Public Utilities Commission
Site Permit Amendment Application for a Large Wind Energy Conversion System

Pleasant Valley Wind Farm Repower Project

Northern States Power Company

Mower and Dodge Counties, Minnesota

Docket No. IP-6828/WS-09-1197

APRIL 2022

414 Nicollet Mall

Minneapolis, MN 55401

Project Name:	Pleasant Valley Wind Farm Repower Project
Project Location:	Mower and Dodge Counties
Applicant:	Northern States Power Company
Authorized Representative	Matt Langan, Principal Agent
Signature:	
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF CHARTS

LIST OF FIGURES

APPENDICES

ACRONYM LIST

Acronym	Definition
AADT	Annual Average Daily Traffic
ABPP	Avian and Bat Protection Plan
ACS	American Community Survey
Act	Minnesota Wind Siting Act
ADLS	Aircraft Detection Lighting System
AMA	Aquatic Management Area
Applicant or Xcel Energy	Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy
Application	Site Permit Amendment Application
Application Guidance	Application Guidance for Site Permitting of Large Wind Energy Conversion Systems in Minnesota (Revised July 2019)
AWWI	American Wind Wildlife Institute
BBCS	Bird and Bat Conservation Strategy
BLM	Bureau of Land Management
BMP	best management practice
BWSR	Board of Water and Soil Resources
Commission	Minnesota Public Utilities Commission
CN	Certificate of Need
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CSAH	County State Aid Highway
CWA	Clean Water Act
dB	decibels
dBA	decibels using the A-weighted scale
DHS	Department of Homeland Security
DOC-EERA	Minnesota Department of Commerce – Energy Environmental Review and Analysis
DOT-FHWA	U.S. Department of Transportation, Federal Highway Administration
ECP	Eagle Conservation Plan
EMF	electromagnetic field
EPA	U.S. Environmental Protection Agency
ETP	Eagle Take Permit
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FRS	Facility Registry Service

Acronym	Definition
FSA	Farm Service Agency
GIA	Generator Interconnection Agreement
GIS	Geographic Information System
GLGH	GL Garrad Hassan
Hz	hertz
IAV	inter-annual variability
IBA	Important Bird Area
kV	kilovolt
L_{10}	ten percent of an hour
L_{50}	fifty percent of an hour
LGU	Local Government Unit
LWECS	Large Wind Energy Conversion System
m/s	meters per second
MBS	Minnesota Biological Survey
Mbps	megabytes per second
MDH	Minnesota Department of Health
Merjent	Merjent, Inc.
met	meteorological
MISO	Midcontinent Independent System Operator
MN DEED	Minnesota Department of Employment and Economic Development
MNDNR	Minnesota Department of Natural Resources
MNDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MPUC	Minnesota Public Utilities Commission
MW	megawatt
NAC	Noise Area Classification
NHD	National Hydrography Dataset
NHIS	Natural Heritage Information System
NIEHS	National Institute of Environmental Health Sciences
NLEB	northern long-eared bat
NOAA	National Oceanic and Atmospheric Administration
NPC	native plant community
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NSP	Northern States Power Company
NTIA	National Telecommunications and Information Administration

Acronym	Definition
NWI	National Wetlands Inventory
O&M	operations and maintenance
OSA	Office of the State Archaeologist
PCMM	Post-construction Mortality Monitoring
Phase I ESA	Phase I Environmental Site Assessment
POI	Point of Interconnection
Project	Pleasant Valley Wind Farm Repower Project
Project Area	The area within the Project boundary identified in Figure 1 of this Application
Project Location	Project boundaries identified in Figure 1 and in Table 4.1-1
PVW	Pleasant Valley Wind, LLC
PWI	Public Waters Inventory
PWP	Permanent Wetland Preserve
RCRA	Resource Conservation and Recovery Act
RD	rotor diameter
RES Americans	Renewable Energy Systems Americas, Inc.
Repower	Upgrading existing Vestas V100 2.0 MW turbines with Vestas V110 2.2 MW turbines and upgrading associated equipment
RIM	Reinvest in Minnesota
SCADA	Supervisory Control and Data Acquisition
SHPO	State Historic Preservation Office
SNA	Scientific and Natural Area
SOBS	Sites of Biodiversity Significance
STE	serrated trailing edge
SWPPP	Stormwater Pollution Prevention Plan
TI	Turbulence Intensity
TV	television
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
USFWS	U.S. Fish and Wildlife Service
WCA	Wetland Conservation Act
WIMN	MPCA's *What's in My Neighborhood* Database
WMA	Wildlife Management Area
WNS	white-nose syndrome
WPA	Waterfowl Production Area

Minnesota Rule Chapter 7854.0500 Site Permit Application Contents		
Minnesota Rule	**Required Information**	**Application Section(s)**
Subpart 1	**Applicant.** An applicant for a site permit must provide the following background information regarding the applicant:	
A.	A letter of transmittal signed by an authorized representative or agent of the applicant;	Included with filing
B.	The complete name, address, and telephone number of the applicant and any authorized representative;	See Cover Page
C.	The signature of the preparer of the application if prepared by an agent or consultant of the applicant;	See Cover Page
D.	The role of the permit applicant in the construction and operation of the LWECS;	1.1, 1.7
E.	The identity of any other LWECS located in Minnesota in which the applicant, or a principal of the applicant, has an ownership or other financial interest;	1.1
F.	The operator of the LWECS if different from the applicant; and	1.7
G.	The name of the person or persons to be the permittees if a site permit is issued.	1.0
Subpart 2	**Certificate of need or other commitment.**	
A.	The applicant shall state in the application whether a certificate of need for the system is required from the commission and, if so, the anticipated schedule for obtaining the certificate of need. The commission shall not issue a site permit for an LWECS for which a certificate of need is required until the applicant obtains the certificate, although the commission may process the application while the certificate of need request is pending before the commission.	2.0
B.	The commission may determine if a certificate of need is required for a particular LWECS for which the commission has received a site permit application.	2.0
C.	If a certificate of need is not required from the commission, the applicant shall include with the application a discussion of what the applicant intends to do with the power that is generated. If the applicant has a power purchase agreement or some other enforceable mechanism for sale of the power to be generated by the LWECS, the applicant shall, upon the request of the commission, provide the commission with a copy of the document.	1.3, 2.0
Subpart 3	**State Policy.** The applicant shall describe in the application how the proposed LWECS project furthers state policy to site such projects in an orderly manner compatible with environmental preservation, sustainable development, and the efficient use of resources.	3.0
Subpart 4	**Proposed Site.** The applicant shall include the following information about the site proposed for the LWECS and any associated facilities:	

Minnesota Rule Chapter 7854.0500 Site Permit Application Contents		
Minnesota Rule	**Required Information**	**Application Section(s)**
A.	The boundaries of the site proposed for the LWECS, which must be delineated on a United States Geological Survey Map or other map as appropriate;	4.1, 4.2, Figure 1
B.	The following characteristics of the wind at the proposed site: (1) interannual variation; (2) seasonal variation; (3) diurnal conditions; (4) atmospheric stability, to the extent available; (5) turbulence, to the extent available; (6) extreme conditions; (7) speed frequency distribution; (8) variation with height; (9) spatial variations; and (10) wind rose, in eight or more directions;	9.1
C.	Other meteorological conditions at the proposed site, including the temperature, rainfall, snowfall, and extreme weather conditions; and	9.1.11
D.	The location of other wind turbines in the general area of the proposed LWECS.	9.2, Figure 18
Subpart 5	**Wind Rights.** The applicant shall include in the application information describing the applicant's wind rights within the boundaries of the proposed site.	7.0
Subpart 6	**Design of Project.** The applicant shall provide the following information regarding the design of the proposed project:	
A.	A project layout, including a map showing a proposed array spacing of the turbines;	5.0, 6.0, Figures 2 and 4
B.	A description of the turbines and towers and other equipment to be used in the project, including the name of the manufacturers of the equipment;	5.2
C.	A description of the LWECS electrical system, including transformers at both low voltage and medium voltage; and	5.4
D.	A description and location of associated facilities.	6.0
Subpart 7	**Environmental Impacts.** An applicant for a site permit shall include with the application an analysis of the potential impacts of the project, proposed mitigative measures, and any adverse environmental effects that cannot be avoided, in the following areas:	
A.	Demographics, including people, homes, and businesses;	8.1
B.	Noise;	8.4
C.	Visual impacts;	8.5
D.	Public services and infrastructure;	8.6
E.	Cultural and archaeological impacts;	8.7

Minnesota Rule Chapter 7854.0500 Site Permit Application Contents		
Minnesota Rule	**Required Information**	**Application Section(s)**
F.	Recreational resources;	8.8
G.	Public health and safety, including air traffic, electromagnetic fields, and security and traffic;	8.9
H.	Hazardous materials;	8.10
I.	Land-based economics, including agriculture, forestry, and mining;	8.11
J.	Tourism and community benefits;	8.12, 8.13
K.	Topography;	8.14
L.	Soils;	8.15
M.	Geologic and groundwater resources;	8.16
N.	Surface water and floodplain resources;	8.17
O.	Wetlands;	8.18
P.	Vegetation;	8.19
Q.	Wildlife; and	8.20
R.	Rare and unique natural resources.	8.21
Subpart 8	**Construction of Project.** The applicant shall describe the manner in which the project, including associated facilities, will be constructed.	10.1-10.5
Subpart 9	**Operation of Project.** The applicant shall describe how the project will be operated and maintained after construction, including a maintenance schedule.	10.6
Subpart 10	**Costs.** The applicant shall describe the estimated costs of design and construction of the project and the expected operating costs.	10.7
Subpart 11	**Schedule.** The applicant shall include an anticipated schedule for completion of the project, including the time periods for land acquisition, obtaining a site permit, obtaining financing, procuring equipment, and completing construction. The applicant shall identify the expected date of commercial operation.	10.8
Subpart 12	**Energy Projections.** The applicant shall identify the energy expected to be generated by the project.	10.9
Subpart 13	**Decommissioning and restoration.** The applicant shall include the following information regarding decommissioning of the project and restoring the site:	
A.	The anticipated life of the project;	11.1
B.	The estimated decommissioning costs in dollars;	11.2
C.	The method and schedule for updating the costs of decommissioning and restoration;	11.4
D.	The method of ensuring that funds will be available for decommissioning and restoration; and	11.3
E.	The anticipated manner in which the project will be decommissioned and the site restored.	11.5

Minnesota Rule Chapter 7854.0500 Site Permit Application Contents		
Minnesota Rule	**Required Information**	**Application Section(s)**
Subpart 14	**Identification of Other Permits.** The applicant shall include in the application a list of all known federal, state, and local agencies or authorities, and titles of the permits they issue that are required for the proposed LWECS.	12.0

1.0 APPLICANT INFORMATION AND PROJECT BACKGROUND

1.1 APPLICANT DESCRIPTION

Northern States Power Company (NSP), a Minnesota corporation, doing business as Xcel Energy (the Applicant or Xcel Energy), respectfully submits this Site Permit Amendment Application (Application) to the Minnesota Public Utilities Commission (MPUC or Commission) for a site permit amendment for the currently operating 200-megawatt (MW) Pleasant Valley Wind Farm (Project). The Project is a large wind energy conversion system (LWECS), as defined in the Wind Siting Act, Minnesota Statutes Chapter 216F. The Project is located in Mower and Dodge Counties in southeastern Minnesota, directly adjacent to the City of Dexter and approximately six miles northeast of Austin, Minnesota.

NSP, doing business as Xcel Energy, is a Minnesota corporation headquartered in Minneapolis, Minnesota, that is engaged in the business of generating, transmitting, distributing, and selling electric power and energy and related services in the states of Minnesota, North Dakota, and South Dakota. In Minnesota, Xcel Energy provides electric service to 1.3 million customers. Xcel Energy is a wholly-owned utility operating company subsidiary of Xcel Energy Inc. and operates its transmission and generation system as a single integrated system with its sister company, NSP, a Wisconsin corporation, together known as the NSP Companies. The NSP Companies are vertically integrated transmission-owning members of Midcontinent Independent System Operator (MISO). In Minnesota, North Dakota, and South Dakota, Xcel Energy currently has over 3,000 MW of wind generation through commercial owned facilities or power purchase agreements. Of Xcel Energy's currently owned and operating wind projects, over 1,300 MW are in Minnesota, including Blazing Star I, Blazing Star II, Lake Benton II, Nobles, Community Wind North, Jeffers, Pleasant Valley, Grand Meadow, Freeborn, and Mower Wind Projects.

1.2 PROJECT BACKGROUND, PURPOSE, AND NEED

The Pleasant Valley Wind Farm was permitted by Pleasant Valley Wind, LLC (PVW), a wholly owned subsidiary of Renewable Energy Systems Americas, Inc. as either a 188 or 130 turbine (depending on turbine model selected), 301 MW project. On October 27, 2010, the Commission issued an order approving a site permit to PVW to construct the Pleasant Valley Wind Farm (the 2010 Site Permit). The 2010 Site Permit allowed construction of up to a 301 MW LWECS and associated facilities known as the Pleasant Valley Wind Farm. On February 20, 2013, the Commission issued an amendment to the site permit to allow PVW to extend the deadline by two years for obtaining a power purchase agreement and commencing construction (the 2013 Site Permit).

On November 25, 2013, PVW filed a petition to further amend the site permit to reduce the potential nameplate capacity of the Project from 301 MW to 200 MW, to specify an alternate turbine model, to reduce the total number of turbines, and to revise the preliminary turbine layout. In the petition, PVW stated that these changes were the result of a purchase and sale agreement with Xcel Energy (refer to Docket No. IP-6828/CN-09-937 for additional information regarding the purchase and sale agreement and certificate of need).

On February 10, 2014, the Commission issued an amendment to the 2013 Site Permit to allow PVW to construct and operate up to a 200 MW LWECS and associated facilities for the Pleasant Valley Wind Farm (2014 Site Permit). The purchase and sale agreement with Xcel Energy stipulated that PVW design and build the wind project. On November 18, 2015, after construction was completed, the ownership of the Pleasant Valley Wind Farm transferred from PVW to Xcel Energy.

The Project is an LWECS, as defined in the Wind Siting Act, Minnesota Statutes Chapter 216F, and is located in Mower and Dodge Counties in southeastern Minnesota near the cities of Dexter, Sargeant, Brownsdale, Waltham, and Hayfield and approximately six miles northeast of the City of Austin (Figures 1 and 2).

In accordance with the issued 2014 Site Permit, PVW installed 100, Vestas V100 2.0 MW wind turbines within leased land areas. Xcel Energy has owned and operated the Project for the past six years. The Project was commissioned in November 2015 and has a Generator Interconnection Agreement (GIA) with MISO. The Project required a Certificate of Need (CN), which was originally approved on October 27, 2010, and later updated on February 19, 2013, and February 5, 2014, in Docket CN-09-937. The issued 2014 Site Permit expires on February 20, 2043; a copy is provided in Appendix A – 2014 Site Permit Order for reference.

Xcel Energy is seeking an amendment of the 2014 Site Permit to allow Xcel Energy to repower all 100 turbines (Repower), which will increase energy production from the facility, improve overall reliability, and extend the service life of the turbines. The current turbines are otherwise operating as planned. In 2015 when the Vestas V100 turbines were installed, the rotor size was 100 meters (328.1 feet) in diameter; Xcel Energy proposes to repower all 100 turbines with 110-meter (360.9-foot) rotors.

Via this Petition (the Application), Xcel Energy is requesting an amendment to the 2014 Site Permit to accommodate the Pleasant Valley Repower and is providing information to the Commission in support of this request. Xcel Energy submits that the minor changes discussed within this Petition do not substantively change the findings of the 2014 Site Permit. Xcel Energy has reviewed the 2014 Site Permit and provided supplemental information where warranted. With this submission, Xcel Energy respectfully requests Commission approval for an amended Site Permit to support the repowering process with several minor modifications that are discussed in detail within this Petition.

Xcel Energy plans to repower all V100 2.0 MW turbines by installing larger rotors, upgraded gear boxes, and associated nacelle components or replacing the entire nacelle. The previously permitted locations of turbines, access roads, collection lines, and other supporting infrastructure will remain the same. A large crane, as described further in Section 6.4, will be used to remove the current rotors and hub or the nacelle. Cranes will be moved along existing roadways and access roads. Some minor upgrading of public roadways and intersections will likely be required to allow for delivery of the replacement rotors and nacelle components or new nacelles to each turbine location. Current components will either be recycled or properly disposed of.

Xcel Energy would like to complete the work during the 2025 construction season and is currently targeting the second quarter of 2025 for construction start. The work is anticipated to take 8-10 months, with commercial operation by December 2025.

The purpose of the repowering Project is to improve turbine technology, maximize energy yield, and extend service life of the turbines. New blades provide an increase in the rotor swept area, which, when coupled with the upgraded generators, results in a corresponding increase in the nominal production capacity of the Project from 200 MW to roughly 220 MW. The Repower does not constitute a material modification and can therefore proceed under the original GIA so long as the energy delivered to the Point of Interconnection (POI) does not exceed 200 MW, the amount in the original GIA. In accordance with the GIA, control equipment will be installed that will limit the injection at the POI to the 200 MW service granted in the GIA.

1.3 XCEL ENERGY REPOWER CONTEXT

The Pleasant Valley Wind Farm Repower Project was among a suite of Repower projects originally proposed in an Xcel Energy Report, responding to the Commission's May 20, 2020, Notice of Reporting Required by Utilities (Docket No. E,G999/CI-20-492.) Following that filing with the Commission, the Company filed a Wind Repower Petition (E002/M-20-620) on September 23, 2020, which was approved by the Commission on January 22, 2021. The Company's next step toward project approval is to apply for an amendment to its existing LWECS Site Permit. Statutes and Rules governing the State's public review process for Site Permit Amendments are described in Section 3.0 of this application.

1.4 ISSUED SITE PERMIT AND CHANGES REQUESTED

In addition to evaluating the Repower Project against current *Application Guidance for Site Permitting of Large Wind Energy Conversion Systems in Minnesota*, which includes a chapter on Repowering (Application Guidance; DOC-EERA, 2019), the 2014 Site Permit was evaluated for existing permit conditions and conditions that might need to be modified. Appendix B – Summary of 2014 Site Permit Conditions provides a comprehensive summary of the conditions in the 2014 Site Permit and comments on whether the conditions can be satisfied by the Repower Project or require modification. While the majority of the 2014 Site Permit requirements can be satisfied under the Repower Project, Xcel Energy is respectfully requesting that the Commission consider the following modifications within the amended Site Permit:

1. Cover: The Applicant requests that the name of the permittee be updated to Northern States Power Company d/b/a Xcel Energy; the nameplate capacity of the wind farm be updated to 220 MW; and the expiration date for the permit be updated to 25 years from the date of amended Site Permit issuance.

2. Site Permit: Update the nameplate capacity of the wind farm to 220 MW and update the acreage of the Project boundary to 45,449 acres.

3. Section 1: Update the nameplate capacity of the wind farm to 220 MW and individual turbine capacity.

4. Section 2: Update the township, range, and section information as follows:

   a. Mower Co.:

      i. T103N, R16W, Sec. 3 - 9, 14 - 30, and 33
      ii. T103N, R17W, Sec. 1, 12
      iii. T104N, R16W, Sec. 5 - 11, 14 - 22, and 27 – 34
      iv. T104N, R17W, Sec. 1 - 5, 10 - 15, 22 - 24, and 36

   b. Dodge Co.:

      i. T105N, 17W, Sec. 24, 25, and 32 – 36
      ii. T105N, R16W, Sec. 19, 20, and 29 - 32

5. Section 3: The Applicant requests that the reference to the amended site permit application be updated to April 29, 2022.

6. Wind Access Buffer 4.1: The Applicant requests the Commission waive the wind access buffer setback for 25 turbines, including turbines 1, 3, 8-11, 24, 32, 43, 44, 53-55, 58, 64, 66, 70, 77, 80, 85, 92, and 96-99. New wind rights-only leases are needed for 36 parcels (33 landowners) that will fall within the larger 3RD x 5RD wind access buffer of the repowered turbines. As of the date of this Application, the Applicant has secured 11 of the needed wind rights-only leases. The Applicant will continue to pursue agreements for the remaining parcels.

7. Native Prairie 4.7: The Applicant requests the language be updated consistent with other recent projects *"Wind turbines and associated facilities including foundations, access roads, collector and feeder lines, underground cable, and transformers shall not be placed in native prairie, as defined in Minn. Stat. § 84.02, subd. 5, unless addressed in a prairie protection and management plan and shall not be located in areas enrolled in the Native Prairie Bank Program. Construction activities, as defined in Minn. Stat. § 216E.01, shall not impact native prairie unless addressed in a Prairie Protection and Management Plan.*

   The Permittee shall prepare a Prairie Protection and Management Plan in consultation with the DNR if native prairie, as defined in Minn. Stat. § 84.02, subd. 5, is identified within the site boundaries. The Permittee shall file the plan with the site plan required by Section 5.1 of this permit. The plan shall address steps that will be taken to avoid impacts to native prairie and mitigation to unavoidable impacts to native prairie by restoration or management of other native prairie areas that are in degraded condition, by conveyance of conservation easements, or by other means agreed to by the Permittee, the DNR, and the Commission."

8. Noise 6.6: The Applicant requests the language be updated consistent with other recent projects: *"The Permittee shall file a proposed methodology for the conduct of a post-construction noise study at least 14 days prior to the pre-construction meeting. The Permittee shall develop the post-construction noise study methodology in consultation*

with the Department of Commerce. The study must incorporate the Department of Commerce Noise Study Protocol to determine the operating LWECS noise levels at different frequencies and at various distances from the turbines at various wind directions and speeds. The Permittee must conduct the postconstruction noise study and file with the Commission the completed post-construction noise study within 18 months of completion of the repowering project."

9. Avian and Bat Protection 6.7: The Applicant requests the language be updated consistent with other recent projects: "*The Permittee shall utilize a qualified third party to conduct a minimum of two full years of avian and bat fatality monitoring following the commencement of the operational phase of the project. Monitoring activities and results will be coordinated directly with the Minnesota Department of Natural Resources, U.S. Fish and Wildlife Service, and the Commission. Detailed monitoring protocols, agency coordination, and any avoidance and minimization measures will be detailed in the project's Bird and Bat Conservation Strategy (BBCS).*"

10. Avian and Bat Protection Plan 6.7.1: The Applicant requests the language be updated consistent with other recent projects: "*The Permittee shall comply with the provisions of the March 2022, Bird and Bat Conservation Strategy submitted for this project as part of the April 29, 2022, Site Permit Amendment Application, and all necessary revisions that occur during the permit issuance process will be incorporated into a Permit Version. The Permit Version of the BBCS will be filed with the Commission 14 days before the preconstruction meeting and revisions will include any updates associated with final construction plans. The BBCS must address steps to be taken to identify and mitigate impacts to avian and bat species during the construction phase and the operation phase of the project. The BBCS shall also include formal and incidental post-construction fatality monitoring, training, wildlife handling, documentation (e.g., photographs), and reporting protocols for each phase of the project."*

    The Permittee shall, by the 15th of March following each complete or partial calendar year of operation, file with the Commission an annual report detailing findings of its annual audit of BBCS practices. The annual report shall include summarized and raw data of bird and bat fatalities and injuries and shall include bird and bat fatality estimates for the project using agreed upon estimators from the prior calendar year. The annual report shall also identify any deficiencies or recommended changes in the operation of the project or in the BBCS to reduce avian and bat fatalities and shall provide a schedule for implementing the corrective or modified actions. The Permittee shall provide a copy of the report to the Minnesota Department of Natural Resources (DNR) and to the U.S. Fish and Wildlife Service (USFWS) at the time of filing with the Commission."

11. Immediate Incident Reporting 6.7.3: The Applicant requests the language be updated consistent with other recent projects: *"The Permittee shall notify the Commission, EERA, the USFWS, and the DNR within 24 hours of the discovery of any of the following:*

(a) five or more dead or injured birds or bats, at an individual turbine location, within a five day reporting period;
(b) twenty or more dead or injured birds or bats, across the entire facility, within a five day reporting period;
(c) one or more dead or injured state threatened, endangered, or species of special concern;
(d) one or more dead or injured federally listed species, including species proposed for listing; or
(e) one or more dead or injured bald or golden eagle(s).

In the event that one of the five discoveries listed above should be made, the Permittee must file with the Commission within seven days, a compliance report identifying the details of what was discovered, the turbine where the discovery was made, a detailed log of agencies and individuals contacted, and current plans being undertaken to address the issue."

12. The Applicant requests that condition *6.7.4 Turbine Operational Curtailment* be added to Section 6.7, Avian and Bat Protection, *"The Permittee shall operate all facility turbines so that all turbines are locked or feathered up to the manufacturer's standard cut-in speed from one-half hour before sunset to one-half hour after sunrise of the following day from April 1 to October 31 of each year of operation. All operating turbines at the facility must be equipped with operational software that is capable of allowing for adjustment of turbine cut-in speeds."*

13. Final Boundaries 8.2: The Applicant requests that the Commission approve a smaller project boundary. The proposed boundary more closely aligns with parcels containing Project infrastructure and with Section 4.13 of the 2014 Site Permit, Footprint Minimization. The requested boundary is reflected throughout this Application and is specifically defined in Table 4.1-1.

14. The Applicant requests that Special Conditions 13.1 and 13.2 be removed in the amended Site Permit. Section 13.1 should be removed because the Repower Project does not involve the same ground disturbing activities required for the initial construction of the Project. Section 13.2 should be removed because it will be replaced by the newer language provided in Section 6.7 and 6.7.1 described above.

1.5 DESCRIPTION OF REPOWERING PROCESS

The general sequence of construction to repower the Project is as follows:

1. The use of existing access roads, Project substation and interconnection facilities, operations and maintenance (O&M) building, and collection line easements will continue.

2. Existing on-site roads, temporary radius curves, and narrow gravel road sections will be widened to accommodate truck deliveries and crane staging.

3. Wind turbine components will be delivered and off-loaded at the turbine pads and laydown yard.

4. Wind turbine generators will be de-energized to maintain non-operational condition by back-up power or other means during construction. Underground cables will not be removed.

5. Crane crews will remove and place the existing blades, hub, and drive train, or the entire nacelle, on the ground. Cranes will stay at the turbine site for removal and installation tasks then continue moving to the next turbine in the sequence after the tasks are completed.

6. Crane paths across fields will not be used for the Project. Instead, cranes will be broken down, moved on existing access roads between turbine sites via carrier outriggers, and reassembled at the following turbine site.

7. The blades, nacelles, and other components will be recycled, re-used, or properly disposed of. Xcel Energy is coordinating with the equipment supplier on disposal options either at a landfill or at a re-use or recycling facility for the blades. The remaining materials will be reduced to transportable size and removed from the site for disposal. Materials will be disposed of in a suitable facility.

8. At 86 turbines, the gearbox, main shaft, main bearing, and associated subassemblies in the nacelle will be replaced with new upgraded equipment. Once all upgrades are made, the hub and new blades will be reinstalled on the tower by crane.

9. At 14 turbines, the entire nacelle will be replaced.

10. The turbines will be inspected and tested prior to returning to operation.

11. Areas disturbed by repowering activities will be restored.

12. Unexcavated areas compacted by equipment used during construction may be tilled in a manner adequate to restore the topsoil and subgrade material to a density consistent with the surrounding areas.

It is expected to take approximately 2-3 days per turbine to complete the repowering process, including the foundation repower activities, with some repowering of individual turbines occurring simultaneously.

1.6 ROLE OF APPLICANT IN CONSTRUCTION AND OPERATION

Xcel Energy will construct, own, and operate the repowered Project.

1.7 OWNERSHIP STATEMENT

Xcel Energy will construct, own, and operate the repowered Project.

1.8 COMPLIANCE STATUS OF PROJECT

Prior to submittal of this Petition, Xcel Energy completed an internal audit of its compliance with the 2014 Site Permit. Commercial operation of the Pleasant Valley Wind Farm began in November 2015 and pursuant to the requirements outlined in Section 6.7.2 (Avian and Bat Protection Plan) of the 2014 site Permit, the submittal date for the first quarterly incident report would have been in January 2016. The January 2016 report was not filed because development of the Post-construction Mortality Monitoring (PCMM) was ongoing. Xcel Energy closely coordinated with Minnesota Department of Commerce, Energy Environmental Review and Analysis (DOC-EERA) regarding development of its PCMM in early 2016; incidental monitoring during PCMM development and prior to implementation of the PCMM protocols did not identify any avian or bat fatalities.

Section 8.1 of the 2014 Site Permit requires as-built plans and specifications, as well as Geographic Information System (GIS) data, to be filed with the Commission within 60 days after completion of construction. Based on review of the MPUC docket, and Xcel Energy's records, it appears this information was not filed to eDockets. Xcel Energy proposes to file as-built drawings of the repowered Project within 60 days after completion of construction.

Xcel Energy has complied with all of the conditions of the 2014 Site Permit. Xcel Energy is committed to ensuring ongoing compliance with the Site Permit.

1.9 COMPLIANCE WITH PROJECT COMPLAINTS AND RESOLUTION

Xcel Energy reviewed the summary of complaint reports as filed with the MPUC and the log of all complaints between November 2014 and February 2021 for the existing Project.

Xcel Energy received complaints related to noise in July 2016, August 2016, October 2018, March 2019, and July 2020. In response to each complaint, Xcel Energy investigated, coordinated with the landowner, and resolved the issues by making any necessary repairs to the turbine or, in one instance, offering the landowner a good neighbor agreement.

