Environmental Assessment

Odell Wind High Voltage Transmission Line

PUC Docket No. IP6914/TL-13-591

Prepared by:

Energy Environmental Review and Analysis

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Abstract

Odell Wind Farm, LLC (Applicant or Odell) submitted an application to the Minnesota Public Utilities Commission (Commission) for a high voltage transmission line (HVTL) Route Permit to construct a new single-circuit, approximately 9.5-mile, 115 kilovolt (kV) HVTL and a new substation called the Woad Hill Substation. The proposed project is located in Cottonwood, Jackson and Martin Counties, Minnesota.

The Applicant submitted its HVTL Route Permit Application (RPA) to the Commission on December 13, 2013. The RPA was accepted as complete by the Commission on January 23, 2014. The docket number for the HVTL Route Permit proceedings is IP-6914/TL-13-591.

Under the Power Plant Siting Act (Minn. Statute 216E), a route permit from the Commission is required to construct a high voltage transmission line (HVTL). Department of Commerce, Energy Environmental Review and Analysis (EERA) staff is responsible for conducting the environmental review for RPAs submitted to the Commission (Minn. Rules 7850). Accordingly, EERA staff has prepared this environmental assessment (EA) for the Odell Wind HVTL project. This EA addresses the issues required in Minnesota Rule 7850.3700, subpart 4, and those identified in the Department's scoping decision of April 17, 2014.

Persons interested in this project can place their names on the Project Mailing List by contacting the Public Advisor: Tracy Smetana at consumer.puc@state.mn.us, 651-296-0406 or 1-800-657-3782. Documents of interest can be found on the eDockets system: https://www.edockets.state.mn.us/EFiling/search.jsp (enter the year "13" and the number "591").

Following release of this environmental assessment, a public hearing will be held in the project area. The hearing will be presided over by an administrative law judge from the Office of Administrative Hearings. Upon completion of the environmental review and hearing process, the record compiled on the RPA will be presented to the Commission for a final decision. A decision on a route permit for the Odell Wind Farm HVTL project is anticipated by October 2014.

Acronyms, Abbreviations and Definitions

ALJ	Administrative Law Judge
Commission	Minnesota Public Utilities Commission
dBA	A-weighted sound level recorded in units of decibels
EA	Environmental Assessment
EERA	Department of Commerce Energy Environmental Review & Analysis
EMF	electromagnetic field
FEMA	Federal Emergency Management Agency
FHA	Federal Housing Administration
HVTL	high voltage transmission line
kV	kilovolt
MDH	Minnesota Department of Health
mG	milligauss
mg/L	milligrams per liter – equivalent to parts per million (ppm)
MNDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MSIWG	Minnesota State Interagency Working Group
NAC	noise area classification
NESC	National Electrical Safety Code
NIEHS	National Institute of Environmental Health Sciences
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
PWI	Public Waters Inventory
RAPID	U.S. EMF Research and Public Information Dissemination
ROW	Right-of-Way
RPA	Route Permit Application
SHPO	State Historic Preservation Office
SWPPP	Stormwater Pollution Prevention Plan
USCOE	United States Corp of Engineers
USFWS	United States Fish and Wildlife Service
WHO	World Health Organization

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1.0 Introduction

Odell Wind Farm, LLC (Applicant or Odell) has made an application to the Minnesota Public Utilities Commission (Commission) for a high voltage transmission line (HVTL) Route Permit for the construction of one new 115 kV transmission lines in Cottonwood, Jackson, and Martin Counties pursuant to Minn. Statutes Section 216E and Minnesota Rules Chapter 7850.

The Department of Commerce Energy Environmental Review and Analysis (EERA) staff is tasked with conducting environmental review on applications for route permits. The intent of the environmental review process is to inform the public, the applicant, and decision-makers about potential impacts and possible mitigation measures for the proposed project.

This environmental assessment (EA) addresses the issues noted in Minnesota Rule 7850.3700, subpart 4, and those identified in the Department's scoping decision for this project (**Appendix A**), and is organized as follows:

Section 1.0	**Introduction**	The introduction provides an overview of this document and of the proposed project. It also provides a summary of the potential impacts of the project and mitigative measures.
Section 2.0	**Regulatory Framework**	Section 2.0 describes the regulatory framework associated with the project.
Section 3.0	**Proposed Project**	Section 3.0 describes the project as proposed by Odell Wind Farm, LLC, including rights-of-way, structures and conductors.
Section 4.0	**Other Routes**	Section 4.0 describes routes considered and rejected, and any alternative routes or route segments that were developed through the EA scoping process.
Section 5.0	**Potential Impacts and Mitigation Measures**	Section 5.0 details the potential impacts of the proposed project to human and natural environments and identifies measures that could be implemented to avoid, minimize, or mitigate potential adverse impacts.
Section 6.0	**Unavoidable Impacts**	Section 6.0 describes the unavoidable impacts, and the irreversible and/or irretrievable commitment of resources resulting from the project.

Section 7.0 Application of Routing Factors

Section 7.0 applies the information and data available in the RPA (RPA) and the EA to those factors described in Minnesota Rule 7850.4100.

1.1 Project Description

Odell proposes to construct one, approximately 9.5-mile, 115 kV HVTL and a substation in Cottonwood, Jackson and Martin Counties (**Figure 1**). The new transmission line would be constructed on private land adjacent to existing public road rights-of way (ROW). The key components of the proposed project include:

- The proposed HVTL would connect to the proposed Odell Wind Farm Substation (included in the Odell Wind Site Permit Application PUC Docket IP6914/WS-13-843) in section 32 of Mountain Lake Township in Cottonwood County, extending approximately four miles to the east adjacent to County Highway 17, turning south and extending south into Jackson County for approximately one mile adjacent to County Road 85, then extending east for approximately three miles adjacent to 240th Street in Martin County, and turning south adjacent to 30th Avenue for approximately 1.5 miles ultimately terminating at the proposed Woad Hill Substation.

- The new Woad Hill Substation would be constructed east of 30th Avenue and south of 230th Street in section 16 of Cedar Township in Martin County.

1.2 Project Location

The proposed project is located in Cottonwood, Jackson, and Martin Counties, Minnesota.

Table 1 below summarizes the proposed project location.

Table 1. Project Location

Township	Range	Sections	Political Township	County
105N	34W	32 – 36	Mountain Lake	Cottonwood
104N	34W	1 – 5, 11 & 12	Kimball	Jackson
104N	33W	4 – 9, 16 & 17	Cedar	Martin

1.3 Project Purpose

The proposed project was designed to transmit energy generated at the planned 200 MW Odell Wind Farm project in Cottonwood, Jackson, Martin and Watonwan counties to the proposed Woad Hill Substation. The proposed Woad Hill Substation will be a new 345/115 kV substation on Northern States Power's Lakefield Junction-Wilmarth 345 kV transmission line.

1.4 Sources of Information

Much of the information used in this Environmental Assessment is derived from documents prepared by Odell Wind Farm, LLC, including the HVTL Route Permit Application (RPA), December 2013. Discussion of Electromagnetic Field (EMF) issues came primarily from the white paper developed by the Interagency Task Force led by the Minnesota Health Department, the National Institute for Environmental Health and the World Health Organization. Additional information comes from earlier Department of Commerce and Environmental Quality Board environmental review documents in similar dockets, other state agencies, such as the Department of Natural Resources, and additional research. Firsthand information was gathered by site visits along the proposed line.

2.0 Regulatory Framework

Persons seeking to construct and operate a high voltage transmission line in Minnesota must seek permission to do so from the Minnesota Public Utilities Commission (Commission).

2.1 Certificate of Need

No person may construct a large energy facility in Minnesota without a certificate of need from the Commission (Minn. Statute 216B.243). A transmission line is a large energy facility if it (1) has a capacity of 200 kV or more and is greater than 1,500 feet in length, or (2) has a capacity of 100 kV or more with more than 10 miles of its length in Minnesota, or (3) has a capacity of 100 kV or more and crosses a state line (Minn. Statute 216B.2421).

The Applicant has stated that the Odell Wind HVTL project is exempt from the certificate of need requirements under Minn. Statutes Section 216B.243, which exempts HVTLs of 115 kV that are less than 10 miles in length and do not cross a state border.

2.2 Route Permit

Minn. Statutes Section 216E.03, subd. 2, provides that no person may construct a HVTL without a route permit from the Commission. An HVTL is defined as a transmission line of 100 kV or more and greater than 1,500 feet in length in Minn. Statutes Section 216E.01, subd. 4. The proposed transmission line is a HVTL and therefore a route permit is required prior to construction.

The Applicant submitted the HVTL RPA for the proposed Odell Wind HVTL pursuant to the provisions of the Alternative Permitting Process outlined in Minnesota Rules 7850.2900. The alternative permitting process includes environmental review and public hearings, and typically takes six months.

A copy of the HVTL RPA, along with other relevant documents, can be reviewed at the Energy Environmental Review and Analysis web page at:
http://mn.gov/commerce/energyfacilities/Docket.html?Id=33682.

The EERA staff is responsible for evaluating the HVTL RPA and administering the environmental review process. The Commission is responsible for selecting the transmission lines routes and issuing the HVTL route permit.

Environmental Review
Environmental review under the alternative permitting process includes public information/scoping meetings and the preparation of an environmental review document, the Environmental Assessment (Minn. Rule 7850.3700). The environmental assessment is a written

document that describes the human and environmental impacts of the transmission line project (and selected alternative routes) and methods to mitigate such impacts.

The Deputy Commissioner of the Department of Commerce (Commissioner) determines the scope of the EA. The EA must be completed and made available prior to the public hearing.

2.3 Scoping Process

On January 23, 2014, Commission staff sent notice of the place, date and times of the Initial Public Information and Scoping meeting to those persons on the General List maintained by the Commission, the agency technical representatives list and the project contact list.[1]

Notice of the public meeting was also published in the local newspapers.

On Monday, February 10, 2014, Commission staff and EERA staff jointly held a public information/scoping meeting at the Windom Community Center in Windom, Minnesota. The meeting began at 6 pm. The purpose of the meeting was to provide information to the public about the proposed project, to answer questions, and to allow the public an opportunity to suggest alternatives and impacts (i.e., scope) that should be considered during preparation of the environmental review document.

Four people attended the public information and scoping meetings; 1 individual took the opportunity to speak on the record. A court reporter was present to document oral statements.[2]

A variety of topics were discussed during the presentation. Topics included: the route permit process, development of the environmental assessment document, design/construction of structures, specifics on the proposed alignment, the concepts of route width and right-of-way/easement width, sources of power generation for this project, and health and safety issues.

Written comments were due no later than Monday, February 24, 2014.

One written comment was received: the Department of Natural Resources (MNDNR) submitted comments regarding the Woad Hill Substation site being located to the western portion of the proposed substation site to provide an increased buffer between the substation and Cedar Creek. The MNDNR comment letter included a statement on the requirements of the License to Cross Public Lands and Waters. The MNDNR also commented that the Natural Heritage Review completed for the Odell Wind Farm project is not valid for the Odell Wind HVTL project, and a Natural Heritage Review request should have been submitted prior to the submission of the RPA.[3]

[1] Notice of Public Information and Scoping Meeting, January 23, 2014, eDocket No. 20141-95727-01
[2] Public Comments and Notes, Information and Scoping Meeting, February 10, 2014, eDocket No. 20142-96887-01
[3] MNDNR Written Comment Received During Scoping, February 24, 2014, eDocket No. 20142-96736-01

The process for individuals to request that specific alternative routes, alternative route segments, and/or alignment modifications be included in the scope of the environmental review document was discussed at the public meeting.

These items and issues, along with the typical HVTL routing impacts, were incorporated into the EERA staff's recommendation to the Department Deputy Commissioner on the Environmental Assessment Scoping Decision.

Proposed Alternatives
No alternative routes were put forth during the EA scoping comment period.

Applicant Comments
The Applicant provided no further comments following the close of the EA Scoping comment period.

Scoping Decision
On April 10, 2014, the Commission at its regularly scheduled meeting, considered what action, if any, the Commission should take in regard to the alternatives put forth during the scoping process; the Commission elected to take no action in this matter.

After consideration of the comments, the Deputy Commissioner issued his Scoping Decision on April 14, 2014. A copy of this decision is attached in **Appendix A**. The items and issues brought forth during the scoping process, along with the typical HVTL routing impacts, were incorporated into the Scoping Decision.

On June 6, 2014 Odell Wind Farm, LLC filed a request to expand the route width of the Odell Wind Farm HVTL Project to accommodate the potential revised location and design of the proposed Woad Hill Substation. The requested route expansion would move the proposed Woad Hill Substation from the NW1/4 of Section 16, T104N, R33W to the SE1/4 of Section 8, T104N, R33W, of Martin County. The additional route area being requested is approximately 480 feet wide and 950 feet long directly to the west of the originally Proposed Route, refer to Figure 1.

The request to expand the Proposed Route was not deemed to be a substantial change or substantial new information that has significantly affected the potential environmental effects of the project or the availability of reasonable alternatives (see Minnesota Rule 7850.3700, Subpart 3). It was determined the Scoping decision did not need to be changed.

2.4 Public Hearing

The Commission is required by Minn. Rule 7850.3800 subp 1 to hold a public hearing once the EA has been completed. It is anticipated that this hearing will be held on July 9, 2014 at 1:00 pm at the Windom Community Center in Windom, Minnesota; the hearing will be conducted by Administrative Law Judge (ALJ) Steve M. Mihalchick.

The hearing was noticed separately from the EA, and details can be found online at http://mn.gov/commerce/energyfacilities/Docket.html?Id=33682. Interested persons may comment on the EA at the public hearing. Persons may testify at the hearing without being first sworn under oath. ALJ Mihalchick will ensure that the record created at the hearing is preserved and will provide the Commission with a report setting forth findings, conclusions and recommendations on the merits of the proposed transmission line project applying the routing criteria set forth in statute and rule.

Comments received on the Environmental Assessment become part of the record in the proceeding, but EERA staff is not required to revise or supplement the EA document. A final decision on the route permit will be made by the Commission at an open meeting following the public hearing and filing of the ALJ's report.

2.5 Final Decision

The Commission's obligation is to choose routes that minimize adverse human and environmental impacts while insuring continuing electric power system reliability and integrity, and also while insuring that electric energy needs are met and fulfilled in an orderly and timely fashion. Route permits contain conditions specifying construction and system operation standards (see a sample Route Permit in **Appendix B**).

There are a number of potential impacts associated with HVTLs that must be taken into account on any transmission line project. Minnesota Rule 7850.4100, A through N, identifies 14 factors that the Commission must consider when designating a route for a HVTL:

a. *effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services;*

b. *effects on public health and safety;*

c. *effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining;*

d. *effects on archaeological and historic resources;*

e. *effects on the natural environment, including effects on air and water quality resources and flora and fauna;*

f. *effects on rare and unique natural resources;*

g. *application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity;*

h. *use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries;*

i. *use of existing large electric power generating plant sites;*

j. use of existing transportation, pipeline, and electrical transmission systems or rights-of-way;

k. electrical system reliability;

l. costs of constructing, operating, and maintaining the facility which are dependent on design and route;

m. adverse human and natural environmental effects which cannot be avoided; and

n. irreversible and irretrievable commitments of resources.

The Commission must make specific findings that it has considered locating a route for a high-voltage transmission line on an existing high-voltage transmission route and the use of parallel existing highway right-of-way and, to the extent those are not used for the route, the Commission must state the reasons.

At the time the Commission makes a final decision on the permit application, the commission shall determine whether the EA and the record created at the public hearing address the issues identified in the scoping decision.

The Commission shall make a final decision on a site permit or a RPA within 60 days after receipt of the record from the hearing examiner. A final decision must be made within six months after the Commission's determination that an application is complete. The Commission may extend this time limit for up to three months for just cause or upon agreement of the applicant.

2.6 Other Permits

The Public Utilities Commission HVTL route permit is the only State permit required for routing of high voltage transmission lines, but other permits may be required for certain construction activities, such as river crossings. **Table 2** includes a list of potential permits that may be required for Odell Wind Farm, LLC to complete this project.

Table 2. Potential Required Permits

Permit	Jurisdiction
Federal	
Section 404 Jurisdictional Determination/Permit	U.S. Army Corps of Engineers (USCOE)
State	
Route Permit	MPUC
Utility Permit	MnDOT
NPDES Construction Stormwater Permit	MPCA
Section 401 Water Quality Certification	MPCA (certification required for 404 Individual Permit issuance, if activity qualifies for 404 general permit (GP) or Letter of Permission (LP) determine if MPCA has provided 401 pre-certification for the activity)
Local	
Minnesota Wetland Conservation Act Certification	Cottonwood, Jackson, and Martin Counties

Once the Commission issues a Route Permit, local zoning, building and land use regulations and rules are preempted per Minn. Statute 216E.10, subd 1. However, the Applicant is still required to obtain relevant permissions, such as road crossing permits.

2.7 Applicable Codes

The transmission line, regardless of route location, must meet all requirements of the National Electrical Safety Code (NESC) for High Voltage Transmission Lines. These standards are designed to protect human health and the environment. They also ensure that the transmission line and all associated structures are built from high quality materials that will withstand the operational stresses placed upon them over the expected lifespan of the equipment provided normal routine operational and maintenance is performed.

Utilities must comply with the most recent edition of the National Electric Safety Code, as published by the Institute of Electrical and Electronics Engineers, Inc. and approved by the American National Standards Institute, when constructing new facilities or reinvesting capital in existing facilities. See Minn. Statute 326B.35 and Minn. Rule 7826.0300 subp 1.

The NESC is a voluntary utility developed set of standards intended to ensure that the public is protected. The NESC covers electric supply stations and overhead and underground electric supply and communication lines, and is applicable only to systems and equipment operated by

utilities or similar systems on industrial premises. For more information, go to standards.ieee.org/faqs/NESCFAQ.html#q1.

2.8 Issues Outside the Scope of the EA

The EA does not consider the following:

- Any route alternatives not specifically identified in the scoping decision
- The manner in which landowners are paid for transmission rights-of-way easements

3.0 Proposed Project

The project is located in Cottonwood, Jackson and Martin counties, and no portion of the proposed project is located within any municipal boundaries. **Figure 1** illustrates the proposed HVTL on a U.S.G.S. Topographic Survey Map. **Figures 2-4** illustrate the proposed substation locations in greater detail.

The project includes the construction of approximately 9.5-miles of new 115 kV transmission line to transmit energy generated at the planned 200 MW Odell Wind Farm from the Odell Wind Farm Substation, being permitted under the Odell Wind Farm LWECS Site Permit, to the proposed Woad Hill Substation. The Woad Hill Substation will be designed in a manner to allow the substation to connect with Northern States Power's Lakefield Junction-Wilmarth 345 kV transmission line and provide interconnection to the grid.

The proposed HVTL route would begin at the planned Odell Wind Farm Substation in section 32 of Mountain Lake Township in Cottonwood County, Minnesota. From the Odell Wind Farm Substation the HVTL goes east for approximately 3.5 miles along County Highway 17, at which point the HVTL turns south and extends into Jackson County, Minnesota for approximately one mile adjacent to County Road 85. The HVTL will then run east for approximately 3 miles adjacent to 240th Street into Martin County, Minnesota. The HVTL will run south for approximately 1.25 miles adjacent to 30th Avenue, and ultimately connect to the proposed Woad Hill Substation.

There are currently three configurations under consideration for the proposed Woad Hill Substation. The Original Configuration was proposed by the Applicant in the RPA and would be located in the NW1/4 of Section 16, T104N, R33W in Martin County. The Original Configuration consists of placing the Woad Hill Substation and the Xcel Energy switchyard north of the existing Xcel Energy 345 kV electrical transmission line, which the Odell Wind Farm HVTL is to interconnect with. **Figure 2** shows the Original Configuration of the Woad Hill Substation.

Odell Wind Farm, LLC also considered a variation, Second Configuration, of the Original Configuration in which the Woad Hill Substation and the Xcel Energy switchyard would be co-located to the south of the Xcel Energy 345 kV electrical line. Again, the Odell Wind Farm, LLC HVTL would then be interconnected to the Xcel Energy 345 kV electrical transmission line. **Figure 3** shows the Second Configuration of the Woad Hill Substation.

Both the Original and Second Configuration have been designed using the NESC and other publicly available standards. Xcel Energy has indicated to Odell Wind Farm, LLC the Original and Second Configurations may not be practicable due to Xcel's internal design spacing requirements of substations and switchyards. Odell has requested an expansion of the Proposed Route, and designed a Third Configuration to the northwest of the Original and Second Configurations. The Third Configuration would place the Woad Hill Substation in the SE1/4 of

Section 8, T104N, R33W in Martin County, and the substation would be connected to the Xcel Energy switchyard to the southeast of the substation, with a new 345 kV electrical transmission line. The 345 kV electrical transmission line connecting the Woad Hill Substation and the Xcel Energy switchyard will be less than 1,500 feet and would be permitted by Martin County. **Figure 4** shows the third configuration of the Woad Hill Substation.

3.1 Right-of-Way Requirements

The Power Plant Siting Act (Minn. Statutes, chapter 216E) authorizes the Commission to meet its routing responsibility by designating a *route* for a new transmission line when it issues an HVTL Route Permit. A Route means the location of a high voltage transmission line between two end points and may have a variable width of up to 1.25 miles. The right-of-way is the land interest required within a route for the construction, maintenance, and operation of a high voltage transmission line.

To aid the siting of the ROW, given the constraints between the end points, the Applicant has requested a route width of between 150 and 600 feet in which to site the 80-foot width required for the ROW.

Right-of-Way Acquisition

This project will require approximately 9.5 miles of new right-of-way. The evaluation and acquisition process would include title examination, initial owner contacts, survey work, document preparation and purchase. Odell worked with the landowners to address their concerns to reach an agreement for the utilities' purchase of land rights. The Applicant has prepared a Transmission Easement Agreement for each parcel along the Proposed Route. The Agreements have diagrams showing the location and the size of the easement, for the HVTL, on each parcel.

Table 3. Summary of Transmission Structures

Line Type	Structure Type	Structure Material	Typical ROW Width (feet)	Approximate Structure Height (feet)	Structure Base Diameter (inches)	Foundation Diameter (feet)	Span Between Structures (feet)
Single-circuit 115 kV	Monopole	Wood or Steel	80	Ranges from 65-70 ft	Ranges from 24-36"	Wood: direct embed Steel: drilled pier concrete (9-14 ft)	350-400 ft

3.2 Project Construction and Maintenance

The Applicant's proposed 9.5 miles of single-circuit 115 kV HVTL will be constructed with either wood or steel monopole structures, which will be direct embedded or drilled pier concrete respectively. During final design the determination will be made if self-supporting angle and deadend or atypical structures will be needed. The structures will range in height from 65 - 70 feet above ground, and the spans adjacent to these structures will be approximately 350 - 400 feet (**Table 3**). The Applicant plans to coordinate construction and maintenance of the HVTL and Woad Hill Substation with the construction and operation of the Odell Wind Farm project.

Typical equipment used during HVTL and associated substation construction will consist 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, pick-up trucks, concrete trucks and various trailers.

Pole height and span length will vary depending on topography and environmental constraints within the proposed right-of-way. Based on geotechnical investigations, structure installation may require special techniques due to the presence of hydric soils near or above surface bedrock and other subsurface conditions.

All structures will be designed to meet or surpass all relevant local or state codes, North American Electric Reliability Corporation and the National Electrical Safety Code. Illustrations of the proposed structure types are shown below in **Figures 5 and 6.** After land rights have been secured, landowners will be notified prior to the start of the construction phase of the project, including an update on the project schedule and other related construction activities.

The first phase of construction activities will involve survey staking of the construction corridor and pole locations within the approved ROW. Removal of trees and other vegetation from the ROW will follow the survey and staking process. Clearing and grubbing will be completed in a manner that meets NESC standards and allows easy access for the construction crews. As a general practice, low-growing brush or tree species are allowable at the outer limits of the easement area. Taller tree species that endanger the safe and reliable operation of the transmission facility will be removed. The Applicant will coordinate clearing efforts with landowners to ensure minimal impacts to wind breaks, landscaping, and other vegetative buffers.

The NESC states that “vegetation that may damage ungrounded supply conductors should be pruned or removed.” Trees beyond the ROW area that are in danger of falling into the energized transmission line (danger trees) will be removed or trimmed to eliminate the hazard, based on the terms in the easement that is acquired. Danger trees generally are those that are dead, weak or leaning towards the energized conductors. In special circumstances, tree trimming agreements may be possible to minimize tree removal based on negotiations with individual landowners.

