SITE PERMIT AMENDMENT APPLICATION

Community Wind South Repower Project

Nobles County, Minnesota

SEPTEMBER 30, 2021

PREPARED FOR:

Greenbacker
RENEWABLE ENERGY COMPANY

PREPARED BY:

Westwood

Application to the Minnesota Public Utilities Commission for a Site Permit Amendment to Repower the 30.75 MW Community Wind South Large Wind Energy Conversion System

Community Wind South Repower Project

Nobles County, Minnesota

MPUC Docket Number: IP-6871/WS-11-863

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September 30, 2021

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Project Location:	Nobles County
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ACRONYMS

ACRONYM	DEFINITION
2012 Site Permit	May 1, 2012 Commission Order Granting Site Permit
AADT	Annual Average Daily Traffic
Act	Minnesota Wind Siting Act
ADLS	Aircraft Detection Lighting System
Applicant	Zephyr Wind, LLC
Application	Site Permit Amendment Application for Community Wind South Repower Project
Application Guidance	Application Guidance for Site Permitting of Large Wind Energy Conversion Systems in Minnesota (Department of Commerce, 2019)
ASOS	Automated Surface Observing System
BBCS	Bird and Bat Conservation Strategy
BMPs	Best Management Practices; prevents soil erosion and sedimentation
Capacity	The capability of a system, circuit, or device for storing electronic charge
CEG	Consulting Engineers Group
Corps	US Army Corps of Engineers
CN	Certificate of Need
CRP	Conservation Reserve Program
dB	Decibels
dB(A)	A-weighted decibel
DOC-EERA	Department of Commerce, Energy Environmental Review and Analysis
EMF	Electric and Magnetic Field
EPC	Engineering, Procurement and Construction
EQIP	Environmental Quality Incentive Program
FAA	Federal Aviation Administration
FBCI	Feathering below cut-in speed
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FMP	Foundation mounting piece
ft	foot/feet
Gearbox	An assembly of parts transmitting power between the low-rpm and high-rpm electric generator designed to transfer torsional power from the wind turbine rotor to the electric generator.
Generator	A machine by which mechanical energy is changed into electrical energy
GIA	Generator Interconnection Agreement
Greenbacker	Greenbacker Renewable Energy Company LLC
HDD	Horizontal directional drilling
Hub	The central component of the wind turbine which connects the rotors to the generator.
IAV	inter-annual variability
IBA	Important Bird Area

ACRONYM	DEFINITION
Interconnection	Location of project connection to the power grid.
IPaC	Information Planning and Consultation
IRAC	Interdepartment Radio Advisory Committee
kcmil	kcmil means 1,000 circular mils, which is a unit used to measure the area of the circular cross section of a wire.
kV	kilovolt
kW	kilowatt
LWECS	Large Wind Energy Conversion System
MCBS	Minnesota County Biological Survey
MDH	Minnesota Department of Health
MW	megawatt
MWh	megawatt-hour
m	meter
met	meteorological
m/s	meters-per-second
MISO	Midcontinent Independent Transmission System Operator
MNDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MPUC or Commission	Minnesota Public Utilities Commission
MWFRA	Migratory Waterfowl Feeding and Resting Areas
Nacelle	A streamlined enclosure (as for an engine), which houses the gearbox, generator, brake, cooling system and other electrical and mechanical systems
NOAA	National Oceanic and Atmosphere Administration
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NTIA	National Telecommunications and Information Administration
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
O&M	Operations and maintenance facility
Phase I	Cultural Resources Reconnaissance Survey – physical inspection and identification of cultural resources within a specific area.
Pitch	The action or a manner of pitching; especially an up-and-down movement
POI	Point of Interconnection
PPA	Power Purchase Agreement
Project and Repower Project	Community Wind South Repower Project
PWI	Public Waters Inventory
Repower (Partial)	Replacing select turbine or plant components
Repower (Full)	Complete dismantling and replacement of turbines and equipment
Repowering	Replacing select turbine or plant components
RF	Radio Frequency
Rotor	The rotor consists of three blades mounted to a rotor hub
RD	Rotor Diameter: Diameter of the rotor from the tip of a single blade to the tip of the opposite blade
RIM	Reinvest in Minnesota

ACRONYM	DEFINITION
SCADA	Supervisory Control and Data Acquisition (communications technology)
SHPO	Minnesota State Historic Preservation Office
SPCC	Spill Prevention Control and Countermeasure
Step-up Transformer	A transformer that increases voltage
Substation	A subsidiary station in which electric current is transformed
SWCD	Soil and Water Conservation District
SWPPP	Storm Water Pollution Prevention Plan
TI	Turbulence Intensity – a measure of the standard deviation of wind speed over an hour, divided by the mean for the same time period
Transformer	An electrical device by which alternating current of one voltage is changed to another voltage
USFWS	US Fish and Wildlife Service
WCA	Wetland Conservation Act
Wind Farm	Community Wind South Repower Project
WMA	Wildlife Management Area
WTG	Wind Turbine Generators

COMPLETENESS CHECKLIST

Minnesota Rule 7854.0500	Required Information	Application Sections
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.	Under separate cover
B.	The complete name, address, and telephone number of the applicant and any authorized representative.	Section 1.1
C.	The signature of the preparer of the application if prepared by an agent or consultant of the applicant.	Under separate cover
D.	The role of the permit applicant in the construction and operation of the large wind energy conversion system (LWECS).	Section 1.1
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.	Section 1.1
F.	The operator of the LWECS if different from the applicant.	Section 1.1
G.	The name of the person or persons to be the permittees if a site permit is issued.	Section 1.1
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.	Section 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.	Section 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.	Section 1.2
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.	Section 3.0
Subpart 4.	Proposed site. The applicant shall include the following information about the site proposed for the LWECS and any associated facilities:	
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.	Section 4.1 Map 1

Minnesota Rule 7854.0500	Required Information	Application Sections
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 (10) wind rose, in eight or more directions	Section 9.0
C.	Other meteorological conditions at the proposed site, including the temperature, rainfall, snowfall, and extreme weather conditions.	Section 9.0
D.	The location of other wind turbines in the general area of the proposed LWECS.	Section 8.22 Section 9.1.13 Map 7
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.	Section 4.6 Section 7.0 Map 4
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.	Section 5.1 Map 2
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.	Section 5.2
C.	A description of the LWECS electrical system, including transformers at both low voltage and medium voltage.	Section 5.4
D.	A description and location of associated facilities.	Section 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:	Section 8.0
A.	Demographics, including people, homes, and businesses	Section 8.1
B.	Noise	Section 8.3
C.	Visual Impacts	Section 8.4
D.	Public services and infrastructure	Section 8.5
E.	Cultural and archaeological impacts	Section 8.6
F.	Recreational resources	Section 8.7
G.	Public health and safety, including air traffic, electromagnetic fields, and security and traffic	Section 8.8
H.	Hazardous materials	Section 8.9
I.	Land-based economics, including agriculture, forestry, and mining	Section 8.12
J.	Tourism and community benefits	Section 8.11
K.	Topography	Section 8.13

Minnesota Rule 7854.0500	Required Information	Application Sections
L.	Soils	Section 8.14
M.	Geologic and groundwater resources	Section 8.15
N.	Surface water and floodplains resources	Section 8.16
O.	Wetlands	Section 8.17
P.	Vegetation	Section 8.18
Q.	Wildlife	Section 8.19
R.	Rare and unique natural resources	Section 8.20
Subpart 8.	Construction of project. The applicant shall describe the manner in which the project, including associated facilities, will be constructed.	Section 10.0
Subpart 9.	Operation of project. The applicant shall describe how the project will be operated and maintained after construction, including a maintenance schedule.	Section 10.6
Subpart 10.	Costs. The applicant shall describe the estimated costs of design and construction of the project and the expected operating costs.	Section 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.	Section 10.8
Subpart 12.	Energy projections. The applicant shall identify the energy expected to be generated by the project.	Section 10.9
Subpart 13.	Decommissioning and restoration. The applicant shall include the following information regarding decommissioning of the project and restoring the site:	Section 10.10
A.	The anticipated life of the project.	Section 10.10.1
B.	The estimated decommissioning costs in current dollars.	Section 10.10.2
C.	The method and schedule for updating the costs of decommissioning and restoration.	Section 10.10.3
D.	The method of ensuring that funds will be available for decommissioning and restoration.	Section 10.10.4
E.	The anticipated manner in which the project will be decommissioned, and the site restored.	Section 10.10.5
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.	Section 11.0

1.0 APPLICANT INFORMATION AND PROJECT BACKGROUND

1.1 Applicant Description

Zephyr Wind, LLC, respectfully submits this application (Application) to the Minnesota Public Utilities Commission (Commission or MPUC) for a site permit amendment to repower the currently operating 30.75 megawatt (MW) Community Wind South Project (CWS Project or Project). The CWS Project is a large wind energy conversion system (LWECS), as defined in the Wind Siting Act, Minn. Stat., Section 216F (2020). The CWS Project is located in Summit Lake and Larkin townships, within Nobles County in southwestern Minnesota (Figure 1).

On May 1, 2012, the Commission issued a site permit to CWS Wind Farm, LLC for the Project. At that time, the Project was owned 95% by CWS Wind Farm, LLC and 5% by Community Wind South Project, LLC which, in turn, was owned by three separate limited liability companies (LLCs) that also owned Summit Transmission, LLC. Community Wind South Project, LLC, the three LLCs, and Summit Transmission, LLC were subsequently merged into a single entity called Zephyr Wind, LLC (Zephyr or Applicant) and Zephyr became the direct owner of 100% of the Project. The Commission approved transfer of the Project's site permit to Zephyr on July 18, 2012.

Currently, Zephyr is a subsidiary of Greenbacker Renewable Energy Company, LLC. Greenbacker is a publicly reporting, non-traded limited liability company that acquires and manages income-generating renewable energy and energy efficiency projects, and other energy-related businesses. With a portfolio of 308 assets, as of August 31, 2021, Greenbacker's gross investments totaled an aggregate generating capacity of 2.2 GW comprised of 330.8 MW of wind facilities, 1,821.9 MW of solar facilities, 12.0 MW of biomass, and 16.0 MW of battery storage. Greenbacker acquired Zephyr in August 2019. As a result, Greenbacker now owns 100 percent of Zephyr, and Zephyr owns 100 percent of the Project.

In addition, Greenbacker provides operations and asset management services to wind and solar projects across the United States. Greenbacker has the ability to be the long-term operator and asset manager for the projects it owns. Greenbacker currently owns several projects in nearby states and recently acquired two other Minnesota wind facilities – the 25.3 MW Ridgewind project and the 5.4 MW WindShare project.

1.2 Project Background, Purpose, and Need

On May 1, 2012, the Commission issued an order granting a site permit (2012 Site Permit) to CWS Wind Farm, LLC to construct the CWS Project. The 2012 Site Permit granted approval for construction of up to a 30.75 MW LWECS and associated facilities. In accordance with the 2012 Site Permit, Zephyr installed 15 REpower MM92 turbines (2.05 MW) with a hub height of 98.5 m (323 ft) within a 3,111-acre area. The CWS Project was commissioned in 2012 and has a 20-year Power Purchase Agreement (PPA) with Northern States Power, a wholly owned subsidiary of Xcel Energy, with 12 years remaining. The 2012 Site Permit expires May 1, 2042, and a copy is provided in Appendix B for reference.

Zephyr is seeking an amendment of the 2012 Site Permit to allow repowering of all 15 turbines (Repower Project) to improve overall turbine reliability and extend the service life of the turbines

(Figure 1). REpower (which later became Senvion) is now bankrupt, so the Project is seeking to replace the current turbines with components manufactured by an operating turbine supplier with a proven international track record.

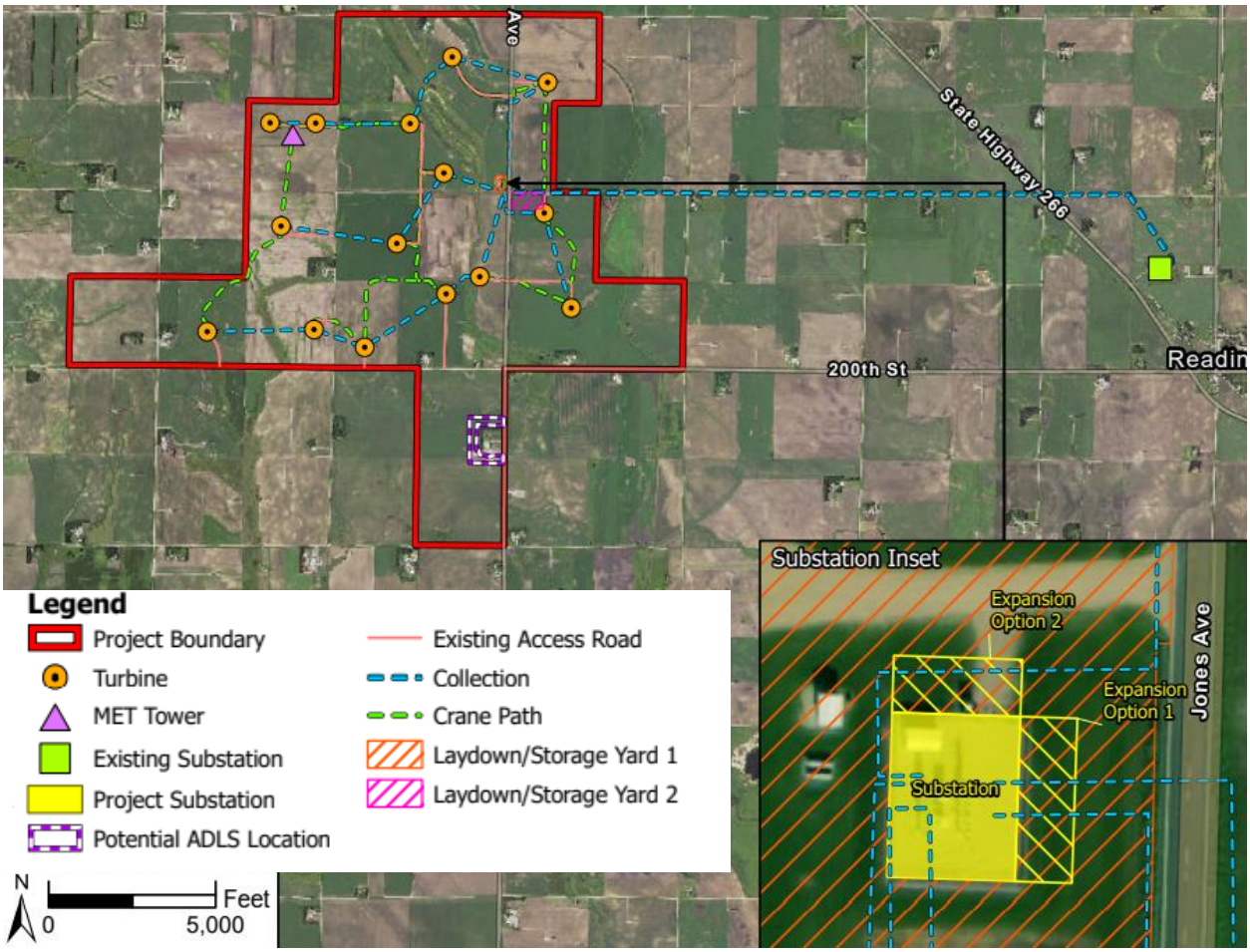

Figure 1: Existing Project Layout

Zephyr is proposing to repower the existing REpower MM92 turbines using Vestas V110 turbines. The repower package will require removing the old nacelles and blades, installing an adapter on top of the existing towers, followed by placement of new nacelles and blades. As part of the repower process, there will be a set of REpower components (blades, nacelles, pad mount transformers, and internal electrical components) that require disposal and/or recycling. Disposal will take two possible paths: scrap by the project Engineering, Procurement and Construction (EPC) contractor, or sell the used components to another REpower project owner. The determination will be made based on the expected market for the used components. The Applicant is pursuing several options to recycle the turbine blades instead of sending those components to a landfill. Additionally, Vestas anticipates the machines will use a dry transformer system compared to the oil-filled pad mount transformers currently in use.

With the Vestas repower package, the repowered 2.2 MW turbines will replace the existing 2.05 MW turbines. The 2.2 MW configuration upgrades the wind turbines to a new, more efficient

configuration with a 33 MW nameplate capacity. Despite the higher capacity rating, the project will be governed at the Point of Interconnect (POI) to maintain power delivery to the grid at or below the permitted 30 MW interconnection agreement with the Midcontinent Independent System Operator (MISO). The proposed repowering of the 15 existing REpower MM92 turbines includes increasing the blade length from 92.5 m to 110 m, increasing the hub height from 98.5 m to 105.05 m, and increasing the rated capacity from 2,050 kW to 2,200 kW. The increased hub height includes a 7 m adapter added to the existing tower. Between the longer rotors and hub height adapter, the overall turbine height will increase by approximately 50 feet. The Vestas V110 model was selected for its increased rotor sweep area and hub height, reliability, and extended turbine operational life, while still being able to utilize the existing foundations and towers. The longer Vestas blades allow them to convert more wind energy, and the increased hub height of the Vestas will encounter faster wind speeds than the REpower because wind speeds increase with height. Based on these upgrades, the Repower Project is expected to produce more energy per year than with the existing REpower turbines. The CWS Project's POI will not change.

