Enterprise Park to Crooked Lake 115 kV Transmission Line Project Environmental Assessment

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Cover photo provided by Great River Energy. The photo is an example of the single wood pole structures to be used in the Enterprise Park to Crooked Lake 115 kV transmission line project.

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Anoka Municipal Utility
Minnesota Municipal Power Agency
Northern States Power Company

Abstract

Pursuant to the provisions of Minnesota Statutes, chapter 216E, Great River Energy (Applicant) filed a high-voltage transmission line route permit application with the Minnesota Public Utilities Commission (Commission) on October 4, 2011, for a proposed 115 kilovolt (kV) transmission line and modifications to two existing substations (Project).

The proposed Project is for the construction of approximately 5.8 miles of new, overhead 115 kV transmission line between Xcel Energy's existing Crooked Lake Substation in Coon Rapids, Minn., and Anoka Municipal Utility's existing Enterprise Park Substation in Anoka, Minn., in Anoka County. The project will remove, rebuild, and attach Anoka Municipal Utility's existing overhead 12.5 kV distribution lines to the new 115 kV transmission line where the new line overtakes the existing distribution lines. The project would also include modifications to the Crooked Lake and Enterprise Park substations.

Minnesota Department of Commerce Energy Facilities Permitting (EFP) is tasked with conducting environmental review of the applications for transmission line route permits. The intent of this environmental assessment document and the environmental review process is to inform the public, the Applicant, and decision-makers of the potential impacts from the proposed Project and possible mitigations for those impacts.

Persons interested in these matters can register their names on the project contact list by contacting Matthew Langan, Energy Facility Permitting, 85 7th Place East, Suite 500, St. Paul, Minnesota, 55101, phone: (651)-296-2096, email: matthew.langan@state.mn.us.

Documents related to this Project can be found by going to: https://www.edockets.state.mn.us/EFiling/search.jsp and entering "11" for Year and "915" for Number, under search criteria.

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List of Acronyms and Abbreviations

AADT	annual average daily traffic
AC	alternating current
ACSS	Aluminum Core Steel Supported
APE	Area of Potential Effect
APP	Avian Protection Plan
ASR	Antenna Structure Registration
BMP	best management practice
CFR	Code of Federal Regulations
CO	carbon monoxide
CRP	Conservation Reserve Program
dBA	A-weighted decibels
EA	environmental assessment
ELF	extremely low frequency
EMF	electric and magnetic fields
EMI	electromagnetic interference
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FCC	Federal Communications Commission
ft	feet
GPS	Global Positioning System
HVTL	high voltage transmission line
kHz	kilohertz
kV	kilovolt
mA	milliamperes
MDOC	Minnesota Department of Commerce
MnDNR	Minnesota Department of Natural Resources
mG	milliGauss
Mn/DOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
mph	miles per hour
MW	megawatt
NAC	Noise Area Classification
NACE	National Association of Corrosion Engineers
NESC	National Electrical Safety Code
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NHIS	Natural Heritage Information System
NHPA	National Historic Preservation Act
NO2	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
OSHA	Occupational Safety and Health Act

PM10	particulate matter less than or equal to 10 microns in diameter
ppm	parts per million
PPSA	Power Plant Siting Act
PUC	Public Utilities Commission
PWI	Public Waters Inventory
RF	radio frequency
ROW	right-of-way
SHPO	State Historic Preservation Office
SO2	sulfur dioxide
SWPPP	Storm Water Pollution Prevention Plan
TMDL	total maximum daily load
UHF	ultra-high frequency
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
µT	micro Teslas
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service
WHO	World Health Organization

1. Introduction

Great River Energy (Applicant) has made application to the Minnesota Public Utilities Commission (Commission) for a route permit under the alternative permitting process of the Power Plant Siting Act (Minnesota Statute 216E). The route permit application is for the construction of a new 115 kilovolt (kV) transmission line in Anoka County, Minnesota (Project). The approximately 5.8-mile transmission line would connect the existing Crooked Lake and Enterprise Park Substations. Equipment modifications at each substation would be included in the Project.

The proposed Project is for the construction of approximately 5.8 miles of new, overhead 115 kV transmission line between Xcel Energy's existing Crooked Lake Substation in Coon Rapids, Minn., and Anoka Municipal Utility's existing Enterprise Park Substation in Anoka, Minn., in Anoka County (Figure 1). The project will remove, rebuild, and attach Anoka Municipal Utility's existing overhead (12.5 kV) distribution lines to the new 115 kV transmission line where the new line overtakes the existing distribution lines. (Alternatively, Anoka Municipal Utility may choose to bury some of the distribution lines.) The project would also include modifications to the Crooked Lake and Enterprise Park substations to accommodate the new transmission line, including a new ring bus, breaker additions, step down transformers, and associated switch gear.

The Applicant is requesting a route width as narrow as 100 feet in some locations, and as wide as 400 feet in others, except for the area near Anoka High School where the requested route width is 800 feet. The variation in route width is due to the developed nature of the project area. The typical right-of-way for the 115 kV line is 50-75 feet, depending on the structure used. The typical span between poles without underbuild is 300 to 400 feet, and 250 to 300 where 12.5 kV distribution lines are attached. Poles range in height from 60 to 85 feet. Most poles will be constructed as single-pole, wood structures with horizontal post insulators. The transmission line and substation modifications would cost approximately $11.7 million.

Energy Facility Permitting (EFP) staff is tasked with conducting environmental review of applications for high-voltage transmission line route permits. The intent of the environmental review process is to inform the public, the Applicant, and decision-makers about potential impacts and possible mitigation measures for a proposed high-voltage transmission line project.

This environmental assessment (EA) covers the environmental review requirements in accordance with the Scoping Decision Document for this EA, and as outlined in Minnesota Rules 7850, for the proposed project and route permit application as follows:

Section 1.0 - Introduction

Section 2.0 – Describes the regulatory framework associated with the Project, which includes information on the certificate of need criteria, route permit requirements, and the alternative permitting processes.

Section 3.0 – Provides a detailed description of the Project as proposed by Great River Energy and Route Segment Alternative A.

Section 4.0 – Describes the methods used when constructing the transmission line, clean-up and restoration, maintenance procedures, and utility rights-of-way acquisition.

Section 5.0 – Details the potential impacts of the proposed Project to human and natural environments and identifies measures that could be implemented to avoid, minimize or mitigate any potential adverse impacts.

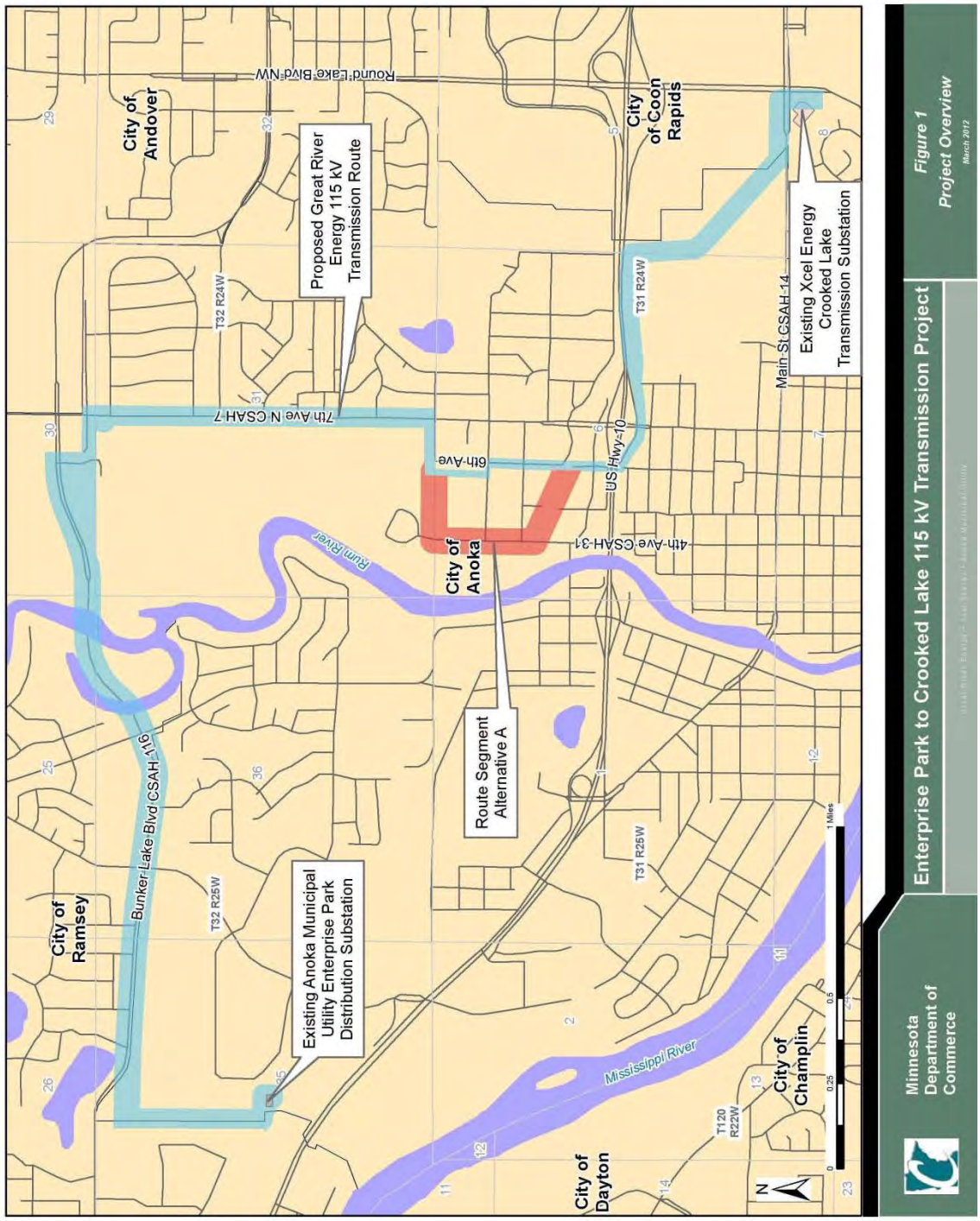
Section 6.0 – Lists additional permits that may be required for the proposed Project.

Section 7.0 – Provides a comparison of the routes analyzed in this EA.

Section 8.0 – References

Much of the information used in this EA is derived from documents prepared by Great River Energy. These include Great River Energy's *Route Permit Application for the Crooked Lake to Enterprise Park 115 kV Transmission Line Project*, October 4, 2011, along with emails and requests for information. Discussion of electromagnetic field issues came primarily from the white paper developed by the Interagency Task Force led by the Minnesota department of Health (MDH), the National Institute for Environmental Health Sciences (NIEHS), and the World Health Organization (WHO). Additional information comes from earlier EFP environmental review documents in similar dockets, other state agencies such as the Minnesota Department of Natural Resources (MnDNR) and the Minnesota Pollution Control Agency (MPCA). Section 8.0 provides a listing of additional references used in the preparation of this EA.

Figure 1: Project Overview



2. Regulatory Framework

In Minnesota, no person may construct a high-voltage transmission line without a route permit from the Public Utilities Commission under Minnesota Statute 216E.03, subdivision 2. A high-voltage transmission line is defined as a conductor of electric energy and associated facilities designed for and capable of operation at a nominal voltage of 100 kV or more and is greater than 1,500 feet in length. Associated facilities of the transmission line include buildings, equipment, and other physical structures that are necessary to the operation of a high-voltage transmission line.

2.1. Alternative Permitting Process

The proposed project is eligible for consideration under the alternative permitting process (Minnesota Rule 7850.2800) of the Power Plant Siting Act (Minnesota Statute 216E.04). The alternative permitting process is shorter than the full permitting procedures and does not require the Applicant to propose alternative sites or routes to the preferred site or route, but does require the Applicant to disclose rejected route alternatives and an explanation of why they were rejected.

2.2. Certificate of Need

Pursuant to Minnesota Statute 216B.243, subdivision 2, "No large energy facility shall be sited or constructed in Minnesota without the issuance of a certificate of need by the Commission." In the case of a high-voltage transmission line, a large energy facility is defined as, (1) any high-voltage transmission line with a capacity of 200 kV or more and greater than 1,500 feet in length, and (2) any high-voltage transmission line with a capacity of 100 kV or more with more than ten miles of its length in Minnesota or that crosses a state line. Because this proposed Project is less than 10 miles in length, a certificate of need is not required.

2.3. Route Permit Application

The Applicant filed a route permit application with the Commission for the Project on October 4, 2011. The Commission accepted the application as complete in an order issued on November 4, 2011. Under the alternative permitting process, the Commission has six months to issue a route permit from the date a route permit application is deemed complete. The Commission may extend this time limit for up to three months for just cause or upon agreement of the Applicant.

2.4. Public Information and Scoping Meeting

EFP staff held two public information and environmental assessment scoping meetings on December 1, 2011, at Anoka City Hall in Anoka, Minnesota, as required by Minnesota Rule 7850.3500. The meetings provided the public an opportunity to learn about the proposed project and the state's high-voltage transmission line route permitting process, review the Applicant's route permit application, ask questions, and submit comments.

A court reporter was present at the public meetings and transcribed questions asked and comments made by the public, as well as responses from EFP staff and the Applicant. Approximately 20 members of the public attended the two meetings.

A public comment period, ending on December 19, 2011, provided the public an opportunity to submit comments to EFP staff on issues and alternative routes and alignments for consideration for the scope of the EA. EFP staff received four comment letters by the close of the comment period. After consideration of the public comments the deputy commissioner of the Department of Commerce issued the scope of the EA on January 5, 2011. The EA scoping decision document is included in Appendix B. Included in the scope of the EA were the Applicant's proposed route and an alternative route segment proposed by the public, known as Route Segment Alternative A.

The following issues were determined to be outside the scope of the EA:

- No-build alternative
- Issues related to project need, size, type, or timing
- Any route or substation alternatives not specifically identified in the scoping decision document.
- Policy issues surrounding whether utilities or local-government should be liable for the cost to relocate utility poles when roadways are widened
- The manner in which land owners are paid for transmission rights-of-way easements, as that is outside the jurisdiction of the Commission.

2.5. Environmental Assessment

An EA must be prepared for all high-voltage transmission projects being reviewed under the alternative permitting process. The procedures EFP staff must follow in preparing the EA are described in Minnesota Rule 7850.3700. The EA contains information on the human and environmental impacts of the proposed project as identified in the scoping decision document. It also addresses required methods to mitigate such impacts for all routes considered. The EA is the only state environmental review document required to be prepared for this project.

Upon completion of the EA, continuing procedural steps include: providing notice on the availability of the EA, scheduling and providing notice of a public hearing in the area where the project is located, and bringing the matter to the Commission for a final decision. An example of a route permit issued by the Commission for a high-voltage transmission line is provided in Appendix C.

Copies of the route permit application and other documents relevant to the process are available for viewing and downloading on the eDockets website at: https://www.edockets.state.mn.us/EFiling/search.jsp, enter “11” for Year and “915” for Number, under search criteria.

3. Proposed Project

The proposed Project is for the construction of approximately 5.8 miles of new, overhead 115 kV transmission line between Xcel Energy's existing Crooked Lake Substation in Coon Rapids, Minn., and Anoka Municipal Utility's existing Enterprise Park Substation in Anoka, Minn., in Anoka County (Figure 2). The project will remove, rebuild, and attach Anoka Municipal Utility's existing overhead (12.5 kV) distribution lines to the new 115 kV transmission line where the new line overtakes the existing distribution lines. (Alternatively, Anoka Municipal Utility may choose to bury some of the distribution lines.) The project would also include modifications to the existing Crooked Lake and Enterprise Park substations.

The Applicant is requesting a route width as narrow as 100 feet in some locations, and as wide as 400 feet in others, except for the area near Anoka High School where the requested route width is 800 feet. The variation in route width is due to the developed nature of the project area. The typical right-of-way for the 115 kV line is 50-75 feet, depending on the structure used. The typical span between poles without underbuild is 300 to 400 feet, and 250 to 300 where 12.5 kV distribution lines are attached. Poles range in height from 60 to 85 feet. Most poles will be constructed as single-pole, wood structures with horizontal post insulators. The transmission line and substation modifications would cost approximately $11.7 million.

Modifications to the existing Crooked Lake and Enterprise Park substations would consist of a new ring bus, breaker additions, step down transformers, and associated switch gear. The substation yards will be expanded by less than one acre to accommodate the added equipment.

Upon issuance of a route permit by the Commission, the Applicant would begin ROW acquisition. Construction of the Project is expected to begin in May, 2013. The estimated in-service date of the Project is October, 2013.

3.1. Purpose of the Project

The stated need of the Project is to address conductor overload concerns to consumers in the Highway 10 corridor from Anoka to Elk River, create a redundant transmission source to the Enterprise Park Substation, providing a more reliable energy source to the industrial loads in the area, support local economic development efforts by the cities of Anoka and Ramsey, provide a transmission line for a future Anoka Municipal Utility substation in the vicinity of 7th Avenue and County Road 116, and to facilitate longer-term opportunities to further strengthen the power supply service to the area.

3.2. Project Location

The proposed Project would be located primarily in the city of Anoka, Anoka County, Minnesota. The proposed transmission line will pass through small portions of the cities of Coon Rapids and Ramsey, Anoka County, Minnesota (Figure 2.) Table 3.1 identifies the geographic areas spanned by the project. Detailed Map Sheets of the Project route are found in Appendix A to this EA.

Figure 2: Transmission Line Route Map

Table 3.1: Project Location

County	City	Section(s)	Township	Range
Anoka	Coon Rapids	8	T31N	R24W
Anoka	Coon Rapids & Anoka	5	T31N	R24W
Anoka	Anoka	6	T31N	R24W
Anoka	Anoka	31, 30	T32N	R24W
Anoka	Anoka & Ramsey	25, 36, 35	T32N	R25W

The proposed new transmission line would exit from the north and east side of the existing Xcel Energy Crooked Lake Substation, cross north over Anoka County Highway 14 (Main Street), then continue west 0.15 miles along the north side of Main Street to the Burlington Northern Santa Fe (BNSF) railroad right-of-way. The Route continues northwesterly 0.38 miles along the northeast side of the BNSF railway corridor, at which point it turns to the north a distance of 0.19 miles across private property to the frontage road located on the south side of U.S. Highway 10. The Route turns to the west along the frontage road approximately 0.25 miles and crosses over to the southwest side of the BNSF railway corridor. The Route continues westerly along the south side of U.S. Highway 10 approximately 0.25 miles to Anoka County Highway 7 (7th Avenue). The Route crosses 7th Avenue and continues westerly 0.13 miles along the south side of U.S. Highway 10 to the northwest corner of the Rudy Johnson Park property. The Route turns north across U.S. Highway 10 and continues along 6th Avenue a distance of 0.40 miles to Grant Street. The Route turns west along Grant Street a distance of less than 200 feet, then turns north a distance of 0.16 miles, following behind 10 homes located on the west side of 6th Avenue. The Route turns east and follows along the north side of Garfield Street a distance of 0.15 miles to the west side of 7th Avenue. The Route turns north along 7th Avenue for a distance of one mile to the south side of the Anoka Ice Arena property. The Route turns west and continues 0.37 miles to Anoka County Highway 116 (Bunker Lake Boulevard), in the general proximity of the Anoka Municipal Utility's wind generator. The Route continues westerly along Bunker Lake Boulevard a distance of 0.55 miles to State Highway 47.

The Route continues along Bunker Lake Boulevard a distance of one mile to a point where Bunker Lake Boulevard curves to the northwest and the Route continues straight west for a distance of 0.16 miles to the municipal boundary line common to the cities of Anoka and Ramsey. The Route turns south along the municipal boundary line between Anoka and Ramsey for a distance of 0.40 miles to the north side of the Enterprise Park Substation property. The Route then turns east along the north side of the Enterprise Park Substation a distance of 0.1 miles, then turns south to enter into the east side of the Enterprise Park Substation facility.

3.3. Alternative Route

During the public EA scoping process, a member of the public suggested a route segment alternative be included in the scope of the EA. This route segment alternative (Route Segment Alternative A) is in the city of Anoka. As is represented in Figure 2, this alternative would depart from the Applicant's preferred route at 6th Avenue where it crosses railroad tracks, and instead parallel the railroad right-of-way to the northwest, then turn north along 4th Avenue, then turn east to join up with the Applicant's preferred route at Garfield Avenue. The route width for this route segment alternative is 400 feet.

3.4. Substation Modifications

The proposed Project involves modifications to the existing Crooked Lake 115-kV Substation. Xcel Energy will own all common substation facilities (land, fence, etc.). Modifications will include installing a new breaker ring bus configuration, modifying the high side structures to accommodate the new 115-kV transmission line, grading, fencing, constructing a control building, and erecting steel structures. The new 115-kV transmission line will exit the Crooked Lake Substation from the east side of the substation and extend north over Main Street. Great River Energy/Minnesota Municipal Power Agency will have a permanent easement for its facilities on the east portion of the substation, and will own and operate all the high voltage 115-kV facilities. The substation yard will be expanded by less than one acre, on Xcel Energy-owned land, to accommodate the added equipment.

The proposed Project involves modifications to the existing Enterprise Park 69-kV Substation. Anoka Municipal Utility will own all common substation facilities (land, fence, etc.) and will operate the low voltage distribution facilities. Modifications will include installing one 115/12.47-kV transformer to receive the new 115-kV service and step it down to 12.47 kV for distribution, installing one box structure, a 115-kV switch with associated bus work and one 115-kV transrupter to accommodate the 115-kV transmission line termination. Portions of the high side structure will be owned by Minnesota Municipal Power Agency and Anoka Municipal Utility. Modifications will also include grading, fencing, constructing a control building, and erecting steel structures. The substation yard will be expanded by less than one acre, on Anoka Municipal Utility-owned land, to accommodate the added equipment.

The new 115-kV transmission line will enter the Enterprise Park Substation on its east side. Great River Energy/Minnesota Municipal Power Agency will have a permanent easement for its facilities on the east portion of the existing Enterprise Park Substation, and will own and operate all the high voltage 115-kV facilities. The substation yard will be expanded by less than one acre to accommodate the added equipment.

3.5. Route Width and Rights-of-Way Requirements

The Applicant requests route widths that vary between 50 and 200 feet from the centerline of the roadways. A larger area is requested around the Anoka High School campus to allow development of an alignment for the transmission line that would work

with the School District, city of Anoka, and Anoka County Highway Department's development plans for this area. The requested route widths are intended to allow flexibility to work with landowners on the alignment and to accommodate environmental concerns. The rights-of-way will typically be 25 to 35 feet from the centerline of the transmission line. In special circumstances, wider rights-of-way may be needed.

The route width of Route Segment Alternative A is 400 feet. The right-of-way will be typical of the Applicant's proposed route, varying from 25 to 35 feet from the transmission line centerline.

3.6. Project Costs

The total estimated cost of the Project, as proposed by the Applicant, is approximately $11.71 million (2010 dollars.) The total estimated cost of the project, incorporating Route Segment Alternative A, is approximately $12.16 million. Cost estimates for the proposed transmission line and substations include expenditures for permitting, surveying (land and cultural resources),right-of-way acquisition, right-of-way clearing and right-of-way restoration, materials, relocation or underbuild for distribution facilities, and construction for both the transmission line and substation modifications.

Transmission line costs vary depending on easement costs, permitting costs, the structure type, the number of structures per mile (i.e., span length), the height and diameter of the wood poles or steel poles, labor and hardware costs, and any modifications to existing distribution infrastructure. The line construction costs include the cost of structures, foundations, insulators, conductor, bird flight diverters where necessary, and labor as well as any costs of equipment that will be used to construct the new line and modify the existing substations.

The single-pole 115-kV transmission line costs for a 795 ACSS conductor (the conductor proposed for this Project) in a developed area are approximately $1,503,000 per mile.

Annual operating and maintenance costs associated with 115-kV transmission lines in Minnesota currently average about $600 per mile. Storm restoration, annual inspections and ordinary replacement costs are included in these annual operating and maintenance costs. The estimated annual cost of right-of-way maintenance is between $500 and $750 per mile of transmission line.

Operation and maintenance costs associated with the Crooked Lake and Enterprise Park substations will be minimal. Operation and maintenance costs include weed control inside the substations.

4. Facility Construction

Construction of the Project would begin following the decision of the Commission and the issuance of required permits and approvals. Prior to construction, all easement rights and ROW must be acquired and soil conditions established to finalize the construction design.

The Applicant has stated the Project will be designed in compliance with the latest industry standards, as well as environmental and other permit conditions. This includes adherence to National Electric Safety Code (NESC) standards regarding clearances to ground, clearance to crossing utilities, clearance to buildings, right-of-way widths, erecting power poles, and stringing of transmission line conductors.

The Applicant has stated it typically uses outside contractors for construction activities on large transmission line projects. The contractor is required to construct the line in accordance with specifications developed by the Applicant's Engineering and Project Management Department. A copy of the Applicant's easement restriction list, environmental restriction lists, and any required local permits are given to the awarded contractor prior to construction.

The Applicant has stated the proposed 115 kV transmission line would be constructed at existing grade elevations. Therefore, no pole locations would require grading, unless it is necessary to provide a level area for construction access and activities.

Typical tangent structures will be wood, laminated wood, or steel direct-embedded poles. The structures will require a hole dug 10 to 15 feet deep and 3 to 4 feet in diameter for each pole. Any excavated soil that is not backfilled will be thin spread or removed from the site as required. The poles may be backfilled with native soils, crushed rock or concrete depending on design conditions. In lowland areas, a galvanized steel culvert may be also inserted for pole stability if soil capacity is poor.

Due to the congested development throughout the Project area, angle structures will typically be self supported and attached to a drilled concrete pillar foundation. The pillar will typically have a diameter of 4 to 8 feet. The hole may require a depth of 15 to 30 feet depending on design requirements. The pillar will be poured onsite with concrete delivered to the site via concrete trucks from a local batch plant.

Poles may be delivered to the staked location or to a designated marshalling yard depending on delivery and contractor availability. If the poles are delivered to a staked site, they are placed on the right-of-way out of the clear zone of any adjacent highways or designed pathways. The poles are typically framed with insulators and hardware on the ground and then lifted and placed in the hole via a bucket truck or a crane depending on the weight of the structure.

Once the structures have been erected, conductors are installed by establishing stringing setup areas within the right-of-way. These stringing setup areas are typically located

every two miles along the project route. The conductors are pulled with a rope lead that connects to every structure through a dolly attached at the insulator location. Temporary guard or clearance poles are installed at crossings to provide adequate clearance over other utilities, streets, roads, highways, railroads, or other obstructions after any necessary notifications are made or permit requirements met to mitigate any concerns with traffic flow or operations of other utilities.