Transmission line structures are generally designed for installation at existing grades. Therefore, structure sites will not be graded or leveled unless it is necessary to provide a reasonably level area for construction access and activities. If vehicle or installation equipment cannot safely access or perform construction operations properly near the structure, minor grading of the immediate terrain may be necessary. If the landowner approves, the Applicant intends to leave any working pads and graded/leveled areas in place for future maintenance activities and access.

The Applicant will employ industry-specific best management practices (BMP). BMPs address ROW clearance, erecting transmission line structures and stringing transmission lines. BMPs for each specific project are based on the proposed schedules for activities, prohibitions, maintenance guidelines, inspection procedures and other practices. In some cases these activities, such as schedules, are modified to incorporate BMP construction that will assist in minimizing impacts for sensitive environments. Any contractors involved in construction of the transmission line will be advised of these BMP requirements. General construction BMPs will also be utilized and will include but not be limited to safety and storm water pollution prevention planning.

Staging areas established for the HVTL Project will likely be shared and co-located with the staging areas for the associated Odell Wind Farm project. Staging areas are used for the delivery and temporary storage of equipment and materials needed to construct the new HVTL. Once at the staging areas, the equipment and materials are sorted and loaded onto structure trailers which will deliver materials to the staked locations throughout the Proposed Route. Temporary laydown areas outside the HVTL ROW are generally needed for temporary storage of materials and to attach insulators and other hardware to the structure while it on the ground. Rental agreements will be established with affect landowners to allow the use of the temporary laydown areas.

During the installation of new poles, equipment will access the staked locations by using public rights-of-way that are parallel or perpendicular to the transmission line right-of-way. If private roads or trails are to be used for accessing the transmission line right-of-way for pole installation, the appropriate landowner will be contacted beforehand to obtain permission. Existing access roads may be upgraded or temporary access roads may be constructed to accommodate the heavy construction equipment. Temporary access roads will be removed and the disturbed areas will be revegetated following the completion of construction. Woody vegetation that has been removed for construction will be allowed to regrow as long as it does not encroach on the NESC prescribed clearances.

Odell Wind Farm, LLC currently anticipates that the construction contractor will place and secure the HVTL poles using a direct-embedment method. Direct-embedment is completed by removing the spoils from below ground level at the pole locations, placing the poles in the excavated hole and backfilling around the set pole with crushed rock. If the walls of the excavation hole do not stay in place during excavation, temporary casings may be used to maintain the excavated hole walls while setting the pole. All excavated spoil materials will be

removed from the site and properly disposed of unless prior arrangements have been with the landowner. Odell Wind Farm, LLC has committed to not placing spoil materials in remnant prairies, areas restored to native plant communities, wetlands, protected water bodies, protected watercourses or in a manner that could impact these areas through erosion and transport of the spoil materials. When site conditions warrant, concrete pole foundations will be used. Concrete foundation installation will require the use of steel casings and rebar during excavation, and concrete and anchor bolts will be placed into the excavated hole. Concrete foundations are anticipated to project approximately one foot above the existing ground surface.

After a number of new structures have been erected, the Applicant will begin to install the new static wire by establishing stringing setup areas within the ROW. Conductor stringing operations require brief access to each structure to secure the conductor wire to the insulators or to install shield wire clamps once final sag is established. Temporary guard or clearance structures are installed, as needed, over existing distribution or communication lines, streets, roads, highways, railways or other obstructions after any necessary notifications are made or permits obtained. This ensures that conductors will not obstruct traffic or contact existing energized conductors or other cables and also protects the conductors from possible damage.

Crossing of rivers, streams and wetlands may require specific methods during construction. The most effective measure to minimize impacts to watercourses is to span the stream or river. Construction equipment will not be allowed to drive across waterways except when all other routes are not feasible, and only after discussion with the appropriate resource agency and after all necessary approvals and/or permits have been obtained. 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. In areas where construction occurs close to waterways, BMPs help prevent soil erosion and ensure that equipment fueling and lubricating occur at a distance from waterways.

Impacts to wetlands will be minimized by implementation of BMPs, and to the extent possible the avoidance of construction within wetlands. Construction crews will be directed to avoid disturbance to wetlands and drainage systems by strategically locating access roads outside of these areas and by spanning wetlands and drainage systems. When it is not possible to span a wetland additional measures will be taken by the construction crews to minimize impacts, including, constructing within wetlands while the ground is frozen, access wetlands with the least amount of physical impact (i.e. shortest route within the wetland), structure assembly in an upland area and brought to the site for installation and the utilization of construction mats when construction within the wetland is not possible in the winter.

Woad Hill Substation construction will be similar to the transmission line construction process. The substation site will be grubbed and graded as necessary, and new drive approaches will be constructed to allow access and delivery to the site from existing public rights-of-way. Foundations will be installed for the transformer, high voltage structures, and control housing. The grounding grid and underground conduit will be installed to allow for electrical service to

the substation. Additional grading and installation of secondary containment facilities for the transformer will completed as needed. Additional equipment will be delivered and installed on constructed foundations. Electrical wires will be strung within the substation, and Xcel Energy will string a 345 kV line which will connect the Woad Hill Substation to the Xcel switchyard. Once connection with the Xcel Energy switchyard has been established the Woad Hill Substation will be energized.

Substations require a certain amount of maintenance to keep them functioning in accordance with accepted operating parameters and the NESC requirements. Transformers, circuit breakers, batteries, protective relays and other equipment need to be serviced periodically in accordance with the manufacturer's recommendations.

The principal operating and maintenance costs for transmission facilities are the costs of inspections and vegetation management. Monthly inspections of the HVTL will be completed by truck or fixed winged aircraft. 115 kV HVTL in the Upper Midwest have annual operation and maintenance costs that range from $300 to $600 per mile of transmission ROW.

Vegetation Removal and Management

The purpose of vegetation removal and management is to keep transmission facilities clear of tall growing trees, brush, and other vegetation that could grow close to the conductors, and to allow for construction vehicle access to and between structures.

BMPs attempt to limit ground disturbance during construction wherever possible. However, disturbance will occur during the normal course of work, which can take several weeks in any one location. As construction is completed, Odell Wind Farm, LLC's contractors will restore disturbed areas to their original condition to the maximum extent practicable. Odell Wind Farm, LLC or their contractor will attempt to contact each property owner after construction is completed to assess if any remaining damage has occurred as a result of the project. If damage has occurred to the property, Odell Wind Farm, LLC will fairly compensate the landowner for the damages sustained to crops, fences, or the property in accordance with the terms and conditions of the Transmission Easement Agreement held between Odell Wind Farm, LLC and the landowner.

In some cases, Odell Wind Farm, LLC may engage an outside contractor to restore the damaged property as nearly as possible to its original condition. Portions of vegetation that are disturbed or removed during construction of HVTLs 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 HVTL may require assistance in reestablishing the vegetation stratum and controlling soil erosion. Commonly used methods to control soil erosion and assist in reestablishing vegetation include re-seeding and mulching, erosion control blankets with embedded seeds, silt fence installation, hay bale installation, hydroseeding and planting individual seeds or seedlings of native species.

These erosion control and vegetation establishment practices are regularly used in construction projects and will be incorporated in the Applicant's construction plans. These construction techniques typically minimize long-term impacts that may result from the project. The Minnesota Noxious Weed Law (Minn. Statutes Section 18.75-18.91) defines a noxious weed as an annual, biennial or perennial plant that the Commissioner of Agriculture designates to be injurious to the public health, the environment, public roads, crops, livestock or other property. The Minnesota Department of Agriculture's Noxious & Invasive Weed Program assists local governments and landowners with resources for managing noxious and invasive weeds throughout Minnesota. Odell Wind Farm, LLC and their contractors will attempt to limit the spread of noxious and invasive weeds by cleaning construction equipment before it enters the construction work area and using only invasive-free mulches, topsoil, and seed mixes. Permanent vegetation will be established in areas disturbed within the construction work area except in actively cultivated areas and standing water wetlands. Seed used will be purchased on a *Pure Live Seed* basis for seeding revegetation areas. The seed tags on the seed sacks will also certify that the seed is "Noxious Weed Free."

Odell Wind Farm, LLC and their contractors may use both herbicides and mechanical methods to control the spread of noxious weeds. Only herbicides approved by the U.S. Environmental Protection Agency and the State of Minnesota Department of Agriculture will be used. These herbicides are to be applied by commercial pesticide applicators that are licensed by the Minnesota Department of Agriculture. If during post-construction monitoring of the restored right-of-way a higher density and cover of noxious weeds on the right-of-way is noted when compared to adjacent off right-of-way areas, landowner permission will be obtained and work to mitigate noxious weed concerns will be completed.

3.3 Project Implementation

Construction is anticipated to begin in the third quarter of 2014, and construction should be completed within two months. This schedule is based on information known as of the date of the application filing and upon planning assumptions that balance the timing of implementation with the availability of crews, material and other practical considerations. This schedule may be subject to adjustment and revision as further information is developed.

Project Costs

The Applicant has estimated that the installation of the new transmission line will cost approximately $3.5 million, and construction of the Woad Hill Substation will cost approximately $2 million. The Applicant anticipates that the majority of operations and maintenance costs incurred by the new transmission line and the substation will be in the form of regularly scheduled monthly inspections, which will be completed by truck or fixed wing air craft. The Applicant has estimated the typical annual operation and maintenance costs of a 115 kV line in the Upper Midwest are between $300 and $600 per mile of transmission right-of-way.

4.0 Other Routes and Route Segments

The process for individuals to request that specific alternative routes, alternative route segments, or alignment modifications be included in the scope of the environmental review document was discussed at the public meeting. No alternative routes, alternative route segments or alignment modifications were put forth during the EA scoping period.

In developing its proposed route, Odell Wind Farm, LLC informally evaluated and rejected a number of alternative HVTL route options based on a desktop environmental review and through consultation with individual landowners. The dismissed options included routing along portions of the following:

- 240th Street in Martin County
- 20th Avenue in Martin County
- County Road 85 along the Jackson and Martin County borders
- 40th Avenue in Martin County

Due to the agricultural land use and the generally low population density within the general proposed project area, the Applicant found negligible differences in environmental and engineering constraints between the Proposed Route and the other route options considered. Ultimately, the Proposed Route was selected as the alternatives considered were dismissed due to a lack of land to site the Woad Hill Substation or lack of landowner acceptance.

This environmental assessment only addresses the human and environmental impacts associated with the proposed transmission line.

5.0 Potential Impacts of the Proposed Route

The construction of a transmission line involves both short and long-term impacts. An impact is a change in the status of the existing environment as a direct or indirect result of the proposed action. Direct impacts are caused by the action and occur at the same time and place. Indirect impacts are caused by the action and occur later or are further removed in distance, but are still reasonably foreseeable.

Impacts may be negative or positive and temporary or permanent or long-lasting. Short-term impacts are generally associated with the construction phase of the project and can include vegetation damage, soil compaction, and noise. Long-term impacts can exist for the life of the project and may include land use restrictions or modifications. Measures that would be implemented to reduce, minimize, or eliminate potential impacts are discussed under the appropriate topic and highlighted as necessary in this section.

It may be possible to mitigate potential impacts by adjusting the proposed route, selecting a different type of structure or pole, using different construction methods or implementing any number of post-construction practices. The Commission can require route permit applicants to use specific techniques to mitigate impacts or require certain mitigation thresholds or standards to be met through permit conditions.

5.1 Description of Environmental Setting

The Minnesota Department of Natural Resources and the U.S. Forest Service have developed an Ecological Classification System (ECS) for ecological mapping and landscape classification. There are eight levels of ECS units in the United States. Map units for six of these levels occur in Minnesota: Provinces, Sections, Subsections, Land Type Associations, Land Types and Land Type Phases.

The project is located in Cottonwood, Jackson, and Martin Counties, Minnesota. This area lies within the Prairie Parkland Province, North Central Glaciated Plains section, and the Minnesota River Prairie subsection under the ECS. Prior to agricultural clearing, the lands within and surrounding the proposed project site were covered by upland and wet prairie communities with oak savanna on uplands protected from fire and floodplain forests protected by adjacent waterways. The most recent glaciation resulted in the development of several small wetlands and kettlehole lakes within the region.

Prior to agricultural clearing, upland prairie communities were dominated by native warm- and cool-season grass species such as big bluestem (*Andropogon gerardii*), prairie dropseed (*Sporobolus herterolepis*), little bluestem (*Schizachyrium scoparium*), Indian grass (*Sorghastrum nutans*), porcupine grass (*Stipa spartea*) and side-oats grama (*Bouteloua curtipendula*). Wet prairie communities were also dominated by native grass species, big bluestem, prairie cordgrass (*Spartina pectinata*), Indian grass, switchgrass (*Panicum virgatum*) and mat muhly grass

(*Muhlenbergia richardsonis*). The wet prairie communities tended to support more native forbs than the adjacent upland prairie communities. Some of the more common wet prairie forbs species would have included Canada goldenrod (*Solidago canadensis*), giant goldenrod (*Solidago gigantea*), tall meadow-rue (*Thalictrum dasycarpum*), eastern panicled aster (*Aster lanceolatus*), great blazing star (*Liatris pycnostachya*), heath aster (*Aster ericoides*), and golden alexanders (*Zizia aurea*). Upland savanna habitat and floodplain forested habitat had scattered trees compromising 25 – 50 percent of the canopy cover. Upland savannas were dominated by bur oak (*Quercus macrocarpa*) and northern pin oak (*Quercus ellipsoidalis*). Floodplain forest tree species were composed of silver maple (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*), cottonwood (*Populus deltoides*), and American elm (*Ulmus americana*).

Much of this subsection has been converted to agricultural lands. The Applicant's consultant, Applied Ecological Services (AES), utilized the 2001 National Land Cover Database (NLCD) developed by U.S. Geological Survey to complete the initial vegetative cover mapping. AES assigned the NLCD land cover types to one of the following vegetative cover types: developed, cropland, barren land, grassland, upland shrub-scrub, upland forest, forested wetland, shrub-scrub wetland, emergent wetland or open water **(Table 4)**.

Table 4. AES Vegetation Cover Type Description

AES Habitat Cover Type	Description
Developed	Residential, commercial, industrial, and other developed land, including developed green space (e.g., golf course, city park).
Cropland	Regularly cultivated land. Pasture, hay meadow, and fallow field are grasslands.
Barren Land	Land with sparse to no vegetation (e.g., mines, landfills, construction sites, sparsely vegetated shores).
Grassland	Grass and herbaceous plants cover ≥90percent of the ground in uplands; includes pasture, hay meadow, and fallow field.
Upland Shrub-Scrub	Shrubs and scrubby or mature trees cover 10-50percent of the ground. Includes brushland and savanna with trees and shrubs.
Upland Forest	Trees cover ≥50percent of the ground.
Forested Wetland	A wetland or lowland flooded area with 50-100percent tree cover.
Shrub-Scrub Wetland	A wetland with 10-50percent cover by shrubs, scrubby and mature trees. Includes savanna with trees and shrubs.
Emergent Wetland	A wetland with ≥90percent cover of herbaceous plants.
Open Water	Water and sparse to no vegetation cover; rivers, streams, lakes, ponds.

Currently, approximately 98.8 percent of the proposed route is utilized for agricultural purposes; within cropland are small patches of grasslands adjacent to drainage ditches and fence rows, and woodlots and windbreaks associated with farmsteads. The small grasslands are dominated by non-native cool season grasses such as smooth brome (Bromus inermis), Kentucky bluegrass (Poa pratensis) and quack grass (Elytrigia repens). The farmstead woodlots and windbreaks are primarily composed of fast growing tree species which have been planted: cottonwood, American elm, silver maple, aspen (Populus spp.) and willow (Salix spp.) The remaining 1.2 percent of the proposed route is composed of slightly larger patches of grassland adjacent to drainageways, emergent wetlands, and upland forest patches. The Woad Hill Substation is being sited entirely within currently tilled cropland. Refer to **Figure 12** for mapped cover types according to AES cover type descriptions.

The wildlife species utilizing the proposed route are adapted to agriculture and developed landscapes. Commonly encountered native wildlife species include: white-tailed deer (*Odocoileus virginanus*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), red-winged blackbird (*Agelaius phoeniceus*), common grackle (*Quiscalus quisculua*), American crow (*Corvus brachyrhynchos*) and American robin (*Turdus migratorius*). Additionally, a number of introduced wildlife species are common in the habitat types within the proposed route including: house sparrow (*Passer domesticus*), house finch (*Carpodacus mexicanus*), rock pigeon (*Columa livia*), ring-necked pheasant (*Phasianus colchicus*) and European starling (*Sturnus vulgaris*).

5.2 Socioeconomic

According to the 2010 Census data, populations in Cottonwood, Jackson and Martin counties were 11,687, 10,266, and 20,840 people respectively. The white, non-Hispanic percent of the total population in all three counties was relatively high: Cottonwood (92.2 percent), Jackson (95.8 percent), and Martin (96.7 percent). Minority groups in the three counties constituted a very small percentage of the total population at 7.8 percent, 4.2 percent, and 3.3 percent in Cottonwood, Jackson and Martin counties respectively. Minority groups made up 13.7 percent of the total population of the State of Minnesota in 2010. Persons living in poverty made up 11.7 percent, 11.2 percent and 9.3 percent of the populations in Cottonwood, Jackson and Martin counties respectively, which was relatively close to the statewide average of 11.9 percent of Minnesota residents in poverty.

The proposed route does not contain disproportionately high minority populations or low-income populations. Population and economic characteristics based on the 2010 U.S. Census are presented in **Table 5.**

Table 5. Population and Economic Profile, 2010

Location	Population	Minority[4] Population (percent)	Median Household Income (dollars)	Population Below Poverty Level (percent)
State of Minnesota	5,344,861	13.7	56,954	11.9
Cottonwood County	11,687	7.8	43,111	11.7
Jackson County	10,266	4.2	47,455	11.2
Martin County	20,840	3.3	44,791	9.3

Approximately 60 workers will be required by Odell Wind Farm, LLC for transmission line construction over an approximately two month time period.

[4] Minority population includes all persons excluding non-Hispanic white.

There will be a short-term influx of contractor employees during construction of the various aspects of the project. Both utility personnel and contractors will be used for construction activities. The communities near the project should experience short-term positive economic impacts through the use of the hotels, restaurants and other services by the various workers.

It is not expected that additional permanent jobs will be created by the project, but the project will allow construction of the 200 MW Odell Wind Farm which will generate temporary and a limited number of permanent jobs. The construction activities will provide a seasonal influx of economic activity into the communities during the construction phase, and materials such as concrete may be purchased from local vendors. Long-term beneficial impacts from the project include increased local tax base resulting from the incremental increase in revenues from utility property taxes.

The lands along the proposed route of the project are primarily used for agricultural purposes. The proposed HVTL will result in little to no land being removed from agricultural production, but the proposed Woad Hill Substation, in Martin County, will result in the conversion of approximately 10 acres of agricultural land to developed land.

Potential Impacts

There is no indication that any minority or low-income population is concentrated in any one area of the project, or that the transmission line would cross through an area occupied primarily by any minority group.

Socioeconomic impacts resulting from the project will be primarily positive with an influx of wages and expenditures made at local businesses during the construction of the project, increased tax revenue and increased opportunities for business development.

The relatively short-term nature of the project construction and the number of workers who would be hired from outside of the project area should result in short-term positive economic impacts in the form of increased spending on lodging, meals and other consumer goods and services. It is not anticipated that the project would create new permanent jobs during construction, but would create temporary jobs that would provide a short-term influx of income to the area.

If local contractors are used for portions of the construction, total wages and salaries paid to contractors and workers in Cottonwood, Jackson and Martin counties would contribute to the total personal income of the region. Additional personal income would be generated for residents in the counties and the state by circulation and recirculation of dollars paid out by the applicant as business expenditures and state and local taxes. Expenditures made for equipment, energy, fuel, operating supplies and other products and services would benefit businesses in the counties and the state.

Indirect impact may occur through the increased temporary job generation for the construction of the Odell Wind Farm, which would contribute to the economic growth of the region.

Long-term beneficial impacts to the county's tax base, as a result of the construction and operation of the transmission line, would be the incremental increase in revenue from utility property taxes which is based on the value of the project.

The loss of approximately 10 acres of agricultural land will likely have minimal or no noticeable impact on overall annual crop production in Martin County, and the economic impacts of lost crop production will be negligible.

Property Values

Large electric transmission facilities have the potential to impact property values. Because property values are influenced by a complex interaction between factors specific to each individual piece of real estate as well as local and national market conditions, the effect of one particular project on the value of one particular property is difficult to determine.

One of the first concerns of many residents near existing or proposed transmission lines is how the proximity to the line could affect the value of their property. Research on this issue does not identify a clear cause and effect relationship between the two. Rather, the presence of a transmission line becomes one of several factors that interact to affect the value of a particular property.

In the Final Environmental Impact Statement (EIS) on the Arrowhead-Weston Electric Transmission Line Project, the Wisconsin Public Service Commission addressed the issue of property value changes associated with high voltage transmission lines[5]. This document looked at approximately 30 papers, articles and court cases covering the period from 1987 through 1999.

> *In general there are two types of property value impacts that can be experienced by property owners affected by a new transmission line. The first is a potential economic impact associated with the amount paid by a utility for a right-of-way (ROW) easement. The second is the potential economic impact involving the future marketability of the property.*
>
> *However, substantial differences may exist between people's perceptions about how they would behave and their actual behavior when confronted with the purchase of property supporting a power line.*
>
> *The presence of a power line may not affect some individual's perceptions of a property's value at all. These people tend to view power lines as necessary infrastructure on the landscape, similar to roads, water towers and antenna.*

[5] Final Environmental Impact Statement , Arrowhead –Weston Electric Transmission Line Project, Volume I, Public Service Commission of Wisconsin Docket 05-CE-113, October 2000, pg 212-215

> *They generally do not notice the lines nor do they have strong feelings about them.*

The Final EIS provides six general observations from the studies it evaluated. These are:

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

Later, the Final EIS stated, "In coastal states, such as California and Florida, the decrease in property values can be quite dramatic; in states within the Midwest (Minnesota, Wisconsin and the Upper Peninsula of Michigan), the average decrease appears to be between 4 and 7 percent."

Finally, the EIS succinctly summarizes the dilemma in its closing paragraph which stated, "It is very difficult to make predictions about how a specific transmission line will affect the value of specific properties."

Based on the research that has been ongoing since at least the 1950s, several generalizations about the effect of transmission lines on property values can be made:

- Studies have found a potential reduction of sale price for single-family homes of between 0 to 14 percent. Studies conducted in the upper Midwest (Minnesota, Wisconsin and the Upper Peninsula of Michigan) have shown an average decrease of 4 to 7 percent.
- Although proximity to a transmission line does not appear to affect appreciation of a property, it can sometimes result in increased selling time.
- Property characteristics such as the neighborhood, proximity to schools, lot size, square footage of the house, and other amenities, tend to exert a greater effect on sales price than the presence of a power line.
- High-value properties are more likely than lower-value properties to experience a reduction in sales price.
- The sales price of smaller properties could be more adversely affected than for larger properties.

