

CHAPTER  
44. Mississippi River at Alma to  
Holmen—Detailed Project Description**4.1. PROPOSED 345 KV TRANSMISSION LINE ROUTE  
ALTERNATIVES**

The applicants have proposed three routes, with some variations, to make the connection from the Mississippi River crossing at Alma in Buffalo County to a new substation in the La Crosse service area near the village of Holmen in La Crosse County. The routes can be traced by route segments on the Index map in Figure Vol. 2-1 or on the existing electric transmission facilities map in Figure Vol. 2-2. Each route is described in terms of its individual route segments at the beginning of the EIS chapter dedicated to a discussion of its potential impacts (Chapters 7 through 11). The routes are described more briefly below to establish some perspective for the discussions that follow in this chapter.

**4.1.1. Q1-Highway 35 Route and Q1-Galesville Route**

Two of the routes, the applicants' Q1-Highway 35 and Q1-Galesville Routes, follow an existing 161 kV corridor southward as a 345/161 kV double-circuit line on metal, single-pole structures along GRR to the mouth of Waumandee Creek between the villages of Cochrane and Fountain City. At that point the routes leave the Mississippi River and extend inland, still following the existing 161 kV corridor as a double-circuit line. East of the Trempealeau River, these two routes diverge and follow very different paths to avoid different resource impacts. The routes are discussed in detail in Chapters 7 and 8, respectively.

The Q1-Highway 35 Route continues along the existing 161 kV transmission corridor as a double-circuit line to where the corridor intersects with STH 35 east of the village of Trempealeau. From that point, the route leaves the 161 kV corridor, takes the 161 kV line with it, and parallels STH 35 east as a double-circuit line across the Black River bottomlands and the Van Loon State Wildlife Area to the STH 35/USH 53 interchange, where it then follows USH 53 southward to a proposed substation site along Briggs Road southwest of Holmen. This route was proposed by the applicants as an alternative to their original proposal that followed the existing Q1 transmission corridor all the way to the substation site. The existing Q1 corridor in this area passes through the Refuge, and the USFWS has indicated that it would not support that corridor.

The Q1-Galesville Route avoids the Black River bottomlands and the Van Loon Wildlife Area by diverging from the existing 161 kV corridor around Delaney Road east of the Trempealeau River and running eastward as a single-circuit line, connecting with STH 54 south of Galesville and intersecting with a different, north-south 161 kV transmission corridor east of USH 53. From that point, it follows the

transmission corridor, USH 53, CTH HD, and Briggs Road as a double-circuit line to the proposed substation site.

#### **4.1.2. WisDOT's STH 88 Alternative for the Q1 Routes**

WisDOT has strong concerns about a route along GRR (STH 35), and has suggested an alternative route connector that would run from the Mississippi River crossing at Alma east as a 345/161 double-circuit line to a point north of Waumandee Creek valley and south along STH 88 as a single-circuit line to connect to the Q1-Highway 35 or Q1-Galesville Route from the north. From Waumandee Creek eastward, either of the two Q1 Routes would be the same. Commission staff has included this route alternative in its review so that it can be considered by the Commission when making final project decisions. It is discussed in Chapter 9 of this draft EIS.

#### **4.1.3. Arcadia Route**

A third route proposed by the applicants avoids GRR and the Van Loon Wildlife Area almost entirely. It is an overland route that, from Alma, roughly follows the existing east-west 161 kV transmission corridor over the river bluffs as a 345/161 kV double-circuit line to a point across the Trempealeau River northeast of Arcadia. It then turns south following an existing north-south 69 kV transmission corridor generally as a 345/69 kV double-circuit line to STH 54 east of Centerville, and then heads east on STH 54 and south of Galesville along the identical path for the Q1-Galesville Route to the substation. The Arcadia Route is discussed in Chapter 10 of this draft EIS.

#### **4.1.4. Ettrick Alternative for the Arcadia Route**

WDNR staff suggested that an alternative route might be found that would provide the Commission with a second routing possibility to avoid the Black River bottomlands and the Van Loon State Wildlife Area. The applicants responded with this alternative, which diverges from the Arcadia Route where the existing 69 kV corridor crosses Fox Coulee Lane. It follows an east-west 69 kV corridor as a 345/69 kV double-circuit line (with the 69 kV portion built to 161 kV standards) along Fox Coulee and Hovell Lane, and across a ridge. It continues to follow the 69 kV corridor eastward into the Beaver Creek valley to where the 69 kV meets the existing north-south 161 kV corridor west of the village of Ettrick. It follows that 161 kV corridor southward to the Black River and, from there, follows the same path as the Arcadia or Q1-Galesville Routes to the proposed substation site. The Ettrick Alternative is discussed in Chapter 11 of this draft EIS.

#### **4.1.5. Applicants' original Q1 Route**

During the pre-application process, the applicants proposed a route following the existing DPC 161 kV line between Alma and the North La Crosse Substation in Holmen called the Q1 line. This line is reaching the end of its service life, and DPC has determined that it needs to be rebuilt or replaced. The original Q1 Route was rejected by USFWS because a portion of it crosses the Refuge. However, in case circumstances surrounding the project change, comparable information was provided about this route so that, if the Commission determines that it should be considered, it can make informed decisions.<sup>43</sup> Potential impacts of the original Q1 Route are discussed in Chapter 7, the chapter about the Q1-Highway 35 Route, where appropriate.

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<sup>43</sup> The information was provided in the CPCN application as Appendix N.

## **4.2. ELECTRIC TRANSMISSION FACILITIES**

### **4.2.1. Transmission line facilities**

#### **4.2.1.1. Voltage**

The proposed new transmission line would be energized at 345 kV. Existing 161 kV and 69 kV lines in the selected route corridors would be removed and reconstructed at their existing voltages in a double- or triple-circuit with the new 345 kV transmission line.

