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

3.1 TRANSMISSION LINE ENGINEERING AND OPERATIONAL DESIGN

A high voltage transmission line consists of three electrical paths known as phases. Each phase of a high voltage transmission line consists of one or more conductors. When more than one conductor is used to make up a phase, it is referred to as a "bundled" conductor. Conductors are metal cables with an inner core consisting of multiple steel strands with multiple aluminum strands wound around the steel strands. A single-circuit transmission line carries three phases (conductors) and shield wire(s). A double-circuit transmission line carries six phases (conductors) and two shield wires. Each phase is installed at the end of an insulator. Insulators are attached to support structures that are available in different configurations.

Shield wires are typically less than one inch in diameter and are strung above the electrical phases to prevent damage from lightning strikes. The shield wire may also include fiber optic cable to provide a communication path between substations.

Design constraints, voltage of the transmission line, and other considerations determine what structure configuration is used for the construction of any portion of a high voltage transmission line. Structure variations can include single pole structures, H-Frame structures, and multiple pole structures. Transmission lines are constructed within a right-of-way, the width of which is dependent on the voltage of the high voltage transmission line and the structure type selected for its construction.

3.1.1 Transmission Structure and Conductor Design

(a) *345 kV Transmission Line*

ITC Midwest proposes to primarily use single pole, weathering or galvanized steel structures. Double-circuit structures (345 kV/161 kV) will be used for the Project. Structures are proposed to be placed using spans of approximately 700 to 1,000 feet, with an average span of approximately 900 feet. A single pole structure is typically installed on a concrete foundation.

Other specialty structures may be necessary due to environmental conditions developed in cooperation with other State or federal agencies or to accommodate particular design considerations that cannot be identified until detailed survey work and soil sampling has been performed for the Project. Such detailed work will not likely be undertaken until after the Commission issues a Route Permit for the Project to ensure that the areas where these activities occur are those covered by the final route selected in this proceeding.

Because Route A anticipates co-locating the 345 kV line with existing transmission facilities where feasible and to allow for future expansion in the remaining locations where co-location of existing transmission facilities is not proposed at this time, ITC Midwest proposes to use double-circuit structures built to 345 kV/161 kV double-circuit standards. The Project will not be co-located along the existing Lakefield to Border 161 kV Transmission Line centerline in the following areas:

- Fox Lake and Lake Charlotte. Where the Project, along Route A is proposed to be co-located with an existing 69 kV transmission line near Fox Lake, structures will be built to 345 kV/161 kV double-circuit standards but operated at 345 kV/69 kV.

- Jackson Municipal Airport. ITC Midwest proposes to move the 161 kV line to 345 kV/161 kV double-circuit structures on new right-of-way. Although ITC Midwest proposes to primarily use single pole structures for the Project, specialty structures may be used where conditions require their use. Along Route A and Route B north of the Jackson Municipal Airport, ITC Midwest may use low profile structures for the 345 kV/161 kV transmission line with shorter span lengths to ensure there are no hazards to air navigation. ITC Midwest is working with the Federal Aviation Administration ("FAA") to determine the appropriate height of structures that may be used in this area.

- West of the Winnebago Junction Subsation. ITC Midwest proposes to move a short portion of the existing Lakefield to Border 161 kV to 345 kV/161 kV structures along new right-of-way into the new Huntley Substation.

If Route B or any of its segments is selected by the Commission for the Project, ITC Midwest proposes to use 345 kV/161 kV double-circuit capable structures

that will allow for future expansion of the transmission system. Only one set of arms, the 345 kV arms, would be installed as part of the Project which would allow only one circuit (three phases) to be installed for Route B. The 161 kV arms, insulators and conductors would be added in the future when conditions warrant. For Route B, ITC Midwest's existing Lakefield Junction to Border 161 kV Transmission Line would remain in its current location except for approximately 1.5 miles in Verona Township that would require relocation to connect to the new Huntley Substation.

Each 345 kV phase will consist of two twisted pair Drake (2-795) Aluminum Conductor Steel Reinforced ("ACSR"), or equivalent 3000 amp, conductor. Each conductor is approximately 1.8 inches in overall diameter. Each individual ACSR cable consists of a core of seven steel conductors surrounded by 26 aluminum strands. ITC Midwest proposes to use the same conductor and bundled configuration for all the 345 kV transmission line sections. Each 161 kV phase constructed on the 345 kV/161 kV structures will be constructed using twisted pair Drake (2-795) ACSR, or equivalent 1600 amp, conductor.

Table 4 provides a summary of the technical specifications of the targeted (*i.e.*, straight line), angle (*i.e.*, minor changes in line direction, and deadened (*i.e.*, used where a transmission line turns or ends) structures that ITC Midwest is seeking permission from the Commission to use for the 345 kV transmission line. **Figure 7** provides sample photos of the structures that ITC Midwest will primarily use for the 345 kV segments of the Project on either route. Technical drawings of all the structures identified in **Table 4** are available in **Appendix G**. If Route B is selected, only the 345 kV arms would be installed at this time. ITC Midwest will design the 345 kV portions of the Project to ensure a minimum conductor clearance of 35 feet between the ground and the lowest point of the conductor.

ITC Midwest will design the Project to meet or surpass all applicable local and State building codes and NESC requirements, and additional standards developed by ITC Midwest. Appropriate safety protocols, procedures, and standards will be followed during design and construction, and after installation.

Table 4. 345 kV Structure Design Summary

Design Configuration	Initial Operation	Structure Type	Structure Material	Right-of-Way Width (feet)	Structure Height (feet)	Structure Base Diameter (feet)	Foundation Diameter (feet)	Span Between Structures (feet)
345 kV/161 kV	345 kV/161 kV	Single Pole Davit Arm	Steel	200	130-190	Tangent: 5 Angle: 9	Tangent: 8 Angle: 12	700-1000
		2 Pole	Steel	200	130-190	Deadend: 9	Deadend: 12	700-1000
		Single Pole Davit Arm Low Profile	Steel	200	100-160	Tangent: 5 Angle: 9	Tangent: 8 Angle: 12	500-1000
		3 Pole Low Profile	Steel	200	100-160	Deadend: 9	Deadend: 12	500-1000
345 kV/161 kV	345 kV/69 kV	Single Pole Davit Arm	Steel	200	130-190	Tangent: 5 Angle: 9	Tangent: 8 Angle: 12	700-1000
		2 Pole	Steel	200	130-190	Deadend: 9	Deadend: 12	700-1000
345 kV/161 kV	345 kV/none	Single Pole Davit Arm	Steel	200	130-190	Tangent: 5 Angle: 9	Tangent: 8 Angle: 12	700-1000
		2 Pole	Steel	200	130-190	Deadend: 9	Deadend: 12	700-1000
		Single Pole Davit Arm Low Profile	Steel	200	100-160	Tangent: 5 Angle: 9	Tangent: 8 Angle: 12	500-1000
		3 Pole Low Profile	Steel	200	100-160	Deadend: 9	Deadend: 12	500-1000