Zephyr is requesting amendments to the 2012 Site Permit to authorize the Repower Project and is providing information to the Commission in support of this request. Zephyr submits that the minor changes discussed within this Application do not substantively change the findings of the 2012 Site Permit. Zephyr has reviewed the 2012 Site Permit and provided supplemental information where warranted. With this Application, Zephyr respectfully requests Commission approval for an amendment to the 2012 Site Permit to support the repowering process with several minor modifications that are discussed in detail within this Application.

It is important to note that the previously permitted locations of turbine towers, access roads, collection lines, and other supporting infrastructure will remain the same, and the Repower Project will not result in a larger facility boundary, nor will it require reinforcement of the towers. Some minor upgrades to the electrical collection system may be needed to support the higher capacity turbines. Additionally, the project substation/switchyard may require an expansion on one side to install new capacitor banks for each medium voltage circuit to meet voltage and power factor requirements as required by MISO.

A large construction crane will be used to remove the current rotors and nacelles, requiring a temporary crane path roughly 80 to 100 feet wide to each turbine. It is the Applicant's intent to use the original crane paths to the degree practicable to minimize impacts to new areas. Some minor upgrading of public roadways and intersections may be needed to allow for delivery of the replacement rotors and nacelles to each turbine location. Two to three temporary 5 to 10 acre laydown yards are planned on agricultural land to stage the turbine components prior to installation and for other temporary storage needs. The exact number and size of the laydown areas will be determined closer to construction.

Zephyr anticipates construction work will begin in spring 2022 and is expected to take up to seven months.

The Applicant has received a determination from MISO that the proposed Repower Project would not constitute a substantial modification and therefore the Project can proceed under an amended Generator Interconnection Agreement (GIA). The amended GIA is expected to be executed just

prior to commencement of construction. The maximum power delivered to the POI will remain the same (30 MW). The GIA will be amended to reflect the new equipment replacing the existing turbine generators. Zephyr anticipates that the term of the amended GIA will remain the same - 25 years from the effective date with automatic one-year extensions until the Repower Project is decommissioned. Confirmation of execution of the GIA amendment can be e-filed with the Commission along with other pre-construction compliance filings.

1.3 Issued Site Permit and Changes Requested

In addition to evaluating the proposed Repower Project against current *Application Guidance for Site Permitting of Large Wind Energy Conversion Systems in Minnesota* (Department of Commerce, 2019) (*Application Guidance*), the 2012 Site Permit was evaluated for existing permit conditions, and conditions that might need to be modified. Appendix C provides a comprehensive summary of the 2012 Site Permit conditions, and whether they can be satisfied by the Repower Project or require modification. While the majority of the 2012 Site Permit requirements can be satisfied under the Repower Project, Zephyr respectfully requests the Commission consider the following modifications within the amended Site Permit in addition to some statutory reference updates:

1. Term. Zephyr requests that the term of the permit be extended so that it extends 30 years from the date of approval of the amendment.
2. Site Permit Section: Change Applicant to Zephyr Wind, LLC and update nameplate capacity 33 MW.
3. Section 1.0 – Project Description: The Applicant requests the Project Description be updated to reflect the proposed Repower Project.
4. Section 3.0 – Application Compliance: Revise date of the site permit amendment application.
5. Section 4.9 – Request change of allowable tower height to 345 feet to accommodate the 7 m adapter.
6. Section 13.1 – Remove requirement to comply with Nobles County Setback Regulations or, in the alternative, grant waivers for the facilities described in Section 8.2.1.2 below.

2.0 CERTIFICATE OF NEED

A Certificate of Need (CN) is required for all "large energy facilities" as defined in Minn. Stat., Section 216B.2421, Subdivision 2(1) (2020), unless the facility falls within a statutory exemption from the CN requirements. The proposed Repower Project does not meet the definition of a "large energy facility" because it is less than 50,000 kW in size and its transmission lines will be at 34.5 kV, which is below the 100 kV threshold. In addition, the Repower Project would be exempt as a qualifying facility pursuant to Minn. Stat., Section 216B.243, Subdivision. 8(a)(1) (2020).

3.0 STATE POLICY

Pursuant to Minn. Stat. Section 216F.03 (2020), the Applicant will further state policy by repowering and operating the Repower Project in a systematic manner compatible with environmental preservation and sustainable development to utilize the site's wind resources more

efficiently. The Applicant plans to repower turbines to maximize energy production while minimizing impacts on land resources. Through the Repower Project, the Applicant is also extending the life of the CWS Project, which avoids completely rebuilding a new project and decommissioning existing facilities that continue to have value.

This Application has been prepared following the Application Guidance and provides information necessary to comply with Minnesota Rules (Minn. R.), Chapter 7854 and Minn. Stat., Section 216F (2020).

4.0 PROJECT DESCRIPTION AND OVERVIEW

4.1 Project Description and Location

The Project is located on approximately 3,111 acres of privately owned and leased land in Nobles County (Table 4.1), generally southwest of State Highway 266 (Map 1).

Table 4.1: Sections in Project Area

Township	Range	Sections
103N	R41W	17-20; 30
103N	R42W	13; 23-24

The Project will utilize the existing foundations and towers, and a majority of the electrical infrastructure and access roads.

Zephyr has an executed GIA with MISO for a 25-year term with automatic one-year extensions but is in the process of negotiating an amended GIA to reflect the Repower Project. The substantial modification review process with MISO is complete and an amendment to the GIA would be executed just prior to commencement of construction. The overall capacity at the POI will not change.

Only minor facilities upgrades will be required for the Repower Project, which currently have all of the needed equipment and software to comply with the requirements of the GIA and what Zephyr anticipates will be the requirements of the amended GIA.

4.2 Size of the Project Area in Acres

Zephyr is not changing the Project boundary as a result of the Repower Project. The 2012 permitted site area is about 3,111 acres in size as shown on Map 2. Typical landscapes within the Repower Project area are shown on Map 3 and consist largely of agricultural fields and wind energy infrastructure. Map 4 shows the existing wind easements and parcels Zephyr has signed with landowners.

4.3 Rated Capacity

Repowering the existing 15 REpower MM92 turbines with the Vestas V110 turbines will result in an increased rating capacity from 2,050 kW to 2,200 kW. The 30.75 MW nameplate capacity will

increase to 33 MW. However, the Repower Project will not exceed the 30 MW interconnection agreement at the POI. The Repower Project will utilize a power plant controller, which will function to curtail the project before it exceeds the 30 MW limit. The Repower Project has been effectively oversized from a nameplate standpoint to capture more energy at lower wind speeds. This will allow the project to generate power more consistently up to the 30 MW interconnection limit.

4.4 Number of Turbine Sites

Zephyr is actively pursuing repowering approval from the Commission for all 15 of the currently operating turbines.

4.5 Meteorological Towers

The CWS Project initially used data from a single 60 m (197 ft) tall meteorological (met) tower that was installed in 2007 and was deployed as part of the original preconstruction monitoring efforts. This met tower was decommissioned and removed prior to initial turbine assembly. A new permanent, free standing, tower was installed between Turbines T-12 and T-13 in accordance with the International Electrotechnical Commission (IEC) guidelines for power performance testing of wind turbines. The Applicant plans to raise the existing permanent met tower to the new 105.05m hub height and add some additional instrumentation. The upgraded met tower will stay in place for the duration of the project.

4.6 Percent of Wind Rights Secured

Zephyr's existing wind lease agreements allow for the activities required for the Repower Project. As shown on Map 4, lease agreements are in place for all the 15 wind turbine locations. While Zephyr is seeking amendments to leases in some cases to extend their terms, no amendments to the existing leases are necessary to accommodate the Repower Project. However, several of the 3 RD x 5 RD wind access buffer setbacks extend outside the current project boundary within lands encumbered by wind lease agreements for the Nobles Wind Project owned and operated by Xcel Energy. Originally, the CWS Project obtained rights to these overlapping wind access buffer setback areas via an acknowledgement and consent from Xcel. For the Repower Project, Zephyr is updating its approach. For parcels impacted by both projects, Zephyr is coordinating closely with Xcel Energy to finalize a mutual consent agreement and to obtain non-exclusive wind rights agreements directly from the affected landowners. Via this process, with Xcel Energy's consent, Zephyr is obtaining agreements from landowners with existing Nobles Wind Project agreements with property that also falls with the Repower Project's wind access buffer setback areas. These landowners will be compensated for wind rights under two separate agreements – one with Zephyr and one with Xcel. Accordingly, all affected landowners understand that two different wind projects are relying upon wind rights from their property and have had the opportunity to negotiate terms and compensation for the use of those wind rights with the owners of each of the two wind projects. All of Zephyr's wind rights agreements will be finalized prior to starting construction. The 3 RD x 5 RD wind access buffer areas for the Repower Project changed only slightly from the original areas due to the way the 3 RD x 5 RD wind access buffer setbacks are currently evaluated compared to 2012 methods.

4.7 Role of Applicant in Construction and Operation

Zephyr plans to construct, own, and operate the Wind Farm after the Repower Project, but may opt to sell the facility at some point in the future.

4.8 Ownership Statement

As of the date of this submittal, Zephyr Wind, LLC and their principals and affiliates own the CWS Project and recently acquired upstream ownership interests in the 25.3 MW Ridgewind project located in Murray and Pipestone Counties and the 5.4 MW WindShare project located in Murray County, Minnesota. Both projects are Large Wind Energy Conversion Systems (LWECS) as defined in Minn. Stat. §216F.01, subd. 2. The Ridgewind project has an LWECS Site Permit issued February 21, 2007 in Minnesota PUC Docket No. IP 6603/WS-06-1327. The Windshare project is permitted via conditional use permits issued by Murray County in 2005.

4.9 Compliance Status of Project

Prior to submittal of this Application, Zephyr completed an internal audit of its compliance with the 2012 Site Permit. Zephyr has largely complied with all 2012 Site Permit conditions, although the internal audit identified several compliance filings that had not been submitted. These documents were e-filed on January 20, 2021. Zephyr is committed to ensuring ongoing compliance with the Site Permit.

5.0 PROJECT DESIGN

5.1 Description of Project Layout

There is no proposed change to the previously permitted locations of turbine towers, access roads, collection lines, or other supporting infrastructure. A 15-acre area has been added to the repower layout to accommodate an Aircraft Detection Lighting System (ADLS) as recommended by Department of Commerce staff. The Project layout, as it currently exists, is shown on Map 2. The Project consists of 15 currently operating REpower 2.05 MW turbines. The wind turbines are connected via an underground electrical collection system that transfers the generated power to the Project substation/switchyard, located east of turbine T-9 in the central portion of the site. A system of gravel roads leading to each turbine provides access for routine turbine maintenance. Existing Project facilities were strategically sited primarily on agricultural lands to minimize impacts to area resources. Individual components of the Project layout are discussed in greater detail throughout this application. As part of the repowering, the gravel access road leading to turbine T-2 will be shifted slightly in two locations at the request of the landowner to better accommodate agricultural activities. The east-west segment currently diverges slightly from the property line to the north to maximize agricultural production. The north-south segment of the access road to T-2 does not run perfectly north-south. Aligning to true north-south will allow better agricultural use for the landowner. Both locations fall within areas that will be surveyed for natural and cultural resources prior to construction. Additionally, it should be noted that the access road to turbine T-14 was relocated from its originally permitted position at the request of the landowner, as the new alignment facilitated agricultural activities on the parcel. This change was made several years after

the original permit issuance and project COD. Zephyr plans to keep the current location of the access road for the repower.

5.2 Description of Turbines and Towers

Zephyr is requesting the Commission review and approve the repowering upgrades proposed on the existing REpower 2.05 MW turbines using the 2.2 MW Vestas V110 turbines. The 2.2 MW configuration upgrades the wind turbines to a newer, more efficient configuration. Vestas will deliver new nacelles to the site with all new major components (gear box, generator, transformer, etc.). Consequently, Vestas will not require a generator refurbishment station.

Table 5.2 provides a pre- and post-repowering comparison of wind turbine characteristics. The primary differences between the two are the rotor diameter (RD), hub height, and total height. The total height of the turbines will increase by 15.3 m (50 ft), with an RD increase of 17.5 m (58 ft), and a hub height increase of 6.55 m (22 ft). The foundations will remain the same.

Table 5.2: Wind Turbine Characteristics Comparison

Design Features	Existing REpower 2.05 MW Wind Turbines	Repowered Vestas V110 2.2 MW Wind Turbines
Rated Capacity	2,050 kW	2,200 kW
Nameplate Capacity	30.75 MW	33 MW
Hub Height	323 ft (98.5 m)	345 ft (105.05 m)
Adapter	N/A	7 m adapter for Vestas turbines will be installed on top of existing towers
Total Height	475 ft (144.75 m)	525 ft (160.05 m)
Rotor Diameter	303 ft (92.5 m)	361 ft (110 m)
Design Life	Minimum of 20 years	Minimum of 20 years
Cut in Wind Speed	6.7 mph (3 m/s)	6.7 mph (3 m/s)
Power Regulation	The rotor utilizes blade pitch regulation and variable speed operation to achieve optimum power output at all wind speeds. Unit is also equipped with low voltage ride through technology.	The rotor utilizes blade pitch regulation and variable speed operation to achieve optimum power output at all wind speeds. Unit is also equipped with low voltage and over voltage ride through technology.
Generation	2.05 MW per turbine	2.2 MW per turbine
Tower	Multi-coated, conical tubular steel with safety ladder to the nacelle	Multi-coated, conical tubular steel with safety ladder to the nacelle
Nacelle Bedplate	2 part - cast iron front part; girder structure rear part	2 part - cast iron front part; girder structure rear part
Main Bearings	Spherical roller bearings	Spherical roller bearings
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
FAA Lighting	Standard FAA lighting	Standard FAA lighting

5.3 Structural Assessments and Reliability

Structural assessments of the existing foundations were performed by RRC Companies in December 2020 and updated in May 2021. The objectives of the structural assessment were to determine if the existing foundations could accommodate specified design loads for the Vestas V110 wind turbine. The original foundation design was created by RRC (formerly known as Renewable Resource Consultants) in 2012 assuming up to 15 turbines would be constructed using the REpower MM92 turbines. The wind turbine towers utilized a foundation mounting piece (FMP) embedded into the foundation designed by others.

For the Repower Project, RRC analyzed load spectra and Markov fatigue loads to perform all the design checks according to current industry standards using the 58'-6" and 63'-6" foundation designs. A comparison of the extreme and operational "no lift" loads between the original loads and the uprated loads showed the Vesta V110 loads passed all the design checks. An analysis of the fatigue loads also showed the Vesta V110 passed all the fatigue load design checks. RRC concluded the existing 58'-6" and 63'-6" foundation design is suitable for the Vesta V110 turbines. Zephyr will perform visual inspections of the foundation pedestals prior to uprating the turbines to confirm there are no indications of soil movement or concrete damage. The RRC study is provided in Appendix D.

The CWS Project has been operating reliably since 2012, producing the power that was expected each year and it is anticipated that the Repower Project will continue to do so through the end of the PPA term. To date, no issues have arisen that call into question the ability of the plant to continue operating through the end of the PPA and the current 2012 Site Permit term. Associated facilities and improvements, including the foundations, electrical system and roads, continue to perform as designed. The proposed Repower Project is largely driven by current and anticipated future equipment constraints due to the bankruptcy of the existing turbine supplier. In order to continue to operate at high levels of availability, a repower that utilizes equipment from a leading turbine supplier is a prudent investment and ensures that the existing wind infrastructure can be run efficiently for years to come.

Additionally, testing and inspection of associated facilities has been undertaken to ensure the turbine towers, foundations and electrical system can accommodate the repower nacelles and rotors. Vestas is estimating a 20-year post-repower useful life. The following studies have been completed: Wind Turbine Foundation Evaluation Report; and a Wind Turbine Tower Evaluation Report. These are discussed in Section 10.4.

POWER Engineers performed a cable ampacity study on the Repower Project's collection system to evaluate underground cables ampacity against upgraded wind turbine output (Appendix E). Study findings show that a segment of the home run cables within approximately 100-200 feet east of the Nobles substation fence will not have the required ampacity due to mutual heating from Xcel 1250 kcmil cables crossing over the top. The proposed solution to mitigate this issue is to upgrade this segment of the existing CWS Project home run cables to a larger size (i.e.: 1250 kcmil) by possibly using horizontal directional drilling (HDD) and adding some splice boxes/vaults. HDD will possibly require drilling 100-200 linear feet. The boundaries of the area of work will be determined after discussions will Xcel Energy. Alternatively, the Applicant is

pursuing additional soil testing in the area for more accurate thermal resistivity values to revalue the cable ampacities.

