Based on the information gathered from the public meeting and the agencies, the Company finalized its route proposal as detailed in this Application. The proposed route is preferred as compared to the other routes analyzed. The Company believes its proposed route is best suited for the Project Area as compared to the other alternatives. A summary of the factors supporting this route are as follows:

- Sharing road right-of-way and following existing property lines and fence lines helped to minimize land use impacts. Approximately 85.8% of the route shares road right-of-way and 22.0% follows existing property lines, fence lines, or drainage ditches for a total of 97.8%.
- Impacts to residences are minimized.
- Environmental impacts are minimized.
- The route minimizes length of the proposed line and therefore maintains lower costs relative to other longer alternatives. The proposed route is approximately 2% shorter when compared to the average length of all 37 alternatives evaluated.
- The route will not conflict with MMU's potential use of the MMU Easement for an anticipated fourth source (power supply) for the City of Marshall. Double circuit structures will be installed in the MMU Shared Easement Area (for approximately one half-mile). As a result, the line proposed in this Application and the new MMU 115 kV source could be constructed on the same poles without impacting reliability.

4.3.1 Consideration of Route Alternatives

In selecting the route proposed in this Application, the Company evaluated many routes that were identified between the Lake Yankton and Southwest Marshall Substations. In all, 37 potential route alternatives were evaluated. In performing the route analysis, many considerations were evaluated including social, environmental, and engineering-related categories. The criteria for which the potential routes were evaluated were further defined by a number of factors within each category. Factors included, for example, proximity to residential or commercial structures, proximity to areas of archaeological or historical significance, proximity to wetlands or protected waters, and several engineering design related factors.

The Project Area was divided into segments. Segment data was compiled for the factors defined within each category. This information served as the basis for comparing the potential routes and consequently identifying the proposed route. The potential routes were each comprised of a unique combination of segments that were defined in the Project Area.

In conjunction with the route analysis described above, the Company analyzed several alternative routes for moving south and west of the Southwest Marshall Substation to the west, through Section 18 of Lake Marshall Township and to the west end of Section 17 of Lake Marshall Township. The purpose of this analysis was to evaluate options through the more densely populated areas and the planned growth areas in the County. Table 3 provides a comparison of the proposed route and the alternatives through Sections 17 and 18. See Appendix B.5-2, "Section 17 and 18 Preliminary Route Details".

TABLE 3
SECTIONS 17, 18, MARSHALL TOWNSHIP ROUTE ANALYSIS

Evaluation Criteria	Route Name						
	Proposed Route	Alter-native A-1 (*2)	Alter-native B	Alter-native C-1	Alter-native C-2	Alter-native D-1	Alter-native D-2
Residences within 100 feet	0	0	4	1	1	1	1
Residences within 100-200 feet	0	12	0	8	6	1	1
Businesses within 200 feet	1	0	2	0	0	0	1
Length along existing or natural corridor (feet)	8,878	12,575	8,915	8,733	6,210	7,782	6,917
Length across agricultural land (feet)	2,900	0	2,089	3,990	4,427	3,642	5,068
Total Length (feet)	11,778	12,575	11,004	12,723	10,637	11,424	11,985
City/County zoning designation	(*1)	(*1)	(*1)	(*1)	(*1)	(*1)	(*1)
Length along Phase 2 or Phase 3 Distribution	582	9,209	2,016	7,941	5,301	0	0

*1 The City portion of the alternative is classified as "Not in Anticipated Growth Area. Future Land Use is Agricultural". The County portion of the alternative is classified as "Planned Growth Area".

*2 If the line were constructed along this route, it is unlikely that a fourth MMU source could be double circuited on the same structures as the Lake Yankton – Marshall 115 kV line because more than one mile of double circuiting would be required and negatively impact system reliability.

4.3.2 REJECTED ROUTE ALTERNATIVES

The Company evaluated 37 alternative route configurations for the Project. The segment maps in Appendix B.4-1 through B.4-4 show the location of the segments which define each alternative.

The majority of the comments received focused on the northern portion of the route. For this area, the six alternatives proposed by landowners, as shown on Figure 2, were analyzed. The location of the route alternatives through Sections 17 and 18, Lake Marshall Township, near the Southwest Marshall Substation and the Klein Addition is presented in Appendix B.5-2. The Company rejected a number of alternatives based on the routing analysis performed. The Company believes its proposed route is best suited for the Project Area as compared to the other routes. The proposed route was selected over other alternatives based on the following key factors:

- Alternative Route A-1 was rejected because it would impact 12 homes located within 200 feet of the line.
- Alternative Route B was rejected because there are four homes located within 100 feet of the line.
- Alternative Route C-1 was rejected because there are nine homes located within 200 feet of the line, including one home within 100 feet and because it would impact agricultural land and interfere with farming operations.
- Alternative Route C-2 was rejected because there are seven homes within 200, including one within 100 feet of the line and because the route would diagonally bisect agricultural land, interfering with farming operations.
- Alternative Route D-1 and D-2 were rejected because there are two homes within 200 feet of the route, including one home within 100 feet. These alternatives would impact farming operations near the Southwest Marshall Substation

and also near the Klein Addition. Additional impacts would occur to the property in Section 18, Marshall Township, owned by Gregg Mathiowetz. He stated that the placement of the line as proposed in Alternative Routes D-1 and D-2 would limit his development options.

In each case, the proposed route provides for fewer/reduced impacts, thus causing the alternatives to be rejected.

4.4 Design Options to Accommodate Future Expansion

The northern approximately one-half mile of the route will be constructed using double circuited structures to accommodate a future 115 kV line in the Marshall area. MMU has indicated that they may build a future 115 kV line from the Southwest Marshall Substation to the Lyon County Substation (fourth power supply source). There are no studies or firm plans at this time that indicate when this fourth source line would be built. However, as noted above, MMU has acquired an easement in anticipation of this new source. The route proposed in this Application gives due consideration to the potential consolidation of these MMU facilities for a portion of the route.

5.0 ENGINEERING DESIGN, CONSTRUCTION AND RIGHT-OF-WAY ACQUISITION

5.1 TRANSMISSION DESIGN AND RIGHT-OF-WAY ACQUISITION

5.1.1 TRANSMISSION STRUCTURES AND RIGHT-OF-WAY DESIGN

Transmission Structures

For the majority of the route, the proposed structures are galvanized or weathering steel, single circuit poles with horizontal post insulators (as shown in Figure 3). For the approximately one-half mile segment west of the Southwest Marshall Substation, double circuit structures will be used (as shown in Figure 4), but a conductor will be strung on only one side of the poles. The conductor will be 795 kcmil 26/7 ACSS.

Table 4 summarizes the structure designs and foundation for the line:

TABLE 4
STRUCTURE DESIGN SUMMARY

Project Component	Line Voltage	Structure Type	Pole Type	Conductor	Foundation	Double Circuit / Single Circuit	Average Span Length	Average Height (feet)
Single Circuit	115 kV	Horizontal Posts	Steel	795 kcmil 26/7 ACSS	Direct Embedded	Single	400 feet	75
Double Circuit	115 kV	Davit Arm	Steel	795 kcmil 26/7 ACSS, one side	Concrete	Double	400 feet	85

The proposed transmission line and modifications to the Lake Yankton Substation will be designed to meet or surpass all relevant local and state codes, the National Electric Safety Code ("NESC"), North American Electric Reliability Corporation ("NERC") requirements and Company standards. Appropriate standards will be met for construction and installation and all applicable safety procedures will be followed during and after installation.