Figure 7. 345 kV/161 kV Double-Circuit Structure Sample Photographs

345 kV/161 kV Double-Circuit

345 kV/161 kV Low Profile Double-Circuit

(b) *161 kV Associated Facilities*

The 161 kV transmission lines that currently terminate at the existing Winnebago Junction Substation are proposed to be reconfigured to terminate at the new Huntley Substation as part of the Project. ITC Midwest evaluated the proposed reconfigurations and necessary system interconnections at the Huntley Substation and identified structures with technical specifications provided in **Table 5** as those most likely to be used for these associated facilities.

Figure 8 provides sample photos of the 161 kV structure types ITC Midwest proposes using for construction of the associated facilities. Technical drawings of all the associated facility structure types identified in **Table 5** are available in **Appendix G**. The 161 kV associated facilities to be owned by ITC Midwest will be constructed using twisted pair Drake (2-795) ACSR, or equivalent 1600 amp, conductor. The N.B.E.I. – Huntley 161 kV transmission line is proposed to be constructed using Aluminum Conductor Steel Supported ("ACSS") 565 kcmil

Calumet, or equivalent 1400 amp, conductor. These facilities will be constructed to ensure that the minimum clearance between the ground and the lowest point of the conductor will measure 25 feet.

ITC Midwest will design the 161 kV associated facilities to meet or surpass all applicable local and State building codes and NESC requirements, and additional standards developed by ITC Midwest. Appropriate safety protocols, procedures, and standards will be followed during design and construction, and after installation.

For the Project's 161 kV transmission line associated facilities, 161 kV single pole single-circuit and 161 kV/161 kV double-circuit poles will be used. Structures are proposed to be placed using spans of approximately 600 to 800 feet, with an average span of approximately 700 feet. A right-of-way of at least 150 feet in width will be necessary for the 161 kV transmission line structures. A right-of-way up to 250 feet may be required between the Winnebago Junction and Huntley substation sites to allow construction of up to five circuits on three parallel, overlapping, rights-of-way. Other specialty structures developed in cooperation with other State or federal agencies may be necessary due to environmental conditions or to accommodate particular design considerations that cannot be identified until detailed survey work and soil sampling has been performed for the Project. Such detailed work will not likely be performed until after the Commission has issued a Route Permit for the Project to ensure that the areas where these activities occur are those covered by the final route selected by the Commission in this proceeding.

Table 5. 161 kV Structure Design Summary

Design Configuration	Initial Operation	Structure Type	Structure Material	Right-of-Way Width (feet)	Structure Height (feet)	Structure Base Diameter (feet)	Foundation diameter (feet)	Span Between Structures (feet)
161 kV/161 kV	161 kV/161 kV	Single Pole Braced Post	Steel	150	80-120	Tangent: 3.5 Angle: 7	Tangent: NA Angle: 10	600-800
		Single Pole Davit Arm	Steel	150	80-120	Deadend: 7	Deadend: 10	600-800
161 kV/161 kV	161 kV/69 kV	Single Pole Braced Post	Steel	150	80-120	Tangent: 3.5 Angle: 7	Tangent: NA Angle: 10	600-800
		Single Pole Davit Arm	Steel	150	80-120	Deadend: 7	Deadend: 10	600-800
161 kV	69 kV	Single Pole Braced Post	Steel	150	70-110	Tangent: 3 Angle: 5	Tangent: NA Angle: 8	600-800[1]
		Single Pole	Steel	150	70-110	Deadend: 5	Deadend: 8	600-800[1]

[1] Spans will be 250-300 feet where proposed to be co-located with distribution lines along 170th Street.

Figure 8. 161 kV Associated Facilities Sample Photographs

161 kV/161 kV Double-Circuit

161 kV Single-Circuit

3.1.2 Transmission Line Right-of-Way

ITC Midwest anticipates constructing the new 345 kV transmission line facilities, either double-circuit or single-circuit, using structures that require a 200-foot right-of-way.

Within the 200-foot right-of-way, ITC Midwest will restrict placement of its structures to a 150-foot easement area (the "Easement Area"). ITC Midwest will acquire an additional 25 foot easement on either side of the Easement Area (the "Ancillary Easement Area") to ensure that ITC Midwest has adequate vegetation management rights and that no structures or other improvements are constructed in the Ancillary Easement Area that pose a safety concern to the Project.

When paralleling existing road rights-of-way, ITC Midwest proposes to place poles on adjacent private property, approximately ten feet off the existing right-of-way, except where Route A parallels Interstate 90. This pole placement allows the transmission line right-of-way to share existing road rights-of-way to the greatest extent feasible and reduces the overall size of the easement likely required from the private landowner.

For Route A, ITC Midwest proposes to follow the centerline of the existing Lakefield to Border 161 kV Transmission Line to the greatest extent practicable. In areas where ITC Midwest determined that following the existing 161 kV transmission line centerline is not feasible, ITC Midwest proposes the following:

- Where the transmission line is placed cross-country, ITC Midwest proposes to locate the poles as close to property division lines as reasonably feasible.
- If locating the poles as close to property division lines is not reasonably feasible, ITC Midwest proposes to locate the poles in a way that minimizes overall impacts to the property owner.
- Where the transmission line is placed parallel to existing road right-of-way, with the exception of Interstate 90, ITC Midwest proposes to locate poles approximately ten feet off road right-of-way.
- Where Route A parallels the interchange right-of-way at Interstate 90 and State Highway 4 and also along Interstate 90, ITC Midwest proposes to locate the structures at least 65 feet, and in most places 100 feet, from the edge of the MnDOT right-of-way.

