

CHAPTER  
12

## 12. Summary and Comparison of Impacts among Routes

This chapter provides a summary and comparison of various potential natural resource and social impacts for the three utility-proposed transmission line routes (Q1-Highway 35, Q1-Galesville, and the Arcadia Routes) and the alternative routes that the applicants developed in response to suggestions by WisDOT (STH 88 Connector Alternative) and WDNR staff (the Ettrick Connector Alternative). The applicants' original Q1 Route is included in the comparisons in case circumstances lead to its reconsideration. This chapter also attempts to discuss relevant issues of concern related to the various proposals, including scenarios for DPC's planned rebuild of its Q1 line if a Q1 Route is not approved. The last section of this chapter addresses cost comparisons among all the route alternatives.

### 12.1. DERIVATION OF PROPOSED ROUTES AND ALTERNATIVES

The three proposed routes plus the two optional STH 88 Connectors (which can be paired with the Q1-Highway 35 or Q1-Galesville Routes) plus the Ettrick Connector (with the Arcadia Route) totals eight routes to summarize and compare. Inclusion of the original Q1 Route brings the total to nine. Their derivations are encapsulated below.

#### 12.1.1. Three routes proposed by the applicants

The three routes proposed in the applicants' submittal are the Q1-Highway 35 Route, the Q1-Galesville Route, and the Arcadia Route. The applicants' originally-preferred Q1 Route was discarded as a primary proposal because of USFWS concerns, but comparable information was included for it in Appendix N of the CPCN application. The Q1-Highway 35 Route is an adaption of the Q1 Route proposed to get the project across the Black River bottom lands and include the DPC Q1 161 kV line in a double circuit, removing that line from its present position crossing the Refuge. The Q1-Galesville Route is an adaption of the Q1 Route proposed to avoid the Black River bottom lands, the Refuge, and the Van Loon State Wildlife Area completely. The Arcadia Route was proposed to provide an alternative to the nearly all of the Q1 path.

The three Q1 Routes share route segments from the Mississippi River crossing at the city of Alma through the DPC Q1 ROW crossing the Trempealeau River. The Q1-Highway 35 Route crosses the Van Loon area parallel to and north of STH 35. The Arcadia and Q1-Galesville Routes separate and head in different directions at the south end of Alma but share the same route segments following STH 54/93 south of Galesville (avoiding the Van Loon), and the segments paralleling USH 53 east of the Van Loon through the village of Holmen to the Briggs Road Substation.

### **12.1.2. Routes resulting from WDOT suggestion**

WisDOT is frequently a cooperating agency and commenter on EIS documents for transmission line projects. In this case, however, WisDOT's concern about potential impacts to GRR has led it to obtain full party intervenor status in the CPCN review. While it cannot be a full party and also an EIS author, WisDOT has cooperated with the EIS preparation and provided information as requested.

During the pre-application process before the applicants filed their submittal to PSCW, WisDOT was an important participant and made the request that an alternative be considered to routing the new 345 kV transmission line along the Great River Road between Alma and the STH 35/88 intersection in the town of Milton. The suggested alternative was to follow the proposed Arcadia Route from Alma to STH 88 and then follow STH 88 south to connect to the proposed Q1-Highway 35 or Q1-Galesville Route and the eastern end of the project. To enable PSCW staff to consider this alternative fairly, staff made formal data requests to the applicants for comparable cost, engineering, and environmental information about the STH 88 Connector.

This alternative follows the Arcadia Route out of Alma eastward to STH 88 and then follow STH 88 southward through the Waumandee Creek valley to the originally-proposed Q1 Route. At Commission staff's request, the applicants' provided information on an alternative connector that would follow the STH 88 highway ROW, called Option A, but also information on another alternative connector suggested by the applicants that straightened the route through the valley to make it less difficult and less expensive to build, called Option B. Options A and B could be applied as Alternative Connectors to either the Q1-Highway 35 Route or the Q1-Galesville Route.<sup>130</sup>

### **12.1.3. Route resulting from WDNR suggestion**

WDNR is a co-author of this document as required under Wis. Stat. § 196.025(2m).

Early in the pre-application process, WDNR staff expressed concern about the high quality of the La Crosse Marsh, where a substation terminus was considered. When all affected agencies and commenters (including those in Minnesota) agreed that the Mississippi River crossing should be at Alma rather than farther south, WDNR's concern about potential impacts to the Van Loon State Wildlife Area and associated wooded wetlands came to the forefront. Crossings of the Van Loon in the utilities' original Q1 Route and the proposed Q1-Highway 35 Route are subject to WDNR permit. Crossing locations under WDNR ownership would be exempt from the eminent domain laws. Proposed wetland construction and WDNR permit issuance are subject to the practicable alternatives requirement in Wis. Admin. Code ch. NR 103.

