the entire 1,000-foot route width (MDC 2011c, Appendix A, Sheet NH8).

MN DEIS Scoping Alternative Parallel Routes in Segment 2

These routes apply to both Segments 2 and 3 ("2C3"). The digit at the end (-2 or -3) indicates whether it is counted in Segment 2 or Segment 3 in the MN EIS. This distinction is useful in the MN EIS because the major segments (1, 2, and 3) are evaluated in their entirety. In this Draft EIS, each of these scoping routes is individually compared to the section of the "P" or "A" route that it was proposed to replace and the distinction is not necessary. However, for consistency with the MN EIS, the nomenclature is retained. All the "2C3" routes are included in the Segment 2 discussion below.

Route 2C3-001-2 begins east of the North Rochester Substation (S) and stays on US-52 in an area where Route 2P moves away from US-52. The rationale for its inclusion was not found in the public record. The main characteristic of this route is that it stays on US-52 through a section where Route 2P moves temporarily away from US-52 and follows county roads instead. A review of the impacts of the route reveals the rationale for detour from US-52 for Route 1P. While Route 2C3-001-2 has 2 fewer residences within 300 feet of the ROW (9 vs 12), five of these are within 75 feet of the alignment centerline, compared to 2 for Route 2P. In addition, Route 2C3-001-2 has two crossings of a continuous BSHS forested floodplain wetland at the Middle Fork of the Zumbro River, adjacent to US-52 near and then east of the County Road 11 interchange. These

crossing lengths are 1,300 and 300 feet long. A subdivision adjacent to US-52 on the north constrains the transmission line location (MDC 2011c, Appendix A, Sheets NH 4 and 13). Associated with this forested floodplain are two zoological NHSs with areas of influence that overlap the estimated alignment centerline (MDC 2011c, Appendix A, Sheet NH 14).

Route 2C3-002-2, 2C3-003-2, 2C3-004-2, 2C3-005-2, 2C3-006-2 and 2C3-007-2 are all north of Pine Island, in the vicinity of Dry Run Creek. They were proposed by the City of Pine Island to avoid current and future residential and business developments. Except for Routes 2C3-005-2 and 2C3-006-2, they all rejoin Route 2P at a point south of the South Fork of the Middle Branch of the Zumbro River.

Compared with Route 2P, Route 2C3-002-2 has more residences within 150 feet of the centerline of the alignment and fewer in the 151-300 foot interval. It is longer than Route 2P and mostly doesn't make use of existing ROWs.

Compared with the section of Route 2P that they replace, Routes 2C3-003-2 and 2C3-004-2 have many fewer residences within 300 feet of the alignment centerline, although they have slightly more residences within 150 feet when compared with Route 2A. They share significantly less ROW with transmission lines or roadways than either Route 2P or 2A.

Route 2C3-006-2 has more overall residences near the ROW, and much more of its length is shared with existing roadway than the comparable section of either Route 2P or 2A.

Route 2C3-007-2 has fewer residences within 300 feet of the centerline of the alignment than either Route 2P or 2A; however, it shares little existing ROW.

All these routes except 2C3-005-2 and 2C3-006-2, which rejoin Route 2P north of the Zumbro River, have a 1,500 foot floodplain crossing with the Middle Fork of the Zumbro River, and also with the South Branch of the Middle Fork of the Zumbro River. There are wetlands (non-forested at Middle Fork and forested at the South Branch) at both crossings; one is within the area of influence of a botanical NHS and one is within the

area of influence of a zoological NHS (MDC 2011c, Appendix A, Sheets NH15 and NH16).

Route 2C3-005-2 is north of Pine Island. The rationale for its inclusion was not found in the public record.

Route 2C3-008-2 is a short segment east of the North Rochester Substation. The rationale for its inclusion was not found in the public record. It is the same length as the compared section of Route 2P and also has no residences within 300 feet of the ROW, but follows a roadway rather than a transmission line (as Route 2P does).

2.5.1.3 Segment 3 – North Rochester Substation to Mississippi River 345 kV

The main differences between Routes 3P and 3A are at the crossing of the Zumbro River.

Route 3P crosses the Zumbro River at the existing crossing of White Bridge Road, with an 800-foot floodplain crossing. On the east side of the river, just outside the floodplain, Route 3P crosses 500 feet of BSMS oak forest, along the edge of the roadway ROW. Route 3P then moves northeast away from the roadway and generally follows the boundary between agricultural fields and the BSMS forested tract that continues for several thousand feet, with a few southward extensions that cross the ROW. The Route 3P alignment follows this boundary and crosses the forest at the southward extensions. Total forest crossing is approximately 1,600 feet, with no existing roadway or transmission line ROW (MCBS 1997b, MDC 2011c, Appendix A, Sheets MR10 and 11). By following the forest edge, Route 3P reduces agricultural impacts.

Route 3A crosses the Zumbro River north (downstream) of Zumbro Lake, at a location where there is no existing road or transmission line. The floodplain crossing is 2,000 feet long, includes 400 feet of BSMS floodplain forest wetlands, and lies within the area of influence of two NHSs. On the east side of the river the ROW bisects two tracts of BSMS forest with a total length of 1,500 feet (MDC 2011c, Appendix A, Sheet MR29). East of the Zumbro River, at Long Creek, a Zumbro River tributary, Route 3A crosses another MSBS forested area, first for a distance of 700 feet, then 1,000 feet, again at a location with no existing transmission line or roadway (MDC 2011c, Appendix A, Sheets MR33 and 34). Further east, on Indian Creek Route 3A crosses a BSOS forested area

for a distance of 1,000 feet, in an area of influence of two NHSs (MDC 2011c, Appendix A, Sheet MR36).

Routes 3P and 3A are coincident for the eastern part of the route and the Mississippi River crossing, where the joint route follows an existing transmission line. As Route 3A/3P moves away from agricultural land and into the steeply wooded blufflands, it has the following crosses of BSMS upland forest, along the existing transmission line ROW: one at 600 feet, one at 1,100 feet, then another at 600 feet. This section also passes through the area of influence of two zoological NHSs (MDC 2011c, Appendix A, Sheets MR 20 and 21). Route 3P/3A, still following the existing transmission line, then enters the Mississippi/Zumbro River floodplain just beyond the point where Route 3P/3A crosses US-61. The route also crosses part of the McCarthy Lake WMA in the Mississippi River floodplain. Most of this area is also wetland, and much of the wetland is BSHS meadow-marsh-swamp complex. The route crosses 1,400 feet of continuous wetland, and then passes out of wetland and then crosses another 6,000 feet of continuous wetland. The part of the route within the floodplain lies within the area of influence of three zoological NHSs (MCBS 1997c, MDC 2011, Appendix A, Sheets MR22 and MR23).

MN DEIS Scoping and MRP Alternatives to Route 3P

Routes 3P-001, -002, and -003 are north of Pine Island and just east of the North Rochester Substation (S). The rationale for the inclusion of these routes was not found in the public record. The compared segments of Routes 3P -001 and -002 exclusively follow county or township roads, while the segment of Route 3P does not follow any transmission lines or roads in this area. The MRP Applicants have identified the inclusion of the 3P-002 segment as preferred over the 3P segment (Hillstrom 2011 p. 12).

Route 3P-004 is a very short segment in Wabasha County northeast of Plainview. It was proposed to reduce impact to a dairy farm and to reduce tree clearance. It is the same length as the comparable Route 3P segment, and neither have residences within 300 feet, and 3P-004 follows more roadway ROW.

Route 3P-005 is a short segment northeast of Oronoco and **3P-010** is a longer segment in the same area. The rationale for their inclusion was not found in the public record. Compared with the corresponding section of Route 3P, Route 3P-010 has more residences within 300 feet of the alignment centerline; however, it is slightly shorter and follows an existing roadway where Route 3P does not.

Routes 3P-006, -007 and -011 are all short segments east of the Zumbro River and they all avoid the forest impact just east of the river that are associated with Route 3P. The rationale for the inclusion of -006 and -011 was not found in the public record. The reasoning behind 3P-011 was to reduce the number of residences impacted and the number of trees removed; however, it appears to have one more residence within 300 feet than does the comparable section of Route 3P, although it results in less tree removal. Route 3P-006 follows the White Bridge Road alignment; however, it is slightly longer and has 3 residences within 150 feet of the ROW compared with none along the comparable section of Route 3P.

Route 3P-008 is a short segment north of Pine Island. The rationale for its inclusion was not found in the public record. It is approximately the same length as the compared segment of Route 3P, and neither segment follows any existing ROW.

Route 3P-009 is north of Oronoco and west of the Zumbro River. The rationale for its inclusion was not found in the public record. It provides an option for getting south to White Bridge Road, where Route 3P crosses the Zumbro River. It follows transmission lines or roadways for more of its length than does the corresponding section of Route 3P. However, it has 5 residences within 75 feet of the alignment centerline, 4 residences within 76 to 150 feet and 5 residences within 151 to 300 feet. The comparable section of Route 3P has no residences within 150 feet and one in the 151 to 300 foot interval.

Route 3P-009 also crosses a cove of Zumbro Lake, at an 800-foot floodplain crossing. For several thousand feet north of the crossing it borders a large tract of BSMS oak forest along the ROW of the roadway it follows (MDC 2011c, Appendix A, Sheet MR 8).

Route 3P-Kellogg is near the Mississippi River. This route was included in the MRP application as an alternative to avoid direct impacts to the McCarthy Lake WMA. It

mainly follows a railroad alignment along US-61 and county or township roads in an area where Route 3P follows an existing transmission ROW. Route 3P-Kellogg also parallels the Great River Road (US Highway 61) for approximately 1.5 miles. It is nearly twice as long as the corresponding section of Route 3P (4.8 vs 2.5 miles).

Through the section that Route 3P Kellogg replaces, Route 3P has no residences within 300 feet of the alignment centerline. Route 3P-Kellogg has one residence within 75 feet of the alignment centerline and one residence in the 76 to 150 foot interval.

Route 3P Kellogg crosses 4,000 feet of wetland along US-61, within an area of influence of six NHSs that originates in the McCarthy Lake WMA, and/or the Mississippi River floodplain area that the Route 3P Kellogg follows (MDC 2011c, Appendix A, Sheets MR42 and MR23).

Route 3P Zumbro is the third alternative for crossing the Zumbro River, and it crosses at the Lake Zumbro dam, where there is no existing roadway or transmission line. It was included in the MRP application (Xcel et al. 2010). Just east of the dam, Route 3P Zumbro crosses 2,800 feet of BSHS forest, mostly oak. Within this region the route is in the area of influence of four NHSs (MCBS 1997b, MDC 2011c, Appendix A, Sheet MR45).