FIGURE 3
115 KV SINGLE-CIRCUIT HORIZONTAL LINE POST STRUCTURE

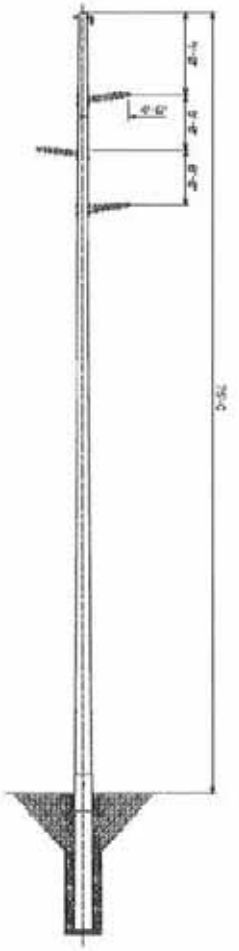
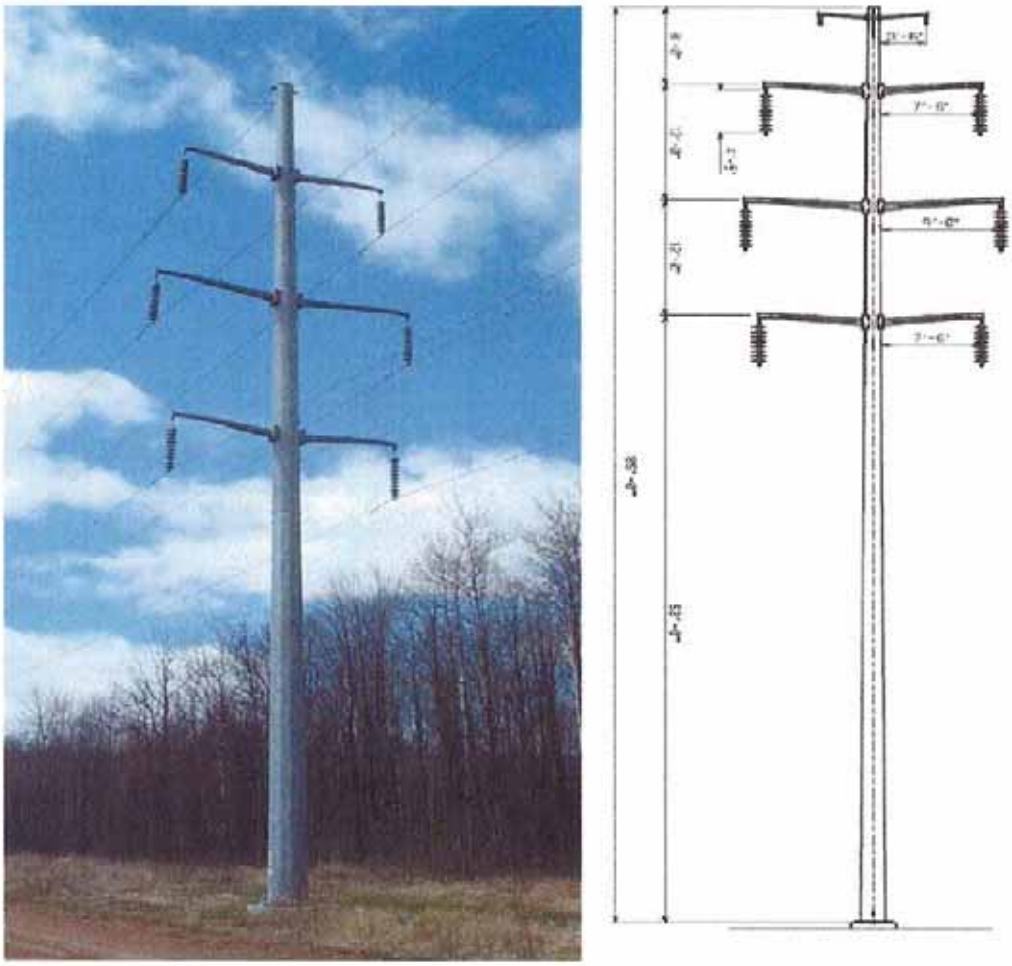


FIGURE 4
DOUBLE CIRCUIT STRUCTURE AND DESIGN[2]



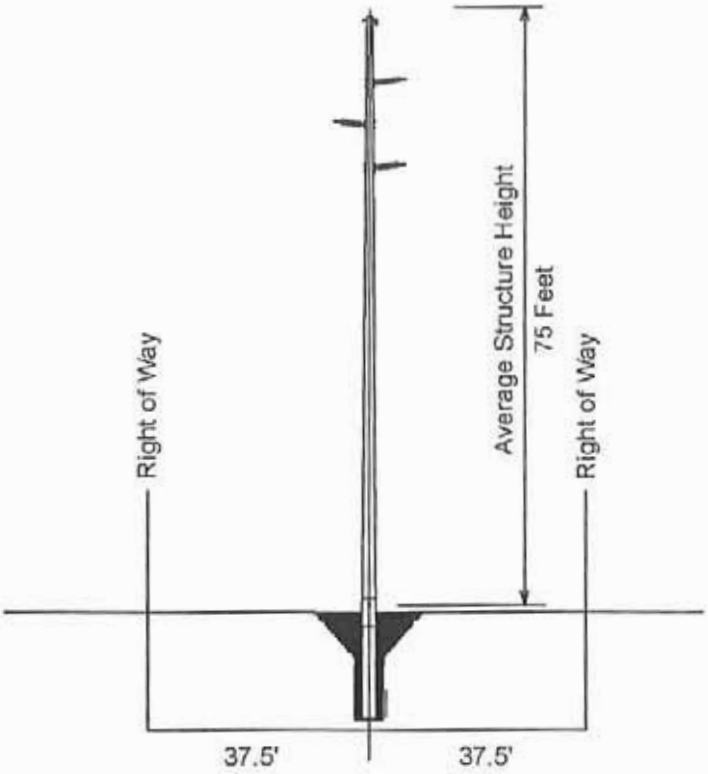
Right-of-Way

The 115 kV transmission line will require a 75-foot right-of-way. When the line is not adjacent to a roadway, the Company will require a 75-foot easement from the landowner. When the line is adjacent to a roadway, the line will share the existing

[2] The double circuit structures proposed in this Application will have conductors placed on one side only for the Lake Yankton to Marshall transmission line.

road right-of-way, an easement of lesser width will be required from the landowner depending on road configuration and structure requirements.

FIGURE 5
Right-of-Way Requirements



115kV Line Typical Structure
75' Typical Total Right-of-Way Width

5.1.2 Right-of-Way Evaluation and Acquisition

The right-of-way acquisition process begins early in the detailed design process. For transmission lines, utilities typically acquire easement rights across the parcels to accommodate the facilities. The evaluation and acquisition process include title examination, initial owner contacts, survey work, document preparation, and purchase. Each of these activities, particularly as it applies to easements for transmission line facilities, is described in more detail below.

The first step in the right-of-way process is to identify all persons and entities that may have a legal interest in the real estate upon which the facilities will be built. To compile this list, a right-of-way agent or other persons engaged by the utility will 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 of the property, and to gather information regarding easements, liens, restriction, encumbrances, and other conditions of record.

After owners are known, a right-of-way representative personally contacts each property owner or the property owner's representative. The right-of-way agent describes the need for the transmission facilities and how the specific project may affect each parcel. The right-of-way agent also seeks information from the landowner about any specific construction concerns. This contact is typically made after a route permit is issued for a project, but may occur earlier in some instances.

The next step in the acquisition process is evaluation of the specific parcel. For this work, the right-of-way agent will request permission from the owner for survey crews to enter the property to conduct preliminary survey work. Permission may also be requested to take soil borings to assess the soil conditions and determine appropriate foundation design. Surveys are conducted to locate the right-of-way corridors, natural features, man-made features, and associated elevations for use during the detailed engineering of the line. The soil analysis is performed by an experienced geotechnical testing laboratory.

During the evaluation process, the location of the proposed transmission line will be staked. This means that the survey crew locates each structure or pole on the ground and places a surveyor's stake to mark the structure's location. By doing this, the right-of-way agent can show the landowner exactly where the structure(s) will be located on the property. The right-of-way agent also delineates the boundaries of easement area required for safe operation of the lines.

The right-of-way agent then negotiates with the property owner(s) to determine the amount of just compensation for the rights to build, operate, and maintain the transmission facilities within the easement area and reasonable access to the easement area. The agent will also provide maps of the line route or site, maps showing the

landowner's parcel, and offer compensation for the transmission line easement. In the event that a complicated appraisal problem should arise, an appraisal is completed by the utility's representative(s) to determine the value of the rights being acquired. The landowner is allowed a reasonable amount of time in which to consider the offer and to present any material that the owner believes is relevant to determining the property's value.

If the landowner desires a second opinion as to the fair market value of the property to be taken, the landowner may have an appraisal made. The landowner is reimbursed up to $500 toward the appraiser fee as long as the appraisal follows standard and accepted appraisal practices (Minn. Stat. §117.189).

In nearly all cases, utilities are able to work with the landowners to address their concerns and an agreement is reached for the utilities' purchase of land rights. The right-of-way agent prepares all of the documents required to complete each transaction. Some of the documents that may be required include: easement, purchase agreement or contract, and deed.

In rare instances, a negotiated settlement cannot be reached and the landowner chooses to have an independent third party determine the value of the rights taken. Such valuation is made through the utility's exercise of the right of eminent domain pursuant to Minnesota Statutes Chapter 117. The process of exercising the right of eminent domain is called condemnation.

To start the condemnation process, a utility files a Petition in the district court where the property is located and serves that Petition on all owners of the property. If the court approves the Petition, the court then appoints a three-person condemnation "commission." The three people must be knowledgeable of applicable real estate issues. Once appointed, the commissioners schedule a viewing of the substation location or property over and across which the transmission line easement is to be located. Next, the commission schedules a valuation hearing where the utility and landowners can testify as to the fair market value of the easement or fee. The commission then makes an award as to the value of the property acquired and files it with the court. Each party has 40 days from the filing of the award to appeal to the district court for a jury trial. In the event of an appeal, the jury hears land value

evidence and renders a verdict. At any point in this process, the case can be dismissed if the parties reach a settlement.

Once right-of-way is acquired and prior to construction, the right-of-way agent will again contact the owner of each parcel to discuss the construction schedule and construction requirements. To ensure safe construction of the line, special consideration may be needed for fences, crops or livestock. For instance, fences may need to be moved or temporary or permanent gates may need to be installed; crops may need to be harvested early; and livestock may need to be moved. In each case the right-of-way agent coordinates these processes with the landowner.