Xcel Energy received several additional noise complaints in 2020 and 2021 related to noise from Turbines 68, 69, and 70. Following a September 2020 noise complaint, Xcel Energy coordinated with the landowner and sent technicians to investigate the complaint. Technicians did not observe the noise referenced by the landowner and found all nearby turbines were functioning as expected. In coordination with the landowner, Xcel Energy installed a sound level monitor on the landowner's property in October 2020 to conduct an initial screening assessment, but the data was found to be contaminated by dry crop wind noise to the degree that it could not be used to assess turbine noise levels. The landowner submitted a follow-up complaint to Xcel Energy in November 2020 and expressed concerns about the potential for increased noise if the existing turbines are repowered with longer rotors. In response, Xcel Energy completed a second screening analysis in April 2021, installing a sound monitor at the site. This screening assessment identified eight nighttime hours where total noise was in excess of the limit, but due to Xcel Energy's limitations on the preliminary screening analysis, the 8-hours of data were submitted to a third-party contractor (RSG) for further analysis and a sound monitoring report was prepared. RSG's analysis determined that noise levels during the periods in question were due to excessive wind noise or

could not attribute the noise level to the turbines. Xcel Energy provided a copy of the sound modeling report to the landowner. In July 2021, Xcel Energy received a complaint from the same landowner about a banging sound coming from Turbine 70 near their property. Xcel Energy sent technicians to investigate the complaint and the technicians noted that the turbine was in need of repair. The turbine was shut down and repaired thereby resolving the complaint.

In December 2021, Xcel Energy received a complaint from the same landowner about dissatisfaction with wind turbine noise levels at their property. Xcel Energy met with the landowner in February 2022 and is continuing to coordinate with the landowner to resolve their concerns and extend existing lease agreements. Options to lower noise levels at the three turbines nearest the landowner's residence consist of installing serrated trailing edges or implementing a Noise Reduced Operating (NRO) mode. Currently, Xcel Energy has requested that the turbine manufacturer provide information on NRO modes for these turbines. Xcel Energy will continue to evaluate the use of NRO modes as a means to reduce noise at the landowner's residence and intends to use STE blades on all repowered turbines. As noted in Appendix E – Noise Modeling for the Pleasant Valley Wind Farm Repower Project, with the use of STE blades on the repowered turbines, the highest modeled turbine only sound level (L_{50}) at this residence is 47 dBA.

Xcel Energy received complaints related to shadow flicker in November 2015, August 2016, June 2017, and December 2017. In response to each complaint, Xcel Energy investigated, coordinated with the landowner or renter, and resolved the issues. For a couple of the complaints, Xcel Energy installed new blinds on the affected windows and planted evergreens to create a natural buffer from the shadow flicker.

Xcel Energy received complaints related to a disruption in television (TV) digital signal in January 2016 and June 2016. In response to each complaint, Xcel Energy investigated, coordinated with the landowner, and resolved the issues, and in one case installed a new antenna to address the issue.

In May 2016, Xcel Energy received a concern related to an eagle nest located within the Project boundary. In June 2016 Xcel Energy met with a group of eight citizens to address their concerns and to discuss Xcel Energy's plan to avoid an eagle strike.

Xcel Energy's agents are currently working with landowners to extend the lease agreements. During those discussions, landowners expressed concerns that are not addressed in the summary above.

1.10 CONSIDERATION OF EXISTING WIND FARMS

There are two wind farms adjacent to the Pleasant Valley Wind Farm: the Wapsipinicon Wind Project (100.5 MW) is located to the east/southeast on the north side of Interstate 90, and the Grand Meadow Wind Farm (100.5 MW) is located to the east, on the south/east side of Interstate 90. In consideration of potential cumulative effects related to the Repower Project, Xcel Energy incorporated turbines within two miles of the Project Area from these existing adjacent wind farms in its analyses of wind rights (see Section 7.0), noise (see Section 8.4), and shadow flicker (see Section 8.5.5).

2.0 CERTIFICATE OF NEED

The Pleasant Valley repowering is exempt from the CN requirement. Minn. Stat. § 216B.243, subd. 8 (8) exempts LWECS repowering projects such as this one from CN requirements.

3.0 STATE POLICY

Pursuant to Minnesota Statutes § 216F.03, the Applicant will further state policy by repowering and operating the Pleasant Valley Wind Farm in an orderly manner compatible with environmental preservation and sustainable development to utilize wind resources more efficiently at the site. The Applicant plans to repower turbines to maximize wind energy development while minimizing impacts on land resources. By repowering the Project, the Applicant is also extending the life of the Project, which avoids decommissioning and completely rebuilding a new project.

The Wind Siting Act (Minnesota Statutes Chapter 216F) requires an application for a site permit for an LWECS, and subsequent amendments, to meet the substantive criteria set forth in Minnesota Statutes § 216E.03, subd. 7. This Application provides information necessary to comply with these criteria and Minnesota Rules Chapter 7854.

The Wind Siting Rules (Minnesota Rules Chapter 7854) govern the content and treatment of applications for an LWECS site permit under the Wind Siting Act. To the extent available, the Applicant has presented information required by the Wind Siting Rules. In addition, sufficient project design, wind resource, and technical information have been provided for a thorough evaluation of the reasonableness of the proposed Project repowering.

This Application has been prepared following the DOC-EERA's Application Guidance.

4.0 PROJECT DESCRIPTION AND OVERVIEW

4.1 PROJECT DESCRIPTION AND LOCATION

Xcel Energy is requesting modification of the Project boundary permitted in 2014, which consisted of approximately 70,000 acres. The Applicant is seeking footprint minimization as described in Section 4.13 of the 2014 Site Permit. The Repower Project infrastructure is physically located on approximately 45,449 acres of privately owned and mostly leased land in Mower and Dodge Counties (Table 4.1-1), generally northwest of Interstate 90, northeast of Austin, and south/southeast of the Town of Hayfield (Figure 3 – Project Boundary Modification). All these acres are located within the previously evaluated and permitted project boundary. Typical landscapes within the reduced wind farm area consist largely of agricultural fields and wind energy infrastructure.

Table 4.1-1
Project Location

County Name	Township Name	Township	Range	Sections
Mower	Dexter	103N	16W	3 - 9, 14 - 30, and 33
	Red Rock	103N	17W	1, 12
	Sargeant	104N	16W	5 - 11, 14 - 22, and 27 - 34
	Sargeant/City of Sargeant	104N	16W	18 and 19
	Waltham	104N	17W	1 - 5, 10 - 15, 22 - 24, and 36
Dodge	Hayfield	105N	17W	24, 25, and 32 - 36
	Vernon	105N	16W	19, 20, and 29 - 32

The wind turbines will be mounted on the existing steel tubular towers and steel reinforced concrete foundations. Associated facilities include electrical collection and communications lines, an electrical substation, a permanent meteorological (met) tower, and gravel access roads.

Xcel Energy has an executed GIA with MISO. The Repower Project has negotiated an amended GIA to reflect repowered turbines. The overall capacity at the point of interconnection will remain the same. In accordance with the GIA, control equipment will be installed that will limit the injection at the POI to the 200 MW service granted in the GIA.

Because the delivered power will be capped at the original 200 MW, only minor facilities and systems upgrades will be required by the Repower. As such, Xcel Energy will focus on operational compliance with the GIA. The Pleasant Valley Repower will have all of the needed equipment and software to comply with the requirements of the GIA and operate inside the parameters specified by both the original GIA and the amended GIA. This includes all equipment and software needed to comply with low voltage ride through and generation cap requirements.

4.2 SIZE OF THE PROJECT AREA IN ACRES

The Repower Project Area has been reduced to 45,449 acres in this Application. The 2014 Site Permit area was roughly 70,000 acres. Xcel Energy is negotiating with additional landowners for

wind rights-only leases to accommodate the 3RD x 5RD Wind Access Buffer setback for the longer blades. Figure 4 (Wind Access Buffer Setbacks) shows the existing wind easements and the parcels Xcel Energy is acquiring wind rights-only leases for.

4.3 RATED CAPACITY

Rotor replacements provide an increase in the rotor swept area, which results in a corresponding increase in the nominal production capacity of the Project from 200 MW to 220 MW. Although the wind farm would be capable of generating additional capacity after repowering, the GIA will remain at 200 MW. The repowered turbines would be able to deliver more energy at lower wind speeds. In the event that all turbines are generating energy at full capacity, the control system will calculate electrical losses and throttle back so that the power delivered to the grid at the POI would not be exceeded.

4.4 NUMBER OF TURBINE SITES

Xcel Energy is requesting repowering approval from the Commission for all 100 of the currently operating turbines.

5.0 PROJECT DESIGN

5.1 DESCRIPTION OF PROJECT LAYOUT AND SETBACK REQUIREMENTS

The repowered turbines will have an increased rotor diameter (RD) from 100 meters (328.1 feet) to 110 meters (360.9 feet). Xcel Energy has reviewed the effects of adding larger rotors upon the permitted and current setback standards for wind projects as shown on Figure 4. The following Table 5.1-1 summarizes the setbacks that: a) were approved in the 2014 Site Permit b) are specified under current MPUC standards (MPUC Order Establishing General Wind Permit Standards; Docket No. E,G-999/M-07-1102), and c) that are possible under the Repower Project. Xcel Energy has executed and recorded full lease agreements for approximately 32,467 acres of private land within the Project Area. In addition, Xcel Energy is currently in the process of seeking an additional 1,931 acres of wind rights-only leases (36 parcels) to add to the periphery of the Project for the larger wind access buffers (Figure 4). For all repowered turbines, the 3RD setback is 330 meters or 1,082.7 feet and the 5RD setback is 550 meters or 1,804.5 feet.

Figure 5 (Setbacks) shows the Project layout in relation to setback requirements and other constraints.

Table 5.1-1
Wind Turbine Setback Requirements for the Project

Setback	2014 Site Permit	Current MPUC Guidance	Possible with Repowering
Wind Access Buffer	3RD on non-prevailing wind direction and 5RD on prevailing wind direction from non-participating property lines.	3RD on the non-prevailing wind axis and 5RD on prevailing wind axis from non-participating property lines.	Xcel Energy is currently seeking additional wind rights-only leases for new parcels that overlap the larger wind access buffers. Xcel Energy will request a waiver of this setback for any parcels in which it cannot obtain additional wind rights.
Occupied Residential Dwellings	1,000 feet from participating properties, 1,500 feet from non-participating properties, and sufficient distance to meet state noise standard.	500 feet and sufficient distance to meet state noise standard.	Turbines are at least 1,000 feet from participating properties, 1,500 feet from non-participating properties.
Noise Requirements	Distance must meet the state noise standard of 50 dBA.	Distance must meet the state noise standard of 50 dBA[1].	Distance must meet the state noise standard of 50 dBA. The repowered turbines are modeled such that turbine-only noise is

Table 5.1-1
Wind Turbine Setback Requirements for the Project

Setback	2014 Site Permit	Current MPUC Guidance	Possible with Repowering
			47 dBA or less at night at all residences[2].
Meteorological Towers	250 feet from the edge of the nearest public road right-of-way and boundaries of developer's site control or in compliance with county ordinance, whichever is more restrictive.	250 feet from the edge of road right-of-way and boundaries of developer's site control.	The existing meteorological tower is at least 250 feet from the edge of the road right-of-way. No new meteorological towers are proposed.
Other Structures	None specified.	None specified.	None specified.
Public Roads	250 feet from the edge of the nearest public road right-of-way.	250 feet from the edge of the nearest public road right-of-way.	Turbines are sited at least 250 feet from public road rights-of-way.
Recreational Trails	Not specified.	250 feet from the edge of public trails, but on a case-by-case basis.	Turbines are sited at least 250 feet from the edge of public trails.
Public Lands	Wind turbines and associated facilities including foundations, access roads, underground cable, and transformers, shall not be located in Waterfowl Production Areas, Wildlife Management Areas, Scientific and Natural Areas, or in county parks.	3RD on the non-prevailing wind axis and 5RD on prevailing wind axis from non-participating property lines.	There are no public lands in the Project Area. The larger wind access buffers comply with this setback and no larger wind access buffers overlap public lands.
Wetlands, Streams, and Ditches	Wind turbines and associated facilities including foundations, access roads, underground cable, and transformers, shall not be placed in public waters wetlands. Electric collector and feeder lines may cross or be placed subject to MNDNR, USACE, and/or LGU permits and approvals.	No turbines, towers, or associated facilities allowed. Electric collector and feeder lines may cross or be placed subject to MNDNR, USFWS, and/or Corps permit.	Turbines, towers, and associated facilities are sited to avoid impacts to wetlands. The Repower will not involve changes to the electric collector and feeder lines.
Internal Turbine Spacing	3RD on non-prevailing wind direction and 5RD on prevailing wind direction	3RD on the non-prevailing wind axis and 5RD on prevailing wind	Fifteen percent of the Repower Project turbines exceed this

Table 5.1-1
Wind Turbine Setback Requirements for the Project

Setback	2014 Site Permit	Current MPUC Guidance	Possible with Repowering
	from non-participating property lines. Twenty percent can exceed threshold.	axis from non-participating property lines. Twenty percent can exceed threshold.	internal spacing threshold, below the 20 percent threshold.
Public Conservation Lands	None specified.	Avoid infrastructure; non-participating property line setback.	Project infrastructure avoids and is sited at least 3RD x 5RD from public conservation lands.
Native Prairies	Turbines and associated facilities shall not be placed in native prairies and construction activities shall not be impact native prairie, unless addressed in a native prairie protection plan.	Turbines and associated facilities shall not be placed in native prairies, unless addressed in a native prairie protection plan.	Native prairies will be avoided by turbines and associated facilities. Prior to the start of construction, Xcel Energy will conduct a survey of the Project Area to identify native prairie and will prepare a Native Prairie Protection Plan in consultation with the MNDNR, as defined in Minn. Stat. § 84.02, subd. 5, for the Project; any unmapped native prairie identified as part of that survey effort will be avoided by modifying the construction workspace.
Sand and Gravel Operations	Turbines and associated facilities shall not be placed in active sand and gravel operations, unless negotiated with the owner.	Turbines and associated facilities shall not be placed in active sand and gravel operations, unless negotiated with the owner.	Sand and gravel operations are avoided by turbines and associated facilities.
Aviation	Turbines and associated facilities shall not be located so as to create an obstruction to navigable airspace of public and private airports.	Turbines and associated facilities shall not be located so as to create an obstruction to navigable airspace of public and private airports.	Turbines and associated facilities have been sited to avoid obstruction to navigable airspace of public and private airports.

Table 5.1-1
Wind Turbine Setback Requirements for the Project

Setback	2014 Site Permit	Current MPUC Guidance	Possible with Repowering
[1]	Commission's General Permit Standards identify the minimum setback from residences as 500 feet, or the minimum distance required to meet the state noise standard of 50 dBA, whichever is greater.		
[2]	Noise standards are regulated by the Minnesota Pollution Control Agency (MPCA) under Minn. R. Ch. 7030. These rules establish the maximum night and daytime noise levels that effectively limit wind turbine noise to 50 dBA. The MPCA standards require A-weighting measurements of noise; background noise must be at least 10 dB lower than the noise source being measured. Xcel Energy has designed the Repower Project such that turbine-only noise at all residences is modeled at or below 47 dBA at night (see Section 8.4).		

5.1.1 Balance of Plant Reliability and Upgrades

The Project has been operating reliably since late 2015. To date, no issues have arisen that call into question the ability of the plant to continue operating through the end of the current 2014 Site Permit term. The balance of plant equipment and improvements, including the foundations, electrical system, and roads, continue to perform as designed. The proposed repower is driven by the improved Project economics that result from the repower rather than by issues with plant reliability.

Additionally, testing and inspection of the balance of plant equipment and facilities have been undertaken to ensure the turbine towers, foundations and electrical system can accommodate the repower hub and rotors. Vestas is estimating a 25 year post-repower useful life.

5.2 DESCRIPTION OF TURBINES AND TOWERS

A horizontal axis wind turbine consists of a hub, nacelle, blades, tower, and foundation. Enclosed within the nacelle is the gear box, low- and high-speed shaft, generator, controller, transformer, and brake. The hub and blades together form the rotor. The tower supports the nacelle, hub, and blades, and is made from tubular steel. Additionally, a control panel inside each turbine houses communication and electronic circuitry.

Xcel Energy is proposing to repower the 100 existing Vestas V100 turbines with Vestas V110 turbines with up to 2.2 MW generating capacity. The current hub height of 95 meters (311.7 feet) will be maintained. The repower will be achieved by installing rotors with longer blades and replacing components of existing nacelles for 86 turbines and replacing the entire nacelle for 14 turbines. The Project nameplate capacity, existing turbine towers, and foundations will remain the same. The repower was developed specifically to upgrade existing turbines to a more efficient configuration, facilitate quick upgrading, and extend turbine service life. Table 5.2-1 provides a comparison of the existing and proposed wind turbine characteristics.

Table 5.2-1
Wind Turbine Characteristics Comparison

Design Feature	Existing V100 2.0 MW Wind Turbines	Repowered V110 2.2 MW Wind Turbines
Nameplate Capacity	2,000 kW	2,200 kW
Hub Height	95 m (311.7 ft)	95 m (311.7 ft)
Total Height	145 m (475.7 ft)	150 m (492.1 ft)
Rotor Diameter	100 m (328.1 ft)	110 m (360.9 ft)
Turbine Positions	100	100
Recyclability Rate	83.5%	84.5%
Cut in Wind Speed	6.7 mph (3 m/s)	6.7 mph (3 m/s)
Cut-out Wind Speed	49 mph (22 m/s)	45 mph (20 m/s)
Re Cut-in Wind Speed	45 mph (20 m/s)	40 mph (18 m/s)
Aerodynamic Brake	Full blade feathering with 3 pitch cylinders	Full blade feathering with 3 pitch cylinders
Power Regulation	Pitch regulated with variable speed	Pitch regulated with variable speed
Electrical	4-pole (50 Hz)/6-pole (60 Hz) doubly fed generator, slip rings	4-pole (50 Hz)/6-pole (60 Hz) doubly fed generator, slip rings
Gearbox	Two planetary stages and one helical stage	One planetary stage and two helical stages
Generation	2.0 MW per turbine	Up to 2.2 MW per turbine
Tower	Tubular steel with safety ladder to the nacelle	Tubular steel with safety ladder to the nacelle
Supervisory Control and Data Acquisition (SCADA)	Each turbine is equipped with SCADA controller hardware, software, and database storage capability	Each turbine is equipped with SCADA controller hardware, software, and database storage capability
Federal Aviation Administration (FAA) Lighting	Option for aviation lighting and markings on the blades	Option for aviation lighting and markings on the blades

The turbine model contains emergency power supplies to allow operation of the control systems, braking systems, yaw systems, and blade pitch systems, and to shut the turbine down safely if grid power is lost. Mechanical and/or ultrasonic anemometers and weather vanes, located on the turbine nacelle, continuously collect real-time wind speed and direction data. Based on the data collected, the turbine yaw system constantly rotates the hub, blades, and nacelle into the wind, while the blade pitch system continuously adjusts the pitch of the blades to optimize the output of the generator. The pitch system also protects the turbine from over-speed events in high winds by pitching the blades perpendicular to the wind and aero-braking the turbine to a stop in normal shutdown conditions. The mechanical braking system, located within the nacelle, is used to stop the turbine's rotation in the event of a storm or turbine fault. The mechanical brake and lock-out system is used to lock the blade rotor to prevent the blades from spinning during maintenance periods or when the turbine is out of service. The gear box adjusts shaft speeds to maintain generator speed in low and high wind speeds. Electrical energy produced by the generator is

transmitted through insulated cables in the power rail to a safety switch and then to a transformer located internally in the tower or externally on the base of the tower.

The Project's design includes safety and control mechanisms. These mechanisms are generally monitored using a Supervisory Control and Data Acquisition (SCADA) system. Each turbine is connected to the SCADA system via fiber-optic cable, which allows the turbines to be monitored in real time by the operation and maintenance staff. The SCADA system also allows the Project to be remotely monitored, thus increasing Project oversight as well as the performance and reliability of the turbines. A SCADA upgrade is planned that will help implement feathering up to cut-in speed and measure potential noise reduction operations. Both the local operation and maintenance office and a 24/7 remote operations facility will have control of the individual turbines. These two teams will coordinate to ensure that the wind turbines operate safely and efficiently.

A third mechanism for safety and control is the turbine. Each turbine monitors the wind speed and direction to ensure that its current position is most efficient to produce electricity. This data is also used for feathering the blades, applying the brakes in the event of high wind speeds or ice build-up on the blades, and to tell the turbine when the wind is strong enough to begin turning the generator and produce electricity at the "cut-in" wind speed.

Operations, maintenance, and service arrangements between the turbine manufacturer and Xcel Energy will be structured to continue providing timely and efficient operation and maintenance. The computerized data network will provide detailed operating and performance information for each wind turbine. Xcel Energy will maintain a computer program and database to track each wind turbine's operational history. Certain turbine data are monitored for abnormalities at an Xcel Energy Maintenance and Diagnostic Center in Denver, Colorado.

5.3 TURBINE FOUNDATIONS

Structural assessments of the existing foundations were completed to determine if the existing foundation design can accommodate the V110 turbines and meet 2022 industry design standards. Based on the field assessment work that's been completed, Xcel Energy understands the current foundation design can accommodate the V110 turbines.

5.4 DESCRIPTION OF ELECTRICAL SYSTEM

The electrical system is the same as permitted in 2014. Each turbine has its own individual step-up transformer located within the nacelle of each unit that increases the voltage at the turbine terminals to the medium voltage level (34.5 kilovolt [kV]) of the buried collector circuits that transmit the power from the turbines to the Project substation. At the Project substation, the power from the collector circuits is then stepped up to 161 kV and delivered to the transmission grid via an approximately five-mile 161 kV transmission line that generally runs east to the Great River Energy Pleasant Valley Substation. The Great River Energy Pleasant Valley Substation is immediately adjacent to and connected to the Prairie Island-Byron-Adams 345 kV transmission line.

6.0 DESCRIPTION AND LOCATION OF ASSOCIATED FACILITIES

Associated facilities exist in the locations previously permitted and constructed to support the operation of the wind turbines and facilitate the delivery of the electricity to consumers. The previously permitted locations of permanent associated facilities such as access roads, collection lines, substation, and O&M facilities will remain the same.

6.1 TRANSMISSION AND PROJECT SUBSTATION

The Repower Project does not require a new transmission line, and the wind farm will continue to connect with the existing Great River Energy Pleasant Valley Substation via the separate Project substation and associated 161 kV transmission line.

The existing Project substation is located in the central portion of the Project Area, approximately 0.75 mile east of Sargeant, Minnesota on the south side of 310th Street. Collection lines transmit the power from the turbines to the Project substation. At the Project substation, the power from the collector circuits is then stepped up to 161 kV. From the Project substation, an approximately five-mile 161 kV transmission line connects the Project to the Great River Energy Pleasant Valley Substation where the power is stepped up to 345 kV and onto the transmission grid. No changes will occur to the Project substation outside of the existing footprint.

The Project substation is monitored by a SCADA system capable of monitoring and controlling most aspects of the substation facility. The Project substation is monitored for abnormalities at an Xcel Energy Maintenance and Diagnostic Center in Denver, Colorado.

The Project substation has a small building within the fenced area that houses the control and relaying equipment, station batteries, and SCADA system. The entire substation is enclosed by a looped chain link fence.

6.2 COLLECTOR LINES AND FEEDER LINES

The following equipment is existing and will continue to be used with the Repower. Power from each turbine generator is converted, controlled, and fed inside the tower from the generator down and through the power conditioning equipment and breaker panel. The turbine output voltage is stepped up to the collector system voltage of 34.5 kV by means of an individual step-up transformer located in a separate locked room in the back of the nacelle. Each transformer is connected to the Project substation through underground collector lines.

The collector lines combine the electrical output of the wind turbines through separate 34.5 kV underground collector circuits. The Project substation steps up voltage from these 34.5 kV collector lines to 161 kV and a five-mile transmission line delivers the power to the grid.

6.3 ADDITIONAL ASSOCIATED FACILITIES

6.3.1 O&M Facility

There will be no upgrades to the existing O&M facility. This building serves as a center for the Project's O&M efforts, provides Project access and storage, and houses the SCADA system. The

facility has an existing footprint of approximately 1.8 acres and includes a parking lot and O&M building. The O&M building is approximately 10,000 square feet (980 square meters) and houses Project equipment. The O&M facility is located along Industrial Park Drive within the City of Dexter east of the Project Area on the opposite side of Interstate 90.

6.3.2 Permanent Meteorological Towers

The Wind Farm currently has a single, permanent, free-standing, 80 meters (262.5 foot) tall met tower that meets Federal Aviation Administration (FAA) and local requirements for lighting and marking. Xcel Energy is not currently planning to construct any new permanent met towers.

6.3.3 Aircraft Detection Lighting System

An Aircraft Detection Lighting System (ADLS) radar system turns FAA-required turbine lights on when low-flying aircraft are detected nearby. In accordance with Minn. Stat. § 216F.084, Xcel Energy will coordinate with the FAA regarding installation of ADLS for the Project. The location of the radar unit(s) will be determined based on participating landowners, environmental conditions, an analysis of radar coverage from an ADLS technology vendor, and, ultimately, review and approval by the FAA and Federal Communications Commission (FCC). The ADLS tower(s) will be similar to a met tower; they will be free-standing, and they will require a temporary workspace of approximately 75 feet by 75 feet.

6.4 REPOWERING CONSTRUCTION REQUIREMENTS

Previously permitted turbine access roads for the wind farm will remain in the same locations and may be temporarily widened to accommodate equipment. A large construction crane will be used to either remove the old rotors and hub or the existing nacelle, and to re-install the longer rotors and upgraded nacelle components or replace the existing nacelle. Repowering of the existing turbines generally will require a temporary 400-foot radius workspace around each turbine and an approximately 300-foot by 60-foot crane assembly area adjacent to the existing access road. Xcel Energy has closely worked with landowners on placement of the crane assembly areas to minimize impacts on agricultural fields. In response to landowner concerns about drain tile, Xcel Energy will not use crane paths between turbine sites. Additionally, Xcel Energy and the construction contractor, with input from landowners, have designed access road and public road turning radius improvements to avoid and minimize crossings of environmentally sensitive features such as Minnesota Department of Natural Resources (MNDNR) native prairie, native plant communities (NPCs), and Sites of Biodiversity Significance (SOBS).

The Repower Project will also require grading of a temporary laydown area to serve both as a parking area for construction personnel and staging area for turbine components during construction. Xcel Energy is currently coordinating with landowners to host this facility – it will be sited on leased land and to avoid wetlands, waterbodies, cultural resources, and environmentally sensitive features such as native prairie, NPCs, and SOBS. The laydown area will be in place for 8-10 months during construction and then restored. Other temporary staging areas may be needed for parking and unloading of large equipment deliveries. Temporary laydown and staging areas, and restoration of these areas, are described more fully in Section 10.3.

7.0 WIND RIGHTS

7.1 STATUS OF WIND RIGHTS AND MODIFICATIONS

All current Project facilities are located on leased land and were sited to accommodate the facilities, required setbacks, and turbine placement flexibility needed to avoid natural resources, homes, and other sensitive features. Given the larger rotor diameter of the proposed repower turbines, the Project is working with landowners to secure sufficient land lease and wind easements/setback easement agreements necessary to repower, operate, and maintain the Project. The overall area within the Project boundary consists of approximately 45,449 acres. Within the 45,449-acre Project Area, Xcel Energy has existing lease agreements with participating landowners for approximately 32,467 acres (71 percent of the Project Area) and is negotiating wind easement amendments with current participating landowners to extend the term of those easements for the entire life of the repowered Project. In addition, approximately 1,931 acres of new wind rights-only leases are being pursued for 36 parcels (33 landowners) that fall within the larger 3RD x 5RD wind access buffer. The acreage provided for wind rights-only leases represents a subset of the area within these parcels, as only the portion of the parcel within the larger 3RD x 5RD will be leased (e.g., the quarter-quarter section). New wind rights-only leases are located both within and outside of the previously permitted Project boundary as shown on Figure 4.

In August 2020, the Project's acquisition team met with several existing participating landowners to explain the proposed Project and gather input from the owners on what they thought the Project needed to do in order to gain community support and ultimately a successful repower. The overall feedback was supportive. From that point forward the Project began its acquisition process, which included the following steps:

- Researching current title on all parcels with existing wind easement agreements, as well as new wind rights-only leases required for the larger 3RD x 5RD wind access buffer.
- Sending a mailer to all landowners in the area with an overview of the proposed Project, which included a request for current contact information and a notice that a Project representative would be reaching out to them later in 2022.
- The Project began outreach in early January 2022 to all impacted landowners. This outreach included: direct phone calls, in person meetings, emails, door hangers, and letters. The outreach and acquisition activities are ongoing.
- In March 2022, the Project held a virtual open house for the public to describe the proposed Project and answer questions.
- To date the Project has been in contact with 92 percent of the landowners of new wind rights-only parcels and have secured 11 of the needed wind rights-only leases. The Project team is also continuing to sign wind easement amendments with current participating landowners to extend the term of those easements for the entire life of the repowered Project. Additional information is provided in Appendix C – Wind Rights Waiver Request. The Project's acquisition team will continue to negotiate and obtain necessary wind rights over the coming months.

- If Xcel Energy's good faith negotiations for wind rights-only leases are unsuccessful, Xcel Energy will request landowners sign a declaration acknowledging the landowner does not wish to enter into an agreement but has no objection to the Commission granting a waiver to the wind access buffer setback.
- For remaining turbines where Xcel Energy is unable to reach agreement or obtain a no-objection declaration, Xcel Energy will seek a waiver from the Commission from the wind access buffer setback, consistent with the Commission's actions in other wind repower dockets.

During acquisition efforts, the Project has also been coordinating closely with the nearby Prairie Star project. Two parcels are impacted by both projects, and Xcel Energy is working with Prairie Star to document a junior wind right granted to the Project that provides the necessary setback wind rights. A mutual consent agreement will be entered into by both parties that confirms the two projects are not in conflict with one another. A notice will be sent to landowners to describe the agreement.

As shown in Appendix C, based on the current status of wind rights negotiations, Xcel Energy is requesting the Commission waive the wind access buffer setback for 25 turbines. As the permitting process and wind rights negotiations proceed, Xcel Energy expects the necessary number of setback waivers to decrease significantly. Xcel Energy will periodically update the Commission on the status of its efforts to obtain wind rights agreements with the newly affected landowners within the larger wind access buffer setbacks of the repowered turbines.