5.4 Description of Electrical System

The electrical system is essentially the same as the 2012 permitted project. Each turbine has its own individual step-up transformer located in a separate locked room in the back of the nacelle. The transformer in each nacelle increases the voltage at the turbine terminals to the medium voltage level (34.5 kV) of the buried collector circuits that transmit the power from the turbines to the Project substation. From the Project substation/switchyard, power is sent approximately 3.8 miles east by two sets of underground 34.5 kV cables to the existing Nobles County substation owned by NSP located northwest of Reading, MN.

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, and substation facilities will remain the same.

6.1 Transmission and Project Substations

The Repower Project will not require a new transmission line. The 34.5 kV collection lines from each turbine transformer are routed to the Project substation/switchyard. The power is then routed via two separate feeders to the POI's at the existing Nobles Substation located approximately 3.8 miles east of the Project substation/switchyard. The Nobles Substation is owned by Northern States Power Company and is not affiliated with Zephyr.

The existing Project substation/switchyard is located north of 190th Street and west of Jones Avenue, near turbine T-9. The switchyard includes a small building that houses the control and relaying equipment, station batteries, and SCADA system. The Project substation is monitored by the SCADA system capable of monitoring and controlling most aspects of the substation facility. The Applicant has no plan to move the SCADA, but it will be upgraded to be compatible with the new turbines. The entire substation is enclosed by a looped chain link fence.

The existing Project substation/switchyard may need to be expanded to accommodate the addition of capacitor banks for each medium voltage circuit to meet voltage and power factor requirements once the new Vestas wind turbines are installed. The capacitor banks are standard electrical equipment that are routinely used within a substation to boost the voltage and reactive power output of a wind farm to maintain the limits required at the point of utility interconnection. The new equipment required for the capacitor bank addition will include a 35kV circuit breaker and capacitor bank for each of the two medium voltage circuits, spread footer type foundations, underground conduits and cabling, and lightning protection masts. If the capacitor banks are required, the existing yard footprint will need to be expanded by up to 35 feet on the east or north side of the yard to accommodate the new equipment (see Map 2). The exact location of the capacitor banks is still being determined. The final location will be dictated primarily by field conditions and existing infrastructure, access issues for future maintenance, and surrounding land

uses (farming, etc.). Zephyr will e-file additional information regarding the proposed location of the capacitor banks prior to permit issuance.

Zephyr has completed the necessary MSIO studies and expects an amended interconnection agreement with MISO to be executed just prior to commencement of construction. Based on information received to date, there may also be some minor upgrades required in the control building (e.g., relays, SCADA) and a portion of the collection may require upgrades.

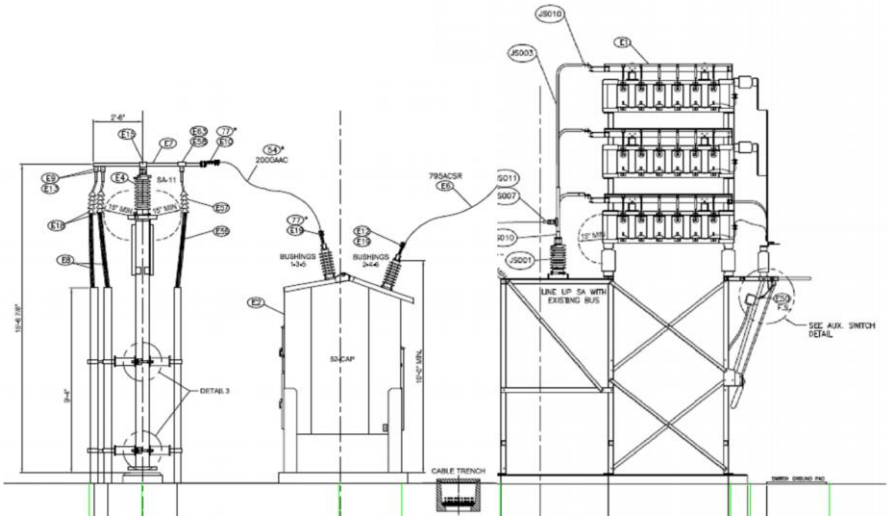

Figure 2: Capacitor Banks Schematic

6.2 Collector Lines and Feeder Lines

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. From the Project substation, power is sent though two sets of underground 34.5 kV cables to the existing Nobles County substation where it is delivered to the grid.

6.3 Other Associated Facilities

6.3.1 O&M Facility

The CWS Project has historically utilized an existing O&M building located at 417 West Gabrielson Road, in Luverne, Minnesota. The existing building is approximately 32 feet by 48 feet (1,536 square feet). Zephyr has moved the O&M team from the existing building into a building owned by Vestas at 1404 South Street, Pipestone, Minnesota. This new O&M building is approximately 12,000 square feet in size and is a hub for operating and managing approximately

13 local Vestas projects. Vestas is currently under contract with Zephyr to perform O&M for the plant and will continue after the repower.

6.3.2 Permanent Meteorological Towers

As described in Section 4.5, the permanent met tower located between turbines T-12 and T-13 will be raised to the new hub height of the repowered turbines (105.05 m) and some additional instrumentation will be added to the tower. The modified met tower will meet FAA and local requirements for lighting and marking. The upgraded met tower will stay in place through the life of the project.

6.3.3 Turbines Access Roads/Temporary Laydown/Staging Areas

With the exception of the minor access road shifts described in Section 5.1, previously permitted access road networks for the Project will remain in the same locations. A large construction crane will be used to remove the turbines, requiring a temporary crane path roughly 80 to 100 feet wide to each turbine. Proposed crane paths were sited using original project construction plans to closely adhere to previously used crane path locations where feasible. In addition, all access roads to county and township roads will require temporary improvement/expansion in order for turbine components to be delivered to the base of each turbine. As shown on Map 2, the temporary crane paths have been sited primarily on previously disturbed agricultural lands. The entire length of the crane path construction corridor and other temporary improvement areas will be reviewed for wetlands, calcareous fens, potential native prairies, and cultural resources prior to construction. However, no significant constraints are anticipated.

The Repower Project will also require grading of two to three temporary laydown/storage areas of approximately five to ten acres to serve both as parking areas for construction personnel and staging areas for turbine components during construction (see Map 2), and to house a temporary construction office. Because Zephyr does not currently have a final component delivery and installation plan from Vestas, the identified areas are preliminary and may be modified to accommodate the needs of the contractor. Any changes to location will be coordinated with the Department of Commerce and MPUC prior to permit issuance. Zephyr has identified approximately five acres immediately surrounding the project substation/switchyard, an additional ten acres on agricultural lands directly northwest of Turbine T-1, and approximately 7 acres in the nearby town of Wilmont, MN. The laydown areas will be sited on previously disturbed lands outside of native landscapes. The laydown area will be in place for approximately 6 to 8 months and then restored. A working area of approximately one acre around each turbine will be required for component delivery, laydown, removal, and installation activities in addition to the 50-foot by 50-foot crane pad. 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 in more detail in Section 10.3.3.

7.0 WIND RIGHTS

7.1 Status of Project Wind Rights and Modifications

Zephyr is currently on track to have all the agreements needed to satisfy setback requirements as shown on Map 4. Zephyr has existing real estate rights with landowners within the project area through 2042 and is working to extend leases through 2052 where possible. As previously described, the wind access buffer area for some turbines overlaps with the Nobles Wind Project area. For parcels under existing agreements with the Nobles Wind Project, Zephyr is coordinating with Xcel Energy to obtain its consent for Zephyr to obtain non-exclusive wind rights agreements directly with the affected landowners. As described earlier, these landowners will be compensated for wind rights under two separate agreements with Xcel and Zephyr. With these additional agreements and Xcel's consent, Zephyr is expecting to have wind rights for the entire 3 RD x 5 RD wind access buffer area for the Repower Project. Project setbacks are discussed in greater detail within Section 8.2.1.2 and shown on Map 5.

8.0 ENVIRONMENTAL IMPACTS

In accordance with Minn. R., Chapter 7854, the Applicant provides the following description of the environmental conditions of the Project area. Because this is an operating project, Zephyr has focused on addressing substantive changes and/or updates rather than a complete revisit of items and resources previously addressed in the 2011 Site Permit application.

The Project location is rural with an agricultural-based economy; typical landscapes within the Project area are shown on Map 3.

The Zephyr team has communicated with relevant agency staff prior to filing this Application. A list of contacted individuals and agencies is provided in Appendix E. On January 12, 2021, the Zephyr team met with the Minnesota Department of Commerce (MNDOC) staff members to discuss the Repower Project and gain feedback in regards to the Application content and process for repowering the project. On January 19, 2021, the Zephyr team had a similar project introduction meeting with planning and engineering staff at Nobles County to begin discussions surrounding local project permits and road use agreements.

In addition, on October 6, 2020, Zephyr mailed letters to individuals representing local, state, and federal entities requesting comment. The letters were followed up by an email to each agency on October 9, 2020. Some of those agencies included the U.S. Fish and Wildlife Service (USFWS), the U.S. Corps of Engineers (Corps), the State Historic Preservation Office (SHPO), Minnesota Department of Natural Resources (MNDNR), Minnesota Department of Transportation (MnDOT), Minnesota Department of Health (MDH) and Nobles County. To date, comments have been received from Nobles County, Shakopee Mdewakanton Sioux Community, MNDNR, SHPO, MnDOT, and the Corps. Responses have been incorporated into this Application, where appropriate. Agencies contacted and comments received are provided in Appendix E.

8.1 Demographics

The Repower Project is located within a lightly populated rural area in southwestern Minnesota in Nobles County near the city of Wilmont, in Summit Lake and Larkin townships. Demographic information was obtained from U.S. Census Bureau's 2019 American Community Survey 5-Year Estimates (U.S. Census, 2021a). Data is provided at the county level for the purpose of comparing the demographics in the Project area to a larger area. Section 8.12 describes the local economies including per capita income, unemployment rates, and the percent of people living below the poverty level in the townships and county.

8.1.1 Population and Race

Population and race characteristics for Summit Lake and Larkin townships, and Nobles County are detailed in Table 8.1-1. The two townships have very small populations compared to the county. The population of Nobles County in 2019 was estimated to be 21,734 with a median age of 35.7 years. Summit Lake Township had an estimated population of 372 and a median age of 44 years, and Larkin Township had an estimated population of 162 and a median age of 50 years. While the population of Larkin Township is nearly half the population of Summit Lake Township, the median age is 6 years older.

The total land area in Summit Lake Township is 36 square miles, Larkin Township is 35.9 square miles, and Nobles County is 714.9 square miles (US Census Bureau, 2021b). Population densities range from 10.3 persons per square mile in Summit Lake Township to 4.5 persons per square mile in Larkin Township. Overall, the population density of the Nobles County is 30.4 persons per square mile.

The predominant race in Summit Lake Township, Larkin Township, and Nobles County is White (alone, not Hispanic or Latino). Less than 10 percent of the population is categorized as a minority population. The largest minority population in Nobles County is comprised of residents who identify as Hispanic or Latino Origin (of any race), the largest minority population in Summit Lake Township includes residents who identify as Two or More Races, and similar to the county, the largest minority population in Larkin Township is comprised of residents who identify as Hispanic or Latino Origin (of any race). Based on these statistics, there is no indication that minority populations are concentrated within the Project area, or that the Project is located in an area occupied by a minority population.

Table 8.1-1: Population and Race Characteristics			
Category [1]	**Summit Lake Township**	**Larkin Township**	**Nobles County**
Total Population	372	162	21,734
Median Age	44	50	35.7
Race and Hispanic or Latino Origin			
One Race (%)	94.6	98.1	97.4
White (%)	92.7	93.8	77.8
Black or African American (%)	0.0	2.5	4.3
American Indian or Alaska Native (%)	0.0	0.0	0.7
Asian (%)	0.0	1.9	6.9
Native Hawaiian/Pacific Islander (%)	0.0	0.0	0.0
Some Other Race	1.9	0.0	7.7
Two or More Races	5.4	1.9	2.6
Hispanic or Latino Origin (of any race)	2.4	3.7	27.8
White Alone, not Hispanic or Latino	92.7	92.0	59.5
Population Density (per square mile)	10.3	4.5	30.4

1 Data retrieved from the 2019: ACS 5-Year Estimates Subject Table, Selected Characteristics of the Total and Native Populations, Table ID: S0601.

Zephyr also evaluated the Minnesota Areas of Environmental Justice Concern interactive map created by the Minnesota Pollution Control Agency (MPCA, 2021a) which identifies areas of environmental justice concern in Minnesota. The MPCA uses U.S. Census tract data in preparing the mapping. A census tract is considered to be an area of concern if it meets one or both of the following: the number of people of color is greater than 50 percent, or more than 40 percent of the households have a household income of less than 185 percent of the federal poverty level. Additionally, communities within Tribal boundaries are also considered areas of concern for Environmental Justice.

The Repower Project falls within two census tracts that bisect the Project area along the township boundary. In Summit Lake Township (census tract 1051), about 18 percent of residents reported income less than 185 percent of the poverty level. In Larkin Township (census tract 1052), about 25 percent of residents reported income less than 185 percent of the poverty level. The only area within Nobles County that meets the area of concern for environmental justice is the City of Worthington, about 9 miles southeast of the Project. No portion of the Project is located within a Tribal boundary.

8.1.2 Housing

Nobles County had an estimated 8,033 total households in 2019 with 626 vacant housing units. While Summit Lake Township had nearly twice as many occupied housing units (139) as Larkin Township (64), they both had the same number of vacant units. The housing characteristics are detailed in Table 8.1-2.

Table 8.1-2: Housing Characteristics			
Category [1]	**Summit Lake Township**	**Larkin Township**	**Nobles County**
Total Households	139	64	8,033
Average Household Size	2.68	2.53	2.65
Total Housing Units	147	72	8,659
Occupied	139	64	8,033
Vacant	8	8	626

[1] Data retrieved from the 2019: ACS 5-Year Estimates Subject Table, Selected Housing Characteristics, Table ID: DP04.

8.1.3 Industry

The top three industries of employment in the county include manufacturing; transportation and warehousing, and utilities; and educational services, and health care and social assistance. The top industries of employment in the townships vary slightly from the county level. The primary industry in Summit Lake Township includes educational services, health care, and social assistance (26.3 percent), and the primary industry in Larkin Township includes agriculture, forestry, fishing, hunting, and mining (27.6 percent). Table 8.1-3 summarizes the percent of each industry for workers over the age of 16 years.

Table 8.1-3: Industry by Occupation			
Category [1]	**Summit Lake Township**	**Larkin Township**	**Nobles County**
Agriculture, forestry, fishing and hunting, and mining	12.4%	27.6%	8.1%
Construction	5.7%	6.6%	6.3%
Manufacturing	12.9%	2.6%	27.2%
Wholesale trade	3.1%	0.0%	4.1%
Retail trade	8.2%	10.5%	11.1%
Transportation and warehousing, and utilities	14.4%	17.1%	3.9%
Information	0.5%	2.6%	1.0%
Finance and insurance, and real estate and rental and leasing	2.1%	2.6%	3.6%
Professional, scientific, and management, and administrative and waste management services	2.6%	6.6%	3.1%
Educational services, and health care and social assistance	26.3%	15.8%	18.8%
Arts, entertainment, and recreation, and accommodation and food services	5.7%	6.6%	5.9%
Other services, except public administration	4.1%	0.0%	4.2%
Public administration	2.1%	1.3%	2.8%

[1] Data retrieved from the 2019: ACS 5-Year Estimates Subject Table, Industry by Occupation for the Civilian Employed Population 16 Years and Over, Table ID: S2405.

8.1.4 Potential Impacts

The Repower Project has the potential to affect the existing demographics in the short term through an influx of construction personnel, which can influence demand for temporary housing. There is no anticipated increase to O&M staff, and therefore no change to demographics that would affect the total population, demand for housing, or change to the ethnicity or race of the local population. A discussion of local economies and impacts is presented in Section 8.12.

Construction and operation of the Repower Project will not displace residents and is expected to have only a minimal, temporary impact on the demographics of the Project area. The continuing operations and maintenance of the Wind Farm currently requires approximately 2 full-time site technicians, and a shared site manager. After repowering, Zephyr anticipates that two permanent technicians will be required for long-term servicing of project equipment, and one shared site manager. Approximately 40 workers will be required at peak employment during construction. Temporary housing is anticipated to be accommodated by local short-term lodging providers in Worthington (Worthington Chamber of Commerce, 2021) and Luverne (City of Luverne, 2021).

If no local contractors are available, the influx of approximately 40 construction personnel would equate to a total population increase of approximately 0.2 percent in Nobles County, 11 percent in Summit Lake Township, and 25 percent in Larkin Township over 2019 census numbers. This would represent a minimal, temporary increase in the total population of the townships.