Zumbro River Crossings. Three Zumbro River crossings were evaluated in the MRP application RPA (Xcel et al. 2010): They are first named below by the MN EIS designation.

Route 3P (Applicant-Preferred - White Bridge Road): Route 3P crosses US-52 from the southern end of the North Rochester Substation siting area, primarily following property lines for approximately five miles before turning southeast along Ash Road toward the City of Oronoco. The route then turns east and lies within 0.25 mile of White Bridge Road and crosses the Zumbro River on the north side of the bridge. The route continues east, crossing US-63.

Route 3A (Applicant Alternate): Route 3A exits the north end of the North Rochester Substation siting area and travels easterly following agricultural fields and property lines, crossing the Zumbro River approximately 0.75 mile north of the intersection of

Wabasha County Road 7 and County Road 21. The route crosses US-63 and heads southwesterly.

Route 3P – Zumbro N and Route 3P – Zumbro S (Zumbro Dam Option): Zumbro N and Zumbro S are essentially the same option except that east of US-63 Zumbro N joins Route 3A and Zumbro S cuts back south to join Route 3P, using the route "3A-Crossover".

Scoping and MRP Alternatives to Route 3A

Route 3A-001 is a short segment just east of MN-42. The rationale for including the route is that it may reduce impacts on a horse training farm. It is slightly longer than Route 3A; however, it follows existing roadways and transmission lines for part of its length.

Route 3A-002 was not retained for evaluation in the MN EIS and is not included in this Draft EIS.

Routes 3A-003 and -004 are short segments west of Hammond. The rationale for inclusion was to preserve a natural wildlife corridor and reduce the number of trees removed. Both routes follow more roadway ROW than the comparable section of Route 3A.

Route 3A-Kellogg is the same route as Route 3P-Kellogg, described above under Route 3P. It is included in the MRP application.

Scoping Alternatives to Both Routes 3P and 3A

Alternative 3B-003 is an option for both Route 3P and 3A just west of the Mississippi River that avoids the McCarthy Lake WMA, the associated BSHS, and several thousand feet of wetland crossing. It follows MN-42 instead of the existing transmission corridor. It has several more residences within 300 feet of the centerline of the alignment than the comparable section of Routes 3P/3A. The MRP Applicants requested a modification to Alternative 3B-003. The modification involves additional route width to accommodate steep wooded slopes. A map of the modification is included in Appendix J (Hillstrom 2011 p. 16 and Schedule 2).

Routes 2C3-001-3a, -3b, 2C3-002-3, 2C3-003-3, 2C3-004-3, 2C3-005-3, 2C3-006-3, 2C3-007-3 and 2C3-008-3 are the same as the 2C3 routes described in Segment 2 above. The only difference is the final "-2" or "-3."

2.5.2 Wisconsin – Segment 4

The route alternatives in Section 4 are compared in **Error! Reference source not found.**5. For clarity, the routes represented by each column are shown in Figures Figure 2-17 through Figure 2-25.

The trade-offs in the Wisconsin part of the route are between the longer and costlier routes with greater impacts to agriculture and homes versus the potential impacts to the GRR/WI-35 and the Van Loon Wildlife Area, including forested wetland impacts and potential impacts to important species.

In addition, selection of any CPCN alternative other than the Q1/Highway 35 Route would require partial or total rebuild of the Q1 line. Q1 scenarios for various routing decisions for Proposal are shown in Table 2-6.

A detailed cost summary of Q1 Rebuild scenarios is presented in Table 2-7, and impacts of the Q1 Rebuild options are presented in Table 2-8.

Table 2-4: Comparison of Minnesota Routes 1P and 1A

Resource Category	Hampton – North Rochester 345 kV		North Rochester – Northern Hills 161 kV		North Rochester – Mississippi River 345 kV	
	Route 1P	Route 1A	Route 2P	Route 2A	Route 3P	Route 3A
Soils and Geology						
Some short-term impacts will occur during construction; however, construction stormwater permits will be required, which will include storm water pollution prevention plans (SWPPPs) and construction best management practices (BMPs) to minimize soil disturbance and erosion. The only potential post-construction impacts would be related to line repair and maintenance, which would result in minimal, if any, soil disturbance. Steep slopes, erodible soil and exposed soil contribute to erosion potential. Land cover, which can affect soil impacts, is summarized below under land resources.						
Slopes (Figure 3-1)	Mostly gently rolling farmland.		Mostly gently rolling farmland. Steeper slopes at Zumbro River.		Steeper slopes on 3P at Zumbro River tributaries. Both have steep slopes at approach to Mississippi River.	
Erosion Potential (Figure 3-2)	Relatively low except for localized high potential areas.				Relatively high.	
Water Resources[92]						
Minimal impacts to water resources are expected with any alternative. Some short-term impacts to surface water bodies from runoff from disturbed areas may occur during construction; however, the required SWPPPs and BMPs will minimize these impacts. All water bodies will be spanned, and construction equipment will not enter water bodies. The only potential post-construction impacts would be related to line repair and maintenance, which would not result in any direct impacts to water bodies, but could result in minor soil disturbance that could have short-term and minor impacts on surface water runoff. Some very minor, localized and short-term impacts to groundwater could occur in areas with very shallow groundwater if tower foundations require dewatering. Post-construction impact on groundwater would not be expected, as no discharges or pumping would be expected.						
Stream crossings	35	44	18	18	95	87
Permanent impacts to floodplains (acres)	<1	<1	<1	<1	<1	<1
Section 10 Permit required?	No				Yes	
Air Resources						
Minimal impacts to air resources are expected with any alternative. Some short-term air impacts will occur during construction as a result of exhaust emissions from construction equipment; there is also the potential for minor, short-term fugitive dust emissions from areas of disturbed soil during construction. Post-construction air quality impact would be minimal, as transmission lines release negligible air emissions.						

[92] Xcel et al 2010, pg. 5-27, 7-70, 8-49.

Resource Category	Hampton – North Rochester 345 kV		North Rochester – Northern Hills 161 kV		North Rochester – Mississippi River 345 kV	
	Route 1P	Route 1A	Route 2P	Route 2A	Route 3P	Route 3A
Acoustic Environment						
Minimal noise impacts are expected with any alternative. There will be some short-term noise from construction equipment. Post-construction noise levels are expected to be minimal as transmission lines produce only very low levels of noise.						
Biological Resources[93,94]						
Bird collisions with power lines are a potential impact with all routes.						
The following species and designated habitat areas are known to occur within the proposed ROWs. However, the presence of a species or habitat area does not mean it will be impacted. For example, since water bodies will be spanned, impacts to aquatic species are not expected. Surveys for threatened or endangered species would be conducted in suitable habitat within the permitted route corridor as directed by state agencies. If impacts to protected species are unavoidable, a Takings Permit from the MDNR and potentially the USFWS may be required along with other conditions.						
Species[95]						
Federal-listed threatened species within ROW	None	Prairie bush clover	None			
Federal-listed endangered species in ROW	None					
State-listed threatened species within ROW	Loggerhead shrike		Tuberous Indian-plantain	Blanding's turtle		
	Paddlefish	Mucket	Elktoe		Paddlefish	
		Prairie bush clover	None	Timber rattlesnake		
				None	Tuberous Indian-plantain	
State-listed endangered species within ROW	None				Rock pocketbook	
					Sheepnose	
Notable habitat areas						
Length crossed (miles)						
Important Bird Areas	0	0	0	0	1.9	1.9
Grassland Bird Conservation Areas	1.1	3.9	0	2.6	0	0
Outstanding Biodiversity Sites	0	0.3	0	0	0.5	0.5
High Biodiversity Sites	0.5	0.1	0	0.7	0.9	0.9

[93] MDC 2011b, listed species obtained from pg. 87, 126, and 160.
[94] Xcel et al 2010, notable habitat areas and wetland data obtained from pg. 5-26 - 5-28, 7-69 - 7-70, 8-49 - 8-50.
[95] Scientific names are included in the discussion in the Draft EIS text.

Resource Category	Hampton – North Rochester 345 kV		North Rochester – Northern Hills 161 kV		North Rochester – Mississippi River 345 kV	
	Route 1P	Route 1A	Route 2P	Route 2A	Route 3P	Route 3A
Wetlands						
Permanent wetlands impacts (acres)	0	0	0	0	0.02	0.02
Temporary wetlands impacts (acres)	0	0	2	3	7	7
Wetland Acres Permanently Changed from Forested to Emergent (acres)[96]	0	4.7	1.3	1.7	13.1	15.2
Area of Forest Removed (acres)[97]	223	74	103	109	621	873
Land Resources[98]						
Land cover[99]						
Percent cropland	63	87	70	74	63	58
Percent grassland	20	11	22	20	22	21
Percent shrubland	<1	<1	<1	<1	2	2
Percent forested land	5	1	5	5	11	17
Percent aquatic	<1	<1	<1	0	<1	<1
Percent marsh	<1	<1	<1	<1	1	1
Percent developed	10	<1	2	<1	<1	<1
Agriculture						
Permanent impact (acres)	42.6	45.1	42.4	42.6	44.4	44.1
Temporary impact (acres)	200	270	139	161	338	323
Conservation Reserve Prog. Lands crossed	51	31	4	2	33	25
Forestry	No impacts to economically important forestry areas are anticipated.					
Mining	No impacts to mines are anticipated.					

[96] Water Resources summary table from Minnesota EIS (MDC 2011b) Appendices H-J.
[97] GAP data from Minnesota EIS (MDC 2011b) Appendices H-J. Forty acres of cropland attributed to the North Rochester substation for all routes.
[98] Xcel et al 2010, land resource data obtained from pg. 5-26 - 5-28, 7-69 - 7-70, 8-49 - 8-50. Forty acres of permanent impact to agricultural cropland for all routes attributed to the North Rochester substation.
[99] For Routes 3P and 3A, does not include Chester 161 kV north-south section, which is primarily agricultural; results are the same for both routes.