In their CPCN application filing, the applicants proposed one path, made up of a string of route segments, that by-passed the Van Loon along STH 54/93 south of the city of Galesville (a path used for the eastern portions of both the Arcadia and Q1-Galesville Routes). In order to provide the Commission with two alternative paths that both avoid the Van Loon, WDNR staff suggested that the applicants seek a second path, perhaps further north, that would run eastward and bypass the Van Loon before turning toward La Crosse. In response, the applicants developed the Etrick Connector for the Arcadia Route. To enable PSCW staff to consider this alternative fairly, staff made formal data requests to the applicants for comparable cost, engineering, and environmental information about the Etrick Connector.

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<sup>130</sup> They can also be applied to the original Q1 Route by considering the appropriate segments.

The Ettrick Connector alternative connects to the Arcadia Route at Fox Coulee near STH 93, running eastward toward Ettrick along an existing 69 kV ROW and then south along an existing 161 kV ROW toward the Black River to reconnect to the Arcadia Route (or the Q1-Galesville Route) just north of the Black River and continue southward to the substation sites near Holmen.

The Arcadia Route with the Ettrick Connector became one of the nine potential project routes being examined on an equal plane with each other that will be considered in the CPCN hearing and final Commission decision.

## **12.2. COMPARISON OF NATURAL RESOURCE IMPACTS AMONG ROUTES**

Expected permanent natural resource impacts for any of the routes include: loss or degradation of natural communities and rare species habitat; upland forest clearing, loss of wooded wetlands and conversion to an open wetland type, loss of wetland or agricultural acreage due to structure placements, and aesthetic effects due to the physical presence of the line and tree clearing associated with the ROW.

### **12.2.1. Potential impacts to rare species and communities**

Each of the routes crosses multiple landscapes and natural communities. To compare potential habitat impacts for the different routes effectively, it is important to consider more than the absolute total of habitat types crossed. Additional factors for consideration include the length of the ROW that crosses the habitat, the areal size of the habitat, the distance to or contiguity with adjacent natural habitat, and the surrounding land use.

Similarly, when comparing potential impacts to rare species, the numbers of occurrences recorded in the NHI database, or the results of habitat assessments and the incidental observations recorded during those assessments are generally skewed towards route segments that are readily accessible and/or on public lands. For this project, there is useful and reliable information for species occurrences and much of the natural habitat along the Q1-Highway 35 Route, as well as the original Q1 Route. Many important habitats along the Q1-Galesville Route are contiguous with the Q1-Highway 35 Route, so reasonable extrapolations from the latter can be made. However, large portions of the Arcadia Routes traverse interiors of private properties and therefore have not been accessible for field study either in the past or for this project. Thus, the species and habitat information for these routes is more general in nature and not as comprehensive as the data available for the Q1 Routes.

Table 12.2-1 is a general comparison of the habitat types along undeveloped portions of the routes, particularly the utility-proposed routes and the original Q1 Route. This information provides a basis for considering natural resource impacts likely to occur as a result of constructing and operating a 345 kV transmission line on the routes. Crop lands, pasture lands, and tree farms are not included although they can provide resources for animals, including rare species, as well as buffer habitat from urban and residential disturbances.

Table 12.2-1 Summary of habitat types potentially affected by routes

Route	Prairie/Grassland (acres)	Upland Shrub (acres)	Upland Forested (acres)	Wetland Forested (acres)	Wetland Non-Forested (acres)
Q1-Highway 35	36.7	0.9	184.9	55.5	37.6
Q1-Highway 35 with STH 88 Connector A*	Unknown	Unknown	Unknown	Unknown	Unknown
Q1-Highway 35 with STH 88 Connector B*	Unknown	Unknown	Unknown	Unknown	Unknown
Q1-Galesville	21.9	2.5	225.1	42.4	42.9
Q1-Galesville with STH 88 Connector A*	Unknown	Unknown	Unknown	Unknown	Unknown
Q1-Galesville with STH 88 Connector B*	Unknown	Unknown	Unknown	Unknown	Unknown
Q1, original route	17.8	0.9	176.6	54.5	75
Arcadia	34.9	4.0	262.5	45.9	65.0
Arcadia-Ettrick Connector*	Unknown	Unknown	Unknown	Unknown	Unknown

\*Habitat data was not submitted as part of CPCN application for the connector segments.

Where the routes are located in the landscape determines the type of habitat impacts that can be anticipated. The original Q1 Route and Q1-Highway 35 Route would predominantly impact wetland and forested communities within some relatively large habitat areas. The original Q1 Route would affect more of the Van Loon/Black River Bottoms wetlands, whereas the Q1-Highway 35 Route affects less of the Van Loon but would also impact the New Amsterdam Grassland area. The Q1-Galesville Route avoids more of the Van Loon/Black River Bottoms and thus has fewer habitat impacts than either the original Q1 Route or the Q1-Highway 35 Route, making protection of rare species during construction easier to manage.