- For upgrade projects, the level of opposition may affect the size and duration of any reduction in sales price.
- Adverse effects on property prices tend to be greatest immediately after a new transmission line is built and diminish over time.
- The sales price for properties crossed by or immediately adjacent to a transmission line appear to be more adversely affected than prices for homes that are not adjacent to the transmission line right-of-way or are greater than 200 feet from the transmission line right-of-way.
- Mitigation measures such as setback distance, landscaping and integration of the right-of-way into the neighborhood, and visual and noise shielding have been shown to reduce or eliminate the impact of transmission structures on sales price.
- Impacts to the value of agricultural property can be reduced by placing structures to minimize disruption to farm operations.[6]

Interviews with residents along existing transmission lines show that a high proportion of residents were aware of the lines at the time they purchased their home and between one-half and three-fourths expressed concerns about the lines. The concerns were related to health effects, aesthetics, and effects on property values. Despite the concerns expressed, 67 to 80 percent of survey respondents with negative feelings about transmission lines reported that their decision to purchase the property and the price they offered to pay was not affected by the lines.[7]

Although results of the studies have not been able to provide a basis for accurately predicting the effect of a particular transmission line on a particular property, researchers have attributed the effects of HVTLs on property values to an interaction between five factors:[8]

- Proximity to the transmission towers and lines
- The view of the towers and lines
- Size and type of HVTL structures
- Appearance of easement landscaping
- Surrounding topography

Federal Housing Administration Regulations

The Federal Housing Administration (FHA) provides mortgage insurance on home loans made by FHA-approved lenders throughout the United States. In order to qualify for FHA mortgage insurance, a property must go through an appraisal and property condition assessment performed

[6] Adapted from Wisconsin Public Service Commission, June 2001. *Environmental Impacts of Transmission Lines*. http://psc.wi.gov/thelibrary/publications/electric/electric10.pdf, p. 17.
[7] Chalmers, James A. and Frank A. Voorvaart. "High-Voltage Transmission Lines: Proximity, Visibility, and Encumbrance Effects." *The Appraisal Journal*. Summer, 2009. http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/2009_HVTLs_and_Property_Values.pdf
[8] Pitts, Jennifer M. and Thomas O. Jackson. 2007. "Power Lines and Property Values Revisited." *The Appraisal Journal. Fall, 2007.*

by an FHA-qualified appraiser. FHA qualified underwriters and appraisers are responsible for adhering to current the policies contained in the FHA's *Homeownership Center (HOC) Reference Guide.* With respect to overhead HVTLs, FHA guidance requires appraisers to review properties under consideration for FHA loans for presence of utility easements. The US Department of Housing and Economic Development provides the following guidance:

- *The appraiser must indicate whether the dwelling or related property improvements is located within the easement serving a high-voltage transmission line, radio/TV transmission tower, cell phone tower, microwave relay dish or tower, or satellite dish (radio, TV cable, etc).*
- *If the dwelling or related property improvement is located within such an easement, the DE Underwriter must obtain a letter from the owner or operator of the tower indicating that the dwelling and its related property improvements are not located within the tower's (engineered) fall distance in order to waive this requirement.*
- *If the dwelling and related property improvements are located outside the easement, the property is considered eligible and no further action is necessary. The appraiser, however, is instructed to note and comment on the effect on marketability resulting from the proximity to such site hazards and nuisances.*[9]

Mitigative Measures

Socioeconomic impacts resulting from construction activities associated with the project would be primarily positive with an influx of wages and expenditures made at local businesses during the project construction. Mitigative measures are not necessary.

In the matter of property values (for those properties receiving an easement) potential impact would typically be a negotiated settlement in an easement agreement between the Applicant and the landowner.

Locating the line away from homes to the extent possible and using line design and landscaping to minimize visual intrusions from the line can be used to minimize impacts to property values from the transmission line.

The presence of an HVTL easement on a property does not preclude qualification for FHA mortgage insurance, although the location of an easement on the property does require further documentation than would be required on properties without such easements.

[9] U.S. Department of Housing and Urban Development. *Is a Property eligible for FHA if there are overhead or high voltage power lines nearby?* http://portalapps.hud.gov/FHAFAQ/controllerServlet?method=showPopup&faqId=1-6KT-2009

5.3 Displacement

Displacement of residential homes or businesses is not anticipated. There are eight dwellings located either within or adjacent to the proposed route. However, no homes would fall within the right-of-way of the transmission line.

The first dwelling is located north of County Road 17 in S32, T105, R34, Cottonwood County, and lies just outside of the proposed route, approximately 400 feet north of the anticipated alignment/ROW (**Figure 7**).

The second dwelling is located south of County Road 17 in S4, T104, R34, Jackson County, and lies just outside of the proposed route, approximately 500 feet south of the anticipated alignment/ROW (**Figure 8**).

The third dwelling is located south of County Road 17 in S4, T104, R34, Jackson County, and lies just outside of the proposed route, approximately 500 feet south of the anticipated alignment/ROW (**Figure 8**).

The fourth dwelling is located south of 240th Street in S12, T104, R34, Jackson County, and lies within the proposed route, approximately 125 feet south of the anticipated alignment/ROW (**Figure 9**).

The fifth dwelling is located south of 240th Street in S12, T104, R34, Jackson County, and lies within the proposed route, approximately 125 feet south of the anticipated alignment/ROW (**Figure 9**).

The sixth dwelling is located north of 240th Street in S1, T104, R34, Jackson County, and lies just outside of the proposed route, approximately 750 feet northeast of the anticipated alignment/ROW (**Figure 9**).

The seventh dwelling is located north of 240th Street in S6, T104, R33, Martin County, and lies within the proposed route, approximately 60 feet north of the anticipated alignment/ROW (**Figure 10**).

The eighth dwelling is located east of 30th Avenue in S9, T104, R33, Martin County, and lies just outside the proposed route, approximately 250 feet east of the anticipated alignment/ROW and the proposed Woad Hill Substation location (**Figure 11**).

Given the anticipated alignment/ROW, no existing structures along the proposed route would fail to meet the NESC safety codes.

Potential Impacts

Displacement of residential homes or businesses is not anticipated; only three dwellings lie within the proposed route and none of these lie within the anticipated ROW/alignment. It may be possible for the Permittee to work with landowners to discuss advantageous placement of the alignment on affected properties.

Mitigative Measures

Odell Wind Farm, LLC has committed to maximizing distance to homes along the Proposed Route, to the extent practicable. No additional mitigative measures are anticipated.

5.4 Noise

Noise is measured in units of decibels (dB) on a logarithmic scale. The A weighted decibel (dBA) scale corresponds to the sensitivity range for human hearing. For example, a noise level change of 3 dBA is barely perceptible to average human hearing while a 5 dBA change in noise level is noticeable. Two sources of noise would be associated with the completed Project: conductors and substations.

Land use activities associated with residential, commercial and industrial land are grouped together into Noise Area Classifications (NAC). Residences, which are typically considered sensitive to noise, are classified as NAC 1. Each NAC is assigned both daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) noise limits for land use activities within the NAC. **Table 6** shows the Minnesota Pollution Control Agency (MPCA) daytime and nighttime limits in dBA for each NAC. The limits 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 one hour.

Typical noise sensitive receptors along a route would include residences, churches, and schools; however, most of the land use along the route is rural agricultural land. Current average noise levels in these areas are typically in the 30 to 40 dBA range and are considered acceptable for residential land use activities. Ambient noise in rural areas is commonly made up of farm equipment, wind, rustling vegetation and infrequent vehicle pass-bys. Higher ambient noise levels, typically 50 to 60 dBA, would be expected near roadways, urban areas and commercial and industrial properties in the project area. Conductor and substation noise would comply with state noise standards.

Table 6. MPCA Daytime and Nighttime Noise Limits

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

Noise concerns for this project may be associated with both the construction and operation of the energy transmission system. Construction noise is expected to occur during daytime hours as the result of heavy equipment operation and increased vehicle traffic associated with the transport of construction personnel to and from the work area. Any exceedences of the MPCA daytime noise limits would be temporary in nature and no exceedences of the MPCA nighttime noise limits are expected for this project.

Operational noise would be associated with the transmission conductors and transformers at substations that may produce audible noise under certain operational conditions. The level of noise depends on conductor conditions, voltage level and weather conditions. Noise emission from a transmission line occurs during heavy rain and wet conductor conditions. In foggy, damp or rainy weather conditions, transmission lines can create a subtle crackling sound due to the small amount of electricity ionizing the moist air near the wires. During heavy rain, the general background noise level is usually greater than the noise from a transmission line and few people are in close proximity to the transmission line in these conditions. For these reasons, audible noise is not noticeable during heavy rain. During light rain, dense fog, snow and other times when there is moisture in the air, the proposed transmission lines may produce audible noise higher than rural background levels. During dry weather, audible noise from transmission lines is an imperceptible, sporadic crackling sound.

Based on a review of recent aerial photography, there are three dwellings within the proposed route. One home in S6, T104, R33, Martin County is within 60 feet to the north of the proposed anticipated alignment. Two additional homes are located in S12, T104, R34, Jackson County and lie approximately 200 feet south of the proposed anticipated alignment. Noise levels produced by a 115 kV transmission line are generally less than outdoor background levels and are therefore not usually audible. Given the distance to the nearest potential receptors the noise levels from the new line should not be noticeable.

Transformer hum is the dominant noise source at substations. Transformer hum is caused by magnetorestrictive forces within the core of the transformer. These magnetic forces cause the core laminations to expand and contract, creating vibration and sound at a frequency of 100 Hz (twice the a.c. main's frequency), and at multiples of 100Hz (harmonics). Typically, the noise

level does not vary with transformer load, as the core is magnetically saturated and cannot produce any more noise.

Preliminary drawings indicate the transformer within the proposed Woad Hill Substation location would be closest to a home (receptor), when you using Configuration 3, **Figure 4**, which would place the transformer approximately 350 to 400 feet northwest of the home. Due to the distance and vegetation that will be separating the Woad Hill Substation transform and the home, it is very unlikely that substation noise would be audible to the residents. The proposed Woad Hill Substation will be designed and constructed to comply with state noise standards established by the MPCA.

Potential Impacts

Noise levels produced by 115 kV transmission lines are usually not audible and have not been demonstrated to approach even the most stringent state standards. Based on preliminary project drawings the closest separation distance between the transformer at the proposed Woad Hill Substation and the nearest home is approximately 350 to 400 feet. Although the Woad Hill Substation transformer will produce noise, the residents of the nearest home are unlikely to be affected due to the distance from the transformer and the vegetative growth between the transformer and the home. Noise impacts from the project are not anticipated.

Mitigative Measures

The Applicant has stated that in an effort to mitigate noise levels associated with construction activities, work would be limited to daytime hours to avoid nighttime construction noise.

No mitigation measures are required for the operational phase of the line as operational noise levels are not predicted to exceed the state noise limits.

5.5 Radio and Television Interference

Corona on transmission line conductors can generate electromagnetic noise at frequencies at which radio and television signals are transmitted. This noise can cause interference (primarily with AM radio stations and the video portion of TV signals) with the reception of these signals depending on the frequency and strength of the radio and television signal. However, this interference is often due to weak broadcast signals or poor receiving equipment.

The most significant factor with respect to radio and television interference is not the magnitude of the transmission line induced noise, but how the transmission line induced noise compares with the strength of the broadcast signal. Generally, the greatest AM radio frequency interference typically occurs immediately under a transmission line and dissipates rapidly within the ROW to either side.

Interference with FM broadcast station reception is generally not a problem 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 (MHz), and
- 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. Noise in the frequency range of cellular type phones is almost non-existent, and the technology used by these devices is superior to that used in two-way mobile radio.

Television interference is rare but can occur when large transmission structures are aligned between the receiver and a weak distant signal source, which creates a shadow effect. Loose or damaged hardware may also cause television interference.

The Applicant completed a search of telecommunication towers located within one mile of the proposed route and substation locations. Two private land mobile towers were identified, and no microwave towers were identified.

Mitigative Measures

No interference issues are anticipated with this project, however, should such interferences be identified, the Applicant would be required to resolve the problem as a condition of the HVTL Route Permit.

If radio interference from transmission line corona does occur with AM radio stations presently providing good reception, the Applicant will work with the affected landowners to establish pre-Project reception levels by appropriate modification of (or addition to) the receiving antenna system.

If radio interference occurs because of the HVTL, the Applicant will work with affected landowners to restore reception to pre-Project levels. Movement of either two-way radio 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.

If television interference occurs due to the presence or operation of the HVTL, the Applicant will inspect and repair any loose or damaged hardware in the HVTL, appropriately modify the receiving antenna systems, or take other necessary actions to restore pre-Project reception levels.

5.6 Aesthetics

Aesthetics refer to the natural and built landscape that contribute to the public's experience and appreciation of their environment. Features, such as wetlands, surface waters, landforms, forests and vegetation patterns are among the natural landscape features that define an area's visual character. Buildings, roads, bridges and other structures represent the built environment and its reformations to the natural landscape. The scenic value or visual importance of an area is a subjective matter and depends upon the perception and philosophical or psychological response of the viewer. The level of impact to visual resources is also subjective and generally depends on the sensitivity and exposure of a particular viewer and can, therefore, vary greatly from one individual to the next.

The proposed structures for the 115 kV HVTL will be similar to the other 115 kV transmission lines on the local landscape. The structures will be constructed with monopole direct embedded wood or steel structures. Monopole structures will have a height of approximately 70 feet above ground and have an approximate span of 350 to 400 feet.

The proposed Woad Hill Substation will be constructed on lands currently used for agricultural row crop farming and will consist of components typically found at substations: control building, fencing, transformer and transmission line. There will also be necessary lighting of the substation to allow for security of the facility.

Potential Impacts

The visual impact will depend largely on the perceptions of the observers. The visual contrast added by the pole structures, transmission lines and the substation components may be perceived as a visual disruption.

Mitigative Measures

The Applicant has minimized visual disruptions of the rural landscape by siting the proposed route along existing roadway corridors. Combining the two linear features (HVTL and roads) will minimize viewshed impacts on the landscape to the greatest extent possible.

Security lighting within the Substation will be shielded downward to minimize lighting impacts on surrounding residences.

5.7 Public Health and Safety Including EMF

The project will be designed to comply with local, state, and NESC standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials and ROW widths. Odell Wind Farm, LLC contracted construction crews will comply with local, state, and NESC standards regarding installation of facilities and standard construction practices. Established industry safety procedures will be followed during and after installation of the

transmission line. Odell will use proper signage and guard structures when stringing wires across roads and railroads.

The transmission line must be equipped with protective devices to safeguard the public from the transmission line if an accident occurs and a structure or conductor falls to the ground. The protective devices are breakers and relays located where the transmission line connects to the substation. The protective equipment would de-energize the transmission line, should such an event occur. In addition to protective devices, proper signage will be posted to warn the public of the safety risks associated with the energized equipment.

Electric and Magnetic Fields

Voltage transmitted through any conductor produces both an electric field and a magnetic field in the area surrounding the wire. The electric field associated with HVTLs extends from the energized conductors to other nearby objects. The magnetic field associated with HVTLs surrounds the conductor. Together, these fields are generally referred to as electromagnetic fields, or EMF. These effects decrease rapidly as the distance from the conductor increases.

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 transmission line gets weaker as one moves away from the transmission line. Nearby trees and building material also greatly reduce the strength of transmission line electric fields.

The intensity of electric fields are associated with the voltage of the transmission line and is measured in kilovolts per meter (kV/M). Transmission line electric fields near ground are designated by the difference in voltage between two points (usually 1 meter). **Table 7** provides the electric fields at maximum conductor voltage for the proposed transmission lines. Maximum conductor voltage is defined as the nominal voltage plus five percent, which in the case of the proposed 115 kV line equals 121 kV.

For the proposed 115 kV structure, the peak electrical field occurs at approximately six feet from the centerline of the ROW, and is not given in Table 7. The maximum electrical field was calculated to be 1.80 kV/m for the vertical configuration and 1.78 kV/M for the delta configuration at one meter above ground at six feet of the centerline. The values in Table 7 are not identical when moving left of the centerline versus right of the centerline. This difference is due to the fact that the three transmission line phase conductors are not symmetrically placed on both sides of the center line.

Table 7. Calculated Electric Fields (kV/m)

Structure Type	Maximum Operating Voltage (kV)	Distance to Proposed Centerline (feet) of ROW												
		Left of Centerline							Right of Centerline					
		50	40	30	20	10	4	0	4	10	20	30	40	48
115 kV Vertical Configuration	121	0.06	0.03	0.09	0.36	0.93	1.39	1.66	1.80	1.66	0.92	0.35	0.08	0.03
115 kV Delta Configuration	121	0.24	0.33	0.47	0.64	0.92	1.29	1.57	1.75	1.69	1.06	0.53	0.29	0.21

There is no federal standard for transmission line electric fields. The Commission, however, has historically imposed a maximum electric field limit of 8 kV/m measured at one meter above the ground. The standard was designed to prevent serious hazards from shocks when touching large objects parked under AC transmission lines of 500 kV or greater.

Magnetic Fields

Current passing through any conductor, including a wire, produces a magnetic field in the area around the wire. The magnetic field associated with a high voltage transmission line surrounds the conductor and decreases rapidly with increasing distance from the conductor. The magnetic field is expressed in units of magnetic flux density, expressed as milligauss (mG).

The magnetic field profiles around the proposed HVTL for each structure and conductor configuration being considered for the project is shown in Table 8. Magnetic fields were calculated for the average loading of 88 megavolt amps (MVA), and the peak loading of 200 MVA based on the design of the HVTL. The average and peak magnetic field values are calculated at a point directly under the HVTL and where the conductor is closest to the ground. The same method is used to calculate the magnetic field at the edge of the right-of-way. The magnetic field profile data show that magnetic field levels decrease rapidly as the distance from the centerline increases.

Due to the conductor configuration of the proposed 115 kV structure, the peak magnetic field for both vertical and delta configurations occurs at one meter above the ground at approximately four feet from the centerline of the ROW. The peak magnetic field was calculated to be 152.22 mG and 153.87 mG for the vertical and delta configurations, respectively, under the expected peak loading condition. Magnetic field values expressed in **Table 8** vary depending on the direction from centerline due to the fact that the three transmission line phase conductors are not symmetrical on both sides of the center line.

Table 8. Calculated Magnetic Flux Density (milligauss)

Structure Type	System Load Conditions (MVA)	Distance to Proposed Centerline (feet) of ROW												
		50	40	30	20	10	4	0	4	10	20	30	40	48
		Left of Centerline							Right of Centerline					
115 kV Vertical Configuration	88 (Average)	12.75	17.19	23.94	34.34	49.39	59.37	64.65	67.28	64.65	49.39	34.34	23.94	18.32
	200 (Peak)	28.86	38.90	54.18	77.70	111.75	134.32	146.28	152.22	146.28	111.75	77.70	54.18	41.45
115 kV Delta Configuration	88 (Average)	11.89	16.38	23.61	35.21	51.66	61.65	66.34	68.01	63.89	47.42	32.36	22.29	16.93
	200 (Peak)	26.91	37.07	53.43	79.67	116.8	139.49	150.11	153.87	144.55	107.28	73.22	50.43	38.31

The actual power flow on the transmission line could potentially vary widely throughout the day depending on the output of the Odell Wind Farm, which will vary with the wind speeds. The actual magnetic field level will likely vary widely from hour to hour. In any case, the average loading of the transmission line will be far below the peak loading of the line, resulting in average magnetic fields typically below the peak magnetic fields during most hours of the year.

Table 9. Magnetic Fields (milligauss) From Common Home and Business Appliances

Type	Distance From Source in Feet			
	0.5	1	2	4
Computer Display	14	5	2	-
Fluorescent Lights	40	6	2	-
Hairdryer	300	1	-	-
Vacuum Cleaners	300	60	10	1
Microwave Oven	200	40	10	2
Conventional Electric Blanket	39.4 peak 21.8 average			

Source: EMF In Your Environment, EPA 1992

It can be noted that magnetic fields are not singularly associated with power lines. Every person has exposure to these fields to a greater or lesser extent throughout each day, whether at home or in schools and offices. **Table 9**, above, contains field readings for a number of selected, commonly encountered items. These reading represent median readings, meaning one might expect to find an equal number of readings above and below these levels.

Stray Voltage

Stray voltage encompasses two phenomena: Neutral to Earth Voltage and Induced Voltage. In general, stray voltage describes any case of elevated potential, but more precise terminology gives an indication of the source of the voltage.

Neutral to Earth Voltage (NEV) refers to a condition that can occur at the electric service entrances to structures, that is, where distribution lines enter structures. It is the phenomena most commonly referred to as "stray voltage." NEV is an extraneous voltage that appears on metal surfaces in buildings, barns and other structures, which are grounded to earth. NEV can be experienced, for example, by livestock who simultaneously come into contact with two metal objects (e.g., feeders, waterers, stalls). If there is a voltage between these objects, a small current will flow through the livestock. The fact that both objects are grounded to the same place (earth) would seem to prevent any voltage from existing between the objects. However, this is not the case – a number of factors determine whether an object is, in fact, grounded. These include wire size and length, the quality of connections, the number and resistance of ground rods, and the current being grounded.[10]

Neutral to Earth Voltage can result from damaged, corroded or poorly connected wiring or damaged insulation. Thus, NEV can exist at any business, house or farm which uses electricity, independent of whether there is a transmission line nearby. NEV is largely an issue associated with electrical distribution lines and electrical service at a residence or on a farm. Transmission lines do not create NEV as they do not directly connect to businesses, residences or farms.

NEV can be reduced in three ways: reducing the current flow on the neutral wire entering a home or building, reducing the resistance of the neutral system, or improving the grounding of the neutral system. Making good electrical connections and making sure that these connections have the proper wiring materials for wet and corrosive locations will reduce the resistance of grounded neutral system and thereby reduce NEV levels.

Induced Voltage refers to situations where an electric field extends to a nearby conductive object, thereby "inducing" a voltage on the object. The electric field from a transmission line in some instances can reach a nearby conductive object, such as a vehicle or a metal fence, which is in close proximity to the transmission line. This may induce a voltage on the object, which is dependent on many factors, including the weather conditions, object shape, size, orientation, capacitance and location along the right-of-way. If these objects are insulated or semi-insulated from the ground and a person touches them, a small current would pass through the person's body to the ground. This touch may be accompanied by a spark discharge and mild shock, similar to what can occur when a person walks across a carpet and touches a grounded object or another person.

[10] Stray Voltage, NDSU Extension Publication #108, http://www.ag.ndsu.edu/extension-aben/epq/files/epq108.pdf.

The major concern with induced voltage is the current that flows through a person to the ground when touching the object, not the level of the induced voltage. Most shocks from induced current are considered more of a nuisance than a danger, but to ensure the safety of persons in the proximity of high-voltage transmission lines, the NESC requires that any discharge be less than 5 milliAmperes. In addition, the Commission's electric field limit of 8 kV/m was designed to prevent serious hazard from shocks due to induced voltage under high-voltage transmission lines. Proper grounding of metal objects under and adjacent to the transmission line is the best method of avoiding these shocks.

While transmission lines do not, by themselves, create NEV because they do not connect to businesses or residences, they can induce voltage on a distribution circuit that is parallel and immediately under the transmission line. This induced voltage only occurs in the immediate vicinity of the distribution circuit; it does not travel along the transmission or distribution line. Standard industrial designs can mitigate potential for stray voltage to impact distribution lines.

Induced voltage can be reduced or eliminated using cancellation, separation or enhanced grounding. Cancellation can be achieved by configuring the conductors of the transmission line to minimize EMF levels. Separation literally increases the distance between the transmission and distribution lines by physically placing the lines in different locations or by increasing the vertical distance between transmission and distribution lines collocated on the same poles. Enhanced grounding connects counterpoises to the distribution neutral wire and the transmission shield wire.

Potential Impacts

Electric and Magnetic Fields

There are no federal or Minnesota state regulations for the permitted strength of a magnetic field on a transmission line; however both Florida and New York have standards ranging from 150 to 250 mG. Table 10 summarizes the international and state guidelines for ELF and EMF that currently exist.

The effect of EMF on human health has been the subject of study for over 25 years. Of particular concern is the link between EMF exposure and cancer. Numerous panels of experts have convened to review research data on whether EMF is associated with adverse health effects. The studies have been conducted by the National Institute of Environmental Health Sciences (NIEHS), the USEPA, the World Health Organization (WHO), and the Minnesota State Interagency Working Group (MSIWG) on EMF issues. Studies regarding EMF exposure and childhood leukemia and other cancer risks have had mixed results. Some organizations have determined that a link between EMF and cancer exists while others have found this link to be weak or nonexistent.

Table 10. ELF EMF International and State Guidelines

ELF-EMF Guidelines Established by Health & Safety Organizations		
Organization		**Magnetic Field**
American Conference of Governmental and Industrial Hygienists (ACGIH) (Occupational)		10,000 mG (for general worker) 1,000 mG (for workers with cardiac pacemakers)
International Commission on Non-Ionizing Radiation Protection (ICNIRP) (General Public, Continuous Exposure)		833 mG
Non-Ionizing Radiation Committee of the American Industrial Hygiene Association		4,170 mG
Institute of Electrical and Electronics Engineers (IEEE) Standard C95.6 (General Public, Continuous Exposure)		9,040 mG
U.K., National Radiological Protection Board (NRPB)		833 mG
Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)		3,000 mG
State Standards and Guidelines		
State	**Line Voltage**	**Magnetic Field (Edge of ROW)**
Florida	69-230 kV	150 mG
	230-500 kV	200 mG
	>500 mG	250 mG
Massachusetts		85 mG
New York		200 mG

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

In 1992, Congress initiated U.S. EMF Research and Public Information Dissemination (EMF RAPID). EMF RAPID program studied whether exposure to electric and magnetic fields produced by the generation, transmission, or use of electric power posed a risk to human health. Program conclusions were presented to Congress on May 4, 1999 as follows:

- The scientific evidence suggesting that ELF-EMF exposures pose any health risk is weak.
- Epidemiological studies have serious limitations in their ability to demonstrate a cause and effect relationship whereas laboratory studies, by design, can clearly show that cause and effect are possible. Virtually all of the laboratory evidence in animals and humans and most of the mechanistic work done in cells fail to support a causal relationship between exposure to ELF-EMF at environmental levels and changes in biological function or disease status. The lack of consistent positive findings in animals or mechanistic studies weakens the belief that this association is actually due to ELF-EMFs, but it cannot completely discount the epidemiological findings.
- The NIEHS concludes that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the Unite States uses electricity and therefore is routinely

> exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern (NIEHS, 1999).