Resource Category	Hampton – North Rochester 345 kV		North Rochester – Northern Hills 161 kV		North Rochester – Mississippi River 345 kV	
	Route 1P	Route 1A	Route 2P	Route 2A	Route 3P	Route 3A
Formally Classified Lands						
Upper Mississippi National Wildlife crossed	0				0.5	0.5
McCarthy WMA crossed (miles)	0				0.9	0.9
RJD State Forest crossed (miles)	0				2.1	2.4
Visual Resources						
The transmission line as a visual intrusion will have the greatest impact on those living near the ROW. The 3A and 3P Routes are joined at the crossing of the Great River Road National Scenic Byway (GRRNSB).						
Residences near ROW	See Socioeconomics below		See Socioeconomics below		See Socioeconomics below	
Crossing of GRRNSB?	No				Yes	
Cultural Resources (within ½ mile of each alternative; except for Chester North-South, within 1 mile of route centerline)[100]						
Archaeological	4	5	6	4	7	8
Architectural						
National Register of Historic Places	7	1	0	3	0	0
Other	54	38	26	26	12	9
Chester North-South - Archaeological	NA	NA	NA	NA	1	1
Chester North-South – Architectural						
National Register of Historic Places	NA	NA	NA	NA	0	0
Other	NA	NA	NA	NA	10	10
Socioeconomics						
Number of residences within 300 feet of route centerline[101]						
Hampton - North Rochester (345kV) and North Rochester - Mississippi River (345kV)						
0-75 feet from route centerline	1	4	N/A	N/A	0	0
76-150 feet from route centerline	12	7	N/A	N/A	0	0
151-300 feet from route centerline	23	29	N/A	N/A	5	4
North Rochester – Northern Hills (161kV)						
0-40 feet from route centerline	N/A	N/A	0	0	N/A	N/A

[100] MDC 2011c, pp. 100 and 141; MDC 2011b, p. 170; with revisions. Northern States Power Company 2011 Table 27.
[101] MDC 2011c, pp. 86, 128, and 164.

Resource Category	Hampton – North Rochester 345 kV		North Rochester – Northern Hills 161 kV		North Rochester – Mississippi River 345 kV	
	Route 1P	Route 1A	Route 2P	Route 2A	Route 3P	Route 3A
41-100 feet from route centerline	N/A	N/A	7	1	N/A	N/A
101-300 feet from route centerline	N/A	N/A	51	27	N/A	N/A
Chester North-South Section (161kV)						
0-40 feet from route centerline	N/A	N/A	N/A	N/A	0	0
41-150 feet from route centerline	N/A	N/A	N/A	N/A	8	8
151-300 feet from route centerline	N/A	N/A	N/A	N/A	11	11
State Criteria: Use or Paralleling of Existing Right-of-Way (ROW) and Property Lines[102]						
Total length of route (miles)	36	49	15	18	57	54
Following transmission line						
Length (miles)	15	1.4	1.9	7.2	18	16.2
Total percentage	41.5%	2.8%	12%	40.2%	31.6%	30.0%
Following road but not transmission line						
Length (miles)	14.6	2.7	12.1	6	7.5	6.7
Total percentage	40.5%	5.5%	78.6%	33.2%	13.2%	12.4%
Following property line but not transmission line or roads						
Length (miles)	5.8	41.5	0.95	3.1	27.6	24.6
Total percentage	16%	85.2%	6.2%	17.1%	48.4%	45.6%
Following transmission line, roads, or property lines						
Length (miles)	35.4	45.6	14.9	16.3	53.1	47.5
Total percentage	98%	93.5%	96.8%	90.5%	93.2%	88.0%
Not following transmission line, roads, or property lines						
Length (miles)	0.7	3.2	0.5	1.7	3.7	6.67
Total percentage	2%	6.5%	3.2%	9.5%	6.5%	12.4%
Estimated Cost (million)						
Cost[103]	$88	$101	$16	$17	$131	$126

[102] MDC 2011c, pp. 66, 67, 110, 113, 148 and 149. Northern States Power Company 2011, Table 27.
[103] MDC 2011c, pg. 8. Northern States Power Company p. 3-2.

Table 2-5: Comparison of Wisconsin Route Alternatives

Resource Category	Q1-Highway 35 Route	Arcadia Route	Arcadia-Alma Option	Q1-Galesville Route	WI-88 Option A Connector		WI-88 Option B Connector		Arcadia-Ettrick Connector (Arcadia Route)
					(Q1-Highway 35 Route)	(Q1-Galesville Route)	(Q1-Highway 35 Route)	(Q1-Galesville Route)	
Soils and Geology									
Some short-term impacts will occur during construction; however, construction stormwater permits will be required, which will include storm water pollution prevention plans (SWPPPs) and construction best management practices (BMPs) to minimize soil disturbance and erosion. The only potential post-construction impacts would be related to line repair and maintenance, which would result in minimal, if any, soil disturbance. Steep slopes, erodible soil and exposed soil contribute to erosion potential. Land cover, which can affect soil impacts, is summarized below under land resources. Note									
Slopes (Figure 3-1)	Lower slopes except for middle third	Steeper slopes for much of route		Lower slopes except for middle third	Mostly steeper except for southern third.				Steeper slopes for much of route
Erosion Potential (Figure 3-2)	Mostly low except for middle third	Moderate, but would increase with exposure.		Mostly low except for middle third	Moderate (but would increase with exposure) for northern two-thirds and low for southern third.				Moderate.
Water Resources									
Minimal impacts to water resources are expected with any alternative. Some short-term impacts to surface water bodies from runoff from disturbed areas may occur during construction; however, the required SWPPPs and BMPs will minimize these impacts. All water bodies will be spanned, and construction equipment will not enter water bodies. The only potential post-construction impacts would be related to line repair and maintenance, which would not result in any direct impacts to water bodies, but could result in minor soil disturbance that could have short-term and minor impacts on surface water runoff. Some very minor, localized and short-term impacts to groundwater could occur in areas with very shallow groundwater if tower foundations require dewatering. Post-construction impact on groundwater would not be expected, as no discharges or pumping is expected.									
Line stream crossings[104]	38	45	44	25	47	36	47	36	65
Permanent impacts to floodplains (acres)	<1	<1	<1	<1	<1	<1	<1	<1	<1
Air Resources									
Minimal impacts to air resources are expected with any alternative. Some short-term air impacts will occur during construction as a result of exhaust emissions from construction equipment; there is also the potential for minor, short-term fugitive dust emissions from areas of disturbed soil during construction. Post-construction air quality impact would be minimal, as transmission lines release negligible air emissions.									

[104] CPCN June 2011, Appendix T, Table 3

Resource Category	Q1-Highway 35 Route	Arcadia Route	Arcadia-Alma Option	Q1-Galesville Route	WI-88 Option A Connector		WI-88 Option B Connector		Arcadia-Ettrick Connector (Arcadia Route)
					(Q1-Highway 35 Route)	(Q1-Galesville Route)	(Q1-Highway 35 Route)	(Q1-Galesville Route)	
Acoustical Environment									
Minimal noise impacts are expected with any alternative. There will be some short-term noise from construction equipment. Post-construction noise levels are expected to be minimal as transmission lines produce only very low levels of noise.									
Biological Resources									
Bird collisions with transmission lines are a potential impact for all routes.									
As shown below, threatened, endangered or special concern species are known to occur within two miles of the routes. Surveys for threatened or endangered species would be conducted in suitable habitat within the permitted route corridor as directed by state agencies. If impacts to rare species are unavoidable, a Takings Permit from the DNR may be required along with other conditions.									
Species[105]									
Threatened, endangered or special concern species within two miles of the route									
Non-historic occurrences	129	69	69	124	117	103	117	103	66
Historic occurrences	40	23	23	29	40	42	40	42	16
Natural communities within two miles of the route	34	2	2	31	34	31	34	31	21
Notable habitat areas									
Does the route cross Important Bird Areas and/or large areas of forested wetlands?	Black River Bottoms	No	No	No	Black River Bottoms	No	Black River Bottoms	No	No
Does route potentially impact the WI-GRRNSB?	Yes	No	No	No	Yes	No	Yes	No	No
Wetlands:									
Perm. wetland impact, acres[22]	0.13	0.14	0.14	0.10	0.09	0.06	0.06	0.06	0.13
Temp wetland impact, acres[106]	6.3	4.8	4.8	6.1	N/A	N/A	N/A	N/A	4.7

[105] Species information presented based on a two mile radius search, per compliance with WDNR reporting guidelines. Species in the proximity of the Arcadia-Alma Option Route assumed to be identical to the Arcadia Route.

[106] CPCN June 2011, Appendix T, Table 1, and route maps included in this Draft EIS Appendix G.

Resource Category	Q1-Highway 35 Route	Arcadia Route	Arcadia-Alma Option	Q1-Galesville Route	WI-88 Option A Connector		WI-88 Option B Connector		Arcadia-Ettrick Connector (Arcadia Route)
					(Q1-Highway 35 Route)	(Q1-Galesville Route)	(Q1-Highway 35 Route)	(Q1-Galesville Route)	
Wetland acres changed from forested to emergent[107]	48.5 / 55.1	37.9 / 38.8	37.9 / 38.8	33.9 / 34.9	NA / 69.1	NA / 48.9	NA / 67.9	NA / 47.8	33.8 / 56.9
Upland forest impact, acres	186	267	252	218	227	261	225	259	305
Total forest impact, acres[108]	241	305	291	253	296	310	293	306	362
Land cover[109]									
Percent cropland	51	47	48	52	49	50	51	52	45
Percent pasture	1	4	4	<1	3	2	2	2	4
Percent specialty (tree farm)	0	1	1	<1	0	<1	0	<1	<1
Percent prairie/grassland	4	5	5	4	3	3	4	3	5
Percent upland shrub	<1	0	0	<1	<1	<1	<1	<1	<1
Percent upland forest	26	28	27	28	27	29	26	28	29
Percent forested wetland	8	4	4	5	8	5	8	5	5
Percent non-forested wetland	4	6	6	4	5	4	5	5	8
Percent residential	4	2	2	4	3	3	2	3	1
% commercial/industrial	2	2	2	3	1	2	1	2	2
Land Resources									
Agriculture									
Permanent impact (acres)[110]	41.0	41.3	41.3	41.2	41.2	41.4	41.2	41.4	41.3
Temporary impact (acres)[111]	325 / 116	445 / 150	455 / 153	367 / 133	399 / 136	442 / 154	418 / 137	460 / 155	468 / 146

[107] CPCN June 2011, Supplemental Connector Information, Appendix T, Summary of Wetland Impacts / Total forested wetland within ROW from Appendix A, Table 2

[108] CPCN June 2011, Appendix A, Table 2, Sum of upland forest and wetland forest

[109] Includes 40 acres of cropland for the Briggs Road West substation

[110] Assumes permanent impact of 200 sq ft/pole with 500-ft span. Includes 40 acres of cropland for the Briggs Road West substation.

[111] CPCN June 2011, pg. 2-167 and ROW totals in Appendix A, Table 2 for a maximum estimated impact/Estimate assuming 0.2 acre/mile for staging areas, 1600 ft^2 per 2 miles for spooling locations, and 0.5 acre/pole with a 500-ft span between poles within agricultural areas of the route.