The larger habitat areas of concern crossed by the Arcadia and Arcadia-Ettrick routes are predominantly upland natural communities because the lowland/wetland areas are fragmented by agricultural land use. These routes would thus potentially impact more upland habitats and species than the Q1 Route variations.

Some portions of routes follow creek valleys, such as the STH 88 Connector options (Waumandee Creek), Segment 13A and 13B1 of the Arcadia Route (Little Tamarack Creek), or Segment 3ET of the Arcadia-Ettrick Connector (Beaver Creek). This type of route segment would create challenges for working in adjacent riparian habitats.

Table 12.2-2 shows the number of rare species that potentially could occur within approximately 2.0 miles of each of the proposed routes based on occurrences recorded in the WDNR NHI. The columns show the number of endangered (E), threatened (Th), and special concern (SC) species separated by hyphens. The applicants did not incorporate NHI summaries into full routes for the STH 88 or the Ettrick Connectors. Comparable route information for the Connectors will be provided in the final EIS.

Table 12.2-2 Summary of NHI rare species occurrences by proposed route \*

Taxa	Q1-Highway 35 (E-Th-SC)	Q1-Galesville (E-Th-SC)	Original Q1 Route (E-Th-SC)	Arcadia (E-Th-SC)
Bird	2-6-7	2-6-7	2-6-7	1-3-3
Butterfly	1-0-4	1-0-2	1-0-4	0-0-1
Mammal	0-0-0	0-0-1	0-0-0	0-0-1
Snake	1-0-2	1-0-2	1-0-2	1-0-2
Terrestrial Snail	0-1-0	0-1-0	0-1-0	0-1-0
Turtle	0-2-1	0-2-0	0-2-1	0-1-0
Dragonfly/Mayfly	1-0-6	1-0-5	1-0-6	1-0-5
Mussel	5-3-4	4-4-4	5-3-4	0-1-1
Fish	4-5-7	4-5-9	6-5-7	4-5-9
Aquatic/Wetland Plant	0-3-2	0-3-1	0-3-2	0-2-4
Total	14-24-42	13-26-40	16-24-41	7-16-35

\*Species data was not submitted as part of CPCN application for the connector segments.

The NHI database is a record of existing sources of information and, as previously stated, more is known about lands with public access. The Arcadia Route shows distinctly fewer NHI species occurrences than the Q1 Route alternatives but that does not necessarily mean that the route would impact fewer rare species. The Arcadia Route and, presumably, the Arcadia-Ettrick Route cross more private property so the database presents an incomplete picture of the rare species that occupy the landscape through which these routes pass. Other rare species might be present along these routes, or species that have already been identified might be present in additional route locations not represented in the NHI data.

Many of the impacts to aquatic plant, fish, mussel, and dragonfly/mayfly species can be avoided or minimized by avoiding direct impacts to waterways through the use of bridges, access from opposite banks, and implementation of strict erosion control measures. On the other hand, it would be more difficult to address impacts to terrestrial and wetland species such as snails, turtles, snakes, and birds because the complexity of environmental and land use concerns along this project make successful implementation of avoidance and minimization measures for all species at all locations very difficult. For example, rare turtles and snakes in the project area are known to attempt hibernation in locations that may not freeze. Therefore, the usual methods of avoidance such as winter construction in this part of the state might not be as successful as for other similar construction projects in other locations.

Rare birds might be disturbed by the activity and noise from construction during critical periods of the breeding season and abandon their nests. Birds that prefer woody or forested habitat could suffer indirect impacts through the loss of habitat, reduction in habitat quality, and increased predation allowed after ROW clearing. Bird diverters may be required on some portions of the routes to help avoid additional impacts to the species after construction has been completed.

The Commission could require one or more methods to minimize or avoid impacts to rare species, including but not limited to specifying the timing of construction, use of construction barriers, or changes in the design of the transmission line. Additionally, the Commission may order an expert to be present during construction of portions of the route to monitor for potential impacts. If it is possible that construction activities could still result in the harm or “take” of a threatened or endangered species, an applicant can apply for an Incidental Take Permit from WDNR. Based in part on the conservation plan included in that application, WDNR would determine whether the criteria for issuing an Incidental Take Permit could be met according to Wis. Stat. § 29.604(6m)(f)1.