#### **4.2.1.2. Size of conductors**

The 345 kV transmission line would have bundled (two) 954 kcmil 45/7 Cardinal aluminum conductor steel supported (ACSS) or 954 ACSS/TW Cardinal 20/7 Type 13 conductors per phase. There are three phases in a transmission line, so there would be three sets of bundled conductors.

The reconstructed 161 kV circuits would have a single 795 kcmil 26/7 Drake ACSS conductor per phase, and reconstructed 69 kV circuits would have a single 795 kcmil 26/7 Drake ACSS conductor per phase. Again, each type of transmission line would consist of three conductors (three phases).

#### **4.2.1.3. Size of shield wire**

The new 345 kV transmission line with and without reconstructed circuits of 161 kV and 69 kV would use two shield wires to protect phase conductors from lightning strikes. The shield wires would consist of standard 7/16-inch, seven-strand extra high-strength steel cable and/or a steel and aluminum stranded wire containing a fiber optic bundle core, generally known as optical ground wire (OPGW). OPGW allows both lightning protection and a communication path between substations. The OPGW would include 36 to 48 fibers.

#### **4.2.1.4. Structure types and heights**

The applicants would use galvanized poles to try to reduce visual effects along STH 35, GRR. In other route sections, the applicants would use primarily single-pole, brown, self-weathering steel structures placed on reinforced concrete foundations. Tangent poles, with arms out to the sides, would carry the line on straightaways. Angle poles, with arms at different angles from the perpendicular, would support the line where it turns at slight angles from a straight path. Two-pole structures (H-frame) and other multiple-pole structures would be used for transmission line alignment angles greater than 30 degrees, for reducing foundation size, for crossing wetlands, and for allowing long spans between hilltops in difficult terrain, such as the hilly coulee regions or river crossings.

Structure diameters at the structure base would vary from five to seven feet if single-pole structures were used and between five and eight feet at two-pole situations. If the line must be turned by more than 30 degrees, the applicants project that two-pole structures would be used instead of single-pole structures.

Structure heights above ground would range from 130 to 185 feet.

The 345, 161, and 69 kV transmission line conductors would be supported by porcelain or glass I-String and V-String insulators on tangent (straight line) and angle poles and by double-string insulators on dead-end poles.

Diagrams of the expected typical structure types were prepared by the utilities for their application and can be found in Appendix A of this draft EIS for the reader's convenience. Appendix A includes tables that relate structure types to proposed route segments. The diagrams show general structure characteristics

and conductor support configurations. Pole or structure types expected to be used for different routes are identified below.

- **Q1-Highway 35 Route** – Appendix A, Figures 1 through 19 and 30
- **Q1-Galesville Route** – Appendix A, Figures 1-24 and 26-29
- **Q1-STH 88 Route Alternative Connector, Option A** – Appendix A, Figures 3, 5, 7, 8, 10, 21, 23, 25, and 27
- **Q1-STH 88 Route Alternative Connector, Option B** – Appendix A, Figures 3, 5, 7, 8, 10, 21, 23, 25, 27, and 28
- **Arcadia-Ettrick Connector** – Appendix A, Figures 1-8, 11-12, 17, and 18

#### **4.2.1.5. Foundations**

Most of the transmission poles would be installed on steel-reinforced, concrete foundations. The foundations would be drilled pier concrete foundations varying from 6 to 10 feet in diameter and about 25 to 50 feet deep, depending on soil conditions. General foundation installation steps are described in Section 5.4.3 and 5.4.4 of Chapter 5 of this draft EIS. Example illustrations of foundation construction work can be found in the following Figures in Volume 2 of the draft EIS:

- Vol. 2-19, 2-21, and 2-24 for drilling/augering the hole
- Vol. 2-25-28 for installing the foundation
- Vol. 2-30, 2-31, and 2-32 for installing the structure on the foundation

If the Q1-Highway 35 Route through the Black River floodplain is approved (Segment 8B), or the original Q1 segment through the Black River floodplain is revisited (Segment 5B), tubular vibratory caisson foundations would be employed. In this design, a steel caisson is stood up at the pole location, and a vibratory hammer is put on top of the caisson. The heavy hammer vibrates and drives the caisson into the ground until its top is about 2 to 3 feet above ground level and its depth is about 30 to 70 feet below grade. There would be no concrete poured or excavation spoils. The transmission structures would be installed on the tops of the caissons.

All construction materials, equipment, and labor would be brought to remote foundation sites over temporary access roads, using special matting where required to protect underlying soils and vegetation. In some wetland cases, the materials and equipment would be brought to the foundation site by heavy-lift helicopter. The helicopter would also stand up the caisson at its pole location, attach the vibratory hammer, and remove the heavy equipment when the job was complete.

Some of the structures in the Mississippi River crossing (Segment 1) might require a “cap-on-pile” foundation design, employing piles driven into the river bottom with pile caps installed on the tops of supporting piles and the transmission structures installed on the pile caps.

#### **4.2.1.6. Span length and conductor clearances**

The span length (the distance between structures) would typically vary from 700 to 1,000 feet, depending on the feature that needs to be spanned. Conductor heights along the line would vary, with the minimum height at mid-span about 34 feet above ground. The mid-span would be highly variable because of topography. Generally, conductor height would vary between 35 and 50 feet above ground level.

## **4.2.2. Rights-of-way**

### **4.2.2.1. Relationship between ROW, structure type and height, and span length**

An electric transmission line ROW is a strip of land that an electric utility uses to construct, maintain, or repair a large power line. A transmission line is usually centered in the ROW. The structures (usually poles and cross arms) keep the wires away from the ground, other objects, and each other. Structure height, structure type, span length, and ROW width are interrelated. If landowners wish to have fewer transmission structures installed on their land, they might ask if a longer span length is possible. To increase the span length, the utility might need to increase the structure height. If the span length and height are greatly increased, a wider ROW is sometimes needed.