In October 1996, a National Research Council Committee of the National Academy of Sciences released a report which corroborated the findings of EMF RAPID. The report concluded:

> *Based on comprehensive evaluation of published studies relating to the effects of power-frequency electric and magnetic fields on cells, tissues, and organisms (including humans), the conclusion of the committee is that the current body of evidence does not show that exposure to these fields presents a human-health hazard.*

Currently the USEPA states the following viewpoint of the associated health effects of EMF on its website (USEPA: Electric and Magnetic Fields (EMF) Radiation form Power Lines, 2009):

> *Much of the research about power lines and potential health effects is inconclusive. Despite more than two decades of research to determine whether elevated EMF exposure, principally due to magnetic fields, is related to an increased risk of childhood leukemia, there is still no definitive answer. The general scientific consensus is that, thus far, the evidence available is weak and is not sufficient to establish a definitive cause-effect relationship (USEPA, 2009).*

In 2001, the World Health Organization (WHO) International Agency for Research on Cancer classified power-frequency EMF as a "possible carcinogenic to humans." Currently the WHO states the following viewpoint of the associated health effects of EMF on its website (WHO, 2009):

> *Extensive research has been conducted into possible health effects of exposure to many parts of the frequency spectrum. All reviews conducted so far have indicated that exposures below the limits recommended in the INNIRP (1998) EMF guidelines, covering the full frequency range from 0-300 GHz, do not produce any known adverse health effect. However, there are gaps in knowledge still needing to be filled before better health risk assessments can be made (WHO, 2009).*

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

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

As noted above, research has not been able to establish a cause and effect relationship between exposure to EMFs and adverse health effects. However, a general consensus has been formed to continue research on the health effects of EMFs. At this time, there are no federal standards in the United States to limit EMF exposure.

Continued Research

In a 2007 report the World Health Organization (WHO) concluded that, although some studies have noted a weak statistical link between exposure to EMF and incidence of childhood leukemia, laboratory evidence does not support these findings and that a similar link has not been noted with other types of cancer:

> *… epidemiological evidence is weakened by methodological problems, such as potential selection bias. In addition, there are no accepted biophysical mechanisms that would*

> *suggest that low-level exposures are involved in cancer development. … Additionally, animal studies have been largely negative. Thus, on balance, the evidence related to childhood leukaemia is not strong enough to be considered causal. … Regarding long-term effects, given the weakness of the evidence for a link between exposure to ELF [extremely low frequency] magnetic fields and childhood leukaemia, the benefits of exposure reduction on health are unclear.*[11]

As noted above, research has not been able to establish a cause and effect relationship between exposure to EMFs and adverse health effects. However, a general consensus has been formed to continue research on the health effects of EMFs. At this time, there are no federal standards in the United States to limit EMF exposure.

EMF as it relates to public health and safety continues to be researched and reviewed.

Stray Voltage

Stray voltage has been raised as a concern on some dairy farms because it can impact operations and milk production. Problems are usually related to the distribution and service lines directly serving the farm or the wiring on a farm. In those instances when transmission lines have been shown to contribute to stray voltage, it was found that the electric distribution system directly serving the farm or the facilities themselves were directly under and parallel to the transmission line. These circumstances are considered in modern day routing/installing of transmission lines and can be readily avoided.

Mitigative Measures

As per the MDH White Paper recommendations concerning "prudent avoidance," Odell Wind Farm, LLC has selected a route that avoids residences to the greatest extent possible. There are no EMF impacts anticipated to be caused by the proposed project, so additional mitigation measures are not proposed at this time.

5.8 Recreation

Outdoor recreational opportunities in the area include boating, hunting, fishing, wildlife viewing, hiking, snowmobiling and ATV riding.

The proposed route does not cross or include any recreational facilities or areas. There are a variety of recreational opportunities approximately four miles to the west of the proposed project along the Des Moines River.

[11] World Health Organization (WHO). 2007. *Electromagnetic Fields and Public Health: Exposure to Extremely Low Frequency Fields. Fact Sheet No. 322.* http://www.who.int/mediacentre/factsheets/fs322/en/index.html

Four State Wildlife Management Areas (WMAs) managed by the MNDNR are located within five miles of the proposed route. One federal Waterfowl Production Area (WPA) managed by U.S. Fish and Wildlife Service (USFWS) is within five miles of the proposed route. One public park and two public trails, one snowmobile and one for ATV use, are located within five miles of the proposed route.

Below is a list of known recreational areas within five miles of the proposed route:

- Bennett State WMA (Approximately 2.9 miles northwest of the proposed route)
- Banks State WMA (Approximately 3.9 miles west/northwest of the proposed route)
- Fossum State WMA (Approximately 2.5 miles northeast of the proposed route)
- Laurs Lake State WMA (Approximately 4.1 miles southwest of the proposed route)
- Christiania USFWS WPA (Approximately 4 miles west of the proposed route)
- Mountain County Park (Approximately 5 miles north of the proposed route)
- Riverside Snowmobile Trail (Approximately 2.5 miles north/northest of the proposed route)
- Elm Creek ATV Trail (Approximately 3.6 miles south of the proposed route)

Potential Impacts

All proposed project facilities will be located on private lands, so no public recreational lands will be directly impacted by construction or operation of the proposed HVTL or Woad Hill Substation. Visual impacts may affect individuals utilizing public or private lands within or near the proposed route. Temporary noise impacts could be experienced by individuals utilizing the recreational resources in the area during construction of the HVTL and the substation. During construction and maintenance activities, hunting and potentially other recreational activities would be temporarily suspended near the HVTL or the substation to maintain safety standards for workers and the general public. The location of the HVTL and the substation could potentially affect hunting activities in close proximity to the proposed project area, as the transmission facilities presences could limit shooting directions and opportunities in the immediate vicinity of the structures.

Mitigative Measures

HVTL and Woad Hill Substation structures will be placed in a manner to avoid impacts to recreational resources to the greatest extent possible. No additional mitigation to recreational resources is proposed at this time.

5.9 Land-based Economies

Transmission lines have the potential to impact land-based economies. Transmission lines and poles are a physical presence on the landscape. This presence can prevent or otherwise limit use of the landscape for other purposes. In general, and for safe operation of the line, buildings and tall growing trees are not allowed in transmission line rights-of-way. This limitation can create impacts for commercial businesses and forestry. Additionally, transmission line poles and the necessary project substation take up space on the ground that could be used for other purposes, e.g., agriculture, mining.

The proposed route only crosses areas zoned as agricultural.

Agriculture

The entire Proposed Route and the proposed Woad Hill Substation locations are entirely within agricultural lands. The proposed Woad Hill Substation locations are composed of the following soil types: Estherville sandy loam, Clarion loam, Crippin loam, Nicollet-Crippin complex, Clarion-Swanlake loams, Coland loam, Webster clay loam, Nicollet clay loam and Canisteo-Glencoe depressional complex, per the United States Department of Agriculture, Natural Resources Conservation Service Web Soil Survey. Clarion, Crippin, Nicollet-Crippin, Clarion-Swanlake and Nicollet soils are considered to be prime farmland. Webster and Canisteo-Glencoe are considered prime farmland when drained. Estherville is considered farmland of statewide importance, and Coland is not considered prime farmland or farmland of statewide importance due to frequent flooding.

Forestry

There is currently no data available for private tree harvest areas located along the Proposed Route or proposed substation location. There are no known state or federally owned and/or managed forest areas within the Proposed Route or proposed substation location. There are scattered areas of privately-owned wooded lands which could be affected by the proposed transmission line. Typical tree species associated with the farmstead wooded areas in the Proposed Route include eastern cottonwood, green ash, box elder, and American elm.

Tourism

There are no official tourists/recreational areas present within the Proposed Route or proposed substation location. There are two public trails and four State WMAs located within five miles of the Proposed Route and the proposed substation location.

Mining

The Minnesota Department of Transportation (MnDOT) Aggregate Source Information Systems (ASIS) does not indicate the presence of any active mining sites within the Proposed Route or the proposed Woad Hill Substation location. The ASIS indicates there is a gravel pit approximately four miles from the Proposed Route in Section 25 of Cedar Township in Martin County. Two gravel mining pits are identified on the U.S.G.S topographic map in Section 16 of Cedar Township in Martin County, just southeast of the proposed Woad Hill Substation location. Based on recent aerial photographs the two gravel pits do not appear to be active.

Potential Impacts

Construction of the proposed HVTL and the Woad Hill Substation will result in the loss of use of approximately 10 acres of prime farmland. The majority of the prime farmland loss will come at the Woad Hill Substation location.

Construction of the proposed HVTL and the Woad Hill Substation will not adversely affect any managed forests, nurseries, privately-owned forest production areas, recreation or tourism at any public facilities, mining resources, or the potential for mining expansion possibilities.

Mitigative Measures

The loss of approximately 10 acres of prime farmland at the Woad Hill Substation location will likely have minimal or no noticeable impact on overall annual crop production in Martin County, and in the long term the economic impacts of lost crop production on that 10 acres of land will be negligible. Odell Wind Farm, LLC will make arrangements with landowner of the selected location for the Woad Hill Substation to ensure appropriate financial compensation for land use and to develop and secure the necessary easement for the Woad Hill Substation location.

5.10 Commercial, Industrial, Residential Land Use

The Proposed Route and proposed Woad Hill Substation is located in the lightly populated, rural portions of Cottonwood, Jackson and Martin counties in southwest Minnesota. Refer to **Table 1** for specific section, township and range project location. Lands within the Proposed Route and the proposed Woad Hill Substation are primarily utilized for agricultural production, and the there are no commercial or industrial lands within the project area. There is limited residential development, in the form of farmsteads, located along the Proposed Route and adjacent to the proposed Woad Hill Substation.

Based on a review of recent aerial photography conducted by the Applicant, there are six homes located within 500 feet of the proposed application alignment. Three homes are located within the Proposed Route:

- T104, R33, Section 6, Martin County (60 feet from application alignment)

- T104, R34, Section 12, Jackson County (200 feet from application alignment)
- T104, R34, Section 12, Jackson County (200 feet from application alignment)

Potential Impacts

The project will require approximately 9.5 miles of new HVTL right-of-way and approximately 10 acres of land for the proposed Woad Hill Substation. The Applicant will need to acquire easement rights across certain parcels to accommodate the facilities for the HVTL right-of-way and the proposed Woad Hill Substation if a route permit is granted.

An easement is an interest in land purchased by the Applicant which permits the use of that land for a specific purpose. In this case, Odell Wind Farm, LLC's easements would permit construction, operation and maintenance of an overhead transmission power line or a substation. The easement also permits the trimming and removal of trees within the easement to prevent them from touching the line.

The existence of a transmission line easement restricts some possible uses for the property. Acceptable uses within the easement areas include planting crops, pasture, roadways, curbs and gutters. The two most common restrictions would include prohibiting construction of permanent structures or buildings within the easement area and restrictions on planting trees that may grow into the lines; properties with existing structures very close to or within the ROW may have further restrictions placed on them.

The project would be designed to meet or exceed the clearance standards provided in NESC Section 232 for a 115 kV transmission line, which require a 9' 1'' horizontal distance between the conductor and a building; a 15' 1'' vertical distance between the conductor and a roof/balcony accessible by people; and a 20' 1'' vertical distance between the conductor and a roadway or parking lot.

Another concern associated with transmission lines includes potential effects on the availability of federal assistance mortgage loan insured by the Federal Housing Administration (FHA) as well as the availability of the Housing and Urban Development (HUD) backed mortgages for development of high density residential and/or mixed use developments. See *Section 5.2 Socioeconomics* for a detailed discussion on this matter.

Based on the Applicant's route evaluation/development work and the project's remote location, the proposed route is able to avoid displacement of any homes or businesses. If the alignment deviates from that which is anticipated due to unforeseen challenges, the Applicant has stated they will maximize distance from homes along the Proposed Route to the extent practicable.

Mitigative Measures

The HVTL Project is not anticipated to constitute a change in existing land use. At this time no displacement is anticipated, and no mitigative measures, other than maximizing HVTL Project distances from homes, have been proposed at this time. Additional measures may be specified as a condition of the HVTL Route Permit.

5.11 Public Services and Transportation

Public services and facilities in the project area generally include emergency services provided by government entities, local fire departments and county sheriffs' departments. The two largest hospitals serving the local residents include the Windom Area Hospital in Windom and the Sanford Medical Center in Jackson.

The Red Rock Rural Water System provides a central water distribution network for the rural residents within the project area. The Proposed Route includes one natural gas pipeline in close proximity, which is operated by Northern Border Pipeline Company. There is an established utility network, which provides gas and electrical services to the farms and homesteads within and near the Project Area.

Several telecommunication providers exist within the Project Area, including the following:

- Citizens Telecommunications Company of Minnesota, LLC
- Integra Telecom of Minnesota, Inc.
- Ionex Communications North, Inc.
- NOS Communication Inc.
- Qwest Corporation
- Sprint Communications Company L.P.
- Frontier Communications of Minnesota, Inc.
- Embarq Minnesota, Inc. d/b/a Century Link
- Windstream Lakedale Link, Inc.
- USLink, Inc. d/b/a TDS METROCOM

The existing public road system that services and provides access to the Project Area is generally located along section lines and is managed by local government units, counties and townships. Minnesota Department of Transportation is responsible for the management of State Highway 60, U.S. Highway 71 and Interstate Highway 90, which are not located within the Project Area but will provide access to the Project Area for project materials and construction equipment and machinery.

Roadways can potentially be impacted temporarily during construction activities and during maintenance of the transmission line. Impacts could result from construction vehicles and safety perimeters temporarily blocking public access to existing roads within the Project Area. Access

during construction and maintenance is expected to be primarily from existing roads. Due to the temporary nature of the proposed construction activities, traffic disruptions are expected to be minor and temporary. Structure placement along roadways can also impact future road expansions, as structures placed within the ROW must be moved to allow a safe distance between structures and the edge of the roadway.

Potential Impacts

Impacts to public services are anticipated to be minimal and temporary in nature should impacts occur. Any impacts to telecommunications, electrical services or water services will likely occur during construction or maintenance activities. Temporary disruption to these services is likely to occur to facilitate relocation of service facilities. No impacts to regional gas services are anticipated.

All impacts to transportation and roadways will be temporary in nature and will likely occur during construction or maintenance activities.

Mitigative Measures

All proper safety requirements will be followed along roadways, railroads and existing utilities along the Proposed Route. In their RPA, the Applicant committed to working with MnDOT, the counties, the townships and all public service providers to coordinate any potential or planned outages when consolidating facilities.

5.12 Archaeological and Historic Resources

A records search was completed at the State Historic Preservation Office (SHPO) on June 12, 2013, for the Odell Wind Farm Site Permit Application, filed separately, Docket No. IP6914/WS-13-843. The records search conducted for the Odell Wind Farm encompassed an area including the proposed boundary of the Odell Wind Farm and extended ½ mile in all directions from the proposed boundary of the Odell Wind Farm. The Proposed Route of the Odell Wind HVTL and the proposed Woad Hill Substation are located within the records search area of the Odell Wind Farm.

The SHPO records search identified no previously recorded archaeological and two architectural sites were identified within the proposed boundary of the Odell Wind Farm, but no archaeological or architectural sites were identified within the Proposed Route of the HVTL or the substation.

The Proposed Route has not undergone an archaeological survey. SHPO recommended additional survey work be completed. The Applicant will contract with a cultural resource professional, and a cultural resource survey will be conducted for all areas proposed to be disturbed by the proposed HVTL and substation installations. The proposed surveys will likely

occur close to the time of Route Permit issuance, but most occur prior to the start of project construction.

Potential Impacts

Currently, SHPO records do not identify any archaeological or architectural sites within or adjacent to the Proposed Route. Additional cultural resource survey work will be conducted prior to the start of project construction to further assess the areas to be disturbed by the project.

Mitigative Measures

Avoidance of archaeological and historic architectural properties is the preferred mitigative policy for construction of infrastructure projects. The Applicant has indicated in their RPA that results of the preconstruction cultural resource survey will be used to avoid and minimize impacts to archaeological and historic sites. Identified sites will be indicated on construction drawings, so construction staff can avoid the archaeological and historic sites to the greatest extent possible. Additionally, if any previously unknown archeological resources are encountered during construction, maintenance or operation of the proposed HVTL project, the discovery will be reported to SHPO.

There may be impacts to unidentified archaeological properties in previously undisturbed portions of the project. As a standard HVTL Route Permit condition, Odell Wind Farm, LLC will be required to work with SHPO to develop an Unanticipated Discoveries Plan prior to the start of construction. The Applicant, per their RPA, has also committed to assessing the integrity and significance of any archaeological sites identified during construction to determine the potential of the site to be eligible for listing in the National Register of Historic Places (NRHP). If any sites are found to be eligible for listing on the NRHP, the Applicant will work with SHPO, the State Archeologist to develop a mitigation plan.

Visual impacts to identified and unidentified historic architectural properties are not anticipated.

5.13 Natural Environment

The consideration of the impacts of a HVTL project on the natural environment, including air quality, water resources and flora and fauna is required as part of the environmental review. The impacts of HVTL projects on the natural environment are a function of the spatial alignment of the grid, the structures and conductors required for various voltages, the extent to which pre-existing corridors are used and how the transmission line is operated and maintained. The range of potential impacts and their significance depend on the area and the design and construction of individual lines.

Air Quality

Temporary fugitive dust emissions from construction activities may occur. Along the proposed route, clearing vegetation and driving the utility poles may create exposed areas susceptible to

wind erosion. In addition, tailpipe emissions may generate exhaust from the construction vehicles.

Fugitive dust is considered particulate matter under air quality regulations. The concentrations of fugitive dust that is fine particulate matter (P.M. less than 2.5 microns or PM2.5) is generally small, or approximately 3 percent to 10 percent of total particulate matter (USEPA's AP-42, Sections 13.2 and 11.9). Since fine particulate matter has the potential to travel further into the lungs, it is of greater concern than larger particle size ranges.

There are minimal air quality impacts associated with transmission line operation. The only potential air emissions from a transmission line result from corona. Corona can produce ozone and oxides of nitrogen in the air surrounding the conductor. Corona consists of the breakdown or ionization of air in a few centimeters or less immediately surrounding conductors. For 115/115 kV double-circuit, 115 kV single-circuit and 161 kV single-circuit transmission lines, the conductor gradient surface is usually below the air breakdown level.

Calculations done for a 345 kV project showed that the maximum one hour concentration during foul weather (worst case) would be 0.0007 parts per million (ppm) ozone. This is well below both the federal (0.075 ppm 8 hour) and state standards (0.08 ppm 8 hour) for ozone.

The Henshaw Effect is a theory that fine particulates already present in the air surrounding HVTLs may become ionized from HVTL corona. Ionization of the particulate matter (PM) is believed by Dr. Denis Henshaw, HH Wills Physics Laboratory, University of Bristol, United Kingdom, to increase the deposition of the fine particulates within the lungs. Fine particulates may be comprised of polycyclic aromatic hydrocarbons (PAHs). The increased deposition may lead to increased lung disease and cancer rates.[12]

Potential Impacts

There would be limited emissions from vehicles and other construction equipment and fugitive dust from ROW clearing during construction of the transmission line and substation. Temporary air quality impacts caused by the construction-related emissions are expected to only 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 from primarily diesel equipment would vary according to the phase of construction but would be minimal and temporary. Adverse impacts to the surrounding environment would be minimal because of the short and intermittent nature of the emission and dust-producing construction phases.

Currently, both state and federal governments have regulations regarding permissible concentrations of ozone and oxides of nitrogen. The national standard is 0.08 ppm on an eight-

[12] Corona ions from powerlines and increased exposure to pollutant aerosols A P Fews, D L Henshaw, R J Wilding and P A Keitch, . International Journal of Radiation Biology, Vol. 75. No. 12, 1523 - 1531, 1999.

hour averaging period. The state standard is 0.08 ppm based upon the fourth-highest eight-hour daily maximum average in one year. Calculations using the Bonneville Power Administration (BPA) Corona and Field Effects Program Version 3 (US Department of Energy, BPA Undated) for a standard single-circuit 115 kV project, predicted the maximum concentration of 0.006 ppm near the conductor and 0.002 ppm at one meter above ground during foul weather or worst-case conditions (rain at one inch per hour). During a mist rain (rain at 0.01 inch per hour), the maximum concentrations decreased to 0.0002 ppm near the conductor and 0.0001 ppm at one meter above ground level. For both cases, these calculations of ozone levels are well below the federal and state standards. Studies designed to monitor the production of ozone under transmission lines have generally been unable to detect any increase due to the transmission line facility. Given this, there would be no impacts relating to ozone for the project.

Mitigative Measures

As a standard HVTL Permit condition, construction activities must follow best management practices (BMPs) to control air emissions (fugitive dust). Petroleum based dust suppressants may not be used. Construction vehicles with excess tailpipe emissions would not be operated until repairs to the vehicle could be made. The disturbed areas resulting from construction will be minimized.

The potential impacts from the corona effect during HVTL operation is thought to be limited and no impacts to air quality are anticipated. No additional mitigation beyond BMPs to control fugitive dust will be necessary.

Water Quality - Surface Water and Wetlands

The Proposed Route is located within the Blue Earth River and Watonwan River watersheds. Public waters are wetlands, water basins and watercourses of significant recreational or natural resource value in Minnesota, as defined in Minn. Statutes Section 103G.005; the MNDNR has regulatory jurisdiction over these waters. The MNDNR Public Waters Inventory (PWI) identifies lakes, wetlands, and watercourses over which the MNDNR has regulatory jurisdiction. Minnesota law (Minn. Statutes Section 84.415 administered through Minnesota Rules Chapter 6135) requires that a license be obtained from the MNDNR Division of Lands & Minerals for the passage of any utility over, under or across any state land or public waters.

Wetlands are important resources for flood abatement, wildlife habitat and water quality. Wetlands that are hydrologically connected to the nation's navigable rivers are protected federally under Section 404 of the Clean Water Act. Under the Clean Water Act, Section 401 water quality certification is also required for activities that may result in a discharge to waters of the United States. On non-tribal lands in Minnesota, the MPCA administers Section 401 water quality certification. If the USCOE authorizes the project under its General Permit/Letter of Permission (GP/LOP) permitting program, the MPCA waives its Section 401 Water Quality Certification authority. In Minnesota, wetlands are also protected under the Wetland Conservation Act, which is administered by the Board of Water and Soil Resources (BWSR) and

the identified Local Government Unit (LGU). The USFWS produced maps of wetlands based on aerial photographs and Natural Resources Conservation Service soil surveys starting in the 1970s; these wetlands are known as the National Wetland Inventory (NWI).

Cedar Creek is the only public watercourse identified along the Proposed Route by the MNDNR PWI. The eastern end of the Proposed Route crosses Cedar Creek in two locations, and parallels Cedar Creek for approximately 0.3 miles. Cedar Creek is identified as a perennial stream along this reach, and Federal Emergency Management Agency (FEMA) Flood Insurance Maps identify a floodplain along Cedar Creek.

There are no wetlands or water basins identified on the MNDNR PWI within the Proposed Route.

The National Wetlands Inventory (NWI) data indicates the presence of four wetlands within or adjacent to the Proposed Route. Four palustrine emergent semi-permenantly flooded (PEMF) and six palustrine emergent seasonally flooded (PEMC) wetland basins are identified to the south of the western end of the Proposed Route. Based on aerial photograph review the PEMF and PEMC wetland basins identified in the NWI, the area appears to be utilized as agricultural land and has likely been degraded by agricultural drainage and plowing. Two palustrine emergent temporarily flooded, drained/ditched (PEMAd) wetlands are located along the Proposed Route, and three PEMAd wetland basins and two palustrine emergent seasonally flooded ditched/drained (PEMCd) wetland basins are located adjacent to the Proposed Route. Based on aerial photograph review it appears that agricultural activities have degraded all of the PEMAd and PEMCd basins. The NWI identifies Cedar Creek as a riverine low-gradient stream with an unconsolidated bottom with water present except during extreme drought and signs of excavation.