5.1.3 Transmission Construction Procedures

Construction will begin after federal, state and local approvals are obtained, property and rights-of-way are acquired, soil conditions are established and final design is completed. The precise timing of construction will take into account various requirements that may be in place due to permit conditions, system loading issues and available workforce.

The actual construction will follow standard construction and mitigation practices that were developed from experience with past projects. These best practices address right-of-way clearance, staging, erecting transmission line structures and stringing transmission lines. Construction and mitigation practices to minimize impacts will be developed based on the proposed schedule for activities, permit requirements, prohibitions, maintenance guidelines, inspection procedures, terrain and other practices. In some cases these activities, such as schedules, are modified to minimize impacts to sensitive environments.

Transmission line structures are generally designed for installation at existing grades. Typically, structure sites with 10% or less slope will not be graded or leveled. Sites with more than 10% slope will have working areas graded level or fill brought in for working pads. If the landowner permits, it is preferred to leave the leveled areas and working pads in place for use in future maintenance activities, if any. If permission is not obtained, the site is graded back to its original condition as much as possible and all imported fill is removed from the site.

Typical construction equipment used on a project consists of 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. Many types of excavation equipment are set on wheel or track-driven vehicles. Steel poles are transported on tractor-trailers.

Staging areas are usually established for the project. Staging involves delivering the equipment and materials necessary to construct the new transmission line facilities. Construction of the project would likely include one or two staging areas. The materials are stored at staging areas until they are needed for the project.

Temporary lay down areas may be required for additional space for storage during construction. These areas will be selected for their location, access, security and ability to efficiently and safely warehouse supplies. The areas are chosen to minimize excavation and grading. The temporary lay down areas outside of the transmission line right-of-way will be obtained from affected landowners through rental agreements.

Access to the transmission line right-of-way corridor is made directly from existing roads or trails that run parallel or perpendicular to the transmission line right-of-way. In some situations, private field roads or trails are used. Permission from the property owner is obtained prior to accessing the transmission line corridor. Where necessary to accommodate the heavy equipment used in construction, including cranes, cement trucks and hole drilling equipment, existing access roads may be upgraded or new roads may be constructed. New access roads may also be constructed when no current access is available or the existing access is inadequate to cross roadway ditches.

When it is time to install the poles, structures are moved from the staging areas, and delivered to the staked location. The structures are placed within the right-of-way until the structure is set. Insulators and other hardware are attached while the steel pole is on the ground. The pole is then lifted, placed and secured on the foundation using a crane.

Typical tangent and angle structures will be installed by direct embedding them into the ground. This method typically involves digging a hole for each pole, filling it partially with crushed rock and then setting the pole on top of the rock base. The area around the pole is then backfilled with crushed rock and/or soil. Structures that are considered medium angle, heavy angle or deadend structures will have concrete foundations. In those cases, holes will need to be drilled in preparation for the concrete. Drilled pier foundations may vary from five- to seven-feet in diameter and 12 or more feet deep, depending on soil conditions. Concrete trucks are required to bring the concrete in from a local concrete batch plant.

Environmentally sensitive areas and wetland areas may also require special construction techniques in some circumstances. During construction, the most effective way to minimize impacts to wet areas will be to span all streams and rivers. In addition, Xcel Energy will not allow construction equipment to be driven across waterways except under special circumstances and only after discussion with the appropriate resource agency. Where waterways must be crossed to pull in the new conductors and shield wires, workers may walk across, use boats, or drive equipment across ice in the winter. These construction practices help prevent soil erosion and ensure that equipment fueling and lubricating will occur at a distance from waterways.

If impacts to wetlands occur, they will be minimized through construction practices. Construction crews will maintain sound water and soil conservation practices during construction and operation of the facilities to protect topsoil and adjacent water resources and minimize soil erosion. Practices may include containing excavated material, protecting exposed soil and stabilizing restored soil. Crews will avoid major disturbance of individual wetlands and drainage systems during construction. This will be accomplished by strategically locating new access roads and spanning wetlands and drainage systems where possible. When it is not feasible to span the wetland, construction crews will rely on several options during construction to minimize impacts:

- When possible, construction will be scheduled during frozen ground conditions.
- Crews will attempt to access the wetland with the least amount of physical impact to the wetland (i.e., shortest route).

- The structures will be assembled on upland areas before they are brought to the site for installation.

When construction during winter is not possible, construction mats will be used where wetlands would be impacted.

5.1.4 Restoration Procedures

During construction, crews will attempt to limit ground disturbance wherever possible. However, areas are disturbed during the normal course of work, which can take several weeks in any one location. As construction on each parcel is completed, disturbed areas are restored to their original condition to the maximum extent practicable. The right-of-way agent contacts each property owner after construction is completed to see if any damage has occurred as a result of the project. If damage has occurred to crops, fences or the property, Applicants will fairly reimburse the landowner for the damages sustained. In some cases, Applicants may engage an outside contractor to restore the damaged property to as near as possible to its original condition. Portions of vegetation that are disturbed or removed during construction of transmission lines will naturally reestablish to pre-disturbance conditions. Resilient species of common grasses and shrubs typically reestablish with few problems after disturbance. Areas with significant soil compaction and disturbance from construction activities along the proposed transmission line corridor will require assistance in reestablishing the vegetation stratum and controlling soil erosion. Commonly used methods to control soil erosion and assist in reestablishing vegetation include, but are not limited to:

- Erosion control blankets with embedded seeds
- Silt fences
- Hay bales

These erosion control and vegetation establishment practices are regularly used in construction projects and are referenced in the construction permit plans. Long-term impacts are minimized by utilizing these construction techniques.

5.1.5 Maintenance Procedures

Transmission lines and substations are designed to operate for decades and require only moderate maintenance, particularly in the first few years of operation.

The estimated service life of the proposed transmission line for accounting purposes is approximately 40 years. However, practically speaking, high voltage transmission lines are seldom completely retired. Transmission infrastructure has very few mechanical elements and is built to withstand weather extremes that are normally encountered. With the exception of severe weather such as tornadoes and heavy ice storms, transmission lines rarely fail. Transmission lines are automatically taken out of service by the operation of protective relaying equipment when a fault is sensed on the system. Such interruptions are usually only momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure is very high, in excess of 99%.

The principal operating and maintenance cost for transmission facilities is the cost of inspections, usually done monthly by air. Annual operating and maintenance costs for transmission lines in Minnesota and the surrounding states vary. For voltages from 115 kV through 345 kV, Company experience shows that cost are approximately $300 to $500 per mile. Actual line-specific maintenance costs depend on the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used, and the age of the line.

Substations require a certain amount of maintenance to keep them functioning in accordance with accepted operating parameters and the NESC and NERC requirements. Transformers, circuit breakers, batteries, protective relays, and other equipment need to be serviced periodically in accordance with the manufacturer's recommendation. The site itself must be kept free of vegetation and drainage maintained.

5.2 Electric and Magnetic Fields

The term EMF refers to electric and magnetic fields that are coupled together such as in high frequency radiating fields. For the lower frequencies associated with power lines, EMF should be separated into electric and magnetic fields. Electric and

magnetic fields arise from the flow of electricity and the voltage of a line. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors. Transmission lines operate at 60 hertz (cycles per second).

5.2.1 Electric Fields

Voltage on any wire (conductor) produces an electric field in the area surrounding the wire. The electric field associated with a high voltage transmission line extends from the energized conductors to other nearby objects such as the ground, towers, vegetation, buildings, and vehicles. The electric field from a power line gets weaker as it moves away from the line. Nearby trees and building material also greatly reduce the strength of power line electric fields.

The intensity of electric fields is associated with the voltage of the line and is measured in kilovolts per meter (kV/m). Power line electric fields near ground are designated by the difference in voltage between two points (usually 1 meter). Table 5 provides the electric fields at maximum conductor voltage for the proposed 115 kV transmission line. Maximum conductor voltage is defined as the nominal voltage plus five percent.

TABLE 5
CALCULATED ELECTRIC FIELDS (KV/M) FOR PROPOSED 115 KV TRANSMISSION LINE DESIGNS
(3.28 FEET ABOVE GROUND)

Structure Type	Voltage	Distance to Proposed Centerline								
		-300'	-200'	-100'	-37.5'	0'	37.5'	100'	200'	300'
Single Circuit 115kV Steel Pole Horizontal Post	121 kV	0.005	0.012	0.047	0.296	1.113	0.285	0.053	0.013	0.006
Double Circuit 115kV Steel Pole with Davit Arms	121 kV	0.002	0.005	0.019	0.236	0.780	0.236	0.019	0.005	0.002

The proposed 115 kV single circuit transmission line will have a maximum electric field density of approximately 0.73 kV per meter, ten feet from centerline on the side of the structure with two phases, one meter above ground. This is significantly less

than the maximum limit of 8 kV per meter that has been a permit condition imposed by the Minnesota Environmental Quality Board ("EQB") in other high voltage transmission line routing proceedings. (The EQB's authority over electric transmission line routing transferred to the Commission in 2005 pursuant to Minn. Stat. § 216E.02, subd. 2.) The Minnesota EQB standard was designed to prevent serious hazard from shocks when touching large objects, such as tractors, parked under extra high voltage transmission lines of 500 kV or greater.