The proposed transmission line would require a ROW wide enough to keep the conductors safely distant from buildings, trees, the ground, and other features as they hang between the transmission poles or other structures. It would also require a ROW wide enough for the equipment and working area to construct the line. The construction ROW, part of which might be temporary, might be wider than the permanent safety clearance ROW. An easement agreement for a ROW would allow the utility to keep the line clear of vegetation, buildings, and other structures that could interfere with line operation. It would also allow the landowner certain land use controls and conditions. If they are needed, the utility might also obtain easements for access roads to get to the power line ROW.

### **4.2.2.2. ROW for Alma-La Crosse project**

The CapX applicants say that the typical required ROW width, with some exceptions, would be 150 feet. In some instances, to preserve tree buffers or for other reasons, the total ROW wanted by the applicants might be less than the 150-foot norm.

In some locations, the ROW would be shared in part with other, already existing transmission ROWs, or road or railroad ROWs. Overall, according to the project CPCN application and depending on the route, the additional ROW width needed could vary from zero to 150 feet.<sup>44</sup> For example, the entire 150 feet would be needed if there is no existing ROW to share. Existing 161 and 69 kV transmission lines already in the project area have ROWs of about 80 feet, so an additional 70 would be needed for the new line. Road ROW widths vary, but typical highway ROWs that could be involved in this project share about 70 feet of ROW width, leaving about 80 feet that would be needed for the new line. South of Galesville, there is a place where the new line would be entirely within road ROW so no additional ROW would be sought.

ROW requirements are covered in the discussions of potential environmental impacts for the individual routes in Chapters 7 through 11.

### **4.2.2.3. Utility ROW clearing**

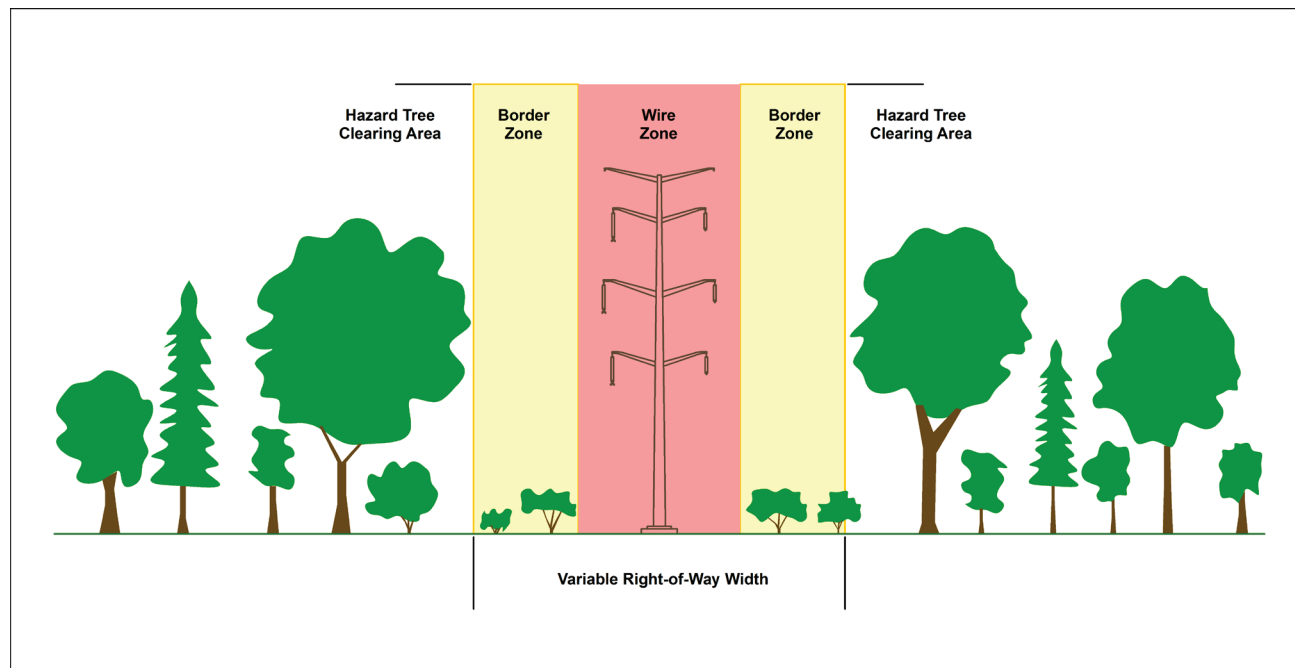
Since the ROW must be kept clear to maintain safe distances for the conductors, some vegetation removal would occur once the ROW easement agreement was made. The Commission requires Wisconsin utilities to maintain their ROWs and clearances in accordance with the National Electric Safety Code (NESC). The NESC requirements are incorporated into Wis. Admin. Code ch. PSC 114.

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<sup>44</sup> CPCN Application, Appendix A, Tables 1A for the Q1-Highway 35, Q1-Galesville, and Arcadia Routes, and Appendix W-A, Tables 1A for the STH 88 Connector Options and Arcadia-Ettrick Connector.

NESC generally requires the pruning or removal of interfering trees to minimize the risk of vegetation-related outages. Otherwise, there are increased chances of fires or electrical or mechanical damage to the electrical equipment. Xcel (and NSPW) has a published guide on ROW vegetation management<sup>45</sup> that includes lists and diagrams illustrating the types of clearances or removals that would need to be maintained. Figure 4.2-1 illustrates a typical transmission line ROW requirement.