Resource Category	Q1-Highway 35 Route	Arcadia Route	Arcadia-Alma Option	Q1-Galesville Route	WI-88 Option A Connector		WI-88 Option B Connector		Arcadia-Ettrick Connector (Arcadia Route)
					(Q1-Highway 35 Route)	(Q1-Galesville Route)	(Q1-Highway 35 Route)	(Q1-Galesville Route)	
Great River Road (GRR)									
Current miles of transmission line in the GRR National Scenic Easement along Q1-Highway 35	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
Post project miles of transmission line within the GRR National Scenic Easement along Q1-Highway 35	2.7	8.1	8.1	2.7	8.1	8.1	8.1	8.1	8.1
Cultural Resources									
Archaeological sites near route[112]	13	8	8	15	10	12	11	13	4
Socioeconomics									
Number of residences within 300 feet of route centerline[113]									
Total	74	102	102	109	79	114	67	102	57
0-100 feet from centerline	14	9	9	14	13	13	12	12	8
101-150 feet from centerline	8	15	15	11	13	16	7	10	7
151-300 feet from centerline	52	78	78	84	53	85	48	80	42
State Criteria: Use or Paralleling of Existing Right-of-Way (ROW) and Property Lines[114]									
Total length of route (miles)	43.0	54.8	54.4	48.4	49.7	55.0	49.0	54.4	57.0

[112] CPCN June 2011, pg. 2-143, Table 2.4-7 and CPCN June 2011, Supplemental Connector Information, pg. 2-45, Table 2.4-1
[113] CPCN June 2011, Supplemental Connector Information, pg. 2-5, Table 2.1-2
[114] CPCN June 2011, Supplemental Connector Information, pg. 2-5, Table 2.1-2

Resource Category	Q1-Highway 35 Route	Arcadia Route	Arcadia-Alma Option	Q1-Galesville Route	WI-88 Option A Connector		WI-88 Option B Connector		Arcadia-Ettrick Connector (Arcadia Route)
					(Q1-Highway 35 Route)	(Q1-Galesville Route)	(Q1-Highway 35 Route)	(Q1-Galesville Route)	
Following transmission line									
Length (miles)	30.6	39.6	39.0	28.2	29.4	27.1	29.2	26.8	47.2
Total percentage	71.2%	72.3%	71.7%	58.3%	59.1%	49.3%	59.6%	49.3%	82.8%
Following road but not transmission line									
Length (miles)	6.5	9.7	9.7	6.8	14.9	15.1	8.7	9.0	2.9
Total percentage	15.1%	17.7%	17.7%	14.0%	30.0%	27.4%	17.8%	16.5%	5.1%
Following railroads but not transmission line or roads									
Length (miles)	3.1	0.0	0.0	3.1	0.6	0.6	0.6	0.6	0.0
Total percentage	7.2%	0%	0%	6.4%	1.2%	1.1%	1.2%	1.1%	0%
Following transmission line, roads, or railroads									
Length (miles)	40.2	49.3	48.7	38.1	44.9	42.8	38.5	36.4	50.1
Total percentage	93.5%	90.0%	89.5%	78.7%	90.3%	77.8%	78.6%	66.9%	87.9%
Not following transmission line, roads or railroads									
Length (miles)	2.8	5.5	5.7	10.3	4.8	12.2	10.5	18.0	6.9
Total percentage	6.5%	10%	10.5%	21.3%	9.7%	22.2%	21.4%	33.1%	12.1%
Add'l ROW required (acres)	366	497	497	456	487	577	515	605	519
Estimated Cost (million)									
Cost	$195	$224	$224	$202	$213	$221	$208	$215	$234

Table 2-6: Q1 Scenarios for Various Proposal Routing Decisions

CapX Project Route or Segment	Post CapX Q-1 Rebuild Required (Miles)				Comment
	Q-1 Rebuild Total Length	Section A Alma-Milton	Section B Milton-Trempealeau	Section C Trempealeau-Holmen	
Complete CapX Routes					
Arcadia Route	39 to 46	10	16	13 to 20	Complete stand-alone rebuild of the Q-1 would be required. Length depends upon alternative.
Arcadia Ettrick Route	39 to 46	10	16	13 to 20	Complete stand-alone rebuild of the Q-1 would be required. Length depends upon alternative.
Q1-Highway 35 Route	0	0	0	0	CapX Project rebuilds entire Q-1.
Q1-Galesville Route	13 to 20	0	0	13 to 20	CapX Project rebuilds approximately 27 miles of the Q-1.
CapX Route Segment					
Highway 88 Connector	10	10	0	0	This length is added to the Q1-Highway 35 Route requirements or the Q1-Galesville Route requirements described above.

Source: Dairyland 2011

Table 2-7: Cost Summary – Q1 Rebuild Scenarios

CapX Project			Q1 Rebuild Shaded Cells Below Are Integral and Inseperable CapX Project Costs (See Note 5)							Total Cost View	Comment
				Q1 Rebuild Summary			Q1 Rebuild Details By Section				
CapX 345 Route	CapX Total Cost	CapX Costs Less Q1 Assignment (See Note 4)	Q1 Rebuild Scenario	CapX Q1 Costs	Stand Alone (Dairyland Only) Q1 Rebuild Costs	Q1 Rebuild Total	Section A Alma - Milton	Section B Milton - Trempealeau	Section C Trempealeau - Holmen	CapX + Q1 Rebuild	
Q1	$ 188,767,000	$ 170,947,000	Existing Q1	$ 17,820,000		$ 17,820,000	$ 4,590,000	$ 7,290,000	$ 5,940,000	$ 188,767,000	CapX Q1 route rebuilds the Dairyland Q1 in its entirety
			Q1 - Hwy 35								
			Q1 - 7 Bridges								
			Q1 - Galesville								
Q1 - Highway 35	$ 194,590,000	$ 175,960,000	Existing Q1							$ 194,590,000	CapX rebuilds Q1 in its entirety. The base CapX proposal relocates the Q1 to Hwy 35 as mitigation for crossing the Black River bottoms wetland.
			Highway 35	$ 18,630,000		$ 18,630,000	$ 4,590,000	$ 7,290,000	$ 6,750,000		
			Seven Bridges								
			Galesville								
Q1 - Galesville	$ 202,065,000	$ 190,185,000	Existing Q1	$ 11,880,000	$ 10,500,000	$ 22,380,000	$ 4,590,000	$ 7,290,000	$ 10,500,000	$ 212,565,000	CapX rebuilds Sections A & B of the Dairyland Q1 line.
			Highway 35	$ 11,880,000	$ 12,200,000	$ 24,080,000	$ 4,590,000	$ 7,290,000	$ 12,200,000	$ 214,265,000	
			Seven Bridges	$ 11,880,000	$ 15,800,000	$ 27,680,000	$ 4,590,000	$ 7,290,000	$ 15,800,000	$ 217,865,000	
			Galesville double circuit with CapX	$ 11,880,000	$ 13,010,000	$ 24,890,000	$ 4,590,000	$ 7,290,000	$ 13,010,000	$ 215,075,000	
Arcadia	$ 224,355,000	$ 224,355,000	Existing Q1		$ 34,000,000	$ 34,000,000	$ 8,600,000	$ 14,900,000	$ 10,500,000	$ 258,355,000	CapX rebuilds zero miles of the Q1 line
			Highway 35		$ 35,700,000	$ 35,700,000	$ 8,600,000	$ 14,900,000	$ 12,200,000	$ 260,055,000	
			Seven Bridges		$ 39,300,000	$ 39,300,000	$ 8,600,000	$ 14,900,000	$ 15,800,000	$ 263,655,000	
			Galesville double circuit with CapX		$ 38,300,000	$ 38,300,000	$ 8,600,000	$ 14,900,000	$ 14,800,000	$ 262,655,000	
Arcadia - Ettrick	$ 233,570,000	$ 233,570,000	Existing Q1		$ 34,000,000	$ 34,000,000	$ 8,600,000	$ 14,900,000	$ 10,500,000	$ 267,570,000	CapX rebuilds zero miles of the Q1 line
			Highway 35		$ 35,700,000	$ 35,700,000	$ 8,600,000	$ 14,900,000	$ 12,200,000	$ 269,270,000	
			Seven Bridges		$ 39,300,000	$ 39,300,000	$ 8,600,000	$ 14,900,000	$ 15,800,000	$ 272,870,000	
			Galesville single circuit		$ 40,700,000	$ 40,700,000	$ 8,600,000	$ 14,900,000	$ 17,200,000	$ 274,270,000	
Hwy 88 - Q1 - Highway 35	$ 207,630,000	$ 193,590,000	Existing Q1								CapX rebuilds Sections B & C of Q1 line
			Highway 35	$ 14,040,000	$ 8,600,000	$ 22,640,000	$ 8,600,000	$ 7,290,000	$ 6,750,000	$ 216,230,000	
			Seven Bridges								
			Galesville								
Hwy 88 - Q1 - Galesville	$ 214,910,000	$ 207,620,000	Existing Q1	$ 7,290,000	$ 19,100,000	$ 26,390,000	$ 8,600,000	$ 7,290,000	$ 10,500,000	$ 234,010,000	CapX rebuilds Section B of the Q1 line
			Highway 35	$ 7,290,000	$ 20,800,000	$ 28,090,000	$ 8,600,000	$ 7,290,000	$ 12,200,000	$ 235,710,000	
			Seven Bridges	$ 7,290,000	$ 24,400,000	$ 31,690,000	$ 8,600,000	$ 7,290,000	$ 15,800,000	$ 239,310,000	
			Galesville double circuit with CapX	$ 7,290,000	$ 21,610,000	$ 28,900,000	$ 8,600,000	$ 7,290,000	$ 13,010,000	$ 236,520,000	
No CapX Project (if CapX is not authorized)			Existing Q1		$ 34,000,000	$ 34,000,000	$ 8,600,000	$ 14,900,000	$ 10,500,000		
			Highway 35		$ 35,700,000	$ 35,700,000	$ 8,600,000	$ 14,900,000	$ 12,200,000		
			Seven Bridges		$ 39,300,000	$ 39,300,000	$ 8,600,000	$ 14,900,000	$ 15,800,000		
			Galesville		$ 40,700,000	$ 40,700,000	$ 8,600,000	$ 14,900,000	$ 17,200,000		

Notes

1 Dairyland Power Cooperative foresees the need to rebuild the Q1 161 kV line regardless of the outcome of the CapX proceeding. Five CapX route alternatives would colocate with (and therefore rebuild) some or all of the Alma - Holmen portion of the Q1. Remaining sections would be rebuilt by Dairyland as a separate project. This table presents the various combinations of CapX and Q1 Rebuild scenarios and the associated costs. Environmental impacts of these scenarios are presented in other tables.