5.2.2 MAGNETIC FIELDS

Magnetic Fields are the result of the flow of electricity or current that travels along transmission lines, distribution (feeder) lines, substation transformers, house wiring, and household electrical appliances. The intensity of a magnetic field is related to the current flow through the conductors (wire).

Considerable research has been conducted throughout the past three decades to determine whether exposure to power-frequency (60 hertz) electric and magnetic fields causes biological responses and health effects. Epidemiological and toxicological studies have shown no statistically significant association or weak associations between EMF exposure and health risks.

In 1999, the National Institute of Environmental Health Sciences ("NIEHS") issued its final report on "Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields" in response to the Energy Policy Act of 1992. NIEHS concluded that the scientific evidence linking EMF exposures with health risks is weak and that this finding does not warrant aggressive regulatory concern. However, because of the weak scientific evidence that supports some association between EMF and health effects, and the common exposure to electricity in the United States, passive regulatory action, such as providing public education on reducing exposures, is warranted.

Minnesota, California, and Wisconsin have all recently conducted literature reviews or research to examine this issue. In 2002, Minnesota formed an Interagency Working Group ("Working Group") to evaluate the body of research and develop policy recommendations to protect the public health from any potential problems resulting from high voltage transmission line EMF effects. The Working Group consisted of

staff from various state agencies. The Working Group published its findings in a *White Paper on EMF Policy and Mitigation Options* in September 2002, Minnesota Department of Health, 2002. The report summarized the findings of the Working Group as follows:

> Research on the health effects of EMF has been carried out since the 1970s. Epidemiological studies have mixed results — some have shown no statistically significant association between exposure to EMF and health effects, some have shown a weak association. More recently, laboratory studies have failed to show such an association, or to establish a biological mechanism for how magnetic fields may cause cancer. A number of scientific panels convened by national and international health agencies and the United States Congress have reviewed the research carried out to date. Most researchers concluded that there is insufficient evidence to prove an association between EMF and health effects; however, many of them also concluded that there is insufficient evidence to prove that EMF exposure is safe.

Id. at p. 1. The Minnesota EQB addressed the matter of EMF with respect to new transmission lines in a number of separate dockets over the past few years. See Docket Nos. 03-64-TR-XCEL (161 kV Lakefield Junction to Fox Lake 161 kV line); 03-73-TR XCEL (Lakefield Junction to Split Rock 345 kV line); 04-84-TR-XCEL (Buffalo to White 115 kV line) and 04-81-TR-Air Lake-Empire (115 kV line in Dakota County). The findings of the EQB and the discussion in the Environmental Assessments prepared on each of those projects are pertinent to this issue with respect to the proposed projects. Documents from those matters are available on the MPUC webpage: www.energyfacilities.puc.state.mn.us.

In June 2005, in Docket No. 03-73-TR-XCEL for the 345 kV Buffalo Ridge line, the EQB made the following findings with regard to EMF:

> 118. No significant impacts on human health and safety are anticipated from the Project. There is at present insufficient evidence to demonstrate a cause and effect relationship between EMF exposure and any adverse health effects. The EQB has not established limits on

magnetic field exposure and there are no Federal or Minnesota health-based exposure standards for magnetic fields. There is uncertainty, however, concerning long term health impacts and the Minnesota Department of Health and the EQB all recommend a "prudent avoidance" policy in which exposure is minimized.

Table 6 provides the estimated magnetic fields based on the proposed line and structure design. The expected magnetic field for the proposed structure type and phase current has been calculated at various distances from the center of the pole in milligauss.

TABLE 6
CALCULATED MAGNETIC FLUX DENSITY (MILLIGAUSS) FOR PROPOSED 115 KV TRANSMISSION LINE DESIGNS (3.28 FEET ABOVE GROUND)

Structure Type	System Condition	Current (Amps)	Distance to Proposed Centerline								
			-300'	-200'	-100'	-37.5'	0'	37.5'	100'	200'	300'
Single Circuit 115 kV Steel Pole Horizontal Post	Peak	237	0.26	0.36	1.94	9.10	27.59	9.90	1.88	0.47	0.20
	Average	142	0.16	0.33	1.16	5.46	16.53	5.93	1.12	0.28	0.12
Double Circuit 115kV Steel Pole with Davit Arms	Peak	237	0.07	0.17	1.00	8.77	30.84	8.46	0.92	0.15	0.07
	Average	142	0.04	0.10	0.60	5.26	18.48	5.07	0.55	0.09	0.04

5.2.3 STRAY VOLTAGE

"Stray voltage" is a condition that can occur on the electric service entrances to structures from distribution lines, not transmission lines. More precisely, stray voltage is a voltage that exists between the neutral wire of the service entrance and grounded objects in buildings such as barns and milking parlors. Transmission lines do not, by themselves, create stray voltage because they do not connect to businesses or residences. Transmission lines, however, can induce stray voltage on a distribution circuit that is parallel to and immediately under the transmission line. Appropriate measures will be taken to prevent stray voltage problems when the transmission lines proposed in this Application are parallel to or cross distribution lines.

Farming Operations, Vehicle Use and Metal Buildings Near Power Lines

Insulated electric fences used in livestock operations can pick up an induced charge from transmission lines. Usually, the induced charge will drain off when the charger unit is connected to the fence. When the charger is disconnected either for maintenance or when the fence is being built, shocks may result. Potential shocks can be prevented by using a couple of methods: i) one or more of the fence insulators can be shorted out to ground with a wire when the charger is disconnected or ii) an electric filter can be instilled that grounds out charges induced from a power line while still allowing the charger to be effective.

Farm equipment, passenger vehicles and trucks may be safely used under and near power lines. The power lines will be designed to meet or exceed minimum clearance requirements over roads, driveways, cultivated fields and grazing lands specified by the NESC. Recommended clearances within the NESC are designed to accommodate a relative vehicle height of 14 feet.

There is a potential for vehicles under high voltage transmission lines to build up an electric charge. If this occurs, the vehicle can be grounded by attaching a grounding strap to the vehicle long enough to touch the earth. Such buildup is a rare event because generally vehicles are effectively grounded through tires. Modern tires provide an electrical path to ground because carbon black, a good conductor of electricity, is added when they are produced. Metal parts of farming equipment are frequently in contact with the ground when plowing or engaging in various other activities. Therefore, vehicles will not normally build up a charge unless they have unusually old tires or are parked on dry rock, plastic, or other surfaces that insulate them from the ground.

Buildings are permitted near transmission lines but are generally prohibited within the right-of-way itself because a structure under a line may interfere with safe operation of the transmission facilities. For example, a fire in a building on the right-of-way could damage a transmission line. As a result, NESC guidelines establish clear zones for transmission facilities. Metal buildings may have unique issues. For example, metal buildings near power lines of 200 kV or greater must be properly grounded. Any

person with questions about a new or existing metal structure can contact the Company for further information about proper grounding requirements.

6.0 ENVIRONMENTAL INFORMATION

This section provides a description of the environmental setting, potential impacts and mitigative measures the Company has proposed, where appropriate, to minimize the impacts of siting, constructing and operating the Project. If the 115 kV transmission line were removed in the future, the land could be restored to its prior condition and/or put to a different use. The majority of the measures proposed are part of the standard construction process at the Company. Unless otherwise identified in the following text, the costs of the mitigative measures proposed are considered nominal.

6.1 DESCRIPTION OF ENVIRONMENTAL SETTING

The proposed route is located south of the City of Marshall and crosses Rock Lake, Lyons, Lynd, and Lake Marshall townships in Lyon County. The area between the Lake Yankton Substation and the MMU Southwest Marshall Substation is primarily agricultural. To the west of the Southwest Marshall Substation are developing commercial and residential areas. There are several rural residences and farms scattered along the proposed route (See Land Use Features Map, Appendix B.7).

The Project Area is located within the Mn DNR North Central Glaciated Plains Ecological Classification section. The landscapes are a result of repeated glaciations and characterized by gently rolling hills, streams, rivers, and shallow prairie lakes and wetlands. The proposed route crosses Cottonwood River and Meadow Creek, ending within ¼ mile of Lake Yankton. There are a number of large wetlands and small lakes in the Project Area. Many, however, have been drained for agriculture.

The topography of the Project Area is relatively level to gently sloping land ranging in elevation between 1,100 to 1,600 feet above mean sea level. Bedrock is typically overlain by 600 to 800 feet of glacial till. Soils are typically well-drained loams in upland areas, with poorly drained silts and loams in wetlands and along streams.