In lowland areas, construction activities may occur during the winter season to mitigate any damage to wetland areas or other sensitive areas, or to comply with required crossing permits. A pre-construction meeting with the State of Minnesota will outline any special requirements for the contractor prior to the start of any construction activities.

During construction, when temporary removal or relocation of fences needs to occur, installation of temporary or permanent gates may be required. The Applicant will be required via the route permit to coordinate with the landowners on replacement of fences and gates.

Regardless of the route or technique selected, similar construction equipment would be required. Equipment that would be used for construction includes: tree removal equipment, mowers, cranes, backhoes, digger-derrick line trucks, track-mounted drill rigs, dump trucks, front end loaders, bucket trucks, bulldozers, flatbed tractor-trailers, flatbed trucks, pickup trucks, concrete trucks, and various trailers.

Modifications to the Enterprise Park and Crooked Lake 115-kV substations will begin once permits are received and the final design is complete. A detailed construction schedule will be developed based upon availability of crews, outage restrictions for any transmission lines that may be affected, weather conditions, spring load restrictions on roads, and any restrictions placed on certain areas for minimizing impacts from construction.

The Applicant has stated that all construction will be completed in accordance with state, NESC, Great River Energy, Anoka Municipal Utility and Xcel Energy construction standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, right-of-way widths, erection of power poles (to connect the line to the substation), and stringing of transmission line conductors.

Less than one acre of land is expected to be disturbed in the modifications of each substation. Some grading of the substations will be needed followed by pouring concrete foundations to support the substation equipment and control house.

4.1. Property/Right-of-Way Acquisition

There are approximately 4.4 miles of existing overhead electric distribution lines located within the 5.8-mile proposed route. These existing distribution lines are owned, operated and maintained by Anoka Municipal Utility. In most instances, there will likely be some element of physical conflict with the new transmission line, making it necessary to

remove, bury, or upgrade the distribution line by attaching it as underbuild on the new transmission line poles. In fewer instances where the new transmission line would not be in conflict with the existing distribution line, the distribution line will be left in its current location.

Approximately 4.2 miles of the 5.8-mile Proposed Route would parallel public road and railroad rights-of-way (approximately 0.65 miles adjacent to Trunk Highway 10, 2.7 miles along Anoka County Roads 7,14 and 116, 0.35 miles adjacent to the BNSF railroad; and 0.54 miles along Anoka city streets). This parallel alignment adjacent to public road and railroad rights-of-way represents approximately 72 percent of the total route length of 5.8 miles.

The typical right-of-way will be 50 to 70 feet wide, 25 to 35 feet on each side of the transmission centerline. Along public roads, the Applicant has stated it will locate the transmission line structures two to five feet outside of the public road rights-of-way, although there may be unique circumstances where structures would need to be located within public road rights-of-way. With much of the Project located in densely developed suburban areas, consideration of narrower right-of-ways will be given in those instances where existing structures or other physical features may reduce the available right-of-way to less than 25 feet on either side of the transmission line.

In rare cases, a right-of-way width exceeding 70 feet may be required for unusually long spans (such as the Rum River crossing) or special design requirements based on final design survey results. The minimum right-of-way width is largely dependent upon the extent of conductor blowout and recommended clearances from physical obstructions along the Route.

Once a route permit is approved and issued by the Commission, an engineering design survey will be completed and a centerline location of the transmission line will be established. Right-of-way negotiations will commence shortly thereafter. As a general practice, landowners or other interested parties will be contacted to review project details and to discuss the initial phases of the transmission project, including survey and soil investigation.

During the right-of-way acquisition process, each landowner or other interested party is provided with an acquisition package generally consisting of a copy of the Route Permit, easement documents, deeds, structure locations, typical structure photos, an offer of compensation and a project plan depicting the proposed transmission line or facility relative to each landowner's property. Additional information will be provided to each landowner or interested party explaining power line safety, easement acquisition procedures, damage settlement procedures, and a complaint reporting form. In addition to permanent easements necessary for the construction, operation and maintenance of the transmission line, there may be other special negotiations with certain landowners for temporary easements or agreements for construction access rights and staging areas for storage of poles and conductor, equipment, vehicles, or other construction-related materials. Landowners will be sufficiently notified in the event that site access is needed for soil investigation activities.

The Applicant will be responsible for acquiring the necessary easement rights for the new 115 kV transmission line. The Applicant will be available to discuss easement issues with all property owners and interested parties.

Xcel Energy is fee owner of the 4.76-acre Crooked Lake Substation property. No additional property acquisition is anticipated for the modifications proposed at this substation facility.

The city of Anoka is fee owner of the existing 2.33-acre Enterprise Park Substation property. In addition to the electric substation facility, the city operates and maintains an elevated municipal water storage tank situated on the easterly portion of the property in close proximity to the substation facility. A 0.69-acre parcel of land located westerly and immediately adjacent to the Enterprise Park Substation property is being considered by the Applicant for purchase in fee title or by easement for the purpose of improving access to the substation both during construction of the Project and any future expansion of the 115-kV components of the substation.

The acquisition of utility easement on private land consists of a multi-step process that includes examining titles, contacting owners, surveying, preparing documents and purchasing the ROW. The first step in the ROW process is to complete a public records search of all land involved in the Project. A title report is then developed for each parcel to determine the legal description of the property and the owner(s) of record and to gather information about easements, liens, restrictions, encumbrances and other conditions of record. Owners of private land located within the desired ROW easement would be contacted by a ROW agent acting on behalf of the Applicant to discuss the land use needs specific to their parcel and any site-specific concerns of the land owner. Contact with private land owners would occur following the issuance of the Route Permit. The ROW will notify the owners of private land prior to performing any land survey and soil exploration activities.. The purpose of the survey is to identify natural features, man-made features, and elevations needed for detailed engineering design of the transmission line.

The ROW agent conducts negotiations with the land owner to acquire easement rights to build, operate, and maintain the transmission line and associated structures. The ROW agent would offer fair compensation for the value of the easement. The specific location of structures associated with the transmission line would be staked during easement negotiations. If the landowner and Applicant cannot reach an agreement, prior to commencing the condemnation process, the Applicant would be required to obtain an independent appraisal of value for the easement, which would be provided to the landowner. If the land owner does not agree with the easement value offered by the ROW agent, the land owner may obtain its own appraisal of easement value. Reimbursement for the cost of the landowner's appraisal, up to pre-specified amounts that vary depending on the type of property, could be awarded by the court-appointed Commissioner in the condemnation process, as stipulated in Minnesota Statutes, section 117.036.

If an agreement cannot be reached regarding the acquisition of easement rights, the Applicant can exercise the right of eminent domain, also referred to as the condemnation process, under Minnesota Statutes, chapter 117. Under the condemnation process, the Applicant files a Petition in the district court where the property is located. The Petition would be served to all owners of the property. If granted by the courts, a three-person condemnation commission would be established to evaluate compensation for the easement. The three-person committee would be comprised of third-party individuals familiar with real estate issues, who would view the property in question. The commission would conduct a valuation hearing, at which the property owners would be allowed to testify regarding the fair market value or the easement. Following the hearing, the commission would make an award as to the value of the property, which would be filed with the court. Each party is given a 40-day window to appeal to the district court for a jury trial.

After ROW is acquired, the ROW agent would contact all land owners to discuss the construction schedule. If personal property must be moved temporarily for the construction of the Project (e.g., property fences), the ROW agent would discuss this with the land owner.

4.2. Transmission Line Structures

Single pole wood structures with horizontal post insulators will be the primary structure used for the Project. In some instances the topography may require longer spans beyond the capability of the horizontal post insulators, in which case a braced post design will be utilized to accommodate the increased loadings. Angles in the line will require guying (the use of anchors and support cables) or specialty structures. Where guying is not practicable, direct embedded laminated wood poles or steel poles on drilled concrete pillar foundations will be utilized.

Single pole with underbuild design will be used in areas where the new transmission line overtakes one of the various distribution providers along the proposed route. This design uses less right-of-way than two separate parallel lines. However, these structures will be taller because the higher voltage circuit is stacked on top of the lower voltage circuit, resulting in a pole that averages 75 to 85 feet in height above ground. Span lengths will average 250 to 300 feet. There are several locations along the proposed route where the distribution may be buried underground due to physical constraints or for aesthetic reasons.

H-Frame design structures may be used in areas where longer spans are required to avoid or minimize impacts to wetlands or waterways. Span lengths average 600 to 700 feet, with 1,000-foot spans possible with certain topography. H-Frame structure heights range from 60 to 80 feet with taller structures required for exceptionally long spans and in circumstances requiring additional vertical clearance exceeding National Electrical Safety Code (NESC) and other agency requirements. Figure 3 illustrates the various structure types that will be used for the Project.

The transmission line will be designed to meet the NESC and the Institute of Electrical and Electronics Engineers standards. The NESC recommends minimum safety standards for clearances over roadways, buildings, signs, light standards, and other facilities.

In most instances, the Applicant states that NESC height standards over highways and roadways (20.1-feet minimum clearance) will be exceeded. In some cases, greater clearances are dictated by MnDOT or local county highway permitting. The Applicant has stated it will work with these agencies to meet their clearance requirements.

Although the existing standards give recommended clearances over buildings, the Applicant has stated it will not locate transmission lines directly over a building unless it cannot be avoided. Horizontal clearances to buildings, signs, light standards, and other installations are determined by calculating the blowout of the wire, structure deflection, and safe electrical clearance from the line.

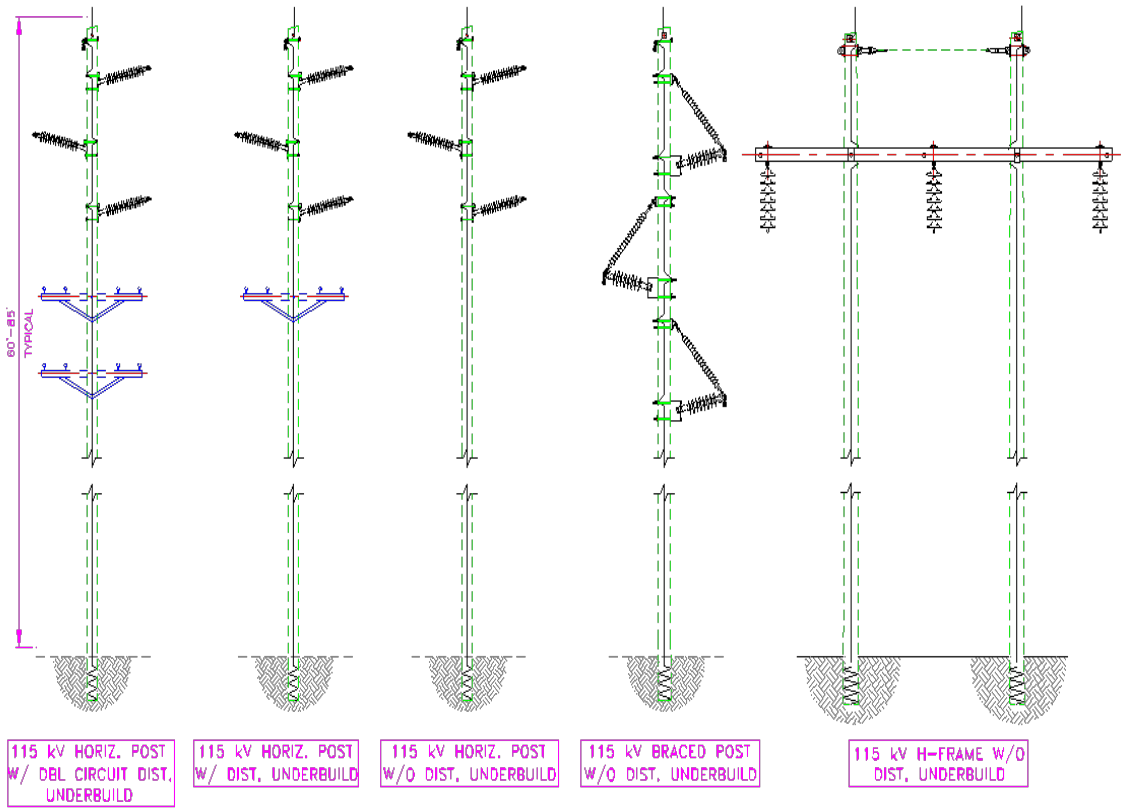
4.3. Transmission Line Conductors

The single circuit structures will have three single-conductor phase wires (not bundled) and one shield wire. The phase wires will be 795 ACSS 26/7 (Aluminum Conductor Steel Supported with 7 steel core strands and 26 outer aluminum strands). The shield wire will be 0.528 optical ground wire. The average span between structures without underbuild will be 300-400 feet and structure heights will range from 60 to 85 feet. The diameter of wood poles at ground level ranges between 15 and 22 inches. Rectangular laminated poles are buried in steel culverts typically four to six feet in diameter that are filled with crushed rock. Steel poles are mounted on concrete pillar foundations with diameters ranging from four to eight feet in diameter with the pole slightly smaller than the concrete pillar. Structures, pole heights and spans will vary depending upon topography and environmental constraints (such as highway crossings, water crossings, and required angle structures).

4.4. Cleanup and Restoration

The HVTL route permit will require the Applicant to restore the ROW following construction. Upon the completion of **c**onstruction, property owners and interested parties will be contacted by the Applicant to determine the extent of construction damages, if any. Personal property and real estate that may have sustained construction-related damage will be restored or replaced by the Applicant to its pre-construction condition or better. Property owners and other interested parties will again be notified by the Applicant upon the completion of the restoration and cleanup, and will be directed to report any outstanding construction issues that have not been addressed. Once construction cleanup is complete and construction damages have been successfully mitigated, landowners will be sent a final notification advising them of the completion of the Project.

Figure 3: Schematic Diagrams of Typical Transmission Line Structures



4.5. Damage Compensation

Following construction of the Project, the ROW agent would contact private land owners to inquire whether any damage occurred to the property during construction and what repairs may be needed. The Applicant would be responsible for restoring all areas to their original condition to the maximum extent possible. If non-repairable damage occurs to a property, the Applicant would reimburse the landowner for such damages.

4.6. Maintenance

The Applicant will periodically use the transmission line right-of-way to perform inspections, maintain equipment, and repair damage. Regular maintenance and inspections will be performed over the life of the facility to ensure a reliable system. Annual inspections will be done by foot, All-Terrain Vehicles, pickup truck, or by aerial means. These inspections will be limited to the acquired right-of-way and areas where obstructions or terrain require access off the easement. An aerial inspection of each transmission line is conducted every other month to ensure reliable operation.

The Applicant will conduct vegetation surveys and remove undesired vegetation that will interfere with the operation of the transmission line. Frequency of vegetation maintenance is on a three- to seven-year cycle. Right-of-way clearing practices include a combination of mechanical and hand clearing, along with an application of herbicides where allowed.

The Applicant will perform periodic inspections, maintain equipment, and make repairs over the life of the substations. Anoka Municipal Utility and Xcel Energy will also conduct routine maintenance as required to remove undesired vegetation that may interfere with the safe and reliable operation of the substations.

4.7. Undergrounding Transmission Line Facilities

It is common to see lower voltage distribution lines that connect to homes and businesses buried directly in the ground using less invasive construction methods. In these cases, undergrounding offers aesthetic and environmental benefits while posing relatively few construction, maintenance, and operational challenges. Undergrounding of transmission lines at higher voltages, however, can become progressively more complex. A number of factors are involved in the consideration of undergrounding a HVTL, including: construction, cost, and maintenance. Because of these challenges, placing high-voltage transmission lines, like the line proposed for this Project, underground is a practice generally used as a mitigative measure only when there is no viable overhead corridor and for very limited distances to address specific constraints.

Underground transmission lines would be placed in a concrete duct system. The underground line would require a concrete duct bank containing two 6-inch PVC conduits for transmission circuits and one 2-inch PVC conduits for ground continuity and communication needs. The trench design is dependent on physical limitations of the

route selected, including existing subsurface features and available ROW. Manholes placed along the route would be used to pull conductors through the duct system.

Open cut trenching is the most commonly used construction technique to install underground duct systems. Depending on the natural features in the right-of-way, it may be necessary to shore up the trench for worker safety, dewater the trench due to the presence of shallow groundwater, and backfill the trench with selective fill material to improve heat transfer. Installation generally includes direct burial in backfilled trenches and concrete trenches with covers or concrete ductbanks. Constructing the trench for the underground transmission line would likely result in greater temporary construction impacts than the proposed overhead line.

In general, construction of underground transmission lines takes longer than construction of overhead transmission lines. A typical progression rate for underground construction would be 200-feet of transmission line per day.

Background research and engineering and design considerations are required before construction of underground transmission lines. Prior to construction of underground transmission lines, the Applicant would conduct soil sampling and testing to determine the thermal conductivity of the earth and ability to trench and bore in the ROW.

An underground transmission line is expected to cost five times more per mile compared to construction of an overhead transmission line, due to time, materials, process, and the use of specialized labor. An underground transmission line must also be routed to avoid other underground installations such as water, gas, and sewer lines. Unstable slopes, hazardous material sites, wetlands, and bedrock must be avoided. Going under a road, highway, or river requires construction techniques, such as directional boring, that are more expensive than overhead installations.

Although failure of underground transmission lines is rare, a disadvantage of building underground transmission lines is the difficulty of finding and repairing failures. Overhead failures can usually be found through visual inspection. The time and cost to repair an underground transmission line would be greater than those anticipated for an overhead transmission line. While overhead transmission lines fail, on average, once every 17.8 years, underground transmission lines fail once every 50.5 years. In addition, the average time to resolve a failure on an overhead transmission line is nine hours. The average time to resolve a failure on an underground transmission line is three weeks.

No routine maintenance or operation costs are anticipated for underground transmission lines. Visual inspections of underground transmission lines are not possible and will not be conducted. Unlike overhead transmission lines that are susceptible to a number of sources of outages (e.g., weather, birds, vehicle impacts), underground transmission lines are susceptible to only two outage causes: cable fault due to overloading of the system and failure of the cable or splices. If a fault is sensed on the transmission system, the underground transmission line will need to be accessed.

5. Affected Environment, Impacts, and Mitigation

The construction of a transmission facility involves both short- and long-term impacts. An impact is a change to the pre-construction environment as a direct or indirect result of the proposed action and may be positive or negative. Direct impacts are caused by the action and occur at the same time and place. Indirect impacts are caused by the action and occur later in time, but are still reasonably foreseeable.

This section describes the potential impacts on resources and the possible mitigation measures intended to avoid, minimize, or mitigate impacts caused by the construction and future operation and maintenance of the proposed transmission facility.

5.1. Human Settlement

The Project has the potential to affect various resources related to human settlement. Potential effects related to proximity to structures, aesthetics, noise, interference with public services and utilities, archaeological and historic resources, and safety and health are addressed in this section.

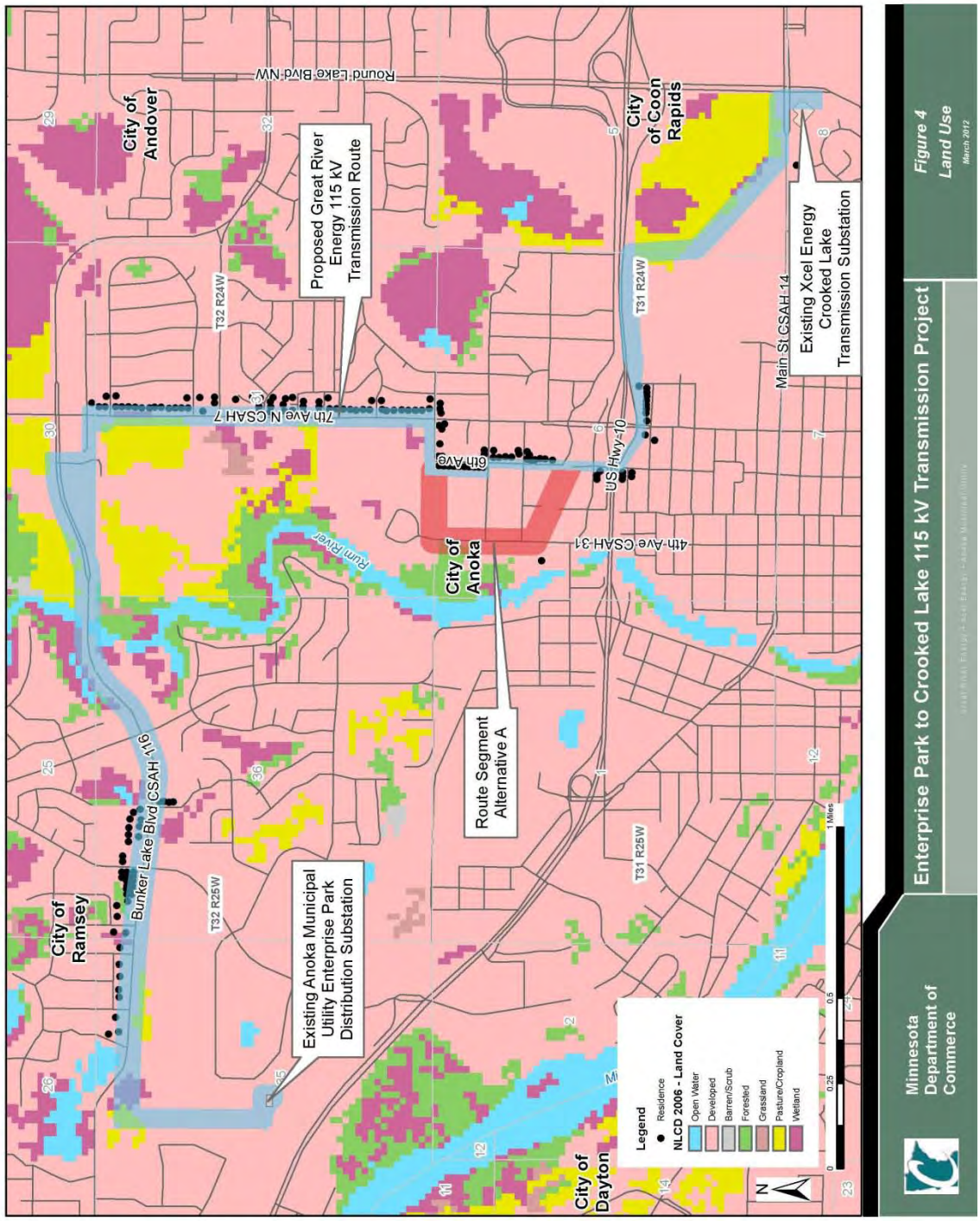
5.1.1. Proximity to Residential Structures

Residences are located along the roads and property lines paralleled by the proposed route and Route Segment Alternative A (Figure 4.) To compare the route alternatives, residences in the Project area were identified, and the number of residences within 35 feet, 36-135 feet, and 136-300 feet of the proposed alignment for the Proposed Route and Segment Alternative was tabulated. Although 17 homes are within the maximum ROW required for the transmission line, the Applicant has stated that no residential displacement will need to occur in order to construct and operate the transmission line. The National Electric Safety Code (NESC) and Applicant standards require certain clearances between transmission line facilities and buildings for safe operation of the transmission line. Therefore, the Applicant would acquire a ROW for transmission lines that is sufficient to maintain these clearances. The Applicant has stated this is possible by reducing the ROW required, and by sharing existing ROW, such as road corridors. This information is presented in Table 5.1.

Table 5.1 Number of Residences within 300 Feet of the Proposed Route Alignment

Resource Category	Proposed Route	Route Segment Alternative A
Number of Residences 0-35 feet from route alignment	17	17
Number of Residences 36-135 feet from route alignment	60	40
Number of Residences 136-300 feet from route alignment	172	172
Total number of residences within 300 feet of route alignment	249	229

Figure 4: Land use



As shown in Table 5.1, a total of 249 residences are within 300 feet of the proposed route, while a total of 229 residences are within 300 feet of the proposed route that incorporates Route Segment Alternative A. The 20 additional existing homes along the preferred route would be between 36 and 135 feet from the route centerline. Volunteers of America has begun construction of a multi-tenant senior continuum of care campus on the property located east of 4th Avenue and north of Grant Street that would be impacted by Route Segment Alternative A.

Mitigation – Proximity to Residential Structures

In order to mitigate effects to structures located near or within the Project ROW, the Applicant refined the routes to avoid the following to the extent possible:

- Existing or planned residences;
- Areas where clearances are limited because of trees or nearby structures; and
- Agricultural areas, agricultural operations, or other related land uses.

Where possible, during detailed design, the Project transmission lines would be placed on the opposite side of the road from residences to further mitigate potential effects on structures within or near the ROW. Proper safeguards also would be implemented for construction and operation of the facility. The Project would be designed in compliance with local, state, and NESC standards for clearance to ground, crossing utilities and buildings, strength of materials, and ROW widths.

The proposed transmission lines would be equipped with protective devices (circuit breakers and relays located in the substation where the transmission lines terminate) to safeguard the public. If an accident were to occur, such as a structure or conductor falling to the ground, protective equipment would de-energize the transmission line.

5.1.2. Aesthetics

The majority of the 115-kV single circuit line will be constructed using single pole wood structures with horizontal post insulators. The average height will be between 60 and 85 feet, with an average span of 250 to 400 feet. The transmission line will generally be designed with a narrow profile that is less intrusive than other types of structures.

Because of the highly developed nature of the Project area, the viewshed is congested with manmade structures and is relatively short, both of which makes the transmission line less apparent to the casual observer. The transmission line will nevertheless be visible along the roads that it parallels. In some areas it will replace an existing distribution line, which may be attached to the new poles. Homes within 500 feet of the Proposed Route alignment will be the most likely to have their viewshed affected by the construction of a transmission line.

Temporary indirect impacts primarily are associated with construction. For example, construction of the transmission line could create visual impacts due to the presence of equipment, the creation of staging areas, and the installation of the structures and lines.

These impacts may disrupt a generally passive experience felt by residents and visitors in the Project area.

More long-term indirect impacts would be associated with the placement of the poles and the potential loss of trees, and as a result, the sentiments associated with these resources. The long-term indirect impacts likely would occur once the transmission line and substations were in operation. In areas where trees would be removed, the transmission lines and poles would be visible to resident and interested/participant viewers.

Minimal direct and indirect impacts are anticipated in the locations of the Enterprise Park and Crooked Lake substations. Activities associated with the modifications would be consistent with the overall industrial atmosphere, albeit noticeable to some existing users.