Minority populations make up less than 10 percent of the population in the county. The largest minority population in Summit Lake and Larkin townships is comprised of residents who identify as Hispanic or Latino Origin (of any race). As shown in Table 8.1-1, population densities in Nobles County and the townships are generally sparse. There is no indication that any minority or low-income population is concentrated in any one area of the Project, or that the wind turbines have been placed in an area occupied primarily by any minority population. For this reason, the Project will not have a disproportionate impact on environmental justice communities.

8.1.5 Mitigation Measures

Zephyr will issue a Request for Proposal (RFP) to qualified contractors to oversee and manage the construction of the Repower Project. In this RFP, Zephyr intends to include a strong preference for bids that utilize local, union construction craft employees to the greatest extent possible in accordance with the Project's timeline and safety requirements. Zephyr expects the selected contractors will collaborate with organized labor unions and other stakeholders to develop a workforce and hiring plan that maximizes the local economic benefits of the Project.

Based on a review of the MPCA's interactive Environmental Justice map, and applicable statistics from the U.S. Census Bureau, it was determined that the Project is not located within an area identified as a concern for Environmental Justice, and therefore no mitigation measures are anticipated.

8.2 Land Use

8.2.1 Local Zoning, Comprehensive Plans, and Setbacks

The primary regulatory approval required for the construction and operation of the Repower Project is a Site Permit 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., Section 216F.04(a) (2020)). 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., Section 216F.07 (2020) 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."

8.2.1.1 Comprehensive Plans and County or Local Ordinances

The Nobles County Zoning Ordinance, Section 729, outlines the procedures and regulations established for wind energy conversion systems (WECS). WECS will be permitted based on the generating capacity and land use district. While the ordinance does not contain provisions regulating repowering of an existing wind energy conversion system (Nobles County, 2006), a Conditional Use Permit (CUP) and Land Use Permit approved by the County Board will be required for the staging and laydown areas, and for expansion of the substation/switchyard. Once submitted, the County notifies the Applicant, neighbors, Planning Commission, and the media of the Public Hearing. The process takes 45 to 60 days from the date of the permit application for final approval. Zephyr will continue to coordinate with Nobles County regarding additional permits or approvals that may be required.

Pursuant to Minn. Stat., Section 394 (2020), Nobles County prepared the 2025 Nobles County Comprehensive Plan (Comprehensive Plan) also referred to as the Nobles County Community Based Plan (Nobles County, 2020). According to the Comprehensive Plan, residents would like to see progress in zoning for wind energy projects to ensure appropriate development. The Comprehensive Plan states that wind development has the potential to provide an abundant amount of economic opportunities in the future, notably as an export industry for the County. The Comprehensive Plan discusses many positive aspects of wind energy, including job creation, increase in the tax base, and income supplementation for landowners; however, the Comprehensive Plan also notes some potential areas of concern including visual impacts and wildlife. Section 8.4 addresses the visual impacts and mitigation, and Section 8.19 addresses wildlife resources in the Project area.

Additionally, the Applicant is actively working with Summit Lake and Larkin townships in regard to the use of township roadways and other utility and access permits that may be required.

8.2.1.2 Project Setbacks

The repowered turbines will involve increasing the rotor diameter from 92.5 m (303 ft) to 110 m (361 ft). The hub heights of the Vestas V110 turbines will result in an increase of approximately 7 m (22 ft). Overall heights of turbines will increase from 144.75 m (475 ft) to 160.05 m (525 ft). Zephyr has reviewed the effects of adding larger rotors and hub heights upon the permitted and current setback standards for wind projects as shown on Maps 4 and 5. Table 8.2.1.2 summarizes the setbacks that were approved in the 2012 Site Permit specified under current Commission standards (*MPUC Order Establishing General Wind Permit Standards; Docket No. E,G-999/M-07-1102 – MPUC 2008*), and that are possible under proposed repowering.

As discussed earlier in this application, Zephyr has the required wind rights to comply with the 3 RD x 5 RD wind access buffer from landowners within the Project footprint and is actively working with landowners and Xcel Energy to obtain wind rights for parcels just outside the project boundary as shown on Map 4 that are within the wind access buffer area. All landowner agreements have or will have a term at least as long as the original 30-year Site Permit term. Those agreements will be finalized by prior to starting construction on the Repower Project. With the additional non-exclusive wind rights agreements and Xcel's consent for those agreements, the Project is expecting to meet all MPUC setback requirements as it did in 2012.

However, as noted above, the Applicant is requesting to either remove the requirement to comply with Nobles County setback regulations or, in the alternative, for waivers to be granted for certain existing facilities. In the Commission's order approving the Site Permit on May 1, 2012, the Commission indicated that it agreed with and adopted the recommendations of the Department of Commerce, which were attached and incorporated by reference into the Commission order. With respect to the Nobles County wind regulations, the Department of Commerce made the following comments:

> *Nobles County Wind Regulations Nobles County Zoning Ordinance (729) covers Wind Energy Conversion System Regulations. This ordinance at part 729.4 establishes setbacks for wind turbines and meteorological towers. Setback requirements are different for non-commercial and commercial turbines. Greater setbacks are required for commercial turbines. The Nobles County regulations do not apply to LWECS. Based on information in its application, it appears that [Zephyr] has also designed the project to meet or exceed the setback requirements adopted by Nobles County for commercial turbines in its wind energy conversion system regulations (section 729.4 Setbacks). On January 21, 2012, EFP staff spoke with Wayne Smith, Environmental Services Director for Nobles County, regarding their setbacks for wind facilities. Mr. Smith acknowledged that the Applicant has met with the county.*
>
> *Several of the requirements in the Nobles County Wind Energy Conversion System Regulations are similar to those reflected in the Commission's General Permit standards set forth in Docket No. E-G-999/M-07-1102. However, the standards adopted by Nobles County for commercial turbines and meteorological tower setbacks to property lines, road rights-of-way, and wetlands (USFWS Types III, IV*

and V) are more stringent than the Commission's. Since the project as proposed is intended to comply with these setbacks, they are incorporated as Special Conditions in Section 13.1 of the Site Permit.

Pursuant to the Department's analysis above, special conditions were incorporated into Section 13.1 of the Site Permit applying certain Nobles County requirements for turbines to be set back from property lines, road rights-of-way, and wetlands. These requirements are more stringent than state standards and would not typically be applied to an LWECS. Upon review of these requirements, the Applicant has determined that the existing Project layout does not fully comply with the Nobles County setback requirements. Specifically, there are modest encroachments on three property line setbacks, one right-of-way setback, and one wetland setback as follows:

- Turbine T-9 encroaches on the Nobles County setback distance to the public road right-of-way by approximately 23 feet. It should be noted that the shortage is to the road right-of-way and not to the roadway. Given that the right-of-way width of 190th is 33 feet on either side, the turbine would not fall within the roadway if it were to topple.
- Turbine T-15 is located within 577 feet of a type III, IV, and V wetland based on National Wetlands Inventory desktop mapping instead of the 600 feet required by Nobles County Ordinance. This distance will be confirmed during wetland delineation activities.
- Turbines T-6, T12 and T-13 exceed the County setback for property lines by 38, 39, and 38 feet, respectively.

Since the Project has changed ownership more than once since the Site Permit was issued, the Applicant does not have any further records to explain why there appears to be a discrepancy between the terms of the issued Site Permit and the approved site plan, despite the site plan apparently having undergone multiple reviews at the permit application, pre-construction, and post-construction stages.

Zephyr is not aware of any concerns raised by regulators, landowners, neighbors or any other party relating to these setbacks in the near-decade since the Project was first approved and constructed. As described above in Section 7.0 related to wind rights, Zephyr is coordinating with area landowners regarding the Repower Project and has not identified any objections or concerns related to application of the Nobles County setbacks. Zephyr also reached out to Nobles County for comments on the encroachments. In a responsive letter from the Nobles County Planning and Zoning Administrator dated September 28, 2021 (Appendix F), the County indicated that it does not object to these waiver requests and included the following feedback:

- With respect to T-9 and the road right-of-way setback, the county noted that the affected road is a minimum maintenance road and therefore it had no objection to waiving the right-of-way setback in this case.
- With respect T-15 and the wetland setback, the county indicated that it had no objection to a waiver request of 23 feet, but noted that if during the wetland delineation process, the encroachment was determined to be 40 feet or greater, that Zephyr should also seek a variance from Nobles County. Zephyr will confirm the distance as part of the updated field delineation of wetlands discussed in Section 8.17 below.

- With respect to T-6, T-12, and T-13 and the non-participating property line setbacks, the county indicated that Zephyr should seek a variance from the county if it is unable to obtain participation agreements from the affected landowners. Zephyr is already in the process of seeking participation agreements from these landowners as these same parcels are affected by the wind access buffer setback and Zephyr expects to be able to obtain such agreements prior to starting construction.

Finally, the county indicated that it does not support fully removing references to the Nobles County setbacks from the Site Permit. Zephyr is comfortable maintaining such references so long as the specific waivers requested are granted. The Repower Project does not contemplate moving the location of any turbines, nor would it be feasible to do so without fundamentally re-designing and re-conceiving the scope of the Repower Project. As a result, setbacks from property lines, road rights-of-way, and wetlands will not change as a result of the repowering. For these reasons, the Applicant requests that the special conditions set forth in Section 13.1 of the issued Site Permit be removed or, in the alternative, that waivers be granted for the instances described above in which existing facilities do not comply with the Nobles County setback requirements.

Table 8.2.1.2: Project Setbacks Comparison

Setback	2012 Site Permit	Current MPUC Guidance	Possible with Repowering
Wind Access Buffer	3 RD on east-west axis and 5 RD on north-south axis from non-participating property lines.	3 RD on east-west axis and 5 RD on north-south axis from non-participating property lines.	All turbines will meet the standard 3 RD x 5 RD setback once new landowner participation agreements and the mutual consent agreement with Xcel Energy are finalized.
Property Lines	1.25 times the total height (Nobles County Setback).	Not specified.	Applicant requests removal of requirement to comply with County's property line setback requirement or waiver for Turbines T-6, T12 and T-13.
Occupied Residential Dwellings	750 feet (Nobles County Setback).	500 feet and sufficient distance to meet state noise standard.	500 feet and sufficient distance to meet state noise standard.
Meteorological Towers	Not specified	250 feet from the edge of road right-of-way and boundaries of developer's site control.	No new met towers will be installed, but the existing permanent met tower will be raised. The met tower will meet the 250-foot setback.
Other Structures	None specified	None specified	None specified
Public Roads	1x the total height of turbines (Nobles County Setback).	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. Applicant

Table 8.2.1.2: Project Setbacks Comparison			
Setback	**2012 Site Permit**	**Current MPUC Guidance**	**Possible with Repowering**
			requests removal of requirement to comply with County's 1x total height or a waiver for T-9.
Recreational Trails	Not specified	250 feet from the edge of public trails, but on a case-by-case basis.	250 feet from the edge of public trails. There are no public trails within the project boundary.
Public Lands	Not specified	3 RD east-west axis and 5 RD on north-south	3 RD east-west axis and 5 RD on north-south
Wetlands, Streams and Ditches	600 feet for wetland types III, IV, and V (Nobles County Setback).	No turbines, towers or associated facilities allowed. Electric collector and feeder lines may cross or be placed subject to MNDNR, USFWS and/or Corps permits.	No turbines, towers or associated facilities are placed within Public Waters and Wetlands. Permits will be acquired for proposed temporary crossing of wetlands from the MNDNR, Corps and County, as needed. Applicant requests removal of requirement to comply with County's wetland setback or a waiver for T-15.
Internal Turbine Spacing	Not specified	3 RD on east-west axis and 5 RD on north south axis. Twenty percent can exceed threshold.	All but one turbine (T-15) meets the internal spacing requirement. The Site Permit allows up to 20 percent, which would be 3 turbines.
Public Conservation Lands	600 feet (there is no prohibition on cables crossing grasslands) (Nobles County Setback).	Avoid with infrastructure; non-participating property line setback.	Avoided
Native Prairies	Not specified	Turbines and associated facilities shall not be placed in native prairies, unless addressed in a native prairie protection plan.	Native prairies are avoided by turbines and associated facilities.

Table 8.2.1.2: Project Setbacks Comparison			
Setback	**2012 Site Permit**	**Current MPUC Guidance**	**Possible with Repowering**
Sand and Gravel Operations	Not specified	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	Not specified	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 placed in a way that avoids obstruction to navigable airspace of public and private airports.

8.2.1.3 Current and Future Zoning

Zephyr will work with Nobles County, and the townships, to confirm that the Repower Project is in alignment with applicable current and future zoning to the extent that Project facilities and/or activities are within the County's jurisdiction and, in all respect, will coordinate with the County to keep local officials informed about the Repower Project.

8.2.2 Conservation Easements

The proposed temporary crane paths and staging/laydown yard(s) required for repowering will be sited outside of known conservation easement areas (Map 6). The USFWS, Nobles County Soil and Water Conservation District (SWCD), and the Natural Resource Conservation Service (NRCS) offer conservation programs that encourage setting aside wetlands and grasslands for conservation purposes, or implementation of conservation practices on private land. Some of these programs include the Conservation Reserve Program (CRP), Reinvest in Minnesota (RIM), Wetland Reserve Program (WRP), and the Environmental Quality Incentive Program (EQIP). CRP and WRP areas will be verified by evaluating current land lease agreements for participating landowners prior to construction.

8.2.3 Potential Impacts

No changes to local zoning are required to implement the Repower Project. The Repower Project will not negatively affect uses already permitted per the zoning designations. Agricultural use of the Repower Project area will continue. The Repower Project will positively impact local economies by continuing to provide a diversified and consistent income stream for landowners, possible temporary jobs for local workers, and long-term tax benefits to the local governments that do not fluctuate very much from year to year. No impacts to local zoning are anticipated.

8.2.4 Mitigation Measures

Zephyr is not proposing mitigation measures, as negative impacts to local zoning and comprehensive plans are not expected. No mitigation measures are proposed for conservation easements because impacts to lands subject to conservation easements are not anticipated. However, if these lands become unavoidable, Zephyr will work collaboratively with the NRCS, as well as the landowner, to remove the impacted portion of the parcel from the program and provide appropriate mitigation.

8.3 Noise

Noise is defined as unwanted sound. It may be made up of a variety of sounds of different intensities, across the entire frequency spectrum. Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more "weight." The A-weighted scale (dB(A)) is used to reflect the selective sensitivity of human hearing. This scale puts more weight on the range of frequencies that the average human ear perceives, and less weight on those that we do not hear as well, such as very high and very low frequencies.

Common sound sources within an agricultural and/or rural environment include, but are not limited to, sound from farm equipment such as tractors and combines, sound generated from traffic on roadways, sounds from birds, and wind rustling through the vegetation. Typically, the ambient acoustic environment of a rural or agriculturally oriented community has equivalent continuous sound levels (Leq, which is an energy-based time-averaged noise level) ranging from 30 dB(A) to 60 dB(A). This is consistent with the findings of other Minnesota wind farm background sound studies including Three Waters Wind Farm (2019; Docket #19-576) that found the average daytime L50 to be 38 dBA, and the average nighttime L50 to be 33 dBA across the entire monitoring area and period. The maximum 1-hour nighttime L50s in that study were typically between 42 and 45 dBA, with a few hours as high as 48 dBA. None exceeded 50 dBA. Given the proximity of the Three Waters Wind Farm project to Community Wind South (approximately 20 miles southeast), and the similar land uses, similar background sound levels are anticipated at the proposed project (RSG, Inc., 2020).

The background noise in the vicinity of the Project facilities is typically a result of farming equipment, agricultural operations, wind, and vehicles. A comparison of typical noise-generating sources is outlined in Table 8.3 (MPCA, 2008).

Table 8.3: Common Noise Sources Table

Sound Pressure Level (dBA)	Common 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

Table 8.3: Common Noise Sources Table	
Sound Pressure Level (dBA)	**Common Noise Source**
80	Heavy Truck Traffic
70	Business Office
60	Conversational Speech
50	Library
40	Bedroom
30	Secluded Woods
20	Whisper

8.3.1 Description of Resources

The MPCA has the authority to adopt noise standards pursuant to Minn. Stat., Section 116.07, Subdivision 2 (2020). The adopted standards are set forth in Minn. R., Chapter 7030. The MPCA standards require A-weighted noise measurements. Different standards are specified for daytime (7:00 AM to 10:00 PM) and nighttime (10:00 PM to 7:00 AM) hours. The noise standards specify the maximum allowable noise volumes that may not be exceeded for more than 10 percent of any hour (L_{10}) and 50 percent of any hour (L_{50}).

The Project Area is considered a Noise Classification Area 1 (NAC 1) with daytime noise allowances of 60 decibels (dBA) and nighttime noise allowances of 50 dBA according to the Minn. Stat., Section 116.07, and Minn. R., Chapter 7030 noise ordinance. Table 8.3.1 provides the MPCA state noise standards based on residential, commercial, and industrial noise area classifications.