In Martin County, just north of the City of Sherburn, Route A parallels Interstate 90. At this time, ITC Midwest proposes to have the centerline of the 345 kV facilities (single pole, double-circuit capable for this area) located approximately 65 to 100 feet from the edge of the MnDOT right-of-way in this area. At the interchange of Interstate 90 and State Highway 4, ITC Midwest proposes to locate structures at least 65 feet from the edge of the MnDOT right-of-way. ITC Midwest does not anticipate any permanent overhang of the MnDOT right-of-way for longitudinal alignments along Interstate 90 or the interchange at State Highway 4. In Martin County, Route A parallels State Highway 15 for approximately 1.25 miles and is proposed to be located at least 80 feet from the

highway centerline.More information on State and County roads crossed and paralleled by the proposed routes are available in **Sections 6.2.10** and **8.2.10**.

For Route B, ITC Midwest proposes similar placement of the transmission line. Where the transmission line is placed cross-country, ITC Midwest proposes to locate the poles as close to property division lines and field lines as reasonably practicable. Where the transmission line is placed parallel to existing road right-of-way, ITC Midwest proposes to locate poles approximately ten feet off the existing right-of-way.

For either Route A or Route B, where the transmission line right-of-way will extend into other existing rights-of-way, ITC Midwest will acquire necessary approvals from the owner of the right-of-way (*e.g.*, county highway, railroad, MnDOT, etc.). ITC Midwest believes this approach to routing the transmission line is consistent with the State's policy of non-proliferation. *People for Envtl. Enlightenment and Responsibility (PEER), Inc. v. Minn. Envtl. Quality Council*, 266 N.W.2d 858 (Minn. 1978). Specifically, the two routes proposed in this Application make use of existing road and/or transmission rights-of-way when practicable, consistent with Minnesota Statutes Section 216E.03, subdivision 7(e) and the Commission's implementing rules that call upon the Commission to consider the utilization of existing road, railroad, and transmission rights-of-way when selecting new transmission line routes.

3.1.3 Design Options to Accommodate Future Expansion

ITC Midwest developed Route A to make the greatest use of existing ITC Midwest transmission rights-of-way in areas where there are suitable and adjacent lands for the additional right-of-way that will be required for the Project. ITC Midwest proposes to co-locate the proposed 345 kV transmission line and existing Lakefield to Border 161 kV Transmission Line on double-circuit structures along the existing 161 kV centerline for the majority of the Project, if constructed along Route A, with the exception of three primary locations (Jackson Municipal Airport, Fox Lake, and Lake Charlotte) where ITC Midwest determined that following the existing 161 kV line is not a feasible alternative. Where co-location with the existing Lakefield to Border 161 kV Transmission Line is not proposed along Route A, ITC Midwest proposes to use 345 kV/161 kV double-circuit capable structure to allow the possibility of co-location of transmission infrastructure in the future. Where Route A crosses Interstate 90 to the south of Fox Lake and after Route A crosses back to the north of Interstate 90 east of Fox Lake, a portion of the Project would be constructed

along an existing 69 kV transmission line right-of-way and the 69 kV conductors would be co-located on 345 kV/161 kV capable structures. The remainder of this area would be constructed using 345 kV/161 kV double-circuit capable structures with only the 345 kV circuit installed at this time. For the deviation north of the Jackson Municipal Airport, the existing 161 kV line would be moved to Route A on 345 kV/161 kV double-circuit structures. Slight deviations may occur in other locations (e.g., near the Faribault Substation) where development has occurred around the existing Lakefield to Border 161 kV Transmission Line and an expanded 200-foot right-of-way cannot be obtained if the current centerline is followed. Route A maximizes use of existing infrastructure to accommodate this proposed expansion of the transmission system in southwest Minnesota.

ITC Midwest also considered future expansion possibilities when investigating siting opportunities for the Huntley Substation. Sufficient land has been acquired at the proposed site for the Huntley Substation to enable additional future transmission line connections and to maintain a buffer between the substation footprint and adjoining landowners. Specifics on how ITC Midwest will design the Huntley Substation for possible future expansion needs are provided in **Section 2.4.3**.

Route B was developed to meet the Project needs but also provide an opportunity to address future system needs. As previously discussed, if the Commission selects Route B for the Project, ITC Midwest proposes to construct the Project using 345 kV/161 kV double-circuit capable structures so that a second 161 kV circuit can be strung when conditions justify expansion.

3.2 IDENTIFICATION OF EXISTING CORRIDORS

As discussed in **Section 4.2.3**, ITC Midwest began its analysis and evaluation of potential 345 kV transmission line routes by inventorying existing ITC Midwest transmission lines between the critical locations of the Lakefield Substation, the Winnebago Junction Substation (now to be replaced with the Huntley Substation) and the Iowa border near Elmore, Minnesota. Route A utilizes the existing centerline of the Lakefield to Border 161 kV Transmission Line or 69 kV transmission lines owned by ITC Midwest for approximately 75 percent of its length.

For Route B, ITC Midwest identified existing transportation rights-of-way for the route where appropriate. Where transportation rights-of-way were either highly

developed or residences were in close proximity to the roadways, other division lines were identified for routing where feasible.

Table 6 lists existing utility and transportation rights-of-way identified in the route selection process and summarizes the linear feature sharing along Route A and Route B. More detailed data for routes are provided in **Appendix H**.

Table 6. Summary of Length of Existing Linear Features Paralleled by Proposed Routes[3]

Route	Length (miles)	Transmission (miles)	Road (miles)	Railroad (miles)	Pipeline (miles)	Field/ Division/ Survey Lines (miles)	None (miles)	Total Paralleled Length (miles)	% Of Length Paralleling Linear Features
A	73	55	12	0	0	52	6	67	92
B	73	0	35	0	0	53	20	53	72

3.3 RIGHT-OF-WAY ACQUISITION, CONSTRUCTION, RESTORATION AND MAINTENANCE PROCEDURES

ITC Midwest developed right-of-way acquisition, construction, restoration, and maintenance procedures for the Project. Although certain procedures will be site-specific based upon the final route and substation design, general procedures are discussed in some detail in this Application.

3.3.1 Right-of-Way Acquisition

The right-of-way acquisition process for the transmission lines and substations is discussed below.

(a) *Transmission Line*

ITC Midwest plans to begin the transmission line right-of-way acquisition process early in the detailed design phase of the Project, which primarily occurs after a Route Permit has been issued by the Commission, although some right-of-

[3] A route may follow both a transmission line and road or transmission line and field line in the same location, for example, so the sum of individual sharing columns does not represent the total length paralleled.

way acquisition may begin earlier if circumstances allow. ITC Midwest typically acquires easements for transmission line right-of-way. The right-of-way evaluation and acquisition process includes title examination, initial owner contacts, survey work, document preparation, easement negotiation, and purchase. Each of these activities is described in more detail below. The existing right-of-way for the Lakefield to Border 161 kV Transmission Line generally measures 100 feet to 150 feet in width, with some variation. In the areas where existing right-of-way can be used for the Project, ITC Midwest will seek permission to increase the width of the right-of-way through an easement.