Presettlement vegetation consisted primarily of tallgrass prairie, with wet prairie and wooded areas restricted to stream margins and ravines along rivers. The typical present-day use of the land is agriculture, with few remnants of prairie vegetation. The major crops in the area are corn and soybeans (Mn DNR, 2007).

6.2 Human Settlement

6.2.1 Public Health and Safety

The Project will be designed in compliance with local, state, NESC, and the Company standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials, and right-of-way widths. The Company construction crews and/or contract crews will comply with local, state, NESC, and the Company standards regarding installation of facilities and standard construction practices. Established the Company and industry safety procedures will be followed during and after installation of the transmission line. This will include clear signage during all construction activities.

The proposed transmission line will be equipped with protective devices to safeguard the public from the transmission line if an accident occurs, such as a structure or conductor falling to the ground. The protective devices are breakers and relays located where the line connects to the substation. The protective equipment will de-energize the line should such an event occur. In addition, the substation facilities will be fenced and access limited to authorized personnel. Proper signage will be posted warning the public of the risk of coming into contact with the energized equipment.

Mitigative Measures

There are no further mitigative measures proposed to address human health and safety.

6.2.2 Commercial, Industrial, Residential Land Use

The single circuit transmission line crosses areas identified in the Lyon County Future Land Use Plan as Agricultural Preservation Area and Planned Growth Area (Figure 25, Lyon County Future Land Use Plan, 2004). There are scattered residences and businesses in the Project Area. Figure 25 from the Lyon County Future Land Use Plan is presented in Appendix B.8-1.

The existing Lake Yankton Substation is in an area that is identified in the Lyon County Future Land Use Plan as Agricultural Preservation Area. The proposed Project is not expected to affect the existing or planned land uses in the area. The

Southwest Marshall Substation owned by MMU is in an area that is identified in the Lyon County Future Land Use Plan as Planned Growth Area (Figure 25, Lyon County Future Land Use Plan, 2004); and by the City of Marshall as agricultural in their Future Land Use Plan (Figure 24, 2004; Appendix B.8-2). The area around the substation site is being used for mostly a mix of agricultural and industrial activities, including a wastewater treatment plant located directly north of the substation.

Mitigative Measures

No impacts are anticipated and therefore no mitigative measures are proposed.

6.2.3 Displacement

Displacement of residential homes or businesses will not occur as a result of this Project.

Mitigative Measures

Since no displacement will occur, no mitigative measures are proposed.

6.2.4 Noise

Transmission conductors produce noise under certain conditions. The level of noise depends on conductor conditions, voltage level, and weather conditions. Generally, activity-related noise levels during the operation and maintenance of substations and transmission lines are minimal.

Noise emission from a transmission line occurs during certain weather conditions. In foggy, damp, or rainy weather, power lines can create a crackling sound due to the small amount of electricity ionizing the moist air near the wires. During heavy rain the background noise level of the rain is usually greater than the noise from the transmission line. As a result, people do not normally hear noise from a transmission line during heavy rain. During light rain, dense fog, snow, and other times when there is moisture in the air, transmission lines can produce noise. Noise levels produced by a 115 kV transmission line are generally less than outdoor background levels and are therefore not usually audible. At substations, the source for noise is primarily the transformers which can create a humming noise.

Since human hearing is not equally sensitive to all frequencies of sound, the most noticeable frequencies of sound are given more "weight" in most measurement schemes. The A-weighted scale corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in dBA, which is the A-weighted sound level recorded in units of decibels. A noise level change of 3 dBA is barely perceptible to human hearing. A 5 dBA change in noise level, however, is clearly noticeable. A 10 dBA change in noise level is perceived as a doubling of noise loudness, while a 20 dBA change is considered a dramatic change in loudness. Table 7 below shows noise levels associated with common, everyday sources.

TABLE 7
COMMON NOISE SOURCES AND LEVELS

Sound Pressure Level (dB)	Typical Sources
120	Jet aircraft takeoff at 100 feet
110	Same aircraft at 400 feet
90	Motorcycle at 25 feet
80	Garbage disposal
70	City street corner
60	Conversational speech
50	Typical office
40	Living room (without TV)
30	Quiet bedroom at night

Source: Environmental Impact Analysis Handbook, ed. by Rau and Wooten, 1980

In Minnesota, statistical sound levels (L Level Descriptors) are used to evaluate noise levels and identify noise impacts. The L_5 is defined as the noise level exceeded 5% of the time, or for three minutes in an hour. The L_{50} is the noise level exceeded 50% of the time, or for 30 minutes in an hour.

The Minnesota Pollution Control Agency ("MPCA") noise standards are consistent with speech, sleep, annoyance, and conversation requirements for receivers based on the present knowledge for preservation of public health and welfare. Similar land uses have been grouped and classified using the State's noise area classification ("NAC") system. Residential areas, churches and similar type land use activities are included in

NAC 1; commercial-type land use activities are included in NAC 2; and industrial-type land use activities are included in NAC 3.

Table 8 identifies the established daytime and nighttime noise standards by NAC. The standards are expressed as a range of permissible dBA within a one hour period; L_{50} is the dBA that may be exceeded 50 percent of the time within an hour, while L_{10} is the dBA that may be exceeded 10 percent of the time within the hour.

TABLE 8
NOISE STANDARDS BY NOISE AREA CLASSIFICATION

(Units in dBA)

Noise Area Classification	Daytime		Nighttime	
	L_{50}	L_{10}	L_{50}	L_{10}
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

The nearest occupied home to either the Lake Yankton Substation or the Southwest Marshall Substation is more than 3,500 feet away, and it is very unlikely that substation noise would be audible at this distance. There are five residences located within 200 feet of the proposed transmission line route. All the residences fall within NAC 1. The noise generated from the transmission lines is not expected to exceed the background noise levels and would therefore not be audible at any receptor location. In addition, noise levels would be well below the noise standards established for NAC 1, as shown in Table 8 above.

Mitigative Measures

No mitigative measures are proposed since no impacts are anticipated.

6.2.5 TELEVISION AND RADIO INTERFERENCE.

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. Tightening loose hardware on the transmission line usually resolves the problem.

If radio interference from transmission line corona does occur, satisfactory reception from AM radio stations presently providing good reception can be obtained by appropriate modification of (or addition to) the receiving antenna system. Moreover, AM radio frequency interference typically 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.

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. 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 Company will inspect and repair any loose or damaged hardware in the transmission line, or take other necessary action to restore reception to the present level, including the appropriate modification of receiving antenna systems if deemed necessary.

If radio or television interference occurs because of the transmission line, the Company will work with the affected landowner to restore reception to pre-project quality.

Mitigative Measures

No impacts are anticipated. If radio or television interference occurs because of the transmission line, the Company will work with the affected landowner to restore reception to pre-project quality.

6.2.6 AESTHETICS

The proposed structures for the 115 kV line from the existing Lake Yankton Substation to the existing Southwest Marshall Substation will be a single-pole construction similar to the other 115 kV transmission line in the area. The single circuit structures will be 75 feet in height and the double circuit poles will be 85 feet tall. All poles will have an average span of approximately 400 feet between the structures. The right-of-way required for these types of structures is approximately 75 feet wide. The new transmission line likely will be visible to residents of Lake Marshall, Lynd, Lyons, and Rock Lake Townships. The transmission line structures will be in contrast to the primarily agricultural land along the proposed route. Additionally, there are several planned wind turbine generators (called Marshall Wind) east of the proposed transmission route in Sodus Township that are currently being constructed and will be highly visible. The large rolling hills to the north of the proposed route, however, will offer variation in the view-shed.

Mitigative Measures

Although the line will be a contrast to some surrounding land uses, the Company has identified the route that utilizes existing corridors and avoids homes to the greatest extent practicable. The Company will work with landowners to identify concerns related to the transmission line.

6.2.7 SOCIOECONOMIC

Population and economic characteristics based on the 2000 U.S. Census are presented in Table 9.

TABLE 9
POPULATION AND ECONOMIC CHARACTERISTICS

Location	Population	Minority Population (Percent)	Caucasian Population (Percent)	Per Capita Income	Percentage of Population Below Poverty Level
State of Minnesota	4,919479	11.8%	88.2%	$23,198	7.9%
Lyon County	25,425	6.42%	93.58%	$18,013	10.10%
Lynd Township	471	1.49%	98.51%	$21,921	0%
Lyons Township	208	5.29%	94.71%	$13,625	6.5%
Rock Lake Township	282	0.71%	99.29%	$19,008	6.3%
Lake Marshall Township	517	1.55%	98.45%	$21,461	4.1%

Source: 2000 U.S. Census: General Demographic Characteristics

According to the 2000 Census race demographics, Lyon County is 93.58 percent Caucasian. Of the townships within the Project Area, the population ranges from 95 to over 99 percent Caucasian. Minority groups in the area constitute a very small percentage of the total population.

Per capita incomes within the townships in the Project Area are similar to those found through Lyon County. The percentages of the population within the townships in the Project Area are comparable to the levels found in Lyon County. The Project Area does not contain disproportionately high minority populations or low-income populations. No impacts are anticipated to minority or low-income populations.