8.0 ENVIRONMENTAL IMPACTS

In accordance with Minn. R. Ch.7854, Xcel Energy provides the following description of the environmental conditions of the Repower Project Area. Because this is an operating project, Xcel Energy has focused on addressing substantive changes and/or updates rather than a complete revisit of items and resources previously addressed in the original 2010 Site Permit Application, the 2014 Site Permit amendment petition, and with respect to the 2014 Site Permit.

On February 1 and 2, 2022, Xcel Energy sent electronic letters to individuals representing local, state, and federal entities requesting comment. Some of those agencies included the U.S. Fish and Wildlife Service (USFWS), the U.S. Army Corps of Engineers (USACE), the State Historic Preservation Office (SHPO), the Minnesota Office of the State Archaeologist (OSA), MNDNR, Minnesota Department of Transportation (MNDOT), Minnesota Department of Health (MDH), Mower County, Dodge County, the Minnesota Indian Affairs Council, and the Tribal Historic Preservation Officer of 11 tribes. To date, comments have been received from the Minnesota Department of Commerce, MNDNR, MNDOT, OSA, and the City of Sargent. Responses have been incorporated into this Application, where appropriate. Agencies contacted and comments received are provided in Appendix D – Agency Correspondence. Lastly, Xcel Energy discussed the Project with DOC-EERA staff including the approach to the Repower Project, community and landowner outreach, and anticipated schedule.

As described in Section 6.4, construction of the Repower Project will require the following temporary workspaces:

- Generally, 400-foot radius around turbines
- Widening of access roads
- Generally, 0.1 acre turning radius improvements at turbine access roads
- Generally, 0.1 to 0.3-acre turning radius improvements at public road intersections
- 300-foot by 60-foot crane assembly areas adjacent to turbine access roads

These temporary workspaces are used for the environmental impact analysis throughout Section 8.0. As described in Section 6.3.3, Xcel Energy is coordinating with the FAA regarding installation of an ADLS radar unit(s) for the Project. Because the number and location of these unit(s) is not yet known, impacts associated with ADLS are described generally in applicable sections (i.e., visual resources). Xcel Energy anticipates impacts associated with ADLS will be similar to a met tower, requiring a construction workspace of approximately 75 feet by 75 feet (less than 0.1 acre) each.

8.1 DEMOGRAPHICS

Demographic information for Minnesota and Mower and Dodge Counties is based on the U.S. Census Bureau 2010 and 2020 Censuses and the 2019: American Community Survey (ACS) 5-year Estimates Data Profiles, available on Explore Census Data and QuickFacts websites. Demographic information is summarized in Table 8.1-1.

Table 8.1-1
Demographics in the Project Area

Census Category	Minnesota	Mower County	Dodge County
Population, Census, April 1, 2020[1]	5,706,494	40,029	20,867
Population, Census, April 1, 2010[1]	5,303,925	39,163	20,087
Percent Change 2010 - 2020	7.6%	2.2%	3.9%
Population per Square Mile, 2010[1]	66.6	55.1	45.7
2019 Estimated Total Housing Units[2]	2,438,203	17,071	8,241
2019 Estimated Total Vacant Housing Units[2]	252,600	1,506	485
Total Minority Population[1, 3]	20.9%	23.3%	8.1%

[1] U.S. Census Bureau, 2019a
[2] U.S. Census Bureau, 2019b
[3] The total minority population is the total population minus the percent of the population that identifies as White alone, not Hispanic or Latino.

The Project is located within a lightly populated rural area in southeastern Minnesota in Dexter, Red Rock, Sargeant, and Waltham Townships in Mower County and Hayfield and Vernon Townships in Dodge County. The City of Sargeant is within the central portion of the Project Area. The nearest municipalities outside of the Project Area are Dexter and Waltham (Project Area is directly adjacent to the municipal boundaries of both), Brownsdale (1.5 miles west), Hayfield (1.0 mile northwest), Vernon (1.2 miles northeast), Elkton (1.6 miles southeast), and Austin (6.2 miles southwest). Demographics in the Project Area vary slightly from the information presented in the original Site Permit Application for the wind farm in 2010 (Docket No. IP-6828/WS-09-1197). In particular, total population, total minority population, and the number of persons living below the poverty line have changed over time.

The 2019: ACS 5-year Estimates Data Profiles, the total number of housing units in Mower and Dodge Counties is estimated to be 17,071 and 8,241, respectively (U.S. Census Bureau, 2019b). The 2010 U.S. Census data shows that the population density in Mower County was 55.1 persons per square mile and in Dodge County was 45.7 persons per square mile, both of which are lower than the state level but consistent with the more rural nature of the Project Area (U.S. Census Bureau, 2019a). Population density from the 2020 U.S. Census is not yet available on the Quick Facts website. Based on review of 2019 aerial photography, there are 254 residences within the Project Area (Figure 2 – Project Area and Facilities).

According to the U.S. Census Bureau's QuickFacts website, the total minority population in Mower County is 23.3 percent, which is slightly higher than the state level of 20.9 percent while the total minority population in Dodge County is 8.1 percent, which is significantly lower than the state level (U.S. Census Bureau, 2019a). The largest minority group in both Mower and Dodge Counties is comprised of persons who identify as Hispanic or Latino at 12.2 and 4.9 percent, respectively.

The Application Guidance suggests an applicant include an environmental justice analysis in the application. Based on review of the Minnesota Pollution Control Agency's (MPCA's)

Understanding Environmental Justice website, there are no environmental justice populations within the Project Area (MPCA, n.d.). The nearest environmental justice populations are located in the City of Austin where environmental justice populations have been identified based on both income and minority populations.

8.1.1 Impacts

The Project would not have a significant or long-term impact on the existing demographics in Mower and Dodge Counties. Construction of the Project will not displace residents and is expected to have a minimal, temporary impact on the demographics of the Project Area. Approximately 200 construction personnel will be required for construction of the Project. Xcel Energy will use union labor for the Repower Project. The influx of approximately 200 construction personnel would equate to a total population increase of approximately one percent in both Mower and Dodge Counties over 2020 census numbers. This would represent a minimal, temporary increase in the total population of Mower and Dodge Counties.

Temporary housing for construction personnel is available in the form of motels and hotels in municipalities near the Project Area such as Austin, Albert Lea, and Rochester which are within 5 to 30 miles of the Project Area. According to the website Hotels.com, there are six hotels in Austin, 12 hotels in Albert Lea, and more than 30 hotels in Rochester (Hotels.com, 2022). In addition, as shown in Table 8.1-1, 1,506 vacant housing units are available in Mower County and 485 vacant housing units are available in Dodge County (U.S. Census Bureau, 2019b). Overall, the demand for temporary housing for construction personnel would represent a minimal, temporary impact on the availability of temporary housing in Mower and Dodge Counties.

Operations and maintenance of the existing Pleasant Valley Wind Farm currently requires 12 full-time site staff. After repowering of the turbines is complete, Xcel Energy anticipates that the same number of staff will be required to operate and maintain the facility; no additional permanent full-time staff will be required. Operation of the repowered facility will not affect the demographics of the Project Area.

The Project will not affect environmental justice communities. Review of the MPCA's Understanding Environmental Justice website indicates that environmental justice populations are not present within the Project Area.

8.1.2 Mitigative Measures

The Project is not expected to impact the demographics in the Project Area; therefore, no mitigation measures are proposed.

8.2 LAND USE AND ZONING

The primary regulatory approval required for the construction and operation of the Repower Project is a Site Permit amendment issued by the Commission. Pursuant to the Minnesota Wind Siting Act (Act), the Commission has been given the responsibility and authority to accept, evaluate, and grant permits for wind projects in Minnesota. The Act provides that "No person may construct an LWECS without a site permit issued by the Public Utilities Commission" (Minn. Stat.

§ 216F.04(a)). The Act defines an LWECS as any combination of wind turbines and associated facilities with a nameplate rating equal to or greater than 5,000 kW. Furthermore, Minn. Stat. § 216F.07 states that, "A permit under this chapter is the only site approval required for the location of an LWECS. The site permit supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances adopted by regional, county, local and special purpose government."

8.2.1 Local Zoning and Comprehensive Plans

A comprehensive plan is a land-use and community-planning tool used to guide the direction and intent of growth for a county or municipality. Generally, comprehensive plans discuss existing and future land uses, population and housing trends, economic development goals and opportunities, and environmental characteristics of the county or municipality.

The Mower County Comprehensive Plan (2002) states that, protection of prime agricultural land and support of commercial agriculture will continue to be a priority for the county. Thoughtful expansion of existing urban centers (e.g., Austin) in a manner that supports preservation of the rural, agrarian lifestyle is also a stated goal of the Mower County Comprehensive Plan. The plan does not specifically address wind energy development.

The Dodge County Comprehensive Plan (2019) outlines plans for growth that promote economic, infrastructure, and urban development while preserving natural resources and supporting agricultural production within the county. The plan recommends the development of overlay districts for specific resources (e.g., groundwater, agricultural land) that would support the preservation goals of the county. The plan does not specifically address wind energy development.

8.2.2 Current and Future Zoning

In preparing this Application, Xcel Energy also reviewed the Mower County Zoning Ordinance (2003) and the Dodge County Zoning Ordinance (1995).

In Mower County, the Project Area is primarily located within the Agricultural District. The exceptions are the Town of Sargeant, which is zoned as Rural Residential, and one smaller pocket of the Project Area that is zoned as a Rural Management District; this area is located near the Root River in the northeastern portion of the Project Area. None of the existing Pleasant Valley Wind Farm facilities are located within the Rural Residential or Rural Management Districts.

The Mower County Zoning Ordinance does not specifically address repowering of an existing commercial wind energy conversion system, but does contain provisions for regulating wind turbines and wind farms over 5 MW that are regulated by the State of Minnesota (Section 14-18.61). The regulations in this section of the Mower County Zoning Ordinance are intended to protect certain designated microwave beam paths by prohibiting wind turbines within designated microwave beam paths or in an area that falls within a one-mile radius of the center point of designated existing towers. The regulations do not comment on whether wind turbines and wind farms are permitted within the Agricultural District as a permitted or conditional use. However, Section 14-48 of the ordinance notes that any uses not provided in the list of permitted, conditional, or prohibited uses for a given zoning district shall be considered prohibited and the Planning Commission may conduct a study to determine if the use is acceptable.

In Dodge County, the Project Area is located in the Agricultural District and no Project facilities are sited within established overlay districts. The Dodge County Zoning Ordinance (1995) lists Wind Energy Conversion Systems as a conditional use in the Agricultural District (Chapter 8: Agricultural District "A"). Section 16.51 of the ordinance clarifies that the county has regulations and performance standards for Wind Energy Conversion Systems with a rated capacity of less than 5 MW that are not otherwise subject to oversight by the State of Minnesota pursuant to Minnesota Statures, Chapter 216F, as amended. As such, the Dodge County Zoning Ordinance regulations for Wind Energy Conversion Systems are not applicable to the Project.

Xcel Energy is coordinating with Mower and Dodge Counties and Dexter, Red Rock, Sargeant, Waltham, Hayfield, and Vernon Townships to confirm that the Project is in alignment with applicable zoning and to obtain any required permits or approvals. Additionally, Xcel Energy is also coordinating with Mower and Dodge Counties and the townships on a road use agreement to protect local roads.

8.2.3 Impacts

Repowering of the existing Pleasant Valley Wind Farm will not significantly affect existing land uses in Mower and Dodge Counties. Agricultural production in the immediate Project vicinity may experience minor short-term impacts from the use of temporary construction workspaces during construction, but these impacts would resolve when construction is complete. Repowering of the existing turbines will not affect designated microwave beam paths; therefore, the Project will be in compliance with the provisions of Section 14-18.61 of the Mower County Zoning Ordinance (2003). No impacts on county zoning designations are anticipated as a result of the Project.

Operation of the repowered wind farm will not interfere with Mower or Dodge County's stated goals for preservation of prime agricultural land for continued use in commercial agricultural production. The Pleasant Valley Wind Farm has been in operation since 2015 and agricultural production within the Project Area has continued during that time. Additionally, no new turbines or other permanent facilities are proposed.

8.2.4 Mitigative Measures

The Project is generally consistent with the comprehensive plan and zoning requirements of Mower and Dodge Counties. Accordingly, no mitigative measures are proposed.

8.3 CONSERVATION EASEMENTS

The Conservation Reserve Enhancement Program (CREP) is an offshoot of the Conservation Reserve Program (CRP) which is a land conservation program established by the U.S. Department of Agriculture (USDA) and administered by the Farm Service Agency that pays farmers a yearly rental fee for agreeing to take environmentally sensitive land out of agricultural production in an effort to improve environmental health and quality (USDA, n.d.). Minnesota implemented the CREP to target state-identified, high-priority conservation resources by offering payments to farmers and agricultural landowners to retire environmentally sensitive land using the Reinvest in Minnesota (RIM) Program (BWSR, 2019). The RIM Program also includes a Wetland Reserve Program that protects and restores previously drained wetlands and adjacent native grasslands.

Enrollment in the conservation easement programs is voluntary. Based on publicly available data, there is a 61-acre Permanent Wetland Preserve (PWP) easement, two RIM easements totaling about 6 acres, and two CREP easements totaling about 82 acres within the Project Area.

One additional area of Farm Service Agency (FSA) interest is located in the northwest portion of the Project Area. The Pesch FSA easement consists of approximately 27 acres of land located along the margins of Cedar River. Figure 6 (Public Land Ownership and Recreation) depicts conservation easements in the vicinity of the Project.

8.3.1 Impacts

Based on publicly available data, one PWP easement, two RIM easements, and two CREP easements are present within the Project Area. Because this is a repowering project, ground disturbance will be limited to workspaces around turbine pads, crane assembly areas, laydown/staging areas, access road widening, and turning radius improvements at access roads and public road intersections. The PWP easement, both RIM easements, and one of the CREP easements are between 0.3 and 1.0 mile from the nearest turbine or Project facility. At this distance, the conservation easements would not be affected by construction of the Project.

One CREP easement is adjacent to the western edge of the permanent access road to Turbines 96 and 97 (refer to Figure 6). Xcel Energy will avoid impacting this CREP easement by siting temporary construction workspaces (i.e., crane assembly area and access road widening) on the east side of the access road.

8.3.2 Mitigative Measures

The Project is not anticipated to impact conservation easements. Xcel Energy will avoid impacting the CREP easement that is adjacent to the access road to Turbines 96 and 97 by siting temporary construction workspaces on the opposite side of the access road. In addition, Xcel Energy will develop a Stormwater Pollution Prevention Plan (SWPPP) for the Project that outlines erosion control measures to be used during construction, which will limit the potential for sedimentation outside of approved construction workspaces.

Xcel Energy is actively completing a title search for all Project participants that will also identify any other conservation easements in the Project Area. If additional conservation easements are identified, Xcel Energy will coordinate with the landowners and the agency that administers the conservation easements to identify their trust resources and address any potential impacts. Additionally, Xcel Energy is coordinating with the Natural Resource Conservation Service (NRCS), Board of Water and Soil Resources (BWSR), and MNDNR on the accuracy of the publicly available easement data.

8.4 NOISE

Sound level is measured in units of decibels (dB) on a logarithmic scale. It may be made up of a variety of sounds of different magnitudes, across the entire frequency spectrum. The human ear is not equally sensitive to sound at all frequencies and magnitudes. Some frequencies, despite being the same dB level (that is, magnitude), seem louder than others. For example, a 500 hertz (Hz)

tone at 80 dB will sound louder than a 63 Hz tone at the same level. In addition, the relative loudness of these tones will change with magnitude. For example, the perceived difference in loudness between those two tones is less when both are at 110 dB than when they are at 40 dB.

To account for the difference in the perceived loudness of a sound by frequency and magnitude, acousticians apply frequency weightings to sound levels. The most common weighting scale used in environmental noise analysis is the "A-weighting," which represents the sensitivity of the human ear at low to moderate sound pressure levels. The A-weighting is the most appropriate weighting when overall sound pressure levels are relatively low (up to about 70 dBA). The A-weighting de-emphasizes sounds at lower and very high frequencies since the human ear is less sensitive to sound at these frequencies at low magnitude.

Higher sound levels typically exist near roadways and near areas that experience greater human activities such as farming. Agricultural/rural areas with higher wind resources generally experience higher sound levels compared to agricultural/rural areas with lower wind resources. Different communities can experience a wide variety of sound levels within their given ambient acoustic environments, and the variability of sound sources creates their respective spectral content. A comparison of typical noise generators is outlined below in Table 8.4-1.

Table 8.4-1
Decibel Levels of Common Noise Sources

Sound Pressure Level (dBA)	Noise Source
140	Jet Engine (at 25 m)
130	Jet Aircraft (at 100 m)
120	Rock and Roll Concert
110	Pneumatic Chipper
100	Jointer/Planer
90	Chainsaw
80	Heavy Truck Traffic (at 15 m)
70	Business Office
60	Conversational Speech
50	Library
40	Bedroom
30	Secluded Woods
20	Whisper

Source: MPCA, 2008

The Minnesota Pollution Control Agency (MPCA) has the authority to adopt noise standards pursuant to Minn. Stat. § 116.07, subd. 2. The adopted standards are set forth in Minn. R. Ch. 7030. The MPCA standards require A-weighted noise measurements. Different standards are specified for daytime (7:00 AM – 10:00 PM) and nighttime (10:00 PM – 7:00 AM) hours. The noise standards specify the maximum allowable noise levels that may not be exceeded for more than 10 percent of an hour (L_{10}) and 50 percent of an hour (L_{50}), respectively. Household units, including farmhouses, are included in Land Use Noise Area Classification (NAC) 1. Table 8.4-2

shows the MPCA State noise standards. All of the land within the Project Area is considered Land Use NAC-1.

Table 8.4-2
MPCA State Noise Standards – Hourly A-Weighted Decibels

Land Use	Code	Day (7:00am – 10:00pm) dBA		Night (10:00pm – 7:00am) dBA	
		L_{10}	L_{50}	L_{10}	L_{50}
Residential	NAC-1	65	60	55	50
Commercial	NAC-2	70	65	70	65
Industrial	NAC-3	80	75	80	75

8.4.1 Impacts

The proposed Repower Project consists of increasing the RD from 100 meters to 110 meters for all 100 existing turbines, as well as upgrading gear boxes and associated components or replacing the nacelle; the hub height will remain at 95 meters. The number and location of the wind turbines will not be changed by the Repower Project. The Pleasant Valley Wind Farm has been in continuous commercial operation since late 2015. Xcel Energy has received complaints related to noise during commercial operation of the wind farm and in response to each complaint, Xcel Energy investigated, coordinated with the landowner, and worked to resolve the issues. A summary of noise complaints received since the Pleasant Valley Wind Farm began operating in 2015 and how Xcel Energy has responded to complaints is provided in Section 1.9.

The Mayor of Sargeant responded to Xcel Energy's project notification letter and noted that he is aware that some landowners near the wind farm have complained about noise and shadow flicker from the turbines. He also expressed concerns about the potential for turbines sited near the city to cause noise and shadow flicker impacts if future development expands in the direction of the turbines. Xcel Energy is continuing to coordinate with the City of Sargeant to address their concerns.

Acoustical modeling was completed by RSG on behalf of Xcel Energy for the Repower Project; a description of the modeling assumptions is included in Appendix E - Noise Modeling for the Pleasant Valley Wind Farm Repower Project.

RSG modeled the predicted noise levels of the Project, with the existing V100 turbines with 100 meter rotors prior to modeling the Repower Project with the proposed V110 turbines. Modeling the existing Project provided a baseline noise level that assisted Xcel Energy in evaluating modeled noise levels for the Repower Project. Background sound levels were reported and collected in the post-construction noise assessment[1] for the original Pleasant Valley Wind Farm Project. Land uses, roadways, and other infrastructure in the Project Area have not changed since the 2016 assessment was conducted, so the data in this report are representative of existing conditions. The

[1] Docket No. IP-6828/WS-09-1197, Pleasant Valley Wind Farm, Post-Construction Noise Assessment, DNV-GL, August 24, 2016.

original Pleasant Valley post-construction assessment was measured in accordance with the guidance[2] by the Minnesota Department of Commerce that was applicable at the time of the monitoring.

Based on RSG's sound propagation modeling, the existing Project produces a maximum turbine-only sound pressure level (L_{50}) of 49 dBA and a maximum total sound pressure level (L_{50}) of 50 dBA. Xcel Energy conducted a series of analyses looking at feasible noise mitigation strategies for the Repower Project. Results of noise modeling showed that 35 of the 100 turbines would need serrated trailing edges (STEs) to meet noise standards. Based on additional noise reduction benefits, relative cost and operational considerations, Xcel Energy proposes to include serrated trailing edge (STE) treatments on all repowered turbines.

STE blades are offered by Vestas and many other manufacturers (sometimes referred to as low noise trailing edges) to reduce sound emissions during turbine operation. This results in lower sound emissions, and a nominal loss in power production.

Based on the proposed design, the highest modeled turbine-only sound level (L_{50}) at both participating and non-participating residences is 47 dBA. Most receptors are projected to see an increase of 1 to 3 dB in turbine-only sound level after the existing turbines are repowered with an average increase across the Project Area of 2.5 dB. The maximum predicted total sound level for the Repower Project is 49 dBA.

A comparison of the predicted turbine-only sound levels at receptors before and after the Repower Project is provided in Table 8.4-3. Predicted sound levels at all receptors are depicted on Figure 7 (Sound/Noise).

Table 8.4-3
Modeled Turbine-Only Sound Levels at Residences Before and After the Repower Project

Modeled Sound Pressure Level dBA	Number of Residences			
	Existing Project[1]		Repowered Project[2]	
	Participant	Non-Participant	Participant	Non-Participant
<40	28	1,232	13	1,184
≥ 40 and ≤ 45	33	272	40	312
46	0	5	7	14
47	0	4	1	5
48	0	0	0	0
49	0	2	0	0
50	0	0	0	0

[1] 100 V100 turbines with 100 m rotor diameter and 95 m hub height.
[2] 100 V110 turbines with 110 m rotor diameter and 95 m hub height. All 100 turbines will have STE blades.

[2] "Guidance for Large Wind Energy Conversion System Noise Study Protocol and Report," October 2012.

Minor, temporary construction noise will be generated by repowering from typical construction equipment such as cranes, component delivery trucks, dump trucks, and graders. In general, construction noise will be less than experienced during Project construction as access roads, turbine pads, towers, and collection lines will remain in place. Machinery will be properly muffled, as required by law, and hours of operation will be consistent with state standards for similar construction projects. Because of the rural nature of the Project location, construction-related noise is expected to be typical of farming operations during the height of planting and harvest seasons.

8.4.2 Mitigative Measures

As discussed in Section 8.4.1, the Project has been in continuous commercial operation since late 2015. Xcel Energy received eight complaints related to noise between July 2016 and July 2021 and in response to each complaint, Xcel Energy investigated, coordinated with the landowner, and worked to resolve the issues by repairing the turbine or, in one instance, offering the landowner a good neighbor agreement. Four of the noise complaints are from a single landowner and additional sound monitoring and analysis at this receptor showed the turbines are not operating outside the established state noise standards.

For the Repower, Xcel Energy has significantly modified its Project design to incorporate noise mitigation measures. All of the 100 turbines will be equipped with STE blades. The STE blades reduce sound levels of the turbines by approximately 2 decibels. As noted in Section 8.4.1 and Appendix E, with these sound mitigation measures, the highest modeled turbine-only sound level (L_{50}) at both participating and non-participating residences is 47 dBA. The modeling assumptions related to these sound mitigation measures are discussed in Appendix E.

8.5 VISUAL RESOURCES

The topography of the Project Area is glaciated, gently rolling plains with elevations ranging from 1,278 to 1,418 feet (390 to 433 meters) above sea level. Elevations are highest in the central portion of the Project Area and lowest in the northern tip of the Project Area. Agricultural fields, farmsteads, and gently rolling topography visually dominate the Project Area. The landscape can be classified as rural open space. Figure 8 (Topographic Map) shows the general topography within the Project Area.

Viewsheds in this area are generally broad and uninterrupted, with only small, scattered areas where they are interrupted by trees or topography. The settlements in the vicinity are residences and farm buildings (inhabited and uninhabited farmsteads) scattered along rural county roads. The area is also shaped by a built environment. Horizontal elements, such as highways and county roads, are consistent with the long and open viewsheds in the area. Vertical elements such as wind turbines and a 345 kV transmission line are visible from considerable distances and are the tallest and often the most dominant visual feature on the landscape. Additionally, numerous electrical distribution lines parallel some unpaved and paved roads that contribute to the existing visual elements.

There are six wind farms that are visible within 10 miles of the Project Area, including:

- Prairie Star (54 turbines) in Mower County;
- Wapsipinicon Wind Project (67 turbines) in Mower County;
- Mower County Wind Energy Center (41 turbines) in Mower County;
- G. McNeilus Wind Farm (9 turbines) in Mower County;
- McNeilus Wind Farm (41 turbines) in Dodge County; and
- Grand Meadow Wind Farm (67 turbines) in Mower County.

The Wapsipinicon and Grand Meadow wind farms are immediately adjacent to the east/southeast edge of the Project Area on either side of Interstate 90, (see Figure 18 – Existing Turbine Locations). These two existing wind farms contain turbines of various heights and RDs and contribute to the aesthetics of the area.

8.5.1 Impacts

Visual impacts can be defined as the human response to visual contrasts resulting from introduction of elements into a viewshed. Such visual contrasts interact with viewer perceptions of the landscape and may cause a negative, positive, or neutral response to the changes in the viewed landscape. Those likely to be viewing the Project include permanent observers (residents) and temporary observers (motorists, tourists, or recreationalists passing by or using the area intermittently). Residents within and in the vicinity of the Project Area are expected to have a higher sensitivity to the potential aesthetic impacts than temporary observers because they will look at the Project more frequently than those individuals periodically passing through the area. The magnitude of visual impacts associated with wind facilities typically depend on several factors, including:

- distance of the project facilities from viewers;
- duration of views (highway travelers vs. permanent residents);
- weather, ground cover, and lighting conditions;
- the presence and arrangements of lights on the turbines and other structures; and
- viewer attitudes toward renewable energy and wind power.

Overall, the Project will not be introducing any significant features to the landscape because the wind turbines are already present. The addition of longer blades will be the only visible permanent change. The FAA requires obstruction lighting or marking of structures over 200 feet (61 meters) above mean sea level because they have the potential to obstruct air navigation. Xcel Energy will coordinate with the FAA on a lighting plan that is compliant with FAA requirements. Additionally, Xcel Energy will include ADLS (if approved by the FAA) to mitigate the impact of nighttime lights by deploying a radar-based system for the Project, turning lights on only when low-flying aircraft are detected nearby, pending FAA approval. This assists in maintaining safe conditions for pilots while reducing the effect to the surrounding communities.

Wind turbines are prevalent within and in the vicinity of the Project Area. These structures could produce visual contrast by virtue of the design attributes of form, color, and line; however, the

Vestas V110 turbines will be similar in appearance to the existing Vestas V100 turbines with three blades, a hub, and a monopole.

Temporary impacts related to construction activities are associated with equipment staging and laydown areas, access roads, and crane assembly areas. These activities will be short-term and converted back to cropland or replanted with grasses and vegetation native to the area following the completion of construction. Visual impacts from an increase in traffic and human activity within the Project Area associated with Project construction will also be short-term. Permanent impacts related to repowering the Project may include the addition of ADLS unit(s). The location and number of ADLS radar towers will be determined in coordination with the FAA but are expected to be similar in appearance to a met tower. Overall, the long-term operation of the Project is not anticipated to increase visual impacts associated with new structures, operations lighting, human activity, or traffic within the Project Area.

8.5.2 Visual Impacts on Public Resources

While wind turbines will impact the visual surroundings of a wind facility, the degree of visual impacts vary based on personal preferences. There are no USFWS national parks or refuges, USFWS Waterfowl Production Areas (WPAs), MNDNR Aquatic Management Areas (AMAs), MNDNR Wildlife Management Areas (WMAs), or other MNDNR-managed lands within the Project Area; there are, however, three snowmobile trails in the Project Area. Additionally, there are several public recreation and wildlife areas within 10 miles of the Project Area (see Figure 6 – Public Land Ownership and Recreation and Section 8.8).

Replacing the existing turbines with larger blades within the viewsheds of these public lands will only minimally change the natural quality and the experience of the persons utilizing those areas. The Project will not be introducing a new feature type to the landscape, and therefore will not significantly affect public resources because existing wind turbines are prevalent within and in the vicinity of the Project Area.

8.5.3 Visual Impacts on Private Lands and Homes

Nearby viewers include the rural residences dispersed throughout the Project Area, recreational and public land users, and motorists (primarily those using Interstate 90 and other local roads). The Town of Sargeant is located within the north-central portion of the Project Area and the municipalities of Dexter and Waltham are immediately adjacent to the Project Area. The towns of Hayfield and Brownsdale are located within 3 miles (4.8 kilometers) from the nearest existing turbine locations.

For nearby viewers, the large size and strong geometric lines of both the individual turbines themselves, and the array of turbines, could dominate views. However, these impacts are assumed to be minor since existing wind turbines have been prevalent within and in the vicinity of the Project Area for more than 6 years. In addition, the operation of the Project will not generate an increase in traffic or noticeable increase in day-to-day human activity; therefore, the Project Area will retain its existing characteristics and the rural sense.

8.5.4 Mitigative Measures

Xcel Energy will work to avoid or minimize visual impacts related to the Repower Project. Xcel Energy proposes the following mitigation measures:

1. Repowered turbine parts will be uniform in color.

2. Turbines will be illuminated only as necessary to meet the minimum FAA requirements for obstruction lighting (e.g., add ADLS to reduce nighttime lighting).

3. Temporarily disturbed areas will be converted back to cropland or otherwise reseeded with native seed mixes appropriate for the region.