Mitigation - Aesthetics
While the new transmission line is proposed for an area that is substantially developed, there will be areas where the Project will create a visual contrast to surrounding land uses. The Applicant has stated it will work with landowners to identify concerns related to the proposed transmission line and upgraded substations. In general, mitigation includes enhancing positive effects as well as minimizing or eliminating negative effects. Mitigation will include, to the extent practicable and within sound engineering practices, the following:

- Locating structures, right-of-way and other disturbed areas after considering input from landowners or land management agencies to minimize visual impacts.
- Taking care to preserve the natural landscape by constructing and operating the line to prevent any unnecessary destruction of the natural surroundings.
- Paralleling or sharing existing transmission lines and other rights-of-way, wherever such actions do not violate sound engineering principles or system reliability criteria.
- Placing structures at the maximum feasible distance from highway, trail and water crossings.
- Compensating landowners for removal of any mature yard trees, either through easement negotiations or on a separate basis.

5.1.3. Noise

There are two potential sources of audible noise from the Project: the conductors on the transmission line and the equipment located within each of the substations.

Noise levels are measured on a logarithmic scale in units of decibels. Because human hearing is not equally sensitive to all frequencies of sound, it is customary to apply a weighting factor so the overall measured sound pressure level will relate as closely as possible to the ear's perception of the sound. The A-weighting network is typically used and the measured sound level is expressed in units of decibels A-weighted (dBA). In general terms, a noise level change of 3 dBA or less is imperceptible to human hearing. A 5-dBA or more change in noise level is clearly noticeable. A 10-dBA change in noise level is perceived as a doubling of noise loudness

Minnesota's Noise Pollution Control Rules (Minn. Rules Chapter 7030) states that noise levels must meet specific standards based on Noise Area Classifications (NAC) established in the rule. The standards are summarized in Table 5.2.

Table 5.2: Noise Area Classifications & Standards

NAC	Day (07:00-22:00)		Night (22:00-7:00)	
	L50	L10	L50	L10
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

The NAC is based on land use activity at the location of the receiver. For example, household units are defined under NAC 1, bus passenger terminals are defined under NAC 2, and transportation right-of-way is defined under NAC 3. NAC 1 also includes other noise-sensitive areas such as medical and other health services, religious services, educational services and camping areas.

Minnesota's Noise Pollution Control Rules use the A-weighting scale and apply statistical sound levels (L-Level Descriptors) to account for changes in sound levels over a period time as shown in Table 5.2. The L10 is defined as the noise level exceeded 10 percent of the time, or for six minutes in an hour. The L50 is the noise level exceeded 50 percent of the time, or for thirty minutes in an hour. The L5 is the noise level exceeded five percent of the time, or for three minutes in an hour.

Audible noise from electrical conductors is due to point source corona (minor breakdown of air insulating a conductor) and is a function of conductor voltage gradient. Noise emission from a transmission line occurs during heavy rain and wet conductor conditions. In foggy, damp, or rainy weather conditions, power lines can create a crackling sound due to the small amount of electricity ionizing the moist air near the wires. During dry weather, audible noise from transmission lines is barely perceptible.

During heavy rain, the background noise level produced from the rainfall and wind is usually greater than the noise from the transmission line. Also, few people are outdoors and often windows are closed, which help to mitigate the level of noise to which a person is subjected. As a result, people do not normally notice audible noise from a transmission line during heavy rain.

Table 5.3 summarizes the expected noise level from a 115-kV transmission line when it is exposed to heavy rain conditions (one inch per hour). These estimates are based on results from the Bonneville Power Administration Corona and Field Effects Program version 3 (U.S. Department of Energy, Bonneville Power Administration (BPA), Undated).

Table 5.3: Conductor Noise Estimates – Heavy Rain Case

Measurement Location	L5	L50
Edge of right-of-way	17.7 dBA	14.2 dBA
Directly under the line	18.8 dBA	15.3 dBA

BPA developed general guidelines based upon public response to alternating current (AC) transmission line audible noise. The guideline indicates that numerous complaints can be expected if the line noise exceeds approximately 58.5 dBA and that few complaints should be expected if audible noise is limited to 52.5 dBA, values relatively consistent with the Minnesota noise rules. The calculated values for the proposed transmission lines are well below the state's standards and BPA's guidelines. The audible noise will be barely perceptible during fair weather.

Noise associated with substations includes the operation of transformers and switchgear. The transformers produce a constant low-frequency humming noise, while the switchgear produces an impulsive or short duration noise during infrequent activation of the circuit breakers. Due to the infrequent operation of the switchgear, the noise generated will be considered temporary in nature and not predicted to exceed the MPCA Noise Limits.

Modifications at the Crooked Lake Substation will not include the installation of a new transformer. Accordingly, the only new noise source will be from new switchgear.

Modifications at the Enterprise Park Substation will include the installation of a new 115-kV step-down transformer. A typical transformer of this type would have vendor noise level guarantees measured one meter from the equipment of 75 dBA when the fans are running. To conservatively predict future noise levels and compliance with the 50-dBA limit, the 75-dBA noise level was treated as a point source at the transformer and modeled to determine the distance where the noise levels would be reduced to 50 dBA.

A simplified, conservative model was created to determine the distance at which the noise would attenuate to 50 dBA (the NAC 1 nighttime L_{50} noise standard). Noise propagation through the outdoor atmosphere typically decreases in level with increasing distance between the source and the receiver. The noise attenuation is the result of several mechanisms, including geometrical spreading of the sound waves, shielding provided by physical structures, atmospheric absorption of the acoustic energy and ground effects on the sound waves. In general, the noise or sound pressure levels emitted from a substation will decrease approximately 6 dB for each doubling of distance from the source to the receiver. The simplified model was prepared based on this 6-dB reduction with a doubling of distance. The model is conservative in that it does not factor in geometric spreading or any attenuation from shielding or ground effects.

Based on the model, substation noise level from the Enterprise Park Substation will attenuate to 50 dBA at a distance of approximately 51 feet from the transformer. The nearest NAC 1 receptor will be the Anoka Technical College, which is approximately 450 feet from the Enterprise Park Substation, and at this distance, the noise level will be approximately 31 dBA. Noise levels will be significantly lower inside the buildings where the educational services occur.

Mitigation - Noise
The MPCA regulates noise limits in the state of Minnesota. Utilities must conform to the standards of these noise limits. The Applicant has stated that the substation substation modifications will be designed to emit noise levels that will attenuate to levels lower than the MPCA noise limits at the nearest receptors. Transmission line noise levels are not predicted to exceed the MPCA noise standards outside the right-of-way for all noise area classifications. Substation noise will not exceed applicable limits, including the MPCA noise limits.

For noise generated during construction, the Applicant would be required by state regulation to adhere to local ordinances dictating when noise can be generated (e.g., daytime only) from construction–related activities. It is expected that noise from construction would be intermittent and temporary in nature.

The applicant has stated it will design the alignment to minimize the removal of trees. Trees provide minimal noise mitigation. It takes approximately a 100-foot wide strip of trees with heavy dense undergrowth to provide a 5 dB reduction in sound levels. A 6 dB change in sound is barely perceptible to the human ear. The trees north of the MnDOT facility entrance road are up to 200 feet wide and undergrowth may be sufficiently dense in the summer to provide some noise mitigation to a receptor northwest of the MnDOT facility (e.g., the strip mall east of 7th Avenue). Cutting this 200-foot wide stand back by 35 feet would not result in a perceptible change in the noise levels. The stand of trees south of the MnDOT entrance road is not sufficiently wide enough and there is no undergrowth to provide any perceptible noise mitigation. Accordingly, cutting these trees are not expected to result in a perceptible noise increase.

5.1.4. Interference with Utility Systems and Public Services

Under certain circumstances, corona from transmission line conductors can generate electromagnetic “noise” at the same frequencies that radio and television signals are transmitted. This noise can cause interference with the reception of these signals depending on the frequency and strength of the radio and television signal. Television interference is rare, but may occur when a large transmission structure is aligned between the receiver and a weak distant signal, creating a shadow effect. Loose and/or damaged hardware may also cause television interference. Tightening loose hardware on the transmission line usually resolves the interference issue.

If radio interference from transmission line corona does occur, satisfactory reception from AM radio stations presently providing good reception can be obtained by adjusting the receiving antenna. Moreover, AM radio frequency interference typically only occurs

immediately under a transmission line and dissipates rapidly within the right-of-way to either side. FM radio receivers usually do not pick up interference from transmission lines because corona generated radio frequency noise currents decrease in magnitude with increasing frequency and are quite small in the FM broadcast band (88-108 Megahertz). Also, the excellent interference rejection properties inherent in FM radio systems make them virtually immune to amplitude type disturbances.

A two-way mobile radio located immediately adjacent to and behind a large metallic structure (such as a steel tower) may experience interference because of signal-blocking effects. Movement of either mobile unit so that the metallic structure is not immediately between the two units should restore communications. This would generally require a movement of less than 50 feet by the mobile unit adjacent to a metallic tower.

Utility Systems and Public Services in the Project area include AM and FM radio; television; global positioning systems (GPS); existing utilities; cellular signals; and emergency service providers (e.g., "911" and emergency management systems (EMS)).

Communications networks in the Project area were identified through a search of current antenna licenses with the Federal Communication Commission (FCC). Existing transmission lines in the Project area were identified by the Applicant in the route permit application.

Transmission lines have the potential to interfere with existing utilities through corona and gap discharges. Corona is a phenomenon associated with energized transmission lines. Under certain conditions, the localized electric field near an energized conductor can be sufficiently concentrated to produce a tiny electric discharge that can ionize air close to the conductors. This partial discharge of electrical energy is called corona discharge or corona (Electric Power Research Institute, 1982 as cited in PG and E, 2005). Several factors, including conductor voltage, shape and diameter, and surface irregularities, such as scratches, nicks, dust, or water drops, can affect a conductor's electrical surface gradient and its corona performance (PG and E, 2005).

Corona from transmission lines could generate electromagnetic signals in the same frequencies as those used for radio and television signals, depending on the frequency and strength of the radio and television signal. Corona discharges cause short pulses of voltage and current to be propagated along the transmission line, resulting in radio frequency noise in the vicinity of the line (PG and E, 2005).

In addition to corona, gap discharges also may be present. These types of discharges could occur "at locations where tiny electrical separations (gaps) develop between mechanically connected metal parts. A small, electric spark discharge across the gap can create unwanted electrical noise" (PG and E, 2005). Generally, interference due to gap discharges is less frequent for high voltage transmission lines than lower voltage lines (PG and E, 2005). Interference issues from transmission lines generally could be corrected by tightening any loose or separated parts on the transmission lines (BPA, 2002).

Interference also depends on the weather conditions. In humid conditions, corona is higher than it would be in dry weather. Under ideal conditions, the conductor cables would be free of corona discharges; protrusions, such as water droplets on the cable, enhance the electric field in the vicinity of the droplet to a size where corona could become present (Straumann and Fan, 2009).

AM radio reception (in broadcast bands 535 to 1605 kilohertz (kHz)) interference typically is stronger if a radio unit and/or antenna is located beneath the transmission line and dissipates rapidly within the ROW to either side of the transmission line. Modifying a radio antenna and/or relocating a radio unit (i.e., away from a transmission line and away from a metallic tower-type structure) are simple ways to restore AM reception on a device that originally had good reception prior to the interference. FM radio reception is rarely affected by the presence of transmission lines. Since corona generated radio frequency noise currents decrease in magnitude as frequency increases, the effects of corona are quite small in a FM broadcast band (88-108 Megahertz). In addition, FM radio systems have inherent excellent interference rejection properties.

Television signals are rarely affected by corona interference. However, some interference may be possible, if a shadow effect is created when a large transmission structure is aligned between a receiver and a weak signal. Digital signals are more tolerant of electric interference. Interference with television reception can be corrected by several methods including adjusting the television antenna, installing a remote antenna, and installing a translator.

GPS collects and coordinates data from at least four satellites at any one time. As such, constellation, positioning of the four satellites, and signal strength are the most important factors that decide accuracy of the GPS. In 2002, the Institute of Electronics and Electrical Engineers (IEEE) conducted a series of experiments to observe if overhead transmission lines interfere with the GPS function. One of the tests utilized a Trimble GPS receiver near a 345 kV line to determine if corona noise and gap discharge could affect the "lock" a receiver had on the satellite constellation above. The results from this experiment by IEEE are as follows:

- Generally, GPS function is very minimally affected by transmission line electromagnetic interference (EMI).
- Interference that is caused could be either due to corona noise or gap discharges.
- Rarely, transmission structure may cause a drop in accuracy due to blocking a view of at least one of the satellites from GPS. However, corona noise and gap discharges do not cause loss of a satellite signal "lock" (IEEE, 2002 as cited in Minnkota Power Cooperative, Inc., n.d.).

Based on this research, GPS signals very rarely experience interference from overhead transmission lines. On rare occasions, a transmission line structure may cause a drop in accuracy within a GPS device due to blocking a view to one satellite, but this would only occur if the receiver, tower, and satellite are in a line, which is rare. Typically, if there is

any EMI present, proper GPS function is usually restored in minutes (IEEE, 2002 as cited in Minnkota Power Cooperative, Inc., n.d.).

Cell phones and wireless internet devices operate at an ultra-high frequency (UHF). In general, as frequency increases, radio frequency noise decreases. Radio frequency noise is generally not existent in the UHF range. High voltage transmission lines are not known to cause interference in cellular phone and wireless internet function.

Mitigation - Interference with Utility Systems and Public Services

The Project would be constructed to comply with NESC standards. No large scale adverse effects of the Project on utility systems are expected.

If radio or television interference occurs because of the transmission line, the Applicant will work with the affected landowner to mitigate the problems so that reception is restored. If television or radio interference is caused by or from the operation of the proposed facilities in those areas where good reception is presently obtained, The Applicant will inspect and repair any loose or damaged hardware in the transmission line, or take other necessary action to restore reception to the pre-Project level, including the appropriate modification of receiving antenna systems if necessary.

Any planned service disruptions to electric utility services that are necessary during construction activities would be scheduled with the affected owners of the existing transmission and distribution lines in accordance with reliability standards. Advanced scheduling of these disruptions would allow for alternative arrangements for electrical service to be made when possible and to allow for customers to be notified in advance. Utility repair crews would be present or on-call during construction activities to respond to any unplanned incidents that may result in an interruption to electric service.

5.1.5. Archaeological and Historic Resources

One recorded historical site was identified within the Proposed Route. Although additional sites have been recorded within one mile of the Proposed Route, the Project will have negligible impacts on these sites, and then only from a visual perspective The Minnesota Historical Society (MHS) was contacted requesting information on the possible effects of the proposed Project on historic properties in the Project area. MHS indicated that the proposed Project was reviewed pursuant to the responsibilities given the State Historic Preservation Officer by the Minnesota Historic Sites Act and the Minnesota Field Archaeology Act.

The Applicant contracted an archeological literature review of the project area. Fourteen previously recorded archaeological sites exist within one mile of the Project. Only one of the 14 sites is located directly in the Proposed Route.

The previously recorded site within the Proposed Route is located in the vicinity of River Bend Park. The site was identified in 1989 during a survey of the entire island on which the park is established. The site was deemed to be non-eligible for registration on the National Register of Historic Properties, and it was subsequently filled over during

construction of the County Road 116 bridge over the Rum River. Despite the 1989 survey, portions of the island remain undisturbed and there is potential for cultural sites to exist based on the site's proximity to the Mississippi and Rum Rivers.

Due to this potential for cultural resources, a Phase I Archaeological Reconnaissance Survey is recommended should construction plans involve ground disturbance of previously undisturbed areas.

Mitigation – Archaeological and Historic Resources
. The Applicant has stated it will conduct a windshield survey of previously undisturbed areas. When the Route is surveyed and pole locations identified, recommendations from the windshield survey will be taken into consideration. After pole locations are identified, the Applicant will consult with MHS to determine if any additional survey work needs to be conducted.

If any archaeological sites are identified during placement of the poles along the permitted Route, construction work will be stopped and MHS staff consulted as to how to proceed.

5.1.6. Safety and Health

Potential safety and health impacts from construction and operation of the Project include Electric and Magnetic Fields (EMFs); Interference with Implantable Medical Devices; and Stray and Induced Voltage.

Electric and Magnetic Fields (EMF)
EMFs are invisible regions of force resulting from the presence of electricity. Naturally occurring EMFs are caused by the earth's weather and geomagnetic field. Man-made EMFs are caused from electrical devices and found wherever people use electricity. EMFs are characterized and distinguished by their frequencies, which is measured by the rate at which the fields change direction each second. All power lines within the United States have a frequency equivalent to 60 cycles per second, defined as 60 Hertz (Hz). EMFs at this frequency level and within the range of 3 - 3,000 Hz are considered to be Extremely Low Frequency (ELF) EMFs.

Electric fields are created by the electric charge (i.e., voltage) on a conductor (e.g., a transmission line). Electric fields are solely dependent upon the voltage of a conductor, not the actual flow of electricity (i.e., current). Electric field strength is measured in kilovolts per meter (kV/m). The strength of an electric field decreases rapidly as the distance from the source increases. Electric fields are easily shielded or weakened by most objects and material, such as trees, buildings, and even human skin.

Although there is no federal regulation, the Minnesota Public Utilities Commission has imposed a permit condition of 8 kV/m for the maximum electric field for previously permitted high voltage transmission lines (HVTLs) (measured at centerline and at 1 meter

above ground). In addition to Minnesota, six other states have state-specific regulations for the maximum electric field of a transmission line, as shown in Table 5.4.

Table 5.4: State-Specific Standards for Electric Fields

State	Maximum Electric Field (kV/m)	Notes
California	---	No kV/m standard; however, a setback distance of 100 ft is required between new schools and the edge of HVTL ROWs for lines between 50 and 133 kV
Florida	8	Applies to HVTL between 69 and 230 kV
Minnesota	**8**	
Montana	7	
Oregon	9	
New Jersey	7	Standard applies to highway crossings
New York	7 - 11.8	A standard of 7 kV/m applies to highway crossings; a standard of 11 kV/m applies to private road crossings; the maximum electric field for all locations is 11.8 kV/m

Source: California Electric and Magnetic Fields Program, 2000.

Magnetic fields are created by and are solely dependent upon the electrical current in a conductor. Magnetic field strength is measured in milliGauss (mG). Similar to electric fields, the strength of a magnetic field decreases rapidly as the distance from the source increases. However, unlike electric fields, magnetic fields are not easily shielded or weakened by objects or materials.

There are no federal or Minnesota regulations for the permitted strength of a magnetic field from a transmission line. Only Florida, Massachusetts, and New York have state regulations for the permitted strength of a magnetic field from a transmission line, which are set at 150 mG, 85 mG, and 200 mG, respectively, for transmission lines less than 230 kV in size. A number of international health and safety organizations have developed guidelines for EMF exposure, which are shown in Table 5.5.

Table 5.5: International Guidelines and Standards for EMF

Regulating Body	Maximum Electric Field (kV/m)	Maximum Magnetic Field (mG)	Notes
American Conference of Governmental and Industrial Hygienists (ACGIH)	25	10,000	Occupational standard for general worker
International Commission on Non-Ionizing Radiation Protection (ICNIRP)	4.2	833	General public continuous exposure
Non-Ionizing Radiation Committee of the American Industrial Hygiene Association	---	4,170	
Institute of Electrical and Electronics Engineers (IEEE) Standard C95.6	5	9.040	General public continuous exposure
UK, National Radiological Protection Board (NRPB)	12	833	General public continuous exposure
Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)	---	3,000	

Source: EPRI, 2003; Union of the Electric Industry – EUROELECTRIC, 2003.

Health Studies

A common concern related to EMFs is the potential for human exposure to EMFs to result in adverse health effects. Studies on whether or not EMFs are associated with adverse health effects have been conducted by numerous organizations including the National Institute of Environmental Health Sciences (NIEHS), the US Environmental Protection Agency (USEPA), the World Health Organization (WHO), and the Minnesota State Interagency Working Group (MSIWG).

In 1992, the US Congress authorized the Electric and Magnetic Fields Research and Public Information Dissemination Program (EMF-RAPID Program) in the Energy Policy Act. The Congress instructed NIEHS, National Institute of Health, and the US Department of Energy (DOE) to direct and manage a program of research and analysis aimed at providing scientific evidence to clarify the potential for health risks from exposure to ELF-EMFs (NIEHS, 1999). The EMF-Rapid Program provided the following conclusions to Congress on May 4, 1999:

- *The scientific evidence suggesting that ELF-EMF exposures pose any health risk is weak.*

- *Epidemiological studies have serious limitations in their ability to demonstrate a cause and effect relationship whereas laboratory studies, by design, can clearly show that cause and effect are possible. Virtually all of the laboratory evidence in animals and humans and most of the mechanistic work done in cells fail to support a causal relationship between exposure to ELF-EMF at environmental levels and changes in biological function or disease status. The lack of consistent positive findings in animal or mechanistic studies weakens the belief that this association is actually due to ELF-EMFs, but it cannot completely discount the epidemiological findings.*
- *The NIEHS concludes that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern* (NIEHS, 1999).

The USEPA states the following viewpoint of the associated health effects of EMFs on its website:

> *Much of the research about power lines and potential health effects is inconclusive. Despite more than two decades of research to determine whether elevated EMF exposure, principally due to magnetic fields, is related to an increased risk of childhood leukemia, there is still no definitive answer. The general scientific consensus is that, thus far, the evidence available is weak and is not sufficient to establish a definitive cause-effect relationship* (USEPA: *Electric and Magnetic Fields (EMF) Radiation from Power Lines*, 2010).

The WHO states the following viewpoint of the associate health effects of EMFs on its website:

> *Based on a recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields. However, some gaps in knowledge about biological effects exist and need further research* (WHO, 2010).

In September of 2002, the MSIWG on EMF Issues, published "A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options," referred to as the "White Paper." The MSIWG was formed to examine the potential health impacts of EMFs and to provide useful, science-based information to policy makers in Minnesota. Work Group members included representatives from the Department of Commerce, the Department of Health, the Pollution Control Agency, the Public Utilities Commission, and the Environmental Quality Board (MSIWG, 2002). The White Paper concluded the following findings:

- *Some epidemiological results do show a weak but consistent association between childhood leukemia and increasing exposure to EMF (see the conclusion of IARC and NIEHS). However, epidemiological studies alone are considered insufficient for concluding that a cause and effect relationship exists, and the association must be supported by data from laboratory studies. Existing laboratory studies have not substantiated this relationship (see NTP, 1999; Takebe et al., 2001), nor have scientists been able to understand the biological mechanism of how EMF could cause adverse effects. In addition, epidemiological studies of various other diseases, in both children and adults, have failed to show any consistent pattern of harm from EMF.*
- *The Minnesota Department of Health concludes that the current body of evidence is insufficient to establish a cause and effect relationship between EMF and adverse health effects. However, as with many other environmental health issues, the possibility of a health risk from EMF cannot be dismissed. Construction of new generation and transmission facilities to meet increasing electrical needs in the State is likely to increase exposure to EMF and public concern regarding potential adverse health effects.*
- *Based upon its review, the Work Group believes the most appropriate public health policy is to take a prudent avoidance approach to regulating EMF. Based upon this approach, policy recommendations of the Work Group include:*
    - *Apply low-cost EMF mitigation options in electric infrastructure construction projects;*
    - *Encourage conservation;*
    - *Encourage distributed generation;*
    - *Continue to monitor EMF research;*
    - *Encourage utilities to work with customers on household EMF issues; and*
    - *Provide public education on EMF issues* (MSIWG, 2002).

A viable cause and effect relationship between the exposure to EMFs and adverse health effects has not been established. The calculated electric fields for the Project at 1 meter (approximately 3.28 feet) above ground are displayed in Table 5.6. Estimates of the anticipated strength of the magnetic field associated with the Project routes are displayed in Table 5.7.

The maximum electric field associated with the Project (1.39 kV/m) would be significantly less than the maximum limit of 8 kV/m, which would be a permit condition imposed by the PUC.

The maximum calculated peak magnetic field strength at 1 meter aboveground would be 87.35 mG. Because the actual power flow on a transmission line could potentially vary widely throughout the day depending on electric demand, the actual magnetic field level could also vary widely from hour to hour. In any case, the typical magnitude of the magnetic field associated with the Project's transmission lines is expected to be well below the calculated intensity at the expected peak loading. The Commission does not impose permit conditions that limit magnetic field strength.

Table 5.6: Calculated Electric Fields (kV/m) for the Project (1 meter above ground)

Scenario	Distance to Proposed Centerline										
	-300'	-200'	-100'	-50'	-25'	Max.	25'	50'	100'	200'	300'
Horizontal Post Operation No Distribution Underbuild Average Load	0.01	0.02	0.06	0.22	0.49	1.39	0.67	0.20	0.07	0.02	0.01
Horizontal Post Operation No Distribution Underbuild Peak Load	0.01	0.02	0.06	0.22	0.49	1.39	0.67	0.20	0.07	0.02	0.01
Horizontal Post Operation with Single Circuit Distribution Underbuild Average Load	0.01	0.02	0.07	0.21	0.30	0.38	0.42	0.18	0.07	0.02	0.01
Horizontal Post Operation with Single Circuit Distribution Underbuild Peak Load	0.01	0.02	0.07	0.21	0.30	0.38	0.42	0.18	0.07	0.02	0.01
Horizontal Post Operation with Double Circuit Distribution Underbuild Average Load	0.01	0.02	0.07	0.18	0.20	0.31	0.30	0.15	0.07	0.02	0.01
Horizontal Post Operation with Double Circuit Distribution Underbuild Peak Load	0.01	0.02	0.07	0.18	0.20	0.31	0.30	0.15	0.07	0.02	0.01

Table 5.7: Calculated Magnetic Flux Density (milligauss) for the Project (1m above ground)

Scenario	Distance to Proposed Centerline										
	-300'	-200'	-100'	-50'	-25'	Max.	25'	50'	100'	200'	300'
Horizontal Post Operation No Distribution Underbuild Average Load	0.12	0.27	0.98	3.10	7.00	13.62	8.24	3.53	1.06	0.28	0.12
Horizontal Post Operation No Distribution Underbuild Peak Load	0.72	1.59	5.89	18.59	41.97	81.71	49.44	21.16	6.37	1.66	0.74
Horizontal Post Operation with Single Circuit Distribution Underbuild Average Load	0.21	0.45	1.61	5.17	14.18	39.67	19.62	7.46	2.10	0.52	0.23
Horizontal Post Operation with Single Circuit Distribution Underbuild Peak Load	0.78	1.69	5.83	16.11	32.82	87.35	53.42	23.76	7.33	1.90	0.85
Horizontal Post Operation with Double Circuit Distribution Underbuild Average Load	0.22	0.50	1.84	6.00	14.64	25.39	14.64	6.19	1.93	0.51	0.23
Horizontal Post Operation with Double Circuit Distribution Underbuild Peak Load	0.83	1.82	6.42	18.44	37.73	59.02	39.21	19.98	6.92	1.90	0.86

Continued Research

It is important to note that although expert panels and agencies, such as the ones discussed above, have not yet identified any viable cause and effect relationships between exposure to EMFs and adverse health effects, alternative hypotheses have existed and continue to be researched.