Approximately four to six workers will be required by the Company for transmission line construction. The transmission crews are expected to spend approximately 13 weeks constructing the transmission line. During construction, there will be a small positive impact on the community due to the expenditures of the construction crews in the local community.

Mitigative Measures

No impacts are anticipated and therefore no mitigative measures are proposed.

6.2.8 Cultural Values

Agriculture and farm-related business remain central to the regional economy. The area has a mix of livestock and crops including corn, soybeans and other grain crops. Marshall is the home of Southwest Minnesota State University that hosts many community events and activities. Museums and visitor centers are also found within the Marshall area. These museums highlight the history of the area. These facilities and associated activities are located within the Marshall city limits and will not be impacted by the Project.

No impacts are anticipated to cultural values.

Mitigative Measures

No impacts are anticipated and therefore no mitigative measures are proposed.

6.2.9 Recreation

Recreational opportunities near the Project Area include the Marshall Golf Club Course, Garvin County Park, the Garvin State Wildlife Management Area, and several local City of Marshall parks (Explore Minnesota, 2006; MN DNR, 2006). The Transmission Line Project will not directly impact these resources and it is not anticipated that the transmission line will be visible from these resources.

Mitigative Measures

No impacts are anticipated, therefore no mitigative measures are proposed.

6.2.10 Public Services

The City of Marshall provides typical public infrastructure (water and sewer) to the community (Marshall Chamber of Commerce, 2007). It is not anticipated that the Project will affect public services.

There are planned and potential highway projects within the area. Lyon County will be starting reconstruction of CSAH 5 from County Road 60 to State Highway 23 in 2008. Minnesota Department of Transportation ("MnDOT") has planned for an overpass at the intersection of State Highway 23 and County Road 7.

Mitigative Measures

It is not anticipated the Project will impact any public services. No impacts to the planned/potential road projects are anticipated and therefore no mitigative measures are proposed.

6.3 Land-Based Economics

6.3.1 Agriculture

According to the 2002 Census of Agriculture, 88.4% of the land is in agricultural production in Lyon County (See Prime Farmland Map, Appendix B.9). The 2002 market value of production was $1,451 per acre in Lyon County. Primary crops in the area are corn and soybean (USDA, 2002). The Project Area is mostly planted in corn and soybeans.

Approximately 78 acres of right-of-way for the proposed transmission line are located on prime farmland soils. Permanent impacts to agricultural land will result from the placement of the transmission line poles on the prime farmland soils. These permanent impacts represent less than 0.1 acre impacted by the proposed Project. Temporary impacts during construction may include soil compaction and crop damages within the right-of-way. Temporary impacts are estimated at approximately 10 acres.

Mitigative Measures

Landowners will be compensated for the use of their land through easement payments. Additionally, to minimize loss of farmland and to ensure reasonable access to the land near the poles, the Company intends to place the poles approximately 5 feet from and overhang the roadway right-of-way. When possible, the Company will attempt to construct the transmission line before crops are planted or following harvest. The Company will compensate landowners for crop damage and soil

compaction that occurs as a result of the Project. Soil compaction will be addressed by compensating the farmer to repair the ground or by using contractors to chisel-plow the site. Normally, a declining scale of payments is set up over a period of a few years.

Where possible, spring time construction will be avoided. However, if construction during spring time is necessary, disturbance to farm soil from access to each structure location will be minimized by using the shortest access route. This may require construction of temporary driveways between the roadway and the structure, but would limit traffic on fields between structures. Construction mats may also be used to minimize impacts on the access paths and in construction areas.

6.3.2 Forestry

The Project is not located near a forested area that would be impacted. For potential impacts to flora, please see Section 6.5.3.

Mitigative Measures

No impacts are anticipated and therefore no mitigative measures are proposed.

6.3.3 Tourism

The Project is not located near any tourist attractions that would be impacted.

Mitigative Measures

No impacts are anticipated and therefore no mitigative measures are proposed.

6.3.4 Mining

There are 252 acres of gravel pits or open mines in Lyon County (Land Management Information Center, 1999). The Project will not impact any active mining operations.

Mitigative Measures

No impacts are anticipated and therefore no mitigative measures are proposed.

6.4 Archaeological and Historic Resources

6.4.1 Previous Cultural Surveys

The prehistoric and Native American cultural background of the Project Area can be found in regional and archaeological overviews including Rose (1912), Johnson (1978), Anfinson (1997), and DeMallie (2001). No systematic archaeological or architectural survey of the Project Area has been previously conducted, therefore the Company has initiated a Cultural Resources Survey. Results of archival research and preliminary fieldwork are summarized below.

Examination of records at the SHPO indicates that there are no known sites in or directly adjacent to the Project Area of Potential Effect ("APE"). Twelve known sites are located within one mile of the corridor alternatives, but none of these sites has been extensively studied. Three of these sites were discovered during a pipeline survey. Locations and details can be found in Rothaus (2007). None of these sites will be impacted by the Project.

6.4.2 Archaeological Survey

The Company is currently conducting a Phase I archaeological survey of the Project Area, and this survey will be completed upon determination of a final route. A Phase I archaeology survey consists of the following tasks: consultation, documentation, and identification of areas considered to have high archaeological potential and to identify the presence of any previously unidentified precontact archaeological sites. A probability model of the area based on existing topographic and hydrological information and visual examination of the Project Area has been developed.

The northern area of the project, adjacent to Highway 23, presents the highest potential for prehistoric archaeological finds, due to the proximity to the Redwood River. Several small creeks previously ran through this area to the river, but the area has been heavily modified and drainage channels have been dug. The need for additional monitoring or surveying will be evaluated when preliminary siting of individual poles is complete.

The archaeological potential of the line in areas farther south is not well-documented, although some landforms suitable for prehistoric use and habitation have been

identified. The Company does not, however, anticipate impacts to previously or newly identified resources as a result of the Project.

6.4.3 Architectural Resources

The SHPO architectural database records no National Register of Historic Places ("NRHP") properties within one mile of the Project Area. Archival research and preliminary field examination indicates nine standing structures that may be eligible for the NRHP. All of these structures are located on active farms or homesteads and are currently occupied. The Company has identified a route that utilizes existing corridors and avoids homes to the greatest extent practicable. The Company will work with landowners to identify concerns related to the transmission line pole types and location and aesthetics. No displacement of residential properties will occur. This approach effectively avoids significant impact to potentially eligible structures and no further research or mitigation is anticipated.

Currently, the Company does not anticipate impacts to previously or newly identified resources as a result of the Project. The Company plans to avoid impact to any newly discovered resources by adjusting pole spacing to span any resources in the corridor. In the event that an impact would occur, the Company will determine, in consultation with SHPO, whether or not the resource is eligible for listing in the NRHP.

Mitigative Measures

Additional survey work may occur upon completion of project design. Testing of the degree of landscape modification will be conducted for pole locations and access roads proximate to the Redwood River. If intact soils are found, a standard Phase I investigation (pedestrian survey and/or subsurface testing) of these locations will be conducted. For the rest of the line, areas of archaeological potential will be spanned when possible. If such landforms cannot be spanned, areas will be examined using standard Phase I techniques. If new resources are discovered during the course of the survey, pole spacing will be adjusted to span such resources.

6.5 Natural Environment

6.5.1 Air Quality

Currently, both state and federal governments have regulations regarding permissible concentrations of ozone and oxides of nitrogen. The national standard is 0.08 parts per million ("ppm") during an eight-hour averaging period. The state standard is 0.08 ppm based upon the fourth-highest eight-hour daily maximum average in one year.

The only potential air emissions from a 115 kV transmission line result from corona and are limited. Corona consists of the breakdown or ionization of air in a few centimeters or less immediately surrounding conductors, and can produce ozone and oxides of nitrogen in the air surrounding the conductor. For a 115 kV transmission line, the conductor gradient surface is usually below the air breakdown level. Typically, some imperfection such as a scratch on the conductor or a water droplet is necessary to cause corona. Ozone is not only produced by corona, but also forms naturally in the lower atmosphere from lightning discharges and from reactions between solar ultraviolet radiation and air pollutants such as hydrocarbons from auto emissions. The natural production rate of ozone is directly proportional to temperature and sunlight and inversely proportional to humidity. Thus, humidity (or moisture), 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 reactivity, it is relatively short-lived. The area near the route presently meets all federal air quality standards.

During construction of the proposed transmission line, there will be limited emissions from vehicles and other construction equipment and fugitive dust from right-of-way clearing. Temporary air quality impacts caused by construction-related emissions are expected to occur during this phase of activity.

The magnitude of the construction emissions is influenced heavily by weather conditions and the specific construction activity occurring. Exhaust emissions, primarily from diesel equipment, will vary according to the phase of construction, but will be minimal and temporary. Adverse impacts to the surrounding environment will be minimal because of the short and intermittent nature of the emission and dust-producing construction phases.

Mitigative Measures

The Company anticipates nominal impacts to air quality, therefore no mitigative measures are proposed.