Figure 4.2-1 Typical Xcel/NSPW ROW clearing requirements



Xcel maintains a “wire zone/border zone” concept for its vegetation management program to allow for different types and heights of vegetation in the ROW. The wire zone in the Xcel policy is the area directly beneath the conductors, as can be seen in Figure 4.2-1. The vegetation allowed in the wire zone would be low-growing herbaceous communities. Other plants would be removed. The border zone would begin at the outside edge of the wire zone and extend to the edge of the ROW as defined in the easement agreement. This zone may contain low-growing woody plants and trees. In the wire zone and border zone, Xcel states that it “does not require removal of tall-growing trees if, at maximum mature height, the tree would not come within the distances set forth in the Minimum Clearance Guidelines, even if the tree were to fall toward the conductors.”<sup>46</sup>

Outside the border zone, there are still potential hazards to the line. “Danger trees” would include any trees on or off the ROW that have the potential to contact the line. “Hazard trees” would be danger trees that have “unacceptable risk” of failing before the next maintenance cycle. They would be topped, pruned, or felled when identified so that they were no longer hazards. Example hazard tree clearing areas are illustrated in Figure 4.2-1 as well.

<sup>45</sup> Xcel Energy. Vegetation Management Guidelines. May 2011.

<sup>46</sup> Xcel Energy. Vegetative Management Guidelines. May 2011, p. 12.

### 4.3. PROJECT ENDPOINT—MISSISSIPPI RIVER CROSSING

The Wisconsin CapX project's western terminus would be a mid-river connection with the Mississippi River crossing for the Minnesota CapX project.

Over the development of the project proposal, the applicants investigated several different places for the proposed transmission line to cross the Mississippi River between Minnesota and Wisconsin and connect with the Wisconsin electric systems. They informed the Commission and WDNR of these alternatives during the pre-application process for the case. Two alternatives, at Winona and Trempealeau, were dropped from consideration before the pre-application process at the Commission was significantly underway.

#### 4.3.1. Alternative crossings and interconnections

Four potential river crossing locations were identified:

- Between La Crescent, Minnesota, and La Crosse, Wisconsin, where an existing transmission line crosses the river. That line operates at 69 kV but is built to 161 kV standards. See Figures Vol. 2-7D, Vol. 2-11, and Vol. 2-12.
- Near Trempealeau, Wisconsin, at Lock and Dam No. 6. There is no existing transmission line there, but the crossing might have been workable because it is a narrow point in the river that includes several islands on which transmission structures could be located. See Figure Vol. 2-7C.
- At Winona, Minnesota, where a 69 kV line built to 161 kV standards exists already. See Figures Vol. 2-7B and Vol. 2-10.
- At Alma, Wisconsin, where an existing 161/69 kV double-circuit line already crosses the river south of the DPC generating stations. See Figures Vol. 2-7A, Vol. 2-8, and Vol. 2-9. The Alma crossing is identified in the Wisconsin CapX project as Segment 1.

Crossings at any other places along the river between Alma and La Crosse would require totally new transmission ROW and a completely new feature crossing the river where no existing river-crossing features exist. There is no need to consider such crossing locations because at least one of the above four locations appears workable.

#### 4.3.2. Winnowing of crossing alternatives

By the time the project CPCN application was submitted to the Commission, the four alternatives had been narrowed to one, at Alma. Decisions were based on input from USFWS and WDNR.

The applicants eliminated the Trempealeau crossing early in the consideration because it would require a new transmission ROW crossing the USFWS Refuge. It was the only crossing of the four that did not have an existing electric transmission ROW. USFWS said it would likely not approve a Special Use Permit for new ROW across the Refuge because USFWS regulations do not allow new uses of Refuge property that fragment habitat.<sup>47</sup> USFWS also raised concerns about migratory birds in the Trempealeau National Wildlife Refuge. The applicants also decided to avoid numerous residences along the river on the Wisconsin side.

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<sup>47</sup> Letter to Pamela Rasmussen of Xcel from Don Hultman of USFWS. February 19, 2008. CPCN Application, Appendix P, p. 21.

The applicants also eliminated the Winona crossing early in the process. The existing transmission line had a 100-foot ROW permitted by USFWS. However, USFWS did not want the additional construction that would be necessary in the Refuge at that location, for the same reasons it delineated for the Trempealeau crossing. The existing crossing at Winona was relatively long, passed through the Refuge, and entered Wisconsin at the mouth of the Trempealeau River by GRR. The potential environmental impact was greater relative to the other two crossings and this crossing was eliminated from the analysis.

The crossing between La Crosse and La Crescent is a shorter crossing and would require a small amount of 345 kV transmission to be built. USFWS described it as its second choice after the Alma crossing, with reservations.<sup>48</sup> However, the substation that would be the endpoint of the line (Xcel's La Crosse Substation) is at the edge of the La Crosse Marsh Natural Resource Area, a 1,077-acre urban wetland complex. An expansion into this marsh, or installation of transmission towers in or around it, would have a large environmental impact on the functions and values of the wetlands. According to WDNR staff, the substation is within the La Crosse River floodway or flood fringe, and a portion of the projected transmission route to it would have to cross property acquired by WDNR. WDNR indicated that the wetland construction in this situation would have "the possibility of being un-permittable."<sup>49</sup> An attempt to site an endpoint substation in another part of the city or on the uplands east of the city appeared to require construction in city streets and the relocations of certain businesses as well as an environmentally sound and feasible way up the bluff.