For example, Dr. David O. Carpenter, during the recent public hearing proceedings for the proposed 345 kV transmission line from Brookings County, South Dakota to Hampton, Minnesota, provided pre-filed direct testimony regarding his findings on health effects associated with EMF. Dr. Carpenter is a public health physician and Director of the Institute for Health and the Environment at the University of Albany, SUNY. He researched and wrote a document titled, *Setting Prudent Public Health Policy for Electromagnetic Field Exposures*. Carpenter concludes "there is strong scientific evidence that exposure to magnetic fields from power lines greater than 4 mG is associated with an elevated risk of childhood leukemia" and that some studies have indicated that there is scientific evidence to suggest that exposures above 2 mG could increase leukemia risks. Carpenter goes on to suggest that "lifetime exposure to magnetic fields in excess of 2 mG is associated with an increased risk of neurodegenerative diseases in adults, including Alzheimer's disease and amyotrophic lateral sclerosis (ALS)." (Carpenter, 2008)

Additionally, during his recent testimony on the proposed 345 kV HVTL in response to whether EMF similar to power line exposure can affect biological tissue, he states the following (Carpenter, 2010):

> *Any one of these actions* [actions that alter cell tissue] *might be responsible for the carcinogenic and/or neurodegenerative actions of EMFs. As with many environmental agents, however, assuming that only one mechanism of action exists would be a mistake, particularly where more than one disease is involved. It is more likely that multiple mechanisms of action would contribute to disease.*

Interference from Implantable Medical Devices

Research has established that electric fields can potentially interfere with implantable medical devices, such as cardiac pacemakers and implantable cardioverter defibrillators (ICDs). This interference, referred to as Electromagnetic Interference (EMI), can cause inappropriate triggering of a device or inhibit the device from responding appropriately (PSCW, 2010). Medtronic and Guidant, manufacturers of various implantable medical devices, have indicated that electric fields below 6 kV/m are unlikely to cause interactions affecting operation of most of their devices. Medtronic recommends an exposure threshold of 1.0 Gauss (G) for magnetic fields and a 2 to 3 foot distance from the implantable medical device to HVTLs for every 10,000 volts for electric fields (PSCW, 2001).

EMFs may cause EMI with implantable medical devices. This interference disrupts the cardiac device's ability to sense normal electrical activity in the heart. Although most modern cardiac devices are less susceptible to effects from EMFs due to engineering design, older designs can still be affected. In the event that a cardiac device is impacted, the effect is typically a temporary asynchronous pacing (i.e., fixed rate pacing) and the device would return to its normal operation when the person moves away from the source of EMFs (PSCW, 2010).

The Project's maximum calculated electric field at 1 meter above the ground would be 1.83 kV/m and would occur directly under the centerline of the transmission line. For all distances from the centerline, the calculated electric fields would be below the common manufacturer guideline of 6 kV/m for avoiding EMI.

Stray and Induced Voltage

Stray voltage is an extraneous voltage that appears on grounded surfaces in buildings, barns, and other structures. Stray voltage and its impact is normally an issue associated with electric distribution lines and is a condition that can exist between the neutral wire of a service entrance and grounded objects in buildings. The source of stray voltage is a voltage that is developed on the grounded neutral wiring network of a building and/or the electric power distribution system. Stray voltage can result from damaged, corroded, or poorly connected wiring or damages insulation. Transmission lines do not, by themselves, create stray voltage because they do not connect to businesses or residences. The Project would have no direct electrical connection to conductors originating in another system; it would not connect with the local distribution system. Transmission lines, however, can induce stray voltage on a distribution circuit that is parallel and immediately under the transmission line. Induced voltage between a transmission line and distribution circuit only occurs in the immediate vicinity of the distribution circuit and does not travel along the transmission or distribution line.

Stray voltage safety concerns are primarily associated with distribution lines. Stray voltage is not identified as a safety concern associated with the Project; however, since transmission lines can induce stray voltage on distribution circuits that are parallel and immediately under a transmission line, mitigation measures may be necessary if the Project transmission line parallels or crosses distribution lines. Induced voltage between a transmission line and distribution circuit only occurs in the immediate vicinity of the distribution circuit and does not travel along the transmission or distribution line. Each of the Project Route Alternatives would require crossing and paralleling distribution lines. Stray voltage is often not noticeable to humans, but may be felt by an animal (PSCW, 2010).

The Applicant would address stray voltage issues on a case by case basis. The three primary methods to reduce or eliminate stray voltage are cancellation, separation, and enhanced grounding. Cancellation entails the arranging of transmission line phase conductors in a configuration to minimize EMF levels, bonding distribution neutral and transmission shield wires together, and bonding an under-built transmission shield wire to distribution neutral wires rather than a normal overhead shield wire. Separation entails

increasing the distance between transmission and distribution lines through re-locating distribution lines underground, placing the transmission line on the opposite side of the road as existing distribution lines, or increasing the vertical distance between the transmission line phase conductor and under-built distribution line. Enhanced grounding would reduce stray voltage potential through connecting counterpoises to the distribution neutral wire and/or transmission shield wire.

Mitigation – Safety and Health

Potential effects of the Project on safety and health would be avoided through adherence to industry design standards and compliance with federal regulations, including NESC standards.

No conclusive health or safety concerns have been identified with EMF exposure, although potential health and safety effects would be minimized through maximizing the distance between the transmission line and residences.

Significant impacts from stray voltage are not anticipated from the Project. However, the Applicant would address stray voltage issues on a case-by-case basis. The three primary methods to reduce or eliminate stray voltage are cancellation, separation, and enhanced grounding. The specific techniques used to address stray voltage would depend on whether existing distribution lines are buried underground, located on the opposite side of the street as the Project structures, or re-located to the Project structures as under-built lines. To ensure the safety of persons in the proximity of high voltage transmission lines, the NESC requires that any discharge be less than five (5) milliAmperes (mA).

5.2. Environmental Setting

The Project area is a highly developed Twin Cities metropolitan suburb with residential, commercial and industrial properties throughout the Project area. Significant roadway infrastructure typical of a suburban area has been developed throughout the Project area.

Hydrologic features in close proximity to the proposed transmission line include:

- The Rum River, which would be crossed by the transmission line in Sections 25 and 36 of Township 32N Range 25W.
- Minnesota Department of Natural Resources (MnDNR) Public Water Wetland (115W) located in Sections 25 and 36 of Township 32N Range 25W.
- MnDNR Public Water Wetland (116W) located in Sections 26 and 35 of Township 32N Range 25W.

A mix of suburban type groundcover, consisting primarily of turf grasses on developed lots and voluntary weed growth on undeveloped lots, is present in the Project area. The physiographic features (topography, soils, geology and farmland) are typical of this area and do not preclude the development of this Project.

Blanding's turtles and creek heelsplitters (mussels) are both found in the vicinity of the Project. Blanding's turtles have a Minnesota status of "threatened" and creek heelsplitters have a Minnesota status of "special concern." Neither species is indicated as having a federal status.

Land use in the Project area is mainly residential, commercial, and industrial. The residential areas are primarily high density single-family homes. Open space areas, located primarily along the west side of 7th Avenue, are currently larger lots that have not been fully developed.

The Anoka High School campus is located along the Proposed Route near the intersection of 7th Avenue and Anoka County Highway 116.

5.2.1. Air Quality

Air quality emissions directly related to high-voltage transmission lines are negligible amounts of ozone and oxides of nitrogen caused by the corona effect. The other potential air quality issues are associated with construction activities, such as fugitive dust and exhaust emissions from construction equipment.

Corona discharge is energy loss that physically creates very small amounts of sound, radio noise, heat, and chemical reactions of the air near a conductor, and is a phenomenon associated with all transmission lines. Under certain conditions, the localized electric field near an energized conductor can become strong enough to produce a tiny electric discharge that can ionize air close to the conductors. Several factors contribute to corona discharge, including conductor voltage, shape and diameter, and surface irregularities that can affect a conductor's electrical surface gradient such as scratches, nicks, dust, or water drops. In the case of air quality, this partial discharge of electrical energy can produce very tiny amounts of ozone and nitrogen oxide with ozone being the primary oxidant.

Ozone also forms naturally in the Earth's lower atmosphere from lightning discharges and from reactions between solar ultraviolet radiation and air pollutants such as hydrocarbons from auto emissions. Typical rural ambient levels are around 10 to 30 parts per billion (ppb) at night with peaks of 100 ppb and higher (EPRI, 1982). In urban areas, concentrations greater than 100 ppb are common.

The natural production rate of ozone is directly proportional to temperature and sunlight and inversely proportional to humidity. Therefore, humidity, the same factor that increases corona discharges from transmission lines, inhibits the production of ozone. Ozone is a very reactive form of oxygen and combines readily with other elements and compounds in the atmosphere. Because of its high reactivity, ozone is relatively short-lived. The state and federal government both have regulations regarding permissible concentrations of ozone and oxides of nitrogen: Minnesota sets an ozone limit of 0.08 parts per million (ppm) as the highest eight hour average (Minnesota Rule, part 7009.0800), and the federal limit is 0.075 ppm as the fourth-highest eight hour daily maximum average (40 CFR, Part 50).

Calculations according to the BPA Corona and Field Effects Program Version 3 for a standard single-circuit 115 kV project predicted a maximum concentration of 0.006 ppm near the conductor and 0.002 ppm at one meter above ground during foul weather or worst case conditions with rain at one inch per hour. During a mist (rain at 0.01 inch per hour) the maximum concentrations decreased to 0.0002 ppm near the conductor and

0.0001 ppm at one meter above ground level. (United States Department of Energy, BPA) For both cases, the ozone levels are below federal standards. Studies designed to monitor the production of ozone under transmission lines have been unable to detect any increase attributable to the transmission line facility.

There would be limited emissions from vehicles and other construction equipment and fugitive dust from right-of-way clearing during construction of the Project. Temporary air quality impacts are expected to occur during this phase of activity. The magnitude of emissions is influenced heavily by weather conditions and the specific construction activity taking place. Exhaust emissions from primarily diesel equipment would vary according to the phase of construction but would be minimal and temporary. Adverse impacts to the surrounding environment would be minimal because of the short and intermittent nature of the emission and dust-producing construction phases. The Project is not anticipated to result in any permanent impacts on air quality.

Mitigation Measures – Air Quality
As a standard HVTL Permit condition, construction activities must follow best management practices (BMPs) to control air emissions (fugitive dust). Petroleum based dust suppressants may not be used. Construction vehicles with excess tailpipe emissions would not be operated until repairs to the vehicle could be made. The disturbed area for each route would be minimized.

As there are no significant impacts to air quality anticipated, no mitigation beyond these BMPs are proposed.

5.2.2. Soils and Geology

The topography of Anoka County is the result of glacial deposition. The area is characterized as level to gently rolling. The elevation ranges from approximately 829 to 899 feet mean sea level. The topography of the Proposed Route is nearly level except for some elevated road crossings and the floodplain of the Rum River.

The Anoka Sand Plane Subsection has exposed bedrock in the St. Cloud area. In other areas, surface deposits are generally less than 200 feet deep. Bedrock consists of Cambrian and Ordovician dolomite, sandstone, and shale.

The Hubbard-Nymore formation makes up a large portion of the soil types in the Project area. This soil association is mainly a level to gently sloping outwash plain that is dissected by drainageways and pitted by large depressions. Steeper slopes occur next to these larger depressions and drainageways. Hubbard soils have a black and very dark grayish-brown coarse sandy surface layer about 20 inches thick. The subsoil is dark-brown and yellowish-brown coarse sand. The underlying material at a depth of about 44 inches is yellowish-brown sand. Nymore soils typically have a surface layer of very dark gray and black to very dark grayish-brown loamy sand about 2-8 inches thick. The subsoil is dark-brown loamy sand. The underlying material at a depth of about 26 inches is yellowish-brown sand.

Mitigation – Soils and Geology
The Applicant has stated it will restore areas disturbed during construction to their original condition to the extent practicable and to limit ground disturbance wherever possible. Where disturbance and excavation cannot be avoided, it could be minimized using Best Management Practices (BMPs). These may include reseeding of vegetation and use of erosion control blankets and/or silt fence. MnDNR recommends wildlife-friendly erosion control blankets where suitable habitat exists for listed species of amphibians and reptiles. In areas where soils have been compacted, the Applicant could use techniques such as ripping to reduce compaction and avoid future impacts to agricultural crops.

Additionally, the Applicant would be required to obtain coverage under the state general permit for storm water discharges associated with construction activities, and to develop a Storm Water Pollution Prevention Plan (SWPPP) prior to the start of construction. The plan is required to outline the BMPs that would be used during construction, especially focusing upon erosion and sediment control.

5.2.3. Water Resources

The MnDNR divides Minnesota into six groundwater provinces. All of Anoka County falls within the Metro Province, which is described as sand aquifers in generally thick sandy and clayey glacial drift overlaying Precambrian and Paleozoic sandstones, limestone and dolostone aquifers.

The Project area lies within the Rum River to Mille Lacs Watershed Planning Unit of the Upper Mississippi River Basin (Figure 8). The Project crosses the Rum River and its associated riparian ecosystem. Consistent with the MnDNR definition of shoreland zones, the riparian area extends 300 feet from each bank of the Rum River.

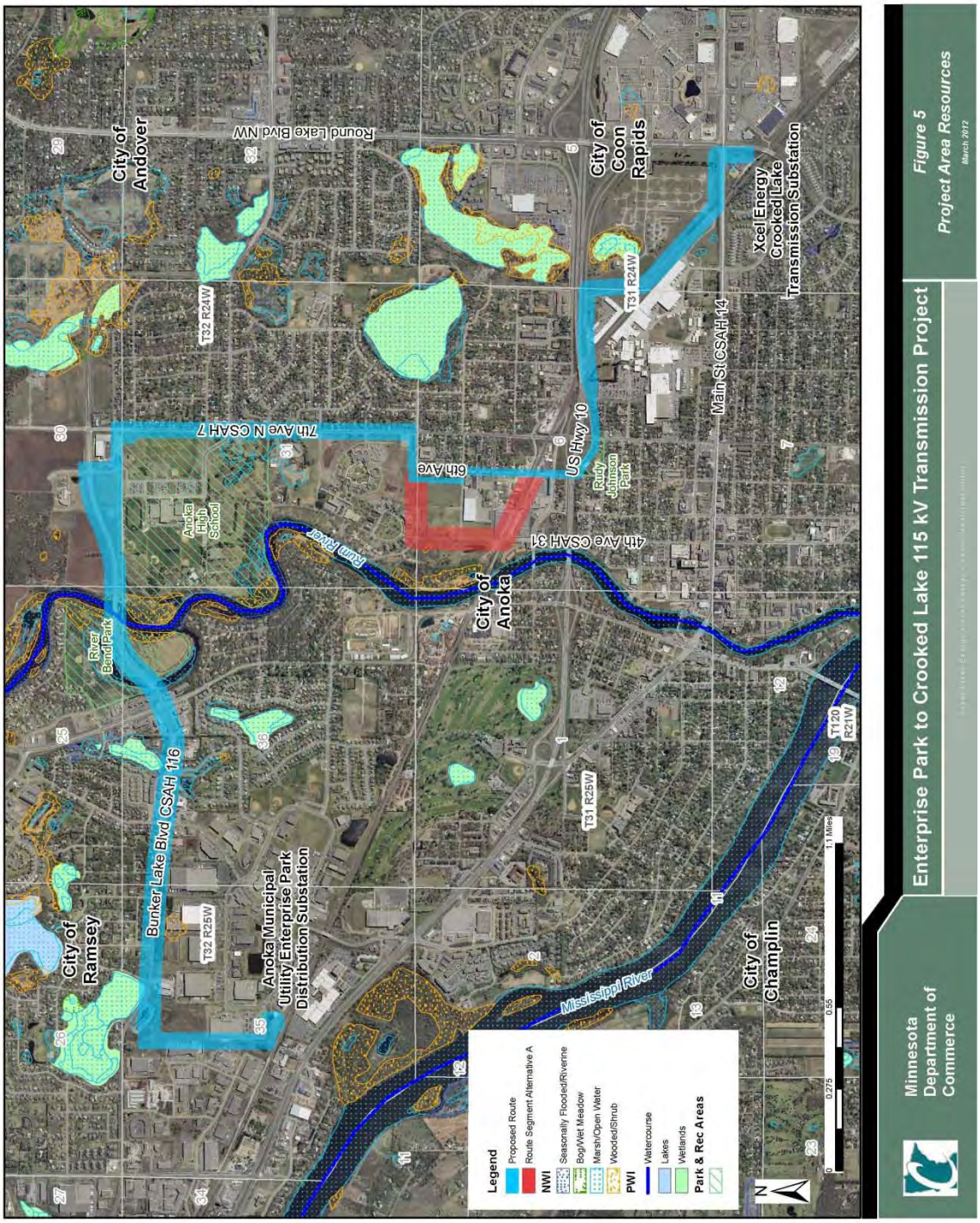
The Rum River is a Minnesota Wild and Scenic River, as defined in Minnesota Rules Chapter 6105. At the proposed crossing of the Rum River, a Type 7 wetland (Wooded swamp) lies to the north of the Bunker Lake Blvd/CSAH 116 bridge and road crossing. Tree clearing in this area would result in impacts to this wetland.

The Project also crosses the Rum River floodplain. The Project will require a United States Army Corps of Engineers (Corps) permit under Section 10 of the Rivers and Harbors Act because the transmission line will cross the Rum River, a navigable water of the United States.

There are no lakes greater than 10 acres in the vicinity of the Project, so there are no riparian areas associated with lakes.

The Rum River is listed as impaired for mercury in the MPCA's draft 2010 list of impaired waters. Section 303(D) of the Federal Clean Water Act requires states to publish, every two years, a list of streams and lakes that are not meeting their designated uses because of excess pollutants (impaired waters). The list, known as the 303(d) list, is based on violations of water quality standards. In Minnesota, the MPCA has jurisdiction over determining 303(d) waters. These waters are described as impaired.

Figure 5: Project Area Resources Map



The Public Water Inventory (PWI) shows the Rum River, which will be crossed by the proposed transmission line, and two wetlands adjacent to the line (116W in T32N R25W, Sections 26 and 35 and 115W in T32N R25W, Sections 25 and 36). The public waters are shown on Figure 5. Public Waters are wetlands, water basins and watercourses of significant recreational or natural resource value in Minnesota as defined in Minnesota Statutes Section 103G.005. The DNR has regulatory jurisdiction over these waters.

There are several National Wetland Inventory (NWI) wetlands in the Project area, the locations of which are summarized in Table 5.8. Except for those wetlands in the Rum River floodplain, these wetlands will be adjacent to the proposed transmission line rather than crossed by it. Wetlands are important resources for flood abatement, wildlife habitat, and water quality. Wetlands that are hydrologically connected to the nation's navigable rivers are protected federally under Section 404 of the Clean Water Act. In Minnesota, wetlands are also protected under the Wetland Conservation Act (WCA).

The United States Fish and Wildlife Service (USFWS) produced maps of wetlands based on aerial photographs and NRCS soil surveys starting in the 1970s. These wetlands are known as the National Wetland Inventory (NWI). Wetlands listed on the NWI may be inconsistent with current wetland conditions; however, NWIs are the most accurate and readily available database of wetland resources within the Project area and were therefore used to identify wetlands along the Proposed Route.

Table 5.8: Locations of NWI Wetlands in Project Area

Location
T 31N R 24W Section 5
T 32N R 24W Section 31
T 32N R 24W Sections 30 & 31 T 32N R 25W Sections 25 & 36
T 32N R 25W Section 36
T 32N R 25W Section 35

Mitigation – Water Resources
No impacts to groundwater in the vicinity of the Project are anticipated.

The Proposed Route of the transmission line avoids wetlands except for those near the Rum River. The Applicant will be required to apply to MnDNR for a license to cross the Rum River and to the Corps for a Section 10 permit once sufficient design details are available. These licenses/permits will include conditions to minimize erosion and other impacts.

The proposed transmission line will span the Rum River and no support structures will be located within the river. Accordingly, no direct impacts to the river are anticipated.

Indirect impacts could include sediment reaching surface waters during construction due to ground disturbance by excavation, grading, construction traffic, and dewatering of holes drilled for transmission structures. This could temporarily degrade water quality due to turbidity. These impacts will be avoided or minimized using appropriate sediment control practices and best management practices (BMPs) contained in MPCA's NPDES permit erosion control plan. As the Rum River is a Minnesota Wild and Scenic River, the Applicant will adhere to all rules under Minnesota Rules Chapter 6105. This includes avoiding or reducing impacts to the extent possible to the wooded swamp north of the road bridge.

Sound water and soil conservation practices will be maintained during construction and operation of the Project to protect topsoil and adjacent water resources and minimize soil erosion. These practices may include:

- Containing stockpiled material away from river banks and wetland boundaries.
- Stockpiling and re-spreading topsoil.
- Implementing erosion and sediment controls.
- Locating structures and disturbed areas as far away from rivers and wetlands as practicable.
- Reseeding and re-vegetating disturbed areas.

Once the Project is completed, there will be no significant impact on surface water quality because wetland impacts will be minimized and mitigated per the various federal, state and local permits required to construct and operate the Project. Disturbed soil will be restored to previous conditions or better, and the amount of land area converted to an impervious surface will be minimal.

The Project should have no impact on the impairment status of the waters in the Project area. There is potential to increase turbidity due to increased sediment loading from construction activities; however, appropriate erosion and sediment control measures will be implemented to avoid or minimize such impacts.

Potential impacts to riparian areas along the Route will be limited to ground disturbances due to pole placement. Due to the flexibility to avoid placing poles in sensitive areas, the anticipated impacts to the riparian areas along the Route are minimal.

Construction of the transmission line is not expected to alter existing water drainage patterns or floodplain elevations due to the small cross section per pole and their relatively wide spacing. Also, modifications at the existing Crooked Lake and Enterprise Park substations will not substantively change the size of impermeable surfaces. The small area of impermeable surfaces created by the pole structures and breaker station outbuildings or foundations will not cause an increase in susceptibility of flooding in the region.

Temporary impacts to wetlands may occur if they need to be crossed during construction of the transmission line. No staging or stringing setup areas will be placed within or

adjacent to water resources as practicable. Wetland impact avoidance measures that will be implemented during design and construction of the transmission line include spacing and placing the power poles at variable distances to span and avoid wetlands where possible. When it is not possible to span the wetland, several measures will be utilized to minimize impacts during construction:

- When possible, construction will be scheduled during frozen ground conditions.
- Construction crews will attempt to access the wetland with the least amount of physical impact to the wetland (e.g., shortest route) and will access poles near/in wetlands from roadways whenever possible to minimize travel through wetland areas.
- The structures will be assembled on upland areas before they are brought to the site for installation, when practicable.
- When construction during winter is not possible, construction mats (wooden mats or those similar to the Dura-Base Composite Mat System) will be used to protect wetland vegetation. Additionally, all-terrain construction vehicles may be used, which are designed to minimize impact to soils in damp areas.

Permanent impacts to wetlands occur where structures must be located within wetland boundaries. In such cases where a wetland cannot be avoided, approximately 20 square feet of permanent impacts (i.e., fill) will occur for each structure in the wetland. Wetland vegetation will be restored in the disturbed areas following construction.

In the event that impacts to hydrologic features are unavoidable, the Applicant will work with the jurisdictional agencies to determine the best ways to minimize the impacts and implement appropriate mitigation measures.

Vegetation maintenance procedures under transmission lines prohibit trees from establishing. Existing trees must be removed throughout the entire right-of-way, including forested wetlands. If these wetlands undergo permanent vegetative changes within the right-of-way, mitigation may be required by the Corps for the conversion of forested wetlands to emergent and shrub/scrub wetlands.

5.2.4. Flora

The Project is located in a highly developed suburban area. Most of the Project area has been planted with turf grasses. Voluntary grasses and noxious plants have become established in some of the lesser developed areas. Property owners have planted non-native vegetation, gardens, and trees as part of their individual landscaping efforts. Little to no native vegetation remains. There are some forested areas around River Bend Park. The Project follows a bridge and road to River Bend Park and would impact minimal amount of vegetation.

Mitigation – Flora
No impacts to native vegetation are anticipated. If native vegetation areas are later identified, pole placement in those areas will be avoided.

The entire width of the transmission line right-of-way will need to be cleared of tall-growing vegetation that could potentially grow into the conductors.

The Applicant has stated it will replace or compensate landowners for any impacts to landscaping (lawn, gardens, trees, etc.) through negotiations with each individual landowner.

The Applicant has stated it is working with the city of Ramsey park staff on avoiding, minimizing, or mitigating the impacts of any tree clearing in River Bend Park.

In accordance with MnDNR guidance on invasive species control, the Applicant has stated it will incorporate the following BMPs during construction and operation of the transmission line::

- Before arriving at a work site, the Applicant will inspect for and remove all visible plants, seeds, mud, soil, and animals from construction/maintenance equipment.

- Before leaving a work site, the Applicant will inspect for and remove all visible plants, seeds, mud, soil and animals from construction/maintenance equipment.

- Before leaving an aquatic work site, the Applicant will drain water from any equipment, tanks, or water-retaining components of construction /maintenance equipment.

- After working on infested waters or waters known to harbor pathogens of concern, the Applicant will clean and dry equipment prior to using in locations not known to be infested with species or pathogens present at the last location visited.

5.2.5. Fauna

The Project would be located primarily along existing road ROWs in a developed, suburban environment. In general, wildlife near the Project consists of birds, mammals, fish, reptiles, amphibians, and insects, typical of a suburban developed area. No State Wildlife Management Areas are within the Project area.

Construction of new transmission lines can affect fauna through temporary impacts, permanent impacts, and avian-specific impacts. Temporary impacts include displacement and habitat alteration caused by temporary disturbances and noise associated with construction activities. Such impacts are most likely to affect fauna at the proposed structure locations where activity would be most intense. Similarly, staging and stringing areas also have the potential to temporarily impact fauna within the Project construction area. Such activities have the potential to impact small birds (e.g., eggs or nestlings) and small mammals that may be unable to avoid equipment. Many wildlife species would likely avoid the immediate area during construction. The distance that

animals would be displaced is dependent on the species and the tolerance level of each individual. Based on the availability and suitability of other unaffected and similar habitat within and near the Project area, the potential temporary impacts to wildlife are not expected to cause a change in listing status or a detectable change in local populations. In addition to temporary and permanent construction impacts to fauna, transmission lines also have the potential to impact birds through electrocution and collision after construction is complete. Electrocution risk is addressed in structure design elements that provide adequate clearance for perching birds.