### 12.2.2. Potential forest losses

Table 12.2-3 compares each route and alternative with respect to forests affected by new ROW. While upland forest clearing is always a concern, WDNR has expressed strong concerns about the quality of local wetland forests that would be crossed and impacted by different project routes. Clearing of wetland forest permanently alters both wetland hydrology and biology.

Table 12.2-3 Comparison of potential upland forest impact for each route

Route	Route Length (miles)	New Upland Forest Affected (acres)	New Wetland Forest Affected (acres)	Total Forested Area Cleared (acres)
Q1-Highway 35	43.0	94.50	33.30	127.8
Q1-Highway 35 with STH 88 Connector A	49.7	128.40	48.30	176.7
Q1-Highway 35 with STH 88 Connector B	49.0	128.10	48.00	176.1
Q1-Galesville	48.4	111.90	20.00	131.9
Q1-Galesville with STH 88 Connector A	55.0	145.80	34.99	180.8
Q1-Galesville with STH 88 Connector B	54.4	145.52	34.68	180.2
Q1, Original	41.3	87.60	36.30	123.9
Arcadia	54.8	140.00	21.10	161.1
Arcadia-Ettrick Connector	57.0	148.10	27.30	175.4

Table 12.2-3 shows that, except for the original Q1 Route, the Q1-Highway 35 Route would be the shortest proposed or suggested route and affect the least amount of woodland overall. The Q1-Galesville Route would affect slightly more woodland overall but notably less wooded wetland, the least of any route considered. The Arcadia Route would clear almost as little wooded wetland but notably more upland forests and the greatest amount of woodland overall of the three utility-proposed routes.

Substituting the STH 88 Connector options increases the amounts of upland and wetland forests affected for both the Q1-Highway 35 Route and the Q1-Galesville Route. Comparing potential wetland forest impacts of the Q1 routes with the STH 88 Connectors to the impacts of the Arcadia Route, the relative impact of the Q1 Routes becomes greater. When upland forest impacts are compared, the Arcadia Route still has more impact than the Q1-Highway 35 Route with STH 88 Connector Options but the Q1-Galesville Route with STH 88 Connector Options would have more impact than the proposed Arcadia Route.

Substituting the Ettrick Connector into the Arcadia Route increases both upland and wetland forest impacts. The Arcadia-Ettrick Route has the greatest amount of upland forest clearing of any route under consideration. Its potential wetland forest impact would be less, though, than that of the Q1-Highway 45 Route with or without the STH 88 Connector and less than that of the Q1-Galesville Route with the STH 88 Connector.

### 12.2.3. Potential Impacts to rivers and streams

The routes cross both the mouths of three larger local river systems (Waumandee Creek and the Black and Trempealeau Rivers) and many tributaries that feed these waterways. The differences between the various routes in relation to waterway impacts relates to the number of streams that are crossed, the quality of the streams, where the stream crossings occur within the watershed (at the mouth, upstream or at feeder

stream)), and the type of impact (temporary clear span bridge or permanent structures within the waterway).

The Original Q1 and the Q1-Highway 35 Routes impact the floodplains/bottomlands and river mouths of these river systems. The Arcadia Route primarily affects the headwaters of Waumandee Creek and tributaries to the river systems. The remaining routes cross a combination of the river floodplains and upstream tributaries.

Table 12.2-4 compares each route and alternative with respect to the numbers of rivers and streams that are crossed. Some streams are identified as trout waters by WDNR and their fish populations could change if shading vegetation is removed and thermal loading increases. Some crossings would be spanned while others could require temporary bridging.

The application contains some internal inconsistencies regarding how stream crossings were identified and would be addressed during construction that were unable to be resolved prior to the issue of this draft EIS. Additionally, the term “miscellaneous structure” is used but not defined in the application. Verbal communication with the applicants indicates that this term could be applied to a variety of structures including a bridge, an in-stream support for a bridge, or a transmission structure, each potentially causing different impacts and concerns. Finally, the applicants did not submit WDNR Utility Permit Application Tables for the STH 88 Route Options, so waterway and wetland route comparisons with these options cannot be completed at this time.

From the information presented in Table 12.2-4, it appears that the Arcadia-Etrick Route crosses the largest number of streams and the most high-quality streams, and that it would require the most TCSBs during construction. Issues associated with high-quality stream crossings include construction timing, proper erosion control, and removal of vegetation along the stream banks, all of which could increase the potential for soil runoff, increased sedimentation into the waterway and degradation of the aquatic habitat.

The original Q1 Route has also a large number of waterway impacts, primarily associated with the crossing of the Black River and Van Loon wetland complex. Because it is such a highly-valued habitat resource, potential construction impacts within and adjacent to the Van Loon would be a significant risk of this route.

The Q1-Galesville Route has the fewest crossings of waterways, crosses no high-quality waterways, avoids the Van Loon complex entirely, and would require the least number of structures within the waterway.