The applicants propose the Alma crossing. It requires less steep river bluff terrain construction on the Minnesota side and follows an existing transmission corridor. It would also require the shortest crossing of the Mississippi River floodplain and the Refuge and have fewer wetland impacts. And, it is the crossing preferred by USFWS,<sup>50</sup> which identified the Alma crossing as the one that "may pose the least environmental impact."<sup>51</sup>

The applicants' decision on the proposed crossing was reinforced during the state of Minnesota EIS scoping process in the spring of 2010. The Minnesota Office of Energy Security (OES) convened two advisory task forces and a public scoping comment period on the issues and route alternatives that should be evaluated in the Minnesota EIS. If the comments from the task forces and the public did not indicate that the La Crosse crossing should be reevaluated in addition to the Alma crossing, then the scope of the Minnesota EIS would include the Alma crossing as the only crossing. The OES scoping decision in August 2010 confirmed the Alma crossing as the one to be carried through the two states' review processes. See Appendix D, the Executive Summary of the Minnesota EIS, page 1.<sup>52</sup>

### **4.3.3. Crossing at Alma**

The applicants have developed Alma crossing designs with different tradeoffs between structure height and ROW width in consultation with USFWS.

An existing double-circuit transmission line crosses the Mississippi River and about 0.5 mile of the Refuge, with two structures on Refuge property on a 180-foot-wide permitted ROW. The two main structures

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<sup>48</sup> Rasmussen letter from Hultman, p. 20.

<sup>49</sup> Letter to Tom Hillstrom of Xcel Energy from Cheryl Laatsch and Shari Koslowsky of WDNR. May 29, 2009. CPCN Application, Appendix P, pp. 124-125.

<sup>50</sup> CPCN Application, Introduction and Overview, pp. 1-15.

<sup>51</sup> Rasmussen letter from Hultman, p. 20.

<sup>52</sup> Section 6 of the Minnesota OES EIS discusses the factors supporting the "Kellogg Crossing" at Alma in detail. It also discusses alternative crossing methods. CapX Hampton-Rochester-La Crosse 345 kV and 161 kV Transmission Lines Project Environmental Impact Statement, August 2011.



supporting the river crossing are 180 feet tall. An area about 125 feet wide is kept clear of trees. Minimum conductor clearance over the main channel of the river is about 90 feet, as required by USACE.

To accommodate a new 345 kV line, a triple-circuit system would be needed.<sup>53</sup> If it remained within the existing 125-foot cleared ROW, the structures supporting the main channel crossing would need to be about 275 feet tall and could be required by the Federal Aviation Administration (FAA) to be painted red and white. Other options keep the structures at the main channel as short as possible, just under 200 feet tall, and all the conductors on the lines in the same plane to minimize bird impacts. One such option would require the cleared ROW to be expanded up to about 280 feet. Others would keep the main channel-crossing structures below 200 feet but utilize different combinations of structure designs for the other seven structures (four in the Wisconsin portion) that allow cleared ROWs to be narrower, back to about 125 feet near the Minnesota and Wisconsin shore. One option would keep the cleared ROW at the main channel at about 180 feet, with about 125 feet of width toward either shore. Because a Special Use Permit would be required to cross the Refuge, the applicants would work closely with USFWS to identify the most appropriate structure design for crossing the river with an overhead line.

On USFWS request, an underground alternative was investigated, either an extruded dielectric cable system or a high-pressure fluid-filled (HPFF) pipe. Both underground options would avoid bird collision impacts across the river. On the other hand, both options would require direct bore or trenching installation. An open trench method would disrupt the river and its bed across its entire width. A direct bore method would avoid a long open trench but would require about eight ten-inch borings under the river spaced about 25 feet apart. There would be additional tree clearing for construction areas. The existing lines on overhead structures would remain in place, continuing to present an obstacle to bird flight. And, a new overhead transition station about an acre in size between the underground and overhead construction would be needed at each end of the underground segment. In the case of the HPFF, there would be additional environmental risk related to the mineral oil dielectric coolant in the pipes. For the limited protection of birds and the additional impact at the ground level and underwater, the underground options would also be more expensive, about \$90 million for 1.3 miles of construction or \$70 million per mile as opposed to about \$2 million per mile for overhead construction.<sup>54</sup>

## **4.4. PROJECT ENDPOINT—BRIGGS ROAD SUBSTATION**

The eastern endpoint of the Alma-La Crosse Project would be a 345/161 kV substation southwest of Holmen in La Crosse County. The substation, its proposed alternative sites, and potential environmental impacts are discussed in more detail in Chapter 6.

### **4.4.1. Proposed facilities description**

A new 345/161 kV transmission substation called the Briggs Road Substation would be constructed as part of the project. This substation would allow the new 345 kV transmission line to connect to the existing transmission lines in the La Crosse area. It would be owned and operated by NSPW.

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<sup>53</sup> The options for the line across the Mississippi River at Alma are discussed, mapped, and diagrammed in detail in the CPCN Application, Appendix F2. An example triple-circuit structure can be seen in Appendix A, Figure 14 of this EIS. The exact structure heights and ROW widths for the river crossing would be subject to USFWS permitting.

<sup>54</sup> Underground Feasibility Analysis – Alma Crossing: Applicants' Conclusions. CPCN Application, Appendix F3.

#### **4.4.2. Location**

The new Briggs Road Substation would be constructed near the intersection of USH 53 and Briggs Road in the town of Onalaska, near Holmen, at the southern end of the project area. The applicants have identified two potential substation sites on either side of Briggs Road, a West Site and an East Site.

#### **4.4.3. Existing environment**

The West Site supports field crops. There is recreational area with woodlands and wetlands within 0.5 mile south of the West Site. Within 0.5 mile to the north, there is open space and single-family homes, with USH 53 physically separating the proposed Briggs Road Substation West Site from the open space and the houses. There is also woodland and wetland 0.5 mile to the east.