Mitigation – Fauna

Avian protection standards that minimize the risk of bird electrocution are well documented in the following resources: the Avian Power Line Interaction Committee's (APLIC's) *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006), APLIC's *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994* (APLIC 1994), and APLIC's and USFWS' *Avian Protection Plan (APP) Guidelines* (APLIC and USFWS 2005). The structure designs used for this Project are consistent with the recommendations of these resources in that they provide adequate clearance from energized conductors to grounded surfaces and to other conductors. As such, avian electrocution risk is considered minimal and is not addressed in further detail. Conversely, avian collisions with new transmission lines are possible, and risk is assessed through an analysis of line span locations relative to surrounding habitats and bird movement. Risk is characterized on a site-specific basis by evaluating surrounding habitat, reviewing bird concentration and movement patterns, and examining structure configurations. Habitats are characterized by identifying historical and active nest sites, bird concentration areas, foraging areas, roost sites, and rookeries. Potential collision risk is highest at spans or structures located in rural areas with native vegetation where the line crosses habitats typically used by area birds (e.g., rivers and wetlands) and human influence in the immediate vicinity is limited. The Route crosses the Rum River, a potential avian use area.

Several mitigation strategies and measures can be used to minimize temporary, permanent, and avian impacts. To mitigate potential impacts to wildlife the transmission line would span designated habitat, conservation areas, or other sensitive habitats wherever practical. In areas where complete spanning is not possible, the Applicant would minimize the number of structures placed in high quality wildlife habitat and would work with the MnDNR and USFWS to come up with appropriate mitigation. Additionally, the Applicant has proposed to use construction mats to avoid soil compaction where appropriate (e.g., in wetland habitats). Areas temporarily disturbed by construction activities may be restored to pre-construction contours and allowed to re-vegetate naturally, subject to landowner approval. The MnDNR encourages wildlife friendly erosion control mesh to be used during and following construction activities. Plastic mesh, particularly when placed where there are known locations of reptiles or amphibians, may be detrimental or even fatal to wildlife.

The Applicant will address avian issues by working with MnDNR and USFWS to identify areas that may require marking transmission line shield wires and/or the use of

alternative structures to reduce the likelihood of collisions. MnDNR and USFWS recommend the use of avian flight diverters along the transmission line segment that crosses the Rum River. MnDNR recommends that flight diverters should be placed on the shield wire not only where the Project crosses the river, but where the Project crosses the riparian area as well. If necessary, field surveys to obtain more route specific wildlife data will be completed once a route has been permitted in order to help minimize and mitigate potential impacts.

Adjacent suitable habitat in the vicinity of the Project area would reduce displacement impacts to terrestrial wildlife species from the Project.

5.2.6. Rare and Unique Natural Resources/Critical Habitat

Based on the MnDNR public database, it was determined that the Blanding's turtle and creek heelsplitter are both found in the vicinity of the Project. The Blanding's turtle has a Minnesota status of "threatened" and the creek heelsplitter has a Minnesota status of "special concern." Neither species are indicated as having a federal status. MnDNR has provided the Applicant with construction BMPs that reduce the potential to impact the Blanding's turtle. No federally-listed species were found in the Project area. Threatened and endangered species in Minnesota are protected from death, harm, and harassment under the Federal Endangered Species Act (ESA), as amended (16 U.S.C. §§ 1531 – 1544) and the Minnesota Endangered Species Statute (*Minnesota Statutes*, section 84.0895). Minnesota's Endangered Species Statute requires the MnDNR to adopt rules designating species meeting the statutory definitions of endangered, threatened, or species of concern. The Endangered Species Statute also authorizes the MnDNR to adopt rules that regulate treatment of species designated as endangered and threatened. These regulations are codified as *Minnesota Rules*, parts 6212.1800 to 6212.2300 and impose a variety of restrictions, a permit program, and several exemptions pertaining to the taking of species designated as endangered or threatened. The results of field studies and detailed project plans determine whether a takings permit is required.

Mitigation – Rare and Unique Natural Resources/Critical Habitat

The Applicant has stated that construction team members and contractors will be instructed on the potential to encounter Blanding's turtles and will be provided copies of the DNR's guidelines on minimizing impacts to the turtle's population.

The creek heelsplitter is a mussel species of special concern, and is sensitive to degradations to water quality. The Applicant will be required by the MPCA NPDES permit erosion control plan to maintain sound erosion control practices in all, areas, including areas of likely mussel habitat.

The Applicant would be required to maintain sound water and soil conservation practices during construction of the Project to protect topsoil and adjacent water resources and minimize soil erosion and sedimentation. The MnDNR encourages wildlife friendly erosion control mesh to be used during and following construction activities. Plastic mesh, particularly when placed where there are known locations of reptiles or amphibians, may be detrimental or even fatal to wildlife.

Upon receipt of a permitted route the Applicant will coordinate with the appropriate agencies (e.g., USFWS, USACE, and MnDNR) to determine species-specific survey and wetland delineation needs, as well as additional avoidance and mitigation measures.

Surveys for state listed endangered and threatened species would be conducted in suitable habitat within the permitted route corridor as directed by the agencies.

5.3. Socioeconomics

The Project has the potential to affect various resources related to the socioeconomic setting in the Project area. Potential effects related to socioeconomics, property values, land-based economies, zoning and compatibility with planning, recreation, and transportation are addressed in this section.

5.3.1. Socioeconomic Setting

The communities in the vicinity of the Project include the cities of Anoka, Coon Rapids, Ramsey and Andover. Local community ties relate to recreation, work, worship, celebration and economic growth. All the communities have strong cultural ties to recreation, with the diversity of trails, parks, and lakes present in the area. The communities value nearby shopping and entertainment districts, local employment opportunities, and easy access to Minneapolis and St. Paul. Development of new industry, business, homes and recreational opportunities are strongly supported by the local units of government.

The estimated population of Anoka County in 2009 was 331,582 with an 11.2 percent increase in population from 2000 through 2009 (see Table 5.9). The number of persons per square mile (population density) in 2000 was 703.0. The total number of housing units in 2009 was 125,496. The home ownership rate in 2000 was 83.4 percent and housing units in multi-unit structures was 15.5 percent.

Table 5.9: Population Characteristics

Location	Population 2000	Population 2009 (est.)	Percent Change 2000-2008
Minnesota	4,919,492	5,266,214	7.0
Anoka County	298,086	331,582	11.2

The population in Anoka County was 89.5 percent white. All minority populations had some presence and no one minority population dominated (see Table 5.10). Females accounted for 49.5 percent of the population. The age group composition was 6.8 percent under five years old, 25.5 percent under 18 years old, and 9.4 percent 65 years and older.

Anoka County is generally as racially and ethnically diverse as the state of Minnesota (Table 5.10). Neither racial nor ethnic minorities will be disproportionately affected by the Project.

Table 5.10: Race/Ethnicity Characteristics

Place	Population	Percentage of Population						
		White	Black/ African-American	American Indian	Asian/ Pacific Islander	Other Race	More than One Race	Hispanic /Latino
Minnesota	5,266,214	88.6	4.7	1.3	3.8	--	1.6	4.3
Anoka County	331,582	89.5	4.0	0.8	3.9	--	1.8	2.9

The 2008 median household income for Anoka County was $69,981 with 5.8 percent of people living below the poverty level (see Table 5.11.)

Table 5.11: Household Economic Characteristics, 2010

Place	Median Household Income	Home Ownership Rate	Median Value of Owner Occupied Housing	Persons per household	Percentage Below Poverty Level Individuals
Minnesota	$57,318	74.6	$122,400	2.52	9.6
Anoka County	$69,981	83.4	$131,300	2.77	5.8

Any adverse impacts to socioeconomic conditions or factors associated with the Project will be short-term; therefore, no mitigation is proposed.

It is estimated that 15 to 20 workers will be employed during construction of the Project. It is not expected that additional permanent jobs will be created by this project. Construction activities will provide seasonal influx of additional revenue into the communities during the construction phase, and materials may be purchased locally.

Construction of the Project should result in short-term positive economic impacts in the form of increased spending for lodging, meals and other consumer goods and services. The Project will not likely create new permanent jobs, but it will create temporary construction jobs that will provide a one-time influx of income to the area.

Expenditures for equipment, energy, fuel, operating supplies and other products and services benefit businesses in the county where the Project is located. Indirect impacts may occur through the increased capability of the electric system to supply energy to commercial and industrial users, which will contribute to the economic growth of the region.

There will also be some long-term beneficial impacts from the new transmission lines, including an increase to the county's tax base resulting with incremental increase in revenue from utility property taxes. The availability of reliable power in the area will have a positive effect on local businesses and residents.

5.3.2. Property Values

Property values generally are determined by a combination of individual property characteristics and local market trends. These characteristics may include, but are not limited to, size, age, condition, and amenities. These characteristics are associated with both residential and non-residential properties. Local market trends typically are determined from detailed analyses of property sales within a given geographic area.

Residents living near existing or proposed overhead transmission lines often are concerned about how the proximity to the line could affect the value of their properties. Research on this issue, however, does not identify a clear cause and effect relationship between the two variables. Instead, the presence of a transmission line becomes one of several factors that interact to affect the value of a particular property.

Effects of transmission lines on property values are difficult to quantify as numerous variables may influence the final value of a property. These variables may include the type and size of power lines, the distance to the power lines, and amenities offered by the property. Researchers have not been able to isolate a leading variable that could predict the impact of transmission lines on property values. A summary of recent research for residential and non-residential properties is presented below.

Since the 1950's, researchers have evaluated the impact of high voltage transmission lines on property values. Many of the early studies, however, were contradictory and unsupportive in regard to the selected research methodologies. In the 1970's, research became more systematic, including attitudinal and statistical evaluations. These types of studies continue today (Kroll and Priestley, 2003).

In 2000, the Public Service Commission of Wisconsin evaluated the results of 30 papers, articles, and court cases covering the period from 1987 through 1999. The authors of this research were interested in determining the impact of a transmission line on property values for inclusion in a Final Environmental Impact Statement for the Arrowhead – Weston Electric Transmission Line Project (PSCW, 2000). Their analysis identified two types of property value impacts that property owners may experience, which include potential economic impacts associated with the amount paid by a utility for a ROW easement and the value regarding the future marketability of the property. The first type of property value typically refers to the market price of the land with a transmission line and one without (PSCW, 2000). The second type of value refers to a combination of the sale price, the amount of time required to sell a property, and the debt amount carried over that period (PSCW, 2000).

The Wisconsin FEIS included six general observations from the studies evaluated, which are as follows:

- A potential reduction in sale price for single family homes may range from 0 to 14 percent;
- Adverse effects on the sale price of smaller properties could be greater than effects on the sale price of larger properties;
- Other amenities, such as proximity to schools or jobs, lot size, square footage of a house, and neighborhood characteristics, often have a much greater effect on sale price than the presence of a power line;
- Adverse effects created by the presence of a power line appear to diminish over time;
- Effects on the sale price of property most often are observed for property crossed by or immediately adjacent to a power line. However, effects also have been observed for properties that are located farther away from the line; and
- The value of agricultural property is likely to decrease if the power line poles are placed in an area that inhibits farm operations (PSCW, 2000).

The FEIS study also demonstrated that homes not directly adjacent to the ROW or beyond 200 feet from the ROW were affected to a much lesser degree than those abutting the line or ROW (PSCW, 2000). Based on these observations, however, the authors concluded that "It is very difficult to make predictions about how a specific transmission line (would) affect the value of specific properties" (PSCW, 2000).

Other authors evaluating the potential impacts of transmission lines on property values determined that a negative impact on value diminished with the distance from the power lines and became negligible at a distance of 200 meters (656.2 feet) (Colwell, 1990 and Hamilton and Schwann, 1995). Likewise, another author determined that prices could be expected to be affected within 100 feet of a transmission line, but that little effect would be perceived beyond that distance (DiMento, 1982 as cited in Kroll and Priestley, 1992).

In other evaluations of property values, some authors demonstrated that individual perceptions of property values were dependent on the size of the support structures (i.e., the height of the poles) and the amount of voltage carried. In this regard, larger transmission lines were perceived to have a greater impact on property value than lower support structures and lower voltage lines (Hamilton and Schwann, 1995). Other types of studies that evaluated perception suggested that those with higher status employment were more concerned over the presence of a transmission line than those with lower job status. These individuals often were concerned not only with property value, but also health and safety (Priestly and Evans, 1990 as cited in Kroll and Priestley, 1992).

Conversely, within a professional study of property sales in New England, the author found no evidence of systematic effects of either distance or visibility of a 345 kV transmission line on residential property values. Instead, the author of this study found a slight negative effect due to the presence of the transmission line easement on adjacent properties (Chalmers, 2009).

Based upon the conclusions from the evaluated studies, the presence of transmission wires and poles is not always indicative of a reduction in residential property value. Other factors may influence an individual's perception of the overall value and thus, in turn, the market value of a property. Furthermore, impacts on property values from the transmission lines likely would vary throughout the Project area, since no two properties have the same characteristics.

Mitigation – Property Values
Direct impacts to property values would be mitigated through landowner compensation for the use of their land through easement payments. When property easements are needed the Applicant would work with individual landowners to provide just compensation for property easements; the ROW representative would contact the owners of each parcel to discuss the construction schedule and construction requirements, as well as activities to occur after construction.

5.3.3. Land-Based Economies

Land-based economies in the project area consist primarily of tourism. There are no agricultural lands along the Project route, no mineable resources within the Project route, and no forested lands used to harvest forest resources along the Project route. No impacts are anticipated for agricultural, mining or forestry operations as a result of this Project, therefore no mitigation measures are proposed.

Tourism in the Anoka County consists primarily of antique shopping, golfing, fishing, boating, and participating in local festivals. The proposed transmission line Route is dominated by industrial and commercial facilities with some adjacent residential properties. The transmission line will cross the Rum River at River Bend Park in the city of Ramsey, which is primarily used by the local population for short-term recreational activities.

Mitigation – Land-Based Economies
The Applicant has stated it will work with the city of Ramsey parks staff to locate and construct the transmission line to minimize visual impacts to River Bend Park and avoid limiting activities within the park.

5.3.4. Zoning and Compatibility with Planning

Although a Route Permit issued by the Commission supersedes any local zoning, building, and land use regulations, the new 115-kV transmission line does not represent an incompatible land use with those that exist in the area. Therefore, anticipated impacts of the proposed Project on land use are minimal and no mitigation measures are proposed. Potential land use impacts along the Proposed Route due to the 115-kV transmission line will be limited. The Proposed Route for the 115-kV transmission line will be approximately 5.8 miles long and will overtake existing distribution lineright-of-way and parallel roadright-of-way as much as possible.

Zoning designations and land uses near the transmission lines are not expected to change as a result of the construction and operation of the Project. Temporary and permanent impacts would be limited to the area where poles are placed and to the construction areas.

5.3.5. Recreation

The Proposed Route traverses two public sites. Rudy Johnson Park is south of and adjacent to U.S. Highway 10 between 6th and 7th Avenue. River Bend Park is located along Bunker Lake Road (County Road 116) in the city of Ramsey.

Rudy Johnson Park is a recreational park with an ice skating rink in the winter and a baseball field in the summer. A few trees are scattered mostly along the western side of the park.

Anoka High School has recreational fields along the proposed route at 7th Avenue in the city of Anoka.

The proposed transmission line Route traverses River Bend Park. River Bend Park includes a baseball field, tennis courts, a playground and picnic areas.

Mitigation - Recreation
The transmission line will cross through Rudy Johnson Park. The Applicant believes the best alignment for the transmission line through the park will be to place the transmission line as close as possible to the U.S. Highway 10 easement, which will minimize impacts to the park.

Potential impacts to the Anoka High School athletic fields can be reduced by placing the transmission line ROW as close to 7th Avenue as allowable, and by placing transmission poles even with the soccer end lines. This would require two 360-foot spans between three poles.

The transmission line will cross through River Bend Park. Park staff has suggested the transmission line will have fewer impacts if it were to follow along the north side of County Road 116. The Applicant has stated it will continue to work with the city of Ramsey to minimize and mitigate impacts in the park.

5.3.6. Transportation

Approximately 4.2 miles of the 5.8-mile Proposed Route would parallel public road and railroad rights-of-way (approximately 0.65 miles adjacent to Trunk Highway 10, 2.7 miles along Anoka County Roads 7,14 and 116, 0.35 miles adjacent to the BNSF railroad; and 0.54 miles along Anoka city streets). This parallel alignment adjacent to public road and railroad rights-of-way represents approximately 72 percent of the total Route length of 5.8 miles. A portion of the Project ROW could overlap existing roadway ROW.

The BNSF railroad ROW in the project area is 125 feet in width. The communities within the Project area have developed around this railroad alignment, leaving minimal space between the railroad ROW and local businesses, industrial buildings, and

communications towers. The portion of the Applicant's proposed route is an area where the transmission line ROW can be placed without affecting the railroad's utility accommodation policy. Route Segment Alternative A would parallel a portion of the railroad ROW where insufficient ROW exists for the placement of a transmission line.

The route width would allow flexibility in the alignment of the transmission line such that roadways could be crossed in order to avoid certain sensitive resources. The transmission line would be designed in accordance with National Electrical Safety Code (NESC) standards, which establish clearances required between transmission lines and transportation structures. These clearances are designed to accommodate a relative vehicle height of 14 feet, such that vehicle use could safety occur beneath the transmission line.

Construction of the Project could result in temporary construction-related detours and road closures. Road or lane closures would occur where the alternatives cross and (to some degree) parallel roads. Closures and detours would typically be necessary to string transmission lines across roads, or to allow for the movement of construction vehicles and the delivery of construction materials. Due to the traffic volumes on local roads, it is not expected that lane closures would significantly delay travel times.

Mitigation – Transportation

The Project would be designed in accordance with NESC standards to minimize impacts to transportation. NESC standards establish clearances required between transmission lines and transportation structures.

HVTL permits issued by the Commission direct the Permittee to comply with MnDOT and all applicable road authorities' management standards and policies during construction. The permits also direct the permittee to provide written notice of construction to MnDOT and applicable city, township, and county road authorities.

Construction workforces could work closely with the Minnesota State Patrol and county officials to ensure the implementation of appropriate measures to safeguard the public and construction workforces, and to notify the public about planned road closures and detours. Potential interference with highway resurfacing projects could be reduced by coordinating construction schedules with MnDOT.

Based on right-of- way maps provided by MnDOT, the Applicant believes there is adequate space to locate the physical components of the transmission line outside of MnDOT's existing Hwy 10 right-of-way. The Applicant will conduct a detailed field survey as well as locate all existing underground utilities prior to submitting its Plan and Profile to the Commission for review. After these activities are completed and a final design is established, the Applicant will consult with MnDOT to locate the transmission line components in a manner to minimize conflicts with its existing right-of-way.

Construction will require traffic on Hwy 10 and 7th Ave just south of Hwy 10 to be stopped for a short period of time (approximately five minutes) to allow the conductor

lead rope to be carried across each roads. Alternatively, the Highway Patrol may set up a low speed rolling road block on Hwy 10. The 7th Avenue crossing can likely be coordinated with a signal light cycle or with local law enforcement personnel present. The Applicant consult with the City, MnDOT and the Highway Patrol to determine the best means and schedule for the crossings.

6. Required Permits and Approvals

Construction of the Project would require a High Voltage Transmission Line (HVTL) permit from the Commission (Minn. Stat. 216E.03, subd. 2). Additional potentially required permits and approvals are listed in Table 6.1 below.

Table 6.1: Potentially Required Permits and Approvals

Permit	Jurisdiction
Federal Approvals	
Section 404 Permit, Clean Water Act (Local/State/Federal Application for Water/Wetland Projects, for discharge of fill due to placement of poles in wetlands) Section 106 Review	Corps of Engineers Section 10 Permit
Part 7460 review (to ensure compliance with 7460)	FAA
Spill Prevention, Control and Countermeasure (SPCC) Plan (Xcel Energy for modifications to the Crooked Lake Substation and Anoka Municipal Utility for modification at the Enterprise Park Substation)	EPA
Minnesota State Approvals	
License to Cross Public Waters or State Lands	DNR – Lands and Minerals
Utility Permit (Road Crossing Permits to cross or occupy state trunk highway roadright-of-way)	Mn/DOT
NPDES Construction Stormwater Permit (Xcel Energy for modification at Crooked Lake Substation and Anoka Municipal Utility for modifications at Enterprise Park Substation) **NPDES Construction Stormwater Permit** (Great River Energy, for line construction)	MPCA
Minnesota Local Approvals	
Land Permits, including road crossing/right-of-way permits (may be required to occupy lands such as parklands, watershed districts, and other publicly-owned land)	County, City
Minnesota Wetland Conservation Act	County, Board of Water and Soil

Permit	Jurisdiction
Exemption	Resources
Road Crossing Permits	County, City
Overwidth Loads Permits	County, City
Driveway/Access Permits	County, City

7. Route Comparison

There are two routing scenarios presented in the scope of this environmental assessment, previously described as the Applicant's proposed route, and the Applicant's proposed route incorporating Route Segment Alternative A. These routes are described in Chapter 3 of this EA, and on all Figures contained in this document.

In analyzing the two routing scenarios, many of the potential impacts would be the same or similar. For example, there are no cultural resources located in the area between 6th Avenue and Garfield Avenue, no matter if the proposed route or segment alternative is followed. However, there are differences in potential impacts with residences located near the line, cost, transportation, and land use.

Route Segment Alternative A follows a route that would reduce the number of homes within 36 to 135 feet of the line. The proposed route has 20 more homes within this distance of the transmission line than does the segment alternative. Neither route alternative would cause displacement of residences as a result of constructing and operating the Project.

Route Segment Alternative A would be 0.3 miles longer than the Applicant's proposed route. This would result in an increase to project costs of $450,000, or a 3.8 percent increase.

Route Segment Alternative A would parallel a portion of the railroad ROW where insufficient ROW may exist for the placement of a transmission line. The BNSF railroad ROW in the project area is 125 feet in width. The communities within the Project area have developed around this railroad alignment, leaving minimal space between the railroad ROW and local businesses, industrial buildings, and communications towers. The Applicant's proposed route, instead of paralleling the railroad ROW in this area, makes a perpendicular crossing at 6th Avenue.

Both the Applicant's preferred route and Route Segment Alternative A follow transportation ROW and property lines. Route Segment Alternative A crosses or parallels land owned by the city of Anoka and Anoka County. These lands have development occurring or planned. Volunteers of America has begun construction of a senior continuum of care campus on the property located east of 4th Avenue and north of Grant Street. There is a monopole cell tower located in the city's Public Services equipment yard that is close to the BNSF right-of-way and would likely be impacted by the proposed route segment alternative. Route Segment Alternative A may also impact the rail station which abuts both sides of the tracks. If the segment alternative were to be located on the south side of the tracks, it would impact the planned construction of a multi-level parking facility and pedestrian overpass as well as other commercial development. Locating the line along the north side of the tracks would impact the buildings at 2804 5th Avenue and 2707 6th Avenue which abut the BNSF right-of-way. It is likely that an easement would be required from BNSF to locate the line within this area or the line would have to be constructed over the building(s). The area along the north

side of the track between 4th Avenue and 6th Avenue is planned for future development by the city of Anoka. These current and future development plans would not be affected by the Applicant's proposed route.