8.5.5 Shadow Flicker

Shadow flicker caused by wind turbines is defined as alternating changes in light intensity at a given stationary location (or "receptor"), such as the window of a home. In order for shadow flicker to occur, three conditions must be met: (1) the sun must be shining with no clouds to obscure it; (2) the rotor blades must be spinning and must be located between the receptor and the sun; and (3) the receptor must be sufficiently close to the turbine to be able to distinguish a shadow created by it (generally less than 1,500 feet because if the shadow is at this distance, the shadow is sufficiently diffuse that the shadow is not seen as a solid obstruction). Shadow flicker intensity and frequency at a given receptor are determined by a number of interacting factors:

- **Sun angle and sun path**: As the sun moves across the sky on a given day, shadows are longest during periods nearest sunrise and sunset, and shortest near midday. They are longer in winter than in summer. On the longest day of the year (the summer solstice), the sun's path tracks much farther to the north and much higher in the sky than on the shortest day of the year (the winter solstice). As a result, the duration of shadow flicker at a given receptor will change significantly from one season to the next.
- **Turbine and receptor locations**: The frequency of shadow flicker at a given receptor tends to decrease with greater distance between the turbine and receptor. The frequency of occurrence is also affected by the sightline direction between turbine and receptor. A turbine placed due east of a given receptor will cause shadow flicker at the receptor at some point during the year, while a turbine placed due north of the same receptor at the same distance will not, due to the path of the sun at the turbine's latitude.
- **Cloud cover and degree of visibility**: As noted above, shadow flicker will not occur when the sun is obscured by clouds. A clear day has more opportunity for shadow flicker than a cloudy day. Likewise, smoke, fog, haze, or other phenomena limiting visibility would reduce the intensity of the shadow flicker.
- **Wind direction**: The size of the area affected by shadow flicker caused by a single wind turbine is based on the direction that the turbine is facing in relation to the sun and location of the receptor. The turbine is designed to rotate to face into the wind, and as a result, turbine direction is determined by wind direction. Shadow flicker will affect a larger area if the wind is blowing from a direction such that the turbine

rotor is near perpendicular to the sun-receptor view line. Similarly, shadow flicker will affect a smaller area if the wind is blowing from a direction such that the turbine rotor is near parallel to the sun-receptor view line.

- **Wind speed**: Shadow flicker can only occur if the turbine is in operation. Turbines are designed to operate within a specific range of wind speeds. If the wind speed is too low or too high, the turbine will not operate, eliminating shadow flicker.

- **Obstacles**: Obstacles, such as trees or buildings, can have a screening effect and reduce or eliminate the occurrence of shadow flicker if they lie between the wind turbine and the receptor.

- **Contrast**: Because shadow flicker is defined as a change in light intensity, the effects of shadow flicker can be reduced by increasing the amount of light within a home or room experiencing shadow flicker.

- **Local topography**: Changes in elevation between the turbine location and the receptor can either reduce or increase frequency of occurrence of shadow flicker, compared to flat terrain.

Shadow flicker modeling for the Repower Project incorporated average long-term sunshine probability from the Minneapolis-St. Paul and Des Moines weather stations between 1981-2010. The Minneapolis-St. Paul weather station is closer to the Repower Project in latitude but Des Moines is more similar to southeast Minnesota in solar resource. Therefore, the average of the two weather stations was used (Table 8.5-1). Wind speed and direction are displayed in Chart 9.1-3 Pleasant Valley Wind Farm Wind Rose in Section 9.1.10.

Table 8.5-1
Average of Minneapolis-St. Paul and Des Moines Average Sunshine (hours/month)[1]

Month	Average
January	149
February	165
March	202
April	227
May	274
June	307
July	340
August	297
September	239
October	202
November	127
December	121

[1] Data gathered from National Climatic Data Center for Minneapolis, Minnesota, and Des Moines, Iowa (1981-2010).

8.5.5.1 Shadow Flicker Impacts

Shadow flicker modeling for the Repower Project was completed by ReGenerate for 1,576 residences (receptors) using WindPRO software. These receptors are those within the Project Area and one-mile buffer that could receive shadow flicker. WindPRO calculates the number of hours per year as well as the maximum minutes per day during which a given receptor could realistically expect to be exposed to shadow flicker from nearby wind turbines. As expected with slightly taller turbines and longer blades, shadow flicker is anticipated to increase at some receptors. There are 19 residences modeled to have more than 30 hours of shadow flicker per year, six of which are participants and the remaining 13 are non-participants. Figure 9 (Shadow Flicker) provides a visual representation of shadow flicker across the Pleasant Valley Repower Project; Appendix F - Shadow Flicker Modeling for the Pleasant Valley Wind Farm Repower Project shows results of the shadow flicker assessment for the Project.

The maximum shadow flicker (hours per year) for non-participants is 48.3 hours per year and 50.8 hours per year for participants. The shadow flicker modeling is conservative and does not take into consideration several factors including:

- availability of the turbines (i.e., whether they are operating or not based on meteorological conditions and/or maintenance);
- turbines not operating below cut-in and above cut-out wind speeds;
- obstacles (like trees or buildings) obstructing shadow flicker from a receptor; and
- dust or aerosols in the air which reduce the impact of shadow flicker.

For example, the participating residence modeled to receive the maximum amount of shadow flicker has turbines to the east, southeast, and west. The residence has dense vegetative screening on the western side of the property that is not accounted for by the model. These trees provide an obstruction to shadows from nearby turbines.

The closest turbine to a residence is 1,516 feet; at this distance, receptors will typically experience shadow flicker only when the sun is low in the sky, and when certain meteorological and operational factors are present. If a receptor does experience shadow flicker, it most likely will be during a few days per year from a given turbine, and for a fraction (typically less than one percent) of annual daylight hours.

Shadow flicker from the proposed turbines is not harmful to the health of photosensitive individuals, including those with epilepsy. The Epilepsy Foundation has determined that in general, the frequency of flashing lights most likely to trigger seizures is between five and 30 flashes per second (Epilepsy Foundation, 2020). The frequency of shadow flicker from wind turbines is a function of the rotor speed and number of blades, and is generally no greater than approximately 1.5 Hz (i.e., 1.5 flashes per second). Because the frequency of wind turbine shadow flicker is so much lower than the frequency range that can trigger seizures, there is no potential for causing seizures.

8.5.5.2 Shadow Flicker Mitigative Measures

The Pleasant Valley Wind Farm has been in continuous commercial operation since 2015. There have been four shadow flicker complaints filed with the Commission during its operational history (see Section 1.9). In response to each complaint, Xcel Energy investigated, coordinated with the landowner or renter to develop flicker minimization options, and resolved the issues. Xcel Energy will continue to evaluate any comments received regarding flicker. In coordination with the affected party, Xcel Energy will evaluate potential flicker minimization options in the unlikely event more flicker is present than was modeled.

Recently, the MPUC has begun including a Shadow Flicker Mitigation Plan requirement for receptors with more than 30 hours/year of expected shadow flicker impacts unless the project owner and landowner negotiate a shadow flicker agreement or waiver.

Xcel Energy is coordinating with participating and non-participating landowners of receptors with more than 30 hours/year of expected shadow flicker impacts to offer additional shadow-flicker specific agreements. Additional mitigation options that Xcel Energy may consider providing, where appropriate and reasonable, include exterior screening such as trees, shrubs and awnings, and interior screening such as curtains or blinds for windows. Xcel Energy will also develop a Shadow Flicker Mitigation Plan for the Project that reduces shadow flicker exposure to less than 30 hours per year for all occupied residences for those landowners who have not executed a shadow flicker agreement or waiver.

Xcel Energy can also provide materials about shadow flicker to landowners that can help minimize the effect of shadow flicker such as turning on lights and using a different room for a short period of time.

8.6 PUBLIC SERVICES AND INFRASTRUCTURE

Online research was used to identify emergency services, existing utilities, roads and railroads, and communication systems within the Project Area. The results of this review and a discussion of potential impacts to these services from construction and operation of the Project is presented below.

8.6.1 Emergency Services

The Project is located in a rural area in southeastern Minnesota (Figure 1 – Project Location). Within the Project Area, local law enforcement and emergency response agencies are available in Mower and Dodge Counties and nearby communities. Mower and Dodge Counties have sheriff departments that provide services, and the cities of Austin, Brownsdale, Blooming Prairie, Kasson, and Grand Meadow have local police departments. Fire services near the Project Area are provided by city and community fire departments in Austin, Brownsdale, Blooming Prairie, Hayfield, Dodge Center, Kasson, Dexter, Grand Meadow, and Adams.

Ambulance response is provided by regional and local ambulance services including Grand Meadow Ambulance which provides emergency response services to the cities of Dexter, Grand Meadow, and Racine, as well as Clayton, Bennington, Frankford, Grand Meadow, Pleasant Valley

and Racine townships (Grand Meadow, undated). Hayfield Community Ambulance provides emergency response services to the cities of Dexter, Hayfield, Sargeant, and Waltham (Minnesota Emergency Medical Services Regulatory Board, 2021). South of the Project Area, Adams Area Ambulance Service provides emergency response services to a 120-square mile area that covers the cities of Elkton, Adams, Taopi, and Johnsburg (Adams Area Ambulance Service, 2018). The communities of Blooming Prairie and Austin Local also provide ambulance services (Minnesota Emergency Medical Services Regulatory Board, 2021).

Hospitals near the Project Area include the Mayo Clinic Health System in Austin and the Mayo Clinic in Rochester. Smaller medical clinics or medical centers in the area include the Olmsted Medical Center in Spring Valley and the Mayo Clinic Health System's Mobile Health Clinic in Blooming Prairie.

8.6.1.1 Impacts

Construction and operation of the Project are not expected to impact the availability of emergency services. Repowering of the existing wind farm will be of much lower intensity and extent than building a new wind project of similar size, because new construction of access roads to turbine pads, turbine foundations, towers, underground electrical systems, transmission interconnections, data communication lines, O&M building, etc. will not occur. In addition, the duration of construction will be approximately 8-10 months. After the repowering work is completed, O&M activity and use of public services and infrastructure would not increase from levels needed prior to the repower.

Xcel Energy will coordinate with emergency services providers to determine appropriate safety precautions and standards and develop measures to address these precautions and standards. If emergency services are required during construction or operation of the Project, the numerous law enforcement, fire departments, ambulance services, and hospitals near the Project Area would be adequate to address Project-related emergency service needs without negatively impacting the availability of these services for the local populace.

8.6.1.2 Mitigation Measures

No impacts to emergency services are anticipated; therefore, no mitigation measures are proposed.

8.6.2 Existing Utility Infrastructure

The location of existing utilities is an important factor to be considered when siting an LWECS project. Turbines should be sited at least 1.1x the turbine height from existing overhead utilities to avoid potential impacts to existing infrastructure.

Electrical service in the Project Area is provided by Freeborn-Mower Electric Cooperative and Xcel Energy (Minnesota Geospatial Commons, 2021). Minnesota Energy Resources provides natural gas service in the Project Area (Minnesota Energy Resources, 2021). Water to rural residences within the Project Area is supplied by private wells.

There are three electric transmission lines within the Project Area. One is a 161 kV transmission line (owned by Great River Energy) in the central portion of the Project Area that runs both east-west and north-south through agricultural fields for approximately 7 miles, entering the Project Area near the intersection of 290th Street and 620th Avenue and exiting the Project Area along 310th Street (DHS, 2021; Minnesota Geospatial Commons, 2016). A 69 kV transmission line (owned by Dairyland Power Cooperative) in the central portion of the Project Area is collocated on the 161 kV transmission line for approximately 3 miles, entering the Project Area near the intersection of 290th Street and 620th Avenue and ending at a substation at the intersection of 640th Avenue and 300th Street. As noted in Section 6.1, the Project is connected to the grid via a 161 kV transmission line in the central portion of the Project Area, that begins at the Project substation on 310th Street and continues east along 310th Street for approximately five miles to connect with the existing Great River Energy Pleasant Valley Substation.

Two natural gas pipelines owned by Northern Natural Gas Company are mapped within the Project Area (National Pipeline Mapping System, 2021). One runs east-west across the northern portion of the Project Area for approximately five miles, entering the Project Area approximately 0.25 mile north of the intersection of 330th Street and 640th Avenue and exiting the Project Area at State Highway 56 approximately 0.5 mile north of 330th Street. The second pipeline runs north-south within the Project Area, entering the Project Area south of 750th Street approximately 0.23 mile west of 197th Street and connecting with the other pipeline after approximately 1.5 miles. Infrastructure within the Project Area including existing transmission lines is shown on Figure 2 (Project Area and Facilities).

8.6.2.1 Impacts

Xcel Energy will avoid impacting underground utilities during construction of the Project by designing temporary construction workspaces to avoid these features. The existing electric transmission lines are along major roadways and do not intersect crane paths or construction workspaces. Improvements to existing public roads were designed to avoid impacts to existing utilities.

After repowering of the existing turbines with longer blades is complete, the turbines will remain sited to the industry best practice of 1.1x turbine tip height from all high-voltage transmission lines.

8.6.2.2 Mitigation Measures

Xcel Energy will conduct a Gopher State One Call prior to and during construction to identify the locations of any buried utilities and safety concerns and to prevent possible structural conflicts.

8.6.3 Roads and Railroads

Interstate 90 forms the southeastern border of the Project Area, State Highway 30 forms the northern border of the Project Area, and State Highway 56 parallels, borders, and intersects the western border of the Project Area. In general, the existing roadway infrastructure in and around the Project Area is characterized by state, county, and township roads that generally follow section lines. Various county and township roads and private gravel access roads provide access to turbines

throughout the Project Area. Roadway infrastructure throughout the Project Area also includes two-lane paved and gravel roads. In agricultural areas, many landowners use private, single-lane farm roads and driveways on their property.

The MNDOT conducts traffic counts on roads in Minnesota and provides Annual Average Daily Traffic (AADT) counts via its online Traffic Mapping Application (MNDOT, 2021). Interstate 90 borders the southeastern corner of the Project Area (for about 1.1 miles), then parallels the southern edge of the Project Area until the intersection of Interstate 90 and State Highway 56 in the unincorporated City of Nicolville (about 6 miles), at which point the interstate continues west. According to MNDOT's Traffic Mapping Application, the AADT of Interstate 90 ranges from 9,388 to 10,400 vehicles per day in the vicinity of the Project Area (MNDOT, 2021). Additionally, AADT for State Highway 30 ranges from 1,750 to 2,500 vehicles per day and AADT for State Highway 56 ranges from 2,350 to 3,050 vehicles per day within and in the vicinity of the Project Area. Within the Project Area AADTs range from 180 vehicles per day along County State Aid Highway (CSAH) 9 to 570 vehicles per day along CSAH 2. Traffic counts are generally higher in proximity to nearby cities and towns.

No railroads are located within the Project Area. The nearest railroad to the Project Area is the Canadian Pacific Railroad, which runs through the cities of Austin and Blooming Prairie approximately 7 to 8 miles west of the Project Area (MNDOT, 2015).

8.6.3.1 Impacts

During the construction phase, temporary impacts are anticipated on some public roads within the Project Area. However, construction traffic for the repowering of the existing turbines would be considerably less than those experienced for construction of a new wind farm facility. Roads will be affected by the transportation of equipment to and from the Project Area and turbine sites. Some roads may also be expanded along specific routes as necessary to facilitate the movement of equipment. Construction traffic will use the existing county, state, and federal roadway system, and existing private turbine access roads to reach the Project Area and deliver construction materials and personnel.

Construction activities will increase the amount of traffic using local roadways, and may temporarily affect traffic numbers in the area, but such use is not anticipated to result in adverse traffic impacts. During the construction phase, several types of light, medium, and heavy-duty construction vehicles will travel to and from the Project Area, as well as private vehicles used by construction personnel. Trucks accessing the Project Area would likely use State Highways 30 and 56 and Interstate 90 to access the Project Area. Specific additional truck routes will be dictated by the location required for delivery.

Xcel Energy estimates that there will be approximately 350 large truck trips per day and up to 200 small-vehicle (pickups and automobiles) trips per day in the area during peak construction periods. Roads within the Project Area generally fall under the functional classifications of Minor Arterial, Major Collector, Minor Collector, and Local Roads (MNDOT, 2022). The functional capacity for rural roads in the Project Area ranges between 15 to 40 AADT for Local Roads and 1,500 to 6,000 AADT for Minor Arterial roads (DOT-FHWA, 2017). Except for Interstate 90, the heaviest traffic in the Project Area is on State Highway 56 (3,050 AADT) which cuts through the northwestern

corner of the Project Area; State Highway 56 is classified as a Minor Arterial roadway. Since many of the area roadways classified as either Minor Arterial, Major Collector, or Minor Collector roadways have AADTs that are currently well below capacity, the addition of 550 vehicle trips during peak construction would be perceptible, but similar to seasonal variations such as spring planting or autumn harvest.

After construction is complete, traffic impacts during the operations phase of the Repower Project will be minimal and similar to traffic levels for the currently operating wind farm. Operation and maintenance activities will not noticeably increase traffic in the Project Area, as these activities tend to be sporadic and spread out through the Project Area. A small maintenance crew driving through the area in pickup trucks on a regular basis will monitor and maintain the wind turbines as needed. There would be a slight increase in traffic for occasional turbine and substation repair, but traffic function will not be impacted as a result.

8.6.3.2 Mitigative Measures

Xcel Energy is coordinating with Mower County, Dodge County, and townships within the Project Area on the development and execution of a single, cooperative Development, Road Use, and Drainage Agreement to minimize and mitigate impacts on existing roadways. Xcel Energy will ensure that the general contractor communicates with the road authorities throughout the construction process, particularly regarding the movement of equipment on roads and the terms of the development agreement.

In addition, Xcel Energy is coordinating with MNDOT to identify any additional operating permits required for the Project. MNDOT responded to Xcel Energy's Project introduction letter and recommended that existing project access points remain the same and encouraged Xcel Energy to remain aware of future MNDOT projects that may overlap with construction activities for the Project. MNDOT also identified potential permits for the Project including oversize/overweight permits.

If roadways are impacted by the use of heavy construction equipment, they will be restored per the Development, Road Use, and Drainage Agreement. Additional operating permits will be obtained for over-sized truck movements after supply routes have been finalized.

No impacts are anticipated from operation of the Project; therefore, no mitigation measures are proposed during Project operations.

8.6.4 Communication Systems

Xcel Energy commissioned a communication tower study by Comsearch, which identified one communication tower within the Project Area. Additionally, there are 10 communication antennas in the Project Area (Appendix G – Telecommunications Studies). The tower structure and seven communication antennas are registered with the FCC. The remaining three antennas may be located on a variety of structure types such as guyed towers, monopoles, silos, rooftops, or portable structures. Seven of the 10 antennas are located on the communication tower. A summary of the types of communication systems in the Project Area are listed in Table 8.6-1. Each of the

communication system types are described in more detail below; land mobile towers are described in Section 8.6.6.

Table 8.6-1
Communication Towers and Antennas in the Project Area

Communication System Type		Within the Project Area
Antenna[1]	Microwave	4
	Land Mobile	5
	TV	1
Tower	Communication	1

[1] There are four unique tower and antenna locations. The communication tower holds multiple antennas.

Source: Comsearch (Appendix G – Telecommunication Studies)

On January 21, 2021, Comsearch contacted the National Telecommunications and Information Administration (NTIA) in regard to the Repower Project. The NTIA provided plans to the federal agencies represented in the Interdepartment Radio Advisory Committee for the Repower Project. After a 45 plus day period of review, no federal agencies, including the Department of Defense, identified any concerns regarding blockage of their radio frequency transmissions, or construction of turbines on this site. A copy of the letter from the NTIA is provided in Appendix D.

Microwave Beam Paths

The Repower Project has undertaken an assessment of microwave beam paths to ensure that the Project does not interfere with microwave paths (Fresnel zones) that have been established for communications systems in the vicinity of the Project. Xcel Energy commissioned a microwave beam path study from Capitol Airspace Group. Capitol Airspace Group identified nine microwave beam paths associated with five unique microwave links/signals in the Project Area (some paths contain multiple links/signals; Appendix G and Figure 10 – Microwave Bean Path). The results of this study show none of the proposed wind turbines (including their rotor-swept area) are located within the Fresnel zones associated with the microwave beam paths.

AM/FM Radio

Comsearch also provided a report on AM and FM Radio broadcast stations in the Project vicinity whose service could potentially be affected by the Project (Appendix G). The closest AM station to a wind turbine is 11.68 kilometers (7.26 miles) west of the Project in Austin, Minnesota, and the closest FM station is located 3.53 kilometers (2.19 miles) north of the nearest turbine in Hayfield, Minnesota. There are no AM or FM Radio station towers in the Project Area. Xcel Energy has received no complaints of AM or FM radio interference in over six years of facility operation.

8.6.4.1 Impacts

Microwave Beam Paths

Xcel Energy has not received any complaints of interference from any operators during the over six years of facility operation. The results of the microwave beam path study show none of the proposed wind turbines (including their rotor-swept area) are located within the Fresnel zones associated with the microwave beam paths. As a result, increasing the rotor diameter of existing wind turbines from 100 to 110 meters should not create a line-of-sight obstruction for any licensed or applied non-federal microwave links.

AM/FM Radio

Turbines sited within three kilometers (1.9 miles) of an AM broadcast station can cause impacts to AM broadcast coverage. The closest AM station to the Repower Project is 11.68 kilometers (7.26 miles) from the closest turbine in the Project Area. The coverage of FM stations is generally not susceptible to interference caused by wind turbines. The closest FM station is 3.53 kilometers (2.19 miles) from a turbine. At this distance, there should be adequate separation to avoid radiation pattern distortion. Therefore, impacts to AM and FM broadcast stations are not anticipated.

In addition, Xcel Energy is not aware of any radio signal interference during the past six years of facility operation. A change in coverage of radio stations associated with wind turbine repowering is unlikely due to the nature of the repower changes, which do not increase radio interference.

8.6.4.2 Mitigative Measures

Because the Project has been operating for over six years with no complaints, interference with communications systems is not expected. Should the addition of larger rotors trigger interference issues not previously experienced, Xcel Energy will work with those landowners to rectify the issue using high-gain antennas, a low noise amplifier, a monetary contribution toward comparable satellite television services, or another mutually agreeable solution.

Microwave Beam Paths

No impacts to microwave beam paths are anticipated; therefore, no mitigation measures are proposed.

AM/FM Radio

No impacts to AM/FM radio transmission or reception are anticipated; therefore, no mitigation measures are proposed. Should issues arise as a result of repowering, Xcel Energy will work closely with area stations on potential mitigation options.

8.6.5 Television

Comsearch conducted an off-air television report that identified 136 off-air TV stations within 150 kilometers (93.2 miles) of the Project Area (Appendix G). TV stations at a distance of 150 kilometers or less are the most likely to provide off-air coverage to the Project Area and

neighboring communities. Of these 136 stations, only 83 stations are currently licensed and operating; the other 53 stations are either in construction or have applied for a construction permit. Of the 83 licensed and operating stations, 56 are low-power stations or translators. Translator stations are low-power stations that receive signals from distance broadcasters and retransmit the signal to a local audience. These stations serve local audiences and have limited range, which is a function of their transmit power and the height of their transmit antenna. The other 27 licensed and operating stations are digital television broadcast stations.

8.6.5.1 Impacts

The rotating blades of a wind turbine have the potential to disrupt over-the-air broadcast TV reception within a few miles of the turbine, especially when the direct path from the viewer's residence is obstructed by terrain. Based on the Comsearch analysis of licensed television stations within 150 kilometers of the Pleasant Valley wind turbines, seven full-power digital stations and three low-power digital stations currently serve the Project Area; these stations may experience reception disruptions related to the Project. The areas primarily affected by such a disruption would include the TV service stations located within 10 kilometers of the turbines that have clear line-of-sight to a wind turbine.

Since the Project is a repower of an existing wind farm at the same tower locations with marginal height increases (10 meters), it is expected that the impact due to these changes will be minimal. Television reception at residences relying on cable or satellite television service will not be impacted by the Repower Project.

8.6.5.2 Mitigative Measures

During the six years since the Project became operational, Xcel Energy has received two complaints related to a disruption in TV digital signal (see Section 1.9). In response to each complaint, Xcel Energy investigated, coordinated with the landowner regarding potential mitigation options, and resolved the issues.

If interference to a residence's or business's television service is reported to Xcel Energy, Xcel Energy will work with affected parties to determine the cause of interference and, when necessary, reestablish television reception and service.

Xcel Energy plans to address any post-construction television interference concerns on a case-by-case basis. If television interference is reported to Xcel Energy, Project representatives will:

- Log the contact in Xcel Energy's complaint database to track resolution efforts.
- Review results of the report to assess whether impacts are likely Project related.
- Meet with the landowner and a local communication technician to determine the current status of their television reception infrastructure.
- Discuss with the landowner the option of (1)) installing a combination of high gain antenna and/or a low noise amplifier, or (2) entering into an agreement to provide a

monetary contribution (equal to the cost of installing the recommended equipment) toward comparable satellite television services at the residence.

- At the landowner's election, Xcel Energy will either install the necessary equipment or enter into an agreement to reimburse the landowner for the cost of comparable satellite television services.
- If the landowner chooses satellite service, Xcel Energy will consider the matter closed upon installation of the satellite dish.
- If the landowner chooses to have the antenna and/or amplifier installed and later complains of continued interference issues, Xcel Energy will send a technician to the site to assess whether the equipment is working properly and fix the equipment as needed and evaluate the reported interference issues.
- If Project-related interference remains an issue, Xcel Energy will propose an agreement that reimburses the landowner for the costs of comparable satellite television services and will remove the antenna and amplifier equipment if requested by the landowner, unless it was initially installed to serve multiple households.
- If Xcel Energy and the landowner are unable to reach an agreement to resolve interference-related issues, Xcel Energy will report the concern as an unresolved complaint and follow the Commission's dispute resolution process to resolve the matter.

8.6.6 Cell Towers and Broadband Interference

As noted in the Land Mobile and Emergency Services report (Appendix G), cellular services in the Project Area are provided by many carriers including AT&T, Blue Ridge Wireless II, Bug Tussel Wireless, DISH Network, T-Mobile, US Cellular, and Verizon. As described in Section 8.6.4 (Communication Systems), there are four land mobile antenna locations in the Project Area. Additionally, Comsearch conducted a specific study on land mobile and emergency services for the Project Area (Appendix G). The study identified the same four land mobile antenna locations in the Project Area as the Communication Tower Study.

Minnesota is prioritizing border-to-border high-speed internet access throughout the state. The Border to Border Broadband Development Grant Program was created in Minn. Stat. § 116J.395 in 2014. The legislative focus of this grant program is to provide state resources that help make the financial case for new and existing providers to invest in building broadband infrastructure to unserved and underserved areas of the state. Based on data from the Minnesota Department of Employment and Economic Development (MN DEED), the majority of the Project Area is identified as an Unserved Area (no wireline broadband of at least 25 megabytes per second [Mbps] download and 3 Mbps upload [25M/3M]) (MN DEED, 2021a, 2021b). Small portions of the Project Area are identified as Underserved Areas (wireline broadband of at least 25M/3M but less than 100M/20M). Areas of the Project Area near Dexter, Sargeant, and Hayfield are identified as Wireline Broadband of at Least 100M/20M.

8.6.6.1 Impacts

Xcel Energy does not anticipate any impacts to cellular services as a result of the Repower Project. Each of the cellular-provider networks in the Project Area is designed to operate reliably in a non-line-of-sight environment. Many land mobile systems are designed with multiple base transmitter stations covering a large geographic area with overlap between adjacent transmitter sites in order to provide handoff between cell phones. Therefore, any line-of-sight signal blockage caused by placement of the proposed wind turbines would not materially degrade the reception because the end user is likely receiving signals from multiple transmitter locations.

Xcel Energy also does not anticipate any impacts to land mobile communication systems. Per FCC interference emissions from electrical devices in the land mobile frequency bands, turbines within 77.5 meters of land mobile fixed-base stations can cause impacts. The closest turbine to a land mobile tower/antenna is 560 meters, well beyond the recommended FCC interference setback.

Based on data from the MN DEED, most of the Project Area is considered an Unserved Area for broadband. As such, impacts to broadband service are not likely or anticipated. Additionally, Xcel Energy is unaware of potential interference or disruptions to broadband service that could be caused by operation of wind turbines.

Xcel Energy is not aware of complaints regarding telephone, internet, or cellular phone service during the past six years of facility operation.

8.6.6.2 Mitigative Measures

If cell tower signal or broadband interference is identified during or after construction of the Project, Xcel Energy will address the interference on a case-by-case basis. Xcel Energy does not propose mitigative measures at this time.

8.7 CULTURAL AND ARCHAEOLOGICAL RESOURCES

On behalf of Xcel Energy, Merjent, Inc. (Merjent) conducted background research on known cultural resources in January 2022 by requesting information from the OSA and the SHPO. Data regarding known cultural resources information resulting from previous professional cultural resources surveys and reported archaeological sites and historic architectural resources was received from the agencies and reviewed. In addition, the Phase I archaeological survey report prepared for the Pleasant Valley Wind Farm was reviewed (Arzigian and Holtz-Leith, 2014). In addition to the background research, Merjent also reviewed information from 19th century General Land Office maps and notes on file with the Bureau of Land Management (BLM, 2020), Trygg Historical Maps (Trygg, 1964), and aerial photographs from 1938 and 1954 on file with the Minnesota OSA.

The background literature review identified archaeological and historic architectural resources within one mile of the Project Area. This information was used to understand the types of archaeological sites that may be encountered and landforms or geographic features that have a higher potential for containing significant cultural resources. A copy of the background literature

review, including a cultural and historic overview of the Project Area, is provided in Appendix H - Phase 1a Literature Review and Natural Heritage Information System Review Request.

8.7.1 Previous Investigations

The Phase Ia literature review for the Project identified one previous archaeological inventory report and three previous historic architectural inventory reports within the Project Area. The archaeological report provides the results of a series of Phase I archaeological inventories conducted for the Pleasant Valley Wind Farm between 2010 and 2013 (Arzigian and Holtz-Leith, 2014). The three architectural reports provide the results of historic architectural inventories conducted in the vicinity of the Project in 1981, 1985, and 1990 (Frame, 1981; Roberts, 1985; and Hess et al., 1990).

8.7.2 Previously Recorded Archaeological and Historic Architectural Resources

Table 8.7-1 summarizes previously recorded archaeological sites and historic architectural resources that were identified within the Project Area or within one mile of the Project Area. Information regarding National Register of Historic Places (NRHP) eligibility of the previously recorded sites was also reviewed.