2 Hwy 88 scenarios assume Hwy 88 Option B. Hwy 88 Option A adds $5.75 million.

3 Per the CapX2020 agreements, Dairyland has an 11 percent cost and ownership share of the CapX La Crosse project regardless of the route selected.

4 In this column, the incremental cost to attach the Q1 to the CapX line as a double circuit, when applicable, was removed and assigned to the shaded cells in Q1 Rebuild portion of this table. This presentation does not change the CapX2020 proposal for each route.

5 Shaded cells represent incremental costs of colocating the Q1 with the CapX 345 line as a double circuit. The shaded costs are integral components of the related CapX2020 proposal and represent CapX project costs. A go-by incremental cost of $450,000 was assigned to the Q1 circuit.

Source: Dairyland 2011

Table 2-8: Impact Summary for Q1 Rebuild Options across Black River Bottoms

Resource Category	Original Q-1 Route			Highway 35 Route			Seven Bridges Route			Galesville Route		
	CapX Plus Q-1 assumes 100% CapX/Q-1 double circuit			CapX Plus Q-1 assumes 100% CapX/Q-1 double circuit			CapX Plus Q-1 assumes CapX on the Galesville Route and Q-1 on Seven Bridges[1]			CapX Plus Q-1 assumes 11.3 miles CapX/Q-1 double circuit, 8.6 miles Q-1 single circuit, 9.0 miles CapX[2]		
	CapX Only	Cap X plus Q-1	Q-1 Only	CapX Only	Cap X plus Q-1	Q-1 Only	CapX Only (On Galesville Route)[1]	Cap X plus Q-1	Q-1 Only	CapX Only	Cap X plus Q-1	Q-1 Only
Length (miles)		**13.2**	**13.2**	**15.0**	**15.0**	**15.0**	**20.3**	**36.5**	**16.2**	**20.3**	**28.9**	**19.9**
General Characteristics												
Existing ROW	Not applicable. If CapX is built on the Q-1 route it would of necessity double circuit the Q-1											
Length utilizing existing Transmission corridor (miles)		13.2	13.2	7.4	7.4	7.4	5.0	17.4	12.4	5.0	5.0	0.0
% of route utilizing existing Transmission corridor		**100%**	**100%**	**50%**	**50%**	**50%**	**25%**	**48%**	**77%**	**25%**	**17%**	**0%**
Length utilizing existing Transportation corridor (miles)		0.0	0.0	6.5	6.5	6.5	6.9	10.7	3.8	6.9	15.4	13.6
% of route utilizing existing Transportation corridor		**0%**	**0%**	**43%**	**43%**	**43%**	**34%**	**29%**	**23%**	**34%**	**53%**	**68%**
Length utilizing existing Transmission corridor and/or Transportation corridor (miles)		13.2	13.2	13.9	13.9	13.9	11.9	28.1	16.2	11.9	20.4	13.6
% of route utilizing existing Transmission corridor and/or transportation corridor		**100%**	**100%**	**93%**	**93%**	**93%**	**59%**	**77%**	**100%**	**59%**	**70%**	**68%**
Length not utilizing linear features (miles)		0.0	0.0	1.1	1.1	1.1	8.4	8.4	0.0	8.4	8.5	6.3
% of route not following linear infrastructure		**0%**	**0%**	**7%**	**7%**	**7%**	**41%**	**23%**	**0%**	**41%**	**30%**	**32%**
Natural Resources												
Length crossing Wetlands (miles)		2.6	2.6	1.5	1.5	1.5	1.1	2.9	1.8	1.1	1.1	1.1
Forested Wetlands Impacted (Acres of Forested Wetlands Converted to non-Forested Wetlands)		6.5	1.4	26.5	26.5	17.7	12.9	24.8	11.9	12.9	13.2	9.3
Upland Forest Impacted (acres)		14.1	4.5	19.9	19.9	8.3	76.2	83.4	7.2	76.2	91.0	32.9
Waterway Crossings		27	27	18	18	18	4	11	7	4	5	4
NHI Occurrences (Historic and Non-Historic) within 2 miles of reference centerline		47	47	44	44	44	25	44	40	25	28	28
Residences												
Total residences 0-25 feet		0	0	0	0	0	0	0	0	0	0	0
Total residences 26-50 feet		0	0	0	0	0	1	1	1	0	0	0
Total residences 51-100 feet		5	5	6	6	6	9	21	15	6	13	10
Total residences 101-150 feet		3	3	5	5	5	11	33	25	8	17	15
Total residences 151-300 feet		15	15	25	25	25	51	100	42	58	101	82
Total Residences 0 - 150 feet		**8**	**8**	**11**	**11**	**11**	**21**	**55**	**41**	**14**	**30**	**25**
Total Residences 0 - 300 feet		**23**	**23**	**36**	**36**	**36**	**72**	**155**	**83**	**72**	**131**	**107**
Newly impacted residences 0-25 feet		0	0	0	0	0	0	0	0	0	0	0

Resource Category	Original Q-1 Route			Highway 35 Route			Seven Bridges Route			Galesville Route		
	CapX Plus Q-1 assumes 100% CapX/Q-1 double circuit			CapX Plus Q-1 assumes 100% CapX/Q-1 double circuit			CapX Plus Q-1 assumes CapX on the Galesville Route and Q-1 on Seven Bridges[1]			CapX Plus Q-1 assumes 11.3 miles CapX/Q-1 double circuit, 8.6 miles Q-1 single circuit, 9.0 miles CapX[2]		
	CapX Only	Cap X plus Q-1	Q-1 Only	CapX Only	Cap X plus Q-1	Q-1 Only	CapX Only (On Galesville Route)[1]	Cap X plus Q-1	Q-1 Only	CapX Only	Cap X plus Q-1	Q-1 Only
Newly impacted residences 26-50 feet		0	0	0	0	0	1	0	0	0	0	0
Newly impacted residences 51-100 feet		0	0	0	0	0	6	3	0	3	9	9
Newly impacted residences 101-150 feet		0	0	3	3	3	9	8	2	6	15	15
Newly impacted residences 151-300 feet		0	0	9	9	9	38	48	8	40	82	79
Newly impacted Residences 0 - 150 feet		**0**	**0**	**3**	**3**	**3**	**16**	**11**	**2**	**9**	**24**	**24**
Newly impacted Residences 0 - 300 feet		**0**	**0**	**12**	**12**	**12**	**54**	**59**	**10**	**49**	**106**	**103**
Schools, Day-care Centers, and Hospitals												
Total 0-300 feet		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
State and Federal Lands												
State Lands crossed (miles)		0.30	0.30	0.11	0.12	0.12	0.00	1.54	1.54	0.00	0.06	0.06
Federal Lands crossed (miles)		0.93	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

One house in the Total Residences 151-300 feet range for the Galesville Route and the Cap X plus Q-1 would be double counted because it is 195' from the 161 kV line and 252' from the 345 kV line.

1 Assumes CapX follows the Galesville Route. While this route was studied for the Q-1 line it is not seen as a feasible for the CapX 345 kV route. Therefore the "CapX Only and CapX plus Q-1" option presented in Table 5 studies the Galesville route for this option.

2 Galesville Route note: CapX/Q1 double-circuit on the east-west portion of this route (11.3 miles) and independent routes on the north-south portion. On the north-south portion the CapX line is proposed to be double circuited with the Tremval 161 kV line and therefore the Q-1 line is proposed on a new alignment adjacent to Highway 53/93.