Table 12.2-4 Comparison of potential waterway impacts for each route

Route	Route Length (miles)	Number of Waterway Crossings on ROW	ROW Crossings of Outstanding/Exceptional Waterways and Trout Streams***	Number of Structures in Waterways (Appendix T, Table 1)	Number of Structures in Waterways (Appendix T, Table 3)	Number of TCSBs Off ROW (Appendix T, Table 5)
Q1-Highway 35	43.0	38	None	1 TCSB, 7 Misc. Structures	3 TCSBs, 7 Misc. Structures	2 TCSBs
Q1-Galesville	48.4	23	None	2 TCSBs, 2 Misc. Structures	4 TCSBs, 2 Misc. Structures	2 TCSBs
Q1 Original*	41.3	46	None	3 TCSBs, 18 Misc. Structures	5 TCSBs, 18 Misc. Structures	2 TCSBs, 1 Misc. Structure
Arcadia	54.8	42	1 Crossing, (Tamarack Creek)	6 TCSBs, 1 Misc. Structure	12 TCSBs, 1 Misc. Structure	8 TCSBs
Arcadia-Ettrick Connector (Segments 1ET, 2ET, 3ET, 4ET)**	57.0	63	7 Crossings, (Tamarack, Abraham Coulee, Beaver, and an unnamed Creek)	13 TCSBs, 1 Misc. Structure	7 TCSBs	11 TCSBs

\*Source: CPCN Application, Appendix N.

\*\*Source: CPCN Application, Appendix W.

\*\*\*Source: GIS files submitted as part of CPCN application filing, in addition to statewide databases.

### 12.2.4. Potential wetland impacts

The numbers of wetlands or wetland acreage affected is an important factor to consider, but it may not be as critical as the hydrologic and biological quality of the affected wetland(s). As noted above, there is strong concern about the change in quality that could occur in certain forested wetlands. As discussed in Section 7.3.4 in Chapter 7, the wetlands of the Van Loon are the state’s highest priority wetland in the project area.

The importance of the Van Loon notwithstanding, Table 12.2-4 compares each route and alternative with respect to the numbers and acreages of wetlands that are crossed. The wetlands of the Van Loon are represented in the numbers and acreages shown for the Q1-Highway 35 Route and the original Q1 Route. The acreages under Total Wetlands Affected are broken down into four categories in the four columns on the right side of the table.

Table 12.2-5 only identifies the quantity of wetlands that would be impacted by the potential routes. Consideration of wetland quality and type is as important, if not more important, when comparing impacts along each route. Wetland size, contiguity with or distance to other natural community types, dominant vegetation species, and hydrology provide additional valuable information about a wetland’s quality and functional values. Additionally, forested wetlands are considered more vulnerable and possibly more valuable than other types of wetlands because they are permanently lost when ROW clearing occurs and are rarely replaced when off-site wetland restoration/mitigation is required by regulatory agencies. In the case of transmission construction, forested wetlands would be replaced by lower-quality, grassy meadow wetlands. The natural restoration of all affected wetlands could be further complicated by the potential introduction of non-native species. Once non-native species become established within the transmission ROW, the ability of the wetland complex to function properly and its species diversity would both be diminished.



Table 12.2-5 Comparison of potential wetland effects for each route

Route	Total Acres of Wetlands Affected (as a percentage of total ROW acres)	Number of Structures in Wetlands	New Forested Wetland Affected (acres)	Existing ROW Forested Wetland (acres)	New Non-Forested Wetland Affected (acres)	Existing ROW Non-Forested Wetland (acres)
Q1-Highway 35	83.5/10.6%	78	33.3	21.8	13.6	14.9
Q1-Highway 35 with STH 88 Connector A*	109.0/11.9%	67	48.3	20.8	28.4	11.6
Q1-Highway 35 with STH 88 Connector B*	111.2/12.3%	65	48.0	20.0	32.7	10.6
Q1-Galesville	63.7/7.2%	50	20.0	14.9	14.5	14.3
Q1-Galesville with STH 88 Connector A*	60.7/8.4%	30	27.5	10.6	20.5	2.2
Q1-Galesville with STH 88 Connector B*	62.9/8.8%	27	27.2	9.7	24.8	1.2
Q1, original route	118.8/15.4%	105	36.3	28.0	28.7	25.8
Arcadia	95.6/9.5%	64	21.1	17.7	34.3	22.6
Arcadia – Etrick Connector	142.9/13.7%	119	27.3	29.6	45.7	40.3

\*Source for number of structures in wetland for STH 88 Connector options was personal email communication from applicants.