Prior to contacting landowners from whom easements will be required, ITC Midwest will conduct a title search to identify all persons and entities that have a recorded interest in the affected real estate. A title company will be engaged to complete the public records search. A title report for each parcel will be prepared to document the legal description and the owners of record, and to report information regarding easements, liens, restrictions, encumbrances, and other conditions of record.

After owners are identified, a right-of-way agent will contact each landowner or the landowner's representative. The right-of-way agent will describe how the Project may affect the landowner's property. At this time, the right-of-way agent will ask the landowner for information about any specific concerns related to construction of the Project on the landowner's property.

The right-of-way agent will also request the landowner's permission for survey crews to enter the property to conduct any necessary preliminary surveys. Surveys are conducted to locate rights-of-way, natural and manmade features, and associated elevations, which are used during detailed engineering of the transmission line. Soil borings may be taken to assess soil conditions and determine appropriate foundation design. During or before initial contact with a landowner after the Commission issues a Route Permit, ITC Midwest will provide the landowner with a copy of the Route Permit and any other materials the Commission determines are necessary.

The right-of-way agent will discuss with the landowner where the structure(s) will be located on the property, as well as the boundaries of the easement area. If requested by the landowner, ITC Midwest will stake the proposed transmission line's location (*i.e.*, the survey crew will identify the proposed boundary of the easement and the approximate location of the structure or pole on the ground with a surveyor's stake).

The right-of-way agent will collect area land value data to determine the amount of just compensation to be paid for the rights to build, operate, and maintain the transmission facilities within, and reasonable access to, the easement area. The agent will provide the landowner with a map of the transmission line route across the landowner's parcel and will negotiate with the landowner regarding compensation for the transmission line easement. An appraisal may be obtained to resolve any complicated valuation issues. The landowner will be allowed a reasonable amount of time to consider the offer and to present any information that the owner believes is relevant to determining the property's value.

ITC Midwest is committed to working with the landowners to address their concerns. In most cases, an agreement can be reached to purchase the land rights. The right-of-way agent will prepare the documents required to complete each transaction, which may include an easement, a purchase agreement, and subordination agreements.

If a negotiated settlement cannot be reached, ITC Midwest will acquire real property rights through exercise of the power of eminent domain pursuant to Minnesota Statutes Chapter 117, including the "quick-take" process set forth in Minnesota Statutes, Section 117.042. The process of exercising the power of eminent domain is called "condemnation."

In the event of condemnation, ITC Midwest will provide the landowner with a copy of each appraisal it has obtained for the property interests to be acquired. To initiate the condemnation process, ITC Midwest files a petition in the district court in the county where the property is located. If the court approves the petition, the court appoints a three-person condemnation "commission." The three people appointed must be knowledgeable of applicable real estate values. Once appointed, the commissioners schedule a viewing of each parcel identified in the petition. Next, the commissioners schedule a valuation hearing, where the utility and landowners present testimony and evidence regarding the just compensation for acquisition of the easement. The commission then makes an award of just compensation and files it with the court. Each party has 40 days from the filing of the award to appeal to district court for a de novo jury trial. In the event of an appeal, the jury would hear land value evidence and render a verdict. At any point in this process, the case can be dismissed if the parties reach a settlement.

There may be instances where landowners elect to exercise their rights under Minnesota Statutes Section 216E.12, subdivision 4, which would require ITC

Midwest to purchase their property in fee, rather than acquiring only an easement for the transmission facilities. Minnesota Statutes Section 216E.12, subdivision 4, is sometimes referred to as the "Buy-the-Farm Statute." The Buy-the-Farm Statute applies only to transmission facilities that are 200 kV or more; thus, the Buy-the-Farm Statute may apply to parcels crossed by the 345 kV transmission line, but would not apply to parcels crossed by the 161 kV transmission line.

Once right-of-way is acquired and prior to construction, the right-of-way agent will contact each owner to discuss the construction schedule and requirements. To ensure safe construction, special consideration may be needed for fences, crops, or livestock. For instance, fences or livestock may need to be moved, or temporary or permanent gates may need to be installed. In each case, the right-of-way agent will coordinate with the landowner, who will be compensated for Project-related construction damages, including crop losses.

(b) *Substations*

When acquiring property for new substations or substation expansions, ITC Midwest typically follows the same general steps outlined above. The exception is that ITC Midwest acquires a fee interest, rather than an easement, in the land required for substations. ITC Midwest will seek to acquire a parcel of sufficient size to construct the fenced area of the substation and to provide a buffer between the substation and neighboring properties.

ITC Midwest purchased a 40-acre parcel for its proposed Huntley Substation in December 2012. Although ITC Midwest purchased this site and believes that it is the most reasonable site for the Project to address all system needs, ITC Midwest understands that the Commission may identify a different site that it believes is more appropriate for the Huntley Substation. If the Commission grants a Route Permit approving this 40-acre parcel for the Huntley Substation, the only fee interest ITC Midwest will need to obtain for the Project for a substation site in Minnesota will be for the proposed approximately three acre expansion at the Lakefield Junction Substation.

As the regulatory review process proceeds, ITC Midwest's representatives will consult with the owners in the area of the proposed Lakefield Substation expansion, and if another site is identified for the Huntley Substation, to discuss the Project in detail and to obtain permission to access the site to conduct any surveys and soil borings required to finalize the substation's design. During the

acquisition phase, landowners will be advised of construction schedules, needed access to the site, and required vegetation clearing. Where possible, the ITC Midwest will negotiate and obtain necessary property rights through voluntary sale. If a voluntary sale agreement cannot be reached, ITC Midwest would acquire the substation parcel through condemnation.

3.3.2 Construction Procedures

Construction for the Project will not begin until all necessary federal, State, and local approvals are obtained, property and rights-of-way are acquired, soil conditions are established, and final design is completed. Construction in areas where State, federal, or local approvals are not needed or have already been obtained may proceed while approvals for other areas of the Project, right-of-way acquisition, surveys, or design are still pending or in process. Precise timing and phasing of right-of-way clearing and construction will depend on permit conditions, system loading issues, when existing transmission lines can be taken out of service for construction to proceed, and available workforce.