Source: Dairyland 2011

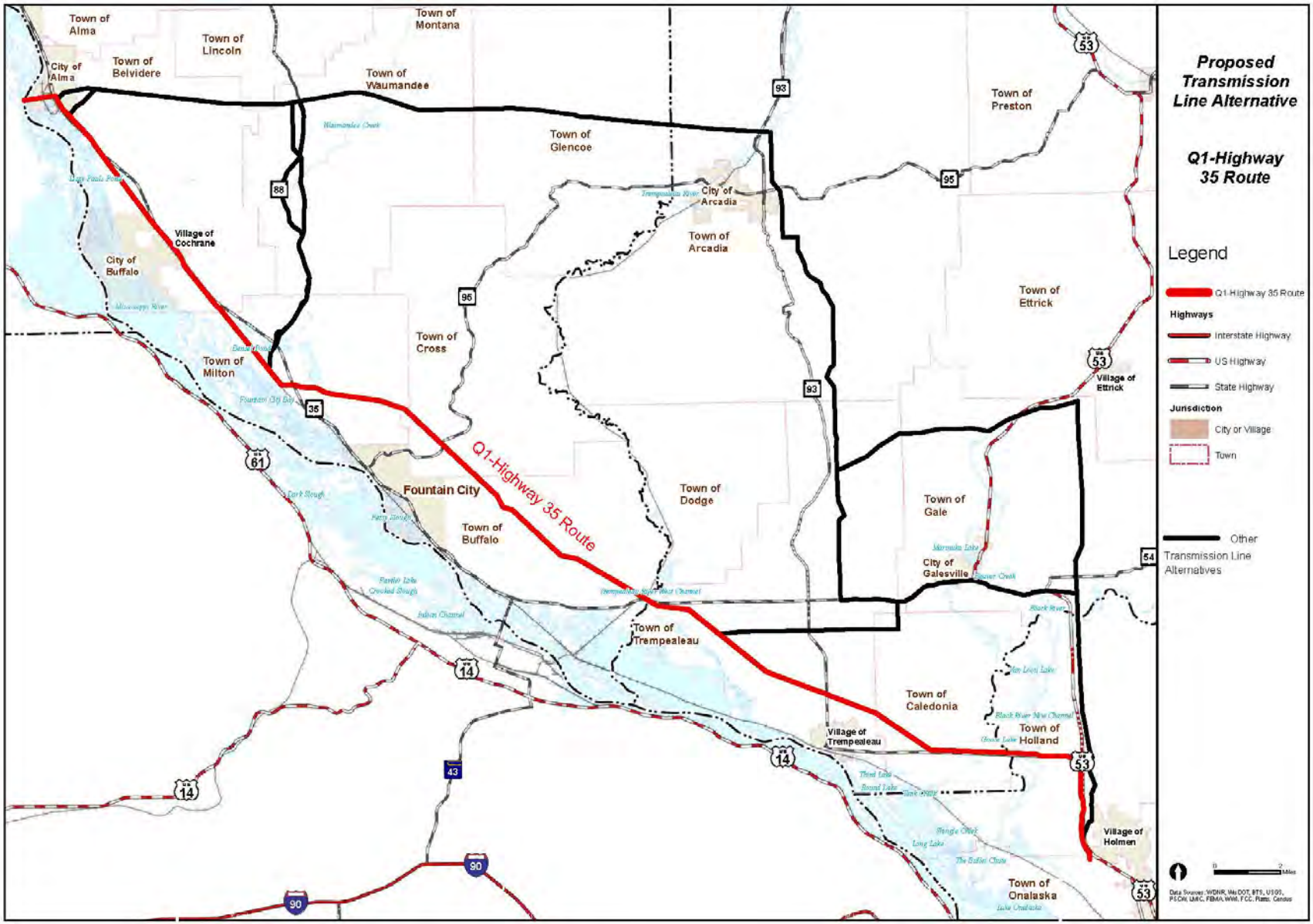

Figure 2-17: Segment 4 Alternative - Q1 - Highway 35 Route

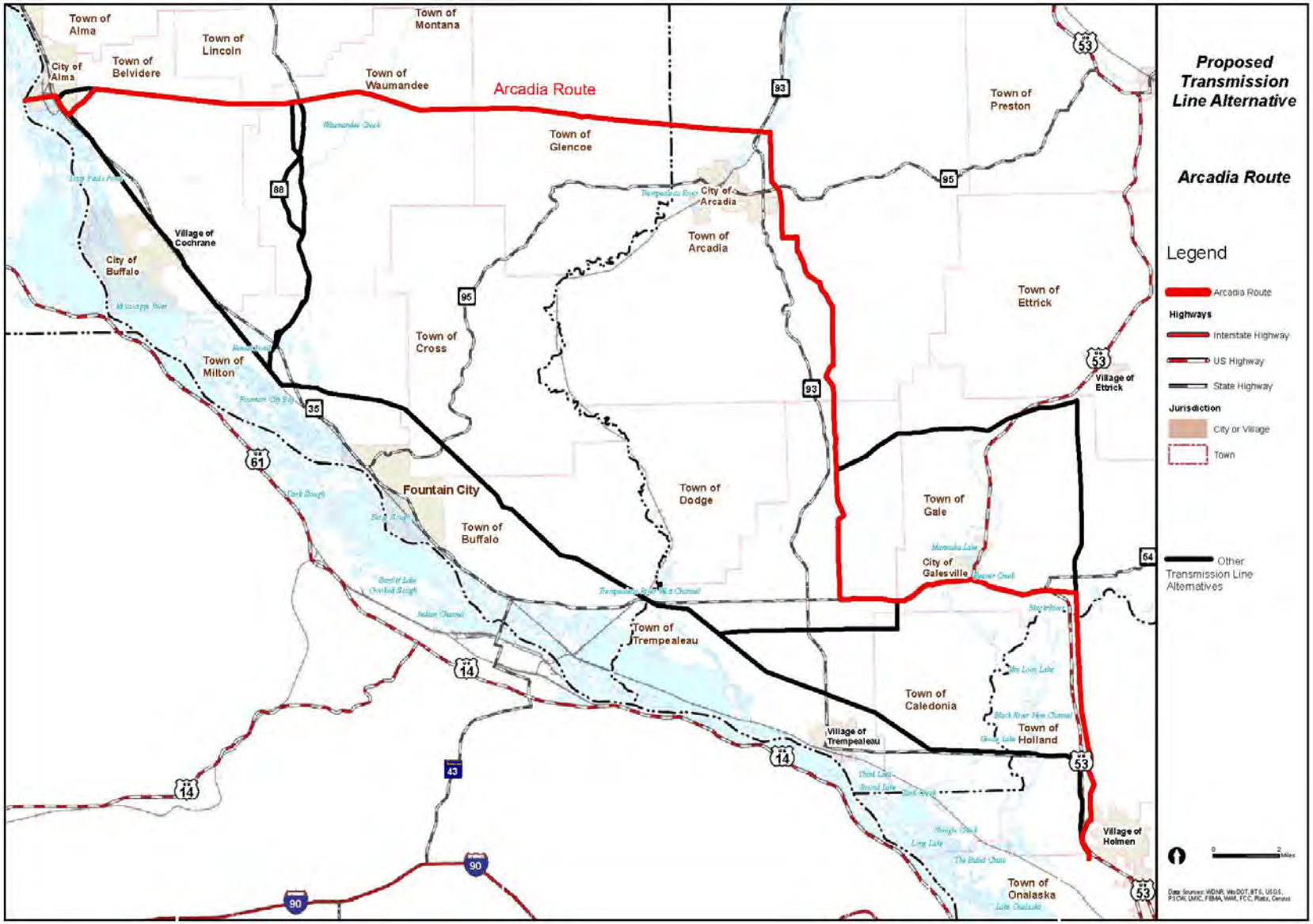

Figure 2-18: Segment 4 - Arcadia Route

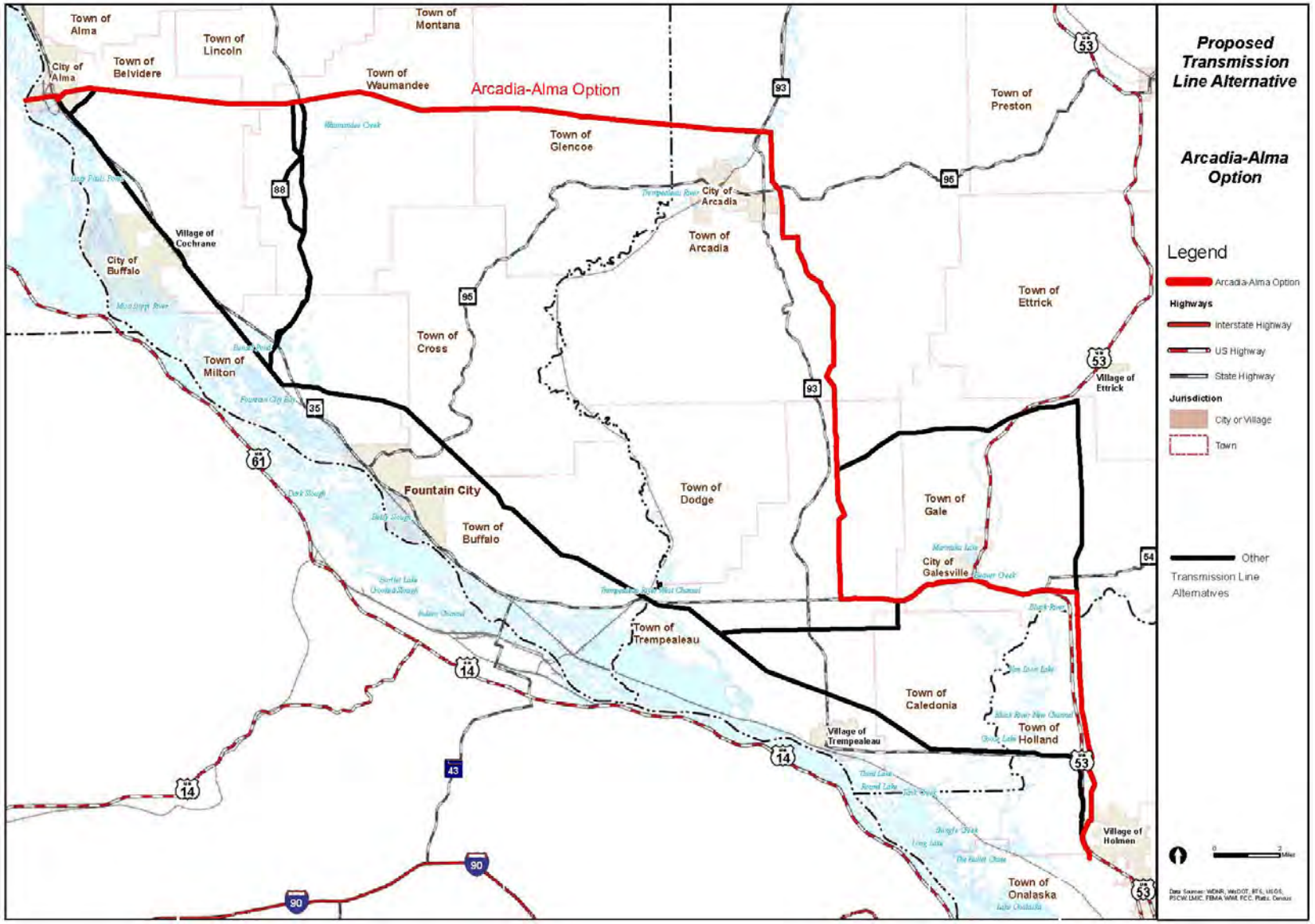

Figure 2-19: Segment 4 - Arcadia - Alma Option