The Van Loon wetlands present a problem. Of all the routes under consideration, the original Q1 Route not only has the highest percentage of its ROW within wetlands, it also crosses (Segment 5B) the large, forested, floodplains wetlands of the Van Loon and Black River bottoms. Much of the area encompassing these high-quality wetlands is owned or managed by the state or federal government. Because of the quality of these natural areas, which provide habitat to a diversity of species, permits for this route are unlikely to be approved by USFWS. The Q1-Highway 35 Route crosses a significantly smaller portion of the Van Loon and Black River bottoms than the original Q1 Route (Segment 8B); however, natural resource concerns persist. WDNR permitting of the route through the Van Loon is problematic and subject to the practicable alternative requirements of Wis. Admin. Code ch. NR 103.

## 12.3. COMPARISON OF COMMUNITY IMPACTS

### 12.3.1. Recreational resources

This project is not expected to have any adverse effect on public trails.

Depending on which route is selected, the proposed 345 kV transmission line may have some disruptive impacts on recreational lands including at or near the Mississippi River crossing common to all routes, on the original Q1 Route in the Refuge in the Black River bottom lands, in the Van Loon State Wildlife Area crossed by the original Q1 Route and the Q1-Highway 35 Route, and at the Holland Sand Prairie State Natural Area north of Holmen along the Arcadia and Q1-Galesville Routes. There is also a canoe landing on the Black River along Segment 17A which is common to the Arcadia and Q1-Galesville Routes.

### 12.3.2. High-voltage impact fees

Different municipalities and counties would receive different amounts of shared revenue dollars depending on the route chosen. The distribution of thousands to hundreds of thousands of dollars on an annual basis would be a positive impact to these communities. Local governments may use the annual

payments for any purpose. Regardless of the route chosen, Buffalo, La Crosse, and Trempealeau Counties would receive a one-time environmental impact payment between \$400,000 and more than \$2.5 million.

### 12.3.3. Proximity of the routes to residences, schools, daycare centers, and businesses

Table 12.3.2-1 shows the relative locations of residential buildings and businesses within 300 feet of the proposed centerlines for each of the proposed and alternative routes. There are no schools or day care centers within 300 feet of the project routes.

Table 12.3-1 Comparison of residential and commercial buildings within 300 feet of the centerline by route

Route	Length (miles)	Distance from the Proposed Centerline (feet)					Totals Within 300 Feet	
		0-25	26-50	51-100	101-150	151-300	Residences	Commercial
Q1-Highway 35 Route	43.0	0	0	14	8	52	74	1
Q1-Highway 35 Route with STH 88 Connector A	49.7	0	0	13	13	53	79	1
Q1-Highway 35 Route with STH 88 Connector B	49.0	0	0	12	7	48	67	1
Q1-Galesville Route	48.4	0	0 <sup>a</sup>	14 <sup>b</sup>	11 <sup>c</sup>	84	109 <sup>d</sup>	2
Q1-Galesville Route with STH 88 Connector A	55.0	0	0 <sup>a</sup>	13 <sup>b</sup>	16 <sup>c</sup>	85	114 <sup>d</sup>	2
Q1-Galesville Route with STH 88 Connector B	54.4	0	0 <sup>a</sup>	12 <sup>b</sup>	10 <sup>c</sup>	80	102 <sup>d</sup>	2
Q1-Original Route	41.3	0	0	13	6	42	61	1
Arcadia Route	54.8	0	0 <sup>a</sup>	9 <sup>b</sup>	15 <sup>c</sup>	78	102 <sup>d</sup>	2
Arcadia Route with Ettrick Connector	57.0	0	0	7	7	42	56	2

- a. An 8-unit apartment building under construction in Galesville is not included in this table.
- b. An 8-unit apartment building under construction in Galesville is not included in this table.
- c. An 8-unit apartment building under construction in Galesville is not included in this table.
- d. Three 8-unit apartment buildings under construction in Galesville are not included in this table.

None of the routes under consideration would have homes closer than 50 feet from the centerline, but because the ROW is 150 feet wide, any residences or portions of them that are less than 75 feet from the centerline would be within the ROW. The Q1-Highway 35 and Q1-Galesville Routes each have 14 homes within 100 feet of the proposed centerline. The STH 88 Connectors each have a few less. The Arcadia Route has nine homes within 100 feet; utilization of the Ettrick Connector decreases that number to seven. In addition to single-family homes, there are three new apartment buildings being constructed within 50, 100, and 150 feet of the Q1-Galesville and Arcadia Routes.

Because the greatest single concentration of homes in the project area is along STH 54/USH53 on the south side of Galesville, all of the routes that utilize Segments 13B1, 13B2, and 13 C (the Arcadia Route and all of the Q1-Galesville alternatives) have the highest number of residences in close proximity to the line.