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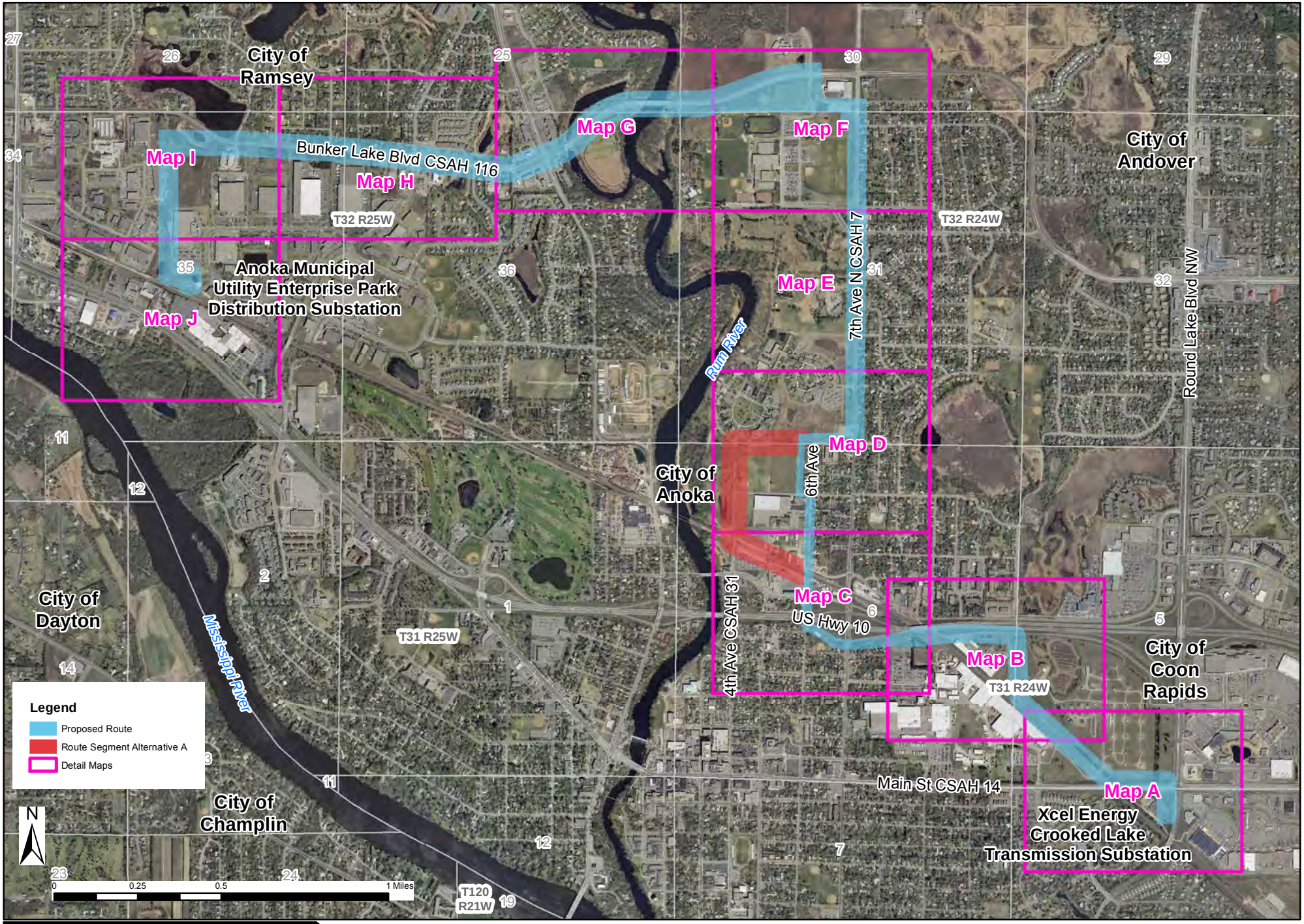
Appendix A:
Detailed Map Sheets



Minnesota Department of Commerce

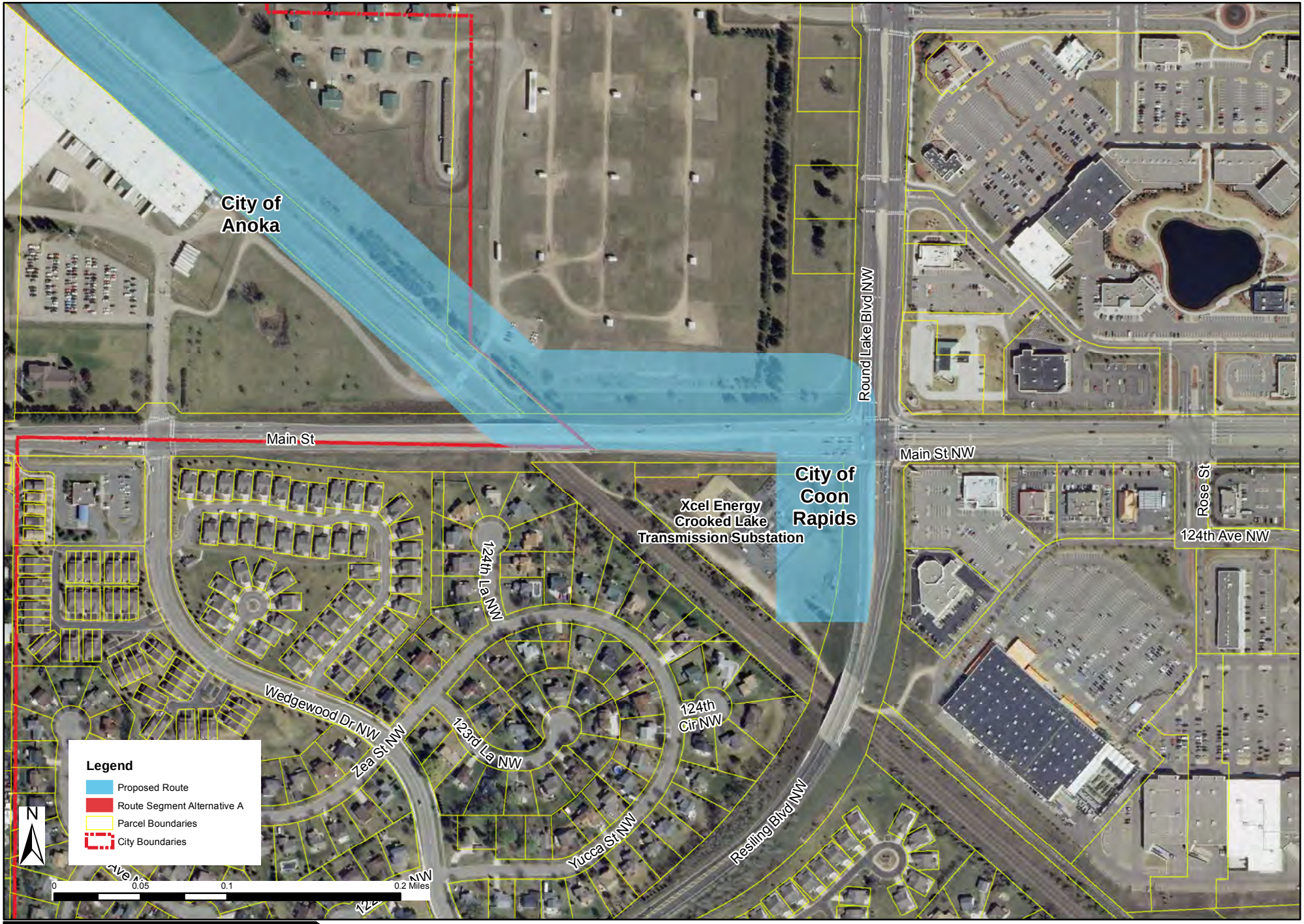
Enterprise Park to Crooked Lake 115 kV Transmission Project

Great River Energy • Xcel Energy • Anoka Municipal Utility

Figure 6

Map Key

March 2012



Minnesota Department of Commerce

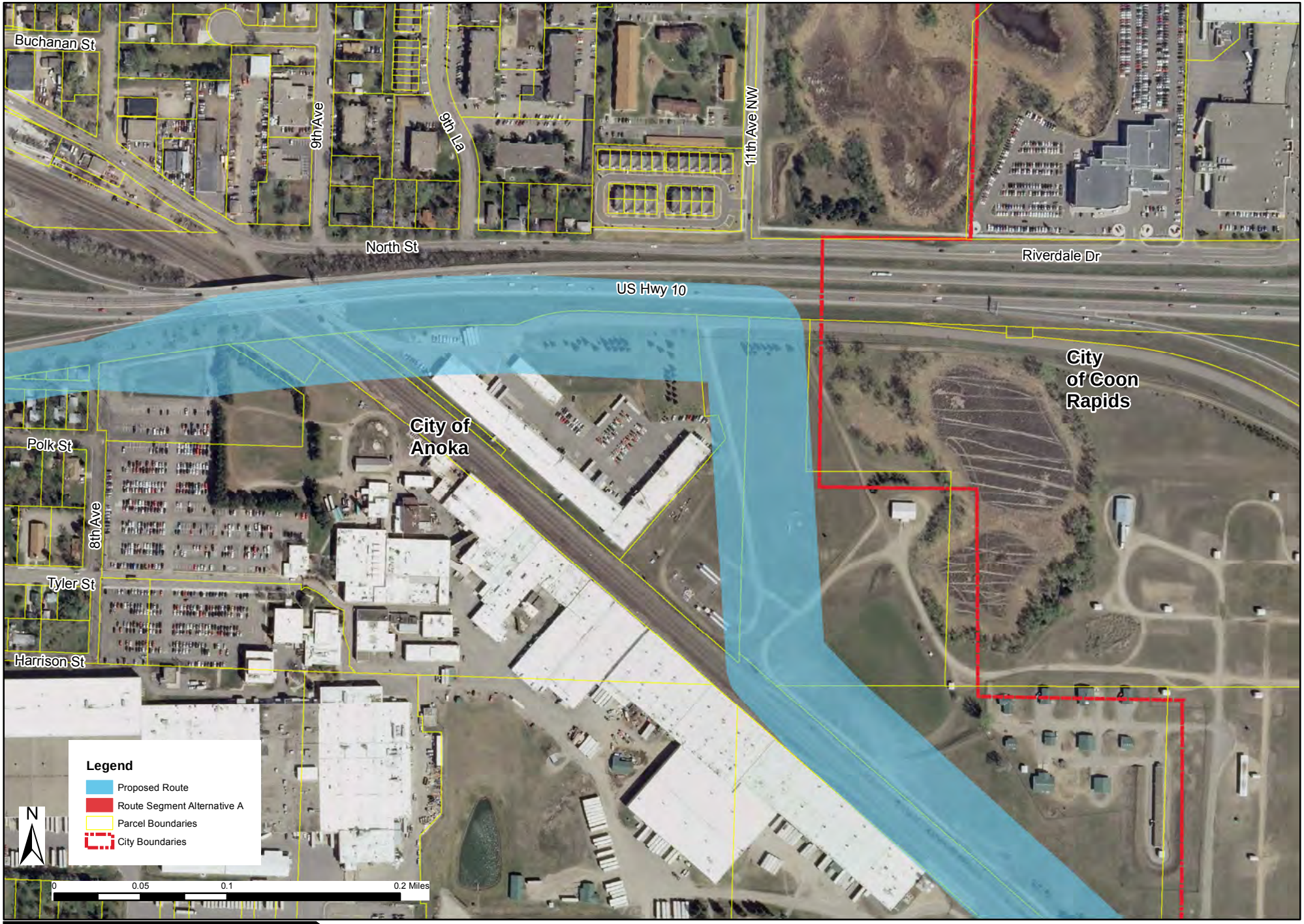
Enterprise Park to Crooked Lake 115 kV Transmission Project

Great River Energy • Xcel Energy • Anoka Municipal Utility

Figure 6a

Proposed Route Map A

March 2012



Minnesota Department of Commerce

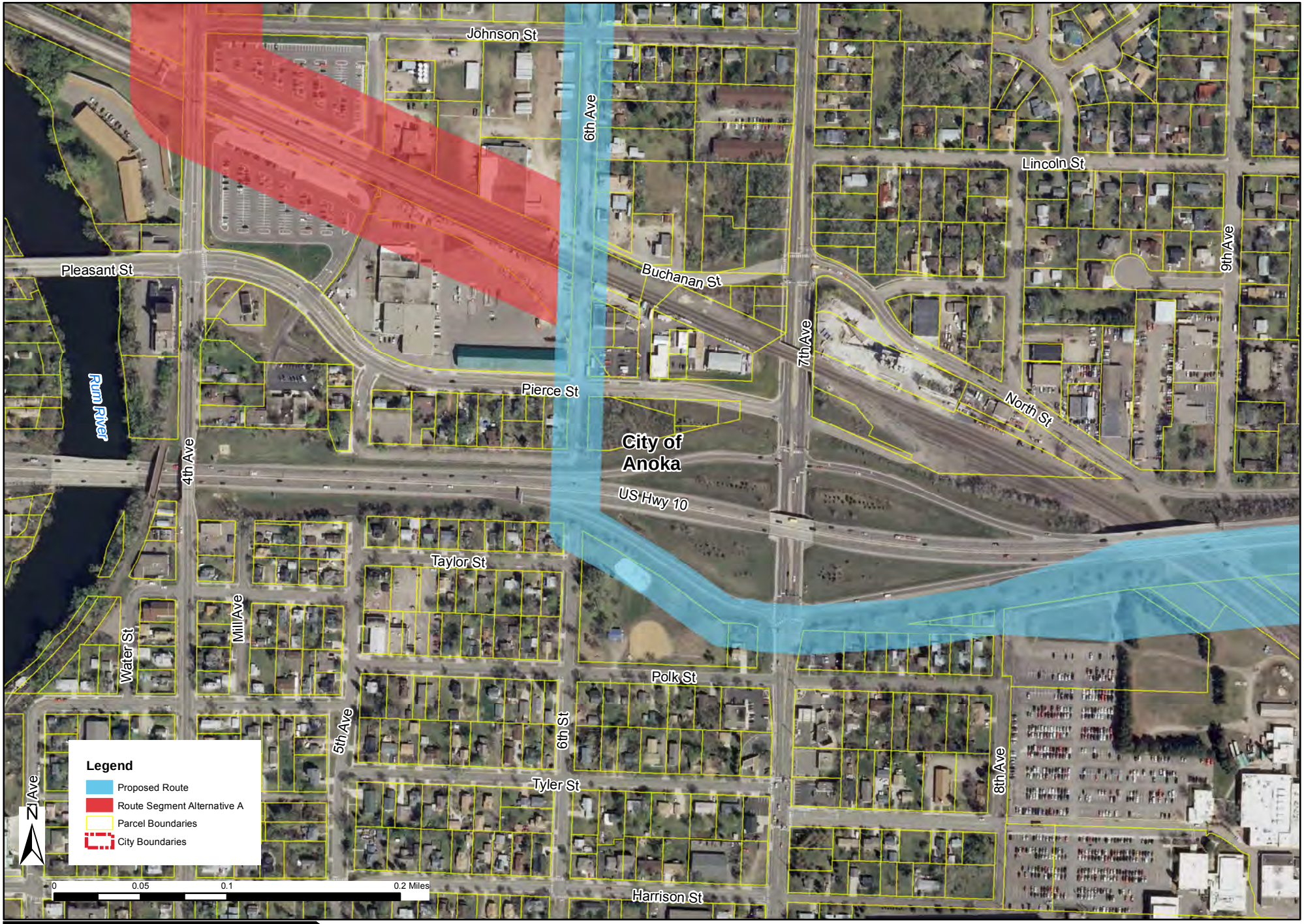
Enterprise Park to Crooked Lake 115 kV Transmission Project

Great River Energy • Xcel Energy • Anoka Municipal Utility

Figure 6b

Proposed Route Map B

March 2012



Minnesota Department of Commerce

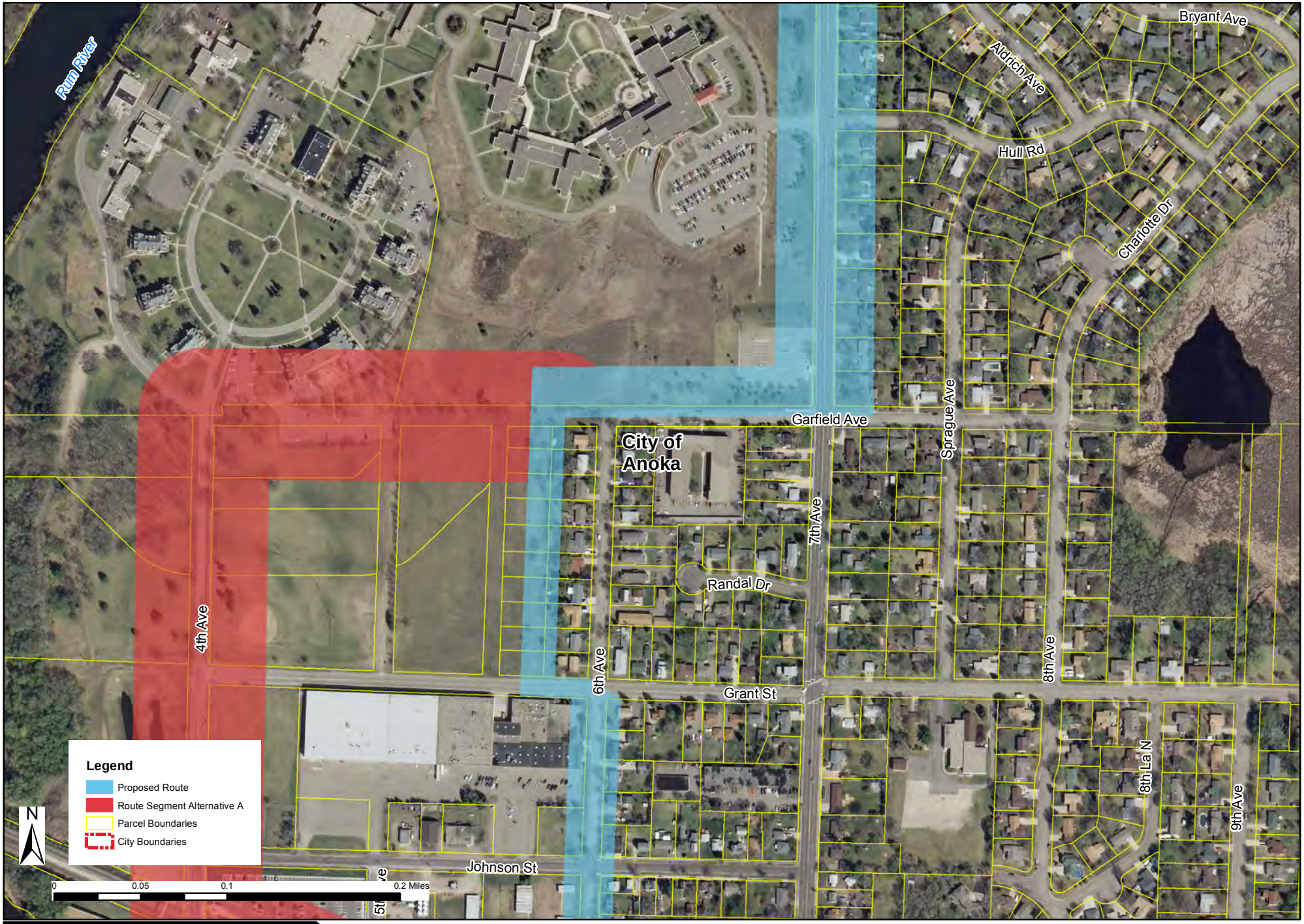
Enterprise Park to Crooked Lake 115 kV Transmission Project

Great River Energy • Xcel Energy • Anoka Municipal Utility

Figure 6c

Proposed Route Map C

March 2012



Minnesota Department of Commerce

Enterprise Park to Crooked Lake 115 kV Transmission Project

Great River Energy • Xcel Energy • Anoka Municipal Utility

Figure 6d

Proposed Route Map D

March 2012

Minnesota Department of Commerce

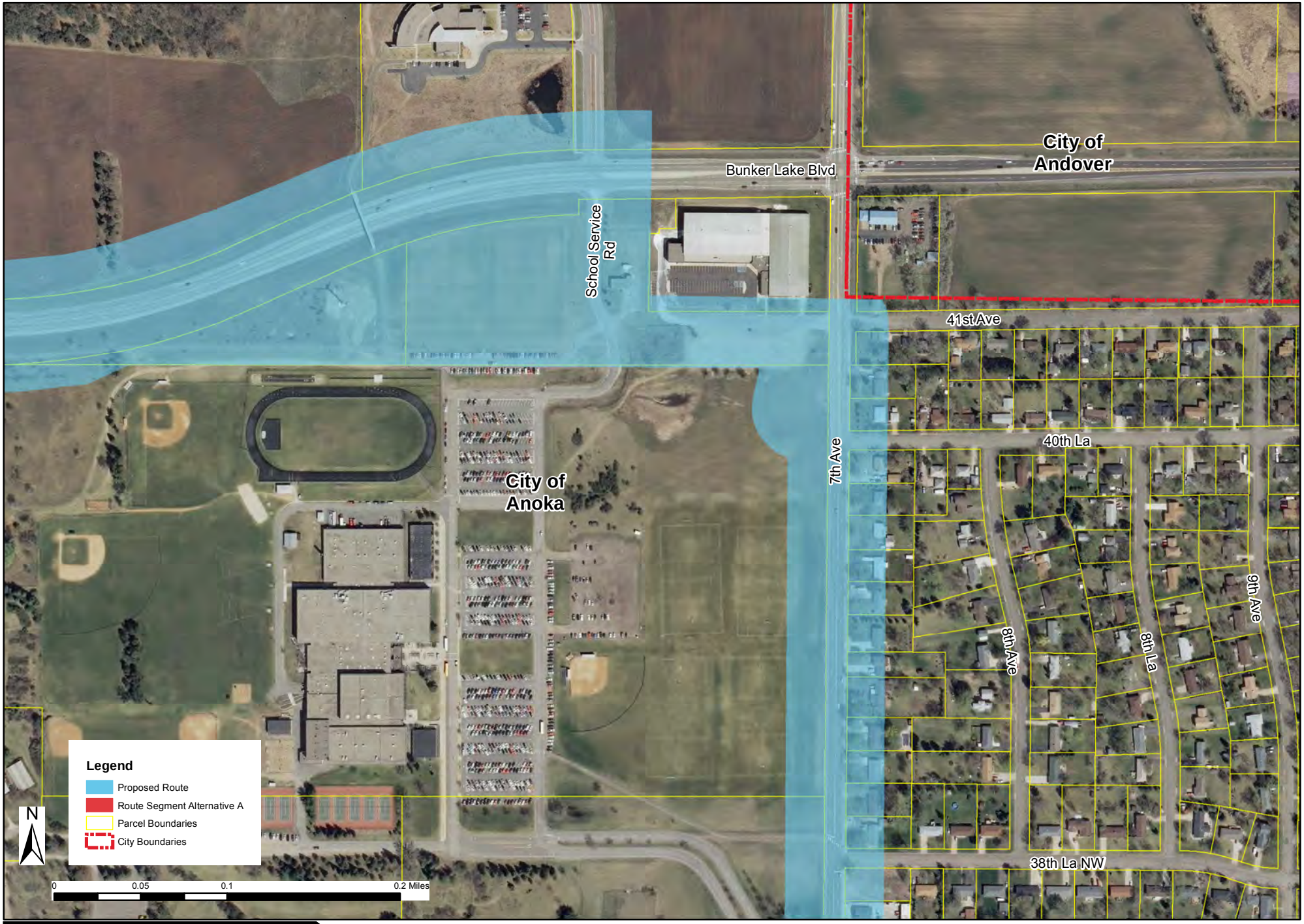
Enterprise Park to Crooked Lake 115 kV Transmission Project

Great River Energy • Xcel Energy • Anoka Municipal Utility

Figure 6e

Proposed Route Map E

March 2012



Minnesota Department of Commerce

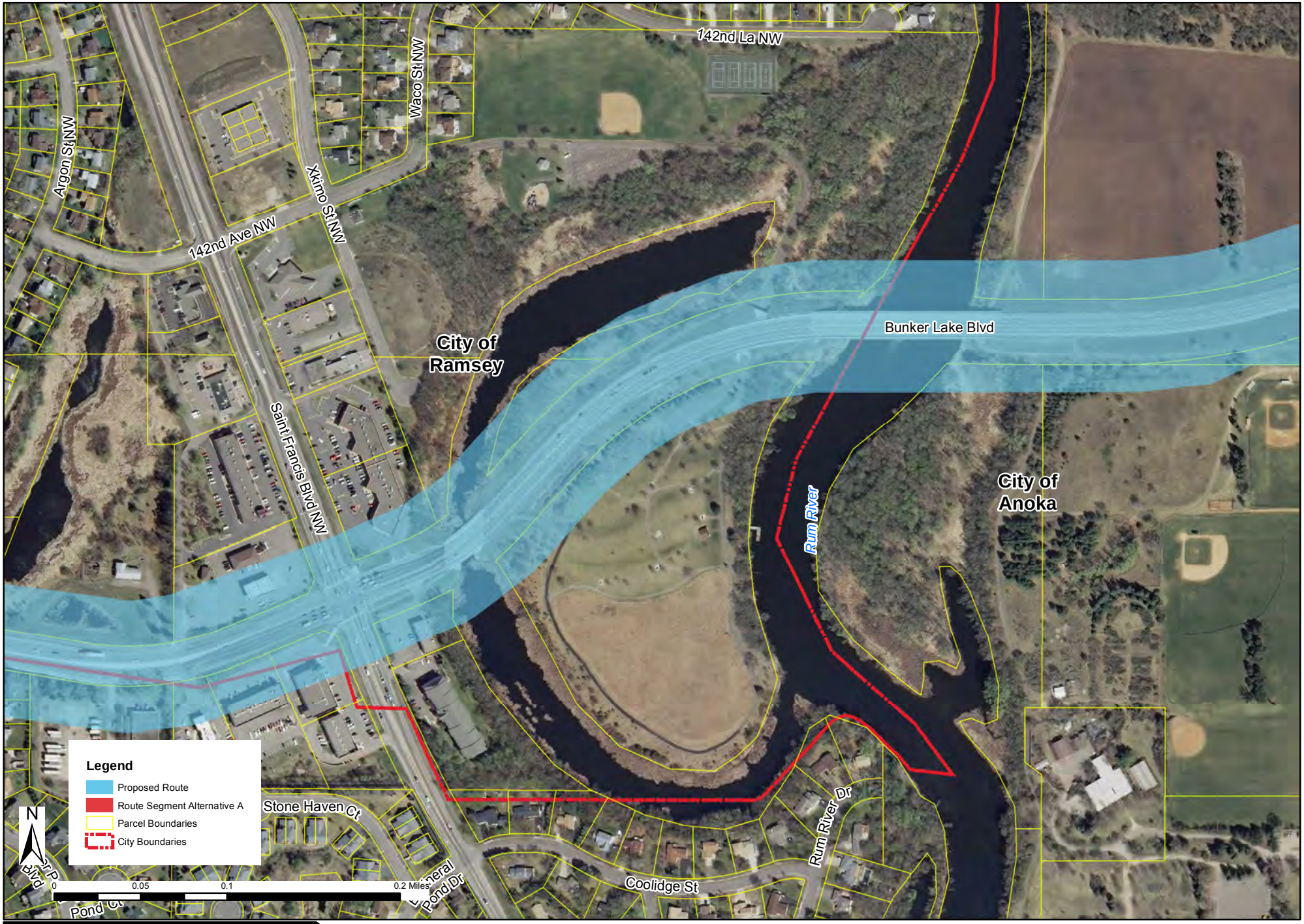
Enterprise Park to Crooked Lake 115 kV Transmission Project

Great River Energy • Xcel Energy • Anoka Municipal Utility

Figure 6f

Proposed Route Map F

March 2012



Minnesota Department of Commerce

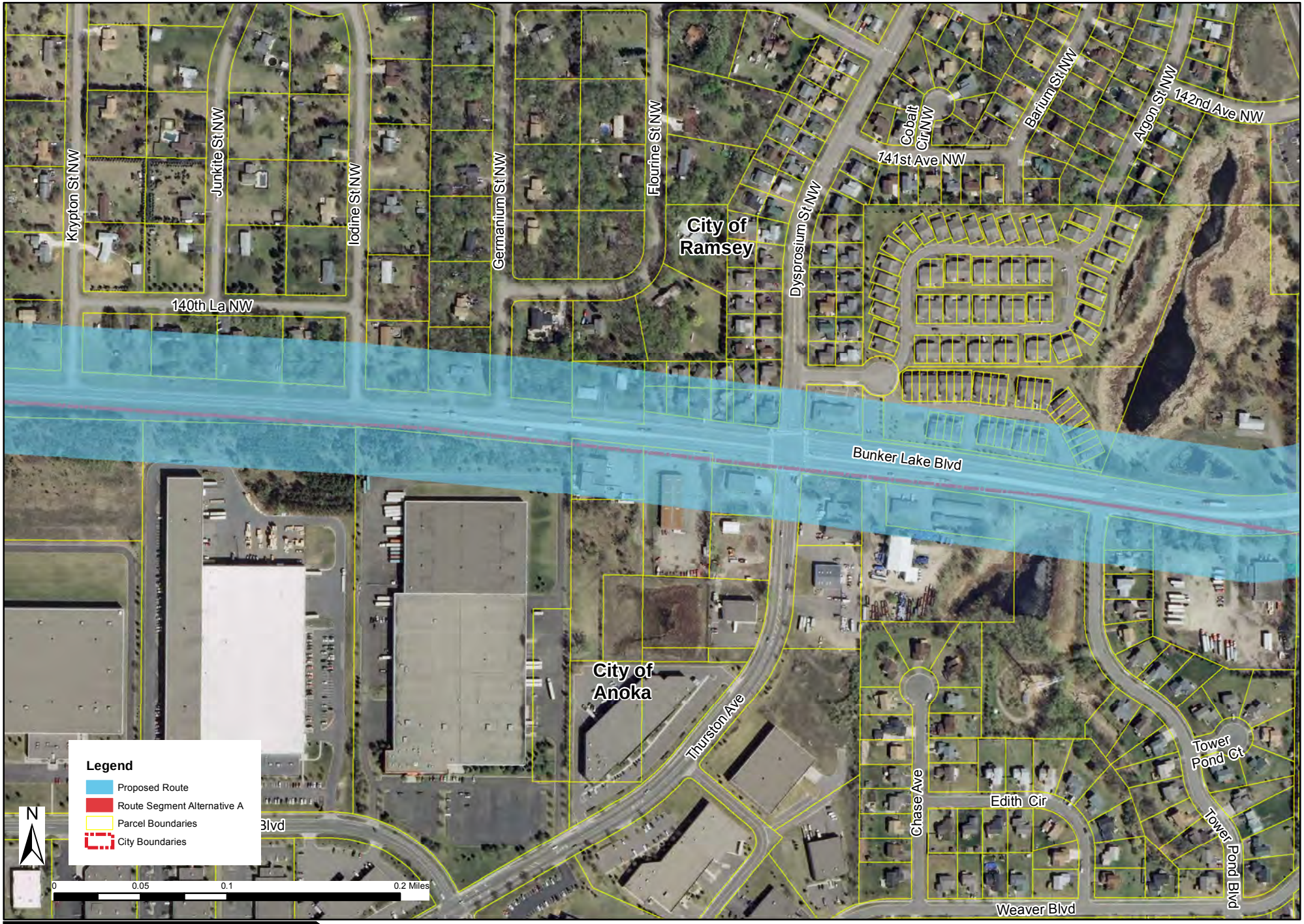
Enterprise Park to Crooked Lake 115 kV Transmission Project