The nearby East Site currently supports horse farm facilities, including an exhibition area and pastures, with woodlands at the south and east ends. Land use within 0.5 mile south of the East Site is active agriculture and rural residential. Land use within 0.5 mile west of it is agricultural land and woodland. Within 0.5 mile north of it are single-family homes and the North La Crosse Substation. Again, USH 53 would physically separate the proposed substation from the residential and recreation lands to the north. Land use to the east of the proposed site is woodland.

#### **4.4.4. Acreages and heights of existing and new construction**

The general substation arrangement is shown in Figure 4.4-1, at the Briggs Road West Site as an example.



## 4.5. COSTS

The proposed project costs estimated as the sum of year-of-occurrence dollars range from about \$195 million to about \$234 million, depending upon the transmission line route. These costs were estimated from 2010 dollar costs and escalated to represent 2014-2015 construction years using the industry-recognized Handy-Whitman index. They include the new substation cost, distribution line relocation cost, and allowance for funds used during construction (AFUDC).

The details of these costs are shown in Tables 4.5-1, 4.5-2, and 4.5-3.

### 4.5.1. New substation

The Briggs Road Substation is common to all routing alternatives. Table 4.5-1 shows costs to construct the Briggs Road Substation. The total substation cost, \$27,285,000, is shown in the lower right corner of the table.

Table 4.5-1<sup>55</sup> Briggs Road Substation construction cost estimates

Project Cost Categories	345 kV portion	161 kV portion	Total
Engineering and Design	\$234,000	\$936,000	\$1,170,000
Material	\$1,914,000	\$7,656,000	\$9,570,000
Transformer	0	\$3,870,000	\$3,870,000
Construction Labor and Rents	\$1,267,000	\$5,068,000	\$6,335,000
Commissioning and Testing	\$100,000	\$400,000	\$500,000
Other	\$1,318,000	\$4,522,000	\$5,840,000
<b>Total Substation Cost</b>	<b>\$4,833,000</b>	<b>\$22,452,000</b>	<b>\$27,285,000</b>

### 4.5.2. Utility-proposed routes

The applicants proposed three alternative routes and one alternative segment. The costs provided by the applicants are itemized in Table 4.5-2. The cost of the Briggs Road Substation has been factored into each of the alternative route costs.

Table 4.5-2 Project cost estimates for utility-proposed transmission routes plus the proposed Briggs Road Substation<sup>56</sup>

Project Cost Categories	Q1-Highway 35 Route	Arcadia Route	Alma-Arcadia Option <sup>57</sup>	Q1-Galesville Route
<b>Material</b>				
Poles	\$22,680,000	\$28,410,000	\$28,190,000	\$24,270,000
Wire	5,440,000	5,910,000	5,830,000	5,640,000
Other Material	15,040,000	16,220,000	16,070,000	13,780,000
<b>Labor</b>				
ROW Prep	2,620,000	2,570,000	2,490,000	2,380,000
Foundations	16,970,000	22,470,000	21,980,000	19,180,000
Line	19,980,000	23,620,000	23,460,000	21,180,000

<sup>55</sup> From CPCN Application, pp. 2-62.

<sup>56</sup> From CPCN Application, pp. 2-60 and 2-61.

<sup>57</sup> This option is the Arcadia Route using a different route segment (10B2) to connect the line at the river with the existing 161 kV ROW east of the bluffs at Alma.

Project Cost Categories	Q1-Highway 35 Route	Arcadia Route	Alma-Arcadia Option <sup>57</sup>	Q1-Galesville Route
<b>Other</b>				
Real Estate	3,860,000	4,940,000	4,890,000	4,360,000
Technical Support Services	13,010,000	13,370,000	13,350,000	13,190,000
Environmental	1,410,000	1,470,000	1,470,000	1,440,000
Removal	2,020,000	2,070,000	2,050,000	1,890,000
Distribution Relocations	0	2,820,000	2,820,000	1,820,000
Escalation	18,410,000	22,190,000	21,960,000	19,470,000
Overheads	6,970,000	8,370,000	8,290,000	7,340,000
AFUDC	19,330,000	22,960,000	22,740,000	20,400,000
<b>Subtotal</b>	<b>\$147,740,000</b>	<b>\$177,390,000</b>	<b>\$175,590,000</b>	<b>\$156,340,000</b>
<b>Substation</b>				
Briggs Road Substation	\$27,285,000	\$27,285,000	\$27,285,000	\$27,285,000
<b>161 kV re-routes to substation</b>				
Material	\$946,000	\$562,000	\$562,000	\$562,000
Labor	1,496,000	868,000	868,000	868,000
Other	1,871,000	1,102,000	1,102,000	1,102,000
<b>Subtotal</b>	<b>\$31,598,000</b>	<b>\$29,817,000</b>	<b>\$29,817,000</b>	<b>\$29,817,000</b>
<b>Other Costs</b>				
Pre-certification Costs	\$7,281,000	\$7,686,000	\$7,668,000	\$7,476,000
One-Time Environmental Impact Fee*	\$7,117,000	\$8,448,000	\$8,558,000	\$7,528,000
Annual Impact Fees Based on Three Years to Construct the Project*	\$854,000	\$1,014,000	\$1,026,000	\$904,000
<b>Subtotal</b>	<b>\$15,192,000</b>	<b>\$17,148,000</b>	<b>\$17,252,000</b>	<b>\$15,908,000</b>
<b>Total Cost</b>	<b>\$194,590,000</b>	<b>\$224,355,000</b>	<b>\$222,659,000</b>	<b>\$202,065,000</b>

\* The Commission determined in the Rockdale-West Middleton 345 kV case (PSCW docket 137-CE-147) that pre-certification costs would not be included in the cost basis calculation for high-voltage impact fees. The Commission will need to determine in this case if non-345 kV construction costs should be included in the cost basis calculation for the high-voltage impact fees. See discussion in Section 4.5.4.