Table 8.7-1
Previously Recorded Cultural Resources within the Project Area and within 1-mile Buffer

Resource Type	Project Area	1-mile Buffer
Archaeological Sites	1	2
Total Listed in or Eligible for Listing in NRHP[1]	0	0
Historic Architectural Resources	8	14
Total Listed in or Eligible for Listing in NRHP[1]	0	0
Total Previously Recorded Cultural Resources	**9**	**16**
Total Listed in or Eligible for Listing in NRHP[1]	**0**	**0**

[1] The number of NRHP-eligible resources shown is a subset of the total number of archaeological sites or historic architectural resources in each category.

One previously recorded archaeological site was identified within the Project Area. This site is an historic site lead (Sutton Ghost Town). Site leads are reported sites that have not been verified or their precise location is unknown, thus Sutton Ghost Town has not been evaluated for listing in the NRHP.

The Phase Ia literature review identified two previously recorded archaeological sites within one mile of the Project Area. The sites are a Precontact lithic scatter and a Precontact single artifact find. Neither of the previously recorded archaeological sites within one mile of the Project Area have been evaluated for listing in the NRHP.

The Phase Ia literature review identified eight previously recorded historic architectural resources within the Project Area. Previously recorded architectural resources within the Project Area include two stores, one school, a fire station, St. Johann Evangelical Church, two historic bridges,

and Trunk Highway 56. None of these architectural resources have been evaluated for listing in the NRHP.

Fourteen previously recorded historic architectural resources were identified within one mile of the Project Area. Previously recorded architectural resources within one mile of the Project Area include the Dexter Elevator, Dexter Public School, First State Bank of Dexter, German Lutheran Church, Evanger Lutheran Church, District School No. 111, Waltham Town Hall, a Standard Station, two schools, two residences, and two historic bridges. None of these architectural resources have been evaluated for listing in the NRHP.

In addition, one cemetery was identified within one mile of the Project Area (the Waltham Cemetery) and three cemeteries (St. John's Cemetery; BF, DL, and James M. Tanner Family Cemetery; and Trinity Evangelical Lutheran Church Cemetery) were identified within the Project Area. Title 36 CFR Part 60.4 states that cemeteries or graves are not considered for NRHP listing unless they are integral parts of districts that do meet one of the criteria (Criteria a to d) or meet one of the seven criteria considerations (Considerations a to g). Instead, cemeteries are protected under state laws. In Minnesota, this is Minn. Stat.§ 307.08 Damages; Illegal Molestation of Human Remains; Burials; Cemeteries; Penalty; Authentication.

8.7.3 Agency and Tribal Coordination

As part of public outreach for the Project, Xcel Energy sent project introduction letters to the Minnesota SHPO, the Minnesota OSA, the Minnesota Indian Affairs Council, and 11 Native American Tribes with known interest in the Project Area.

The Minnesota OSA responded on March 16, 2022, and noted the presence of the Sutton Ghost Town, un-platted cemeteries, and areas of moderate to high potential to contain archaeological materials within the Project Area. The Minnesota OSA recommends a Phase Ia literature review of the Project Area. The Phase Ia literature review for the Project is provided in Appendix H.

To date, no other responses have been received.

8.7.4 Impacts

Construction of the Project has the potential to affect archaeological and historic architectural resources within the Project Area. The Phase Ia literature review identified one potential archaeological site lead and eight previously recorded historic architectural resources within the Project Area. The historic ghost town of Sutton is currently an unconfirmed site lead that has not been definitively located or evaluated for listing in the NRHP.

The Phase I archaeological survey report prepared for the Pleasant Valley Wind Farm in 2014 included research on cemeteries and noted that no disturbance of cemeteries would occur from construction of the wind farm (Arzigian and Holtz-Leith, 2014). The Phase Ia literature review for the Repower Project identified three cemeteries within the Project Area. The locations of these cemeteries in the OSA files are generalized (section, quarter section, or quarter-quarter section only) and larger than the actual boundaries of the cemeteries. Aerial imagery was reviewed within the generalized locations of the cemeteries to locate their boundaries and their proximity to existing

Project infrastructure. The St. John's Cemetery and Trinity Evangelical Lutheran Church Cemetery are clearly visible on aerial imagery. The St. John's Cemetery is approximately 2,400 feet north of the access road to Turbines 56 and 57, in the southwest corner of the intersection of 630th Avenue and County Road 57. The Trinity Evangelical Lutheran Church Cemetery is approximately 1,040 feet west of the access road to Turbine 93 on the north side of 230th Street. The exact location of the BF, DL, and James M. Tanner Family Cemetery is not evident on aerial imagery and additional research to verify its location provided two different potential locations within T103N, Range 17W, Section 12, both of which are south of 265th Street and more than 0.75 mile from the nearest turbine, Turbine 65.

Temporary construction workspaces for the Project (i.e., workspaces at turbine pads, crane assembly areas, staging areas, widened access roads, and improvements at access roads and public road intersections) are sited away from existing structures and would not affect previously recorded historic architectural resources. In addition, none of the previously recorded historic architectural resources identified within the Project Area have been evaluated for listing in the NRHP. For these reasons, no impacts on previously recorded cultural resources that are eligible for listing in the NRHP are anticipated. The three cemeteries identified within the Project Area are located at a sufficient distance from temporary construction workspaces for the Project and Xcel Energy will avoid disturbance to the cemeteries in accordance with Minn. Stat. § 307.08.

8.7.5 Mitigative Measures

During Summer 2022 and in consideration of previous investigations within the Project Area, literature search results, and future coordination with SHPO, Merjent will conduct field surveys in areas of planned disturbance that have not previously been surveyed. The Phase 1 field survey will meet the standards established in the SHPO Manual for Archaeological Projects in Minnesota. This investigation will be conducted by a professional archaeologist meeting the Secretary of the Interior's Standards for Archaeology as published in Title 36 Code of Federal Regulations Part 6. The survey protocol and report will be coordinated with and approved by SHPO. If archaeological or historic architectural resources are identified as a result of field surveys, Xcel Energy will work with SHPO to identify measures to avoid or mitigate any effects to these resources. Additionally, Xcel Energy will reconfigure the placement of construction workspaces to avoid impacts to newly identified archaeological and historic architectural resources that are eligible for listing in the NRHP. Avoidance of resources may include minor adjustments to the Project design and designation of environmentally sensitive areas to be left undisturbed during construction.

If archaeological resources are discovered during construction, ground disturbing activity will be halted in that location, the SHPO will be notified, and measures will be developed in conjunction with SHPO to assess and protect the resource. Additionally, if unanticipated human remains are discovered during construction, they will be reported to the State Archaeologist per Minn. Stat. § 307.08 and construction will cease in that area until adequate mitigation measures have been developed between Xcel Energy and the State Archaeologist.

8.8 RECREATION

Recreational opportunities near the Project Area include snowmobiling, hunting, golfing, and nature viewing. Figure 6 (Public Land Ownership and Recreation) depicts the locations of WMAs,

Scientific and Natural Areas (SNAs), WPAs, AMAs, golf courses, and snowmobile trails within 10 miles of the Project Area.

Minnesota WMAs are managed to provide wildlife habitat, improve wildlife production, and provide public hunting and trapping opportunities. These MNDNR lands were acquired and developed primarily with hunting license fees. WMAs are closed to all-terrain vehicles and horses because of potential detrimental effects on wildlife habitat. There are no WMAs within the Project Area and 21 WMAs within 10 miles of the Project Area, as shown in Table 8.8-1 below and Figure 6.

Table 8.8-1
Wildlife Management Areas within Ten Miles of the Project Area

Distance from Project Area (miles)	WMA Name	General Location Relative to Project Area	WMA Area (acres)
5.1	Mentel WMA	Southwest	36.7
4.3	South Fork Zumbro River WMA	Northeast	29.3
1.5	Schwerin Creek WMA	South	37.2
8.5	Schottler WMA	Southwest	166.3
2.0	Orning WMA	North	66.0
9.3	Deer Creek WMA	East	39.7
6.1	High Forest WMA	Northeast	69.2
5.7	Nelson Fen WMA	Northeast	78.8
5.8	Marian Marshall WMA	Northeast	59.4
5.2	Tri-cooperative WMA	Northeast	47.0
8.3	Lyle-austin WMA	Southwest	115.9
5.9	Rock Dell WMA	Northeast	489.1
8.0	Cary Creek WMA	East	50.1
1.3	Vernon WMA	North	83.5
6.0	Ramsey Mill Pond WMA	West	394.9
9.9	Lena Larson WMA	Southwest	171.8
5.7	Suess WMA	Northeast	53.8
8.9	Keller WMA	Northeast	196.4
4.3	Bud Jensen WMA	North	102.4
9.0	Rose WMA	South	50.6
7.8	Schumann WMA	East	92.3

SNAs are areas designated to protect rare and endangered species habitat, unique plant communities, and significant geologic features that possess exceptional scientific or educational

values. There is one SNA within the Project Area and one SNA located adjacent to the Project Area, as shown in Table 8.8-2 and on Figure 6.

Table 8.8-2
Scientific and Natural Areas within Ten Miles of the Project Area

Distance from Project Area (miles)	SNA Name	General Location Relative to the Project Area	SNA Area (acres)
Adjacent (0.04 mile)	Iron Horse Prairie SNA	Adjacent (North)	37.1
Within	Wild Indigo SNA	Within	124.7

There is one AMA within 10 miles of the Project Area. The Cedar River AMA is located approximately 9.5 miles southwest of the Project Area (Figure 6).

One WPA is located within 10 miles of the Project Area. The Arlen Schamber Legacy WPA is located approximately 9.8 miles west of the Project Area (Figure 6).

There are three snowmobile trails that intersect the Project Area: Heartland Sno-goers Snowmobile Trail (Trail # 325), Mower County Management Trails (Trail #176), and Dodge County Trails (Trail #126). A section of the Heartland Sno-goers Snowmobile Trail (Trail # 325) enters the southeastern portion of the Project Area approximately 0.5 mile west of the Town of Dexter and travels northwest for approximately 0.5 mile before turning north and then east where it then splits and continues north as Trail # 325 and west as Trail #176. Trail #325 then continues north for approximately 0.5 before exiting the Project Area. Trail #176 continues west/northwest for the remaining width of the Project Area and turns north just inside the western edge of the Project Area along 610th Avenue. Trail #176 then continues north/northeast for approximately 4.3 miles before exiting and then re-entering the Project Area and continuing north/northwest and exiting the Project Area just east of the Town of Waltham. Trail #176 renters the Project Area for 0.50 mile before it turns into Dodge County Trail (Trail #126) at Dodge Mower Road. Trail #126 continues north within the Project Area for 1 mile before exiting and continuing north then turning east around the north side of the Town of Hayfield, eventually re-entering the Project Area adjacent to 210th Avenue. Trail #126 then travels east and south for approximately 4.8 miles before exiting the Project Area. Snowmobile trails are shown on Figure 6.

There are three golf courses within 10 miles of the Project Area: Ramsey Golf Club is located 6.5 miles west of Project Area, Cedar River Golf Course is located 8.0 miles south of Project Area, and Blooming Prairie Country Club is located 9.9 miles northwest of Project Area.

There are no Designated Wildlife Lakes or state parks within 10 miles of the Project Area.

8.8.1 Impacts

Xcel Energy has designed the temporary construction workspaces to avoid the Wild Indigo SNA and Heartland Sno-goers Snowmobile Trail and Dodge County Trails; no construction workspace will intersect these recreational resources. However, the Mower County Management Snowmobile Trail will be crossed by a public intersection improvement workspace that intersects a small

portion of the trail for approximately 78 feet. Snowmobile trails located within public intersection improvement areas will result in a minimal, temporary impact to the trail, but no permanent impacts to the trail would occur from this activity. As snowmobile trails are only used during winter months, potential impacts will depend on the timing of construction. If construction in this area is completed during non-winter months, snowmobilers would not notice an impact.

The longer blades will result in an increase in height of up to 10 meters or about 33 feet. Potential visual impacts on recreational resources within and around the Project Area related to adding larger rotors to the turbines will be minimal and are discussed further in Section 8.5.2.

8.8.2 Mitigative Measures

Xcel has mitigated potential Project effects on recreational resources by designing temporary construction workspaces to largely avoid recreation areas.

In response to the Project notification letter, the MNDNR recommended that Xcel Energy consult with the applicable snowmobile groups regarding any potential overlap between construction activities for the Project and public use of snowmobile trails in the Project vicinity. Xcel will consult with these groups on construction timing and to determine if rerouting of the path is needed and/or to facilitate any modifications.

8.9 PUBLIC HEALTH AND SAFETY

8.9.1 Electromagnetic Fields and Stray Voltage

Electromagnetic fields (EMF(s)) arise from the movement of an electrical charge on a conductor such as transmission lines, power collection (feeder) lines, substation transformers, house wiring, and electrical appliances (NIEHS, 2002). The intensity of the electric portion of EMFs is related to the potential, or voltage of the charge on a conductor, and the intensity of the magnetic portion of the EMF is related to the flow of charge, or current, through a conductor. EMFs are commonly associated with power lines, but they occur only at close range because the magnetic field rapidly dissipates as the distance from the line increases (EPA, 2020).

8.9.1.1 Impacts

The National Institute of Environmental Health Sciences has conducted extensive research on EMFs (NIEHS, 1999). While there is no conclusive research evidence that EMFs from power lines and wind turbines pose a significant health impact, the turbines were originally installed beyond the minimum allowable distances from occupied residences (500-foot minimum setback; the closest turbine to a residence is 1,516 feet), where EMF is expected to be at background levels unrelated to wind project proximity. EMFs from underground electrical collection and feeder lines dissipate very quickly and relatively close to the source because they are installed below ground to a depth of approximately 48 inches and are heavily insulated and shielded. Consequently, the electrical fields that emanate from buried lines and transformers are generally considered negligible, and magnetic fields often decrease significantly within approximately three feet of stronger EMF sources (such as transmission lines and transformers; NIEHS, 2002). No changes to the Xcel Energy electrical system will occur except limited conductor size increases, testing of the

system, and repairs to any deficient conductors. Consequently, no significant increase in EMF impact is expected from the repowering or operation of the Project. Xcel Energy is not aware of any complaints or claims of impact from EMFs since the Project became operational.

8.9.1.2 Mitigative Measures

Based upon current research regarding EMFs and the separation distances being maintained between transformers, turbines and collector lines from public access and occupied homes, EMFs associated with the Repower Project are not expected to have an impact on public health and safety. Because no changes to the electrical system with the repowering that could increase EMFs are expected, no significant mitigations related to EMFs are planned. Xcel Energy is committed to inspecting and maintaining the electrical infrastructure. Xcel Energy is committed to installing facilities in a manner that minimizes the potential for EMFs.

8.9.2 Air Traffic

There are no public airports within 10 miles of the Project Area (AirNav, 2022). One private airstrip is located outside of the eastern edge of the Project Area, about 1.5 miles north/northwest of Dexter and 1.6 miles from the nearest turbine. The airstrip has an east-west orientation, a turf surface, and has been in operation since 2009. Air traffic may be present near the Project Area for crop dusting of agricultural fields. Crop dusting is typically carried out during the day by highly maneuverable airplanes or helicopters.

8.9.2.1 Impacts

There are no public airports within 10 miles of the Repower Project. One private airstrip is located outside of the Project Area and about 1.6 miles from the nearest turbine. This airstrip has been active since 2009 and has continued to operate alongside the Pleasant Valley Wind Farm since 2015. No impacts on this private airstrip are anticipated. The installation of wind turbine towers in active croplands will create a potential for collisions with crop-dusting aircraft. However, the turbines would be visible from a distance. Xcel Energy will notify local airports about the Project including locations of new ADLS towers in the area to minimize impacts and reduce potential risks to crop dusters.

8.9.2.2 Mitigative Measures

Xcel Energy will submit 7460-1 forms to initiate the FAA review of the Repower Project at least 18 months prior to the start of construction. The FAA will review the repower turbines and issue a “Determination of No Hazard.” Further, Xcel Energy will appropriately mark and light the turbines to comply with FAA requirements and, as mentioned in Section 8.5.1, Xcel Energy will coordinate with the FAA on implementing an ADLS. Xcel Energy will notify local airports about the Project to reduce the risk to crop dusters. Additionally, Xcel Energy will coordinate with landowners within and adjacent to the Project regarding crop-dusting activities.

8.10 HAZARDOUS MATERIALS

The land within the Project Area is primarily rural and used for agriculture. Potential hazardous materials within the Project Area are associated with agricultural activities, and include petroleum products (fuel and lubricants), pesticides, and herbicides. Older farmsteads may also have lead-based paint, asbestos shingles, and polychlorinated biphenyls in transformers. Trash and farm equipment dumps are common in rural settings.

Xcel Energy reviewed the U.S. Environmental Protection Agency's (EPA) Facility Registry Service (FRS) to identify sites that are listed on the Comprehensive Environmental Response, Compensation, and Liability Information System (also known as Superfund sites); Resource Conservation and Recovery Act (RCRA) Treatment, Storage, and Disposal; RCRA hazardous waste generators; the Assessment, Cleanup, and Redevelopment Exchange System; Minnesota Permitting, Compliance, and Enforcement Information Management System; and the Leaking Underground Storage Tank—American Recovery and Reinvestment Act database (EPA, 2021). Xcel Energy also reviewed the MPCA's *What's in my Neighborhood* (WIMN) database to identify any potential contaminated sites in the Project Area (MPCA, 2020).

Review of the FRS and WIMN databases identified six solid waste generators, six remediated fuel leak sites, 10 underground storage tanks that have been removed, eight aboveground storage tanks that have been removed, three aboveground storage tanks containing gasoline blends and diesel fuel, three hazardous waste – minimal quantity generator sites, one hazardous waste – very small quantity generator site, and nine inactive hazardous waste generator sites in the Project Area.

In addition to the research described above, an ASTM-conforming Phase I Environmental Site Assessment (Phase I ESA) will be conducted for all parcels the Project Area that require a new lease agreement; parcels already under lease agreements for the Project that are receiving a lease extension will not be included in the Phase I ESA. The Phase I ESA will identify known recognized environmental conditions or historical recognized environmental conditions that may require additional action prior to or during construction.

8.10.1 Impacts

Construction of the Project will not impact known contaminated sites. Xcel Energy has designed construction works areas for the Project to avoid known contaminated sites within the Project Area. Xcel Energy also will conduct a Phase I ESA of all newly leased parcels prior to construction to locate any additional contaminated sites in the Project Area that require avoidance.

Spill-related impacts from construction are primarily associated with fuel storage, equipment refueling, and equipment maintenance. To avoid spill-related impacts during construction, Xcel Energy's construction contractor will develop a Spill Prevention, Control, and Countermeasures Plan that will outline measures to be implemented to prevent accidental releases of fuels and other hazardous substances and describe the required response, containment, and cleanup procedures to be used in the event of a spill.

During operation of the Project, three types of petroleum-product fluids will be used for turbine operation:

- gear box oil – synthetic or mineral depending on application (approximately 300 liters);
- hydraulic fluid; and
- gear grease.

Turbine hydraulic oils and lubricants will be contained within the wind turbine nacelle, or in the case of car, truck, and equipment fuel and lubricants, within the vehicle. Transformer oil will be contained within the transformer. Fluids will be monitored during maintenance at each turbine and transformer. A small amount of hydraulic oil, lube oil, grease, and cleaning solvent will be stored in the O&M facility. When fluids are replaced, the waste products will be handled according to regulations and disposed of through an approved waste disposal firm in compliance with the requirements of applicable laws and regulations.

8.10.2 Mitigative Measures

Potentially hazardous waste sites identified through online research or the Phase I ESA of the Project Area will be avoided; therefore, no mitigation measures are proposed. If any wastes, fluids, or pollutants are generated during any phase of construction or operation of the Project, they will be handled, processed, treated, stored, and disposed of in accordance with Minn. R. Ch. 7045.

8.11 LAND-BASED ECONOMIES

8.11.1 Agriculture/Farming

The majority of land use in the Project Area is cultivated crop land (approximately 42,562 acres or 94 percent) as shown in Figure 12 (Land Cover) and discussed in Section 8.19. As shown in Table 8.15-1 and discussed further in Section 8.15, about 99 percent of the soils in the Project Area are classified as prime farmland, including those soils identified as prime farmland if the limiting factor is mitigated.

According to the USDA's 2017 Census of Agriculture, the average farm size in Mower County is 419 acres and in Dodge County is 406 acres; this is generally larger than the average size of all Minnesota farms which is 371 acres (USDA, 2019). Crop sales account for a larger percentage of total market value of agricultural products compared to livestock in Mower County ($243 million vs. $171 million, annually) and in Dodge County ($138 million vs. $100 million). Corn, soybeans, and vegetables harvested for sale are the dominant agricultural crops by acreage while hogs and pigs, cattle, and poultry (i.e., layers) are the dominant livestock raised in Mower County. In Dodge County, the dominant agricultural crops by acreage are corn, soybeans, and forage and the dominant livestock raised are hogs and pigs, cattle, and poultry (layers and broilers).

Specialty crops typically include nurseries, vineyards, orchards, citrus groves, dairies, aquaculture, and tree farms; to date, no farmland engaged in specialty crop production has been identified in the Project Area. Xcel Energy will continue to work with individual landowners through the easement process to identify any specialty crops or livestock operations that may be impacted by

the Project. If any specialty crops or livestock operations are identified, Xcel Energy will work with landowners to determine measures to avoid and minimize impacts to these resources.

As discussed in Section 8.3, Conservation Easements, two CREP easements and one FSA easement are present within the Project Area (*see* also Figure 6 – Public Land Ownership and Recreation). One of the CREP easements and the FSA easement are not located near existing Project facilities and will not be affected by repowering activities. One CREP easement is directly adjacent to the western edge of the permanent access road to Turbines 96 and 97.

8.11.1.1 Impacts

Construction of the Project could cause minimal, temporary impacts to farmland from soil compaction and rutting, accelerated soil erosion, crop damage, temporary disruption to normal farming activities, drain tile damage, and introduction of noxious weeds to the soil surface. Because this is a repowering project, impacts on agricultural land will be limited to workspaces around turbine pads, crane assembly areas, laydown/staging areas, access road widening, and turning radius improvements at access roads and public road intersections. However, these impacts would be temporary and would resolve with the completion of the repower work.

Xcel Energy will avoid impacting the CREP easement that is directly adjacent to the western edge of the permanent access road to Turbines 96 and 97 by siting temporary construction workspaces (i.e., crane assembly area and access road widening) on the east side of the access road. In addition, Xcel Energy will develop a SWPPP for the Project that outlines erosion control measures to be used during construction, which will limit the potential for sedimentation outside of approved construction workspaces. Impacts to the CREP easement that would affect landowner participation in the program are not anticipated.

Operation of the repowered wind farm would not impact agricultural production, as no new turbines or other permanent facilities are proposed. As demonstrated by other wind energy projects in the Midwest, agricultural practices continue during construction. After construction, continued operation of the wind farm would not impact agricultural production in the Project Area.

8.11.1.2 Mitigative Measures

Construction of the Repower Project would result in short term, minimal impacts on agricultural production within the Project Area. The use of temporary workspaces around turbine pads, laydown/storage areas, crane assembly areas, and widened access roads is not expected to significantly impact agricultural production. After the repower work is completed, Xcel Energy will restore disturbed areas as close as practicable to their original condition. Post-construction restoration methods may vary depending upon the vegetation (or lack thereof) and the soil types at each location.

Construction equipment used in the erection of wind turbine components is designed with wide tires and tracks to distribute the weight over a larger area, providing stability and reducing soil compaction. After the repowering work is complete, Xcel Energy will assess disturbed areas to determine whether corrective action (e.g., tilling or other decompaction methods) is needed. The temporary workspaces around turbine pads, crane assembly areas, areas where access roads are

widened, and staging areas typically experience a higher volume of construction vehicle traffic and will likely require de-compacting before being returned to agricultural use.

Xcel Energy will coordinate with property owners to identify features on their property, including drain tile, to avoid impacting these features. While avoidance of drain tile is planned, Xcel Energy recognizes that excavation and heavy equipment operation during construction has the potential to cause damage to known or unknown drain tiles. In the event that there is damage to drain tile as a result of construction activities or operation of the Project, Xcel Energy will work with affected property owners to repair the damaged drain tile in accordance with the lease agreements between Xcel Energy and the landowner.

As discussed in Section 8.3.1, Xcel Energy will avoid impacting the CREP easement that is adjacent to the western edge of the permanent access road to Turbines 96 and 97 by siting temporary construction workspaces (i.e., crane assembly area and access road widening) on the east side of the access road and using best management practices (BMPs) during construction. Additionally, Xcel Energy is coordinating with the NRCS, BWSR, and MNDNR on the accuracy of the publicly available easement data. If additional easements are identified during the title search or in consultation with the NRCS, BWSR, and MNDNR, and impacts to such conservation easements are unavoidable, Xcel Energy will work with easement holders to obtain all necessary consents to construct and operate the Project.

8.11.2 Forestry

Economically important forestry resources are not found in this region of Minnesota. Forested areas are primarily associated with homes in the form of woodlots, shelterbelts, and along the margin of waterbodies within the Project Area.

8.11.2.1 Impacts

Forestry resources would not be impacted by construction or operation of the Project.

8.11.2.2 Mitigative Measures

The Project is not expected to impact forestry resources; therefore, no mitigation measures are proposed.

8.11.3 Mining

Many of the gravel operations found in Mower and Dodge Counties are inactive, abandoned, or their use is limited to the landowner. Because land uses can change over time, and keeping up with these changes can be challenging, Xcel Energy reviewed MNDOT's Aggregate Source Information System data (MNDOT, 2018), the County Pit Maps for Mower and Dodge Counties (MNDOT, 2002a and 2002b), and several years of aerial photography to identify mining operations in the Project Area. One commercial aggregate mine was identified within the Project Area as a result of this review. The mine is located approximately 0.5 mile northwest of the intersection of 280th Street and 660th Avenue and about 0.9 mile southeast of the nearest turbine.

8.11.3.1 Impacts

No impacts on mining resources or operations are anticipated as a result of the Project. One commercial aggregate mine was identified within the Project Area. This commercial aggregate mine is about 0.9 mile from the nearest turbine and would not be impacted by the Project.

8.11.3.2 Mitigative Measures

The Project is not expected to impact mining resources; therefore, no mitigation measures are proposed.

8.12 TOURISM

Tourism in the vicinity of the Project centers around various festivals and activities hosted by the cities near the Project Area, such as Austin, and outdoor recreational opportunities described in Section 8.8.

The City of Austin hosts numerous public events during the year including the Austin Winter Extravaganza, which includes one event each month between December and March: a Santa visit at the fairgrounds in December, January Snowflake Days, February Follies, and March Melt (Austin Area Chamber of Commerce, Undated). In the summer months Austin also hosts an annual Independence Day Parade and a Ladies Night Out, both of which are held during July. The Mower County Fair is also held within the City of Austin each year during the month of August at the Mower County Fairgrounds (Mower County Fair, 2022).

Other popular tourist attractions in Austin are the SPAM® Museum and Gift Shop, which are located in the City of Austin. The SPAM® Museum and Gift Shop are operated by Hormel Foods to provide visitors with an introduction to the history of SPAM® products (SPAM, 2021). The museum and gift shop are open 7-days a week and admission to the museum is free. SPAM™bassadors are also available to provide tours of the museum free of charge.

Outside of municipal events, residents and tourists enjoy recreational opportunities at the WMAs, SNAs, and snowmobile trails in Mower and Dodge Counties. See Section 8.8 for more details on public recreation opportunities near the Project Area.

8.12.1 Impacts

Construction of the Project will have a minimal impact on tourism opportunities in the Project vicinity. Construction impacts would mostly be related to increased traffic due to construction activities that may be perceptible to persons traveling through the Project Area to visit tourist destinations in Austin or nearby recreation lands. These impacts will be minimal, temporary, and isolated to specific areas throughout the Project Area.

8.12.2 Mitigative Measures

The Project is not expected to impact tourism opportunities in the Project vicinity; therefore, no mitigation measures are proposed.

8.13 LOCAL ECONOMIES AND COMMUNITY BENEFITS

Socioeconomic information is provided at the county level to characterize the socioeconomic conditions in the Project Area and at the state level for the purpose of comparison. Table 8.13-1 summarizes the existing socioeconomic conditions in the Project Area.

Table 8.13-1
Existing Economic Conditions in the Project Area

Category	Minnesota	Mower County	Dodge County
Per Capita Income Level (U.S. dollars)	$37,625	$29,720	$34,399
Unemployment Rate (%)	3.6	3.7	2.6
Persons Living Below the Poverty Level (%)	9.7	13.5	5.1
Top 3 Industries[1]	E (25.4%), M (13.4%), R (11.0%)	E (26.8%), M (22.9%), and R (9.5%)	E (32.7%), M (13.5%), R (9.5%)

Source: U.S. Census Bureau, 2019c

[1] Industries are defined under the 2012 North American Industry Classification System and abbreviated as follows: E = Educational, Health and Social Services; M = Manufacturing; and R = Retail Trade.

The top three industries of employment in the State of Minnesota are "education, health, and social services" at 25.4 percent, "manufacturing" at 13.4 percent, and "retail trade" at 11.0 percent. The top three industries of employment in Mower and Dodge Counties are similar to the state level, but "manufacturing" plays a larger role in Mower County and "education, health, and social services" plays a larger role in Dodge County than at the state level (U.S. Census Bureau, 2019c).

Per capita income in Mower County is about $7,000 less than per capita income at the state level of $37,625 (see Table 8.13-1). Per capita income in Dodge County is similar to the state level. The unemployment rate in Mower County is similar to the state level, while the unemployment rate in Dodge County is a percentage point lower than the state level. The number of persons living below the poverty level in Dodge County is 4.6 percent lower than the state level, while the number of persons living below the poverty line in Mower County is 3.8 percent higher than the state level of 9.7 percent.

8.13.1 Impacts

The overall impact of the Project on the local economy and communities of Mower and Dodge Counties will be positive in both the short term and long term. Repowering of the existing wind farm supports diversification of economic development in the agricultural sector and promotes efforts to attract additional employment opportunities and tax revenues while retaining and growing the existing business base. Repowering is expected to extend life of the Pleasant Valley Wind Farm, thereby extending the economic benefits for an additional 10 years beyond the term of the current easement agreements.