Construction, after acquisition of property or rights-of-way, is anticipated to progress generally as follows: survey marking of the right-of-way, right-of-way clearing and preparation, grading or filling where necessary, installation of concrete foundations, installation of poles with insulators and hardware attached, conductor stringing, and installation of any markers required by State or federal permits on conductors or shield wires.

At substations, after property acquisition is complete, survey marking and clearing preparation will occur first. Once substation grading has been completed, concrete foundations will be placed throughout the substation for pad-mounted substation equipment. Substation perimeter fencing (*i.e.*, chain link fence) will then be installed. All substation equipment will be contained within the fenced area. Construction of the substation control house, which encloses protective relaying and control equipment, will also occur at this time. Erection of steel structures will occur after foundations have properly cured. These steel structures consist of rolled or tubular steel columns. Beams are used for mounting the electrical conductors and disconnect switches. Large high voltage equipment, such as circuit breakers and transformers, are installed following completion of the steel structure.

Construction will follow ITC Midwest's standard construction and mitigation best practices developed from past project construction experience. ITC Midwest

developed best practices to address right-of-way clearing, staging, erecting transmission line structures, and stringing transmission lines. Construction and mitigation practices will also be developed specific to the Project based on the proposed schedule for activities, permit requirements, prohibitions, maintenance guidelines, inspection procedures, terrain, and other practices. For construction across agricultural lands, ITC Midwest is developing an Agriculture Impact Mitigation Plan ("AIMP") that will be reviewed with the Minnesota Department of Agriculture to minimize impacts to these lands. ITC Midwest will also take advantage of weather conditions (*e.g.* frozen ground in wet areas for construction, etc.) when feasible to minimize impacts to lands.

ITC Midwest will design the transmission line structures for installations at the existing grades. As a standard design parameter, ITC Midwest will not generally grade or level structure sites with a slope of 10 percent or less. Where a site slope exceeds 10 percent, working areas will be graded or leveled with fill. If acceptable to the landowner, ITC Midwest proposes to leave the graded/leveled areas after construction for future maintenance activities. If not acceptable to the landowner, ITC Midwest will, to the best of its ability, return the grade of the site back to its original condition. Based on initial review, grades exceeding 10 percent are not anticipated along Route A or Route B.

ITC Midwest anticipates that construction of the Project will require the use of many different types of construction equipment including 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 or other hauling equipment. Excavation equipment is often set on wheel or track-driven vehicles. Construction crews will attempt to use equipment, when opportunities are available, that minimizes impacts to lands. Poles will be transported on tractor-trailers to staging areas or construction sites.

Staging areas will be required for the Project. Staging areas are identified after a route is selected and are typically set up at intervals of approximately 25 miles along the route. These staging areas will be used as receiving locations for the delivery and storage of construction materials and equipment for the Project. For staging areas outside the transmission line right-of-way or not located on property owned by ITC Midwest, rights to use these areas will be obtained from affected landowners through individual agreements.

After a Route Permit is issued by the Commission, ITC Midwest will evaluate construction access opportunities by identifying existing transmission line rights-of-way, roads, or trails that run parallel or perpendicular to the transmission line. Where feasible, ITC Midwest intends to traverse the right-of-way acquired for the Project to access construction areas. This method of access will minimize impacts to landowners and adjacent properties. In some situations, private field roads, trails, or fields must be used to gain access to areas for construction. Where no current access is available or existing access is inadequate to cross roadway ditches or other features, new access roads may be constructed. Permission from landowners will be obtained prior to using any of these areas to access the right-of-way for construction. Where necessary to accommodate heavy construction equipment, including cranes, cement trucks, and hole-drilling equipment, existing roads may be upgraded or new roads may be constructed. If new roads must be constructed, in addition to permission from landowners, ITC Midwest will also obtain permissions necessary from the local road authority. During construction activities, ITC Midwest will work with appropriate road authorities to ensure proper maintenance of roadways traversed by construction equipment.

After right-of-way clearing and grading or filling, where necessary, has been completed, pole installation will begin. Most structures for the Project will have concrete foundations. To install a foundation, a hole is drilled that measures approximately eight feet in diameter for a 345 kV transmission structure foundation and 25 feet, or more, deep. An angle or deadend structure may require a foundation up to 12 feet in diameter. A foundation for a 161 kV transmission structure typically measures eight to ten feet in diameter. The actual diameter and depth of the hole (and foundation) depend on soil conditions that are established during the initial survey and soil testing phases. Concrete is brought to the site by concrete trucks from a local concrete batch plant and filled around a steel rebar support cage. Once the foundation is set, installation of the actual pole on top of the foundation can begin.

Poles will be moved from staging areas and delivered to the foundation. Insulators and other hardware are attached while the pole is still on the ground at the installation location. Using a crane, the pole is lifted, placed, and secured to the cured concrete foundation. Some 161 kV poles may be directly embedded into the ground instead of set on concrete foundations for the Project. Direct embedding requires drilling a hole that measures approximately six to eight feet

in diameter and 15 to 20 feet in depth, with some soil conditions requiring a deeper drilled hole.

Some soil conditions will require that construction mats be placed along the right-of-way or at a pole location to minimize soil disturbances. These mats can also be used to provide access across sensitive areas to minimize impacts including soil compaction, rutting, or damage to plant species.

Once the pole has been set, any remaining holes are back-filled with the excavated material or crushed rock. ITC Midwest prefers to spread any remaining excavated material in the area from which they were removed if landowner permission is obtained. If spreading of the excavated material is not permitted by the landowner, the material will be offered to the landowner or completely removed from the site.

Conductor stringing is the last major component of transmission line construction. Stringing setup areas within the right-of-way or on temporary construction easements outside the right-of-way are established. Conductor stringing setup areas are typically located at two-mile intervals along a route. These operations require brief access to each structure to secure the conductor wire to the insulator hardware and the shield wire to clamps once final conductor sag, compliant with ITC Midwest procedures and NESC minimum clearances, is established. Where the transmission line crosses streets, roads, highways, or other energized conductors or obstructions, temporary guard or clearance poles may be installed before conductor stringing. The temporary guard or clearance poles ensure that conductors will not obstruct traffic or contact existing energized conductors or other cables during stringing operations and also protects the conductors from damage. ITC Midwest intends to use compression splices for conductor installation.