### 4.5.3. Routes using segments suggested by WisDOT or WDNR

In this section, costs are provided for alternative routes that are being considered based on suggestions made by WisDOT and WDNR.

Variations on the Q1-Highway 35 and Q1-Galesville Routes were proposed by WisDOT to provide alternatives that would avoid route segments along STH 35 (GRR), between Alma and the mouth of Waumandee Creek. The alternatives would utilize the Waumandee Creek valley along STH 88. Because STH 88 is very curvy the applicants provided costs not only for route segments along the highway but also for route segments in the valley that appeared better from engineering and environmental points of view. (See route discussions earlier in this chapter.) Table 4.5-3 shows cost breakdowns for each option in each of the two Q1 Routes.

A variation on the Arcadia Route was developed by the applicants in response to a request from WDNR that a transmission ROW be followed toward Ettrick north of the Van Loon Wildlife Area. The costs for the Arcadia-Ettrick alternative are also included in Table 4.5-3.

Table 4.5-3 Project cost estimates for STH 88 and Ettrick Route Alternatives based on suggestions from WisDOT and WDNR, plus the proposed Briggs Road Substation<sup>58</sup>

Project Cost Categories	WI-88	WI-88	WI-88	WI-88	Arcadia-Ettrick
	Option A Connector (Q1-Highway 35) Route	Option A Connector (Q1-Galesville) Route	Option B Connector (Q1-Highway 35) Route	Option B Connector (Q1-Galesville) Route	(Arcadia) Route
<b>Material</b>					
Poles	\$25,300,000	\$26,890,000	\$24,560,000	\$26,150,000	\$28,890,000
Wire	\$5,660,000	\$5,850,000	\$5,590,000	\$5,780,000	\$6,380,000
Other Material	\$17,062,000	\$15,772,000	\$16,461,000	\$15,179,000	\$17,386,000
<b>Labor</b>					
ROW Prep	\$2,920,000	\$2,660,000	\$3,150,000	\$2,880,000	\$2,990,000
Foundations	\$22,170,000	\$24,240,000	\$20,430,000	\$22,490,000	\$27,230,000
Line	\$21,100,000	\$22,150,000	\$20,750,000	\$21,800,000	\$24,690,000
<b>Other</b>					
Real Estate	\$4,470,000	\$4,970,000	\$4,410,000	\$4,910,000	\$5,150,000
Technical Support Services	\$12,700,000	\$12,880,000	\$12,670,000	\$12,850,000	\$12,910,000
Environmental	\$1,440,000	\$1,470,000	\$1,440,000	\$1,470,000	\$1,480,000
Removal	\$1,750,000	\$1,620,000	\$1,740,000	\$1,610,000	\$2,350,000
Distribution Relocations	\$1,060,000	\$3,900,000	\$400,000	\$3,240,000	\$580,000
Escalation	\$20,560,000	\$21,250,000	\$19,920,000	\$20,610,000	\$23,290,000
Overheads	\$7,770,000	\$8,020,000	\$7,530,000	\$7,790,000	\$8,760,000
AFUDC	\$21,280,000	\$22,090,000	\$20,730,000	\$21,540,000	\$23,850,000
<b>Subtotal</b>	<b>\$165,242,000</b>	<b>\$173,762,000</b>	<b>\$159,781,000</b>	<b>\$168,299,000</b>	<b>\$185,936,000</b>
<b>Substation</b>					
Briggs Road Substation	\$27,285,000	\$27,285,000	\$27,285,000	\$27,285,000	\$27,285,000
<b>161 kV Re-routes to Substation</b>					
Material	\$946,000	\$562,000	\$946,000	\$562,000	\$562,000
Labor	\$1,496,000	\$868,000	\$1,496,000	\$868,000	\$868,000
Other	\$1,871,000	\$1,102,000	\$1,871,000	\$1,102,000	\$1,102,000
<b>Subtotal</b>	<b>\$31,598,000</b>	<b>\$29,817,000</b>	<b>\$31,598,000</b>	<b>\$29,817,000</b>	<b>\$29,817,000</b>
<b>Other Costs</b>					
Pre-certification Costs	\$7,519,000	\$7,695,000	\$7,496,000	\$7,674,000	\$7,755,000
One-time Environmental Impact Fee*	\$8,055,000	\$8,380,000	\$7,817,000	\$8,142,000	\$8,984,000
Annual Impact Fees Based on Three Years to Construct the Project*	\$966,000	\$1,006,000	\$938,000	\$978,000	\$1,078,000
<b>Subtotal</b>	<b>\$16,540,000</b>	<b>\$17,081,000</b>	<b>\$16,251,000</b>	<b>\$16,794,000</b>	<b>\$17,817,000</b>
<b>Total Cost</b>	<b>\$213,380,000</b>	<b>\$220,660,000</b>	<b>\$207,630,000</b>	<b>\$214,910,000</b>	<b>\$233,570,000</b>

\* The Commission determined in the Rockdale-West Middleton 345 kV case (PSCW docket 137-CE-147) that pre-certification costs would not be included in the cost basis calculation for high-voltage impact fees. The Commission will need to determine in this case if non-345 kV construction costs should be included in the cost basis calculation for the high-voltage impact fees. See discussion in Section 4.5.4.

<sup>58</sup> Copied from Application Appendix W – Supplemental, pp. 2-27 and 2-28.

#### **4.5.4. Environmental impact assessment fees**

Wisconsin communities in which high-voltage transmission lines at 345 kV or greater are constructed receive both a one-time payment and annual payments from fees paid by the utility. Under Wis. Stat. §§ 16.969 and 196.491(3g), and Wis. Admin Code ch. ADM 46, construction applicants that receive a CPCN from the Commission for a 345 kV line are required to pay an annual impact fee and a one-time environmental impact fee to the Wisconsin Department of Administration (WDOA). WDOA distributes the money to the local municipalities and counties through which the transmission line is built.