Great River Energy • Xcel Energy • Anoka Municipal Utility

Figure 6g

Proposed Route Map G

March 2012



Minnesota Department of Commerce

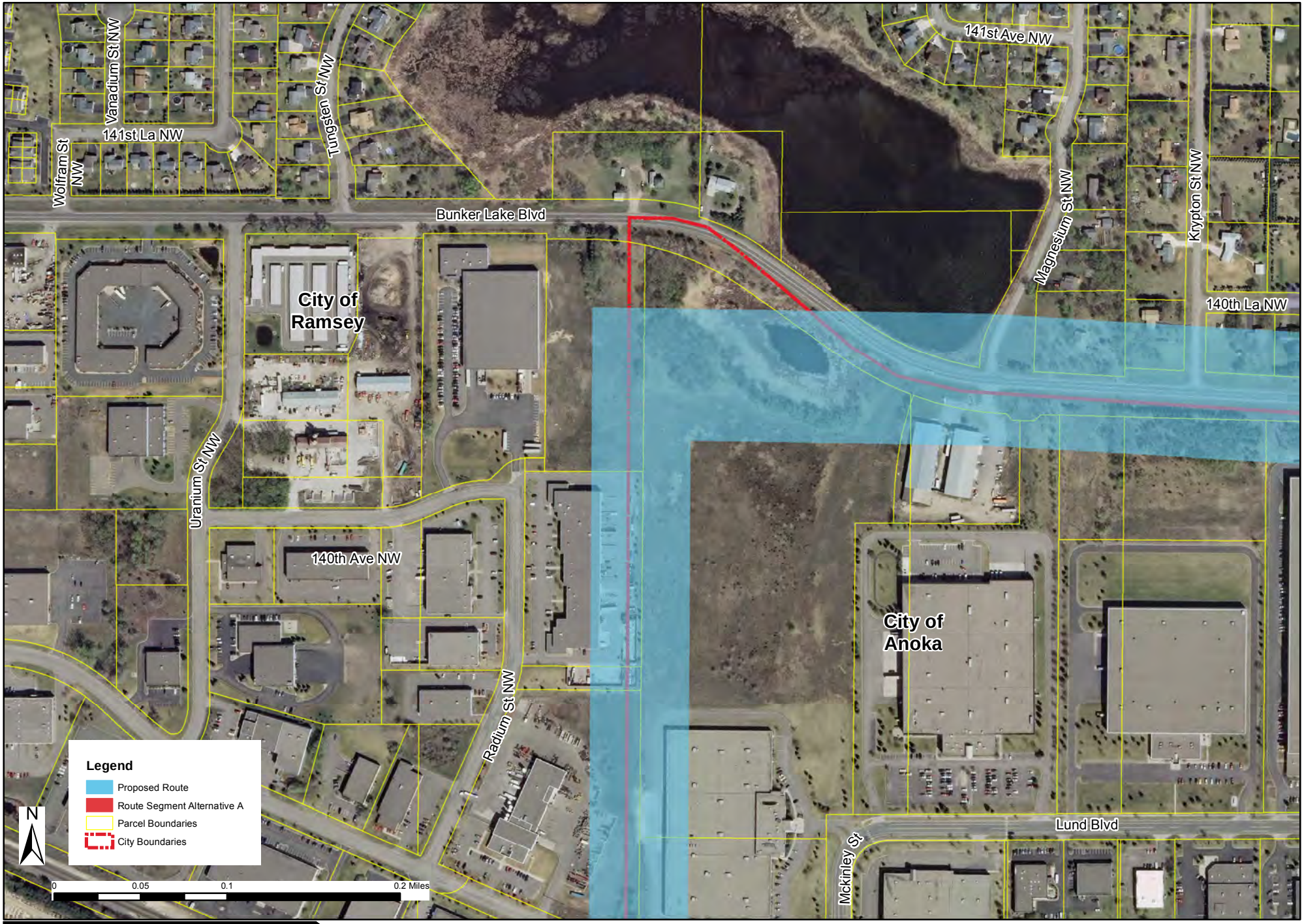
Enterprise Park to Crooked Lake 115 kV Transmission Project

Great River Energy • Xcel Energy • Anoka Municipal Utility

Figure 6h

Proposed Route Map H

March 2012



Minnesota Department of Commerce

Enterprise Park to Crooked Lake 115 kV Transmission Project

Great River Energy • Xcel Energy • Anoka Municipal Utility

Figure 6i

Proposed Route Map I

March 2012

Minnesota Department of Commerce

Enterprise Park to Crooked Lake 115 kV Transmission Project

Great River Energy • Xcel Energy • Anoka Municipal Utility

Figure 6j

Proposed Route Map J

March 2012

Appendix B:
Scoping Decision

STATE OF MINNESOTA
Energy Facility Permitting

Issued: January 9, 2012

NOTICE OF SCOPING DECISION AND INTENT TO PREPARE AN ENVIRONMENTAL ASSESSMENT

In the Matter of the Route Permit Application for the Enterprise Park to Crooked Lake 115 kV Transmission Line Project in Anoka County

PUC Docket No. ET2/TL-11-915

PLEASE TAKE NOTICE that the Minnesota Department of Commerce, Energy Facility Permitting (EFP) announces the release of the scoping decision and notice of intent to prepare an environmental assessment (EA) for Great River Energy's proposed Enterprise Park to Crooked Lake 115 kV transmission line project.

Electronic versions of the EA scoping decision, route permit application and other documents relevant to this matter are available on the Public Utilities Commission's EFP website: http://energyfacilities.puc.state.mn.us/Docket.html?Id=32289, and on the Department of Commerce eDockets website: https://www.edockets.state.mn.us/EFiling/search.jsp (enter the Docket Number Year "11" and Number "915").

The scoping decision identifies the issues and alternative route segment (see attached maps) the deputy commissioner of the Department of Commerce has determined are appropriate for inclusion in the EA. The scoping decision also identifies certain issues that will not be included in the EA. The EA is anticipated to be complete and available in March 2012.

If you have any questions about this project or would like more information, please contact the EFP state permit manager: Matthew Langan, 85 7th Place East, Suite 500, St. Paul, MN 55101; Tel: 651.296.2096, e-mail: matthew.langan@state.mn.us.

In the Matter of the Route Permit Application for the Enterprise Park to Crooked Lake 115 kV Transmission Line Project in Anoka County, Minnesota

Environmental Assessment
Scoping Decision Document
PUC Docket No. ET2/TL-11-915

Introduction

The above matter has come before the deputy commissioner of the Department of Commerce for a decision on the scope of the environmental assessment (EA) to be prepared on the Enterprise Park to Crooked Lake 115 kV transmission line project proposed by Great River Energy (applicant). Great River Energy has submitted this application on behalf of itself and other anticipated co-owners of the project, including Minnesota Municipal Power Agency, Anoka Municipal Utility, and Xcel Energy.

Project Description

On October 4, 2011, the applicant filed a route permit application (RPA) under the alternative permitting process for the construction of approximately 5.8 miles of new, overhead 115 kV transmission line between Xcel Energy's existing Crooked Lake Substation in Coon Rapids, Minn., and Anoka Municipal Utility's existing Enterprise Park Substation in Anoka, Minn., in Anoka County (see Figure 1 attached). The project will remove, rebuild, and attach Anoka Municipal Utility's existing overhead (12.5 kV) distribution lines to the new 115 kV transmission line where the new line overtakes the existing distribution lines. (Alternatively, Anoka Municipal Utility may choose to bury some of the distribution lines.) The project would also include modifications to the Crooked Lake and Enterprise Park substations to accommodate the new transmission line, including a new ring bus, breaker additions, step down transformers, and associated switch gear.

The applicant is requesting a route width as narrow as 100 feet in some locations, and as wide as 400 feet in others, except for the area near Anoka High School where the requested route width is 800 feet. The variation in route width is due to the developed nature of the project area. The typical right-of-way for the 115 kV line is 50-75 feet, depending on the structure used. The typical span between poles without underbuild is 300 to 400 feet, and 250 to 300 where 12.5 kV distribution lines are attached. Poles range in height from 60 to 85 feet. Most poles will be constructed as single-pole, wood structures with horizontal post insulators.

Purpose

In its RPA, the applicant states the purpose of the proposed project is to meet future electric load requirements in the area, to provide relief on the existing transmission system, and to provide backup service to an existing 69 kV transmission line.

This document can be made available in alternative formats (i.e. large print or audio) by calling 651-296-0391 (voice). Persons with hearing or speech disabilities may call us through Minnesota Relay at 1-800-627-3529 or by dialing 711.

Regulatory Background

A high-voltage transmission line RPA for the project was filed by the applicant on October 4, 2011, and accepted by the Minnesota Public Utilities Commission (Commission) on November 4, 2011. The route permit will be reviewed under the alternative review process, pursuant to Minnesota Statues 216E (Power Plant Siting Act) and Minnesota Rules 7850.2800 to 7850.3900. Under the alternative permitting process the Commission has six months from the date the application was accepted as complete to make a decision on the route permit. The Commission may extend this time limit up to three months for just cause or upon agreement of the applicant (Minnesota Rule 7850.3900, subpart 1).

Scoping Process

Scoping is the first step in the process after application acceptance. The scoping process has two primary purposes: 1) to ensure that the public has a chance to participate in determining what routes and issues should be considered for study in the EA, and 2) to help focus the EA on the most important issues surrounding the route permit decision. The scope identifies potential human and environmental issues that will be addressed in the EA. The scope also presents an anticipated schedule of the environmental review process.

Public Scoping Meeting

Department of Commerce Energy Facility Permitting (EFP) staff held public information and scoping meetings on December 1, 2011, at Anoka City Hall in Anoka, Minnesota. The meeting provided members of the public an opportunity to learn about the proposed project and the state's high-voltage transmission line route permitting process, review the applicant' RPA, ask questions, provide comments, and identify potential impacts and route alternatives to be considered for the scope of the environmental assessment. Approximately 20 people attended the two meetings.

A court reporter was present at the public meeting and transcribed questions asked and comments made by the public, as well as responses from EFP staff and the applicant. Six people provided oral comments and/or asked questions about the proposed project. Topics and issues raised by the public at the meeting included: transmission line structure construction and engineering, preferred route, regulatory framework, noise, tree removal, and parks. One route segment alternative was proposed at the meeting.

Route Segment Alternative suggested

Route Segment Alternative A – This route segment alternative is in the city of Anoka. As is represented in the attached Figure 2, this alternative would depart from the applicant's preferred route at 6th Avenue where it crosses railroad tracks, and instead parallel the railroad right of way to the northwest, then turn north along 4th Avenue, then turn east to join up with the applicant's preferred route at Garfield Avenue.

Public Comments

A public comment period, ending on December 19, 2011, provided the public an opportunity to submit comments to EFP staff via e-mail, fax, U.S. mail, or online on issues and alternative routes and alignments for consideration for the scope of the EA. EFP staff received four comment letters by the close of the comment period from the Minnesota Department of Natural Resources (DNR), the Minnesota Department of Transportation (MnDOT), and two citizens who own land or live in the project area. No alternative routes were proposed in the written comments received.

The scoping meeting comment report and each comment letter are available for viewing and downloading on the project website maintained by the Commission at: http://energyfacilities.puc.state.mn.us/Docket.html?Id=32289 or on the eDockets website at: https://www.edockets.state.mn.us/EFiling/search.jsp (enter the year "11" and the number "915").

Issues raised

Issues raised by the public for inclusion in the scope of the environmental assessment include transmission line routing near athletic fields, and possible noise mitigation strategies between a MnDOT garage and residential area once existing trees are removed for the transmission line right-of-way.

DNR requested that information be provided in the EA on vegetation removal minimization techniques, including at the Rum River crossing, a state-designated Wild and Scenic River. DNR also requested information on placement of bird flight diverters in the Rum River area. DNR also sought clarification of the administrator of a parcel of land along the route owned by the State of Minnesota. DNR sent a follow-up email clarifying that the land is administered by the Department of Administration. DNR attached to its letter fact sheets on wildlife-friendly erosion control matting, and the Blanding's turtle, a state-listed threatened species, along with a flyer on best management practices for reducing the potential for impacts to the species.

MnDOT requested information on transmission line impacts to Trunk Highway 10 interchanges at 7th Avenue and Thurston Avenue.

Having reviewed the matter, consulted with EFP staff, and in accordance with Minnesota Rule 7850.3700, I hereby make the following scoping decision:

Matters to be Addressed

The issues outlined below will be identified and described in the EA for the proposed Enterprise Park to Crooked Lake 115 kV project. The EA will describe the project and current setting of the proposed project area. It will also provide information on the potential impacts the proposed project could have as they relate to the topics outlined in this scoping decision document, including possible mitigation for identified impacts, identification of irretrievable commitment of resources and permits from other government entities that may be required.

I. General Description of the Proposal

A. Project Description
B. Purpose of the Transmission Line
C. Project Location
D. Route Description
E. Route Width
F. Right-of-Way
    1. General use of right-of-way
    2. Existing easements
    3. Restoration and maintenance
G. Project Cost

II. Regulatory Framework

A. Certificate of Need
B. High Voltage Transmission Line Route Permits
C. Environmental Review Process

III. Engineering, Design, and Operation

A. Transmission Line Conductors
B. Transmission Line Structures
    1. Design and structure material
    2. Structure strength and stability (i.e. Structural failure)
C. Substations
D. Undergrounding Transmission Line Facility

IV. Construction

A. Transmission Line and Structures
B. Substations
C. Restoration and Cleanup
D. Property Destruction and Compensation
E. Operation and Maintenance

V. Affected Environment, Potential Impacts, and Mitigation Measures

A. Environmental Setting
B. Socioeconomic and Cultural Setting
C. Human Settlement
    1. Noise
    2. Aesthetics
    3. Proximity to homes
    4. Existing utilities

5. Property values
6. Property/right-of-way acquisition and displacement

D. Public Health and Safety
1. Construction and operation/maintenance
2. Electric and magnetic fields
3. Implantable medical devices
4. Stray voltage
5. Induced voltage
6. Air quality associated with the transmission facility

E. Recreation

F. Transportation and Public Services
1. Emergency services
2. Airports
3. Railroads
4. Schools

G. Interference
1. Radio (AM/FM and short-wave)
2. Television (satellite and digital)
3. Cellular phone
4. Broadband and wireless internet

H. Archaeological and Historic Resources

I. Land Use (land-based economies)
1. Industrial/commercial
2. Tourism
3. Forestry

J. Zoning and Compatibility/Federal, State and Local Government Planning
1. Residential
2. Commercial
3. Rural/agricultural
4. Industrial
5. Transportation
6. Shoreland

K. Water Resources
1. Rivers, lakes, wetlands, and other surface waters
2. Floodplains

L. Soil and Groundwater

M. Flora (plants)
1. Vegetation removal

2. Mature tree removal

N. Fauna (wildlife)
   1. Wildlife management areas
   2. Scientific and natural areas
   3. State and federal parks and forests
   4. National wildlife refuge/waterfowl production areas
   5. Avian collision and electrocution

O. Threatened/Endangered/Rare and Unique Natural Resources

VI. Alternative Routes to be Evaluated in the Environmental Assessment

In addition to the Proposed Route, the EA shall evaluate the following alternative route segment suggested through public comment:

Route Segment Alternative A

This route segment alternative is in the city of Anoka. As is represented in the attached Figure 2, this alternative would depart from the applicant's preferred route at 6th Avenue where it crosses railroad tracks, and instead parallel the railroad right-of- way to the northwest, then turn north along 4th Avenue, then turn east to join up with the applicant's preferred route at Garfield Avenue. The route width for this route segment alternative is 400 feet.

VII. Identification of Permits

The EA will include a list and description of permits from other government entities that may be required for the proposed project.

Issues Outside the Scope of the Environmental Assessment

The scope of the Enterprise Park to Crooked Lake 115 kV EA will not consider the following:

A. No-build alternative
B. Issues related to project need, size, type, or timing
C. Any route or substation alternatives not specifically identified in this scoping decision document.
D. Policy issues surrounding whether utilities or local-government should be liable for the cost to relocate utility poles when roadways are widened
E. The manner in which land owners are paid for transmission rights-of-way easements, as that is outside the jurisdiction of the Commission.

Schedule

The EA will be completed and available in March 2012. A public hearing will be held in the project area after the EA has been issued and notice served.

Signed this 5th day of January, 2012

STATE OF MINNESOTA
DEPARTMENT OF COMMERCE
DIVISION OF ENERGY RESOURCES

William Grant, Deputy Commissioner

Figure 1: Enterprise Park to Crooked Lake 115 kV Transmission Line Project Map

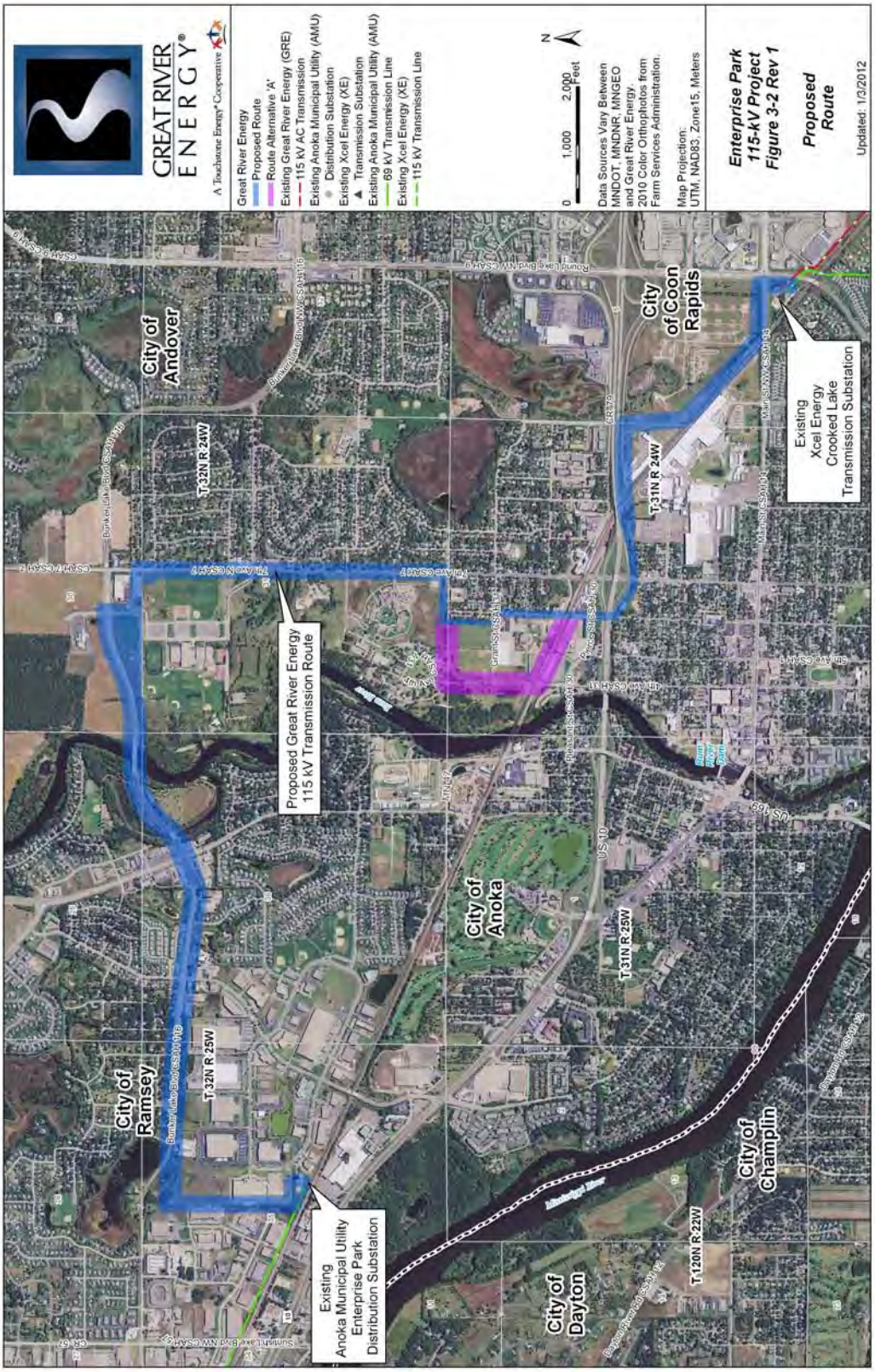
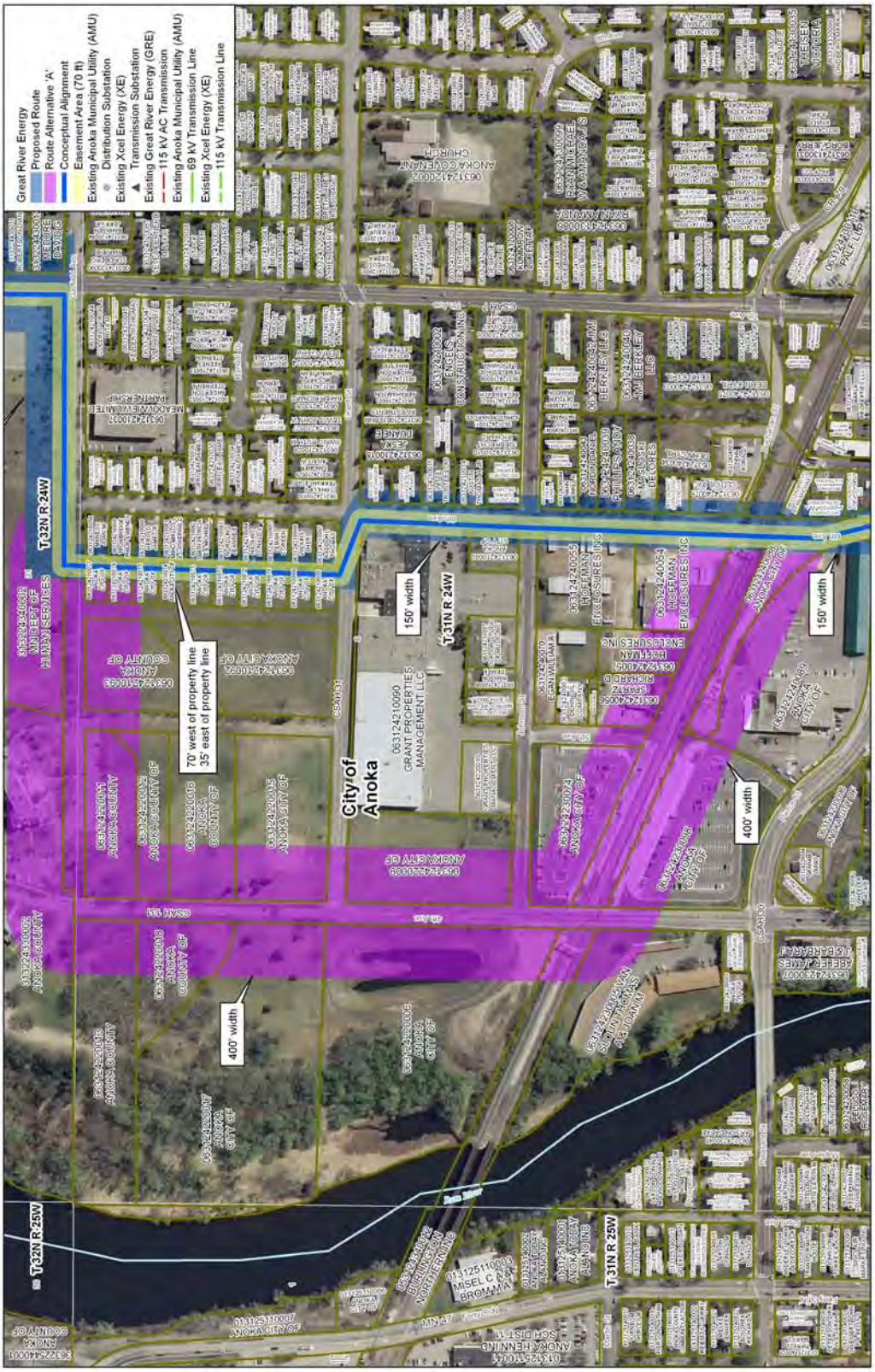


Figure 2: Route Segment Alternative A



Appendix C:
Sample HVTL Route Permit

STATE OF MINNESOTA PUBLIC UTILITIES COMMISSION

ROUTE PERMIT FOR CONSTRUCTION OF A HIGH-VOLTAGE TRANSMISSION LINE AND ASSOCIATED FACILITIES

IN BENTON COUNTY

ISSUED TO
XCEL ENERGY
PUC DOCKET NO. E002/TL-10-1026

In accordance with the requirements of Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7850, this route permit is hereby issued to:

XCEL ENERGY

Xcel Energy is authorized by this route permit to construct the approximately 4.7 mile long St. Cloud Loop 115 kV transmission line and associated facilities in Benton County, Minnesota.

The transmission line and associated facilities shall be built within the route identified in this permit, as portrayed on the official route maps, and in compliance with the all other conditions specified in this permit.