Special construction techniques may be necessary in environmentally sensitive and wetland areas. The most effective way to minimize impacts to these areas during construction is to span them where feasible. ITC Midwest will restrict construction traffic from waterways except under special circumstances and only after discussion with, and approval from, the appropriate resource agency. Where waterways must be crossed during conductor stringing, workers may walk across, use boats to cross, or drive equipment across ice in the winter or use helicopters to facilitate installation of stringing equipment. ITC Midwest will attempt to complete construction and conductor stringing operations in these areas when the ground is frozen. If completing these activities under frozen

conditions is not feasible, the methods discussed above and use of construction matting, where practicable, will be implemented.

Equipment fueling and other maintenance will occur away from environmentally sensitive and wet areas. These construction practices help prevent soil erosion and ensure that fuel and lubricants do not enter waterways or impact environmentally sensitive areas.

After conductor installation is complete, installation of conductor marking devices will occur where required. These marking devices may include bird flight diverters or air navigational markers. ITC Midwest will work with the appropriate agencies to identify locations where marking devices will be installed.

3.3.3 Restoration Procedures

Crews will attempt to minimize ground disturbance whenever feasible during right-of-way and substation site clearing for, and construction of, the Project. Although these attempts will be made, areas will be disturbed during the normal course of work. Once construction is completed in an area, disturbed areas will be restored to their original condition to the maximum extent feasible. Temporary restoration before the completion of construction in some areas along the right-of-way or at substation sites may be required per National Pollution Discharge Elimination System ("NPDES") and Minnesota Pollution Control Agency ("MPCA") construction permit requirements.

After construction activities have been completed, a representative of ITC Midwest will contact the property owner to discuss any damage that has occurred as a result of the Project. This contact may not occur until after ITC Midwest has started restoration activities. If, during the course of construction of the Project, crops, fences, or drain tile have been damaged, ITC Midwest will repair damages or reimburse the landowner to repair the damages.

Ground-level vegetation disturbed or removed from the right-of-way during construction of the Project will naturally reestablish to pre-construction conditions. Vegetation that is consistent with substation site operation outside the fenced area will be allowed to reestablish naturally at substation sites. Areas where significant soil compaction or other disturbance from construction activities occur will require additional assistance in reestablishing the vegetation stratum and controlling soil erosion. In these areas, ITC Midwest will use seed

that is noxious weed free to reestablish vegetation. Various best management practices to be used during the construction of the Project will be identified in the Stormwater Pollution Prevention Plan ("SWPPP") that will be prepared when ITC Midwest applies for an NPDES permit from the MPCA, but some commonly-used methods to control soil erosion are:

- Erosion control blankets with embedded seeds, including those with biodegradable netting, where feasible;
- Silt fences; and
- Straw bales.

Another aspect of restoration relates to the roads used to access staging areas or construction sites. After construction activities have completed, ITC Midwest will ensure that township, city, and county roads used for purposes of access during construction will be returned to either the condition they were in, or better, before right-of-way clearing began. ITC Midwest will meet with township road supervisors, city road personnel, or county highway departments to address any issues that arise during construction with roadways to ensure the roads are adequately restored, if necessary, after construction is complete.

3.3.4 Maintenance Procedures

ITC Midwest and other utilities design transmission lines and substations to operate for decades while requiring minimal maintenance, particularly in the first few years of operation. Substantial work on an existing transmission line is typically only required after it has been exposed to the elements for a long period of time (55, or more, years) or after a storm event has caused damage to the transmission line.

ITC Midwest estimates the service life of its transmission lines at approximately 55-60 years. Practically speaking, however, high voltage transmission lines are seldom retired. This infrastructure has very few mechanical elements and is designed and constructed to withstand weather extremes typical for the region. With the exception of severe weather, transmission lines rarely fail. Protective relaying equipment will automatically take these facilities out of service when a fault is sensed on the system, and these interruptions are usually only momentary. Outages necessary for scheduled maintenance are also infrequent.

Because of these general operational characteristics, the average annual availability of transmission infrastructure is in excess of 99 percent.

Costs associated with the operation and maintenance of transmission facilities are primarily attributed to the cost of inspections, usually done semi-annually by helicopter with a forester, vegetation planner, and line inspector; annually by ground with a forester; and once every four years by ground with a line inspector. Recent experience has shown that annual operation and maintenance costs for 345 kV transmission lines in the ITC Midwest system are approximately $2,000 per mile, including vegetation removal and maintenance, the previously-mentioned helicopter and ground patrols, and line and tower maintenance activities. The actual cost of transmission line maintenance depends on the setting, the amount of vegetation management necessary to ensure and maintain required safety clearances, the frequency of storm damage, structure types and materials, and the overall age of the transmission infrastructure.

Certain maintenance is required at substations to ensure proper operation within NESC and NERC requirements. Various equipment, including transformers, circuit breakers, batteries, and protective relays, must be periodically serviced according to the manufacturers' guidelines. Circuit breakers proposed to be installed as part of the Project will contain sulfur hexafluoride ("SF_6"), a greenhouse gas, as an insulator. Newer circuit breakers contain less SF_6 at lower pressures than older designs and do not sustain the releases associated with older circuit breakers. ITC Midwest intends to install dead-tank Mitsubishi Electric Power Products circuit breakers at the Lakefield Junction and Huntley substations.

3.4 ELECTRIC AND MAGNETIC FIELDS

The term electromagnetic fields ("EMF") refers to electric and magnetic fields that are coupled together, such as in high frequency radiating fields. For lower frequencies associated with power lines (referred to as "extremely low frequencies" or "ELF"), EMF should be separated into electric fields ("EFs"), measured in kilovolts per meter ("kV/m"), and magnetic fields ("MFs"), measured in milliGauss ("mG"). EFs are dependent on the voltage of a transmission line and MFs are dependent on the current carried by a transmission line. The intensity of an EF is proportional to the voltage of the line, and the intensity of an MF is proportional to the current flow through the conductors. Transmission lines in the United States operate at a power frequency of 60 hertz ("Hz") (cycles per second).