The fee payments may not be used to offset any other mitigation measure that is required of the applicants in the CPCN order from the Commission.

##### **4.5.4.1. One-time fee**

Under Wis. Admin. Code § ADM 46.05, the one-time environmental impact fee, to be paid in the calendar year when construction begins, is equal to 5 percent of the cost of the transmission line as determined by the Commission in the CPCN. WDOA distributes 50 percent of the funds from this one-time fee to the eligible counties in proportion to the length of line that is constructed through each county. Likewise, it distributes the other 50 percent of the funds to the eligible towns, villages, and cities in proportion to the percentage of the line that is constructed through each eligible political subdivision. The Commission determines the appropriate allocation.

As stated in Wis. Stat. § 16.969(4), a county, town, village, or city that receives money for the one-time environmental impact fee may use its distribution only for park, conservancy, wetland, or other similar environmental programs. The local government can request in writing from the Commission approval of a different use for the funds provided it is in the public interest.

In this case, for the CapX project, 50 percent of the one-time fee would be allocated between Buffalo, Trempealeau, and La Crosse Counties, and the other 50 percent would be allocated among all the towns, villages, and cities along the selected route described in the Commission's CPCN order.

##### **4.5.4.2. Annual fees**

Under Wis. Admin. Code § ADM 46.04, the annual fee to WDOA would equal 0.3 percent of the cost of the line as determined by the Commission in the CPCN under Wis. Stat. § 196.494(3)(gm). WDOA distributes the funds from the annual fee to each eligible town, village, and city in proportion to the length of line constructed through each municipality as determined by the Commission in the CPCN. After construction of the line is completed and final costs are submitted to the Commission, the annual fee may be adjusted to reflect the actual cost of the line.

##### **4.5.4.3. High-voltage impact fee issue**

The above-referenced statutes refer to the, "cost of the high-voltage transmission line" from which these impact fees are calculated. Commission decisions have used different bases for the cost of construction for different past dockets.

Most recently, the Commission found in the Rockdale-West Middleton case (docket 137-CE-147, PSCW REF #110124) that the purpose of the impact fees is to compensate municipalities for the burden of the physical facilities. For this reason, it was determined that pre-certification costs and operating and maintenance costs during construction should not be factored into the costs basis for these fees. However, lower-voltage construction costs might be included in the costs basis if they would not have been constructed "but for" the proposed 345 kV line.



The applicants for the CapX project excluded the cost of all lower voltage transmission and distribution construction from their cost base that would be used to calculate the impact fees. These excluded costs range from \$34 million to \$38 million and would have a direct impact on the resulting share that the various municipalities would receive. If this project is approved, the Commission will ultimately determine what is included in the cost basis for the high-voltage impact fees.

#### **4.5.5. MISO's transmission tariff benefit**

MISO conducts cost-benefit analyses and infers cost benefit levels for projects that improve transmission network reliability. The beneficiaries of the projects must pay allocated portions of the costs in agreements made for incorporating the new line into the MISO system.

MISO designated this proposed 345 kV project eligible to receive regional cost allocation according to its Regional Expansion Criteria and Benefits (RECB) as applicable to Baseline Reliability Projects. The proposed project, as part of the North Rochester to North La Crosse 345 kV transmission line, is included in Appendix A of the Midwest Transmission Expansion Plan 2008 (MTEP08)<sup>59</sup>. According to the RECB cost allocation methodology for 345 kV transmission line projects, 20 percent of the Rochester-La Crosse 345 kV project cost would be allocated to all utilities' loads in MISO on the basis of their load ratio shares. The remaining 80 percent of the cost would be allocated based on the Line Outage Distribution Factor methodology that allocates costs to those utilities whose flows would be most relieved or helped by the completion of the project. This MISO cost allocation methodology applies to the transmission systems of MISO transmission owner members as of the date of the MTEP report approving the project. Therefore, it excludes the project investment of DPC, RPU, and WPPI from cost sharing. These utilities do not have to participate in the 80 percent of the MISO cost sharing directly. Xcel, the parent company of NSPW, would bear the largest portion of this 80 percent of cost sharing.

#### **4.5.6. Costs for replacement trees within WisDOT ROW**

Costs for trees to replace those to be removed from WisDOT ROW along the approved route would be computed in cooperation with WisDOT as part of WisDOT's permitting process.

According to the WisDOT Highway Maintenance Manual, 09-15-45 (2.0), trees in the road ROW that are proposed to be damaged or removed might have to be replaced at WisDOT's discretion and cannot be damaged or removed without WisDOT's permission and direction. Unless specified otherwise in the utility's permit, compensation must be made by the transmission utility to WisDOT for the loss of trees. Trees greater than or equal to four inches diameter at breast height (DBH) must be replaced at a two-to-one ratio, replaced-to-destroyed. Trees less than four inches DBH may be replaced at a one-to-one ratio.

If low-growth trees cannot be planted in the transmission ROW for transmission safety reasons, then the WisDOT may require the applicants to plant the trees in alternate locations or to pay WisDOT an agreed-to price per tree. The price per tree may be established by an appraisal or by values determined in past permits issued to the utilities. The past-permit price is currently \$200 per tree according to the applicants.

### **4.6. CONSTRUCTION SCHEDULE**

The applicants propose to begin construction in January 2013 and complete it by December 2015. This schedule might need to be adjusted depending on the outcome of the regulatory review processes.

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<sup>59</sup> Available at: [http://www.midwestiso.org/publish/Folder/279a04\\_11db4d152b9\\_-7dc50a48324a?rev=1](http://www.midwestiso.org/publish/Folder/279a04_11db4d152b9_-7dc50a48324a?rev=1) (2008).