Because most of the land within the Project Area is used for agricultural production, Xcel Energy anticipates that some land will be temporarily removed from agricultural production for less than a year while the repowering work is completed. Landowners will be compensated for crop loss under the terms of their landowner agreements. Participating landowners will also benefit economically from continued long-term lease payments for the anticipated life of the Repower Project.

Approximately 200 construction personnel will be required for the construction phase of the Project. Xcel Energy and its construction contractor will use union labor for construction of the Repower Project. Total wages and salaries paid to construction personnel in Mower and Dodge counties will contribute positively to the total personal income of the region. Additional personal income will be generated for residents in the county and state by circulation and recirculation of dollars paid out by the Applicant for business expenditures and for state and local taxes. Expenditures made for equipment, fuel, operating supplies, construction personnel lodging, and other products and services benefit businesses in the counties and the state.

Operations and maintenance of the existing Pleasant Valley Wind Farm currently requires 12 full-time site staff. After repowering of the turbines is complete, Xcel Energy anticipates that the same number of staff will be required to operate and maintain the facility; no additional permanent full-time staff will be required.

Long-term beneficial impacts to the tax base of Mower and Dodge Counties, as a result of the construction and operation of the Project, will have an additional positive impact on the local economy in this area of Minnesota. In addition to the creation of jobs and personal income, Pleasant Valley Wind Farm pays a Wind Energy Production Tax to the local units of government of $0.0012 per kilowatt hour of electricity produced, resulting in annual Wind Energy Production tax revenue from approximately $1.1 million annually, and approximately $27.6 million over the anticipated life of the Repower Project, which is approximately a 10 percent increase.

8.13.2 Mitigative Measures

Socioeconomic impacts associated with the Project will be positive with an influx of wages and expenditures made at local businesses during Project construction. Additionally, continued operation of the wind farm for an additional 25 years from site permit amendment order will contribute to the county tax base. Because the impacts of the Project would be primarily positive, no mitigation measures are proposed.

8.14 TOPOGRAPHY

The Project Area is in the Oak Savanna subsection of the Minnesota and Northeast Iowa Morainal Section in the Eastern Broadleaf Forest Province, as defined by the Ecological Classification System of Minnesota (MNDNR, 2022a). Subsection boundaries delineate a significant regional change in geology, topography, and vegetation. The Oak Savanna subsection consists of a rolling plain of loess-mantled ridges over sandstone and carbonate bedrock and till. Topography is gently rolling. Glacial drift is generally less than 100 feet thick with the maximum thickness of about 200 feet.

In the Project Area, elevations range from 1,278 to 1,418 feet (390 to 433 meters) above sea level. This elevation change is gradual; there are not areas of significant elevation change in the Project Area. A topographic map of the Project Area is shown in Figure 8 (Topographic Map).

8.14.1 Impacts

All workspaces utilized for the Repower Project will be temporary and there are no areas of significant elevation change in the Project Area; therefore, no impacts to topography are anticipated.

8.14.2 Mitigative Measures

The Project is not expected to impact topography in the Project Area; therefore, no mitigative measures are proposed.

8.15 SOILS

Soil series, as established by the NRCS, are soils that are grouped together based on similar soil chemistry and physical properties. Each soil series is delineated as a single map unit and represents the dominant soil patterns or characteristics (Soil Survey Staff, 2021). Mapped soil series within the Project Area were identified from the NRCS soil surveys of Mower and Dodge Counties, Minnesota.

In addition to the soil series, the USDA, NRCS identifies areas that are important to agricultural use, such as prime farmland and farmland of statewide importance. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. Prime farmland can be cultivated land, pastureland, forestland, or other land. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance (Soil Survey Staff, 2021). As shown in Table 8.15-1, 99.2 percent of the soils in the Project Area are classified as prime farmland, including those soils identified as prime farmland if the limiting factor is mitigated. Soils are mapped on Figure 13 (Soils).

Table 8.15-1
Prime Farmland Within the Project Area (acres)

Prime Farmland Classification	Acres	Percent of Project Area
Prime Farmland[1]	45,073.3	99.2%
Farmland of Statewide Importance	40.9	0.1%
Not Prime Farmland	334.5	0.7%
Total	**45,448.7**	**100.0%**

[1] This includes soils classified as prime farmland or prime farmland if the limiting factor is mitigated.

8.15.1 Impacts

Repowering the project will likely result in minor short-term impacts to soils within the Project Area during construction. No additional impacts are expected from continued operation of the Project after repowering is complete.

8.15.2 Mitigative Measures

The potential for construction-related soil erosion will be minimized by siting laydown areas to avoid highly erodible soils on steep slopes. Avoiding steep topography will also reduce the size of cut and fill areas. Within work areas, topsoil will be separated from subsoils, protected from erosion and runoff using mulch, and then re-spread over disturbed areas once work is completed. Erosion control measures will also be implemented during construction to avoid or minimize soil erosion and off-site deposition. Erosion and sedimentation will be reduced by implementation of BMPs such as mulching, hydroseeding, wildlife-friendly erosion control blankets, silt fence installation, jute matting, revegetation, and/or interim reclamation (see Section 10.5). After repowering is completed, soils will be planted with crops or revegetated to stabilize them long term. Based on the implementation of these recommended and required mitigation measures, no adverse impacts to soil resources are expected as a result of repowering the Project.

8.16 GEOLOGIC AND GROUNDWATER RESOURCES

8.16.1 Surficial Geology

Surficial geology in the Project Area is primarily a loess plain over bedrock or till associated with the Browerville Formation (Lusardi et al., 2019; MNDNR, 2022c). Till from this formation contains Cretaceous limestone, shell fragments, and small amounts of gray and speckled shale. Other surficial geology features in the Project Area are Late Wisconsin end moraines, stagnation moraines, floodplain alluvium deposited by modern streams, and outwash. Figure 14 (Geology) provides an overview of geologic conditions in the Project Area.

8.16.2 Bedrock Geology

The bedrock underlying the glacial material in the Project Area consists of the Chickasaw Shale, Maquoketa, Lithograph City, and Coralville Formations; the Bassett, Hinkle, and Eagle Center Members of the Little Cedar Formation; and the Stewartville, Prosser, and Cummingsville Formations of the Galena Group (Jirsa et al., 2011). This Paleozoic rock consists largely of dolostone, sandy dolostone, limestone, and shale.

8.16.3 Aquifers and Wells

Groundwater in the region is supplied by both surficial and buried aquifers. The Upper Carbonate Aquifer is the primary bedrock aquifer (Olcott, 1992). It ranges in thickness and is confined by shale and carbonate rock, known as the Maquoketa confining unit. The water usually meets public use supply recommendations but is also susceptible to contamination from the land surface due to the karst landscape of the area. Purposes of withdrawals from the Upper Carbonate Aquifer include public supply, agricultural purposes, domestic use, and commercial and industrial purposes.

Homes and farms in the Project Area typically use private wells and septic systems for their household needs. According to the Minnesota Department of Health's Minnesota Well Index online database, there are 71 located wells within the Project Area; these wells are generally associated with residences (MDH, 2019).

8.16.4 Impacts

Impacts to geologic and groundwater resources from the Repower Project are not anticipated, as there will be only minimal surface disturbance for construction cranes and workspaces around turbines.

8.16.5 Mitigative Measures

Impacts are not expected to geologic and groundwater resources during Project construction and operation; therefore, no mitigative measures are proposed.

8.17 SURFACE WATER AND FLOODPLAIN RESOURCES

Surface water and floodplain resources for the Project Area were identified by reviewing U.S. Geological Survey (USGS) topographic maps, USGS National Hydrography Dataset (NHD), Minnesota Public Waters Inventory (PWI) maps, and other desktop resources (MNDNR, 2022b; USGS, 2021). The Project Area occurs within the Cedar River, Root River, and Zumbro watersheds (MNDNR, 2021a; Figure 15 – Surface Waters). Named waterbodies within the Project Area include the Cedar River, Dobbins Creek, North Branch Root River, Roberts Creek, Rose Creek, South Fork Zumbro River, and Wolf Creek.

There are no state designated trout streams within the Project Area (MNDNR, 2020a). Similarly, none of the waterbodies within the Project Area are identified as prohibited outstanding resource value waters under Minn. R. 7050.0335, Subp. 3. Figure 15 (Surface Waters) shows the locations of surface waters, federal Clean Water Act (CWA) 303(d) impaired waters, and Minnesota PWI waters within the Project vicinity, all of which were downloaded from the Minnesota Geospatial Commons.

Public waters are all waters that meet the criteria set forth in Minn. Stat. § 103G.005, Subd. 15 that are identified on PWI maps authorized by Minn. Stat., § 103G.201 and consist of PWI wetlands, PWI basins, and PWI watercourses (MNDNR, 2022b). These water features are regulated as public waters under the MNDNR's Public Waters Permit Program. PWI wetlands include all type 3, type 4, and type 5 wetlands (as defined in USFWS Circular No. 39, 1971 edition) that are 10 acres or more in size in unincorporated areas or 2.5 acres or more in size in incorporated areas. There are eight PWI watercourses and one ditch/altered natural PWI watercourse within the Project Area; there are no PWI basins or PWI wetlands within the Project Area. All or part of a watercourse may be designated as a public water. For example, only portions of the Cedar River, Dobbins Creek, and Rose Creek are designated as PWI watercourses. The PWI watercourses in the Project Area are listed in Table 8.17-1.

Table 8.17-1
Public Waters Inventory in the Project Area

PWI Type[1]	Name	Length (feet)[2]
Watercourse	Cedar River (I-027)	605
Ditch/Altered Natural Watercourse	Dexter Creek (M-009-067)	3,153
Watercourse	Dobbins Creek (I-027-011)	10,529
Watercourse	Root River (M-009)	24,761
Watercourse	Rose Creek (I-027-008)	10,477
Watercourse	Sargeant Creek (M-009-065)	6,868
Watercourse	Unnamed Creek (I-027-037)	8,490
Watercourse	Unnamed Creek (M-009-065-001)	22,262
Watercourse	Unnamed Stream (I-027-018-002)	13,280

[1] MNDNR, 2022b
[2] All or part of a watercourse may be designated as a public water; lengths provided in this table represent the portion of each watercourse in the Project Area that is designated as a public water and may not represent the full length of each watercourse within the Project Area.

Section 303(d) of the CWA requires each state to review, establish, and revise water quality standards for all surface waters within the state. Waters that do not meet their designated beneficial uses because of water quality standard violations are considered impaired. There are five 303(d) impaired waters within the Project Area: Cedar River, North Branch Root River, Roberts Creek, Rose Creek, and Wolf Creek (Figure 15); four additional impaired waters are included in the draft 2022 Impaired Waters List (MPCA, 2021). Impaired waters in the Project Area are listed in Table 8.17-2.

Table 8.17-2
Impaired Waters in the Project Area

Name[1]	Impairments[2]	Length (feet)[3]
Cedar River	benthic macroinvertebrate bioassessments, fecal coliform, Mercury in fish tissue, polychlorinated biphenyls in fish tissue, total suspended solids	16,130
Dobbins Creek[2]	benthic macroinvertebrate bioassessments, E. coli, fish bioassessments, total suspended solids	21,702
North Branch Root River	benthic macroinvertebrate bioassessments, turbidity	40,732
Roberts Creek	benthic macroinvertebrate bioassessments, fish bioassessments	12,456
Rose Creek	fecal coliform, turbidity	17,735
Unnamed Creek[2]	benthic macroinvertebrate bioassessments	19,335
Unnamed Creek[2]	E. coli	7,991
Unnamed Creek[2]	E. coli	1,657
Wolf Creek	fecal coliform	3,544

[1] MPCA, 2021
[2] From draft 2022 Impaired Waters List

Table 8.17-2
Impaired Waters in the Project Area

Name[1]	Impairments[2]	Length (feet)[3]

[3] All or part of a watercourse may be designated as impaired; lengths provided in this table represent the portion of each watercourse in the Project Area that is designated as impaired and may not represent the full length of each watercourse within the Project Area.

8.17.1 Wildlife Lakes in and Adjacent to Project Area

The MNDNR commissioner may formally designate lakes for wildlife management under the authority of Minn. Stat. § 97A.101, Subd. 2. This designation allows the MNDNR to manage lake levels periodically to improve wildlife habitat and regulate motorized watercraft and recreational vehicles on the lake. There are no MNDNR designated wildlife lakes in the Project Area (MNDNR, 2016a). As noted above, there are also no state designated trout streams located within the Project Area (MNDNR, 2020a).

8.17.2 Migratory Waterfowl Feeding and Resting Lakes

Migratory Waterfowl Feeding and Resting Areas protect waterfowl from disturbance on select waters of the state by prohibiting motors on these lakes during waterfowl season. These lakes are nominated by a petition process and approved or denied by the MNDNR after public input is received. There are no migratory waterfowl feeding and resting lakes in the Project Area (MNDNR, 2016b).

8.17.3 Federal Emergency Management Agency Floodplains within Project Area

Federal Emergency Management Agency (FEMA)-designated floodplains are digitally available for the Project Area (FEMA, 1982, 2013). There are approximately 60 acres of 100-year floodplains within the Project Area that are associated with an unnamed tributary to the Cedar River (Figure 16 – FEMA Floodplain). The floodplains are located between Turbines 16 and 17; no existing Project facilities are located in 100-year floodplains.

8.17.4 Impacts

Due to the presence of watercourses within the Project Area, permits may be required for temporary impacts during construction. Potential temporary impacts will be closely coordinated with the MNDNR, USACE, and the Local Government Units (LGUs) administering the Minnesota Wetland Conservation Act (WCA), as appropriate.

Temporary construction workspaces will be sited to avoid FEMA floodplains in the Project Area; therefore, no impacts on floodplains are anticipated during the repowering process for the Project.

8.17.5 Mitigative Measures

Temporary construction workspaces will be sited to avoid surface waters. If turning radius improvements at access roads or public road intersections cross surface waters, Xcel Energy will pursue the required regulatory approvals from the USACE and LGU under the WCA.

Because there are impaired waters within the Project Area, the National Pollutant Discharge Elimination System (NPDES) permit and SWPPP will require additional BMPs for potential runoff to these waters. As part of the NPDES permit process, Xcel Energy will design BMPs for the entire Project, including near impaired waters. The MPCA will review the SWPPP prior to finalizing.

There will be no permanent impacts to floodplains; therefore, no mitigation is proposed.

8.18 WETLANDS

Wetlands are areas with hydric (wetland) soils, hydrophilic (water-loving) vegetation, and wetland hydrology (inundated or saturated much of the year). Wetlands are part of the foundation of water resources and are vital to the health of waterways and communities that are downstream. Wetlands detain floodwaters, recharge groundwater supplies, remove pollution, and provide fish and wildlife habitat. Wetlands are also economic drivers because of their key role in fishing, hunting, agriculture, and recreation. Wetland types include marshes, swamps, bogs, and fens. Wetlands vary widely due to differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors.

Wetlands within the Project Area were identified using Minnesota's update to the National Wetlands Inventory (NWI). Within the Project Area most of the wetlands are associated with creeks and streams; few wetlands are isolated basins. The Cowardin Classification System wetland types and their acreage within the Project Area are presented in Table 8.18-1.

Table 8.18-1
National Wetlands Inventory in the Project Area

NWI Wetland Type	Wetland Count	Acres[1]
Freshwater Emergent Wetlands	184	329.8
Riverine	187	290.5
Freshwater Forested Wetlands	47	90.5
Freshwater Shrub Wetland	46	41.8
Freshwater Pond	19	6.3
Freshwater Shrub/Emergent Wetland	1	3.3
Freshwater Forested/Emergent Wetland	2	1.1
Wetland Total	**486**	**763.3**

[1] Wetland acreage is calculated using Minnesota's Update to NWI data.

There are approximately 763.3 acres of NWI-mapped wetlands in the Project Area, which constitutes two percent of the Project Area. Most of the mapped wetlands are freshwater emergent wetlands and riverine wetlands (43 percent and 38 percent, respectively). Freshwater emergent wetlands are mapped at 329.8 acres and riverine wetlands are mapped at 290.5 acres. Freshwater forested wetlands comprise 12 percent (90.5 acres) of the NWI acreage, freshwater shrub wetlands comprise 5 percent (41.8 acres) of the NWI acreage, and freshwater ponds comprise 1 percent (6.3 acres) of the NWI acreage (Table 8.18-1). Freshwater shrub/emergent and freshwater forested/emergent wetland combinations are both less than 1 percent (3.3 acres and 1.1 acres,

respectively) of the NWI acreage. See Figure 17 (Wetlands Inventory Map) for locations of wetlands within the Project Area.

8.18.1 Impacts

Based on the current site plan, only minimal, if any, impacts to wetlands are anticipated. Minor, temporary impacts to wetlands may occur as a result of turning radius improvements at access roads or public road intersections.

8.18.2 Mitigative Measures

Wetland determinations will be completed within the Project Area prior to construction, and the construction plans may be refined to further avoid and minimize wetland impacts. Temporary placement of construction materials (e.g., timber mats) into any wetland for purposes of temporary crossings may require coordination with USACE and Mower and/or Dodge County, administering Section 404 of the CWA and the Minnesota WCA, respectively. Because all proposed impacts are temporary, project fill placement activities are expected to qualify under a Nationwide or Regional General Permit and be eligible for a "no-loss" determination under the WCA.

The MPCA administers the NPDES permit program in Minnesota and regulates construction activities that disturb more than one acre of land. As part of its NPDES permit application, a SWPPP will identify erosion and sedimentation control measures to prevent adverse water quality impacts to wetlands during and after construction. Mitigation measures included in the SWPPP should be sufficient to ensure that streams and surface waters do not incur adverse construction-related stormwater impacts.

Xcel Energy will mitigate impacts to wetlands during construction and operation by protecting topsoil, minimizing soil erosion, and protecting adjacent wetland resources. Practices may include containing excavated material, use of silt fences, protecting exposed soil, stabilizing restored material, and re-vegetating disturbed areas with non-invasive species.

The MNDNR responded to Xcel Energy's Project notification letter and noted that while no previously recorded calcareous fens are present within the Project Area, they recommend that Xcel Energy conduct a field review for the presence of calcareous fens prior to the start of construction. Xcel Energy will continue to consult with the MNDNR regarding the Project's potential to impact these resources.

8.19 VEGETATION

The Project Area is in the Oak Savanna subsection of the Minnesota and Northeast Iowa Morainal Section in the Eastern Broadleaf Forest Province, as defined by the Ecological Classification System of Minnesota (MNDNR, 2022a). Historically, bur oak savanna was the primary vegetation, but areas of tallgrass prairie and maple-basswood forest were common. Tallgrass prairie was concentrated on level to gently rolling portions of the landscape, in the center of the subsection. Bur oak savanna developed on rolling moraine ridges at the western edge of the subsection and in dissected ravines at the eastern edge. Maple-basswood forest was restricted to the portions of the

landscape with the greatest fire protection, either in steep, dissected ravines or where stream orientation reduced fire frequency or severity (MNDNR, 2022c).

Based on review of aerial photographs and land use/land cover database information, the majority of the land area in the Project Area is cultivated crops (refer to Table 8.19-1 and Figure 12 – Land Cover). Corn and soybeans are the dominant agricultural crops by acreage in Mower and Dodge Counties, followed by vegetables harvested for sale in Mower County and forage crops in Dodge County (USDA, 2019). The land cover types in the Project Area are shown in Table 8.19-1.

Table 8.19-1
Land Cover Types and their Relative Abundance in the Project Area

Land Cover	Acres	Percent of Project Area
Cultivated Crops	42,562.0	93.6
Herbaceous	231.1	0.5
Hay/Pasture	385.9	0.8
Developed	1,929.1	4.2
Emergent Herbaceous Wetlands	89.7	0.2
Deciduous/Mixed/Evergreen Forest	235.5	0.5
Barren Land	13.6	<0.1
Open Water	1.8	<0.1
Total	**45,448.7**	**100**

Source: 2019 National Land Cover Database (Wickham, et al., 2021; Homer, et al., 2001-2016; Jin, et al., 2019; Yang, et al., 2018)
Note: The totals shown in this table may not equal the sum of addends due to rounding.

Forested areas are primarily windbreaks around residences and riparian areas along waterbodies in the Project Area. The wetlands are largely associated with creeks and unnamed intermittent streams within the Project Area. Refer to Section 8.18 for a detailed discussion of wetlands within the Project Area.

8.19.1 Impacts

Temporary construction workspaces for the Project were designed to occur primarily in cultivated cropland. Impacts to agriculture are discussed in Section 8.11.1.

The 2014 Site Permit required a prairie protection and management plan to the extent there were prairie impacts (2014 Site Permit, Section 4.7). Although no direct impacts to native prairie were to occur, several areas of prairie were located within the original Project Area; therefore, Xcel prepared a Native Prairie Protection and Management Plan to ensure that impacts to those prairie areas were avoided during construction of the wind farm. As is further discussed in Section 8.21.2, impacts to native prairie will be avoided by Xcel Energy during the repowering process. Prior to the start of construction, Xcel Energy will conduct a survey of the Project Area to identify native prairie and will prepare a Native Prairie Protection Plan for the Project.

The Project will also avoid woodlands, shrublands, grasslands, and water resources to the degree practicable. However, some minor and temporary impacts on wetlands, grasslands, and shrubland may occur as a result of construction workspaces. It is possible that these areas may contain native vegetation (i.e., plant species living in the area where it is found naturally vs. being introduced). If disturbed, Xcel Energy is committed to restoring and seeding these areas with certified weed-free native mixes appropriate for the region. It is the goal of Xcel Energy to minimize impacts to non-cultivated and Sites of Biodiversity within the Project Area.

8.19.2 Mitigative Measures

Xcel Energy will initiate restoration of disturbed soils and vegetation as soon as possible after construction activities are completed. Xcel Energy will restore areas of disturbed soil in non-cropped areas using weed-free native grasses, forbs, and shrubs. In cropped areas, a temporary cover crop may be planted to stabilize soils depending on the timing of construction completion and the next growing season.

The following measures will be used to avoid and minimize potential impacts to land within the Project Area during siting, construction, and operation to the extent practicable:

- Prioritize siting temporary construction workspaces in cultivated cropland.
- Avoid disturbance of wetlands during construction and operation of the Project. If jurisdictional wetland impacts are proposed, Xcel Energy will obtain applicable wetland permits (see Section 8.18).
- Design the Project to minimize the need to clear existing trees and shrubs.
- Prepare a construction SWPPP and secure a NPDES Permit.
- Use BMPs during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion. Practices may include containing excavated material, protecting exposed soil and stabilizing restored material, revegetating non-cropland and range areas with wildlife conservation species, and (wherever feasible) planting native tallgrass prairie species in cooperation with landowners.

8.20 WILDLIFE

8.20.1 General Wildlife

Wildlife in the Project Area consists of birds, mammals, fish, reptiles, amphibians, and insects, both resident and migratory, that use the Project Area habitat for forage, breeding, and/or shelter. The resident species are representative of Minnesota game and non-game fauna that are associated with farmlands, upland grasslands, and wetland and forested areas. Given that the land cover present in the Project Area is comprised primarily of agricultural lands, available wildlife habitat is limited. The majority of the migratory wildlife species are birds, including waterfowl, raptors, and songbirds. The wildlife in the Project Area are similar to what was presented in the original Site Permit Application for the wind farm in 2010 and the 2014 Site Permit.

Section 6.7 of the 2014 Site Permit required Xcel to prepare an Avian and Bat Protection Plan (ABPP, also referred to as a Bird and Bat Conservation Strategy). Pleasant Valley filed a Bird and Bat Conservation Strategy (BBCS) in April of 2014 which incorporated input from the DOC-EERA, MNDNR, and USFWS. Xcel Energy filed a revised BBCS in May of 2014 which incorporated final Project layout and additional comments received from the DOC-EERA. The BBCS was updated again in March 2018 in response to recommendations from the DOC-EERA that Xcel Energy implement operational changes to reduce risks to bat species from turbine collision. As of April 1, 2018, all turbines have been programmed to be feathered at wind speeds up to the manufacturer's standard cut-in speed, from one-half hour before sunset to one-half hour after sunrise, from April 1 to October 31 of each year of operation through the life of the project.

The BBCS addresses the pre-construction siting and field survey efforts that were completed in order to minimize impacts to wildlife and sensitive habitats; BMPs that were implemented to minimize impacts during construction; and post-construction mortality monitoring/studies/reporting. The primary objectives of the post-construction mortality monitoring study were to provide a summary of documented fatalities, present estimates of searcher efficiency and carcass persistence, and calculate fatality rates adjusted for bias at the Pleasant Valley Wind Farm during the study period. The secondary objective was to monitor all turbines specifically for eagle and other large bird fatalities. Results of the post-construction monitoring efforts to date are discussed further in Section 8.20.3 below. Xcel Energy has prepared an updated BBCS (Appendix I) for the Repower Project.

In coordination with the USFWS, Xcel Energy also developed an Eagle Conservation Plan (ECP) for the Pleasant Valley Wind Farm, which has been implemented since 2017 and prescribes measures to minimize risk to eagles, eagle-specific fatality monitoring procedures, and adaptive management in response to changes in eagle use at the facility. In addition, in 2020, Xcel Energy obtained a voluntary Eagle Take Permit (ETP) for incidental take of bald eagles during operation of its Pleasant Valley and Grand Meadow Wind Farms. The permit was effective as of April 7, 2020, and expires on April 6, 2025. This permit was obtained based on the presence of active eagle nests within the Pleasant Valley Wind Farm Project Area. In accordance with the ETP, Xcel Energy is conducting permit compliance monitoring, including two years of systemic monitoring and five years of incidental monitoring, as well as two years of aerial eagle nest surveys. Results of the permit compliance monitoring efforts to date are discussed further in Section 8.20.3 below.

8.20.2 Important Bird Areas

Important Bird Areas (IBAs) are created under voluntary, non-regulatory, international conservation effort that identifies critically essential habitats for birds, designates these habitats as IBAs, monitors the IBAs for changes in avian distribution and abundance, and conserves IBAs to protect birds in the long-term (MNDNR, 2022d). In Minnesota, the IBA program is led by the MNDNR's Nongame Wildlife Program and Audubon Minnesota. There are no IBAs in Mower and Dodge Counties (Audubon Minnesota, 2020).

8.20.3 Impacts

Development of the Project, including construction and operation, is expected to produce a minimal impact to wildlife. Based on studies of existing wind power projects in the United States and Europe, the impact to wildlife would primarily occur to avian and bat populations. It can be expected that, similar to the existing wind farm and at other wind developments, there is a high likelihood that individual bird and bat fatalities will occur at the Project. Repowering the Project with longer rotors will increase the rotor-swept-area, and therefore, may increase collision risk to birds and bats. Similarly, construction activities will introduce risk to primarily birds from construction equipment and vehicles traveling around the Project Area. However, it is unlikely that the Project will affect species at the population level.

In accordance with the Xcel Energy's BBCS, PCMM for birds and bats has been conducted for the Pleasant Valley Wind Farm. The first year of standardized monitoring was initiated in May 2016 and completed in May 2017 and included all turbines within the wind farm. Standardized carcass searches were conducted weekly over 35 survey periods (excluding clearance surveys and Survey Period 30) in spring, summer, and fall, and monthly in winter for a total of 3,549 turbine searches. Sixty-three fatalities (12 birds and 51 bats) were found during these searches. The avian species group with the most fatalities was songbirds (n=9); the most abundant bat species detected as a fatality was the eastern red bat (n=16). Eagle and other large bird-specific fatality monitoring also occurred monthly at all 100 turbines and was conducted concurrently with standardized carcass searches. There were 1,138 eagle and other large-bird specific searches conducted between May 23, 2016, and April 21, 2017. No eagle or other large bird fatalities were detected during these surveys. As is shown in Table 8.20-1 below, based on the first year of standardized monitoring, the estimated fatality rate per MW per year was 0.68 for birds and 1.8 for bats.

Although standardized bird and bat fatality monitoring ended at the facility in 2017, incidental monitoring for bird and bat fatalities will continue for the life of the facility. In 2018, incidental monitoring identified one avian fatality (bald eagle[3]) and no bat fatalities at the wind farm. In 2019, no bird or bat fatalities were documented at the wind farm. As discussed in Section 8.20.1 above, Xcel Energy's ETP requires that eagle injury/fatality monitoring take place at the wind farm for two full years following permit issuance. This monitoring began in June 2020, with searches of each turbine every 28 days. No injured or dead eagles were found at the wind farm in 2020 or 2021. Incidental discoveries of three avian fatalities were recorded in 2020, and three avian and one bat fatality were recorded in 2021 during both eagle fatality/injury monitoring and monitoring by operational staff.

Aerial eagle nest surveys of the project and a two-mile buffer were conducted in spring 2021. Two occupied active bald eagle nests (Nests 2017-01 and 2016-02) were identified within one mile of turbines; with nest 2017-01 located approximately 50 feet from the edge of the standard 400-foot

[3] This eagle fatality was found over 100 meters from nearest turbine; however, according to USFWS, results of analysis showed injuries to the bird consistent with collision with a wind turbine. The eagle also had high levels of rodenticide in its tissues, which may have contributed to its death.

radius workspace of Turbine T-17. The second year of eagle nest surveys required by the ETP are planned for spring 2022.

In addition to post-construction data from the Pleasant Valley Wind Farm, recent post-construction data are available from the following wind facilities in southern Minnesota with comparable landscapes to the Project from which to draw correlative inferences about potential impacts on birds and bats from Project operations:

- Odell Wind Farm (Odell) in Cottonwood, Jackson, Martin and Watonwan Counties, Minnesota;
- Red Pine Wind Energy Facility (Red Pine) in Lincoln County, Minnesota;
- Lakefield Wind Project (Lakefield) in Jackson County, Minnesota;
- Elm Creek I Wind Project (Elm Creek I) in Jackson County, Minnesota;
- Elm Creek II Wind Project (Elm Creek II), in Jackson and Martin Counties, Minnesota;
- Prairie Rose Wind Energy Facility (Prairie Rose) in Rock County, Minnesota;
- Big Blue Wind Farm (Big Blue) in Faribault County, Minnesota;
- Oak Glen Wind Farm (Oak Glen) in Steele County, Minnesota; and
- Grand Meadow Wind Farm (Grand Meadow) in Mower County, Minnesota.