3.4.1 Electric Fields

There is no federal standard for transmission line EF. The Commission, however, has imposed a maximum EF limit of 8 kV/m measured at one meter above the ground. *See In the Matter of the Route Permit Application for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota*, Docket No. ET-2/TL-08-1474, ORDER GRANTING ROUTE PERMIT (*adopting* ALJ Findings of Fact, Conclusions and Recommendation at Finding 194 (Apr. 22, 2010 and amended Apr. 30, 2010)) (Sept. 14, 2010). The standard was designed to prevent serious hazards from shocks when touching large objects parked under alternating current transmission lines of 500 kV or greater. The maximum EF, measured at one meter above ground, associated with the Project is calculated to be 4.71 kV/m. Calculated EFs for the various structure types proposed for the Project are provided in **Table 7**.

Table 7. Estimated Electric Fields (kV/m)

Structure Type	Maximum Conductor Voltage	Distance to Proposed Centerline												
		-300′	-200′	-100′	-75′	-50′	-25′	0′	25′	50′	75′	100′	200′	300′
Single Pole Davit Arm 345 kV/ 161 kV	362.25 kV/ 169.05 kV	0.05	0.10	0.30	0.57	1.67	4.45	3.33	0.74	0.37	0.21	0.12	0.03	0.02
Single Pole Davit Arm 345 kV/ 161 kV at Initial 345 kV/69 kV Operation	362.25 kV/ 72.45 kV	0.05	0.11	0.31	0.57	1.72	4.64	3.86	1.00	0.14	0.09	0.09	0.06	0.03
Single Pole Davit Arm 345 kV/161 kV with only one 345 kV circuit in service	362.25 kV	0.08	0.15	0.31	0.53	1.70	4.71	4.12	1.28	0.25	0.21	0.24	0.13	0.07
Single Pole Davit Arm Low Profile 345 kV/161 kV	362.25 kV/ 169.05 kV	0.03	0.09	0.83	2.00	4.36	3.55	2.46	0.27	0.92	0.51	0.21	0.03	0.02
Single Pole Davit Arm Low Profile 345 kV/161 kV with only 345 kV circuit	362.25 kV	0.05	0.11	0.82	1.97	4.34	3.66	3.32	1.68	0.89	0.57	0.39	0.13	0.06
Single Pole Braced Post 161 kV/ 161 kV	169.05 kV/ 169.05 kV	0.00	0.01	0.03	0.02	0.12	0.96	1.38	0.96	0.12	0.02	0.03	0.01	0.00
Single Pole Braced Post 161 kV/161 kV with 161 kV/69 kV Initial Operation	169.05 kV 72.45 kV	0.01	0.02	0.06	0.05	0.12	1.14	1.61	0.20	0.05	0.03	0.02	0.01	0.01
Single Pole Braced Post 161 kV	169.05 kV	0.01	0.03	0.12	0.22	0.45	0.92	1.96	1.35	0.37	0.19	0.12	0.03	0.01

3.4.2 Magnetic Fields

There are presently no Minnesota regulations or standards pertaining to MF exposure. ITC Midwest provides information to the public and employees so they can make informed decisions about MFs.

MFs were calculated under normal system conditions (system intact) for the expected peak and average (forecast typical current flow) current flows. The peak MF values are calculated at a height of one meter above the ground. The same method is used to calculate the MF at the edge of the right-of-way. The MF profile data show that MF levels decrease rapidly as the distance from the centerline increases (proportional to the inverse square of the distance from the source). The maximum calculated MF profiles around the transmission lines for each structure and initial operation being considered for the Project in the year it is put into service (2017) are shown in **Table 8**. The maximum calculated MF profiles for the Project six years after it is put into service (2023) are shown in **Table 9**.

Table 8. Estimated Magnetic Fields in 2017 (mG)

Structure Type	System Condition	Current (Amps)	Distance to Proposed Centerline (feet)												
			-300	-200	-100	-75	-50	-25	0	25	50	75	100	200	300
Single Pole Davit Arm 345 kV/161 kV	Peak	215/29	0.8	1.7	5.9	9.2	15.3	23.3	21.3	12.5	7.1	4.4	3.0	1.1	0.6
	Average	144/19	0.5	1.1	4.0	6.2	10.2	15.6	14.3	8.4	4.7	3.0	2.0	0.7	0.4
Single Pole Davit Arm 345 kV/161 kV at Initial 345 kV/69 kV Operation	Peak	215/75	0.6	1.4	5.2	8.3	14.0	22.0	20.6	11.9	6.1	3.4	2.2	0.7	0.4
	Average	144/50	0.4	0.9	3.5	5.6	9.4	14.7	13.8	8.0	4.1	2.3	1.5	0.5	0.3
Single Pole Davit Arm 345 kV/161 kV with only one 345 kV circuit	Peak	215	0.8	1.8	6.3	9.8	16.1	24.2	22.0	13.6	8.3	5.4	3.7	1.3	0.6
	Average	144	0.6	1.2	4.2	6.6	10.8	16.2	14.7	9.1	5.6	3.6	2.5	0.9	0.4
Single Pole Davit Arm Low Profile 345 kV/161 kV	Peak	215/29	0.9	1.8	7.0	12.0	21.8	28.6	21.2	10.6	5.0	3.2	2.3	0.7	0.4
	Average	144/19	0.6	1.2	4.7	8.1	14.6	19.2	14.2	7.1	3.4	2.2	1.5	0.5	0.2
Single Pole Davit Arm Low Profile 345 kV/161 kV with only 345 kV circuit	Peak	215	0.9	1.9	7.3	12.5	22.6	29.8	22.3	12.5	7.1	4.3	2.8	0.9	0.4
	Average	144	0.6	1.3	4.9	8.4	15.1	19.9	14.9	8.4	4.7	2.9	1.9	0.6	0.3
Single Pole Braced Post 161 kV/161 kV	Peak	55/68	0.0	0.1	0.2	0.4	0.9	3.3	8.2	4.9	1.9	0.9	0.5	0.1	0.1
	Average	37/46	0.0	0.0	0.1	0.2	0.6	2.2	5.5	3.3	1.3	0.6	0.3	0.1	0.0
Single Pole Braced Post 161 kV/161 kV with 161 kV/69 kV Initial Operation	Peak	55/191	0.3	0.5	1.6	2.4	4.1	9.3	24.2	18.3	8.2	4.2	2.5	0.6	0.3
	Average	37/128	0.2	0.3	1.0	1.6	2.8	6.2	16.2	12.3	5.5	2.8	1.6	0.4	0.2
Single Pole Braced Post 161 kV	Peak	94	0.2	0.4	1.2	2.0	3.7	7.9	14.6	9.6	4.2	2.2	1.3	0.3	0.1
	Average	63	0.1	0.2	0.8	1.3	2.5	5.3	9.8	6.4	2.8	1.4	0.9	0.2	0.1