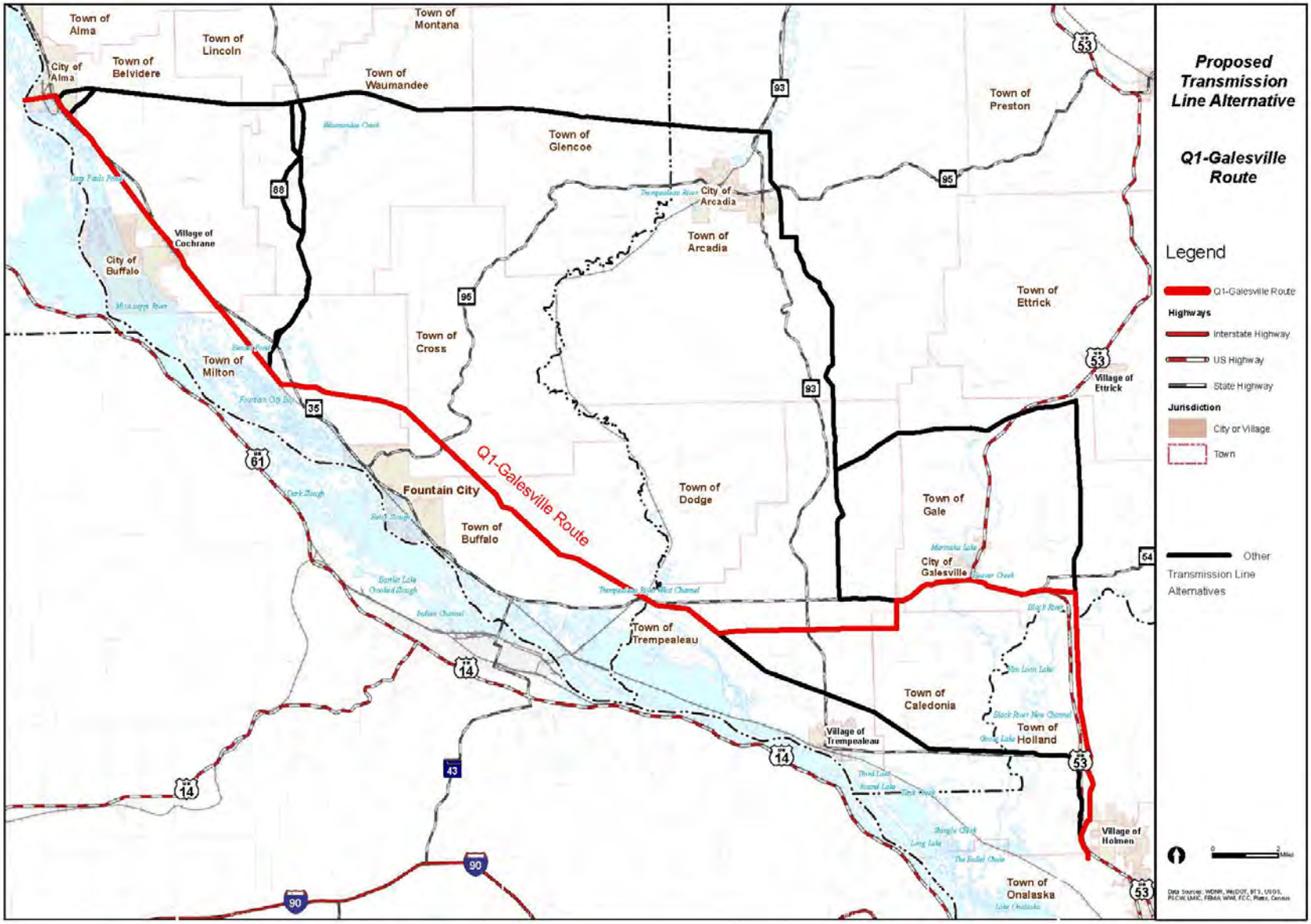

Figure 2-20: Segment 4 - Q1 - Galesville Route

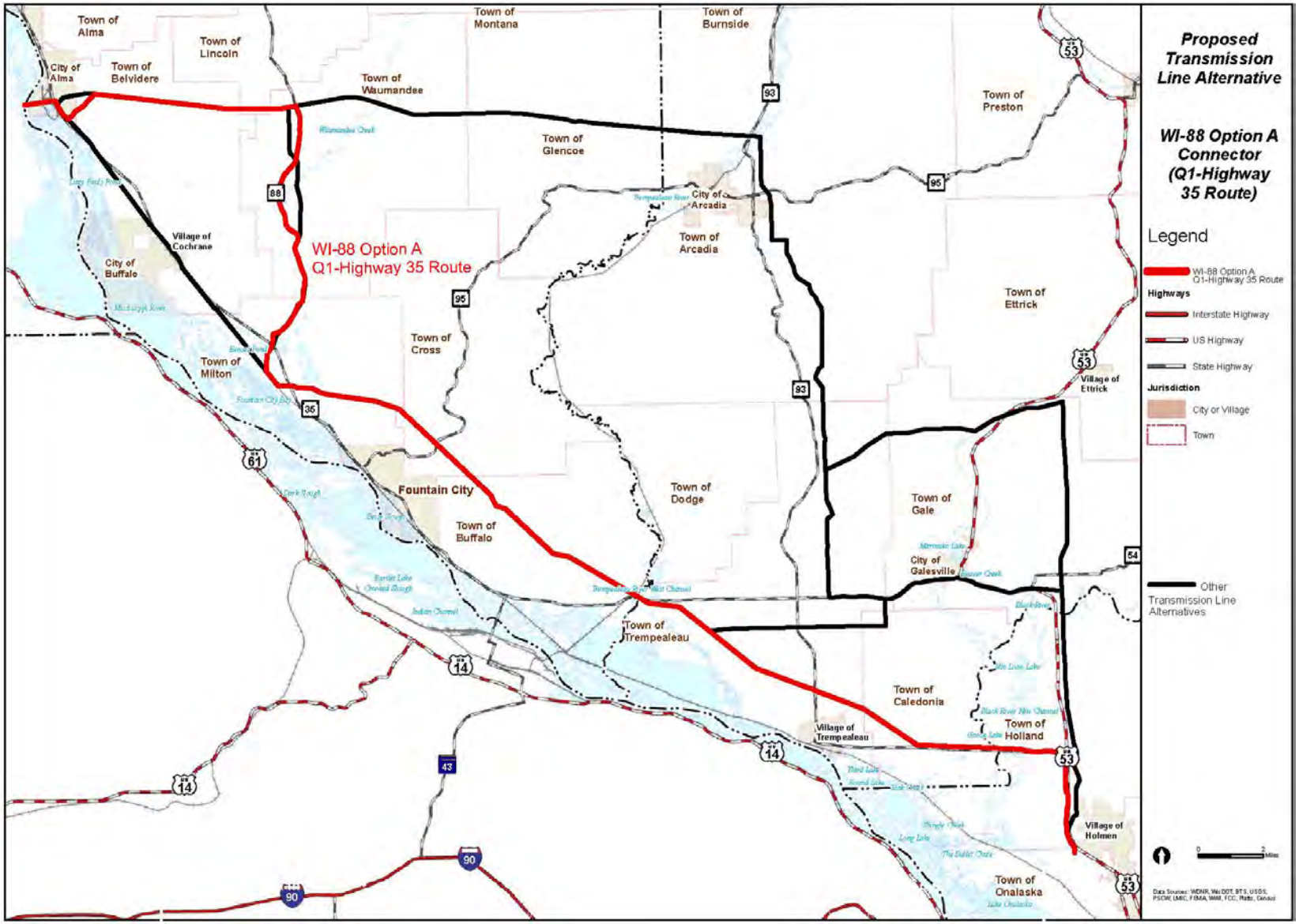

Figure 2-21: Segment 4 - WI-88 Option A Connector (Q1 – Highway 35)

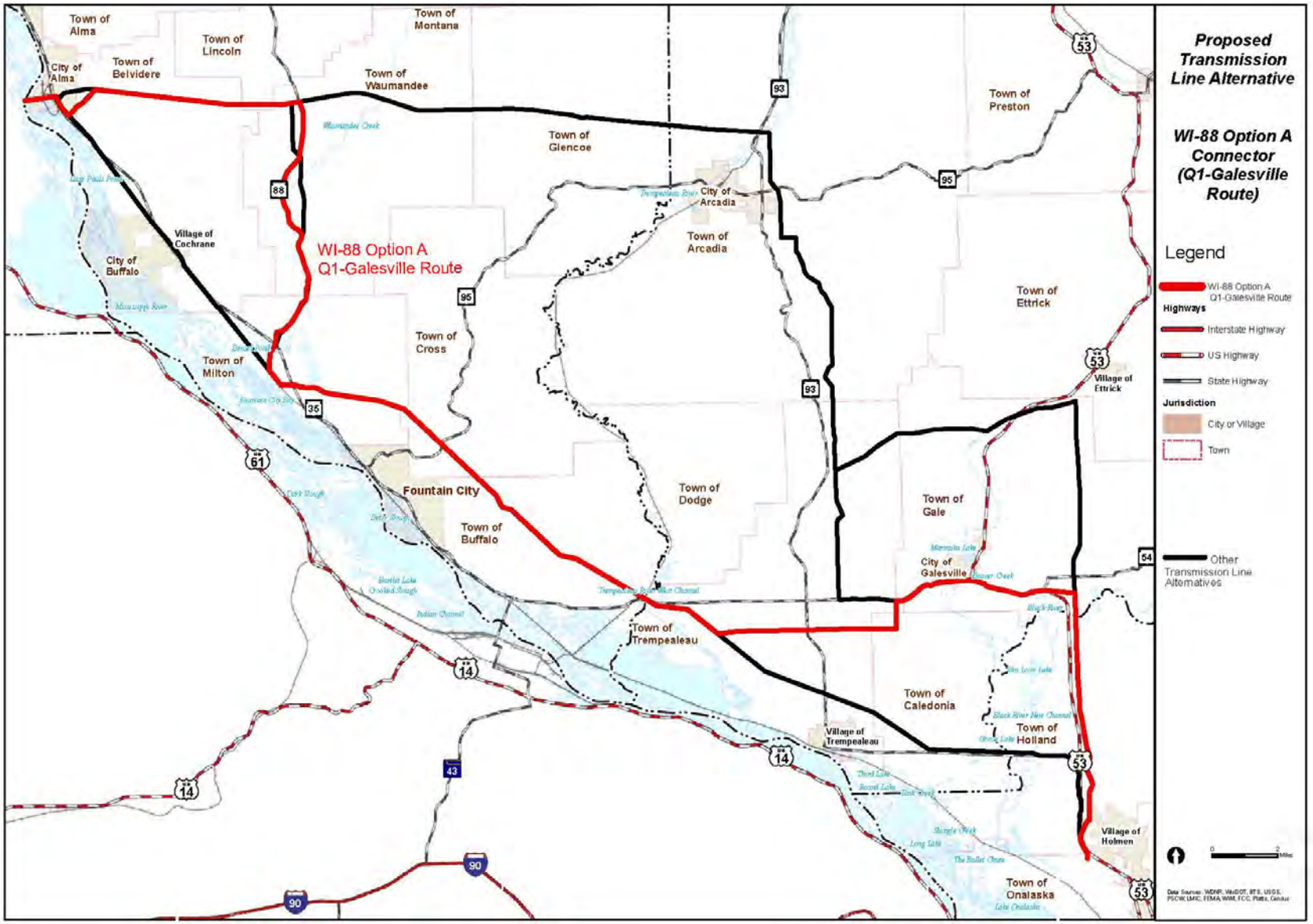

Figure 2-22: Segment 4 - W-88 Option A Connector (Q1 Galesville)