Approved and adopted this _____ day of November, 2011

BY ORDER OF THE COMMISSION

_____

Burl W. Haar,
Executive Secretary

SAMPLE

This document can be made available in alternative formats (i.e., large print or audio) by calling 651.296.0406 (voice). Persons with hearing or speech disabilities may call us through Minnesota Relay at 1.800.627.3529 or by dialing 711.

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FIGURES

Figure 1 – Overview Proposed Route
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ATTACHMENTS

Complaint Handling Procedures for High-Voltage Transmission Lines
Compliance Filing Procedures for Permitted Energy Facilities

1 ROUTE PERMIT

The Minnesota Public Utilities Commission (Commission) hereby issues this route permit to Xcel Energy (permittee) pursuant to Minnesota Statute 216E.03 and Minnesota Rules 7850. This permit authorizes the permittee to construct approximately 4.7 miles of new 115 kV transmission line and associated facilities in Benton County, Minnesota and as identified in the attached route permit maps, hereby incorporated into this document.

2 PROJECT DESCRIPTION

The permittee is authorized to construct a project comprising a 4.7-mile transmission line and as described in the route permit application and evaluated in the environmental assessment. The approved route is shown on the route permit maps attached to this permit and further designated as described.

The project consists of a new 4.7-mile long 115 kV transmission line and is divided into two segments. The first segment (new Line 5520) is approximately 4 miles long and will be constructed between the Mayhew Lake Substation and the Granite City Substation. The second segment (extension of existing Line 5509) is approximately 0.7 miles long and will be constructed between the intersection of Line 5509 with Lines 0887 and 0899 and Structure 39.

The permitee may construct, modify, and upgrade the following for the project:

- construct approximately 4 miles of new 115 kV transmission line (Line 5520) between the Mayhew Lake Substation and the Granite City Substation;

- remove a 1,700 foot segment of existing single-circuit 115 kV transmission line (Line 5509) between the Granite City Substation and its intersection with Lines 0887 and 0899;

- install approximately 0.7 miles of new 115 kV transmission line to extend existing Line 5509 from its intersection with Lines 0887 and 0899 to Structure 39, install either a new single-circuit pole or a new double-circuit structure near Structure 39 and connect Line 5509 from Structure 39 to existing Line 0899, thus creating newly designated Line 5509 connecting the Mayhew Lake Substation to the Benton County Substation;

- remove existing Line 0887 jumper at Structure 39 so that Line 0887 is no longer connected to Benton County Substation, and keeping Line 0887 connection between the St. Cloud and Granite City substations;

- disconnect the existing Line 0899 at Structure 39 to the Benton County Substation and connecting to removed Line 0887 segment from Structure 39 to Benton County Substation, and designating this revised line from Granite City to Benton County substations as Line 0899;

- install fiber optic ground wire with the new 115 kV line and the remaining segment of Line 0899; and

- modify the Benton County, Crossroads, Granite City, Mayhew Lake, and St. Cloud and substations to accommodate the above changes, which includes changing and/or adding new line termination equipment and/or a ring bus, adding transfer trip and pilot relaying, installing fiber optic lines for relaying and transfer trip, installing breakers, reconfiguring line protection, replacing shield wire with fiber optic shield wire, and related modifications.

2.1 Project Location

The 115 kV St. Cloud Loop transmission line project will be located northeast of the city of Sauk Rapids in Benton County, Minnesota. The project would specifically be located in portions of the city of Sauk Rapids and Minden and Sauk Rapids townships

Route	County	Township Name	Township	Range	Sections
Proposed Route	Benton	City of Sauk Rapids	36N	31W	14, 23, 24, 25
Proposed Route	Benton	Sauk Rapids Township	36N	31W	11, 12, 13, 14, 23, 24, 25, 36
Proposed Route	Benton	Minden Township	36N	30W	30, 31

2.2 Associated Facilities and Substations

The project would include changes and modifications to five existing substations and existing transmission lines 0887, 0899 and 5509; installation of fiber optic ground wire; and changing existing line designations.

Mayhew Lake Substation

Changes and modifications at the existing Mayhew Lake Substation include the addition of oil circuit breakers, a 115 kV main bus, and a 115 kV line termination structure. The new structures and equipment will require site grading and expansion of the fenced area (approximately 0.6 acres), foundation installation, steel structure installation, equipment installation, and control room modifications. Changes will also include three new transmission line structures for routing of the proposed transmission line into the substation along with modifications to existing structures including possible removal and replacement of one old structure with one of the newly proposed structures.

Granite City Substation

Changes and modifications at the existing Granite City Substation include the addition of oil circuit breakers, a 115 kV main bus, and a 115 kV line termination structure. A new dead-end transmission structure(s) will be required where the new transmission line would enter the substation site with a preliminary location in the northeast corner of the substation site.

Benton County, St. Cloud, and Crossroads Substations

Changes and modifications will include replacements or upgrades of relays and communication equipment internal to the control house(s), installing fiber optic lines for relaying and transfer trip, installing breakers, reconfiguring line protection, replacing shield wire with fiber optic shield wire, and related modifications.

Transmission Structure 39

Jumpers connecting existing lines will be removed and new jumpers will be added to Structure 39 depending on the proposed transmission line re-designations. New single- and/or double-circuit structures will also be constructed near Structure 39 to support the new transmission line connections and re-designations.

2.3 Structures and Conductors

The primary structure or tangent structure the permittee shall use for the project is a galvanized steel, weathering steel or wood single-pole structure with braced posts or davit arms. The tangent structures will be approximately 70 feet to 90 feet in height with an average span of 300 feet to 400 feet between structures (500 foot maximum). The steel structures will have up to a 5 foot to 8 foot average diameter foundation at ground surface and taper with height.

Approximately 2.7 miles of the new transmission line shall follow and be underbuilt with existing distribution lines along U.S. Highway 10. The permittee shall design the project to fit within these existing easements, thereby requiring less right-of-way while still satisfying the needs of the project. For this segment of the project the permittee shall use the same tangent structures as described above with the addition of a distribution crossarm.

Angle structures will be similar in design to the tangent structures described above. Given the limited right-of-way, guyed structures would likely not be necessary.

Double-circuit structures may be used for approximately 0.7 miles of the route where existing Line 5509 would be extended from its intersection with Lines 0887 and 0899 to Structure 39. A double-circuit structure may also be required to connect the newly extended Line 5509 from Structure 39 to existing Line 0899 that runs to the existing Benton County Substation. The double-circuit structures will be a galvanized or weathered steel single-pole with davit arms approximately 75 to 105 feet in height with spans of 300 to 500 feet.

The phases for the project will be constructed with three single steel supported aluminum conductors (ACSS) which each consist of a single conductor comprised of seven steel core strands surrounded by 26 outer aluminum strands. The separate conductors are 795,000 circular mils or approximately 1.092 to 1.139 inches in diameter. The 115 kV transmission line would be three-phase, 60 Hz (hertz), alternating current line.

Line Type	Conductor	Structure Type	Structure Material	Estimated Foundation Diameter (feet)	Structure Height (feet)	Span Between Structures (feet)
115 kV Single-Circuit	ACSS 795 kcmil 26/7	Single Pole Braced Post or Davit Arm	Galvanized Steel, Weathering Steel, or Wood	5 - 8	70 - 90	300 - 500
115 kV Single-Circuit with Distribution Underbuild	ACSS 795 kcmil 26/7	Single Pole Davit Arm with Distribution Crossarm Underbuild	Galvanized Steel, Weathering Steel or Wood	5 - 8	70 - 90	300 - 500
115 kV Double-Circuit	ACSS 795 kcmil 26/7	Single Pole Davit Arm	Galvanized Steel or Weathering Steel	6 - 8	75 - 105	300 - 500

The transmission line shall be equipped with protective devices to safeguard the public if an accident occurs. A 0.528 inch diameter fiber optic cable will be installed to protect from lightning strikes and allow for communication between substation protection equipment and other terminals.

The transmission line shall be designed to meet or exceed local and state codes, the National Electric Safety Code (NESC), North American Electric Reliability Corporation (NERC) requirements. This includes standards relating to clearances to ground, clearance to crossing utilities, clearance to buildings, strength of materials, clearances over roadways, right-of-way widths, and permit requirements.

3 DESIGNATED ROUTE

The approved route is shown on the route maps attached to this permit and further designated as follows:

The transmission line exits the existing Mayhew Lake Substation, heads west along County Road 29 for one-half mile and south-southwest for three-tenths of a mile cross-country to U.S. Highway 10. The route proceeds south along the east side of U.S. Highway 10 for two and nine-tenths miles, turns east for three tenths of a mile following County Ditch 3 to the existing Granite City Substation. A second segment of new transmission line will connect to existing Line 5509 at 14th Avenue NE and head south-southeast following County Ditch 3 and existing transmission lines in the area for approximately seven-tenths of a mile to existing Transmission Structure 39.

3.1 Route Width and Alignment

As depicted in the route maps attached to this permit, the designated route will be limited to 400 feet in width for the entire length of the transmission line route, as follows: 200 feet on each side of the proposed alignment from the Mayhew Lake Substation west to its intersection with U.S. Highway 10; a 400 foot route width left-aligned with the eastern edge of the northbound lanes of U.S. Highway 10; 200 feet on either side of the proposed alignment from U.S. Highway 10 heading east along County Ditch 3 to the Granite City Substation; 200 feet on either side of the proposed alignment for the new segment extending Line 5509 at approximately 14th Avenue NE to Structure 39. A 200 foot route width extending from the existing Xcel Energy-owned Mayhew Lake and Granite City substations and 1.4 acres of additional route width located north of the Granite City substation also are authorized. These widths will provide the permittee with flexibility for minor adjustments of the specific alignment or right-of-way to accommodate landowner requests and unforeseen conditions. The final alignment (i.e., permanent and maintained rights-of-way) will be located within this designated route unless otherwise authorized below.

Consequently, this permit anticipates that the actual right-of-way will generally conform to this alignment unless changes are requested by individual landowners, unforeseen conditions are encountered, or are otherwise provided for by this permit. Any alignment modifications within this designated route shall be located so as to have comparable overall impacts relative to the factors in Minnesota Rule 7850.4100 as does the alignment identified in this permit, and shall be specifically identified and documented in and approved as part of the Plan and Profile submitted pursuant to Section 4.1 of this permit.

Route width variations outside the designated route may be allowed for the permittee to overcome potential site specific constraints. These constraints may arise from any of the following:

1) Unforeseen circumstances encountered during the detailed engineering and design process.

2) Federal or state agency requirements.

3) Existing infrastructure within the transmission line route, including but not limited to roadways, railroads, natural gas and liquid pipelines, high voltage electric transmission lines, or sewer and water lines.

4) Planned infrastructure improvements identified by state agencies and local government units (LGUs) and made part of the evidentiary record during the contested case proceeding for this permit.

Any alignment modifications arising from these site specific constraints that would result in right-of-way placement outside the designated route shall be located so as to have comparable overall impacts relative to the factors in Minnesota Rule 7850.4100 as does the alignment identified in this permit and shall also be specifically identified and documented in and approved as part of the plan and profile submitted pursuant to Section 4.1 of this permit.

3.2 Right-of-Way Placement

Where the transmission line route parallels existing highway and other road rights-of-way, the transmission line right-of-way shall occupy and utilize the existing right-of-way to the maximum extent possible, consistent with the criteria in Minnesota Rule 7850.4100, the other requirements of this permit, and for highways under the jurisdiction of the Minnesota Department of Transportation (Mn/DOT), Mn/DOT rules, policies, and procedures for accommodating utilities in trunk highway rights-of-way.

3.3 Right-of-Way Width

The 115 kV transmission line will be built primarily with single pole structures, which will require a 75-foot right-of-way. Where the transmission line will be underbuilt with 2.7 miles of existing distribution line along U.S. Highway 10, the project shall be designed to fit within the existing distribution line easements, thereby reducing the amount of new right-of-way that would be required.

4 GENERAL CONDITIONS

The permittee shall comply with the following general conditions during construction of the transmission line and associated facilities and the life of this permit.

4.1 Plan and Profile

At least 30 calendar days before right-of-way preparation for construction begins on any segment or portion of the project, the permittee shall provide the Commission with a plan and profile of the right-of-way and the specifications and drawings for right-of-way preparation, construction, transmission structure specifications and locations, and restoration for the transmission line. The documentation shall include maps depicting the plan and profile including the right-of-way, alignment, and structures in relation to the route and alignment approved per the permit.

The permittee may not commence construction until the 30 days has expired or until the Commission has advised the permittee in writing that it has completed its review of the documents and determined that the planned construction is consistent with this permit. If the permittee intends to make any significant changes in its plan and profile or the specifications and drawings after submission to the Commission, the permittee shall notify the Commission at least five days before implementing the changes. No changes shall be made that would be in violation of any of the terms of this permit.

4.2 Construction Practices

The permittee shall follow those specific construction practices and material specifications described in the Xcel Energy application to the Commission for a route permit, dated March 11, 2011, and as described in the environmental assessment and Findings of Fact, unless this permit establishes a different requirement, in which case this permit shall prevail.

4.2.1 Field Representative

At least 10 days prior to commencing construction, the permittee shall advise the Commission in writing of the person or persons designated to be the field representative for the permittee with the responsibility to oversee compliance with the conditions of this permit during construction.

The field representative's address, phone number, email, and emergency phone number shall be provided to the Commission and shall be made available to affected landowners, residents, public officials and other interested persons. The permittee may change the field representative at any time upon written notice to the Commission.

4.2.2 Local Governments

During construction, the permitee shall minimize any disruption to public services or public utilities. To the extent disruptions to public services occur, these would be temporary and the permitee will work to restore service promptly.

Where any impacts to utilities have the potential to occur, permitee will work with both landowners and local agencies to determine the most appropriate transmission structure placement.

The permittee shall cooperate with county and city road authorities to develop appropriate signage and traffic management during construction.

4.2.3 Cleanup

All waste and scrap that is the product of construction shall be removed from the area and properly disposed of upon completion of each task. Personal litter, including bottles, cans, and paper from construction activities shall be removed on a daily basis.

4.2.4 Noise

Construction and routine maintenance activities shall be limited to daytime working hours, as defined in Minnesota Rule 7030.0200, to ensure nighttime noise level standards will not be exceeded.

4.2.5 Vegetation Removal in the Right-of-Way

The permittee shall minimize the number of trees to be removed in selecting the right-of-way specifically preserving to the maximum extent practicable windbreaks, shelterbelts, living snow fences and vegetation in areas such as trail crossings, where vegetative screening may minimize aesthetic impacts, to the extent that such actions do not violate sound engineering principles or system reliability criteria.

Tall tree species located within the transmission line right-of-way that endanger the safe and reliable operation of the transmission facility will be removed.

In many cases certain low and slow growing species that do not exceed a mature height of 15 feet can be planted in the right-of-way to blend the difference between the right-of-way and adjacent wooded areas, to the extent that the low growing vegetation that will not pose a threat to the transmission facility or impede construction.

Vegetation management in infrequently mowed areas, such as in ditches, along utility access roads, and under power lines, shall be done mechanically (chemicals shall not be used). Work in these areas shall occur fall through spring (after October 1st and before June 1st).

4.2.6 Aesthetics

The permittee shall consider input pertaining to visual impacts from landowners or land management agencies prior to final location of structures, rights-of-way, and other areas with the potential for visual disturbance. Care shall be used to preserve the natural landscape, minimize tree removal and prevent any unnecessary destruction of the natural surroundings in the vicinity of the project during construction and maintenance. Structures shall be placed at the maximum feasible distance, consistent with sound engineering principles and system reliability criteria, from intersecting roads, highway, or trail crossings and could cross roads to minimize or avoid impacts.

4.2.7 Erosion Control

The permittee shall follow standard erosion control measures outlined in Minnesota Pollution Control Agency (MPCA) guidance and best management practices regarding sediment control practice during construction include protecting storm drain inlets, use of silt fences, protecting exposed soil, immediately stabilizing restored soil, controlling temporary soil stockpiles, and controlling vehicle tracking.

The permittee shall implement reasonable measures to minimize runoff during construction and shall promptly plant or seed, erect sediment control fences (e.g. biorolls, sandbags, and silt fences), apply mulch (e.g. hay or straw) on exposed soils, and/or use erosion control blankets and turf reinforcement mats to provide structural stability to bare surfaces and slopes.

When utilizing seed to establish temporary and permanent vegetative cover on exposed soil, the permittee shall consult with (Mn/DOT) and Minnesota Department of Natural Resources (DNR) to select specific site characteristic seed certified to be free of noxious weeds.

Contours shall be graded as required so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate re-vegetation, provide for proper drainage, and prevent erosion. All areas disturbed during construction of the facilities shall be returned to their pre-construction condition.

Where larger areas of one acre or more (substation site) are disturbed or other areas designated by the MPCA, the permittee shall prepare the required Stormwater Pollution Prevention Plan (SWPPP) and obtain a National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) construction stormwater permit from the MPCA.

4.2.8 Wetlands and Water Resources

Structures shall be located to span watercourses, wetlands, and floodplains to the extent practicable and consistent with sound engineering principles. Minimal grading of areas around pole locations may be required to accommodate construction vehicles and equipment.

The permittee shall endeavor to access wetlands and riparian areas using the shortest route possible in order to minimize travel through wetland areas and prevent unnecessary impacts wherever possible.

Construction in wetlands and riparian areas shall be scheduled during frozen ground conditions, when practicable. When construction during winter is not possible, construction mats (wooden mats or a composite mat system) shall be used to protect wetland vegetation. All-terrain construction vehicles designed to minimize soil impact in damp areas may also be used.

No staging or stringing set up areas shall be placed within or adjacent to wetlands or water resources, as practicable. The structures shall be assembled on upland areas before they are brought to the site for installation.

Soil excavated from the wetlands and riparian areas shall be contained and not placed back into the wetland or riparian area. The permittee shall also utilize erosion control methods identified in Section 4.2.7 (Erosion Control), as warranted. Areas disturbed by construction activities shall be restored to pre-construction conditions (soil horizons, contours, vegetation, etc.).

4.2.9 Temporary Work Space

The permittee shall limit temporary easements to special construction access needs and additional staging or lay-down areas required outside of the authorized right-of-way. Space shall be selected to limit the removal and impacts to vegetation.

Temporary lay down areas outside of the authorized transmission line right-of-way will be obtained from affected landowners through rental agreements and are not provided for in this permit.

Temporary driveways may be constructed between the roadway and the structures to minimize impact by using the shortest route possible. Construction mats may also be used to minimize impacts on access paths and construction areas.

4.2.10 Restoration

The permittee shall restore the right-of-way, temporary work spaces, access roads, abandoned right-of-way, and other public or private lands affected by construction of the transmission line. Practices to restore areas impacted by construction and maintenance activities are also described in Section 4.2.7 of this permit.

Restoration within the right-of-way must be compatible with the safe operation, maintenance, and inspection of the transmission line.

Within 60 days after completion of all restoration activities, the permittee shall advise the Commission in writing of the completion of such activities. The permittee shall compensate landowners for any yard/landscape, crop, soil compaction, drain tile, or other damages that may occur during construction.

4.2.11 Notice of Permit

The permittee shall inform all employees, contractors, and other persons involved in the transmission line construction of the terms and conditions of this permit.

4.3 Periodic Status Reports

The permittee shall report to the Commission on progress regarding finalization of the route, design of structures, and construction of the transmission line. The permittee need not report more frequently than weekly. At the request of the Commission, the permittee shall report to the Commission on progress regarding finalization of the route and design of structures.

4.4 Complaint Procedures

Prior to the start of construction, the permittee shall submit to the Commission the procedures that will be used to receive and respond to complaints. The procedures shall be in accordance with the requirements set forth in the complaint procedures attached to this permit.

4.5 Notification to Landowners

The permittee shall provide all affected landowners with a copy of this permit and the complaints procedures at the time of the first contact with the landowners after issuance of this permit. At the time of first contact, the permittee shall also provide all affected landowners with a copy of the *Landowner Guide to Easements* publication provided by the Department of Commerce.

The permittee shall contact landowners prior to entering the property or conducting maintenance along the route. The permittee shall avoid construction and maintenance practices, particularly the use of fertilizer, herbicides or other pesticides, that are inconsistent with the landowner's or tenant's use of the land (See also, Section 4.2.5).

The permittee shall work with landowners to locate the high-voltage transmission lines to minimize the loss of agricultural land, forest, and wetlands, and to avoid homes and farmsteads.

4.6 Completion of Construction

4.6.1 Notification to Commission

At least three days before the line is to be placed into service, the permittee shall notify the Commission of the date on which the line will be placed into service and the date on which construction was complete.

4.6.2 As-Builts

Within 60 days after completion of construction, the permittee shall submit copies of all the final as-built plans and specifications developed during the project.

4.6.3 GPS Data

Within 60 days after completion of construction, the permittee shall submit to the Commission, in the format requested by the Commission, geo-spatial information (ArcGIS compatible map files, GPS coordinates, associated database of characteristics, etc.) for all structures associated with the transmission lines, each switch, and each substation connected.

4.7 Electrical Performance Standards.

4.7.1 Grounding

The permittee shall design, construct, and operate the transmission line in a manner that the maximum induced steady-state short-circuit current shall be limited to five milliamperes (mA), root mean square (rms) alternating current between the ground and any non-stationary object within the right-of-way, including but not limited to large motor vehicles and agricultural equipment. All fixed metallic objects on or off the right-of-way, except electric fences that parallel or cross the right-of-way, shall be grounded to the extent necessary to limit the induced short-circuit current between ground and the object so as not to exceed one mA rms under steady state conditions of the transmission line and to comply with the ground fault conditions specified in the NESC. The permittee shall address and rectify any induced current problems that arise during transmission line operation.

4.7.2 Electric Field

The transmission line shall be designed, constructed, and operated in such a manner that the electric field measured one meter above ground level immediately below the transmission line shall not exceed 8.0 kV/m rms.

4.7.3 Interference with Communication Devices

If interference with radio or television, satellite, wireless internet, GPS-based agriculture navigation systems or other communication devices is caused by the presence or operation of the transmission line, the permittee shall take whatever action is prudently feasible to restore or provide reception equivalent to reception levels in the immediate area just prior to the construction of the line.

4.8 Other Requirements.

4.8.1 Applicable Codes

The permittee shall comply with applicable requirements of the NESC including clearances to ground, clearance to crossing utilities, clearance to buildings, right-of-way widths, erecting power poles, and stringing of transmission line conductors. The transmission line facility shall also meet the NERC reliability standards.

4.8.2 Other Permits

The permittee shall comply with all applicable state rules and statutes. The permittee shall obtain all required local, state and federal permits for the project and comply with the conditions of these permits. A list of the required permits is included in the route permit application and the environmental assessment. The permittee shall submit a copy of such permits to the Commission upon request.

4.8.3 Pre-emption

Pursuant to Minnesota Statutes 216E.10, subdivisions 1 and 2, this route permit shall be the sole route approval required to be obtained by the permittee and this permit shall supersede and preempt all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government.

4.8.4 Delay in Construction

If the permittee has not commenced construction or improvement of the route within four years after the date of issuance of this permit, the Commission shall consider suspension of the permit in accordance with Minnesota Rule 7850.4700.

5 SPECIAL CONDITIONS

The permittee shall provide a report to the Commission as part of the plan and profile submission that describes the actions taken and mitigative measures developed regarding the project and the following Special Conditions.

5.1 Tauber Property

In the vicinity of the Tauber Property, the permittee shall work with Benton County to place new pole structures within the existing County Road 29 right-of-way as close to the road as is allowable, hang conductors on the road side so that they are further away from the home, and otherwise design structures so that right-of-way width of 75 feet can be reduced along this specific portion of the route, allowing the new pole structures to span the parcel and stay along the County Road 29 roadway.

5.2 Contamination Survey

The permittee, in consultation with the MPCA, shall identify any contaminated sites as it performs its detailed survey and acquisition work prior to the submittal of the final plan and profile to the Commission.

5.3 Archaeological and Historic Resources

The permittee shall consult with the Minnesota State Historic Preservation Office (SHPO) once detailed survey and acquisition work has been performed, and prior to the submittal of the final plan and profile to determine the need and extend of survey work that may be required for the project.

The permittee shall make every effort to avoid impacts to identified archaeological and historic resources when installing the high-voltage transmission line on the approved route. In the event that a resource is encountered, the SHPO should be contacted and consulted; the nature of the resource should be identified; and a determination should be made on the eligibility for listing in the National Register of Historic Places. Where feasible, avoidance of the resource is required.

5.4 Avian Mitigation

The permittee's standard transmission design shall incorporate adequate spacing of conductor(s) and grounding devices in accordance with Avian Power Line Interaction Committee standards to eliminate the risk of electrocution to raptors with larger wingspans that may simultaneously come in contact with a conductor and grounding devices.

The permittee shall site the route to avoid tree and shrub removal at the wooded wet swale north and south of Golden Spike Road at the U.S. Highway 10 interchange, where an important wetland corridor exists; attach kestrel nest boxes to power poles, one every one-half mile, along U.S. Highway 10, particularly between Benton Drive and Golden Spike Road, where American kestrels are known to occur; and in consultation with the DNR, incorporate swan flight diverters every 25 feet along the route staggering them between the lines for trumpeter swans, Canada geese and sandhill cranes, three species identified in areas that are of particular concern.

5.5 Blanding's Turtle

The permittee shall follow measures and recommendations for avoiding and minimizing impacts to Blanding's turtle populations as outlined in the *Minnesota Department of Natural Resources Division of Ecological Resources Environmental Review Fact Sheet Series for Blanding's Turtle* (http://files.dnr.state.mn.us/natural_resources/animals/reptiles_amphibians/turtles/blandings_turtle/factsheet.pdf) . Construction and maintenance personnel shall be made aware of the Blanding's turtle and their habitat during pre-construction meetings.

6 PERMIT AMENDMENT

The permit may be amended at any time by the Commission. Any person may request an amendment of the conditions of this permit by submitting a request to the Commission in writing describing the amendment sought and the reasons for the amendment. The Commission will mail notice of receipt of the request to the permittee. The Commission may amend the conditions after affording the permittee and interested persons such process as is required.

7 TRANSFER OF PERMIT

The permittee may request at any time that the Commission transfer this permit to another person or entity. The permittee shall provide the name and description of the person or entity to whom the permit is requested to be transferred, the reasons for the transfer, a description of the facilities affected, and the proposed effective date of the transfer.

The person to whom the permit is to be transferred shall provide the Commission with such information as the Commission shall require to determine whether the new permittee can comply with the conditions of the permit. The Commission may authorize transfer of the permit after affording the permittee, the new permittee, and interested persons such process as is required.

8 REVOCATION OR SUSPENSION OF THE PERMIT

The Commission may initiate action to revoke or suspend this permit at any time. The Commission shall act in accordance with the requirements of Minnesota Rule 7850.5100 to revoke or suspend the permit.