6.5.2 WATER RESOURCES

The water resources located in the Project Area are identified on the Water Resources Map in Appendix B.10. During construction there is the possibility of sediment reaching surface waters as excavation, grading, and construction traffic disturb the ground. Once the Project is complete it will have no impact on surface water quality. The NWI wetlands that are located adjacent to the proposed alignment are identified in Table 10. These locations will be field verified during pole placement.

TABLE 10
WETLANDS IDENTIFIED NEAR THE PROJECT ROUTE

County	Township	Range	Section	Site Number	Wetland Type	Land Area
Lyon	111N	41W	17	1	PEMCd	1.03 acres
Lyon	111N	41W	18	2	PEMCd	0.34 acres
Lyon	111N	41W	18	3	PEMCd	12.3 acres
Lyon	110 N	42W	24	4a	PEMC	1.29 acres
Lyon	110N	42W	24	4b	PEMF	5.38 acres
Lyon	110N	42W	25	5a	PEMC	4.61 acres
Lyon	110N	42W	25	5b	PEMF	5.54 acres
Lyon	109N	42W	10	6	PUBFh	2.45 acres
Lyon	109N	42W	10	7	PEMC	1.87 acres

PEMCd – Palustrine Emergent Seasonally Flooded Partially Drained/Ditched
PEMC – Palustrine Emergent Seasonally Flooded
PEMF – Palustrine Emergent Semipermanently flooded
PUBFh – Palustrine Unconsolidated Bottom Diked/Impounded

During construction, the most effective way to minimize impacts to wetland areas will be to span all streams and rivers. In addition, the Company will not allow construction equipment to be driven across waterways except under special circumstances and only after discussion with the appropriate state, county or local resource agency. Where waterways must be crossed to pull in the new conductors

and shield wires, workers may walk across, use boats, or drive equipment across ice in the winter. These construction practices help prevent soil erosion and ensure that equipment fueling and lubricating will occur at a distance from waterways.

If impacts to wetlands occur, they will be minimized through construction practices. Construction crews will maintain sound water and soil conservation practices during construction and operation of the facilities to protect topsoil and adjacent water resources and minimize soil erosion. Practices may include containing excavated material, protecting exposed soil and stabilizing restored soil. Crews will avoid major disturbance of individual wetlands and drainage systems during construction. This will be accomplished by strategically locating new access roads and spanning wetlands and drainage systems where possible. When it is not feasible to span the wetland, construction crews will rely on several options during construction to minimize impacts:

- When possible, construction will be scheduled during frozen ground conditions;
- Crews will attempt to access the wetland with the least amount of physical impact to the wetland (*i.e.*, shortest route);
- The structures will be assembled on upland areas before they are brought to the site for installation; and
- When construction during winter is not possible, construction mats will be used where wetlands would be impacted.

Several intermittent streams cross the proposed route. The locations include Section 18 in Lake Marshall Township; Sections 24 and 25 in Lynd Township; and Sections 12, 24 and 35 in Lyons Township. There are several protected waters as indicated on the Mn DNR Protected Waters Inventory within the Project Area. These include the Cottonwood River, Redwood River, an unnamed tributary to Meadow Creek, and Lake Yankton. The proposed route crosses the Cottonwood River less than 0.25 miles north of the Lake Yankton Substation in Sections 10 and 15 (Rock Lake Township). The proposed route crosses the unnamed tributary to Meadow Creek in Section 35 (Lynd Township). The route is located less than 0.5 miles from Lake Yankton and the Redwood River, but does not directly cross them. The northern most portion of the route west of the Southwest Marshall Substation (approximately -

1.5 miles) is within a mapped 100-year floodplain (Lyon County Preliminary DFIRM). Direct impacts to the surface water resources are not anticipated.

Mitigative Measures

The Company will follow standard erosion control measures identified in the MPCA's Stormwater Best Management Practices Manual, such as using silt fencing to minimize impacts to adjacent water resources.

No direct impacts to the surface water resources are anticipated. No Public Water Works Permit is required from the Mn DNR under Minnesota Statute 103G.2455, Subd. 1. If waters of the United States, as defined by the U.S. Army Corps of Engineers (Corps.) or wetlands defined under the Minnesota Wetland Conservation Act are impacted, the Company will obtain the required permits. At this time, no impacts are anticipated, therefore no permit is required.

In addition, Minnesota Statutes Section 84.415 requires the Company to obtain a license from the Mn DNR for passage of any utility over, under, or across any state land or public waters. Because the line will span the Cottonwood River and tributary to Meadow Creek, a Mn DNR license will be required.

6.5.3 FLORA

Impacts to trees may occur where the single circuit transmission line parallels properties with windbreaks or adjacent to the roadway. The area of trees that will be impacted by the proposed Project due to the routing of this transmission line is expected to be approximately 0.17 acres (7,500 ft^2).

A majority of the rest of the Project is agricultural land along the transmission line route. Row crops such as corn and soybean dominate the area. For a discussion on impacts to agriculture, see Section 6.3.1.

Mitigative Measures

To minimize impacts to trees in the Project Area, the Company will only remove trees located in the right-of-way for the transmission line, or those that would impact the safe operation of the facility. Trees outside the right-of-way that would need to be

removed include trees that are unstable and could potentially fall into the transmission facilities.

6.5.4 FAUNA

There is a potential for temporary displacement of wildlife during construction and the loss of small amounts of habitat from the Project. Wildlife that inhabit trees that may be removed for the Project and organisms that inhabit agricultural areas will likely be temporarily displaced. Comparable habitat is adjacent to the route for both habitat types, and it is likely that these organisms would only be displaced a short distance. A list of common mammal and avian species recorded in the Project Area is included as Appendix C.2.

Raptors, waterfowl and other bird species may be affected by the construction and placement of the transmission lines. Avian collisions are a possibility after the completion of the transmission line in areas where there are agricultural fields that serve as feeding areas, wetlands and open water.

Additionally, the electrocution of large birds, such as raptors, can be a concern with distribution lines. Electrocution occurs when birds with large wingspans come in contact with two conductors or a conductor and a grounding device. The Company transmission line design standards provide adequate spacing to eliminate the risk of raptor electrocution, so there are no concerns about avian electrocution as a result of the proposed Project.

Mitigative Measures

Displacement of fauna is anticipated to be minor and temporary in nature. No long term population-level effects are anticipated; therefore, no mitigation is proposed.

The Company has been working with various state and federal agencies over the past 20 years to address avian issues as quickly and efficiently as possible. In 2002, the Company, entered into a voluntary memorandum of understanding ("MOU") with the U.S. Fish and Wildlife Service to work together to address avian issues throughout its service territories. This includes the development of Avian Protection Plans ("APP") for each state the Company serves: Minnesota, South Dakota and North Dakota. Work is currently underway on the NSPM APP.

The primary methods the Company uses to address avian issues for transmission projects include:

- Working with the resource agencies to identify any areas that may require marking transmission line shield wires and/or using alternate structures to reduce collisions. This may include the MN DNR, USFWS, and/or the Corps.
- Attempting to avoid areas known as major flyways or migratory resting spots.

This Project has been assessed for these types of areas and none have been found. As such, it is unlikely that any avian impacts will result from the construction of these facilities.

6.6 Rare and Unique Natural Resources

The following is a list of rare or unique resources identified by the DNR Natural Heritage Database in the Project Area (See Rare Features Map, Appendix B.11). One known occurrence of rare species or special communities has been identified within one mile of the proposed route (Natural Heritage Database 2000). The resources in Table 11 were compiled using the DNR Natural Heritage Database (per Houston Engineering, Inc. License Agreement No. LA-423).

TABLE 11
RARE AND UNIQUE RESOURCES

Common Name	Number of Occurrences	Scientific Name	Federal Status	MN Status	State Rank [3]
Prairie Mimosa	1	Desmanthus illinoensis	None	Special Concern	S3

The DNR did not identify any known occurrences of rare and unique resources that would be affected by the proposed Project. All of the listed species and natural communities are outside of the Project Area; the closest record is for Prairie Mimosa,

[3] In Minnesota, a rank is assigned to the natural community type, which reflects the known extent and condition of that community. Ranks range from S1 (in greatest need of conservation action in the state) to S5 (secure under present conditions) to SU (undetermined, more information is needed).

a vascular plant species. Prairie Mimosa was last observed on September 20, 1954 growing along the shore of Lake Yankton, approximately 0.5 miles from the Lake Yankton Substation. The Prairie Mimosa's habitat is moist to mesic black soil prairies, moist meadows near rivers, openings in woodlands, limestone glades, and areas along levees. It is sometimes planted in pastures to feed cattle, and is used in prairie restorations to improve the soil. However, it recovers poorly from wildfires. This plant favors disturbed areas.

Mitigative Measures

No impacts are anticipated and therefore no mitigative measures are proposed.