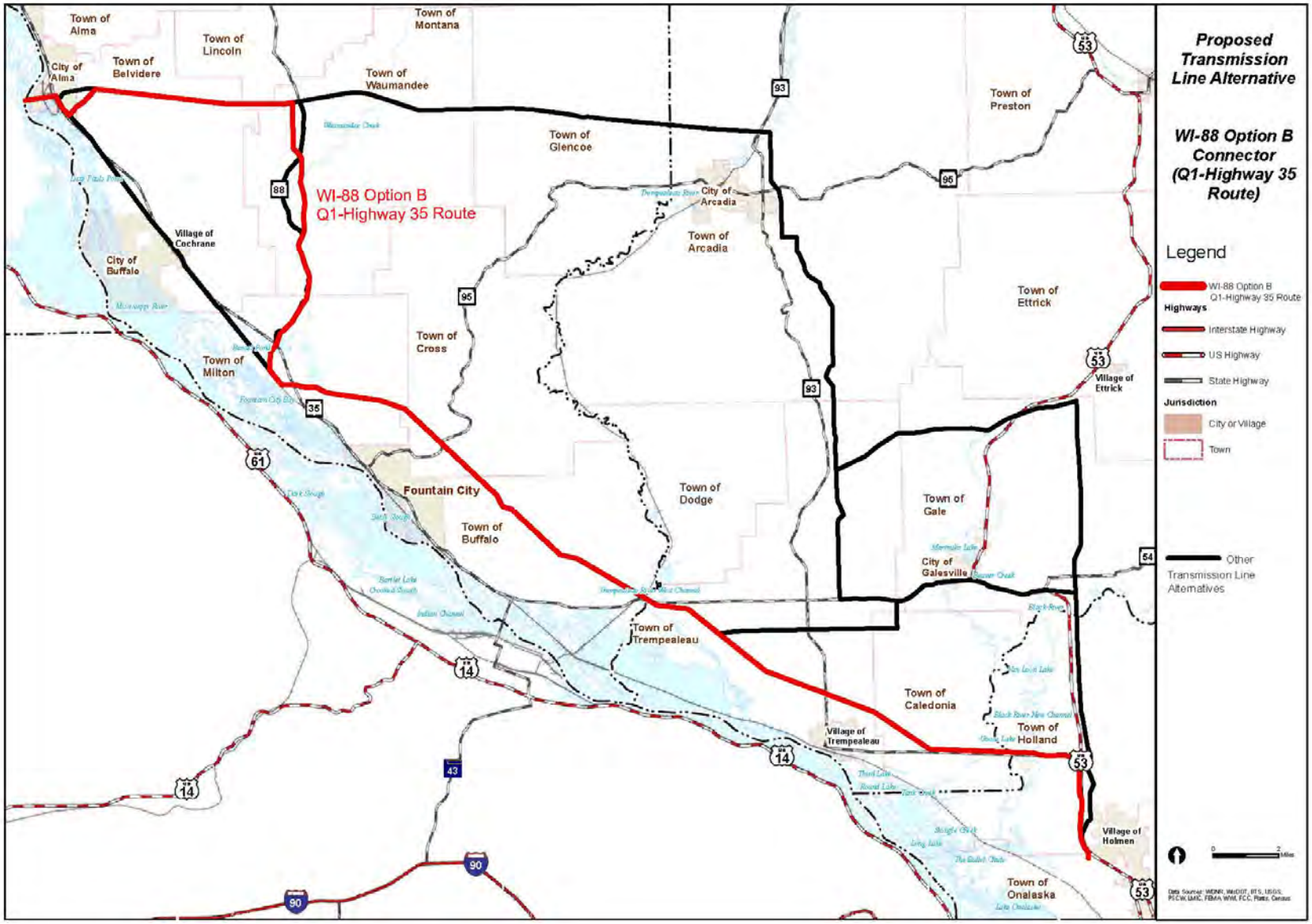

Figure 2-23: Segment 4 - W-88 Option B Connector (Q1 Highway 35)

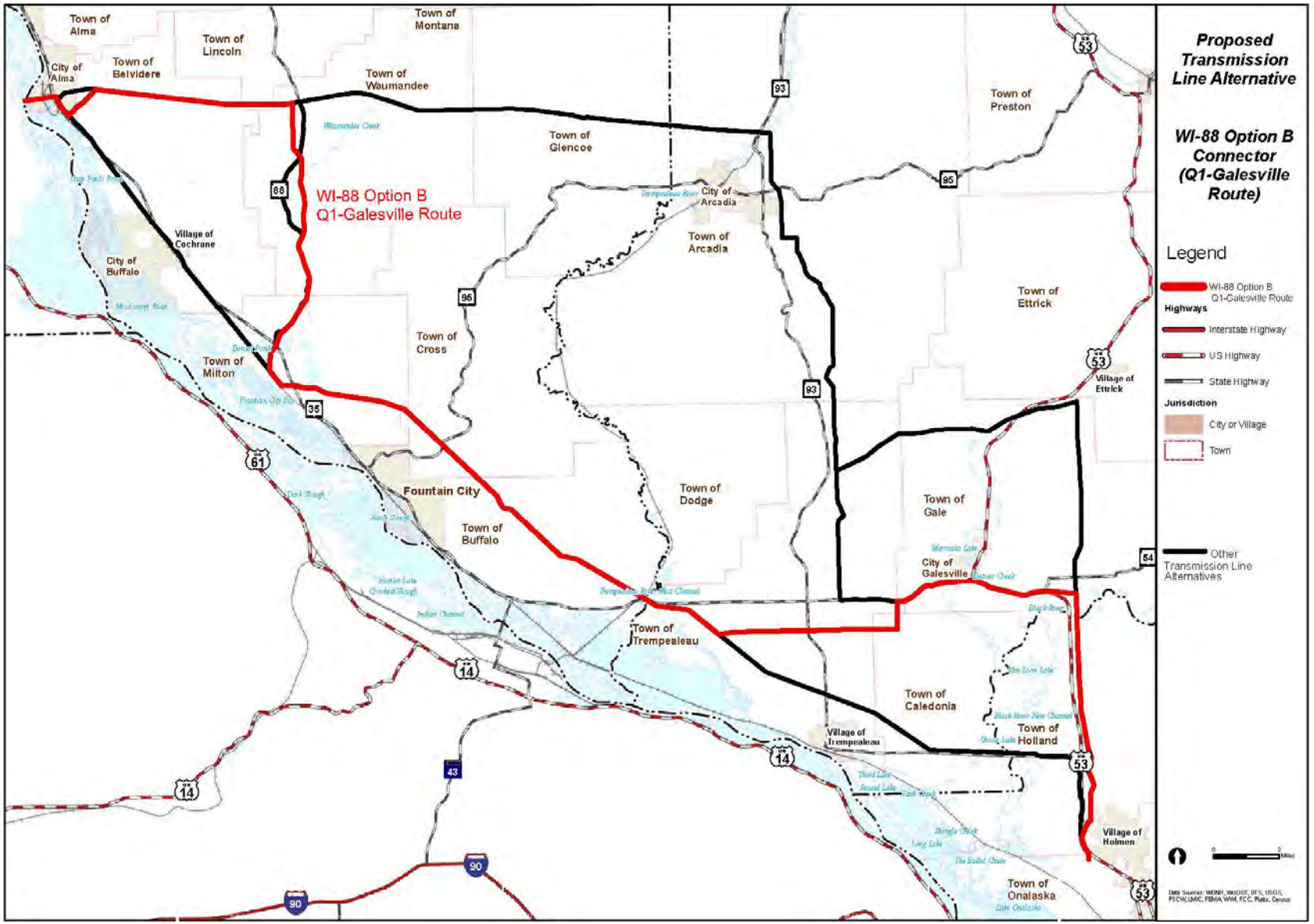

Figure 2-24: Segment 4 - WI-88 Option B Connector (Q1 Galesville)

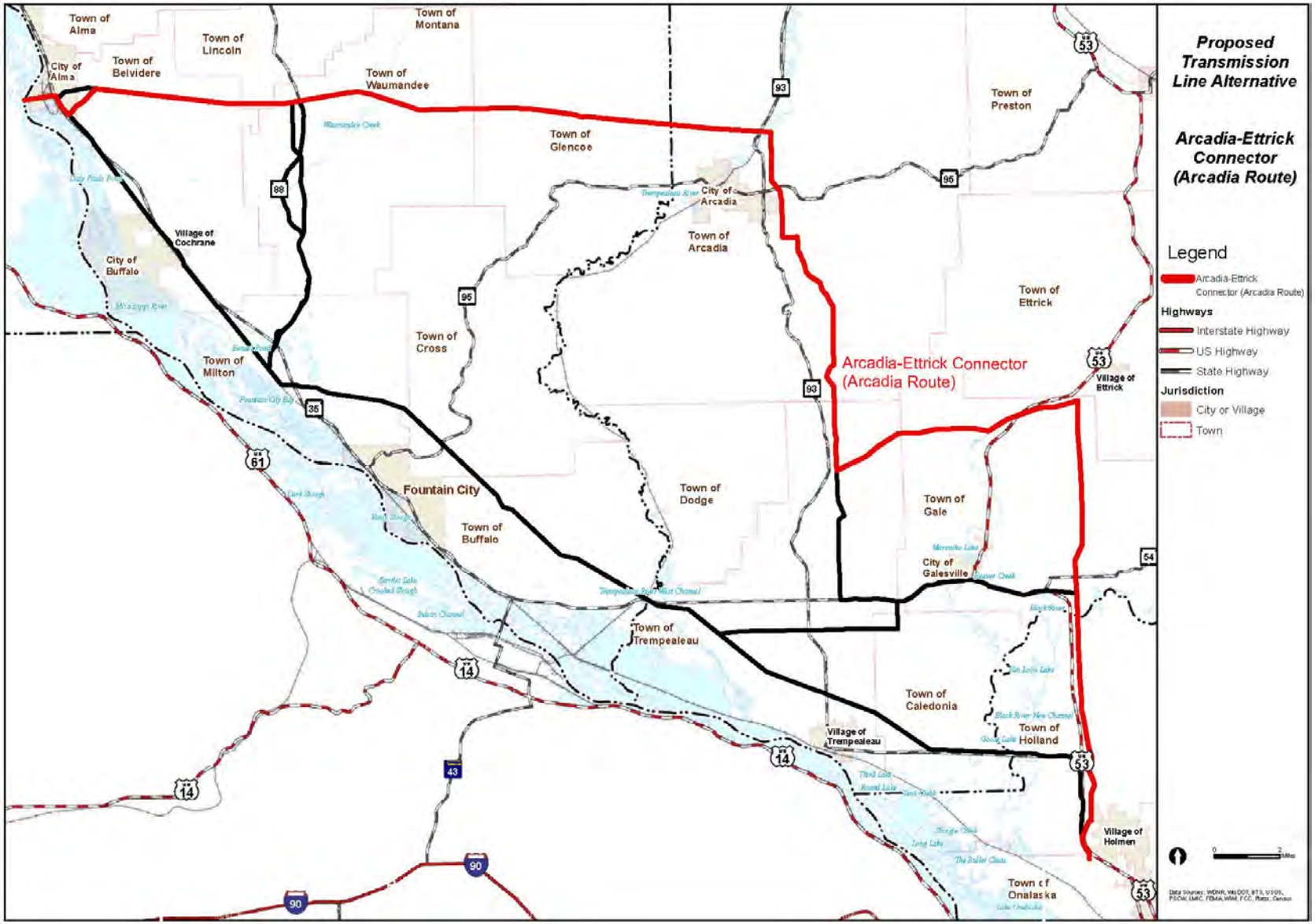

Figure 2-25: Segment 4 - Arcadia - Ettrick Option