Data from post-construction avian and bat studies at these facilities show comparable types and levels of impacts as the Pleasant Valley Wind Farm; impacts associated with the Repower Project are expected to be similar (Table 8.20-1).

Table 8.20-1
Recent Bird and Bat Post-Construction Fatality Estimates at Wind Facilities in Southern Minnesota

Facility	Survey Timeframe (month/year)	Bird (#/MW)	Bat (#/MW)	Comments
Odell[1]	12/2016-12/2017	4.69	6.74	• Most avian fatalities were in September and October • Bat fatalities were primarily July through September • Seasonality suggests most fatalities were fall migrants • Most common bat species was hoary bat
Red Pine[2]	3/2018-11/2018 (cleared plot)	4.47	11.35	• Most common bird species were ruby-crowned kinglet, marsh wren, red-eyed vireo, and sedge wren • Bat species were hoary, big brown, eastern red, and silver-haired
	3/2018 – 11/2018 (road & pad)	2.68	18.74	
Lakefield[3]	4/2012-11/2012	2.75	19.97	• Fifteen species of birds documented

Table 8.20-1
Recent Bird and Bat Post-Construction Fatality Estimates at Wind Facilities in Southern Minnesota

Facility	Survey Timeframe (month/year)	Bird (#/MW)	Bat (#/MW)	Comments
				• Documented bat species were hoary, big brown, eastern red, and little brown • No fatalities were federal- or state-listed
	6/2014-10/2014	1.07	20.19	• Most of the bat fatalities (65 percent) were solitary tree roosting bats (eastern red bat, hoary bat) • Bat fatalities were during fall migration (last week of July through mid-September)
Elm Creek I	2009-2010	2.32	1.49	• This report is not publicly available
Elm Creek II	2011-2012	8.73	2.81	• This report is not publicly available
Prairie Rose[4]	4/2014-6/2014	0.44	0.41	• Estimates provided are per study period (i.e., 8 weeks during spring migration and 10 weeks during fall migration) • An operational shut-down from August 18 through August 28, 2014 may have affected fatality rates
	8/2014-10/2014			
Big Blue[5]	7/2013-10/2013	--	6.33	• Systematic avian surveys were not conducted • Bat fatalities peaked twice: in late July/early August and in late August/early September. • Bat fatalities were primarily tree-roosting bats
Oak Glen[5]	2013	--	3.09	• Systematic avian surveys were not conducted • Bat fatalities peaked twice: in late July/early August and in late August/early September. • Bat fatalities were primarily tree-roosting bats
Grand Meadow[5]	2013	0.53-0.80	3.11	• Bat fatalities peaked twice: in late July/early August and in late August/early September. • Bat fatalities were primarily tree-roosting bats • Surveys focused on bat fatalities, conclusions for birds only apply to period between July
	2014	0.0	1.05	

Table 8.20-1
Recent Bird and Bat Post-Construction Fatality Estimates at Wind Facilities in Southern Minnesota

Facility	Survey Timeframe (month/year)	Bird (#/MW)	Bat (#/MW)	Comments
				and October; avian fatalities were only observed as incidental observations • 2013 bird fatality estimate is for small birds; no large birds were documented • In 2014, no small or large birds were documented in the standardized searches
Pleasant Valley[6]	2016 - 2017	0.68	1.80	• Bat fatalities were detected in late summer and early fall. • Documented bat species were eastern red bat, little brown bat, hoary bat, big brown bat, and silver-haired bat. • No eagle or large bird fatalities were detected.

[1] Chodachek and Gustafson, 2018
[2] Trana et al., 2019
[3] Westwood Professional Services, 2015
[4] Chodachek et. al, 2015
[5] Chodachek et al., 2014
[6] Tetra Tech, 2017

Overall, adjusted fatality rates for all bird species vary between three to six birds/MW/year for the majority of post-construction fatality studies nationwide. Fatality estimates are relatively constant across the country except for in the Great Plains, where there appears to be lower avian fatality rates, and the Pacific region, where there may be slightly higher fatality rates. Most avian fatalities due to wind turbines are small passerines, which account for about 60 percent of avian fatalities in publicly available reports in the United States. Fatality rates of migratory passerines increase in the spring and fall during migration (AWWI, 2020). The majority of avian species have a low risk of impacts at the population level (Allison et al., 2019). Based on the post-construction fatality studies outlined above, national averages for post-construction fatalities, and AWWI's conclusions about geographic trends, Xcel Energy anticipates that avian fatalities due to collision will be at or below the national average and may result in limited localized impacts to some groups of birds, such as small passerines.

Potential unavoidable impacts from the Project on bats are expected to be similar to the post-construction fatality rates at the above wind facilities, based on the similar land uses within the Project Area, geographic proximity of the projects, and similarities in species composition. Migratory tree-roosting bats, which were detected during the Project's post-construction studies, may have the highest risk of collision based on previous bat fatality studies (AWWI, 2020). Unlike

birds, wind facilities may present a risk to populations of migratory tree-roosting bats; in addition, although impacts from wind facilities on cave-roosting bats are typically low, even a small impact can be a risk to populations already impacted by white-nose syndrome (Allison et al., 2019). Overall, risk of mortality to bats in the Project Area is likely to be greatest on nights during fall migration, when the number of bats moving through the area are the highest. During the fall migration, weather conditions that are most conducive to higher mortality rates occur with warm temperatures (greater than 50 degrees Fahrenheit) and low wind speeds (less than 6.5 meters per second [m/s] or 14 miles per hour) (Baerwald and Barclay, 2009; Arnett et al., 2011; Good et al., 2011; Cryan and Brown, 2007). In addition, risk may be higher on the first night following the passage of a low-pressure system when the prevailing wind shifts from a southerly to a northerly direction (Cryan and Brown, 2007; Good et al., 2011). Additional impacts may include a small reduction in the available habitat that some wildlife uses for forage or cover; however, operation of the Project will not significantly change the existing land use.

8.20.4 Mitigative Measures

The MNDNR's early coordination response letter dated March 7, 2022, recommended the following in regard to the Project: (1) feathering turbine blades below cut-in speeds to minimize impacts to bat species, (2) operating turbines must be equipped with operational software capable of adjusting turbine cut-in speeds, (3) preparation of a BBCS, and (4) conduct post-construction fatality monitoring.

As noted above in Section 8.20.1, all turbines have been programmed to be feathered at wind speeds up to the manufacturer's standard cut-in speed, from one-half hour before sunset to one-half hour after sunrise, from April 1 to October 31 of each year of operation and will continue to be through the life of the wind farm.

As discussed above, two occupied active bald eagle nests (Nests 2017-01 and 2016-02) were identified within one mile of turbines during 2021 aerial nest surveys. Nest 2017-01 is located approximately 50 feet from the edge of the standard 400-foot radius workspace at Turbine T-17. As such, Xcel Energy has modified the construction workspace for this turbine to create a larger buffer from disturbance for this nest (approximately 260 feet).

Xcel Energy prepared an updated BBCS (Appendix I) to document and describe measures to identify, avoid, and manage risks to avian and bat species that may result from wind turbine upgrades, both during construction and operation. Xcel Energy submitted the BBCS to MNDNR staff on April 22, 2022. The updated BBCS is based on the recommendations provided in the USFWS's Land-Based Wind Energy Guidelines (USFWS, 2012) that apply to a repower project and operational wind farm. The BBCS will also describe the protocol that will be used for post-construction avian and bat fatality monitoring, which will be conducted for two years.

In accordance with the Standard Erosion Control and Invasive Species Prevention Best Practices included with the preliminary comments from the MNDNR on the Project (Appendix D), Xcel Energy will utilize wildlife friendly erosion control and invasive species prevention practices to minimize risks to aquatic and terrestrial habitats, as applicable. Examples include utilizing bio-netting or natural netting erosion control blanket types to minimize the risk of entanglement and death of small animals, and cleaning of equipment at a site prior to moving to the next site to

prevent invasive species introduction and spread. Lastly, construction staff will be provided with wildlife awareness training on construction and operational BMPs to reduce risks to wildlife and incident reporting.

8.21 RARE AND UNIQUE NATURAL RESOURCES

In a letter dated February 1, 2022, Xcel Energy requested comments on the Project from the USFWS and MNDNR. The MNDNR provided early coordination comments on March 7, 2022, and recommended the following in regard to the Project: (1) avoidance of rare species, communities, and features, and (2) preparation of a Prairie Protection and Management Plan. Xcel Energy submitted a Natural Heritage Review Request to the MNDNR for the Project on March 7, 2022. A copy of this request is included in Appendix H - Phase 1a Literature Review and Natural Heritage Information System Review Request. To date, a response has not been received.

8.21.1 Federal and State Listed Species

The USFWS's Information for Planning and Consultation system (USFWS, 2022) was reviewed for federally listed species, candidate species, and designated or proposed critical habitat that may be present within the Project Area (Table 8.21-1). The MNDNR's Natural Heritage Information System (NHIS) was also reviewed for documented occurrences of federally listed species and state-listed species within one mile of the Project Area (MNDNR, 2022e; Table 8.21-2). The MNDNR maintains the NHIS database through their Natural Heritage Program and Nongame Game Research Program; the NHIS is the most complete source of data on Minnesota's rare, endangered, or otherwise significant plant and animal species, plant communities, and other rare natural features. Although these reviews do not represent a comprehensive survey, they provide information on the potential presence of rare and unique species and habitats. The NHIS information provided here is based on a query of licensed NHIS data (per MNDNR license agreement; MNDNR, 2022e); as noted above, Xcel Energy has submitted an NHIS review request to MNDNR to confirm species' presence.

Table 8.21-1
Federally Listed Species with the Potential to Occur within the Project Area

Species	County Distribution	Federal Status
Northern Long-eared Bat (*Myotis septentrionalis*)	Mower, Dodge	Threatened
Prairie Bush-Clover (*Lespedeza leptostachya)*	Mower, Dodge	Threatened
Monarch Butterfly (*Danaus plexippus*)	Mower, Dodge	Candidate

Table 8.21-2
Federal and State Listed[1] Species Documented Within One Mile of the Project Area[2]

Type	Federal Status	State Status[3]	Scientific Name	Common Name	NHIS Records within the Project Area (#)	NHIS Records within one Mile of Project Area Boundary (#)	Year of Most Current Observation
Plant	--	THR	*Valeriana edulis var. ciliata*	Edible Valerian	2	3	2011
	--	END	*Parthenium integrifolium*	Wild Quinine	4	3	2018
	--	THR	*Arnoglossum plantagineum*	Tuberous Indian-plantain	1	2	2011
	--	THR	*Asclepias sullivantii*	Sullivant's milkweed	4	1	2014
	THR[4]	END	*Platanthera praeclara*	Western Prairie Fringed Orchid	0	1	2013
Bird	--	END	*Lanius ludovicianus*	Loggerhead Shrike	1	0	2003
Insect	END[4]	END	*Oarisma poweshiek*	Poweshiek Skipperling	0	1	1982

1 The MNDNR also maintains a listing of special concern species. Special concern species are not legally protected, but are uncommon in Minnesota or have unique or highly specific habitat requirements and deserve careful monitoring of its status.
2 MNDNR, 2022e
3 THR = Threatened, END = Endangered
4 Although this species is federally listed, it was not identified as potentially occurring in the Project Area by the USFWS Information for Planning and Consultation system.

The northern long-eared bat (NLEB) is a medium-sized bat species that occurs across the eastern and central U.S. (Caceres and Barclay, 2000). The annual life history of the NLEB includes an inactive period when the species is hibernating and an active period when the species forages, raises its young, and breeds. Hibernation generally occurs in caves and mines between November 1 and March 31 (USFWS, 2015; USFWS, 2016). In April, the species emerges from its hibernacula and moves to summer habitat. NLEB typically forage on flies, moths, beetles, caddisflies, and other insects in the understory of wooded areas (USFWS, 2015). Adult females form breeding or maternity colonies that are variable in size, ranging from a few individuals to as many as 60 adults (Caceres and Barclay, 2000; Wisconsin Department of Natural Resources, 2017). During the

summer, the species roosts in live and dead trees in cavities and crevices and under bark (Timpone et al., 2010). The NLEB forages primarily in forested areas (USFWS, 2015). The NLEB is currently experiencing a population decline due to a disease that affects hibernating bats called white-nose syndrome (WNS). Records of documented hibernacula and roost trees are maintained in the MNDNR's NHIS. Based on a review of NHIS records, there are no documented NLEB maternity roost trees within 150 feet of the Project Area or hibernacula within 0.25 mile of the Project Area. Although there are no records of NLEB, the species may still be present in the Project Area.

The prairie bush clover is an obligate of tallgrass prairie habitats (USFWS, 2019). As discussed in Section 8.21.2 below, there are approximately 95.4 acres of MNDNR-mapped native prairie within the Project Area.

On December 17, 2020, the USFWS published the result of their 12-month review of the monarch butterfly, and determined that listing the species under the Endangered Species Act (ESA) was warranted but precluded. The species meets the criteria for listing as an endangered or threatened species, but the USFWS cannot currently implement the listing due to limited staff and/or funding and because there are other listing actions with a higher priority. The species is now a candidate for listing; however, candidate species are not protected under the ESA. Adult monarch butterflies feed on nectar from a wide variety of flowers. Reproduction is dependent on the presence of milkweed, the sole food source for larvae.

As shown in Table 8.21-2 above, and based on review of the NHIS, there are five state-listed (threatened or endangered) plants recorded within one mile of the Project Area: the edible valerian, wild quinine, tuberous Indian-plantain, Sullivant's milkweed, and western prairie fringed orchid. The edible valerian is a long-lived perennial that favors moist, sunny, calcareous habitat, including calcareous fens, wet meadows, and moist prairies (MNDNR, n.d.-a). The wild quinine is a long-lived perennial prairie species that is restricted to mesic habitats in remnant prairies and savannas of the type that developed in the southeastern portion of the state (MNDNR, 2020c). The tuberous Indian-plantain is largely restricted to native, mesic prairies in the southern portion of the state, with many of these habitats found on old railroad rights-of-way (MNDNR, 2021b). The Sullivant's milkweed is restricted to undisturbed wet and mesic tallgrass prairies (MNDNR, 2021c). The western prairie fringed orchid is found almost exclusively in remnant native plant communities. In southern Minnesota, most populations are found in southern mesic prairie and occasionally southern wet prairie (MNDNR, 2020d).

The loggerhead shrike lives in areas of upland grasslands and sometimes in agricultural areas where short grass vegetation and perching sites such as hedgerows, shrubs, and small trees are found (MNDNR, 2018a). They may occur in both native and non-native grasslands including native prairie, pastures, old fields, shelterbelts, farmyards, and cemeteries (MNDNR, 2018a). Loggerhead shrikes nest in trees or brush.

The Poweshiek skipperling occupies wet to dry native prairie habitats in Minnesota. Observations in Minnesota and Wisconsin (Borkin 1995, 1996) indicate that prairie grasses, especially prairie dropseed (*Sporobolus heterolepis*) and little bluestem (*Schizachyrium scoparium* var. *scoparium*), are probably the most important larval hosts for the species (MNDNR, 2018b).

8.21.1.1 Impacts

Northern Long-eared Bat

Construction of the Project will not involve tree clearing, and, as such, will not impact NLEB. See Section 8.20.3 for a discussion of the Projects operational impacts on bat species, including NLEB.

Prairie Bush-clover

As discussed above, there are 95.4 acres of MNDNR-mapped native prairie within the Project Area; however, temporary construction workspaces associated with the Project will not impact MNDNR-mapped native prairie.

Monarch Butterfly

As discussed above, temporary construction workspaces for the Project were designed to occur primarily in cultivated cropland. The Project will also avoid woodlands, shrublands, grasslands, and water resources to the degree practicable. However, some minor and temporary impacts on wetlands, grasslands, and shrubland may occur as a result of construction workspaces. It is possible that these areas may contain native vegetation (i.e., plant species living in the area where it is found naturally vs. being introduced) that would serve as a food source for monarch butterflies.

Edible Valerian

There is no calcareous habitat located within the Project Area; therefore, suitable habitat for the edible valerian will not be impacted by the Project.

Wild Quinine

As discussed above, there are 95.4 acres of MNDNR-mapped native prairie within the Project Area; however, temporary construction workspaces associated with the Project will not impact MNDNR-mapped native prairie.

Tuberous Indian-plantain

As discussed above, there are 95.4 acres of MNDNR-mapped native prairie within the Project Area; however, temporary construction workspaces associated with the Project will not impact MNDNR-mapped native prairie.

Sullivant's Milkweed

As discussed above, there are 95.4 acres of MNDNR-mapped native prairie within the Project Area; however, the temporary workspaces associated with the Repower Project will not impact any MNDNR-mapped native prairie.

Western Prairie Fringed Orchid

The western prairie fringed orchid record is associated with an SNA located outside of the Project Area and is absent from the USFWS species list for the Project Area; as such, the western prairie fringed orchid is not likely to occur in the Project Area.

Loggerhead Shrike

Construction of the Project will not involve tree or shrub clearing, and, as such, impacts to the loggerhead shrike are not anticipated.

Poweshiek skipperling

The historic Poweshiek skipperling record is associated with an SNA located outside of the Project Area and is further absent from the USFWS species list for the Project Area. As such, the Poweshiek skipperling is not likely to occur in the Project Area. In addition, the Project will not impact native prairie.

8.21.1.2 Mitigative Measures

Northern Long-eared Bat

No mitigative measures are proposed for construction, as the Project will not involve tree clearing and will not impact NLEB. See Section 8.20.4 for a discussion of the mitigative measures that Xcel Energy would employ to protect this and other bat species during operation.

Prairie Bush-clover

Xcel Energy will not impact suitable habitat for the prairie bush clover; therefore, no mitigative measures are proposed.

Monarch Butterfly

It is possible that the Project will have minor, temporary impacts to native vegetation serving as a food source to monarch butterflies; however, no long-term significant impacts to the species are anticipated. Xcel Energy is committed to restoring and seeding areas with native vegetation (wetlands, grasslands, and shrubland) with certified weed-free native mixes appropriate for the region.

Edible Valerian

Xcel Energy will not impact suitable habitat for the edible valerian; therefore, no mitigative measures are proposed.

Wild Quinine

Xcel Energy will not impact suitable habitat for the wild quinine; therefore, no mitigative measures are proposed.

Tuberous Indian-plantain

Xcel Energy will not impact suitable habitat for the tuberous Indian-plantain; therefore, no mitigative measures are proposed.

Sullivant's Milkweed

Xcel Energy will not impact suitable habitat for the Sullivant's milkweed; therefore, no mitigative measures are proposed.

Western Prairie Fringed Orchid

Xcel Energy will not impact suitable habitat for the western prairie fringed orchid; therefore, no mitigative measures are proposed.

Loggerhead Shrike

Xcel Energy will not impact suitable nesting habitat for the loggerhead shrike; therefore, no mitigative measures are proposed.

Poweshiek skipperling

Xcel Energy will not impact suitable habitat for the Poweshiek skipperling; therefore, no mitigative measures are proposed.

8.21.2 Native Prairie

In addition to rare and sensitive species, the MNDNR also maps rare and unique plant communities that may include relatively rare habitats (e.g., prairie) or higher quality or good examples of more common plant communities (e.g., wet meadow). Although most NPCs have no legal protection in Minnesota, these areas may have the potential to contain undocumented populations of rare plant species, which may be protected under Minnesota's state endangered species law (Minn. Stat. § 84.0895). These native prairies and NPCs may also provide essential habitat for rare species of fauna.

Native prairies are typically unplowed plant communities originating on the site and dominated by grass and sedge species, with a rich mix of broad-leaved forbs and a few low shrub species (MNDNR, 2018c). Approximately 250,000 acres of native prairies ranked good to excellent remain in Minnesota (MNDNR, 2017a). There are five MNDNR-mapped native prairie areas within the Project Area, all of which are the Mesic Prairie (Southern) prairie type, totaling 95.4 acres. Three of the five MNDNR-mapped native prairie areas are also Minnesota Biological Survey (MBS) SOBS ranked as high, and two are MBS SOBS ranked as moderate (see section 8.21.3 below).

The MNDNR's railroad prairie rights-of-way are native prairie remnants that occur along railroad rights-of-way. The railroad rights-of-way program was instituted in 1997 by the Minnesota legislature in the Prairie Parkland and Eastern Broadleaf Forest Ecological Classification System

Provinces (MNDNR, 2017b). There are no railroad prairie rights-of-way in or adjacent to the Project Area (MNDNR, 2017b).

8.21.2.1 Impacts

As discussed above, there are 95.4 acres of MNDNR-mapped native prairie within the Project Area; however, temporary construction workspaces associated with the Project will not impact MNDNR-mapped native prairie. Prior to the start of construction, Xcel Energy will conduct a survey of the Project Area to identify native prairie and will prepare a Native Prairie Protection Plan for the Project; any unmapped native prairie identified as part of that survey effort will be avoided by modifying the construction workspace.

8.21.2.2 Mitigative Measures

As noted above, Xcel Energy has designed construction workspaces to avoid impacts to MNDNR-mapped native prairie within the Project Area; therefore, no specific mitigation measures are proposed.

8.21.3 Native Plant Communities and Sites of Biodiversity Significance

The MBS assesses and maps the distribution and status of the Minnesota's fauna, flora, NPCs, and SOBS.

Native Plant Communities

NPCs are assemblages of native plants that have not been substantially impacted by non-native species or human activities. NPCs are formed and classified by hydrology, soils, landforms, vegetation, and natural disturbance regimes such as floods, wildfires, and droughts. NPCs are named for the characteristic plant species within them or for characteristic environmental features (MNDNR, n.d.-b). NPCs may include native prairie. The MNDNR has classified NPCs within the state using plant species, soils, and other site-specific data from vegetation plots. The current NPC classification covers most of the wetland and terrestrial vegetation in the state and was completed in 2003. It is a six-level hierarchical classification that accounts for vegetation structure and geology, ecological processes, climate and paleohistory, local environmental conditions, canopy dominants, substrate, and environmental conditions (Aaseng et al., 2011).

There are seven NPCs within the Project Area, made up of three different NPC types. Table 8.21-3 presents the MBS's NPC types that occur within the Project Area and the number of acres of each NPC type within the Project Area.

Table 8.21-3
Native Plant Community Types within the Project Area

Native Plant Community Type	Number of NPCs within Project Area	Acres
Southern Wet-Mesic Hardwood Forest	1	31.4
Mesic Prairie (Southern)	5	95.4
Southern Mesic Oak-Basswood Forest	1	18.8
Total	**7**	**145.6**

Sites of Biodiversity Significance

The MBS is an assessment of Minnesota landscapes for NPCs, rare animals, rare plants, and animal communities through desktop review and follow-up field survey. MBS designates and assigns rankings to SOBS, based on landscape context, NPC, and occurrence of rare species populations. The MBS groups and ranks SOBS for each Minnesota's system subsections for the purpose of designating and cataloguing the state's most notable examples of NPCs and rare species. A site's biodiversity rank is based on the presence of rare species populations, the size and condition of NPCs within the site, and the landscape context of the site (MNDNR, 2009; MNDNR, n.d.-c). Both native prairie and NPCs may also be designated as SOBS. There are four biodiversity significance ranks: outstanding, high, moderate, and below.

- "Outstanding" sites contain the best occurrences of the rarest species, the most outstanding examples of the rarest NPCs, and/or the largest, most ecologically intact or functional landscapes.
- "High" sites contain very good quality occurrences of the rarest species, high-quality examples of rare NPCs, and/or important functional landscapes.
- "Moderate" sites contain occurrences of rare species, moderately disturbed native plant communities, and/or landscapes that have strong potential for recovery of NPCs and characteristic ecological processes.
- "Below" sites lack occurrences of rare species and natural features or do not meet MBS's standards for outstanding, high, or moderate rank. These sites may include areas of conservation value at the local level, such as habitat for native plants and animals, corridors for animal movement, buffers surrounding higher-quality natural areas, areas with high potential for restoration of native habitat, or open space.

There are no MBS SOBS ranked as outstanding within the Project Area. Table 8.21-4 presents the MBS SOBS with rankings of below, moderate, or high that occur within the Project Area and their Biodiversity Significance Rank (also see Figure 11 – Rare and Unique Natural Features).

Table 8.21-4
Sites of Biodiversity Significance within the Project Area

Site of Biodiversity Significance Rank	Number of Sites Within Project Area	Acres
Below	8	144.3
Moderate	3	105.3
High	2	84.7
Total	**13**	**334.3**

8.21.3.1 Impacts

As shown in tables 8.21-3 and 8.21-4 above, there are seven NPCs and 13 MBS SOBS within the Project Area. The temporary construction workspace for Turbine 86 intersects one mapped MBS SOBS ranked as below (Dexter 16), which is a former railroad grade; however, the land use at this location was converted between 2017 and 2019 from a narrow corridor of forest/shrub habitat to actively cultivated cropland. Agricultural production in the immediate Project vicinity may experience minor short-term impacts from the use of the workspace during construction, but these impacts would resolve when construction is complete.

The remaining construction workspaces associated with the Project will not impact any NPCs or MBS SOBS.

8.21.3.2 Mitigative Measures

As noted above, Xcel Energy has designed temporary construction workspaces to avoid impacts to NPCs and MBS SOBS sites; therefore, no specific mitigation measures are proposed.

9.0 SITE CHARACTERIZATION

9.1 SITE WIND CHARACTERISTICS

The wind monitoring program at the Pleasant Valley Wind Farm began in August 2007 with Mast 380, then followed up by Masts 480, 481, 482, 483 and 484 in November of 2008; all met masts period of records end in November of 2013.

Table 9.1-1
Mast Data for the Pleasant Valley Wind Farm

Mast ID	Site UTM Coordinates (NAD83, Zone 15)		Elev. (m)	Period of Record	Monitoring Heights (m)		
	Easting	Northing			Wind Speed	Wind Direction	Temp
380	517487	4846743	425	AUG 2007 – NOV 2013	58, 54, 35, 35, 10	58, 50	2, 3
480	517000	4841937	409	NOV 2008 – NOV 2013	59, 59, 53, 38, 24	48, 35	3
481	512580	4847744	418	NOV 2008 – NOV 2013	59, 59, 53, 38, 38, 24	48, 35	3, 0
482	513452	4852593	428	NOV 2008 – NOV 2013	80, 80, 80, 74, 69, 54, 34	66, 66, 51	3
483	521256	4851948	402	NOV 2008 – NOV 2013	59, 59, 53, 38, 24	48, 35	3
484	516809	4858843	407	NOV 2008 – NOV 2013	59, 59, 53, 38, 24	48, 35	3, 2

Wind speed and temperature data from the Mast tower were adjusted to align with data from multiple reference sites in the area (r-squared), which are shown in Table 9.1-2. A higher r-squared value indicates a stronger correlation.

Table 9.1-2
Correlation of MET Data with Reference Sites

Reference	r-squared Value
Estherville ASOS	0.707
Mason City ASOS	0.792
Rochester ASOS	0.902
MERRA 43.5N 92.7W	0.880
MERRA 44.0N 92.7W	0.895

9.1.1 Interannual Variation

Interannual variation is the variation in wind speed from one year to the next. The inter-annual variability (IAV) of wind speed at the Project is estimated to be 4.0% to 6.0%. The max IAV of 6.0%, applied to the Project's estimated average hub height wind speed, is 0.5 m/s.

9.1.2 Seasonal Variation

Seasonal variation is represented by the shift in production percent (correlated to wind speeds) from one month to the next. Table 9.1-3 shows the estimated average seasonal variation based on long-term correlations with meteorological data collected in the Project Area. The months of October through May are expected to generally have the highest wind speeds, while the months of July and August are expected to have the lowest wind speeds.

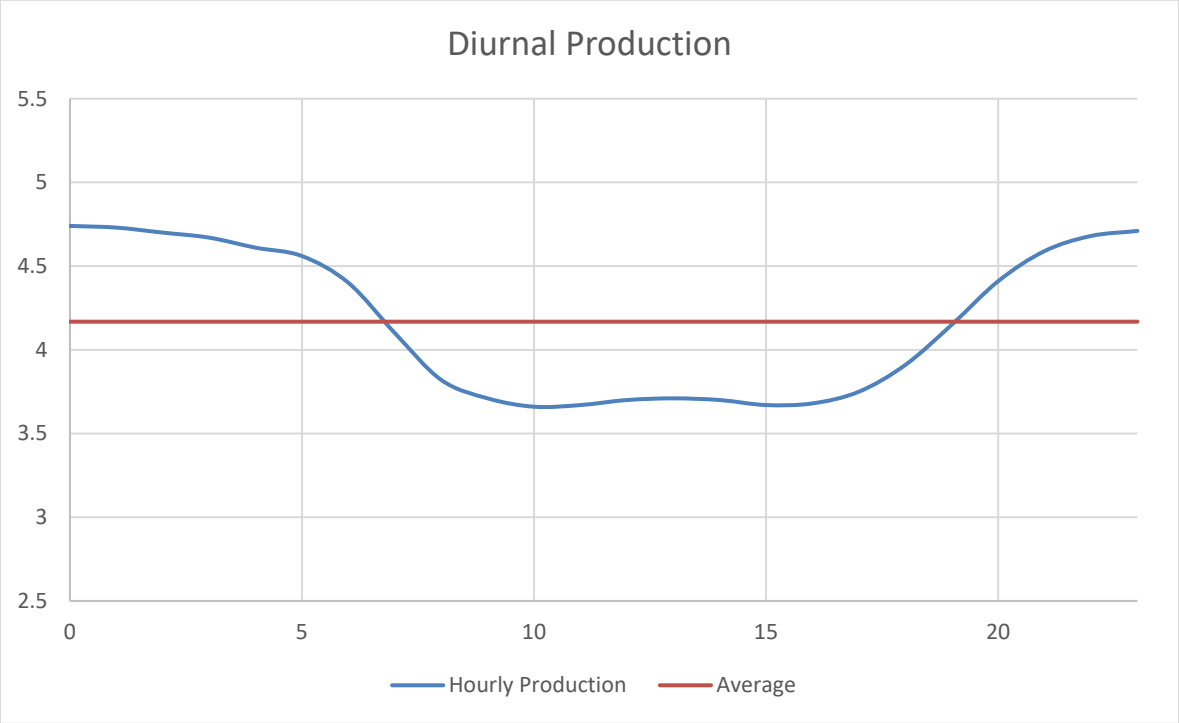
Table 9.1-3
Average Monthly Production Percent at Hub Height of Turbines (95 m)

Month	Production (%)
January	9.95
February	9.35
March	9.15
April	9.22
May	8.74
June	6.94
July	5.93
August	6.05
September	7.34
October	8.39
November	9.29
December	9.65
Annual Average	**8.33**

9.1.3 Diurnal Conditions

As shown in Chart 9.1-1, the annual daily wind speed pattern at hub height at the Project's met tower shows an increase in wind speeds during the evening and overnight hours.