PWI and NWI identified surface water features are shown in **Figure 13**.

Potential Impacts

During construction, there is the possibility of sediment reaching surface waters and wetlands as the ground is disturbed by excavation, grading and construction traffic. After construction, maintenance and operation activities for the transmission line facilities are not expected to have an adverse impact on surface water quality.

Permanent impacts to water resources from the proposed HVTL project are anticipated to be minor. In the RPA, the Applicant has committed to designing and constructing the HVTL in a manner that will span all wetlands and watercourses within the Proposed Route to the extent practicable.

Mitigative Measures

As a standard HVTL Permit condition, the Applicant would be required to employ erosion control best management practices as well as adherence to the terms and conditions of the National Pollutant Discharge Elimination System (NPDES) permits and Stormwater Pollution Prevention Plan (SWPPP).

BMPs include maintaining sound water and soil conservation practices during construction and operation of the project to protect topsoil and adjacent water resources and minimize soil erosion. Practices can include containing excavated material, protecting exposed soil and stabilizing restored soil. Odell Wind Farm, LLC, through adherence to BMPs, will avoid major disturbance of individual wetlands and drainage systems during construction. This will be done by spanning wetlands and drainage systems where possible.

A formal wetland investigation and delineation will be completed along the Proposed Route prior to construction. If the proposed construction activities will permanently or temporarily impact any waters of the U.S., wetlands, waterbasins or watercourses protected under State jurisdiction, or identified 100-year floodplains, Odell Wind Farm, LLC will apply for and obtain any necessary permits from Federal, State and local government agencies prior to construction.

Flora

The project is located within the Prairie Parkland Province, North Central Glaciated Plains section and the Minnesota River Prairie subsection under the ECS. Prior to agricultural clearing the lands within and surrounding the proposed project site were covered by upland and wet prairie communities with oak savanna on uplands protected from fire and floodplain forests protected by adjacent waterways. The most recent glaciation resulted in the development of several small wetlands and kettlehole lakes within the region.

Prior to agricultural clearing, upland prairie communities were dominated by native warm- and cool-season grass species such as big bluestem (*Andropogon gerardii*), prairie dropseed (*Sporobolus herterolepis*), little bluestem (*Schizachyrium scoparium*), Indian grass (*Sorghastrum nutans*), porcupine grass (*Stipa spartea*) and side-oats grama (*Bouteloua curtipendula*). Wet prairie communities were also dominated by native grass species, big bluestem, prairie cordgrass (*Spartina pectinata*), Indian grass, switchgrass (*Panicum virgatum*) and mat muhly grass (*Muhlenbergia richardsonis*). The wet prairie communities tended to support more native forbs than the adjacent upland prairie communities. Some of the more common wet prairie forbs species would have included Canada goldenrod (*Solidago canadensis*), giant goldenrod (*Solidago gigantea*), tall meadow-rue (*Thalictrum dasycarpum*), eastern panicled aster (*Aster lanceolatus*), great blazing star (*Liatris pycnostachya*), heath aster (*Aster ericoides*) and golden alexanders (*Zizia aurea*). Upland savanna habitat and floodplain forested habitat had scattered trees compromising 25 – 50 percent of the canopy cover. Upland savannas were dominated by bur oak (*Quercus macrocarpa*) and northern pin oak (*Quercus ellipsoidalis*). Floodplain forest

tree species were composed of silver maple (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*), cottonwood (*Populus deltoides*) and American elm (*Ulmus americana*).

Currently, approximately 98.8 percent of the proposed route is utilized for agricultural purposes. Within cropland are small patches of grasslands adjacent to drainage ditches and fence rows and woodlots and windbreaks associated with farmsteads. The small grasslands are dominated by non-native cool season grasses, such as, smooth brome (Bromus inermis), Kentucky bluegrass (Poa pratensis) and quack grass (Elytrigia repens). The farmstead woodlots and windbreaks are primarily composed of fast growing tree species which have been planted: cottonwood, American elm, silver maple, aspen (Populus spp.) and willow (Salix spp.) The remaining 1.2 percent of the proposed route is composed of slightly larger patches of grassland adjacent to drainageways, emergent wetlands and upland forest patches. The Woad Hill Substation is being sited entirely within currently tilled cropland.

Potential Impacts

The majority of impacts to vegetation are anticipated to be temporary in nature. The Proposed Route includes a 80-foot wide corridor, which will total approximately 92 acres. Temporary impacts within that 92 acres may include soil compaction, crop damage and non-agricultural vegetation removal during construction activities. The permanent impacts to vegetation, primarily agricultural cropland loss, will be caused by the installation of approximately 125 power poles (approximately 0.06 acres total), and the construction of the Woad Hill Substation (approximately 10 acres).

Mitigative Measures

The Applicant will coordinate pole placement with landowners, and attempt to complete project construction prior to planting or after harvest to minimize impacts to crops and croplands. Farmers will be compensated by the Applicant for any unavoidable crop damage or loss, including soil compaction.

The Proposed Route has been selected in part to avoid natural vegetation. To the extent possible construction activities will completed in a manner that will avoid disturbance to natural vegetation, and where disturbance is unavoidable the disturbed areas will be reseeded with native, non-invasive, plant species.

Fauna

The wildlife species utilizing the proposed route are adapted to agriculture and developed landscapes. Commonly encountered native wildlife species include: white-tailed deer (*Odocoileus virginanus*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), red-winged blackbird (*Agelaius phoeniceus*), common grackle (*Quiscalus quisculua*), American crow (*Corvus brachyrhynchos*) and American robin (*Turdus migratorius*). Additionally, a number of introduced wildlife species

are common in the habitat types within the proposed route including: house sparrow (*Passer domesticus*), house finch (*Carpodacus mexicanus*), rock pigeon (*Columa livia*), ring-necked pheasant (*Phasianus colchicus*) and European starling (*Sturnus vulgaris*).

Potential Impacts

Wildlife that resides within the construction zone will be temporarily displaced to adjacent habitats during the construction process. It is unlikely that the construction and maintenance activities of the project would have a permanent effect on fauna present in the area. Wildlife that inhabits trees that may be removed for the HVTL installation will likely be displaced. Comparable habitat is near the route, and it is likely that these organisms would only be displaced a short distance.

Birds have the potential to collide with all elevated structures, including power lines. Avian collisions with transmission lines can occur in proximity to agricultural fields that serve as feeding areas, wetlands and water features and along riparian corridors that may be used during migration.

Collision with HVTL is more typical of larger bird species, i.e. raptors and waterfowl. Electrocution occurs when birds with large wingspans come in contact with two conductors or a conductor and a grounding device. Utility transmission line design standards provide adequate spacing to reduce the risk of raptor electrocution and will minimize potential avian impacts of the proposed project.

Plastic erosion control netting is frequently used for erosion control during construction and landscape projects and can negatively impact terrestrial and aquatic wildlife populations as well as snag in maintenance machinery, resulting in costly repairs and delays. Wildlife entanglement in and death from plastic netting and other man-made plastic materials has been documented in birds, fish, mammals and reptiles.[13]

It is anticipated that fish and mollusks that inhabit Cedar Creek will not be affected by the construction, operation, or maintenance of the HVTL.

Mitigative Measures

Displacement of fauna is anticipated to be minor and temporary in nature, and no long-term population-level impacts are anticipated from the proposed project. The Applicant has stated that it will construct the transmission line according to Avian Power Line Interaction Committee (APLIC) recommended safety design standards in order to reduce avian collisions and avian electrocution. In addition, the Applicant will work with EERA, MNDNR and the USFWS to identify any areas that may require marking the transmission line to reduce the likelihood of

[13] http://files.MnDNR.state.mn.us/eco/nongame/wildlife-friendly-erosion-control.pdf

avian collisions. The HVTL Route Permit could include this consultation as a required permit condition. The transmission line has been included in portions of the Avian and Bat Protection Plan (ABPP) being completed for the Odell Wind Farm Site Permit process (Docket No. IP6914/WS-13-843).

Avoiding the use of photodegradable erosion-control materials where possible and using biodegradable materials (typically made from natural fibers) instead, preferably those that will biodegrade under a variety of conditions, can minimize the impact to wildlife. The HVTL Route Permit could include the use of these materials as a standard condition.

5.14 Rare and Unique Natural Resources

Construction and maintenance of transmission lines might destroy individual plants and animals or might alter their habitat so that it becomes unsuitable for them. For example, trees used by rare birds for nesting might be cut down, or soil erosion may degrade rivers and wetlands that provide required habitat.

In some limited cases, transmission line ROWs can be managed to provide habitat for endangered/threatened resources. An example includes osprey nesting platforms built on top of transmission poles.

Endangered species are species whose continued existence is in jeopardy. Threatened species are likely to become endangered. Species of special concern have some problems related to their abundance or distribution, although more study is required.

The MnDNR Division of Ecological and Water Resources manage the Natural Heritage Information System (NHIS) which provides information on Minnesota's rare plants, animals, native plant communities and other rare features. The NHIS is continually updated as new information becomes available and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities and other natural features. Its purpose is to foster better understanding and conservation of these features.

However, some areas of the state have not been surveyed extensively or recently, so the NHIS database cannot be relied upon as a sole information source for rare species. The MNDNR NHIS database was queried by the Applicant to obtain the locations of rare and unique natural resources within the proposed boundary of the Odell Wind Farm, which includes the Odell Wind HVTL Proposed Route and the proposed Woad Hill Substation. The June 24, 2013, Natural Heritage Review Letter from the MNDNR was included in Appendix B of the RPA.

The review of the NHIS database identified several Sites of Biodiversity Significance within the the proposed boundary of the Odell Wind Farm project. The NHIS database review does not identify any rare species or Sites of Biodiveristy Significance within the Proposed Route. One Site of Biodiversity Significance is located approximately one mile north of the very west end of the Proposed Route.

The Fish and Wildlife Service lists Poweshiek skipperling (*Oarisma poweshiek)* in Cottonwood County and prairie bush clover (*Lespedeza leptostachya*) in Cottonwood, Jackson and Martin Counties as species covered under the Endangered Species Act (ESA). The northern long eared bat (*Myotis septentrionalis*) is found in Cottonwood, Jackson and Martin Counties, and has been proposed to be listed as endangered under the ESA.

The Poweshiek skipperling is typically found in native prairie remnants, and the prairie bush clover is generally found growing in dry prairie sites. The northern long eared bats typically spends the winter months hibernating in old mine shafts and caves and will swarm in woodlands near their hibernacula in the fall. During spring and summer months northern long eared bats roost and forage within or near upland forests.

Tier 3 wildlife surveys conducted by the Applicant's consultant identified three bird species currently listed as State Special Concern: trumpeter swam (Cygnus buccinators), Franklin's gull (Leucophaeus pipixcan) and American white pelican. Additionally bald eagle (Halliaeetus leucocephalus were identified during the Tier 3 wildlife surveys. The trumpeter swan and bald eagle were identified in the northwestern portion of the proposed boundary of the Odell Wind Farm, which is away from the Proposed Route.

Potential Impacts

Impacts to Poweshiek skipperling and prairie bush clover are not anticipated as there are no native prairie remnents or dry prairie sites within the Proposed Route, so the species are likely not present. The potential for impacts to northern long eared bats are thought to be minimal, and would only occur during tree clearing during construction or maintenance activities. Minimal tree clearing will be completed during project construction, further reducing the possibility for impacts to the northern long eared bat.

There is potential for larger birds, such as trumpeter swan, American white pelican and bald eagle to collide with transmission lines and be electrocuted. Due to the predominance of agricultural lands within and adjacent to the Proposed Route, impacts to rare and unique natural resources is expected to be minimal.

Mitigative Measures

The environmental review process is designed to identify rare species and unique natural resources so that the various routing options can be designed to avoid encroachment and effects on these items to the greatest extent practicable.

The Proposed Route has been sited away from known records of rare species and unique natural resources, including native habitats. Additionally, the Applicant has committed to constructing the HVTL project according to the APLIC recommended standards to reduce the potential for

avian collissions and electrocution. If any impacts to State or Federally listed threatened or endangered species are identified, the Applicant will work with the appropriate government agencies to identify appropriate avoidance, minimization and mitigative measures.

6.0 Unavoidable Impacts

During construction of the proposed HVTL, there will be temporary unavoidable adverse impacts on the existing flora and fauna, soil and traffic in those locations where construction would occur adjacent to an existing roadway. Some of these impacts may occur, on a lesser scale, during maintenance of the transmission line. Longer-term, non-temporary adverse impacts related to construction and maintenance of the proposal transmission line and the proposed Woad Hill Substation include the loss approximately 10 acres of agricultural land within the footprint of the proposed substation; visual impacts; impacts to migratory birds from collisions with the lines; and potential impacts to property values.

In addition, there are few commitments of resources associated with this project that are irreversible and irretrievable, but those that do exist are primarily related to construction. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action.

The proposed HVTL will require the commitment of land (a ROW of approximately 9.5 miles in length and 113 to 130 feet wide, adjacent to township roads and county roads, respectively). The ROW for certain land uses will be lost. In most cases, this ROW can continue to be used for many purposes, primarily agricultural lands.

Construction resources that will be used include aggregate resources, concrete, steel and hydrocarbon fuel. These resources will be used to construct the project. During construction, vehicles will be traveling to and from the site utilizing hydrocarbon fuels. However, once built, the proposed HVTL will not consume raw materials.

7.0 Application of Routing Factors

In the Alternative Routing Process, Odell is not required to provide any routes for review other than the route proposed in the Route Permit Application. However, the scoping process allows citizens or local units of government to propose alternatives. In this case, no additional routes or route segments were proposed.

The Power Plant Siting Act requires the Commission to locate transmission lines "in an orderly manner compatible with environmental preservation and the efficient use of resources" and in a way that minimizes "adverse human and environmental impact while insuring" electric power reliability.[14] Minn. Statute Section 216E.03, subdivision 7(b) identifies considerations that the Commission must take into account when making its final determination on routing of HVTLs. Minnesota Rule 7850.4100, lists 14 factors to guide Commission route designations, including the evaluation and minimization of adverse environmental impacts, impacts to public health and welfare, and adverse economic impacts. These factors are outlined in Section 2.5 Final Decision of this document.

In this section, the information gathered from the RPA and the review process is applied to these factors.

Factors for Which Impacts are Anticipated to be Minimal
Based on the information in the RPA and EA there are routing factors for which adverse impacts of the project will be minimal. These routing factors concern effects to:

- human settlement (including factor elements socioeconomics, displacement, aesthetics, noise, property values, cultural values, recreation, electronic communications and public services);
- public health and safety (including factor elements electric and magnetic fields, stray voltage and induced voltage);
- land based economies (including factor elements agriculture, forestry, tourism, and mining);
- archaeological and historic resources;
- natural environment - factor element air quality, and;
- unique natural resources.

A discussion on these routing factors and elements is located in Chapter 5 of this document.

Many of the potential impacts associated with these factors are mitigated through standard industrial practices and requirements and general conditions contained within the HVTL Route Permit.

[14] Minnesota Statute 216E.02

The applicable factors and corresponding elements that would be minimized through the application of standard industrial practices and requirements and general and special conditions contained within a HVTL Route permit are illustrated below.

Factor	Element	Standard Practice	General/Special Route Permit Condition
Human Settlement	Noise	RPA pages 26 and 27 EA pages 29-31	Appendix B, Sample HVTL Route Permit, Section 4.2.4
	Electronic Communications	RPA pages 28 EA pages 31 and 32	Appendix B, Sample HVTL Route Permit, Section 4.7.3
Public Health & Safety	Stray Voltage and Induced Voltage	RPA pages 17 - 23 EA pages 37- 42	Appendix B, Sample HVTL Route Permit, Section 4.7.2
	Electric Fields	RPA page 17 - 23 EA pages 34 and 35	Appendix B, Sample HVTL Route Permit, Section 4.7.2
Land Based Economies	Agriculture, Forestry, Tourism, Mining	RPA pages 34 - 36 EA pages 44 and 45	Appendix B, Sample HVTL Route Permit, Section 4.2
Archaeological and Historic Resources		RPA pages 36 and 37 EA pages 48 and 49	Appendix B, Sample HVTL Route Permit, Section 4.8.4

Factors for Which Impacts, Through the Use of Mitigation Strategies, are Anticipated to be Minimal to Moderate

Based on the information in the RPA and EA, there is a routing factor for which adverse impacts of the project will be minimal given the application of mitigative strategies identified in the EA. This routing factor concerns the potential impacts to the natural environment factor elements water quality, flora and fauna.

> Water Quality – With the implementation of Best Management Practices[15] the construction and operation of the proposed project is not anticipated to result in adverse or significant impacts to wetlands and water bodies in the project area. The Applicant will be required to prepare a Storm Water Pollution Prevention Plan (SWPP) that outlines the BMPs for erosion prevention and sediment control. As part of the SWPPP, the Applicant will be required to prepare a Spill Prevention, Control, and Countermeasure

[15] http://www.pca.state.mn.us/index.php/water/water-types-and-programs/stormwater/stormwater-management/minnesotas-stormwater-manual.html

(SPCC) Plan to minimize the potential for spills of hazardous materials and their transport to streams and other water bodies.

Flora – The transmission line ROW will be restored and vegetation reestablished through re-seeding and mulching, except within agricultural lands. To inhibit weeds from becoming established on the new ROW, disturbed areas will be stabilized and replanted as soon as practicable with an approved seed mix.

Fauna – It is unlikely that the construction, operation, and maintenance of the proposed project would have a permanent effect on fauna present in the area. Wildlife that inhabits trees that may be removed for the HVTL will be displaced. However, comparable habitat is near the route, and it is likely that these organisms would only be displaced a short distance.

Electrocution of avian species occurs when birds with large wingspans come in contact with two conductors or a conductor and a grounding device. Odell Wind Farm, LLC transmission line design standards provide adequate spacing to reduce the risk of raptor electrocution and will minimize potential avian impacts of the proposed project.

Factors Which are Met and/or Adequately Addressed

Some routing factors are applicable to the State's goal of ensuring electric energy security through efficient, cost-effective power supply and transmission infrastructure. These routing factors are:

- design options (including factor elements energy efficiency, and ability to accommodate expansion);
- use of or paralleling existing ROWs (including factor elements survey lines, natural division lines, and agricultural boundaries);
- use of existing infrastructure ROWs (including factor elements roads/highways, rail roads, pipelines, and transmission lines), and;
- route and design dependent costs (including factor elements construction, operation and maintenance).

The information contained in the RPA and EA indicate that these factors have been met.

Design Options – The proposed project is to transmit energy generated at the Odell Wind Farm, an up to 200 MW large wind energy conversation system, to the proposed Woad Hill Substation. The proposed Woad Hill Substation will interconnect with an anticipated Xcel Energy switchyard where interconnection with the Northern States Power, Lakefield Junction – Wilmarth 345 kV transmission line will place the generated energy onto the grid. The range of potential routes and engineering designs considered by the Applicant for the proposed project was constrained by a need to connect to the proposed Odell Wind Farm Substation and the anticipated Xcel Energy switchyard and interconnection point.

Use of or Paralleling Existing ROWs - The Proposed Route is proposed to be on private lands directly adjacent to and parallel existing public ROWs (roadways) for the entire length of the project.

Route and Design Dependent Costs - The Applicant has estimated that the installation of the new transmission line will cost approximately $3.5 million, and construction of the Woad Hill Substation will cost approximately $2 million. The Applicant anticipates that the majority of operations and maintenance costs incurred by the new transmission line and the substation will be in the form of regularly scheduled monthly inspections, which will be completed by truck or fixed wing air craft. The Applicant has estimated the typical annual operation and maintenance costs of a 115 kV line in the Upper Midwest are between $300 and $600 per mile of transmission right-of-way.

Factors relating to Unavoidable Impacts, and/or the Irreversible and Irretrievable Commitments of Resources

The final two factors concern implications of irreversible and irretrievable commitments of resources and the unavoidable impacts associated with the implementation of the proposal.

Irreversible and Irretrievable Commitments of Resources

A commitment of resources is irreversible when its primary or secondary impacts limit the future option for a resource. An irretrievable commitment refers to the use or consumption of resources that is neither renewable nor recoverable for later use by future generations. The commitment of resources refers primarily to the use of nonrenewable resources such as fossil fuels, water, and other materials (aggregate minerals, steel/metals, etc.).

Construction activities would require the use of fossil fuels for electricity and for the operation of vehicles and equipment. Use of raw building materials for construction would be an irretrievable commitment of resources from which these materials are produced. The use of water for dust abatement during construction activities would be irreversible. Commitment of labor and fiscal resources to develop and build the project is considered irretrievable.

Unavoidable Impacts

Where feasible, the EA suggests mitigation measures to be incorporated into the planning, design, and construction of the proposed project to substantially eliminate the adverse impacts. In other areas of consideration, adverse impacts can be reduced but not eliminated and are therefore determined to be unavoidable. Most unavoidable adverse impacts would occur during the construction phase of the proposed project and would be temporary.

A review of impacts and possible mitigation measures is located in Chapter 5 of this document; the unavoidable adverse effects caused by the proposed project that would remain after applying mitigation measures are discussed in Chapter 6.

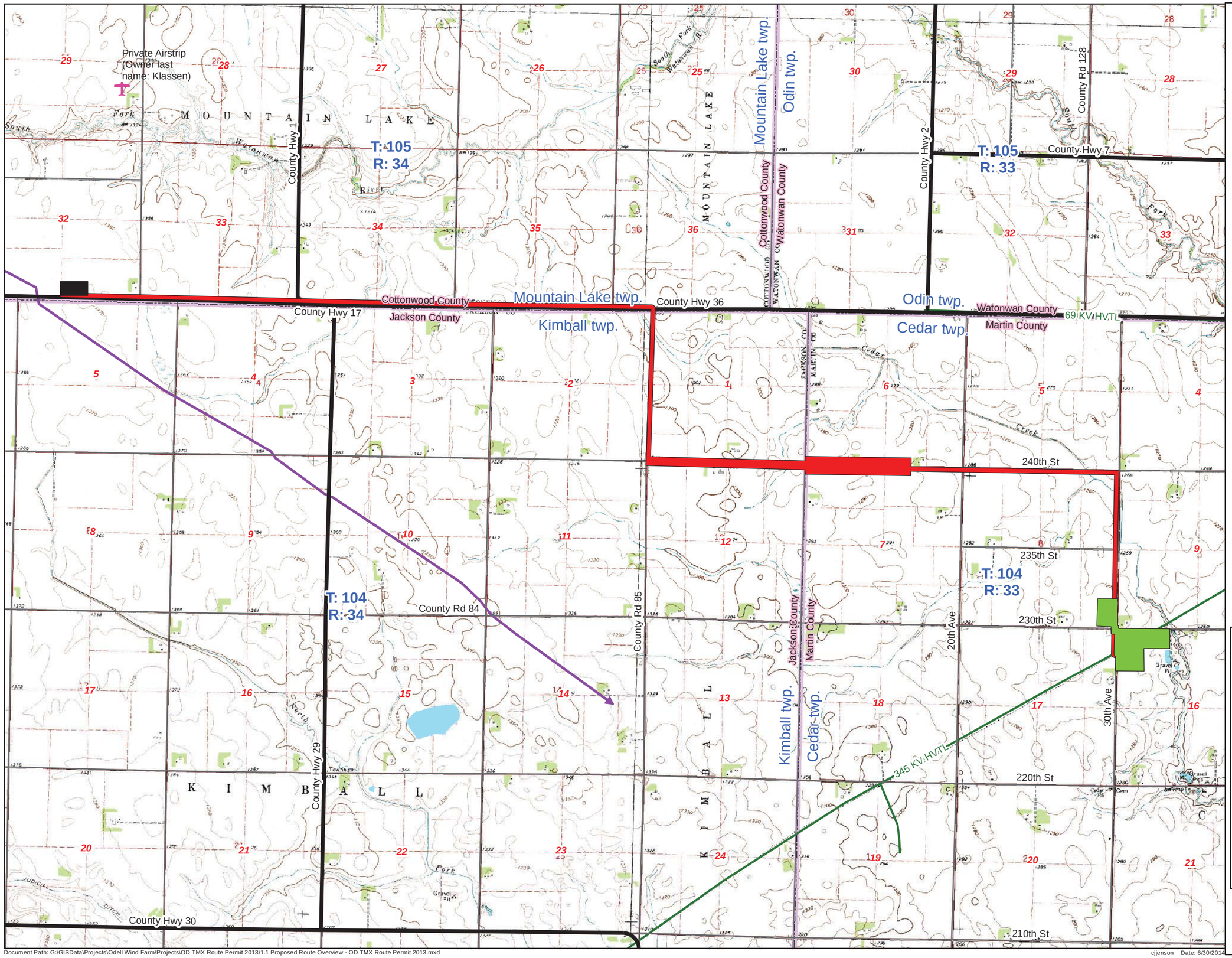
Unavoidable adverse effects related to proposed project construction would last only as long as the construction period, and would include the following:

- Soil compaction, erosion, and vegetation degradation.
- Disturbance to and displacement of some species of wildlife.
- Disturbance to nearby residents.
- Traffic delays in some areas.
- Minor air quality impacts due to fugitive dust.