Table 8.3.1: MPCA State Noise Standards - Hourly A-Weighted Decibels				
Noise Area Classification	**Daytime (7:00 a.m. – 10:00 p.m.)**		**Nighttime (10:00 p.m. – 10:00 a.m.)**	
	L10	L50	L10	L50
1 – Residential	65	60	55	50
2 – Commercial	70	65	70	65
3 – Industrial	80	75	80	75

During construction, noise will be emitted by the construction vehicles and equipment. The amount of noise will vary based on what type of construction is occurring at the Project on a given day. These noise impacts will be temporary and limited to daytime hours. Construction associated noise will likely be perceptible at adjacent residential dwellings. Noise will be generated from construction equipment such as cranes, trucks, bulldozers, and bobcats.

These types of construction equipment are anticipated to generate noise between 75 and 85 dBA at 50 feet (Federal Highway Administration, 2006). Sound levels from grading equipment are not dissimilar from the typical tractors and larger trucks used in agricultural communities during harvest. The noise from construction activities would dissipate with distance and be audible at varying decibels, depending on the locations of the equipment and receptor. Construction activities

will likely be sequenced across the Project, with site preparation occurring at some locations and construction at others.

The main source of noise from the Project during operation will be from the wind turbine hubs and blades. All electrical equipment will be designed to National Electrical Manufacturer Association (NEMA) Standards. The Applicant plans to use the Vestas V110 turbines, which were modeled for the Project.

The Applicant conducted a noise propagation and modeling assessment for the turbine locations (Appendix G). Predicted noise levels were determined using WindPRO modeling software. The Applicant modeled the noise impacts on the residential dwellings, hotels, medical service facilities, educational facilities, camping areas, and religious or cultural gathering areas within the Project Area and up to 2 miles from a turbine location.

According to the provided Vestas V110 specifications, the turbines are expected to produce approximately 107.7 dBA at hub height (105.05 m).

Predicted noise levels were determined using an aggregate of output levels from the turbines throughout the Project area and ambient considerations. Noise contributions from existing turbines at the Nobles Wind Repower and three single-turbine projects (Arnold Wind, Wilmont Hills, Don Sneve) are also included. The sound assessment determined that no occupied or unoccupied residential dwellings will be impacted by sound levels exceeding 60 dBA during the daytime or 50 dBA during the nighttime.

8.3.2 Potential Impacts

The proposed Repower Project consists of replacing each of the existing 15 wind turbine nacelles and blades with Vestas V110's wind turbines as well as increasing the hub height to 105.05 m (345 ft). The number and location of the wind turbines is not changed by the repower Project. The CWS Project has been in continuous commercial operation since 2012. There have been no noise complaints filed with the Commission during its operational history. The Vestas V110 turbines have a sound power level of 107.7 dBA.

A sound assessment was completed by Zephyr for the proposed Project (Appendix G). The sound assessment determined that no occupied or unoccupied residential dwellings will be impacted by total sound levels exceeding 60 dBA during the daytime or 50 dBA during the nighttime. Therefore, the Community Wind South repower is within compliance with Minn. Stat. §116.07 and Minnesota Rules, Chapter 7030.

Using the modeled noise present at each sound receptor, the resulting sound power levels were combined with the ambient environment. The highest daytime and nighttime noise levels, including ambient noise levels, was 48 dBA.

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. Deliveries will also be fewer as the repower will not require concrete for turbine foundations. Zephyr is committed to working within the parameters of the Nobles County Zoning Ordinance to reduce construction noise below levels that would be considered objectionable. Machinery will be properly muffled, as required by law, and hours of operation will be consistent with County 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.

8.3.3 Model Used to Determine Noise Levels

The commercial software used to prepare the acoustical model is WindPRO 3.4. The sound propagation factors used in the acoustical model have been adopted from International Organization for Standardization 9613-2 (ISO 9613-2), Acoustics—Sound Attenuation During Propagation Outdoors Part 2: General Method of Calculation (ISO, 1996). The ISO 9613-2 parameters used in this assessment are mixed ground (G = 0.5, where G may vary between 0 for hard [e.g., water, pavement, or concrete) and 1 for acoustically absorptive ground (e.g., plowed earth]) with all the turbines operating at their rated sound power level simultaneously. The model used a receptor height of 4 m (13.1 feet). No screening from topography or vegetation was considered in the model. These modeling parameters are consistent with those identified in guidelines prepared for the Commission (National Association of Regulatory Utility Commissioners, 2011). Atmospheric absorption for conditions of 10 degrees Celsius (50 degrees Fahrenheit) and 70 percent relative humidity (conditions that favor propagation) was computed in accordance with ISO 9613-1, Acoustics—Sound Attenuation During Propagation Outdoors, Part 1: Calculation of the Absorption of Sound by the Atmosphere (ISO, 1993).

8.3.4 Noise Mitigation Measures

The CWS Project has been in continuous commercial operation since 2012. There have been no noise complaints filed with the Commission during its operational history. The rated sound level of the Repower Project's Vestas wind turbines is 107.7 dBA. Based on the noise assessment, L50 total noise is less than 60 dBA during the day and 50 dBA. Therefore, the Repower Project will be compliant with Minn. Stat., Section 116.07 and Minn. R., Chapter 7030.

8.4 Visual Impacts

8.4.1 Visual Impacts on Private Lands and Homes

Visual impacts to private lands and homes are not anticipated to be substantially different from the current, operating condition. Existing wind turbine locations in the Project vicinity are provided on Maps 7 and 8. Minor, temporary visual impacts to the existing agricultural landscape will occur with the presence of construction cranes for replacement of nacelles and blades, and from erosion control BMPs such as silt fence and fiber blanket within soil disturbance areas. Cranes, equipment, and temporary BMPs will be removed following the repowering activities. Because most of the areas proposed for disturbance are agricultural lands, visual impacts associated with erosion control BMPs should be relatively minor (see Section 10.2). Aside from slightly taller turbines and longer blades, no permanent change to the visual landscape is anticipated. As shown in the representative figure below, the turbines will be 50 feet taller than the current turbines, a change

of roughly 10 percent in overall height. This relatively small change in height, given the scale of the turbines, size of the Project area, and other turbines in the region, is not anticipated to be perceptible by the viewer or create a vastly different landscape experience. As shown on Map 7, the Project is surrounded on three sides by the Nobles Wind Project, which has been in operation since 2010 with a total of 134 turbines.

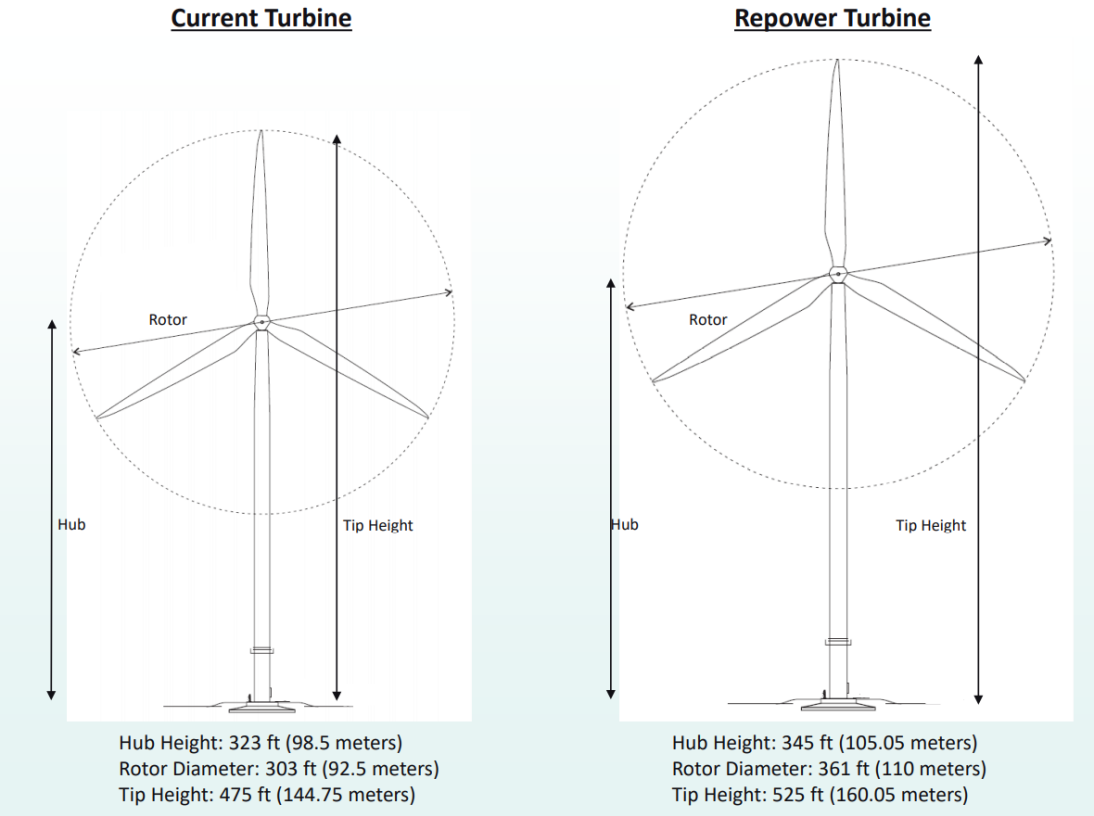

Figure 3: Turbine Schematics

The FAA requires obstruction lighting or marking of structures over 200 feet above mean sea level because they are considered obstructions to air navigation. The FAA standards, as described in Chapter 13 of FAA Advisory Circular 70/7460-1L, indicate that turbines should be painted white or light grey, and obstruction lighting should consist of synchronized FAA L-864 aviation red flashing, strobe, or pulsed obstruction lights. Specific lighting and marking plans for the Repower Project will be closely coordinated with the FAA. Additionally, for safety during construction, the FAA recommends the use of Type L-810 steady red light fixtures.

Zephyr will abide by the FAA's recommendations regarding required obstruction lighting. All 15 turbines will be required to have synchronized red lights in accordance with the FAA's issued Determinations of No Hazard. Zephyr will coordinate with the FAA regarding implementation of an ADLS system for the project that is appropriate for the project's location and size.

8.4.2 Visual Impacts on Public Lands

Table 8.7.1 provides a full list of recreational resources and public lands within 10 miles of the project area. Because no change to infrastructure is proposed other than slightly larger blades and taller hub heights, visual impacts to these resources and public lands are not anticipated to be substantially changed from the current, operating condition. Additionally, Zephyr has received no visual impact complaints during the last 8 years of operation, and no complaints have been filed to the project docket.

8.4.3 Visual Mitigation Measures

Zephyr will work to avoid or minimize visual impacts related to the proposed repowering project.

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

8.4.4 Shadow Flicker

Shadow flicker is a flickering effect caused by the rotation of wind turbine blades casting periodic shadows on an observer. This is generally observed in areas within 2 km of a wind turbine and decreases with distance as the shadow effect diffuses. Additionally, shadow flicker effects are greatest in the winter months and during sunrise and sunset due to the lowered angle of the sun casting longer shadows. Multiple independent conditions must be met for shadow flicker to occur, and these conditions play a role in the intensity and frequency at which a receptor may experience shadow flicker. These conditions and interacting factors are further described below:

1. Number, size, and position of windows: In order for shadow flicker to be perceived within a building, the rotating turbine blade must be between the window and the sun.
2. Ambient lighting conditions: When inside, having lights on could significantly diminish the perception of shadow flicker.
3. Cloud cover: When the sunlight is obscured by clouds, shadow flicker is reduced or eliminated.
4. Time of day: In the middle of the day the shadow does not extend as far from the base of the turbine as it does when the sun is lower in the horizon (e.g., during the morning or late afternoon).
5. Visual Screening: Objects such as trees, topography, buildings, awnings, blinds and drapes can all reduce or eliminate the potential perception of shadow flicker.
6. Operation of the wind turbine: When wind turbine blades are not spinning, the turbine casts a stationary shadow and does not cause shadow flicker. Turbine blades may be

stationary when the wind is above or below its operating speeds, or they may be offline for maintenance.

7. Orientation of the wind turbine: An operating wind turbine rotates and faces into the wind, which may or may not be into the sun. The shape and size of a wind turbine's shadow changes based on which direction it is facing relative to the sun. If the turbine is facing directly into or away from the sun, it will cast the largest shadow.

8.4.5 Potential Impacts

Shadow flicker modeling was completed by the Applicant for the Repower Project (Appendix G). WindPRO software was used to model shadow flicker at a total of 64 participating and non-participating residential dwellings within 2 miles of a wind turbine were identified and analyzed. Fine resolution shadow flicker maps were generated for the turbine array. The 64 shadow receptors were modeled as greenhouse-mode receptors during the estimated shadow flicker calculation for the array. With one exception, no shadow receptors are expected to experience more than 26 hours and 6 minutes of shadow flicker per year. The remaining receptor is expected to experience 35 hours and 14 minutes of shadow flicker per year. This receptor is owned by a participating landowner. Of the 64 shadow receptors, 29 (45.3%) registered no shadow flicker hours. See below for a table depicting the realistic shadow flicker distribution for the 64 identified receptors.

The results presented above include additional modeling to incorporate the blocking effects from physical obstacles at two receptor locations. These sites were field screened to determine the height and classification of the existing blocking or shading effects from trees or structures at the identified farmsteads to evaluate realistic shadow flicker. When modeled with the blocking and shading effects accounted for at the identified sites, the maximum shadow flicker expected at receptor NSA-12-P was not significantly reduced and is expected to have a shadow flicker of 35 hours and 14 minutes per year. The maximum shadow flicker expected at receptor NSA-36-P was reduced by 29 hours and 58 minutes to a total expected shadow flicker of 1 hour and 53 minutes per year. However, this model also assumes an availability factor of 100% while actual availability factors are more likely to be 95-98%, and this is still a conservative approach to estimating shadow flicker totals.

Table 8.4.5: Shadow Flicker at Overage Locations

Receptors	Vestas 2.2 Shadow Impacts
NSA-12-P	**35:14**

8.4.6 Shadow Flicker Mitigation Measures

Zephyr has been in continuous commercial operation since 2012. There have been no shadow flicker complaints filed with the Commission during its operational history.

Zephyr will evaluate any comments received regarding flicker. In coordination with the affected party, Zephyr will evaluate potential flicker minimization options in the unlikely event more flicker is present than was modeled.

Additional mitigation options the Repower Project 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.

Zephyr 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.

8.5 Public Services and Infrastructure

The Repower Project is expected to have minimal effect on existing services and infrastructure of the area (Map 8). The Repower Project will be of much lower intensity and extent than building a new wind project of similar size, as much of the construction activity such as installing roads, foundations, towers, underground electrical systems, transmission interconnections data communication, O&M building, etc. will not occur. In addition, the duration of construction is significantly shorter than building an entirely new project, and therefore less overall impact upon public services and infrastructure.

Once the repower is completed, O&M activity, and use of public services and infrastructure, would not increase from levels prior to the repower. The Repower Project is designed to have manageable temporary effects on the existing infrastructure during construction and operation. Because only minor impacts are expected, extensive mitigation measures are not anticipated. The following sections describe specific impacts that may occur to public services and infrastructure and how they will be mitigated.

8.5.1 Roads and Traffic

Existing roadway infrastructure in and around the Repower Project consists of county and township roads that generally follow section lines, with private gravel turbine access roads, private unpaved farmstead driveways, and county farming access roads.

The major traffic routes to and from the Project area includes Interstate 90 and State Highway 266. In addition, several county and township roads provide access to the site, including two-lane paved and gravel roads and minimum maintenance gravel roads. Annual Average Daily Traffic (AADT) on area roads generally range from 35 to 355 (Map 9).

Traffic during the repower will increase above current levels by roughly 100 trips per day due to construction personnel and deliveries of equipment, cranes, turbine blades, gearboxes, etc. Deliveries will be staged and spread out over the site as repowering activity moves across the Project, so areas of concentrated traffic will be few and of short duration. Once the repower is complete, vehicle activity associated with the Repower Project will return to the low levels of activity currently experienced at the Project site, comprised of approximately five trips to and from the site daily for maintenance activities.

8.5.2 Communication Systems

The Repower Project has undertaken an extensive analysis of federally licensed (FCC) microwave and fixed station radio frequency (RF) facilities that may be adversely impacted as a result of the Repower Project. The study, completed by Comsearch in May 2020, is provided in Appendix H, and includes an analysis of microwave beam paths, land mobile and public safety facilities, television broadcast facilities, radio, cellular service, and government radar and communication systems.

On July 17, 2020, Comsearch contacted the National Telecommunications and Information Administration (NTIA) regarding the Repower Project. The NTIA provided plans to the federal agencies represented in the Interdepartment Radio Advisory Committee (IRAC) for the Repower Project. After a 45 plus day period of review, no federal agencies, including the Department of Defense (DOD), 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 H.