Chart 9.1-1: Diurnal Wind Speeds



9.1.4 Atmospheric Stability

The stability of the atmosphere can be calculated when the temperatures at two levels are available. For the Repower Project, temperature sensors at multiple heights were not available. Based on other regional atmospheric data, Xcel Energy expects the approximate atmospheric stability profile to be: Neutral (15 percent), Stable (70 percent), and Unstable (15 percent). These percentages were confirmed to be appropriate with the National Oceanic and Atmospheric Administration (NOAA)/National Weather Service Station in Chanhassen, Minnesota.

9.1.5 Hub Height Turbulence

Turbulence intensity (TI) is an indicator of the variability of wind speed. Hub height TI for the site is on average 9.2 percent at 15 m/s as calculated by Vestas for the mechanical loads analysis of the turbine components prior to initial construction of the Pleasant Valley Wind Farm with the V100 2.0 MW turbine models.

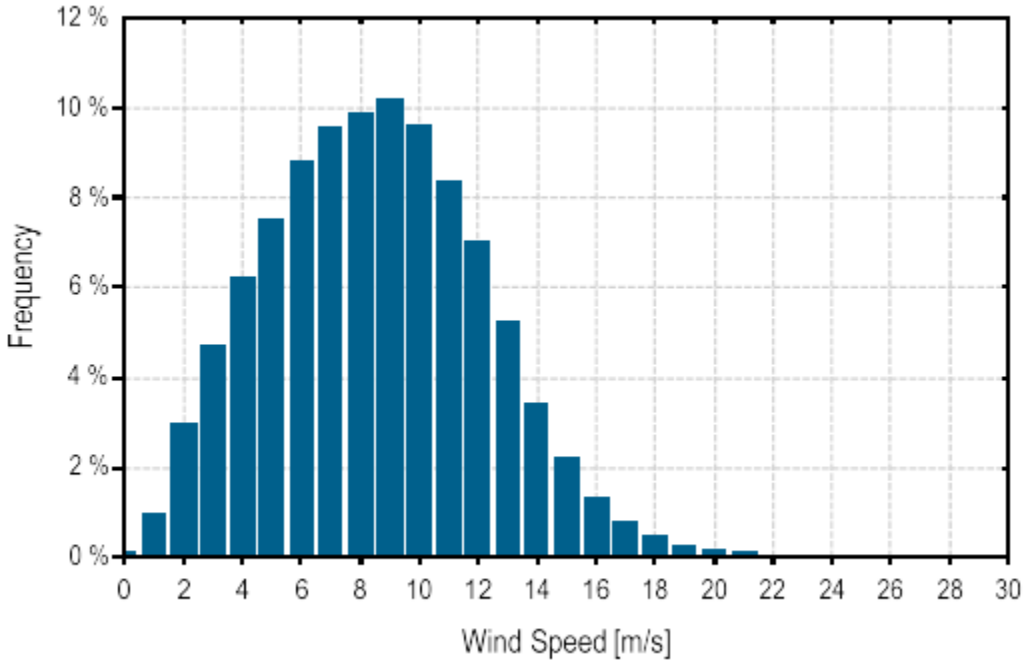
9.1.6 Extreme Wind Conditions

The hub height 50-year extreme 10-minute wind speed for the Project Area is 42.5 m/s. The extreme wind speed was calculated by Vestas for the mechanical loads analysis of the turbine components prior to initial construction of Pleasant Valley Wind Farm with the V100 2.0 MW turbine models.

9.1.7 Wind Speed Frequency Distribution

Chart 9.1-2 shows the wind speed frequency distribution at hub height calculated from wind data collected at met Mast 302. A majority of the winds occur between 2 m/s and 14 m/s. The characteristics of this distribution are consistent with wind regimes observed elsewhere in Minnesota.

Chart 9.1-2: Wind Speed Frequency Distribution



9.1.8 Wind Variation with Height

Data from the met Masts can be seen in Table 9.1-4 shows wind speed at the instrument height, wind shear exponent, and the extrapolated hub height wind speed.

Table 9.1-4
Mast Data for the Pleasant Valley Wind Farm

Mast ID	Monitoring Height (m)	Climate-adjusted Speed (m/s)	Effective Wind Shear Exponent	Extrapolated 95-m Hub Height speed (m/s)
380	58	7.5	0.24	8.5
480	59	7.3	0.26	8.3
481	59	7.5	0.21	8.2
482	80	8.2	0.22	8.5
483	59	7.4	0.22	8.2
484	59	7.6	0.2	8.3

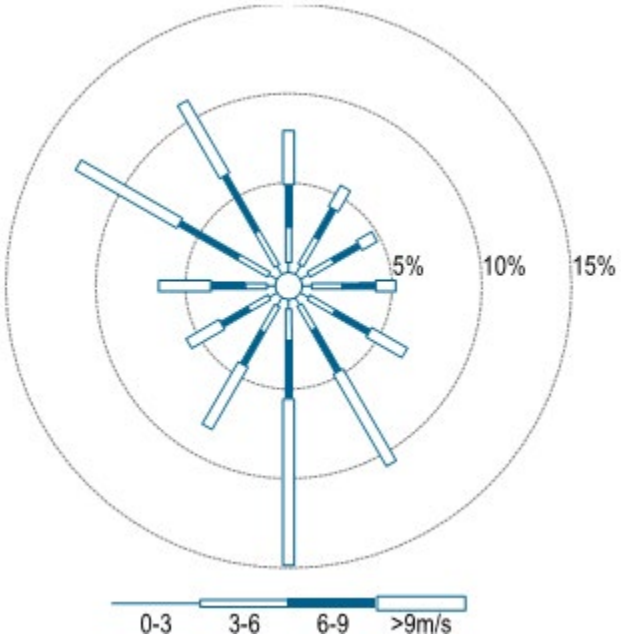
9.1.9 Spatial Wind Variation

GL Garrad Hassan (GLGH) has estimated the annual average hub height wind speeds among the Project's 100 turbines to range from approximately 8.1 to 8.6 m/s, averaging approximately 8.39 m/s. These estimates result from a combination of mesoscale and microscale wind flow modeling using GLGH proprietary software developed using standard industry methodology and formulas.

9.1.10 Wind Rose

A wind rose is a graphical representation of wind speeds based on the direction the wind comes from and the frequency it comes from each direction. Chart 9.1-3 shows the wind rose for the Pleasant Valley Repower Project

Chart 9.1-3: Pleasant Valley Wind Rose



9.1.11 Other Meteorological Conditions

Minnesota has a continental-type climate characterized by frequent occurrences of continental polar air throughout the year, with occasional Arctic outbreaks during winter and occasional periods of prolonged heat during the summer, especially in southern Minnesota when warm air moves in from the Gulf of Mexico and southwestern United States. Pacific Ocean air masses moving across the western United States allow for mild and dry weather conditions during all seasons. While the climate within the Project Area is fairly uniform due to relatively little topographic relief and lack of large water bodies, extreme weather events, such as tornadoes, thunderstorms, high winds, and blizzard conditions do occur. The NOAA has recorded extreme weather events in the Project Area in the U.S. Storm Events Database for the period of time from January 1971 through November 2021 (50 years; NOAA, 2022). Extreme weather events during this period include tornadoes, hail, thunderstorm winds, high wind, winter storms, ice storms, blizzards, extreme cold, heavy snow, drought, floods, and flash floods (among others). NOAA

recorded more than 500 extreme weather events in Mower County and 455 extreme weather events in Dodge County during this time period. Typically, such storms are local in extent, short in duration, and result in damage to relatively small geographic areas. There were 108 event days with property damage reported during this period in Mower County and 80 in Dodge County (NOAA, 2022).

9.2 LOCATION OF OTHER WIND TURBINES WITHIN 10 MILES OF PROJECT AREA

Based on the U.S. Wind Turbine database (USGS, 2022), there are 279 existing wind turbines associated with six wind farms within 10 miles of the Project Area. These include:

- Prairie Star (54 turbines) in Mower County;
- Wapsipinicon Wind Project (67 turbines) in Mower County;
- Mower County Wind Energy Center (41 turbines) in Mower County;
- G. McNeilus Wind Farm (9 turbines) in Mower County;
- McNeilus Wind Farm (41 turbines) in Dodge County; and
- Grand Meadow Wind Farm (67 turbines) in Mower County.

Note that some of these wind farms have more turbines than are included in the 10-mile buffer from the Project Area. For example, Prairie Star includes 61 turbines, 54 of which are within 10 miles of the Pleasant Valley Wind Farm. Figure 18 (Existing Turbine Locations) shows the location of existing wind turbines and wind energy projects. As displayed on Figure 18, there are several more existing wind turbines up to 20 miles north and south of the Repower Project.

10.0 PROJECT CONSTRUCTION

Repowering will consist of the following general construction steps: completing temporary turning radius improvements to existing gravel access roads and public road intersections to accommodate truck deliveries, preparing crane assembly areas, preparing laydown and staging areas, offloading new turbine components near operating turbines, removing and replacing existing blades and hub or removing and replacing the nacelle with a construction crane, performing engineering inspections on new components, returning turbines to operation, and restoring temporarily disturbed areas to pre-construction conditions.

As a repowering project, earthmoving is fairly minimal and generally limited to the laydown yard, temporary turning radius improvements, crane assembly areas, and staging at turbine sites. Land will be graded only where needed to allow for crane and delivery truck access. Detailed descriptions of construction processes are described within sections below for primary grading and preparation areas. Prior to any earthwork being performed, Gopher State One Call will be contacted to mark utility locations, rights-of-way will be identified as needed, and construction stakes placed. Limited access road widening and temporary storage area construction will be completed as necessary to accommodate the repower.

Professional design engineering firms and experienced pre-qualified trade contractors will be hired and managed by the primary contractor for component dismantling and installation. Xcel Energy will have overall project management responsibilities. The repowering team will be on-site to handle materials, deliveries, staging, repowering, and quality assurance. An on-site construction manager will coordinate all aspects of the work, including ongoing communication with local officials, citizens groups, and landowners.

The construction manager will also oversee the temporary widening of access roads, crane assembly areas, gear box, blade, and/or nacelle installations, electrical infrastructure, as well as the coordination of materials receiving, inventory, and distribution.

10.1 ROADS AND INFRASTRUCTURE

During construction, roadways will be accessed by a variety of small to large construction vehicles requiring temporary roadway improvements along some public roads within the Project Area. Following the completion of the repower process, operations traffic will return to normal including small-to-medium sized vehicles performing routine maintenance on turbines and associated facilities. Xcel Energy estimates that the maximum construction workforce the Project will create is approximately 550 additional trips per day on local roadways during peak repowering when turbine components and equipment are being delivered. Total trips per day will decrease to approximately 6 to 12 vehicle trips per day following repowering.

There will be turning radii installed at various intersections to allow for turbine component deliveries and typically includes widening select intersections to allow for the long delivery trucks to turn, and upgrading road surfaces by grading or the addition of gravel. Due to the short-term nature of the repower work, road improvements will primarily be compaction and placement of gravel. Xcel Energy will coordinate with the state, county, and townships, as applicable, regarding the planned use of haul routes that may require road improvements or traffic control measures

during the construction period and to ensure that any overweight permits, road use permits, road maintenance agreements and other approvals are secured.

During construction, Xcel Energy will perform routine maintenance and roadway repairs associated with upkeep needed or damage resulting from the Project activities.

10.2 ACCESS ROADS AND CRANE ASSEMBLY AREAS

The Project will not require construction of new, permanent access roads. Existing access roads will be temporarily widened to allow for crane movement and delivery of equipment to the construction easement located at the base of each turbine. Crane movement and equipment delivery during construction will be accomplished by moving cranes between turbine sites using carrier outriggers traveling along public roads; crane assembly areas will be installed along existing turbine access roads. Xcel Energy will coordinate with landowners throughout the repowering process to minimize disturbances due to active agricultural lands. Crane movement and equipment delivery will require improvements to intersections and access roads to accommodate cranes and oversized hauling vehicles. These improvements will be temporary and will generally consist of removing topsoil, compacting subsoil, and constructing a temporary compacted rock roadway.

Crane assembly areas will be sited adjacent to existing turbine access roads; the precise location of crane assembly areas will be finalized based on landowner requests, avoidance of environmental constraints such as wetlands, SOBs, prairies, sensitive habitat, and other factors. Cranes will be assembled and broken down within the crane assembly areas to support removing and replacing turbine components. Crane assembly areas will consist of a 60-foot (18.3-meter) by 300-foot (91.4-meter) area that will be matted or graveled.

Before a crane is moved to a turbine site, compacted rock crane pads and laydown areas will be constructed. Xcel Energy will utilize mobile lattice boom cranes mounted on wheeled bases. Access roads widened for crane travel and equipment deliveries will be reduced to their permanent width of approximately 16 feet (4.9 meters) upon completion of construction. Where temporary improvements are removed, areas will be graded to natural contours, soil decompaction and reseeding will occur as described further in Section 10.5. After construction, all access improvements and turbine working areas will be removed and disturbed areas will be restored to pre-construction conditions.

10.3 ASSOCIATED FACILITIES

No changes to the existing O&M building are proposed or needed to accomplish repowering. No updates to the existing substation and collection circuits will be required as described in Sections 6.1 and 6.2, respectively. No new permanent met towers are required for the Project. Xcel Energy will utilize the existing permanent met towers where currently installed.

A secure laydown area will be prepared where wind turbine components are temporarily stored, or processed, as part of the wind turbine repowering operation. Xcel Energy is currently coordinating with landowners to host this facility on approximately 12 acres of leased land near Turbines 45 and 46 in Township 140N, Range 16W, Section 19. The laydown yard is sited to avoid

wetlands, waterbodies, cultural resources, and environmentally sensitive features such as native prairie, NPCs, and SOBS. The area will consist of gravel and will be in place for approximately 8-10 months during active construction, and then in conjunction with post-construction clean-up.

Xcel Energy will coordinate with the FAA regarding installation of ADLS radar unit(s). The number and location of these unit(s) is not yet known. Xcel Energy anticipates impacts associated with ADLS will be similar to a met tower, requiring a workspace of approximately 75 feet by 75 feet (less than 0.1 acre) each. The ADLS tower(s) will be sited to avoid environmentally sensitive features.

10.4 TURBINE SITE LOCATION

10.4.1 Foundation Design

Existing turbine foundations will remain unchanged; no changes to the foundations are anticipated. Structural assessments of the existing foundations were completed to determine if the existing foundation design can accommodate the V110 turbines and meet 2022 industry design standards. Based on the field assessment work that's been completed, Xcel Energy understands the current foundation design can accommodate the V110 turbines.

10.4.2 Tower

The existing turbine towers will be used during repowering activities; no modifications will take place. For 86 of the 100 turbines, the repowered rotor (consisting of hub and blades) will be assembled on the ground and picked up as a single unit to be bolted to the nacelle. For the remaining 14 turbines, the new nacelle will be picked up and installed. At this point, crews will work within the tower to ensure all mechanical and electrical connections are completed to facilitate energization.

10.5 POST CONSTRUCTION CLEAN-UP AND SITE RESTORATION

Project activities causing temporary impacts are associated with the widening of existing access roads for equipment transport, crane assembly areas, turning radius improvements at access roads and public road intersections, laydown areas, and turbine repowering activities within the construction easements. Areas temporarily disturbed by construction activities will be re-graded to original contours and revegetated with native seed mixes, crops, or as otherwise noted in the land use agreement. In areas where soil compaction occurred from construction activities, areas will be uncompacted, topped with topsoil, and revegetated.

Impacted areas will be monitored to ensure revegetation. Stormwater BMPs, such as silt fence and straw wattle, will not be removed until at least 70 percent revegetation/regrowth has occurred, unless the area is in a tillable agricultural field. If the area is in tillable agricultural field, a cover crop will be planted to minimize soil loss.

All temporary road radius improvements and temporary culverts will be removed and restored as turbines become mechanically complete. For any section of state, county, or township road used as a haul route, the roadway will be restored to its pre-construction state or better, as negotiated

from road use agreements. This may consist or re-grading, re-paving, enhancing the shoulder of the road or enhancing the segment of roadway as agreed upon by Xcel Energy and the responsible road authority.

10.6 OPERATION AND MAINTENANCE OF PROJECT

Xcel Energy will be responsible for O&M of the Project upon final turnover. O&M will be conducted by Xcel Energy consistent with applicable North American Electric Reliability Corporation Reliability Standards. There will be 24 hours per day, 7 days a week operational monitoring of the Project through SCADA. The O&M crew will consist of 12 full-time staff who largely will be wind technicians (i.e., technicians who carry out the maintenance on the turbines) along with a site supervisor. These workers will work out of the Project O&M building.

Turbines and the substation are monitored remotely by an O&M contractor 24 hours a day at the O&M Contractor's monitoring center. Faults are reset when possible to ensure high turbine availability. Wind technicians are called out on non-resettable faults based on time of day and wind conditions. Certain turbine data are monitored for abnormalities at an Xcel Energy Maintenance and Diagnostic Center in Denver, Colorado.

Engineers also provide performance and reliability optimization using various methods and replicate best practices across the fleet. Fleet O&M is focused on prevention rather than an event response philosophy. Production assurance engineers and wind fleet team major component subject matter experts support fleet level O&M. It is the O&M staff's responsibility to provide root cause and fleet risk analyses, as well as to provide mitigation planning to assure countermeasures are performed on a scheduled basis, which serves to maximize production.

Facility maintenance is a combination of time based and predictive maintenance schedules and is also modified as needed based on engineering decisions. On-site service and maintenance activities include routine inspections, preventive maintenance, component replacements, parts inventory, and unscheduled maintenance and repairs of wind turbines, pad-mount transformers, electrical power network, data communication systems, safety/protection systems, met towers, and radio communications systems. Scheduled time-based turbine maintenance is performed on lower wind days whenever possible to maximize site output on high wind days. Substation and collection system maintenance is scheduled in the summer during low wind periods. Spare parts are kept on-site to address long lead times, and frequently used items are kept in stock to ensure that the failed equipment is returned to service as quickly as possible.

10.7 COSTS

The Capital Expenditure for the Project is currently estimated to be approximately $215 million and includes all costs of development, design, and construction. Ongoing O&M costs and administrative costs are estimated to be approximately $4.7 to $5.7 million per year, including payments to landowners for wind lease and easement rights.

10.8 SCHEDULE

Pending receipt of all required approvals, Xcel Energy plans to begin construction of the Repower Project in May 2025. Construction is anticipated to last between 8-10 months. The Repower Project is anticipated to begin commercial operation in December 2025.

10.9 ENERGY PROJECTIONS

A net capacity factor of approximately 51.3 percent is expected annually for the Project. An average annual output of 900,294 MWh is anticipated, which is a 10.7 percent increase from the pre-construction energy production report from 2014 using the V100 2.0 MW turbine model.

10.9.1 Wake Loss

Turbine locations will not be changed as part of the Repower Project. Base case wake loss calculations from pre-construction, using the V100 2.0 MW turbine model, is 7.4 percent. The energy production estimate for the Vestas V100 base case was 4.6 percent (which did not include wind farm blockage which was a 2018 industry learning). The Repower Project is expected to have wake effect losses of 8.0 percent. A wake loss analysis for the Repower Project will be provided as part of the pre-construction filings required by the Site Permit.

11.0 DECOMMISSIONING AND RESTORATION

On October 16, 2015, Xcel Energy filed a Decommissioning Plan for the Pleasant Valley Wind Project that addressed decommissioning and restoration. The original project will not be decommissioned; it will be repowered. As part of the repowering process, either the existing blades and other components or the entire nacelle will be removed as described in Section 1.5 of this Application. The Xcel Energy equipment supplier will coordinate with the appropriate agencies for responsible recycling or disposal of those components. The remaining materials will be reduced to transportable size and removed from the site for disposal. Materials will be disposed of in a suitable disposal facility. Section 10.5 of this Application describes Post Construction Clean-up and Site Restoration.

Project decommissioning and restoration costs will change as a result of repowering. To address these changes, Xcel Energy prepared an updated decommissioning and restoration plan in February 2022 to reflect the Repower Project (Appendix J).

11.1 ANTICIPATED LIFE OF THE PROJECT

Xcel Energy estimates the service life of the Repower Project to be approximately 25 additional years.

11.2 ESTIMATED DECOMMISSIONING COSTS IN CURRENT DOLLARS

Xcel Energy estimates that net decommissioning cost (estimated cost of dismantling and removal less the salvage value) for the wind farm after the Repower Project is complete at $324,112 per turbine in 2021 dollars.

11.3 METHOD FOR ENSURING THAT FUNDS ARE AVAILABLE FOR DECOMMISSIONING

Xcel Energy will be responsible for all costs associated with decommissioning the Pleasant Valley Wind Project. To ensure that there is an adequate recovery of future decommissioning and restoration costs, a negative net salvage rate is included in the calculation of the depreciation expense rate for the production assets in this Project. The net salvage rate reflects the net of the estimated decommissioning costs and any offsetting proceeds from the salvaging and/or recycling of certain generation equipment, such as the towers, cables, and other material. The net salvage rate is negative in this case because the forecasted costs of decommissioning the facility are higher than the expected salvage proceeds.

In Docket No. E,G002/D-19-723 (the 2020 Annual Review of Remaining Lives), Xcel Energy has proposed a net salvage percent of -11.7 percent for the Pleasant Valley Wind Project. As per Commission order, every five years Xcel Energy is required to perform a comprehensive dismantling study on all electric generation plants. The most recent study was filed in in the 2020 Annual Review of Remaining Lives (Docket No. E,G002/D-19-723) and included all plants in-service as of April 2020. Plants added after that date will be incorporated in the next dismantling study to be performed in 2025.

11.4 METHOD FOR UPDATING THAT FUNDS ARE AVAILABLE AND UPDATING DECOMMISSIONING COSTS

As stated above, Xcel Energy is required to perform a comprehensive dismantling study on all electric generation plants. The most recent study was filed in 2020; the next study will be performed in 2025.

11.5 ANTICIPATED METHODS OF SITE DECOMMISSIONING AND RESTORATION

Decommissioning of the site will include: (1) removal of all turbines and towers; (2) removal of all pad mounted transformers; (3) removal of all above-ground distribution facilities; (4) removal of foundations to a depth of four feet below grade; and (5) removal of surface road material and restoration of the roads and turbine sites to previous conditions to the extent feasible, consistent with the landowner's desires. Removed components will either be scrapped and properly disposed of or recycled. The determination will be made based on the expected market for the used components.

Removal and restoration obligations shall be completed within 18 months, and in general accordance with the requirements of Minnesota Rules 7854.0500, subp. 13, and applicable county requirements.

12.0 IDENTIFICATION OF OTHER POTENTIAL PERMITS

Xcel Energy will be responsible for undertaking all required environmental review and will obtain all permits and licenses that are required following issuance of the LWECS Site Permit. The potential permits or approvals that have been identified as being required for the construction and operation of the Project are shown in Table 12-1. Copies of agency correspondence to date are provided in Appendix D.

Table 12-1
Potential Permits and Approvals

Administering Agency	Permit, Approval, or Consultation	Status and Applicability to the Project
Federal		
U.S. Army Corps of Engineers	Wetland Delineation Approvals	Xcel Energy has conducted a desktop review of wetlands and potential impacts with the MNDNR update to National Wetlands Inventory data. Based on this desktop data, the Project will fall under the impact threshold for either a Nationwide Permit or Minnesota Regional General Permit. Prior to construction, Xcel Energy will conduct wetland delineations to confirm wetland boundaries and impacts based on final design.
	Jurisdictional Determination	
	Federal Clean Water Act (CWA) Section 404	
U.S. Fish and Wildlife Service	Review for Threatened and Endangered Species	Based on a review of federally listed species, a Take Permit is not anticipated for the Project.
	Eagle Take Permit (ETP)	Xcel Energy will coordinate with USFWS on the need for either an amendment to the existing ETP or a new ETP.
Environmental Protection Agency (Region 5) in coordination with the Minnesota Pollution Control Agency (MPCA)	Spill Prevention, Control and Countermeasure Plan	The Construction Contractor will develop a Spill Prevention, Control and Countermeasure Plan for use during construction and operation of the Project to minimize risk of site contamination.
Federal Aviation Administration	Form 7460-1 Notice of Proposed Construction or Alteration (Determination of No Hazard)	Xcel Energy will submit Form 7460-1 for the turbine locations at least 18 months prior to the start of construction to initiate FAA review of the turbines.
	Notice of Actual Construction or Alteration (Form 7460-2)	After construction is complete, Xcel Energy will submit Form 7460-2 for the turbine locations.
Federal Communications Commission (FCC)	Radio Station Authorization/License	Typically required for operation of communications tower associated with ADLS. If needed, Xcel Energy will obtain prior to operation of ADLS communications tower.

Table 12-1
Potential Permits and Approvals

Administering Agency	Permit, Approval, or Consultation	Status and Applicability to the Project
State of Minnesota Approvals		
Board of Water and Soil Resources (BWSR)	Wetland Conservation Act (WCA) approvals	Xcel Energy has conducted a desktop review of wetlands and potential impacts with the MNDNR update to NWI data. Based on this desktop data, the Project will fall under the impact threshold for either a Nationwide Permit or Minnesota Regional General Permit. Prior to construction, Xcel Energy will conduct wetland determination to confirm wetland boundaries and impacts based on final design. A WCA No Loss Determination may be pursued based on coordination with Soil and Water Conservation Districts (SWCDs).
Minnesota Public Utilities Commission	Site Permit Amendment for Large Wind Energy Conversion System	Submitted April 29, 2022.
Minnesota State Historic Preservation Office (SHPO)	Minnesota Statute 138; Cultural and Historic Resources Review and Review of State and National Register of Historic Sites and Archaeological Survey	Xcel Energy has coordinated with SHPO, conducted a literature review of the Project Area. Xcel Energy will conduct surveys for previously unidentified cultural resources in previously unsurveyed areas in summer 2022. Xcel Energy will coordinate with SHPO on the protocol and any potential mitigation.
MPCA	Section 401 Water Quality Certification	Concurrent with Section 404, CWA – Xcel Energy will meet the Minnesota conditions.
	National Pollutant Discharge Elimination System (NPDES) Permit – MPCA General Stormwater Permit for Construction Activity	After the Site Permit is Ordered by the Commission, Xcel Energy will submit the NPDES permit application. The permit is required to be submitted within 30 days of the start of construction.
	Very Small Quantity Generator License – Hazardous Waste Collection Program	To be obtained prior to construction, if necessary.

Table 12-1
Potential Permits and Approvals

Administering Agency	Permit, Approval, or Consultation	Status and Applicability to the Project
	Aboveground Storage Tank Notification Form	To be obtained prior to construction, if necessary.
Minnesota Department of Natural Resources (MNDNR)	License to Cross Public Waters	A License to Cross Public Waters is not anticipated to be needed, as no changes to the Project electrical collection system are planned.
	Native Prairie Protection Plan	Xcel Energy will prepare a Native Prairie Protection Plan.
	General Permit for Water Appropriations (Dewatering)	To be obtained prior to construction, if necessary.
	Public Waters Work Permit	A Public Waters Work Permit is not expected to be needed, as existing access roads will be used and no crane paths are planned as part of the Project.
Minnesota Department of Transportation (MNDOT)	Utility Permits on Trunk Highway Right-of-way (Long Form No. 2525)	To be obtained prior to construction.
	Oversize/Overweight Permit for State Highways	To be obtained prior to construction.
	Access Driveway Permits for MNDOT Roads	To be obtained prior to construction.
Local Approvals		
Mower County	Right-of-way permits, crossing permits, driveway permits for access roads, oversize/overweight permits for County Roads	Xcel Energy will enter into a Development, Road Use, and Drainage Agreement prior to construction.
Mower County SWCD	WCA approvals	Xcel Energy has conducted a desktop review of wetlands and potential impacts with the MNDNR update to NWI data. Based on this desktop data, the Project will fall under the impact threshold for either a Nationwide Permit or Minnesota Regional General Permit. Prior to construction, Xcel Energy will conduct wetland determination to confirm wetland boundaries and impacts based on final design. A WCA No Loss Determination may be

Table 12-1
Potential Permits and Approvals

Administering Agency	Permit, Approval, or Consultation	Status and Applicability to the Project
		pursued based on coordination with the Mower County SWCD.
Dodge County	Right-of-way permits, crossing permits, driveway permits for access roads, oversize/overweight permits for County Roads	Xcel Energy will enter into a Development, Road Use, and Drainage Agreement prior to construction.
Dodge County SWCD	WCA approvals	Xcel Energy has conducted a desktop review of wetlands and potential impacts with the MNDNR update to NWI data. Based on this desktop data, the Project will fall under the impact threshold for either a Nationwide Permit or Minnesota Regional General Permit. Prior to construction, Xcel Energy will conduct wetland determination to confirm wetland boundaries and impacts based on final design. A WCA No Loss Determination may be pursued based on coordination with the Dodge County SWCD.
Townships	Right-of-way permits, crossing permits, driveway permits for access roads, oversize/overweight permits for township roads	Xcel Energy will enter into a Development, Road Use, and Drainage Agreement prior to construction.

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