Unavoidable adverse effects related to proposed project that would last at least as long as the life of the project would include the following:

- The addition to the visual landscape of transmission towers and lines.
- Loss of agricultural lands.
- Direct adverse impacts to wildlife as a result of avian collisions.

Figures



ODELL WIND FARM

Cottonwood, Jackson, Martin, & Watonwan Counties, MN

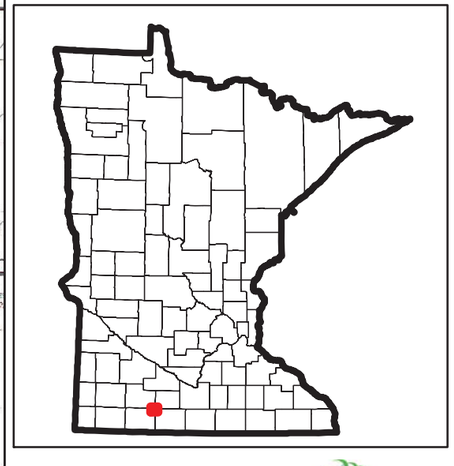
FIGURE 1
Proposed Route Overview

LEGEND

- Odell Wind Farm Substation
- Woad Hill Substation Area
- Proposed Route
- Private Airstrips
- Existing HVTL
- Pipeline - Field Verified
- US Highway
- State Highway
- County Highway
- County Road
- Other Roads
- County Boundary

0.5
Miles

NAD 1983 UTM Zone 15N

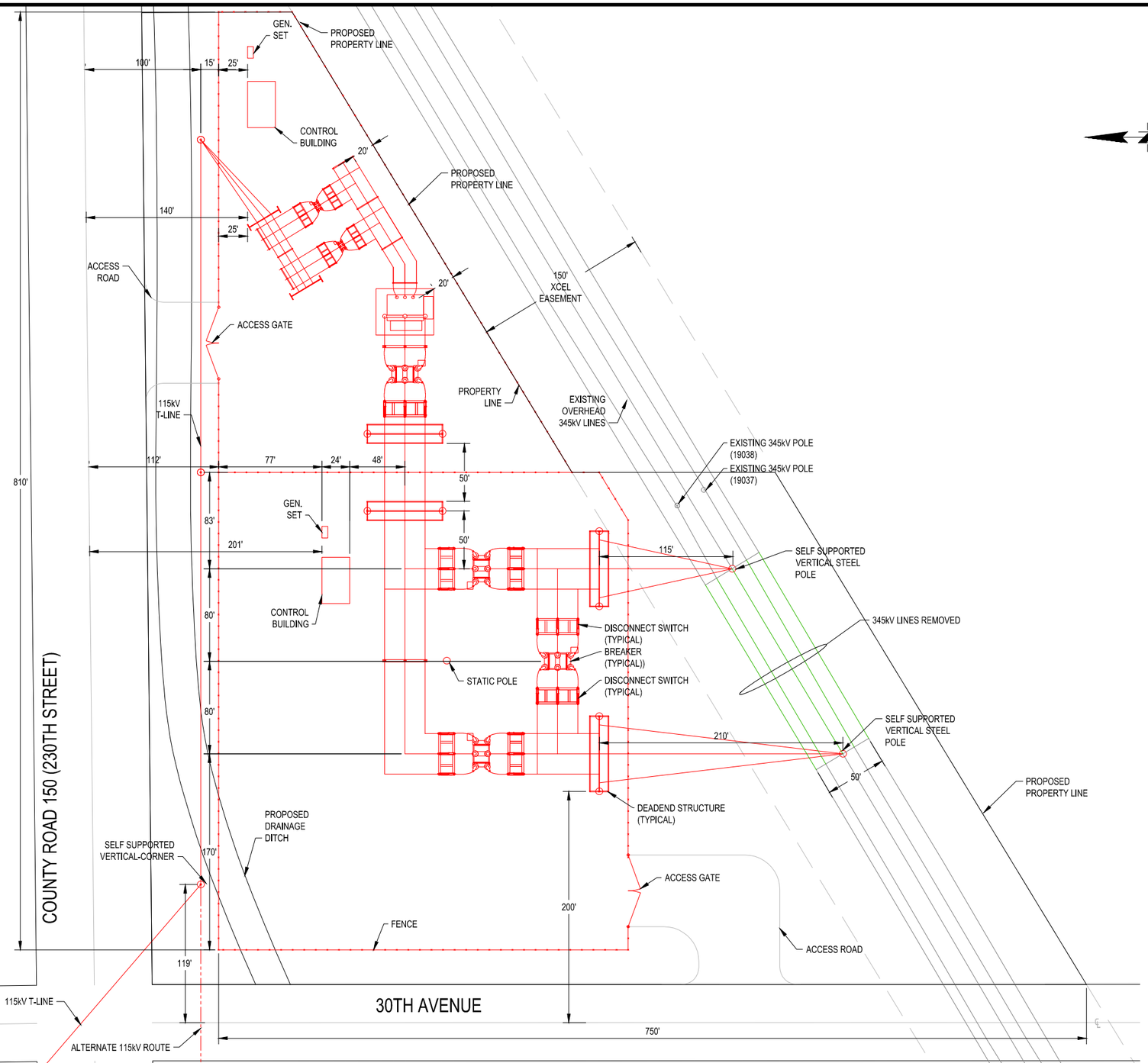


SOURCES:
Geronimo Energy,
Ventyx, USGS,
MNDNR

GERONIMO ENERGY

Document Path: G:\GISData\Projects\Odell Wind Farm\Projects\OD TMX Route Permit 2013\1.1 Proposed Route Overview - OD TMX Route Permit 2013.mxd

cjenson Date: 6/30/2014



NOTES:

1. NORMAL SETBACK FOR ANY STRUCTURE TO CENTERLINE OF PUBLIC RIGHT-OF-WAY IS 200' FT. NORMAL REAR AND SIDE SETBACKS ARE 30' FT FROM PROPERTY LINE. COUNTY VARIANCE IS REQUIRED FOR PROPOSED REDUCED SETBACKS.
2. EXISTING 345kV OVERHEAD TRANSMISSION LINE HAS AN 150' FT EASEMENT.
3. PER PAGE 3 OF THE DECEMBER 5, 2012 XCEL FACILITY STUDY (INCOMPLETE STUDY PUBLISHED ON DECEMBER 12, 2013), THE TWO POLES NEEDED TO TURN THE EXISTING 345 KV TRANSMISSION LINE INTO THE RING BUS SUBSTATION WILL BE SELF-SUPPORTING VERTICAL-CORNER STEEL POLES. THE FIRST EXISTING WOOD POLES TO THE EAST AND THE WEST OF THE NEW VERTICAL-CORNER STEEL POLES WILL BE REPLACED WITH SELF-SUPPORTING STEEL H-FRAME DEADEND STRUCTURES.
4. LAYOUT REQUIRES REVIEW BY XCEL ENERGY AND REVIEW FOR CONTSTRUCTABILITY.

Figure 2.
Original Woad Hill Substation Layout

REV	DATE	CHK'D	APP'D	REVISION DESCRIPTION

DESIGNED: RJN
DRAWN: RW

PRELIMINARY CONCEPT REQUIRES REVIEW FOR CONSTRUCTIBILITY

50 0 50 100 150
SCALE IN FEET

leidos
Leidos Engineering, LLC | 999 Third Avenue, Suite 500
Seattle, WA 98104-4042 | phone 206.695.4700

GERONIMO ENERGY, ODELL WIND PROJECT
WOAD HILL 345/115kV INTERCONNECTION SUBSTATION
SECTION 16, T 104, R 33, MARTIN COUNTY, MN
CONCEPTUAL GENERAL ARRANGEMENT
APRIL 8, 2014

PROJECT NUMBER: 3101301001-4000
SHEET 1 OF: 1
DRAWING NUMBER: CONCEPT D.

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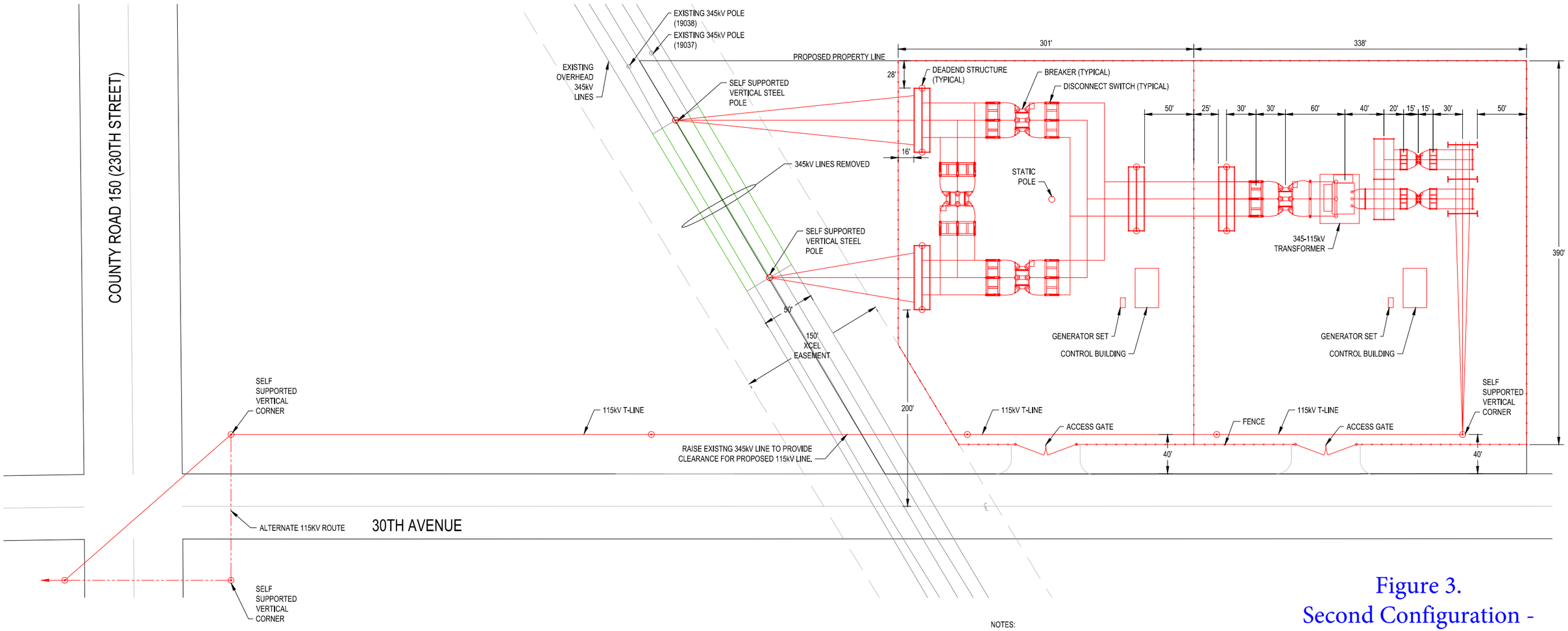

Figure 3. Second Configuration - Woad Hill Substation

NOTES:

1. NORMAL SETBACK FOR ANY STRUCTURE TO CENTERLINE OF PUBLIC RIGHT-OF-WAY IS 200' FT. NORMAL REAR AND SIDE SETBACKS ARE 30' FT FROM PROPERTY LINE. COUNTY VARIANCE IS REQUIRED FOR PROPOSED REDUCED SETBACKS.
2. EXISTING 345kV OVERHEAD TRANSMISSION LINE HAS AN 150' FT EASEMENT.
3. PER PAGE 3 OF THE DECEMBER 5, 2012 XCEL FACILITY STUDY (INCOMPLETE STUDY PUBLISHED ON DECEMBER 12, 2013), THE TWO POLES NEEDED TO TURN THE EXISTING 345 KV TRANSMISSION LINE INTO THE RING BUS SUBSTATION WILL BE SELF-SUPPORTING VERTICAL-CORNER STEEL POLES. THE FIRST EXISTING WOOD POLES TO THE EAST AND THE WEST OF THE NEW VERTICAL-CORNER STEEL POLES WILL BE REPLACED WITH SELF-SUPPORTING STEEL H-FRAME DEADEND STRUCTURES.
4. LAYOUT REQUIRES REVIEW BY XCEL ENERGY AND REVIEW FOR CONSTRUCTABILITY.

REV	DATE	CHK'D	APP'D	REVISION DESCRIPTION

DESIGNED: RJN
DRAWN: RW

PRELIMINARY

50 0 50 100 150
SCALE IN FEET

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Seattle, WA 98104-4042 | phone 206.695.4700

GERONIMO ENERGY, ODELL WIND PROJECT
WOAD HILL 345/115kV INTERCONNECTION SUBSTATION
SECTION 16, T 104, R 33, MARTIN COUNTY, MN
CONCEPTUAL GENERAL ARRANGEMENT
APRIL 10, 2014

PROJECT NUMBER: 3101301001-4000
SHEET 1 OF: 1
DRAWING NUMBER: CONCEPT E.

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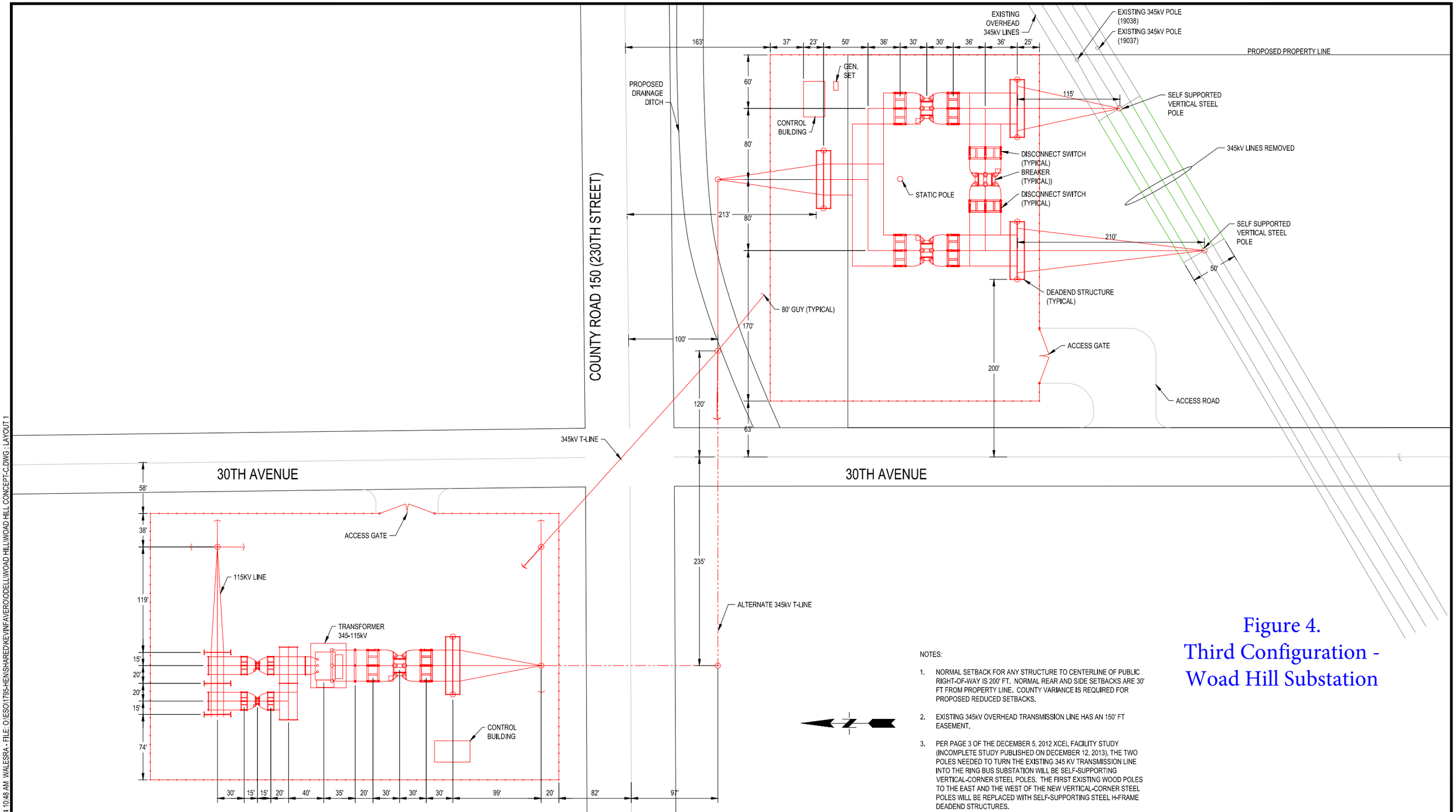

NOTES:

1. NORMAL SETBACK FOR ANY STRUCTURE TO CENTERLINE OF PUBLIC RIGHT-OF-WAY IS 200' FT. NORMAL REAR AND SIDE SETBACKS ARE 30' FT FROM PROPERTY LINE. COUNTY VARIANCE IS REQUIRED FOR PROPOSED REDUCED SETBACKS.
2. EXISTING 345kV OVERHEAD TRANSMISSION LINE HAS AN 150' FT EASEMENT.
3. PER PAGE 3 OF THE DECEMBER 5, 2012 XCEL FACILITY STUDY (INCOMPLETE STUDY PUBLISHED ON DECEMBER 12, 2013), THE TWO POLES NEEDED TO TURN THE EXISTING 345 KV TRANSMISSION LINE INTO THE RING BUS SUBSTATION WILL BE SELF-SUPPORTING VERTICAL-CORNER STEEL POLES. THE FIRST EXISTING WOOD POLES TO THE EAST AND THE WEST OF THE NEW VERTICAL-CORNER STEEL POLES WILL BE REPLACED WITH SELF-SUPPORTING STEEL H-FRAME DEADEND STRUCTURES.

Figure 4.
Third Configuration - Woad Hill Substation

REV	DATE	CHK'D	APP'D	REVISION DESCRIPTION

DESIGNED: RJN
DRAWN: RW

PRELIMINARY

50 0 50 100 150
SCALE IN FEET

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GERONIMO ENERGY, ODELL WIND PROJECT
WOAD HILL 345/115kV INTERCONNECTION SUBSTATION
SECTION 16, T 104, R 33, MARTIN COUNTY, MN
CONCEPTUAL GENERAL ARRANGEMENT
APRIL 8, 2014

PROJECT NUMBER: 3101301001-4000
SHEET 1 OF: 1
DRAWING NUMBER: CONCEPT C.

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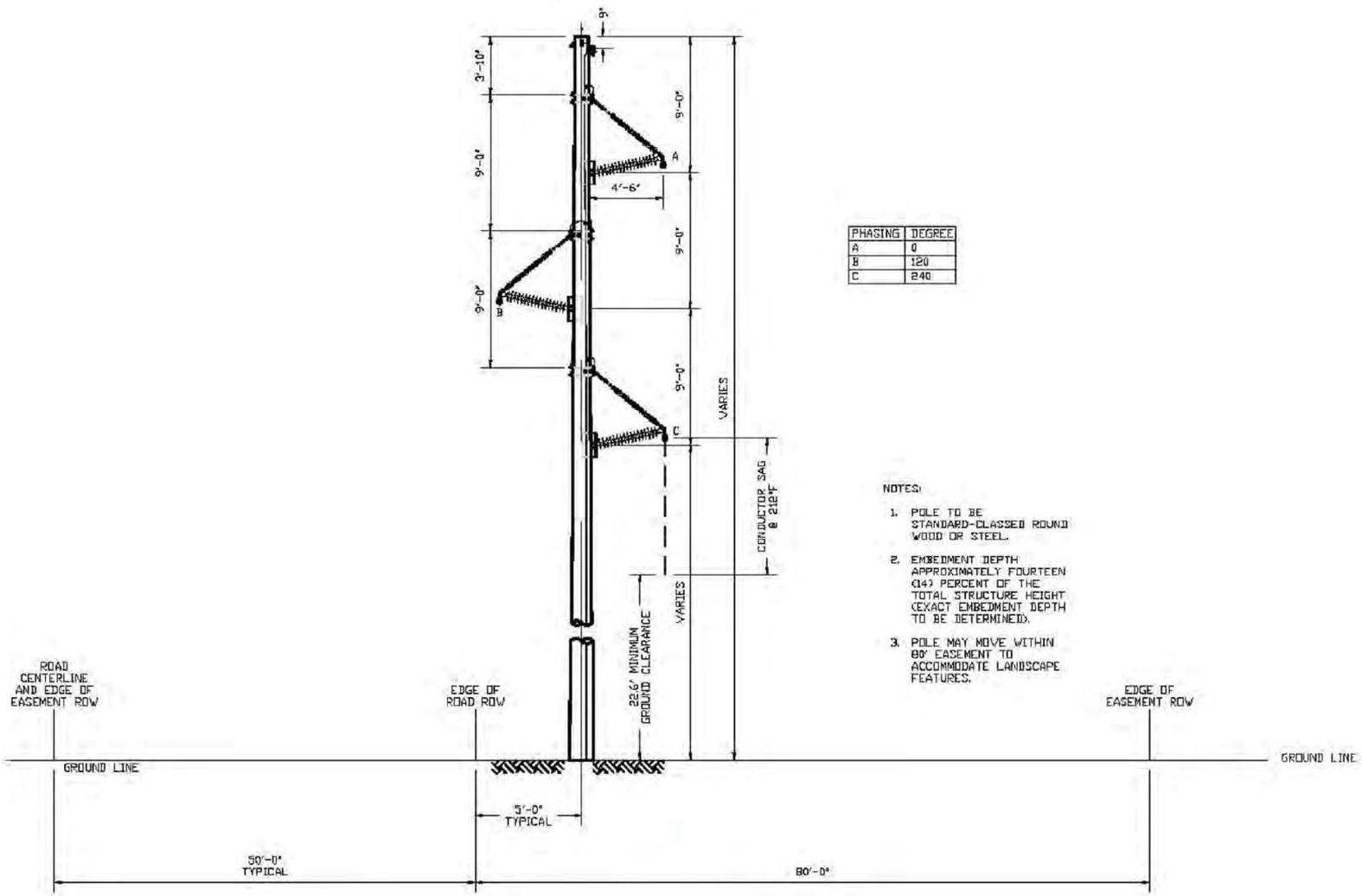
ODELL WIND FARM
Cottonwood, Jackson, Martin, & Watonwan Counties, MN

Figure 5
Picture and Schematic of Proposed Structures (Delta Configuration)

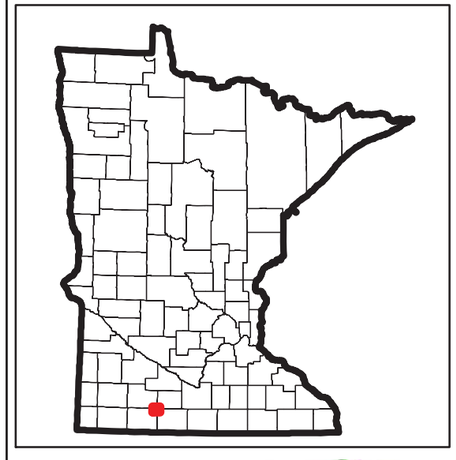


PHASING	DEGREE
A	0
B	120
C	240

NOTES:

1. POLE TO BE STANDARD-CLASSED ROUND WOOD OR STEEL.
2. EMBEDMENT DEPTH APPROXIMATELY FOURTEEN (14) PERCENT OF THE TOTAL STRUCTURE HEIGHT (EXACT EMBEDMENT DEPTH TO BE DETERMINED).
3. POLE MAY MOVE WITHIN 80' EASEMENT TO ACCOMMODATE LANDSCAPE FEATURES.