8.5.2.1 Telephone/Internet/Cellular

Telephone service in the area is provided by CenturyLink, Frontier Communications, citizens Telecommunications Company of Minnesota, Northern Iowa Telephone Company, Lismore Cooperative Telephone, and other cellular and internet service providers. Zephyr is not aware of any complaints being made during the 8 years of operation of the CWS Project in regard to telephone or cellular service interruptions related to the Project.

8.5.2.2 Microwave Beam Paths

The Repower Project has undertaken an assessment of microwave beam pathways to ensure that the project does not interfere with microwave paths that have been established for communications systems in the vicinity of the project. Comsearch identified four unique licensed microwave paths from the FCC database that cross the Project area; three licensed to MnDOT and one to Minnesota Valley TV Improvement. Three turbines, 4, 5, and 6, were found to be close to the beam paths. The study, which is provided in Appendix H, indicates no interference is anticipated.

8.5.2.3 AM/FM Radio

A search of the FCC's database by Comsearch revealed no AM facilities within the required notification distance of 1.86 miles from any turbine, and FM broadcast station signals (88 to 108 MHz) are fairly insensitive to wind turbines. Zephyr has received no complaints of AM or FM radio interference within the Project's 8 years of operation.

8.5.2.4 Fixed Land Mobile Stations

A search of the FCC's land mobile/public safety radio database revealed that no land mobile transmitter stations fall within the search area (about 500 m beyond the outermost turbines).

8.5.3 Television

Nobles County has several off-air stations whose service could be potentially affected by the Repowered Project. Out of the identified 156 stations, Comsearch determined that 12 of the full-power digital stations, along with four low-power digital stations, may have their reception disrupted in and around the Project area. However, since the Project is a repower with only marginal height increases, it is expected that the impact due to the changes will be minimal.

8.5.4 Other Local Services

8.5.4.1 Pipelines

No oil and gas pipelines are known to exist within the Project boundaries.

8.5.4.2 Electrical Services

One 115 kV aboveground transmission line is located within the Project boundary called the Fenton Wind Power Plant to Nobles T-line. Several other transmission lines are located nearby including the Elk to Magnolia 161 kV, the Lismore to Bloom 24 kV and the Adrian to Rushmore 69 kV tap. The Project connects to the grid at the Nobles Substation located approximately 3.8 miles east of the Project substation by way of its own 34.5 kV underground collection system and does not rely on any aboveground system. The project's electrical collection system is described in detail within Section 6.1.

Zephyr will closely coordinate crane movements near electrical lines, substation wiring and Project interconnection updates with electrical utilities so that no lengthy outages are experienced by local residents.

8.5.4.3 Water Supply and Sanitary Service

The final source of construction water is not yet determined. Obtaining and utilizing ground or surface water for dust control will be scoped with the selected civil contractor. If water appropriations are necessary, it would likely come from a public water source/meter or an existing source (permitted well, etc.). On a wind project, the majority of water usage is for the concrete batch plant, turbine foundation backfill/compaction, dust control, and initial road building activities. Given a majority of this infrastructure is installed and will not be modified for the Repower Project, and the overall construction scope will be limited versus a new build, the overall quantity/daily rate of construction water needed is expected to be minimal. In addition, the Repower Project does not add new operations water uses. Operations water uses will be sourced from existing facilities, and the number of operations employees will not increase as described in Section 8.1. No impacts on the local water supply are expected from continued operation of the Repower Project.

8.5.5 Potential Impacts

8.5.5.1 Traffic and Roads

During Project repowering, temporary impacts are anticipated on some public roads within the Repower Project area. Roads will be affected by the normal wear and tear by vehicles required to deliver materials and equipment to and from the Repower Project. Some specific routes will also be impacted by the temporary expansion of road widths and/or intersections to facilitate the safe and efficient delivery of equipment.

In general, construction traffic for repowering is anticipated to be considerably less than when the CWS Project was originally constructed in 2012, as most of the trips for wind farm construction in 2012 were related to activities not applicable to repowering, such as concrete work, foundations, road construction, tower installations, cabling, communication systems, and substation construction. Because deliveries will be mainly for turbine components and blades, the trips will be significantly less, and easily accommodated by the typical functional capacity of a two-lane paved rural highway (usually capable of 5,000 vehicles per day). Because many of the area roadways have AADTs currently well below capacity, the additional anticipated trips for component and equipment delivery will be perceptible, but similar to seasonal traffic increases such as observed during autumn crop harvest. Traffic control measures and coordination with local authorities will be implemented to ensure public health and safety is protected with respect to the Repower Project.

Once the Repower Project has been completed, maintenance crews will periodically drive through the Repower Project area to monitor and maintain the wind turbines. Vehicle activity associated with the Repower Project will return to the low levels of activity currently experienced at the Project site, estimated at approximately five trips per day. These low levels of operation, maintenance and repair activities are not expected to adversely impact normal traffic in the Project area.

In response to the pre-application notice submitted to agencies, MnDOT requested more information about minor upgrades to public roadways and intersections, as well as the Project's intended laydown area and temporary crane paths (see Maps 2 and 8). As requested, Zephyr provided kmz files of the Project boundary and previously-used crane paths for their evaluation. MnDOT provided a letter dated October 12, 2020 indicating that based on the information provided, it appears that the Project is not adjacent to state highways and is unlikely to create direct impacts to the state trunk highway system. The agency indicated that they would appreciate being kept informed if things change with the Project that would require upgrading or modifications to state highways or state highway intersections to accommodate delivery of the new equipment. Zephyr will coordinate with MnDOT should delivery routes require use of state roadways, or improvements to state roadways or intersections.

8.5.5.2 Telephone/Internet/Cellular

Repowering the operating CWS Project is not expected to impact telephone, internet, or cellular service to the Repower Project area. Prior to any excavation, Gopher State One Call will be contacted to locate underground telephone and internet utilities so they can be avoided.

Multidirectional signals emitted from any cellular tower that is not in the immediate area of the Project (within 425 m of any turbine site) would not be expected to be adversely affected by wind turbines. As previously stated, there are no known towers registered with the FCC that are less than 1.25 miles from the nearest turbine. The nearest cell tower is approximately 7 miles southwest of the Project area in Adrian (FCC, 2019). Therefore, the proposed Repower Project should not disrupt cell phone service in the area. Zephyr is not aware of complaints regarding telephone, internet, or cellular phone service during the past 8 years of project operation, and no complaints regarding interruption to these services have been filed to the Project docket.

8.5.5.3 Microwave Beam Paths

Based on Comsearch's interference analysis, four unique licensed microwave paths were identified from the FCC database that cross the project area. The study indicated that no interference is anticipated. In addition to the Comsearch's analysis, Zephyr has received no complaints of interference from any operators during the 8 years of project operation, and no complaints regarding reception have been filed to the project docket.

8.5.5.4 AM/FM Radio

Real-world experience with wind farms has shown that FM broadcast station signals (88 to 108 MHz) are fairly insensitive to wind turbines, even in cases where the FM transmitting antenna is surrounded by turbines that are higher than the FM antenna. Because of the "capture effect" supported by the "discriminator" in FM receivers, significant disruptions to FM stations that are receivable in the area are not expected. Although the received signal may vary with the blade rotation at some locations in the immediate area, good quality FM radios will most likely factor out such time-varying signals. In those relatively few cases where significant impact is caused, home FM radios could be connected to a rooftop antenna to pull in a stronger direct signal.

Large metallic structures such as wind turbines can adversely affect the transmitted signals of AM broadcast stations up to 1.86 miles away. A search of the FCC's database revealed no AM facilities within the required notification distance of 1.86 miles from any turbine.

There should be no reasonable expectations of disruptions in transmitted signals on the AM band due to the presence of the repowered turbines. Occasionally, depending upon ground conditions, local AM receivers may experience slight signal changes due to local effects, but such anomalies are not recognized by the FCC as having an unduly adverse effect.

In addition, Zephyr is not aware of any radio signal interference during the past 8 years of 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.

8.5.5.5 Fixed Land Mobile Stations

Multi-directional transmitting facilities, including land mobile stations, which are within 425 m of a turbine site, customarily should be further evaluated for the possibility of transmitter interference caused by wind turbines. All operating wind turbines are more than 425 m from the nearest identified stations (WQKZ788 and WQOH267).

Based on the current Project layout, no adverse impact is expected to be caused to the transmissions of land mobile stations that are licensed by the FCC. In addition, Zephyr is not aware of fixed land mobile station signal interference during the past 8 years of operation, and no complaints regarding reception at fixed land mobile sites have been filed to the project docket. A change in coverage of fixed land mobile stations associated with wind turbine repowering is unlikely due to the nature of the repower changes, which do not increase radio interference.

8.5.5.6 Television

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. Interference is caused when signals reflected by the blades arrive at the viewer's TV antenna along with the direct signal. This is known as "multipath interference." However, as turbine manufacturers have replaced all-metal blades with blades constructed of mostly nonmetallic materials, this effect has been reduced.

Also, the new generation of HDTV receivers are better equipped to deal with minor multipath interference (which is manifested by "pixilating" or "freezing" of the digital picture) than analog TV sets, as special circuitry is employed to suppress the weaker reflected signal. Occasionally, however, multipath interference from one or more turbines can cause video failure in HDTV receivers, especially if the receiver location is in a valley or other place of low elevation.

There is some possibility of signal disruption for residences that have to point their outdoor antennas through the turbine area, or that utilize "rabbit ear" antennas and/or older HDTV receivers. Most of this effect should be dissipated for locations three or more miles from a turbine, but some residual problems could be noted for HDTV receivers that are located below the grade level at the turbine base. Usually, a rule of thumb is that approximately 10 percent of the receiver locations are affected to some extent within three miles of a large turbine when the turbine is between the TV station and the receiver. The usual effect is intermittent "pixilation" or freezing of the digital TV picture.

If the Repower Project causes disruptions to over-the-air TV viewing, methods to resolve them are available, including:

1. Relocation of the household antenna to receive a better signal,
2. Installation of a better outside antenna, or one with a higher gain, and
3. Installation of satellite or cable TV.

While repowering the turbines has the potential to impact television reception, during the past 8 years of project operation, there have been no documented complaints made to Zephyr and filed with the Commission regarding television interference from the Project. It is the opinion of Comsearch that any disruptions to over-the-air TV broadcast signals that might occur, can be resolved satisfactorily through high-gain antennas or other subscription means such as satellite or cable services.

8.5.5.7 Other Local Services

The Repower Project will be constructed and operated to avoid impacts to underground infrastructure such as drain tile, water, and electrical. Should electrical service interruptions be necessary to facilitate movement of tall construction equipment around transmission or distribution lines, Zephyr and local service providers will work closely to ensure outages are planned and coordinated with local residents and other impacted users.

8.5.6 Mitigation Measures

8.5.6.1 Traffic and Roads

Prior to repowering, Zephyr will require its contractors to coordinate with the applicable local and state road authorities to ensure the weights being introduced to area roads are acceptable, and to obtain all relevant permits for access. Zephyr and its contractors will work with MnDOT, Nobles County, and the townships, as necessary, regarding roadway concerns and right-of-way work (if any) during repowering. Zephyr will also coordinate with the landowners and local road authorities in regard to the temporary widening of driveways and access roads to minimize land-use disruptions during repowering activities.

Road use agreements will be executed with applicable local governments where required, and will be used to identify suitable travel routes, traffic control measures, methods for evaluating, monitoring and restoring roads, and mitigation measures to ensure roads used for oversize/overweight loads are properly identified, monitored and stabilized. Zephyr is also coordinating with Xcel Energy in regard to their planned use of roadways for a similar repowering of the Nobles Wind Project. Details regarding road use agreements and required driveway/access widening will be provided to the PUC prior to permit issuance.

8.5.6.2 Telephone/Internet/Cellular

At this time, no impacts are anticipated to telephone, internet and cellular services. Should impacts to these systems occur, Zephyr will work to remedy service interruptions in cooperation with the landowner and service provider.

8.5.6.3 Microwave Beam Paths

No microwave beam paths currently interfere with the turbines, and therefore Zephyr does not anticipate impacts that would require mitigation. The Comsearch impact study concludes that no impacts are anticipated even with the larger Vestas turbines.

8.5.6.4 AM/FM Radio

Zephyr is not aware of any conflicts with AM/FM Radio transmission or reception during the past 8 years of operations, and no complaints regarding AM/FM reception have been filed to the project docket. Should issues arise as a result of repowering, Zephyr will work closely with area stations in regard to mitigation options.

8.5.6.5 Fixed Land Mobile Stations

In the unlikely event a land mobile licensee believes their coverage has been compromised due to the Repower Project, there are options to improve signal coverage through optimization of a nearby base station or adding a repeater site. Utility towers, met towers, or other structures within or near the Repower Project area can serve as the platform for a land mobile base station or repeater sites if necessary. Zephyr will work with the land mobile licensee towards a mutually agreeable solution.

8.5.6.6 Television

While not anticipated, if interference to a residence's or business's television service is reported as a result of repowering, Zephyr will work with affected parties to determine the cause of interference and, when necessary, reestablish television reception and service. Zephyr plans to address post-construction television interference concerns on a case-by-case basis. If television interference is reported to Zephyr, project representatives will:

1. Review results of the report to assess whether impacts are likely wind project-related.
2. Meet with landowner and a local communication technician to determine the current status of their television reception infrastructure.
3. 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.
4. At the landowner's election, Zephyr will either install the necessary antenna equipment or facilitate a connection to comparable satellite television services to restore reception to pre-Project quality.
5. If the landowner chooses satellite service, Zephyr will consider the matter closed upon installation of the satellite dish.
6. If the landowner chooses to have the antenna and/or amplifier installed and later complains of continued interference issues, Zephyr 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.
7. If wind project-related interference remains an issue, Zephyr will propose an agreement that reimburses the landowner for the initial costs of setting up comparable satellite television services and will remove the antenna and amplifier equipment, unless it was initially installed to serve multiple households.
8. If Zephyr and the landowner are unable to reach an agreement to resolve interference-related issues, Zephyr will report the concern as an unresolved complaint and defer to the MPUC's dispute resolution process to resolve the matter.

8.5.6.7 Other Local Services

Zephyr will coordinate with utility infrastructure owners before and during repowering to fully understand infrastructure and safety concerns and to prevent possible structural conflicts.

8.6 Cultural and Archaeological Resources

8.6.1 Description of Historic and Archeological Resources

On March 26, 2020, the Applicant conducted a cultural resources literature search by examining files through the online Portal maintained by the Office of the State Archaeologist (OSA), and through a database and paper file search request to the Minnesota SHPO at the Department of Administration in St. Paul, MN (Appendix I). Archaeological site files and historic structure inventory files were used to obtain a list of previously recorded archaeological sites and historic structures within the proposed Repower Project area. Cultural resource reports were investigated to determine whether any portions of the Repower Project area had been previously surveyed for cultural resources.

A review of survey reports at SHPO revealed that previous Cultural Resources surveys (archaeology and/or historic architecture) have been conducted for earlier phases of this wind farm. The "Archaeological Survey for the Proposed Community Wind South LWECS Project" was completed in 2012 by Blondo Consulting, LLC. The survey included "an attempt to relocate archaeological sites 21NO0028 "The Indian Hill Site II" and 21NO0029 "The Indian Hill Site I," which are located within the Project area, but "no evidence of either site was found." The survey identified archaeological Summit Lake Site (21NO0071) within the Project area, which was recommended not eligible for listing in the NRHP. The report did not recommend further archaeological work prior to construction.

An "Architectural Survey for the Proposed Community Wind South LWECS Project" was completed in 2012 by Blondo Consulting, LLC. Of the 77 resources identified, ten are located within the Project area and 36 are located within one mile of the Project. Nearly all resources were recommended not eligible for listing in the NRHP. Of the three historic/architectural resources recommended potentially eligible, one is located within the Project area (NO-SLT-038). The SHPO has not issued concurrence of eligibility for any of the properties.

Three previously recorded archaeological sites are located within the Project area (21NO0028, 210029, and 210071). All three sites are prehistoric lithic scatters. Site 210071 is recommended not eligible for listing in the NRHP. Sites 21NO0028 and 21NO0029 have not been evaluated for listing in the NRHP. The 2012 survey identified Summit Lake (21NO0071), consisting of a small lithic scatter site, but was unable to relocate the previously identified sites 21NO0028 or 21NO0029.

Four additional archaeological sites have been previously recorded within one mile of the project area, but outside of the project boundaries. These sites include three prehistoric lithic scatters (Sites 21NO0030, 21NO0064, and 21NO0069) and a possible prehistoric mounds site (Site 21NOj).

Forty-six historic/architectural resources have been previously inventoried within one mile of the Project area, 10 of which are located within the Project boundaries (Table 8.6.1; Map 10).