### 12.3.4. Potential for impact on Great River Road

Each of the proposed routes crosses, shares ROW, or parallels GRR at some point, for different lengths. Routes utilizing the STH 88 Connector Alternative options also affect GRR, to a lesser extent.

The Q1-Highway 35 Route follows GRR for approximately 20 of its approximately 43 miles (Segments 2A through 2E and 8A through 18H). The southernmost segment of this route, Segment 18H, is a segment common to all proposed routes and shares ROW with GRR.

The Q1-Galesville Route would share or parallel GRR’s ROW for approximately 15 miles, the 12-mile segment it shares in common with the Q1-Highway 35 Route, and approximately 3.0 miles at its southern end.

The use of one of the STH 88 Connectors would reduce the amount of route length shared with GRR for the Q1-Highway 35 Route and the Q1-Galesville Route (and the original Q1 Route) by approximately 10 miles.

The Arcadia Route, with or without the Ettrick Connector, would have the least impact on GRR, crossing it near Alma and then paralleling or sharing ROW with GRR for its southernmost 3.0 miles (Segments 18B through 18H).

## 12.4. SCENARIOS FOR A DPC Q1 161 KV REBUILD RESULTING FROM COMMISSION ROUTING DECISIONS

The existing DPC 161 kV line, called the Q1 line, is nearing the end of its useful life. DPC has determined that it must either rebuild or replace the line, regardless of the outcome of this proposed project. The proposed project discussed in Section 3.3.1 would replace the Q1 line if certain routing alternatives were selected and force a different scenario for the Q1 line if others were selected. Table 12.4-1 illustrates different Q1 rebuild scenarios for different routing decisions that could be made in this project review.

Table 12.4-1 Q1 rebuild need scenarios for different Alma-Holmen project routes

Project Route or Segment	Additional Q-1 Rebuild Needed (miles)				Q1
	Alma-Milton	Milton-Trempealeau	Trempealeau-Holmen	Total	
<b>Q1 Route alternatives</b>					
Q1-Highway 35	0	0	0	0	The Q1 line would be completely rebuilt as part of the project.
Q1-Galesville	0	0	13 to 20	13 to 20	About 27 miles of the Q1 line would be rebuilt as part of the project.
STH 88 Connector	10	0	0	10	Increases Q1 rebuild needed for Q1-Highway 35 Route or Q1-Galesville Route
<b>Arcadia Route alternatives</b>					
Arcadia	10	16	13 to 20	39 to 46	Complete stand-alone rebuild of the Q1 line would be needed.
Arcadia-Ettrick	10	16	13 to 20	39 to 46	Complete stand-alone rebuild of the Q1 line would be needed.

Table 12.4-1 shows that the Commission’s decisions in this docket would result in different options for DPC’s Q1 line rebuild. The Arcadia Route and the Arcadia Route with the Ettrick Connector affect the Q1 line only at the north end of the project at Alma on Segments 2A1 and 2A2. If either of these routes is approved, DPC would need to address its need to rebuild nearly all of the Q1 line in the project area.

The Q1-Highway 35 Route, on the other hand, would replace all of the existing Q1 line and rebuild it as part of a double-circuit 345/161kV line as part of this project. Use of the Q1-Galesville Route would require DPC to rebuild the portion of the Q1 line between Delaney Road and Briggs Road in the south

part of the project, and use of the STH 88 Connector for either the Q1-Highway 35 Route or the Q1-Galesville Route would require DPC to rebuild the portion of the Q1 line between Alma and STH 88 in the north part of the project.

Between Alma and Trempealeau, a rebuild of the Q1 line could be on the existing alignment if needed and if WisDOT issues the necessary permits.

Between Trempealeau and Holmen, RUS and USFWS requested that DPC examine alternative routes for the Q1 rebuild. DPC has produced a Technical Memorandum that summarizes the potential impacts related to crossing the Black River.<sup>131</sup> In it, the five alternatives are briefly compared. The alternative routes are summarized in Table 12.4-2.

Table 12.4-2 Q1 rebuild options between Trempealeau and Holmen crossing the Black River

Rebuild Alternative	Length (miles)	DPC-Expected Cost	Existing Infrastructure at the Black River
Existing Q1 Alignment	13.2	\$10,500,000	Q1 161 kV line
STH 35	15.0	\$12, 200,000	STH 35
Seven Bridges Road	16.2	\$15,800,000	Xcel Energy 69 kV line
Galesville double circuit with CapX 345 kV project	19.9	\$14,900,000	STH 54/93 and USH 53
Galesville single circuit 161 kV line	19.9	\$17,200,000	STH 54/93 and USH 53

DPC is assuming a 100-foot ROW width for a rebuild, depending on the width that would be allowed by the USFWS permit. Assuming that width, there could be an expansion of the existing ROW needed for any of the alternatives. If new ROW is needed, the rebuild will need a separate CPCN from the Commission.