FIGURE 1 - PROPOSED DELTA CONFIGURATION STRUCTURE AND EASEMENT RIGHT-OF-WAY CORRIDOR



SOURCES:
Geronimo Energy,
leidos

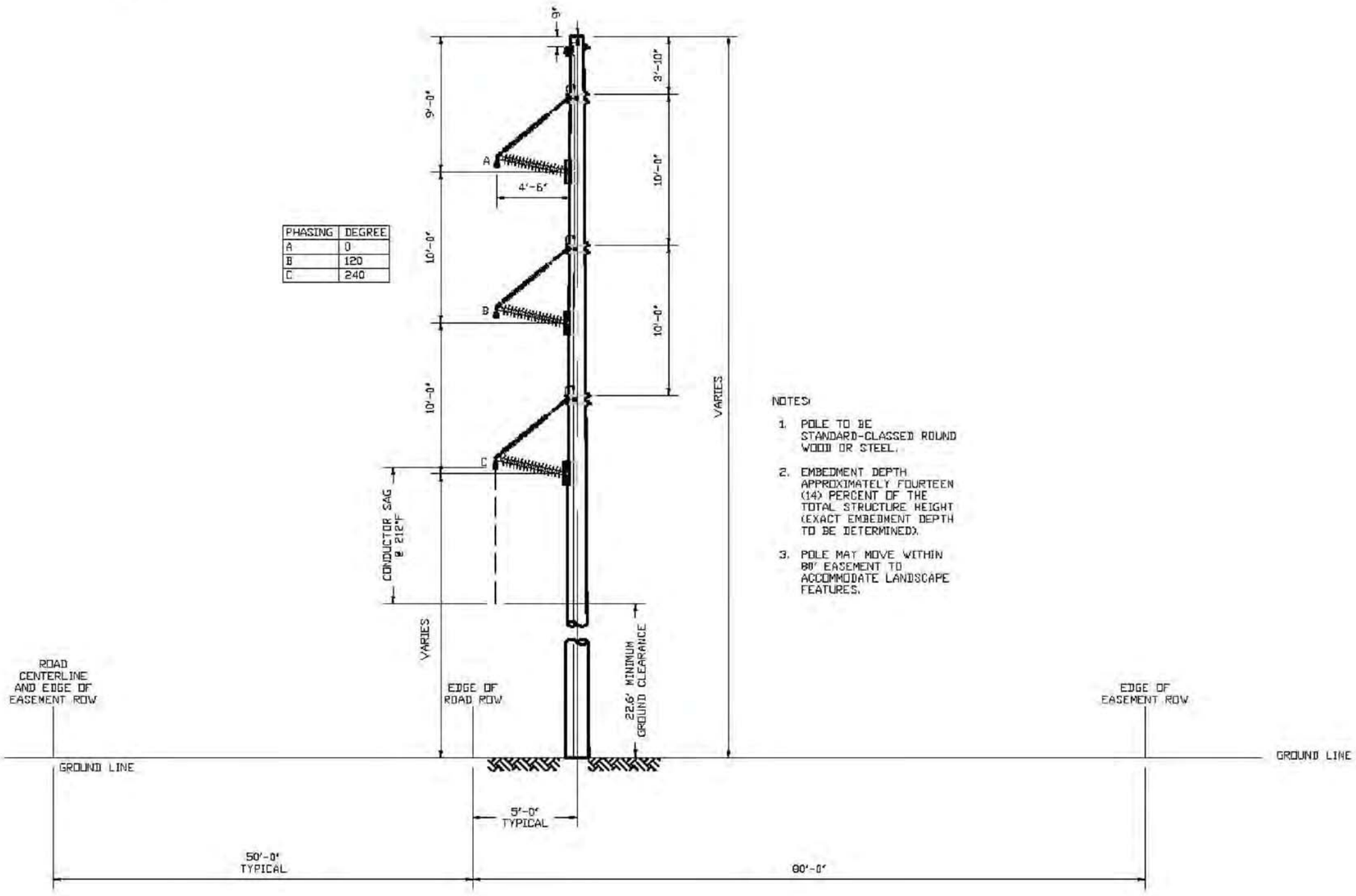
GERONIMO ENERGY

leidos

ODELL WIND FARM

Cottonwood, Jackson, Martin, & Watonwan Counties, MN

Figure 6
Picture and Schematic of Proposed Structures (Vertical Configuration)

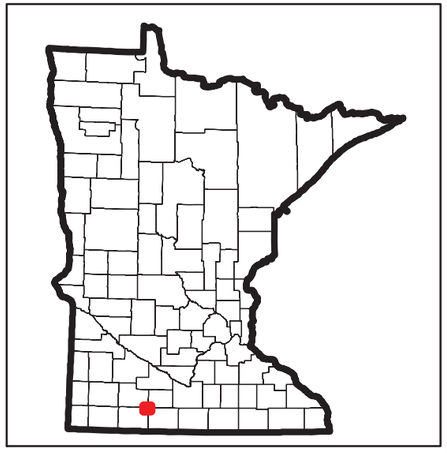


PHASING	DEGREE
A	0
B	120
C	240

NOTES:

1. POLE TO BE STANDARD-CLASSED ROUND WOOD OR STEEL.
2. EMBEDMENT DEPTH APPROXIMATELY FOURTEEN (14) PERCENT OF THE TOTAL STRUCTURE HEIGHT (EXACT EMBEDMENT DEPTH TO BE DETERMINED).
3. POLE MAY MOVE WITHIN 80' EASEMENT TO ACCOMMODATE LANDSCAPE FEATURES.

FIGURE 2 – PROPOSED VERTICAL CONFIGURATION STRUCTURE AND EASEMENT RIGHT-OF-WAY CORRIDOR



SOURCES:
Geronimo Energy,
leidos

GERONIMO ENERGY

ODELL WIND FARM

Cottonwood, Jackson, Martin, & Watonwan Counties, MN

FIGURE 7
Dwelling #1 Location Map

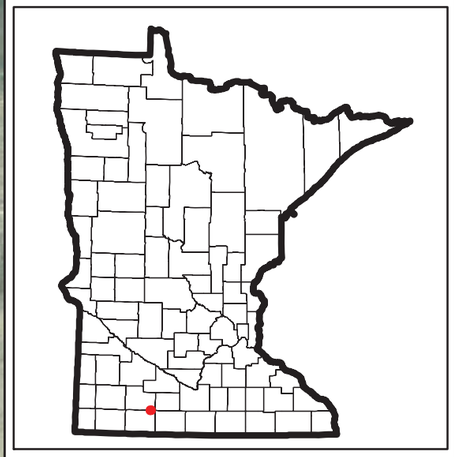
LEGEND

- Residence/Farmstead
- Anticipated Alignment
- Woad Hill Substation
- Proposed Route
- Odell Wind Farm Substation

1,000

Feet

NAD 1983 UTM Zone 15N



SOURCES:
Geronimo Energy,
Ventyx, NAIP,
WSB, PWI

GERONIMO ENERGY

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cjenson Date: 12/11/2013

ODELL WIND FARM

Cottonwood, Jackson, Martin, & Watonwan Counties, MN

FIGURE 8
Dwellings 2 and 3 Location Map

LEGEND

- Residence/Farmstead
- Anticipated Alignment
- Woad Hill Substation
- Proposed Route
- Odell Wind Farm Substation

1,000

Feet

NAD 1983 UTM Zone 15N

SOURCES:
Geronimo Energy,
Ventyx, NAIP,
WSB, PWI

GERONIMO ENERGY

Document Path: G:\GISData\Projects\Odell Wind Farm\Projects\OD TMX Route Permit 2013\5.2 Locations of Residences-Farmsteads - OD TMX Route Permit 2013.mxd

cjenson Date: 12/11/2013

ODELL WIND FARM

Cottonwood, Jackson, Martin, & Watonwan Counties, MN

FIGURE 9
Dwellings 4, 5, and 6 Location Map

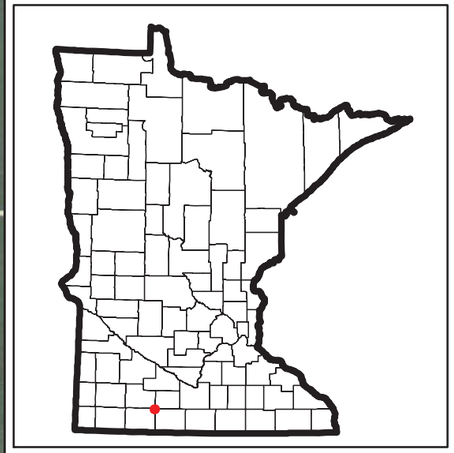
LEGEND

- Residence/Farmstead
- Anticipated Alignment
- Woad Hill Substation
- Proposed Route
- Odell Wind Farm Substation

1,000

Feet

NAD 1983 UTM Zone 15N



SOURCES:
Geronimo Energy,
Ventyx, NAIP,
WSB, PWI

GERONIMO ENERGY

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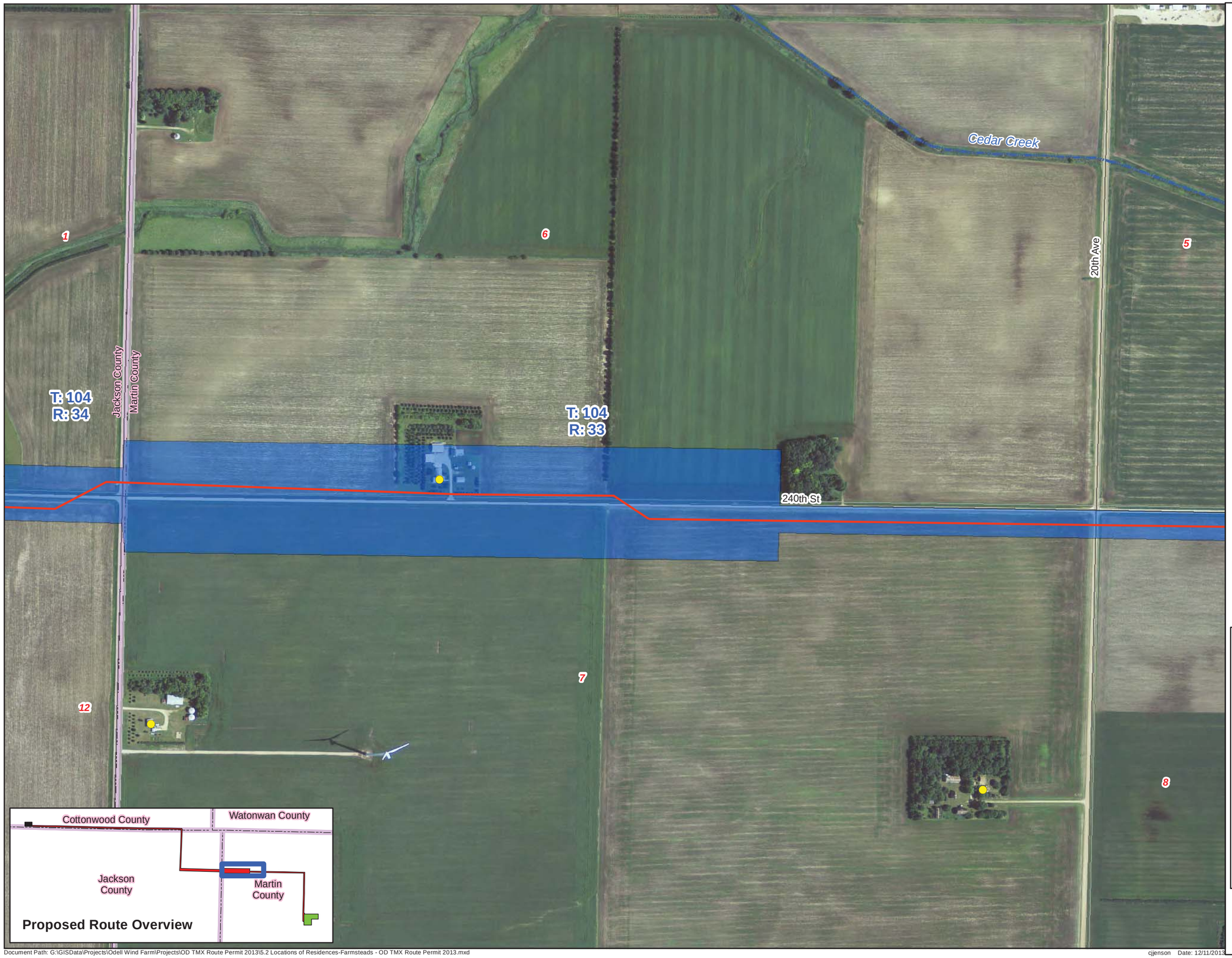
cjenson Date: 12/11/2013

ODELL WIND FARM

Cottonwood, Jackson, Martin, & Watonwan Counties, MN

FIGURE 10
Dwelling 7
Location Map



LEGEND

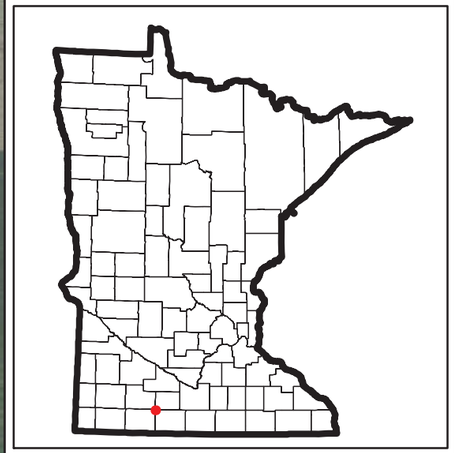
- Residence/Farmstead
- Anticipated Alignment
- Woad Hill Substation
- Proposed Route
- Odell Wind Farm Substation

1,000

Feet

N

NAD 1983 UTM Zone 15N



SOURCES:
Geronimo Energy,
Ventyx, NAIP,
WSB, PWI

GERONIMO ENERGY

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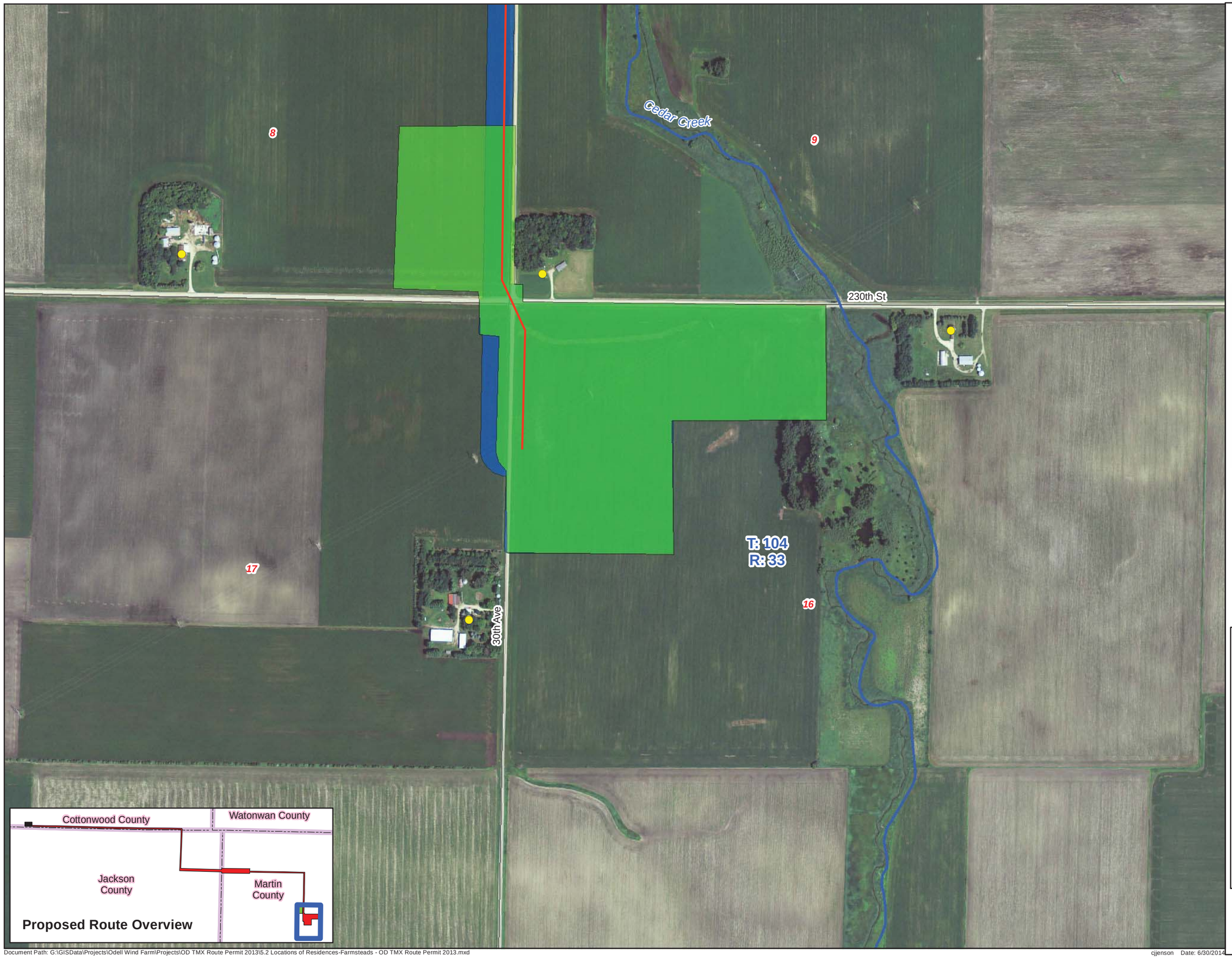


ODELL WIND FARM

Cottonwood, Jackson, Martin, & Watonwan Counties, MN

FIGURE 11
Dwelling 8
Location Map

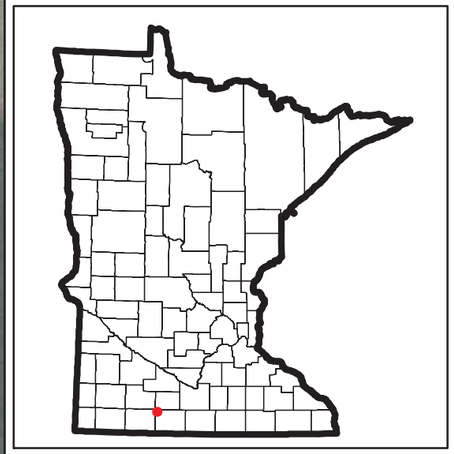
LEGEND

- Residence/Farmstead
- Anticipated Alignment
- Woad Hill Substation Area
- Proposed Route
- Odell Wind Farm Substation

1,000

Feet

NAD 1983 UTM Zone 15N



SOURCES:
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Ventyx, NAIP,
WSB, PWI

GERONIMO ENERGY

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cjenson Date: 6/30/2014

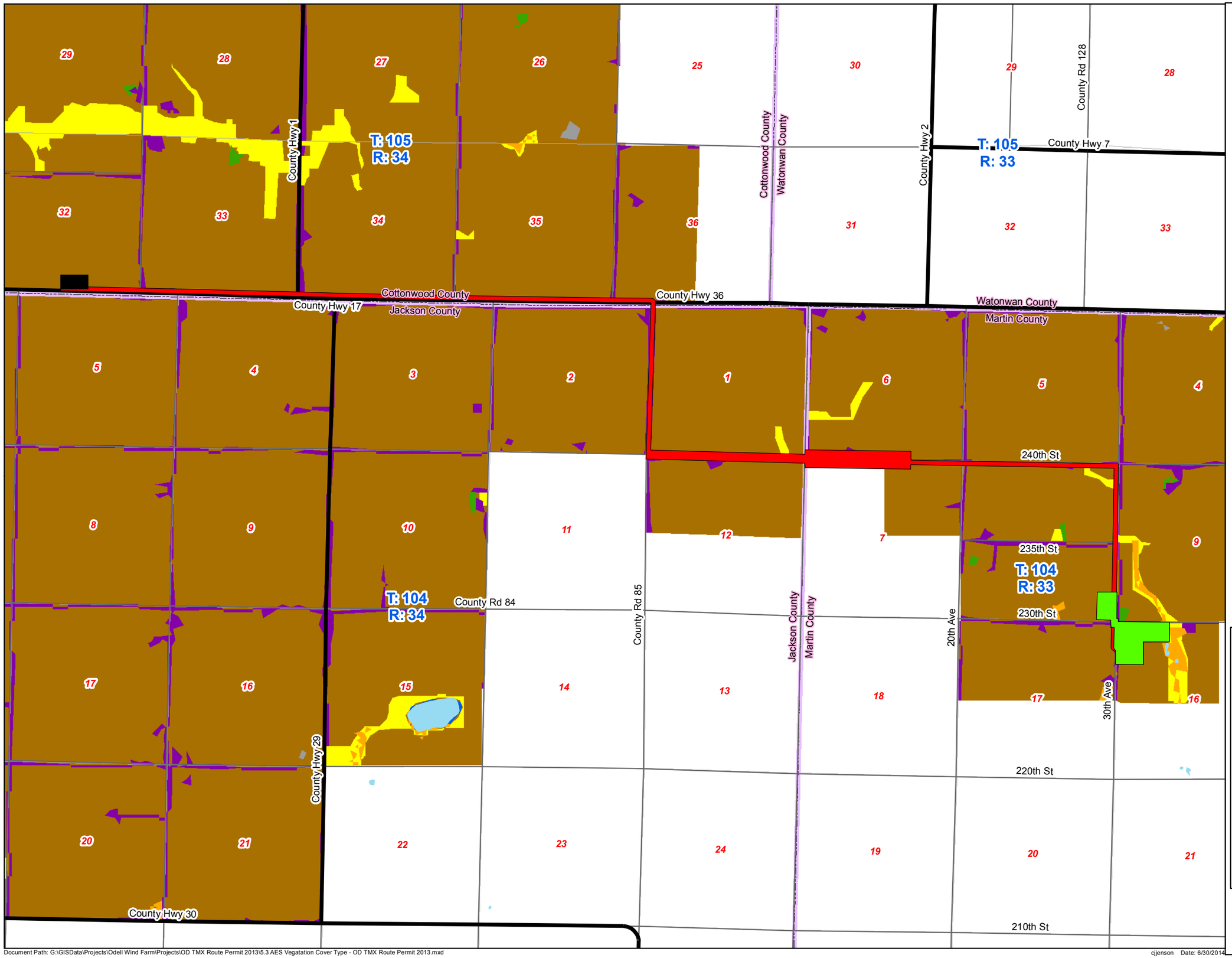


FIGURE 12
AES Vegetation Cover Type

LEGEND

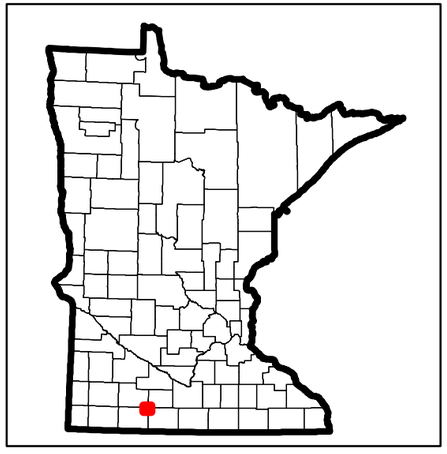
- Woad Hill Substation Area
- Proposed Route
- Odell Wind Farm Substation

AES Land Cover

- Cropland
- Grassland
- Emergent Wetland
- Upland Forest
- Open Water
- Developed
- Barren Land
- County Boundary

0.5 Miles

NAD 1983 UTM Zone 15N



SOURCES:
Geronimo Energy,
Ventyx, AES

Document Path: G:\GISData\Projects\Odell Wind Farm\Projects\OD TMX Route Permit 2013\5.3 AES Vegatation Cover Type - OD TMX Route Permit 2013.mxd