Table 9. Estimated Magnetic Fields in 2023 (mG)

Structure Type	System Condition	Current (Amps)	Distance to Proposed Centerline (feet)												
			-300	-200	-100	-75	-50	-25	0	25	50	75	100	200	300
Single Pole Davit Arm 345 kV/161 kV	Peak	232/31	0.9	1.8	6.4	9.9	16.5	25.2	23.0	13.5	7.7	4.8	3.2	1.2	0.6
	Average	156/21	0.5	1.2	4.3	6.7	11.0	16.8	15.4	9.1	5.1	3.2	2.2	0.8	0.4
Single Pole Davit Arm 345 kV/161 kV at Initial 345 kV/69 kV Operation	Peak	232/81	0.6	1.5	5.6	9.0	15.1	23.8	22.2	12.9	6.6	3.7	2.4	0.8	0.4
	Average	151/54	0.4	1.0	3.8	6.0	10.2	15.9	14.9	8.6	4.4	2.5	1.6	0.5	0.3
Single Pole Davit Arm 345 kV/161 kV with only one 345 kV circuit	Peak	232	0.9	1.9	6.8	10.6	17.4	26.1	23.8	14.7	9.0	5.8	4.0	1.4	0.6
	Average	156	0.6	1.3	4.5	7.1	11.7	17.5	15.9	9.8	6.0	3.9	2.7	1.0	0.4
Single Pole Davit Arm Low Profile 345 kV/161 kV	Peak	232/31	1.0	1.9	7.6	13.0	23.5	30.9	22.9	11.4	5.4	3.5	2.5	0.8	0.4
	Average	156/21	0.6	1.3	5.1	8.7	15.8	20.7	15.3	7.7	3.7	2.4	1.6	0.5	0.2
Single Pole Davit Arm Low Profile 345 kV/161 kV with only 345 kV circuit	Peak	232	1.0	2.1	7.9	13.5	24.4	32.2	24.1	13.5	7.7	4.6	3.0	1.0	0.4
	Average	156	0.6	1.4	5.3	9.1	16.3	21.5	16.1	9.1	5.1	3.1	2.1	0.6	0.3
Single Pole Braced Post 161 kV/161 kV	Peak	59/73	0.0	0.1	0.2	0.4	1.0	3.6	8.9	5.3	2.1	1.0	0.5	0.1	0.1
	Average	40/50	0.0	0.0	0.1	0.2	0.6	2.4	5.9	3.6	1.4	0.6	0.3	0.1	0.0
Single Pole Braced Post 161 kV/161 kV with 161 kV/69 kV Initial Operation	Peak	69/206	0.3	0.5	1.7	2.6	4.4	10.0	26.1	19.8	8.9	4.5	2.7	0.6	0.3
	Average	40/138	0.2	0.3	1.1	1.7	3.0	6.7	17.5	13.3	5.9	3.0	1.7	0.4	0.2
Single Pole Braced Post 161 kV	Peak	102	0.2	0.4	1.3	2.2	4.0	8.5	15.8	10.4	4.5	2.4	1.4	0.3	0.1
	Average	68	0.1	0.2	0.9	1.4	2.7	5.7	10.6	6.9	3.0	1.5	1.0	0.2	0.1

The actual MFs when the Project is placed in service are typically less than that illustrated in the tables provided. For certain segments of the Project, the calculated values are less than what is shown in the table. This is because the table represents the MF with current flow at expected normal peak based on projected regional load growth. Actual current flow on the line will vary, so MFs will be less than peak, and likely even average, levels during most hours of the year.

3.4.3 Stray Voltage

"Stray voltage" is a condition that can occur on electric service entrances to structures from distribution lines—not transmission lines. The term generally describes a voltage difference between two objects where no voltage difference should exist. More precisely, stray voltage exists between the neutral wire of the service entrance and grounded objects in buildings such as barns and milking parlors. Stray voltage is not a feature generally attributed to the operation of a transmission line and is, therefore, not expected from the proposed transmission line.

Appropriate measures, however, will be taken to prevent stray voltage problems when the transmission lines proposed for the Project parallel or cross distribution lines. ITC Midwest does not anticipate that the Project will be responsible for any stray voltage issues.

Certain measures can be taken during the project design phase to avoid stray voltage concerns in the engineering phase. Recommended clearances within the NESC are designed to accommodate a relative vehicle height of 14 feet. ITC Midwest's minimum clearance design is greater than the NESC recommended clearances. The portions of the Project where either a single-circuit 345 kV line is constructed or a 345 kV line is double-circuited with another line, the facility will be designed to maintain a clearance of 35 feet and the 161 kV associated facilities will be designed to maintain a clearance of 25 feet.

Another question that arises when operating vehicles near power lines is whether vehicles can be safely refueled. The possibility of fuel ignition near a high voltage transmission line of the voltage and design proposed for the Project is extremely unlikely and ITC Midwest is unaware of any safety issues related to vehicle refueling near its existing power lines.

Buildings are permitted near transmission lines, but are generally prohibited within the 150 foot Easement Area because a structure under a transmission line may interfere with safe operation. For example, a fire in a building located within 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 transmission lines of 200 kV or greater must be properly grounded. People who have questions about a new or existing metal structure can contact ITC Midwest for further information about proper grounding requirements. ITC Midwest may allow certain structures to be constructed within the 50-foot Ancillary Easement Area, but any such construction in this area is subject to ITC Midwest review and approval.

3.5 CO-LOCATION CONSIDERATIONS

When developing routes for the Project, ITC Midwest analyzed the potential to co-locate portions of the transmission line with existing electric facilities as well as routing the 345 kV line parallel to existing facilities. ITC Midwest concluded that co-location with its existing Lakefield to Border 161 kV Transmission Line for the majority of the length of the Project along Route A was preferred. Route A, where not proposed to be co-located with a transmission line will be constructed on 345 kV/161 kV double-circuit capable structures to provide opportunities for future co-location.

Route B does not follow existing transmission facilities, but considerations for future co-location were considered by ITC Midwest. If the Commission selects Route B, either in its entirety or for a portion of its length, for the Project, ITC Midwest proposes to construct Route B using 345 kV/161 kV double-circuit capable structures. At the time of construction, only the 345 kV arms would be installed as part of this Project. Construction to these standards, however, would provide a co-location opportunity in the future when one is identified.

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