7.0 AGENCY INVOLVEMENT, PUBLIC PARTICIPATION AND REQUIRED PERMITS AND APPROVALS

7.1 AGENCY CONTACTS

7.1.1 MINNESOTA DEPARTMENT OF NATURAL RESOURCES

The Minnesota DNR Natural Heritage and Non-game Research Program database was accessed through our existing licensing agreement on June 6, 2007, to review the Project Area for State threatened and endangered species and rare natural features. The results from our search for Lyon County are shown on the Rare Features Map (Appendix B.11). These areas will be avoided.

The Minnesota DNR Waters Division was contacted regarding the Company's proposed Project. They acknowledged that there are several DNR public waters to cross in the Project Area. However, these types of projects exhibit little or no impact to the public watercourses as long as standard DNR Lands and Mineral license protocols are followed.

7.1.2 MINNESOTA SHPO

On September 19, 2007, the Minnesota SHPO Archaeological and Architectural database records were accessed to determine if the existence of any known or suspected archaeological sites or historic standing structures in the Project Area. Based on the initial consultation with the Minnesota SHPO and a preliminary survey of the Project Area, it was determined that there were no known sites in the general vicinity of the Project and none in or directly adjacent to the Area of Potential Effect (APE). A Phase Ia Cultural Resources Survey, Route Section Analysis for the Lake Yankton to Southwest Marshall Substation was prepared for the Company, dated September 22, 2007 (Rothaus, 2007). Any future correspondence on this issue will be forwarded to the Commission when received.

7.1.3 CITY OF MARSHALL, PUBLIC WORKS DEPARTMENT

The Company contacted the City Engineer for Marshall regarding potential concerns with the location of the proposed 115 kV transmission line between the Lake Yankton Substation and the new Southwest Marshall Substation. The City responded by letter dated October 25, 2007 stating that there were no serious concerns with the

proposed route. The City also noted that further review of the CSAH 7 crossing would be required in light of the future proposed overpass at the intersection of CSAH 7 and State Highway 23, and because of its proximity to the Redwood River overflow channel.

7.1.4 Lyon County, Department of Public Works

The Company contacted the Lyon County Department of Public Works for comments on the Project. On November 27, 2007 the Company received written comments related to the proposal (Appendix D). The County indicated that there will be some re-grading of CSAH 5 north of CR 60 (Rock Lake). In addition, there are some floodplains located in Sections 17 and 18 of Lake Marshall Township. The County also noted that it had not received any complaints, questions or concerns with the proposed route after it was modified around the Klein Addition.

7.1.5 Minnesota Department of Transportation

The Company contacted the MnDOT to provide the agency with an opportunity to comment on the transmission line improvements prior to filing this application. A MnDOT representative was present at both open house meetings in Marshall. The representative noted that further review of the CSAH 7 crossing would be required given the proposed future overpass at the intersection of CSAH 7 and State Highway 23. General comments were received about power lines crossing or using MnDOT right-of-way and the necessary permits required. There are no lines crossing MnDOT right-of-way along the proposed route.

7.2 Identification of Land Owners

A list of landowners along the proposed route is in Appendix E.1. There are 61 landowners along the proposed route included in this Application. This list does not include landowners along the rejected route alternatives with the exception of landowners in Sections 17 and 18 near the Southwest Marshall Substation.

7.3 PUBLIC PARTICIPATION

The Company has worked with the public throughout the process. The Company held two public open houses prior to developing this Application. These meetings were held to inform landowners and public officials of the proposed project and solicit input to be used in route selection.

Comments received from the first open house held on August 16, 2007 included the following:

- Avoid impacts to homes;
- Keep transmission poles out of fields;
- Follow along the roads and existing corridors; and
- Evaluate routes directly south of the Southwest Marshall Substation.

The comments received from the second open house held on October 4, 2007, included the following:

- Avoid impacts to agricultural activities;
- Avoid impacts to homes; and
- Avoid impacts to areas where residential development is likely to occur.

All comments received at the public meetings and subsequent email and letter correspondence are included in Appendix E.2. Several of the comments include recommended route alternatives for routes crossing Sections 17 and 18 of Lake Marshall Township located west of the Southwest Marshall Substation and east of the Klein Addition. The route evaluation through this more densely populated area and the planned growth area is summarized in Table 3 in Section 4.3.

7.4 Required Permits and Approvals

7.4.1 State of Minnesota Permits

No person may construct a high-voltage transmission line without a route permit from the Commission. Minnesota Statutes Section 216E.03, subd. 2. The proposed Project will also potentially require additional permits identified below in Table 12.

TABLE 12
POTENTIAL REQUIRED PERMITS

Permit	Jurisdiction
Road Crossing Permits	County, Township, City
Lands Permits	County, Township, City
Over-width Loads Permits	County, Township, City
Driveway/Access Permits	County, Township, City
License to Cross Public Waters	MN DNR

The Mn DNR Division of Lands and Minerals regulates utility crossings on, over or under any state land or public water identified on the Public Waters and Wetlands Maps. A license to cross Public Waters is required under Minnesota Statutes § 84.415 and Minnesota Rules, Chapter 6135. The Company works closely with the Mn DNR on these licenses and will file for them once the line design is complete. Work in these areas will not commence until permits, which will impose construction conditions, are obtained.

7.4.2 Local Permits

Once the Commission issues a route permit, zoning, building and land use regulations and rules are preempted per Minn. Stat. § 216E.10, subd. 1.

Road Crossing Permits

These permits may be required to cross or occupy county, township, and city road right-of-way.

Lands Permits

These permits may be required to occupy county, township, and city lands such as park lands, watershed districts, and other properties owned by these entities.

Over-width Load Permits

These permits may be required to move over-width loads on county, township, or city roads.

Driveway/Access Permits

These permits may be required to construct access roads or driveways from county, township, or city roadways.

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9.0 DEFINITIONS

Avian	Of or relating to birds.
A-weighted Scale	The sensitivity range for human hearing.
Caisson	A watertight structure within which construction work is carried on under water.
Conductor	A material or object that permits an electric current to flow easily.
Corona	The breakdown or ionization of air in a few centimeters or less immediately surrounding conductors.
Fauna	The collective animals of any place or time that live in mutual association.
Flora	The collective plants of any place or time that live in mutual association.
Hydrocarbons	Compounds that contain carbon and hydrogen, found in fossil fuels.
Ionization	Removal of an electron from an atom or molecule.
Oxide	A compound of oxygen with one other more positive element or radical.
Ozone	A form of oxygen in which the molecule is made of three atoms instead of the usual two.
Raptor	A member of the order Falconiformes, which contains the diurnal birds of prey, such as the hawks, harriers, eagles and falcons.
Scientific and Natural Area	A program administered by the DNR with the goal to preserve and perpetuate the ecological diversity of Minnesota's natural heritage, including landforms, fossil remains, plant and animal communities, rare and endangered species, or other biotic features and geological formations, for scientific study and public edification as components of a healthy environment.

Stray Voltage	A natural phenomenon that can be found at low levels between two contact points in any animal confinement area where electricity is grounded. Electrical systems – including farm systems and utility distribution systems – must be grounded to the earth by code to ensure continuous safety and reliability. Inevitably, some current flows through the earth at each point where the electrical system is grounded and a small voltage develops. This voltage is called neutral-to-earth voltage ("NEV"). When a portion of this NEV is measured between two objects that may be simultaneously contacted by an animal, it is frequently called stray voltage. Stray voltage is not electrocution and is not DC, ground currents, EMFs or earth currents. It only refers to farm animals that are confined in areas of electrical use and not to humans.
Ultraviolet Radiation	A portion of the electromagnetic spectrum with wavelengths shorter than visible light.
Voltage	Electric potential or potential difference expressed in volts.
Wetland	Wetlands are areas that are periodically or permanently inundated by surface or ground water and support vegetation adapted for life in saturated soil. Wetlands include swamps, marshes, bogs and similar areas.

10.0 ACRONYMS

Following are a list of acronyms used in this Application:

ACSS	Aluminum Core Steel Supported
APE	Area of Potential Effect
APP	Avian Protection Plans
CSAH	County State Aid Highway
CCVT	Coupling Capacitor Voltage Transformers
dBA	A-weighted sound level in decibels
DC	Direct Current
DFIRM	Digital Flood Insurance Rate Map
EMF	Electric and Magnetic Fields
FEMA	Federal Emergency Management Agency
HVTL	High Voltage Transmission Line
kV	Kilovolt
kV/m	Kilovolts Per Meter
MCOV	Maximum Continuous Operating Voltage Rating
MEQB	Minnesota Environmental Quality Board
MnDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MMU	City of Marshall Municipal Utility
MOU	Memorandum Of Understanding
MPCA	Minnesota Pollution Control Agency
MPUC	Minnesota Public Utilities Commission
NAC	Noise Area Classification
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NEV	Neutral-to-Earth Voltage
NHDB	National Heritage Database
NIEHS	National Institute of Environmental Health Sciences
NRHP	National Register of Historic Places
NSPM	Northern States Power Company, a Minnesota corporation
NWI	National Wetlands Inventory
PPM	Parts Per Million
SHPO	Minnesota State Historic Preservation Office
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service