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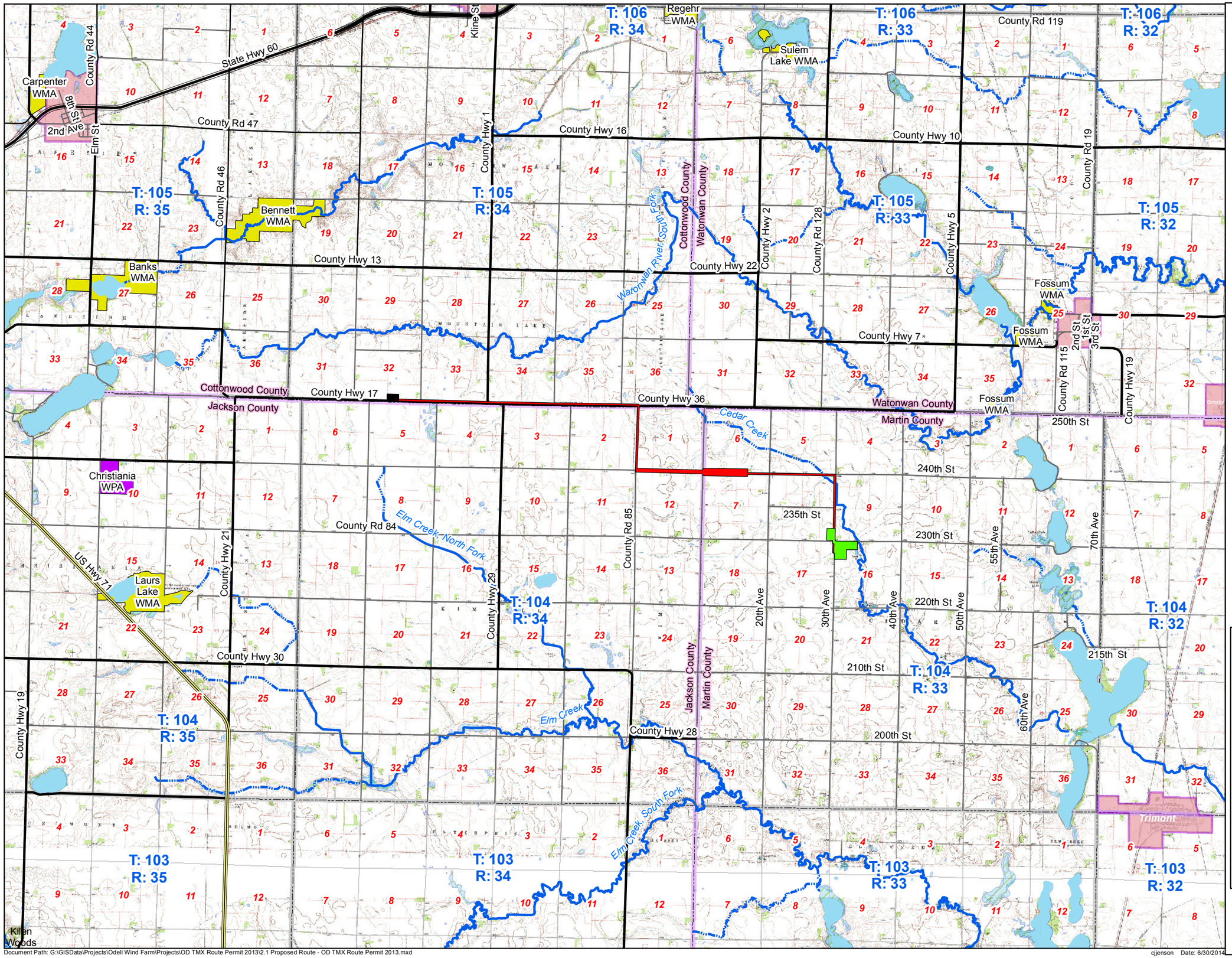

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cjjenson Date: 6/30/2014

ODELL WIND FARM

Cottonwood, Jackson, Martin, & Watonwan Counties, MN

FIGURE 13
Proposed Route with Surface Water Features

LEGEND

- Odell Wind Farm Substation
- Woad Hill Substation Area
- Proposed Route

Public Waters Inventory (PWI)

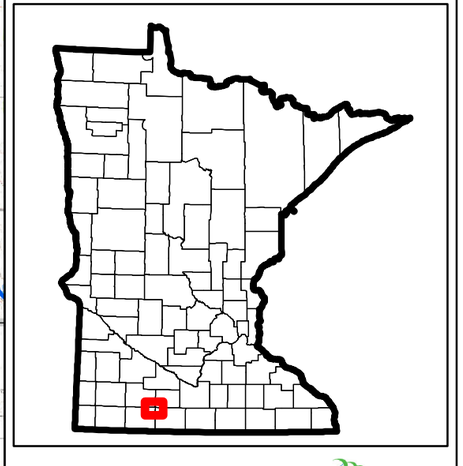
- River
- Perennial Stream
- Intermittent Stream
- Minnesota County Biological Survey
- Scientific and Natural Areas
- Wildlife Management Areas
- State Park
- Waterfowl Production Areas

National Wetland Inventory (NWI)

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Lake/Pond
- Riverine
- City/Town Boundary
- County Boundary
- Township Boundary

1 Miles

NAD 1983 UTM Zone 15N



SOURCES: Geronimo Energy, Ventyx, USGS, MNDNR, PWI

GERONIMO ENERGY

Appendix A – Scoping Decision

In the Matter of the Application of Odell Wind Farm, LLC for a Route Permit for the Odell Wind HVTL Project

ENVIRONMENTAL ASSESSMENT SCOPING DECISION
PUC DOCKET NO. IP6914/TL-13-591

The above matter has come before the deputy commissioner of the Department of Commerce (Department) for a decision on the scope of the environmental assessment (EA) to be prepared for the Odell Wind HVTL project proposed by Odell Wind Farm, LLC in Cottonwood, Jackson, and Martin Counties.

Project Description

Odell Wind Farm, LLC proposes to construct the Odell Wind Farm HVTL Project to transmit energy generated at the planned 200 MW LWECS Odell Wind Farm to the Woad Hill substation. As part of the Project, Odell Wind Farm proposes to construct approximately 9.5 miles of 115 kV HVTL and construct the Woad Hill substation.

Odell Wind Farm, LLC has proposed the project utilize a variable 150 to 600 foot route width for the 115 kV HVTL. The majority of the proposed route will be 150 feet wide extending from the road centerline. Odell Wind Farm, LLC is requesting that the proposed route width in sections 1 and 12 of Kimball Township in Jackson County be 300 feet, extending 150 feet on both sides of the road centerline. The proposed 300 foot route width in this area will allow additional flexibility to accommodate distances from homes. Odell Wind Farm, LLC is requesting a 600 foot route width in section 6 and 7 of Cedar Township in Martin County. In this area, the additional route width will allow flexibility to work around a known easement title issue.

Regulatory Background

A route permit application for the project was filed by Odell Wind Farm, LLC on December 12, 2013, and accepted as complete by the Minnesota Public Utilities Commission (Commission) on January 23, 2014. The route permit application will be reviewed under the alternative permitting process, pursuant to the Power Plant Siting Act (Minnesota Statues 216E) and Minnesota Rules 7850.2800 to 7850.3900.

Scoping Process

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

Public Scoping Meeting
Commission and Department staff held a joint public information and environmental assessment scoping meeting on February 10, 2014, in Windom, Minnesota. The meeting provided members of the public an opportunity to learn about the proposed project and the state's permitting process, ask questions, provide comments, and identify potential impacts and route alternatives to be considered in the scope of the environmental assessment. Four members of the public attended the meeting. One landowner within the proposed route spoke at the meeting, and expressed support for the project and willingness to work with the applicant to accommodate routing on his property.

Public Comments
A comment period, ending on February 24, 2014, provided the public an opportunity to submit comments to Department staff on issues and route alternatives for consideration in the scope of the EA. One comment letter was received by the close of the comment period. No route alternatives were identified in these comment letters.

The Department of Natural Resources (DNR) staff submitted comments suggesting the Woad Hill Substation site be located in the western portion of the proposed substation site to provide an increased buffer between the substation and Cedar Creek. The DNR comment letter included a statement on the requirements of the License to Cross Public Lands and Waters. The DNR also commented that the Natural Heritage Review completed for the Odell Wind Farm project is not valid for the Odell Wind HVTL project, and a Natural Heritage Review request should have been submitted prior to the submission of the Route Permit Application.

Scoping comments are available for viewing on the Department's energy facilities permitting website: http://mn.gov/commerce/energyfacilities/Docket.html?Id=33682 and on eDockets: https://www.edockets.state.mn.us/EFiling/search.jsp (enter "13" for year and "591" for number).

Commission Review
On March 10, 2014, Department staff provided the Commission with a summary of the EA scoping process. The summary indicated that Department staff would be recommending to the deputy commissioner of the Department that the scoping decision for the project include only that route proposed by Odell Wind Farm, LLC in its route permit application for evaluation in the EA. On April 10, 2014, the Commission voted to take no action with respect to the route alternatives to be considered in the EA.

HAVING REVIEWED THE MATTER, consulted with Department staff, and in accordance with Minnesota Rule 7850.3700, I hereby make the following scoping decision:

MATTERS TO BE ADDRESSED

The issues outlined below will be identified and described in the environmental assessment (EA) for the proposed Odell Wind HVTL project. The EA will describe the project and the human and environmental resources of the project area. It will also provide information on the potential

impacts the proposed project could have as they relate to the topics outlined in this scoping decision, including possible mitigation for identified impacts, identification of irretrievable commitment of resources, and permits from other government entities that may be required.

I. GENERAL DESCRIPTION OF THE PROJECT

A. Project Description
B. Project Purpose
C. Route Description
   1. Route Width
   2. Right-of-Way
D. Project Costs

II. REGULATORY FRAMEWORK

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

III. ENGINEERING AND DESIGN

A. Transmission Line Structures
B. Transmission Line Conductors

IV. CONSTRUCTION

A. Right-of-Way Acquisition
B. Construction
C. Restoration
D. Operation and Maintenance

V. AFFECTED ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATIVE MEASURES

A. Environmental Setting
B. Socioeconomics
C. Human Settlements
   1. Noise
   2. Aesthetics
   3. Displacement
   4. Property Values
   5. Public Services
      a) Roads and Highways
      b) Utilities
      c) Emergency Services
   6. Electronic Interference
      a) Radio
      b) Television
      c) Wireless Phone / Internet Services
D. Public Health and Safety
   1. Electric and Magnetic Fields
   2. Implantable Medical Devices

3. Stray Voltage
4. Induced Voltage
5. Air Quality

E. Land Based Economies
1. Agriculture
2. Forestry
3. Mining
4. Recreation and Tourism

F. Archaeological and Historic Resources

G. Natural Environment
1. Water Resources
a) Surface Waters
b) Groundwater
c) Wetlands
2. Soils
3. Flora
4. Fauna

H. Threatened / Endangered / Rare and Unique Natural Resources

I. Zoning and Land Use Compatibility
1. Use of Existing Rights-of-Way

J. Adverse Impacts Which Cannot Be Avoided

K. Irreversible and Irretrievable Commitments of Resources

VI. ALTERNATIVE ROUTES TO BE EVALUATED IN THE ENVIRONMENTAL ASSESSMENT

The route proposed by Odell Wind Farm, LLC in its route permit application will be evaluated in the EA (see attached map). No other routes or route alternatives will be evaluated in the EA.

VII. IDENTIFICATION OF PERMITS

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

ISSUES OUTSIDE THE SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The EA for the Odell Wind HVTL project will not consider the following:

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

SCHEDULE

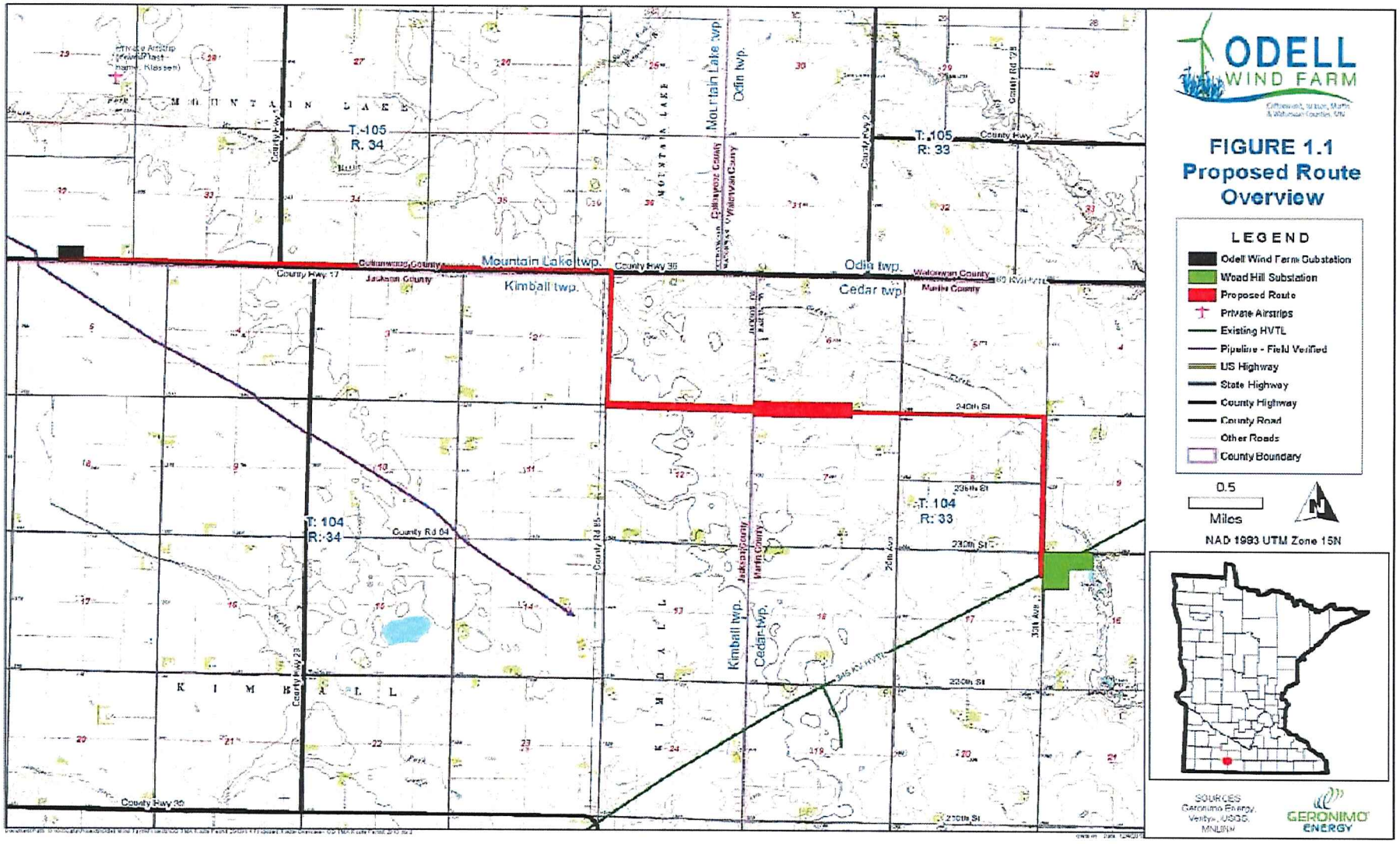
The environmental assessment is anticipated to be completed and available in July 2014. A public hearing will be held in the project area after the environmental assessment has been issued and notice served.

Signed this 14th day of April, 2014

STATE OF MINNESOTA
DEPARTMENT OF COMMERCE

William Grant, Deputy Commissioner

Odell Wind HVTL Project
Route to be Evaluated in Environmental Assessment



Appendix B – Sample Route Permit

GENERIC ROUTE PERMIT TEMPLATE

STATE OF MINNESOTA PUBLIC UTILITIES COMMISSION

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

IN
[*COUNTY*]

ISSUED TO
[*PERMITTEE*]

PUC DOCKET NO. [*Docket Number*]

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

[*PERMITTEE*]

[*Permittee*] is authorized by this route permit to construct [*Provide a description of the project authorized by the Minnesota Public Utilities Commission*].

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

Approved and adopted this ____ day of [*Month, Year*]

BY ORDER OF THE COMMISSION

_____

Burl W. Haar,
Executive Secretary

GENERIC TEMPLATE

This document can be made available in alternative formats (i.e., large print or audio) by calling 651-296-0406 (voice). Persons with hearing or speech disabilities may call us through their preferred Telecommunications Relay Service.

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1.0 ROUTE PERMIT

The Minnesota Public Utilities Commission (Commission) hereby issues this route permit to [*Permittee Name*] (Permittee) pursuant to Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7850. This permit authorizes the [*Permittee Name*] to construct [*Provide a description of the project as authorized by the Minnesota Public Utilities Commission*], and as identified in the attached route permit maps, hereby incorporated into this document.

2.0 PROJECT DESCRIPTION

[*Provide a description of the project as authorized by the Minnesota Public Utilities Commission*]

2.1 Project Location

[*Describe the location of the project including details such as the county, state, city, and townships, as appropriate*]

County	Township Name	Township	Range	Section

2.2 Associated Facilities and Substations

[*Provide a detailed description of the associated facilities and substations as authorized by the Commission*]

2.3 Structures and Conductors

[*Provide a detailed description of the structures and conductors authorized by the Commission*]

The table below details specifics on the various structure types as presented in the route permit application.

Line Type	Conductor	Structure		Foundation	Height	Span
		Type	Material			

The transmission line and associated facilities shall be designed to meet or exceed all relevant local and state codes, the National Electric Safety Code (NESC), and North American Electric Reliability Corporation (NERC) requirements. This includes standards relating to clearances to

GENERIC TEMPLATE

ground, clearance to crossing utilities, clearance to buildings, strength of materials, clearances over roadways, right-of-way widths, and permit requirements.

3.0 DESIGNATED ROUTE

The route designated by the Commission in this permit is the route described below and shown on the route maps attached to this permit. The route is generally described as follows:

[*Provide detailed description of the authorized route including the route widths and any other specifics relevant to each segment. Also include a reference to the relevant route map to be attached to the permit.*]

The identified route widths will provide the Permittee with flexibility for minor adjustments of the specific alignment or right-of-way to accommodate landowner requests and unforeseen conditions. The final alignment (i.e., permanent and maintained rights-of-way) will be located within this designated route unless otherwise authorized below.

3.1 Right-of-Way

The approved right-of-way width for the project is up to [*number*] feet. This permit anticipates that the right-of-way will generally conform to the anticipated alignment as noted on the attached route permit maps unless changes are requested by individual landowners or unforeseen conditions are encountered or are otherwise provided for by this permit. Any alignment modifications within the designated route shall be located so as to have comparable overall impacts relative to the factors in Minn. Rules, part 7850.4100, as does the alignment identified in this permit, and shall be specifically identified and documented in and approved as part of the plan and profile submitted pursuant to section 4.1 of this permit.

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

4.0 GENERAL CONDITIONS

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

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4.1 Plan and Profile

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

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

4.2 Construction Practices

The Permittee shall follow those specific construction practices and material specifications described in [*Permittee Name*] Application to the Commission for a route permit for the [*Project Name*], dated [*Date*], unless this permit establishes a different requirement in which case this permit shall prevail.

4.2.1 Field Representative

At least 14 days prior to commencing construction, the Permittee shall advise the Commission in writing of the person or persons designated to be the field representative for the Permittee with the responsibility to oversee compliance with the conditions of this permit during construction.

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

4.2.2 Local Governments

During construction, the Permittee shall minimize any disruption to public services or public utilities. To the extent disruptions to public services or public utilities occur these

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would be temporary and the Permittee will restore service promptly. Where any impacts to utilities have the potential to occur the Permittee will work with both landowners and local agencies to determine the most appropriate transmission structure placement.

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

4.2.3 Cleanup

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

4.2.4 Noise

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

4.2.5 Vegetation Removal

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

Tall tree species located within the transmission line right-of-way that endanger the safe and reliable operation of the transmission facility will be removed. Certain low growing species can be planted in the right-of-way to blend the difference between the right-of-way and adjacent wooded areas, to the extent that the low growing vegetation that will not pose a threat to the transmission facility or impede construction.

The Permittee shall avoid construction and maintenance practices, particularly the use of fertilizer, herbicides or other pesticides, that are inconsistent with the landowner's or tenant's use of the land.

4.2.6 Aesthetics

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

4.2.7 Erosion Control

The Permittee shall implement reasonable measures to minimize erosion and sedimentation during construction and shall employ perimeter sediment controls, protect exposed soil by promptly planting, seeding, using erosion control blankets and turf reinforcement mats, stabilizing slopes, protecting storm drain inlets, protecting soil stockpiles, and controlling vehicle tracking. Contours shall be graded as required so that all surfaces provide for proper drainage, blend with the natural terrain, and are left in a condition that will facilitate re-vegetation and prevent erosion. All areas disturbed during construction of the facilities shall be returned to pre-construction conditions.

When utilizing seed to establish temporary and permanent vegetative cover on exposed soil the Permittee shall select specific site characteristic seed certified to be free of noxious weeds.

Where larger areas of one acre or more are disturbed or other areas designated by the Minnesota Pollution Control Agency (MPCA), the Permittee shall obtain a National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Construction Stormwater permit from the MPCA.

4.2.8 Wetlands and Water Resources

Wetland impact avoidance measures that shall be implemented during design and construction of the transmission line will include spacing and placing the power poles at variable distances to span and avoid wetlands, watercourses, and floodplains. Unavoidable wetland impacts as a result of the placement of poles shall be limited to the immediate area around the poles. To minimize impacts, construction in wetland areas shall occur during frozen ground conditions. When construction during winter is not possible, wooden or composite mats shall be used to protect wetland vegetation. Soil excavated from the wetlands and riparian areas shall be contained and not placed back into the wetland or riparian area.

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Wetlands and riparian areas shall be accessed using the shortest route possible in order to minimize travel through wetland areas and prevent unnecessary impacts. No staging or stringing set up areas shall be placed within or adjacent to wetlands or water resources, as practicable. Power pole structures shall be assembled on upland areas before they are brought to the site for installation. Areas disturbed by construction activities shall be restored to pre-construction conditions.

All requirements of the U.S. Army Corps of Engineers (wetlands under federal jurisdiction), Minnesota Department of Natural Resources (Public Waters/Wetlands), and County (wetlands under the jurisdiction of the Minnesota Wetland Conservation Act) shall be met.

4.2.9 Temporary Work Space

The Permittee shall limit temporary easements to special construction access needs and additional staging or lay-down areas required outside of the authorized right-of-way. Temporary space shall be selected to limit the removal and impacts to vegetation. Temporary easements outside of the authorized transmission line right-of-way will be obtained from affected landowners through rental agreements and are not provided for in this permit.

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

4.2.10 Restoration

The Permittee shall restore the right-of-way, temporary work spaces, access roads, abandoned right-of-way, and other public or private lands affected by construction of the transmission line. Restoration within the right-of-way must be compatible with the safe operation, maintenance, and inspection of the transmission line. Within 60 days after completion of all restoration activities, the Permittee shall advise the Commission in writing of the completion of such activities.

The Permittee shall fairly compensate landowners for damage to crops, fences, landscaping, drain tile, or other damages sustained during construction.

4.2.11 Notice of Permit

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

4.3 Periodic Status Reports

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

4.4 Complaint Procedures

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

4.5 Notification to Landowners

The Permittee shall provide all affected landowners with a copy of this permit and, as a separate information piece, the complaint procedures at the time of the first contact with the landowners after issuance of this permit. The Permittee shall contact landowners prior to entering the property or conducting maintenance along the route.

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

4.6 Completion of Construction

4.6.1 Notification to Commission

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

4.6.2 As-Builts

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

4.6.3 GPS Data

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

4.7 Electrical Performance Standards

4.7.1 Grounding

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

4.7.2 Electric Field

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

4.7.3 Interference with Communication Devices

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

4.8 Other Requirements

4.8.1 Applicable Codes

GENERIC TEMPLATE

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

4.8.2 Other Permits

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

4.8.3 Pre-emption

Pursuant to Minn. Stat. § 216E.10, this route permit shall be the sole approval required to be obtained by the Permittee for construction of the transmission facilities and this permit shall supersede and preempt all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government.

4.8.4 Archaeological and Historic Resources

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

4.8.5 Avian Mitigation

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

4.9 Delay in Construction

If the Permittee has not commenced construction or improvement of the route within four years after the date of issuance of this permit the Permittee shall file a report on the failure to construct

GENERIC TEMPLATE

and the Commission shall consider suspension of the permit in accordance with Minn. Rules, part 7850.4700.

4.10 Special Conditions

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

[*Describe any special conditions*]

Examples of special conditions included in permits:

- *Avian Mitigation Plan*
- *Environmental Control Plan*
- *Agriculture Mitigation Plan*
- *Vegetation Management Plan*
- *Property Restrictions*
- *Minnesota Department of Natural Resources Requirements*
- *Minnesota Pollution Control Requirements*
- *Minnesota State Historical Preservation Office Requirements*
- *Minnesota Department of Transportation Requirements*

5.0 PERMIT AMENDMENT

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

6.0 TRANSFER OF PERMIT

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

The person to whom the permit is to be transferred shall provide the Commission with such information as the Commission shall require to determine whether the new Permittee can comply

GENERIC TEMPLATE

with the conditions of the permit. The Commission may authorize transfer of the permit after affording the Permittee, the new Permittee, and interested persons such process as is required.

7.0 REVOCATION OR SUSPENSION OF THE PERMIT

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

GENERIC TEMPLATE