Table 8.6.1: Historic/Architectural Resources in Project Area and One-Mile Buffer				
SHPO Inventory ID	**Name**	**Location**	**NRHP Eligibility**	**Project/ Buffer**
NO-LRK-006	Farmstead	NWC of 200th St & Fellows Ave	Not Eligible	P
NO-LRK-007	Farmstead	es Fellows bw 200th & 210th St	Not Eligible	B
NO-LRK-011	Farmstead	ws Erickson Ave bw 190th & 200th St	Not Eligible	B
NO-LRK-012	Farmstead	SWC 200th St & Erickson Ave	Not Eligible	B
NO-LRK-013	Farmstead	ws Erickson Ave bw 190th & 200th St	Not Eligible	B
NO-LRK-015	Farmstead	SEC Fellows & 210th St	Not Eligible	B
NO-LRK-017	Farmstead	ws Heiselroth Ave bw 190th & 200th St	Not Eligible	P
NO-LRK-018	Farmstead	27902 180th St	Not Eligible	B
NO-LRK-019	Farmstead	27481 170th St	Potentially Eligible	B
NO-LRK-022	Farmstead	es Fellows Ave bw 170th & 180th St	Not Eligible	B
NO-LRK-023	Farmstead	NWC 180th St & Fellows Ave	Not Eligible	B
NO-LRK-024	Farmstead	ss 180th St bw Erickson & Fellow Ave	Not Eligible	B
NO-LRK-025	Farmstead	es Fellows Ave bw 180th & 190th St	Not Eligible	B
NO-LRK-026	Farmstead	18564 Fellows Ave	Not Eligible	B
NO-LRK-027	Farmstead	ns 190th St bw Erickson & Fellows Ave	Not Eligible	B
NO-LRK-028	Farmstead	ss 190th St bw Erickson & Fellows Ave	Not Eligible	B
NO-LRK-029	Farmstead	SEC 190th St & Fellows Ave	Not Eligible	B
NO-LRK-030	Farmstead	ws Fellows Ave bw 190th & 200th St	Not Eligible	B
NO-LRK-031	Farmstead	NEC 200th St & Fellows Ave	Not Eligible	P
NO-SLT-003	Farmstead	ns 200th St bw Heiselroth and Jones Ave	Not Eligible	P
NO-SLT-004	Farmstead	NWC 200th St & Jones Ave	Not Eligible	P
NO-SLT-020	Farmstead	SE corner of 200th St & King Ave	Potentially Eligible	B
NO-SLT-021	Farmstead	ns 200th St bw King & Knauf Ave	Not Eligible	B
NO-SLT-022	Farmstead	19032 King Ave	Not Eligible	B
NO-SLT-023	Farmstead	ns 190th St bw King & Knauf Ave	Not Eligible	B
NO-SLT-024	Farmstead	SWC King Ave & 180th St	Not Eligible	B
NO-SLT-025	Farmstead	NWC 180th St & King Ave	Not Eligible	B
NO-SLT-026	Farmstead	NEC 180th St & King Ave	Not Eligible	B
NO-SLT-030	Farmstead	SWC of Jones Ave & 170th St	Not Eligible	B
NO-SLT-031	Farmstead	17462 Jones Ave	Not Eligible	B
NO-SLT-032	Farmstead	ss 180th St bw Heiselroth and Jones Ave	Not Eligible	P
NO-SLT-033	Farmstead	18537 Jones Ave	Not Eligible	P
NO-SLT-034	Farmstead	NEC 190th St & Jones Ave	Not Eligible	P
NO-SLT-035	Farmstead	ns 190th St bw Jones & King Ave	Not Eligible	B
NO-SLT-036	Farmstead	ss 190th St bw Jones & King Ave	Not Eligible	B
NO-SLT-038	Farmstead	NEC 200th St & Jones Ave	Potentially Eligible	P
NO-SLT-039	Farmstead	SEC of 200th St & Jones Ave	Not Eligible	B

Table 8.6.1: Historic/Architectural Resources in Project Area and One-Mile Buffer				
SHPO Inventory ID	**Name**	**Location**	**NRHP Eligibility**	**Project/ Buffer**
NO-SLT-040	Farmstead	ws Jones Ave bw 200th & 210th St	Not Eligible	P
NO-SLT-041	Farmstead	NEC 210th St & Jones Ave	Not Eligible	B
NO-SLT-042	Farmstead	SWC of 210th St & Jones Ave	Not Eligible	B
NO-SLT-043	Farmstead	Jones Ave bw 210th & 220th St	Not Eligible	B
NO-SLT-044	Farmstead	ws Jones Ave at 220th St	Potentially Eligible	B
NO-SLT-045	Farmstead	NWC 220th St & Jones Ave	Not Eligible	B
NO-SLT-047	Farmstead	ss 210th St bw Heiselroth & Jones Ave	Not Eligible	B
NO-SLT-048	Farmstead	SWC 210th St & Heiselroth Ave	Not Eligible	B
NO-XXX-001	Farmstead	Heiselroth Ave bw 200th & 210th St	Not Eligible	B

8.6.2 Potential Impacts

As the Repower Project consists of retrofitting existing turbines and most likely using existing infrastructure, it is anticipated that ground disturbance will be limited primarily to crane paths and intersection improvements. Intersection improvements will likely be similar in design and construction to the originally "permitted" entries and should pose no additional impact to archaeological resources. If ground disturbance goes outside of existing infrastructure and crane path areas, there is the possibility that unrecorded archaeological resources could be impacted. An archaeological survey is planned prior to construction to review areas of new ground disturbance (i.e., new crane paths, staging/laydown, switchyard expansion) that have not been previously surveyed for archaeological resources.

Additionally, the Applicant sent letters to the eleven Minnesota Tribal Nations' Tribal Historic Preservation Office contacts and the Minnesota Indian Affairs Council on October 6, 2020 and followed up with emails on October 9, 2020. One comment email was received on October 15, 2020 from the Shakopee Mdewakanton Sioux Community (Appendix F). The email stated that at this time the Shakopee Mdewakanton Sioux Community has no concerns regarding this Project, however they would like to take a look at the Cultural Resource/Archaeological Study for the new crane walkways when it becomes available. The Applicant will provide the report when it becomes available to the Shakopee Mdewakanton Sioux Community and notice the Minnesota Tribal Nations on the availability of the site permit application.

8.6.3 Mitigation Measures

No mitigation measures are warranted for the Repower Project. If previously unidentified archaeological or historic resources are found during repowering activities, the integrity and significance of such resources will be addressed in terms of the site's potential eligibility to the NRHP. Work in the area will be temporarily halted in the event unanticipated discoveries such as archaeological/historical resources or human remains are identified. Also, an assessment of the Repower Project's potential impacts upon the resource will be undertaken. If such resources are found to be eligible for the NRHP, adverse effects to the resource will be avoided by adjustment

of the Repower Project's layout when possible. If avoidance is not possible, appropriate mitigation measures will need to be developed in consultation with Minnesota SHPO, the State Archaeologist, and consulting American Indian communities. While avoidance would be a preferred action, mitigation for the Repower Project related impacts on NRHP-eligible archaeological and historic resources may include additional documentation through data recovery.

Should previously unknown archaeological resources or human remains be inadvertently encountered during retrofitting and/or operation, the discoveries will be reported to the SHPO. Regarding a discovery of human remains, procedures would be followed to ensure that the appropriate authorities would become involved quickly and in accordance with local and state guidelines.

8.7 Recreational Resources

8.7.1 Description of Resources

Information from USFWS, MNDNR, and Nobles County were reviewed to identify recreational resources within 10 miles of the Repower Project area. The recreational resources within 10 miles include Wildlife Management Areas (WMAs) and Waterfowl Production Areas (WPAs) (Map 6). Recreational opportunities in the area include hunting, fishing, snowmobiling, camping, biking, and hiking.

The 2012 Site Permit application identified no public recreation opportunities within the Project Area. However, there are five Wildlife Management Areas (WMAs) and one Waterfowl Production Area (WPA) located within five miles of the Project Area. There are an additional twelve WMAs, one County Campground/Park, and a Scientific and Natural Area (SNA) located within ten miles of the Project Area. State snowmobile trails are also present surrounding the Project Area. The recreational resources are summarized in Table 8.7.1 below. Map 6 shows the recreational resources present within close proximity to the Project area.

Wildlife Management Areas are operated by the MNDNR and were established to protect lands that have a high potential for wildlife production. These areas provide recreational opportunities such as hunting, wildlife, and native plant viewing, and nature photography to the public.

WPAs are owned and managed by the USFWS. These areas are intended to preserve critical habitat for waterfowl and other wildlife. The recreational opportunities available to the public at these areas include wildlife viewing, photography, plant viewing, and hunting.

The SNA program is managed by the MNDNR. These areas are designated to preserve ecological diversity and rare species within the State. Recreational opportunities in these areas consist of wildlife and plant observation and photography. More intensive recreational activities, such as hunting or camping, are not generally allowed in these areas.

Nobles County supports several County parks. Adrian Lower Park is located in the town of Adrian and offers day-use recreational opportunities such as disc golf and swimming. A campground, owned by the City of Adrian, is also located within the Park and offers camping opportunities.

Table 8.7.1: Recreational Resources				
Recreation Area	**Distance from Project Area (miles)**	**Size (acres)**	**Managed For**	**Recreational Opportunities**
Bluebird Prairie WMA	1	78	Upland Game	Wildlife Viewing, Hunting
VanDrie Ridge WMA	3	82	Upland Game, Winter Habitat	Wildlife Viewing, Hunting
Groth WMA	3	73	Waterfowl	Wildlife Viewing, Hunting
Enick WMA	4	50	Waterfowl	Wildlife Viewing, Hunting
Bloom WPA	4.5	159	Waterfowl	Wildlife Viewing, Hunting
Herlein-Boote WMA	5.1	741.1	Waterfowl	Wildlife Viewing, Hunting
Swessinger WMA	6	69	Upland Game	Wildlife Viewing, Hunting
Lambert Prairie WMA	6.5	82	Upland Game, Waterfowl	Wildlife Viewing, Hunting
Stable Banks WMA	6.5	48	Upland Game	Wildlife Viewing, Hunting
Adrian Lower Park	6.5	36	N/A	Day Use, Camping
Dewald WMA	7	16	Upland Game	Wildlife Viewing, Hunting
Windy Acres WMA	7.5	159	Upland Prairie, Upland Game, Winter Habitat	Wildlife Viewing, Hunting
County Line WMA	7.5	164	Waterfowl, Upland Game	Wildlife Viewing, Hunting
Pheasant Run WMA	8	32	Upland Game	Wildlife Viewing, Hunting
Compass Prairie SNA	8	20	Native Prairie	Wildlife Viewing, Native Plant Viewing
Fenmont WMA	8	526	Upland Game, Waterfowl	Wildlife Viewing, Hunting
Schuering WMA	8	37	Upland Game, Waterfowl	Wildlife Viewing, Hunting
Cleanwater WMA	8.5	35	Nesting Wildlife	Wildlife Viewing, Hunting
Lone Tree WMA (North and South)	9	483	Waterfowl, Upland Game	Wildlife Viewing, Hunting
Champepedan WMA	10	81	Upland Game	Wildlife Viewing, Hunting
State Snowmobile Trail	Varies	N/A	N/A	Snowmobiling

8.7.2 Potential Impacts

The Repowering Project will avoid direct impacts to recreational resources. Total wind turbine height after repowering will increase by 50 ft. Potential visual impacts to recreational resources

around the Repower Project boundary related to adding slightly larger rotors to the turbines will be minimal.

8.7.3 Mitigation Measures

No direct impacts to recreational resources are anticipated as a result of the Project, and therefore no mitigation is proposed.

8.8 Public Health and Safety

8.8.1 Electromagnetic Fields

Electromagnetic fields (EMFs) 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 EMF 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. EMF is 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 (USEPA, 2020).

8.8.1.1 Potential Impacts

Extensive research has been conducted by the National Institute of Environmental Health Sciences (NIEHS, 1999). A number of epidemiological studies have been conducted in an attempt to determine if EMFs pose a health risk. While some of these studies have found a weak association between leukemia and exposure to EMFs, other studies have found no connection. Laboratory studies have also been conducted but have not been able to substantiate a direct relationship between increased electromagnetic activity and increased cancer risks. 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) (NIOSH, 1996). No changes to the Zephyr electrical system will occur except for installing new capacitor banks for each medium voltage circuit in order to meet voltage and power factor requirements, minor potential collection upgrades within approximately 100-200 feet of the Nobles substation, and testing of the system. These upgrades will occur at the substation locations and well away from typical EMF receptors. The nearest home to the project substation is roughly 0.4-mile to the north. Consequently, no significant increase in EMF impact is expected from the repowering or operation of the project. Zephyr is not aware of any complaints or claims of impact from EMFs since the project became operational, and no complaints regarding EMFs have been filed to the project docket.

8.8.1.2 Mitigation 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 EMF are planned. Zephyr is committed to inspecting and maintaining the electrical infrastructure and installing facilities in a manner that minimizes the potential for EMFs.

8.8.2 Aviation

Aviation resources surrounding the Repower Project were investigated. According to the Federal Aviation Administration (FAA), one registered airport is located within ten miles of the Project Area. Worthington Municipal Airport (FAA Code OTG) is located approximately 9.9 miles outside of the project area and approximately 2 miles north of Worthington. The airport is open to the public and has been in operation since 1946 (AirNav, 2020).

8.8.2.1 Potential Impacts

Zephyr received Determinations of No Hazard (DNH) to Air Navigation from the FAA for the increased rotor diameter of 110 m and tower heights on July 9, 2020 (see example in Appendix F). The aeronautical studies revealed that the structures would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. As such, no impacts from the Repower Project to aviation are anticipated.

8.8.2.2 Mitigation Measures

Zephyr will coordinate the lighting plan so that it is consistent with FAA standards and in accordance with the issued DNHs. Zephyr has evaluated Aircraft Detection Lighting System (ADLS) options and will coordinate with the FAA in regard to the design and implementation of an ADLS system appropriate for the project's location and size, and associated compliance with the new Minn. Stat. §216F.084.

8.8.3 Safety and Security

Security measures will be taken during construction and operation of the Repower Project including temporary and permanent fencing, warning signs, and locks on equipment and wind power plant facilities as appropriate. All construction workers will be required to adhere to Zephyr's corporate safety plan. The objective of the Emergency Preparedness and Emergency Action Plan is to outline the course of action associated with emergencies, evacuations, and fire prevention. This instruction applies to all personnel doing business at the Repower Project location, and includes activities in offices, in the field, as well as working within wind turbines. A copy of the safety plan will be available in a common location at the Project site so each employee has access to the plan.

8.8.3.1 Potential Impacts

Potential safety and security impacts resulting from the Repower Project are a primary consideration to Zephyr because wind energy projects consist of complex, large electrical generating structures requiring specialized equipment, high voltages, and trained workers for

installation and operations. This Project is located on leased rural properties in a relatively remote area. No serious safety or security incidences have been reported at the Project site during the past 8 years of operation or filed as a complaint on the Project docket.

8.8.3.2 Mitigation Measures

While no impact to the security of local residents is expected, Zephyr will use the following security measures to reduce the possibility of property damage or personal injury in the Repower Project area:

- Contractors and Project personnel will be trained to use proper construction and maintenance methods to promote and protect workers and public health and safety
- Zephyr and its contractors will use temporary and permanent safety fencing, warning signs, locks and other access control features on equipment and wind power facilities during repowering and ongoing operation of the Repower Project
- Zephyr and its maintenance contractor will conduct regular O&M and inspections during the life of the Repower Project to minimize and address potential equipment failures and condition of safety equipment

8.9 Hazardous Materials

8.9.1 Description of Resources

The wind turbines use lubricants in the gearboxes and hydraulic fluid for the blade pitch actuators. Waste oil will be collected from each repowered turbine and pad mount transformer and will be properly handled and disposed of by qualified technicians in accordance with state and federal regulations.

Any hazardous materials generated by the Repower Project will be stored and disposed of in accordance with Minn. R., Chapter 7045. Wastes generated at the Repower Project site will be hauled off-site and disposed of under a U.S. EPA Small Quantity Hazardous Waste License.

A search of the Minnesota Pollution Control Agencies "What's in My Neighborhood?" database (MPCA, 2021b) listed five registered feedlots within the Project Area. No other sites were mapped within the Project Area.

8.9.2 Potential Impacts

Minimal amounts of hydraulic oil, lube oil, grease, antifreeze, and cleaning solvents will be used on the site to repower the wind turbines, and within construction equipment such as cranes, dump trucks, and graders. Materials will be transported, handled and disposed of by trained and qualified personnel utilizing established procedures and proper equipment. Lubricants, used oils, coolants, and waste products will be handled according to applicable regulations and disposed of through an approved waste disposal firm.