The CPCN process involves analyses of the costs and impacts and a hearing. As shown in Table 12.4-2, the existing alignment would cost the least, and the Galesville Route would cost the most, especially as a single-circuit 161 kV line. The Q1-Highway 35 alternative would result in the greatest loss of forested wetlands, followed by the Seven Bridges alternative, while the existing Q1 alignment would lowest impact on forested wetlands. The Galesville Route would affect the highest acreage of upland forest, and the existing alignment would affect the least. The existing alignment would require crossing the most waterways. The Galesville Route has the highest number of residences close by.

## 12.5. SUMMARY AND COMPARISON OF SELECTED IMPACTS FOR ALL ROUTES

Table 12.5-1 summarizes and compares some of the major ROW characteristics and selected potential impacts for the proposed transmission line routes, including routes utilizing connector alternatives.

<sup>131</sup> DPC Q-1 Rebuild Comparison of Alternatives. Technical Memorandum. September 28, 2011.

Table 12.5-1 Comparison of potential impacts among routes and alternatives

Route	Length (miles)	New ROW (acres)	Percent of ROW Length Shared	Agricultural Land Crossed (acres)	Number of Stream Crossings*	Wetland Area Affected (acres)	Wooded Wetland Crossed (acres)	Total Forest Area Cleared (acres)	Number of Residences within 300 Feet of the Centerline
Q1-Highway 35	43.0	404.4	94%	325.2	38	83.5	55.1	127.8	74
Q1-Highway 35 with STH 88 Connector A	49.7	509.2	90%	399.4	Unknown	109.0	69.1	176.7	79
Q1-Highway 35 with STH 88 Connector B	49.0	543.9	79%	417.9	Unknown	111.2	67.9	176.1	67
Q1-Galesville	48.4	497.0	79%	367.5	23	63.7	34.9	131.9	109
Q1-Galesville with STH 88 Connector A	55.0	601.8	78%	441.7	Unknown	60.7	38.1	180.8	114
Q1-Galesville with STH 88 Connector B	54.4	636.5	67%	460.2	Unknown	62.9	36.9	180.2	102
Q1 Original	41.3	377.1	96%	328.4	46	118.8	64.3	123.9	61
Arcadia	54.8	519.5	90%	445.3	42	95.6	38.8	161.1	102
Arcadia-Etrick Connector (Segments 11G1, 1ET, 2ET, 3ET, 4ET)	57.0	530.4	88%	468.0	63	142.9	56.9	175.4	57

\* Stream data was not submitted in the CPCN Application for STH 88 connector route segments.

## 12.6. SUMMARY AND COMPARISON OF ROUTE COSTS

Table 12.6-1 summarizes estimated project costs for the three utility-proposed project routes plus combinations of those three routes with the three Connector Alternatives proposed by WDOT and WDNR. More detailed cost components are provided in Chapter 4, Section 4.5.

Table 12.6-1 Cost summary and comparison for all proposed routes and route/connector alternatives in dollars

Route	Transmission Costs*	Substation Costs	161 kV Re-route Costs	Total Costs
<b>Q1 Routes</b>				
Q1-Highway 35	\$162,932,000	\$27,285,000	\$4,313,000	\$194,530,000
Q1-Highway 35 with STH 88 Connector, Option A	\$181,782,000	\$27,285,000	\$4,313,000	\$213,380,000
Q1-Highway 35 with STH 88 Connector, Option B	\$176,032,000	\$27,285,000	\$4,313,000	\$207,630,000
Q1-Galesville	\$172,248,000	\$27,285,000	\$2,532,000	\$202,065,000
Q1-Galesville with STH 88 Connector, Option A	\$190,843,000	\$27,285,000	\$2,532,000	\$220,660,000
Q1-Galesville with STH 88 Connector, Option B	\$185,093,000	\$27,285,000	\$2,532,000	\$214,910,000
Original Q1	\$157,169,000	\$27,285,000	\$4,313,000	\$188,767,000
<b>Arcadia Routes</b>				
Arcadia	\$194,538,000	\$27,285,000	\$2,532,000	224,355,000
Arcadia with Etrick Connector	\$203,753,000	\$27,285,000	\$2,532,000	233,570,000

\* Transmission costs include pre-certification costs and high-voltage impact fees.

It is important to note these values are estimates for the routes and route combinations. Even slight variations from these routes could substantially alter the cost estimates. The ranges in the estimated costs for the route combinations shown in Table 12.6-1 and in Section 4.5 are based on the feasibility studies done by the applicants earlier in the project review. They may not precisely reflect the ultimate or final costs for the project.