8.9.3 Mitigation Measures

Zephyr's contractor will prepare a Spill Prevention, Control, and Countermeasure (SPCC) Plan prior to construction, which will be revised for project operations. Containment will be used to prevent fluids that might be spilled from being released into local soil and groundwater. Waste products will be handled and disposed of according to local, state and federal regulations through an approved waste firm by trained technicians.

8.10 Land-Based Economies

8.10.1 Agriculture

Land use within the Repower Project area is primarily agricultural (Map 11). According to the USDA's 2017 Agricultural Census, approximately 90 percent of the land within Nobles County is farmland (USDA, 2017). As shown on Map 12, approximately 55 percent of the soil within the Repower Project area is considered prime farmland, 6 percent is farmland of Statewide Importance, and 8 percent is not prime farmland. The remainder is prime farmland if drained or protected from flooding. During repowering, some cropped areas will be temporarily cleared to facilitate work at the turbine pads, crane pads, crane pathway, road widening locations, and staging areas. After repowering is completed, crops and vegetation will be re-established during the growing season.

8.10.1.1 Potential Impacts

To the extent possible, the Repower Project will avoid impacts to farmland and pasture. Because this is a repowering project, the only impacts to the landscape will be temporary for work around turbine pads, crane pads, crane pathway, staging areas and access road widening. Temporary impacts will total approximately 79 acres, with 15, 16, and 48 acres of impact for turbine work areas, staging/laydown/substation areas, and crane paths/pads, respectively.

8.10.1.2 Mitigation Measures

To mitigate impacts resulting from compaction, the construction equipment used to erect the wind turbine components, much like agricultural equipment, is designed with wide tires and tracks to distribute their weight over a larger area and provide stability. This minimizes the degree of soil compaction resulting from construction. Once repowering is complete, Zephyr will assess disturbed areas and determine whether excessive soil compaction has occurred in conjunction with the affected landowners. In areas where soil compaction has occurred from Repower Project activities, Zephyr will work with the landowner and establish appropriate corrective action measures (e.g., tilling, ripping or other methods). Sites used for temporary storage, material staging, and access areas typically experience significant amounts of traffic, and will likely require de-compacting prior to resuming agricultural use.

While significant impacts to drain tiles and other existing facilities due to the Repower Project are not anticipated, Zephyr will promptly repair or replace drain tile that may be impacted. Prior to beginning site work, Zephyr will contact the landowner where the work will be conducted to

properly identify and locate drain tiles or other underground structures that may be present in the work area.

Overall, impacts to agriculture as a result of the Repower Project are anticipated to be short term, minimal, and are not expected to significantly alter crop production. Once the repower is completed, Zephyr will restore disturbed areas as close as practicable to its original condition. Post-construction restoration will largely depend upon the amount of disturbance occurring on the site and the soil types at each location.

While in operation, it may occasionally be necessary for Zephyr to complete repairs, or clear/spray vegetation around a turbine or substation cap bank area, which could result in additional temporary impacts to agricultural operations. These interruptions are expected to be infrequent and short term, and landowners will be compensated in accordance with the terms of their agreements with Zephyr.

8.10.2 Forestry

There are no economically important forestry resources within the Repower Project area.

8.10.2.1 Potential Impacts

No significant impacts to forestry resources are anticipated. Wooded areas near farmsteads and waterbodies will be avoided by the Repower Project. While significant tree removal is not anticipated, some trees and limbs may occasionally need to be removed for crane access or trimmed to prevent damage to the Repower Project infrastructure from wind and ice, and to ensure reliable operation.

8.10.2.2 Mitigation Measures

Because economically important forestry resources are not found in the Repower Project area, and negligible or no impacts to forestry resources are anticipated, no mitigation has been proposed.

8.10.3 Mining

There are no significant mining resources within the Repower Project area (Map 13).

8.10.3.1 Potential Impacts

No impacts to mining resources or operations are anticipated to accommodate repowering or continuing Project operation.

8.10.3.2 Mitigation

Because there are no significant mining resources within the Repower Project area, no mitigation has been proposed.

8.11 Tourism

Nobles County offers community-centered tourism and recreational opportunities throughout the year. While there are currently no tourism attractions within the Project area, there are tourism opportunities throughout the county. The primary tourism draws near the Project area include outdoor recreational opportunities such as Wildlife Management Areas, Scientific and Natural Areas, and snowmobile trails.

8.11.1 Potential Impacts

No direct impacts to tourism are anticipated.

8.11.2 Mitigation Measures

No negative impacts to tourism are expected. Therefore, no mitigation measures are proposed.

8.12 Local Economies and Community Benefits

8.12.1 Potential Economic Impacts

The Repower Project is expected to positively impact the local economy by adding temporary jobs. About 40 temporary jobs are expected to be added for Repower Project; temporary technicians will be mobilized as needed; and two permanent technicians and a shared site manager will service the project for the long-term. The communities near the Repower Project area are also expected to receive positive economic benefits. Short-term impacts to the socioeconomic resources of the area are expected to be minor. It is anticipated that some land will be temporarily removed from agricultural production for less than a year while the repowering work is accomplished, but landowners will be compensated for this loss under the terms of their landowner agreements. Repowering is anticipated to stimulate some local industries (e.g., hotels, restaurants, gas stations) and is not expected to have any negative impacts to local industries as a whole. At a minimum, repowering is expected to extend the positive economic life of the Wind Farm for at least 20 years, thereby extending the economic benefits as well.

Wages and salaries paid to contractors and workers in Nobles County will contribute to the overall personal income of the region. Additional personal income will be generated for residents in the county and state by circulation and recirculation of dollars Zephyr pays for business expenditures and for state and local taxes. Equipment, fuel, operating supplies, lodging, and other product and service expenses will benefit businesses in the counties and the state.

The top three industries of employment in the county include manufacturing; transportation and warehousing, and utilities; and educational services, and health care and social assistance. The primary industry in Summit Lake Township includes educational services, health care, and social assistance, and the primary industry in Larkin Township includes agriculture, forestry, fishing, hunting, and mining (see Section 8.1 and Table 8.1-1).

The estimated per capita income for Nobles County was $25,939 in 2019. Summit Lake Township had a slightly higher estimated per capita income of $28,401, and Larkin Township had the highest estimated per capita income of $43,513 (Table 8.2).

Overall, Summit Lake and Larkin townships have higher estimated per capita income, lower unemployment rates, and lower number of persons living below the poverty level than Nobles County.

Table 8.2: Income and Poverty

Category [1]	Summit Lake Township	Larkin Township	Nobles County
Per Capita Income	$28,401	$43,513	$25,939
Unemployment Rate (population over 16 years)	0.7%	1.5%	2.3%
Persons Living Below Poverty Level	0.8%	6.2%	13.6%

[1] Data retrieved from the 2019: ACS 5-Year Estimates Subject Table, Selected Economic Characteristics, Table ID: DP03.

The unemployment rate in Larkin Township (1.5 percent) is double the unemployment rate in Summit Lake Township (0.7 percent), and the unemployment rate in Nobles County (2.3 percent) is nearly three times higher than the unemployment rate in Summit Lake Township.

8.12.2 Production Tax Payments Made to Counties

Construction and operation of the Repower Project will provide long-term beneficial impacts to the counties' tax bases and contribute to improving the local economy in this part of Minnesota. As described in other nearby wind project site permit applications, the development of wind energy in this area of Minnesota has been important in diversifying, supporting and strengthening the personal income and property tax base of southwestern Minnesota.

The wind energy production tax for the CWS Project is assessed at $1.20 per megawatt-hour (MWh) of electricity produced. The Repower Project will result in increased tax payments of approximately 10 percent per year, compared to current tax payments, to Nobles County due to increased production. Based on energy production tax to the local counties of $1.20 per MWh of electricity produced, the annual wind energy production tax is projected to average approximately $147,960 per year without the repower and $161,975 each year with the repower. Total taxes for a 20-year period are estimated at approximately $2.9 million without the repower, and $3.2 million with the repower. It should be noted that realized production does vary from year-to-year due to wind speeds, outages, and other factors.

8.12.3 Mitigation Measures

The Repower Project is anticipated to result in positive socioeconomic impacts to the Repower Project area, and be beneficial to landowners, local governments, and communities. The Repower Project will result in increased wages to local businesses and landowners during construction, and an overall increase to Nobles County's tax base as a result of increased energy production. Participating landowners will also benefit economically through increased long-term lease payments. Landowners will be compensated directly for potential financial losses associated with

removing small amounts of land from agricultural production during the less than one-year repower process and for potential drain tile damage per the terms of the lease agreements.

Effects on temporary or permanent housing are anticipated to be negligible. During construction, out-of-town laborers will likely use lodging facilities nearby. The operations and maintenance of the facility will require approximately 2-3 long-term personnel. The Project anticipates that sufficient temporary lodging and permanent housing will be available within Nobles County to accommodate construction laborers and long-term personnel.

8.13 Topography

8.13.1 General Description

Topography within the project area is generally undulating consisting of rolling hills, stream networks, floodplains, and wetlands. Digital elevations are provided on Map 14. Overall topography is generally highest in the west and decreases towards the east. The highest elevation on the site is approximately 1,748 feet above mean sea level (amsl), and the lowest elevation is approximately 1,648 feet amsl.

8.13.2 Potential Impacts

No significant impacts to topography are anticipated, because only limited, if any, grading will be required to repower the project. Grading within steep slope areas will be avoided to the degree practicable. Minimizing cut and fill requirements will reduce erosion control potential as well as decrease overall construction costs. Laydown and staging areas have been sited in relatively flat locations absent of steep slopes to avoid excess grading as shown on Map 13.

8.13.3 Mitigation Measures

Construction Best Management Practices (BMPs) will be implemented surrounding graded areas in accordance with state standards, the MPCA *Stormwater Best Management Practices Manual*, and the approved Stormwater Pollution Prevention Plan (SWPPP) for the Repower Project area (see Section 10.2). Based on recommended and required mitigation measures and avoidance of areas with steep slopes (Map 13), there would be no adverse impact on topographic resources as a result of repowering the currently operational project.

8.14 Soils

8.14.1 General Description

The soils of Nobles County formed in several parent materials. The major kinds of parent material include: glacial till, loess, glacial outwash, alluvium, colluvium, and organic material. The soils are dark colored because they formed under an original vegetation of tall grass prairie. Glacial till or a thin loess mantle over glacial till are the parent materials of about 65 percent of soils in Nobles County. It is composed of older glacial till that was reworked by the Tazewell and Cary substages of the Wisconsin glaciation (DOA, 1975).

The soil map (Map 13) illustrates the soils in the Repower Project area. The two associations located within the project area are Wilmonton-Letri-Everly and Webster-Nicollet-Clarion-Canisteo (DOA, 1975). Other soil associations located near the Project area include Spillville-Millington-Comfrey, Webster-Nicollet-Glencoe-Crippin-Canisteo and.

8.14.2 Potential Impacts

Repowering the Project will likely result in minor short-term impacts to soils within the Project area. Most of the impacts to soils will result from grading to accommodate temporary laydown areas, crane paths, intersection improvements, and expansion of turbine pads for construction cranes. The temporary 5 to 10 acre laydown yard(s) will be constructed on agricultural lands to stage the turbine components prior to installation as well as other routine construction uses. No additional impacts are expected from continued operation of the Repower Project.

8.14.3 Mitigation 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. Zephyr will work with landowners in the Repower Project area to site the staging/laydown areas to minimize impacts to prime farmland to the extent practicable. Within work areas, topsoil will be separated from subsoils, protected from erosion and runoff using mulch, and then respread over disturbed areas once work is completed. Erosion control measures would also be implemented during construction to avoid or minimize soil erosion and off-site deposition. Erosion and sedimentation will be reduced through the use of BMPs such as mulching, hydroseeding, erosion control blankets, silt fence installation, jute matting, revegetation, and/or interim reclamation (see Section 10.2). 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.

8.15 Geologic and Groundwater Resources

8.15.1 General Description

Information on Nobles County geology is summarized from the USDA, 2020, USDOI, 1964, and Morey and Meints, 2000. The crest of the Coteau des Prairies ridge extends across the County from northwest to southeast consists of a bedrock core that is overlain by Cretaceous strata. Cretaceous strata is composed of interbedded shale, siltstone, and sandstone. Sioux Quartzite and granite are the oldest bedrock units found in the county. Both are of Pre-Cambrian age and underlie most of the county. The depth to bedrock throughout the county varies from 150 to 500 feet. In the northeast and northwest parts of the county, the Sioux Quartzite is directly overlain by glacial drift. Bedrock is not known to outcrop in the county. Surficial outwash deposits fill valley bottoms and form the terrace deposits associated with the present-day drainage channels. These are generally made up of sand gravel, and some silt and clay, and range in thickness from 0 to 60 feet or more.

Geologic resources in the county include sand and gravel deposits. The types of aquifers in the county are varied. The primary source of groundwater in Nobles County is the glacial drift. Buried

outwash deposits supply water to 7 of the 10 municipalities, and to most of the farms in the area (USDOI, 1964). Sioux Quartzite also yields water obtained from the fissures of interbedded shale or fractures in the quartzite. Water yield from the quartzite is generally low and it occurs sporadically throughout the county. It is not deemed an important water source in this area. Cretaceous sandstone units are a secondary source of groundwater.

8.15.2 Potential Impacts

Impacts to geologic and groundwater resources from the Repower Project are not anticipated, as there will be only minimal surface disturbance for temporary construction crane paths, staging/laydown, and switchyard expansion.

8.15.3 Mitigation Measures

No impacts to geologic and groundwater resources are expected from repowering or continued operation of the Project, therefore, no specific mitigation is proposed. Turbine components will be "switched out completely" rather than reconfiguring them on-site, and all gear oil and lubricants will be properly managed and disposed of in accordance with local, state and federal regulations. Any minor, accidental spills of petroleum or other coolants or lubricants that might occur from equipment (during construction or operation) will be immediately cleaned up by trained personnel, and absorbent and contaminated materials disposed of at an appropriate facility. Zephyr staff will report spills to the county and state as required.

8.16 Surface Water and Floodplain Resources

8.16.1 Lakes, Streams, and Ditches

Surface water and floodplain resources for the proposed project area were identified by reviewing USGS Topography, National Hydrography Dataset, and Public Waters Inventory Mapping for the Project area.

Several unnamed ditches and watercourses exist within the project boundary as shown on Map 15, but there are no large lakes, ponds or other open waterbodies. The MNDNR Public Waters Inventory (PWI) map for Nobles County shows three public watercourses located within the Project area. Two of these are unnamed and the other is the East Branch Kanaranzi Creek. There are no other public watercourses or basins located within the Project area.

A portion of the East Branch Kanaranzi Creek, located approximately one mile south of the Project Area, is listed as impaired waterbody due to E.coli, turbidity, fishes, bioassessments, and benthic macroinvertebrate bioassessments.

8.16.2 Designated Wildlife Lakes and Special Waters

There are no designated wildlife lakes within Nobles County (MNDNR, 2014a). There are also no known outstanding resource value waters (MPCA, 2018), sensitive lakeshores (MNDNR, 2014b), or trout streams (MNDNR, 2018) within the Project area. As there are none of the aforementioned

resources located within or adjacent to the Project area, it is unlikely that they will be negatively impacted.

8.16.3 Federal Emergency Management Agency (FEMA) Floodplains

Flood Insurance Rate Maps (FIRMs) produced by the Federal Emergency Management Agency were reviewed for the Project area. According to the FIRM map (Community Panel Number 27105C0225C; May 19, 2014) for the site, the majority of the Project area is located outside of the 100-year floodplain (Map 15). Within the central portion of the Project area, there are a couple 100-year floodplains classified as Zone A (FEMA, 2014). These floodplains coincide with the two unnamed MNDNR public watercourses located in the Project area. There are no setbacks to floodplains required by Nobles County.

8.16.4 Calcareous Fens

No calcareous fens are known to be located within the Repower Project area or within one mile of the Project Area (MNDNR, 2020a). Nobles County has one designated calcareous fen located west of the town of Adrian, about 7.5 miles southwest of the Project. Consequently, no impacts to fens are anticipated from the repowering process. Proposed temporary crane paths, staging/laydown yard(s) and any intersection improvement areas will be reviewed for the presence of calcareous fens during wetland delineation activities.

8.16.5 Potential Impacts and Mitigation Measures

Due to the presence of watercourses within the Project area, permits may be required for temporary crane crossings or for routing electrical collection lines. However, the Applicant has identified the previously used crane path routes and intends to use these routes to the degree it is practical. The previous crane path routes avoided crossing identified public watercourses located within the Project Area. Potential temporary impacts will be closely coordinated with the MNDNR, Corps, and the Local Government Units administering the Minnesota Wetland Conservation Act (Nobles County Soil and Water Conservation District), as appropriate.

Only minimal, if any, impacts to FEMA floodplains are anticipated during the repowering process for the Project. It is possible that minor, temporary impacts to FEMA floodplains may occur as a result of crane crossings in areas where it is not possible to avoid. Any disturbed FEMA floodplain areas will be restored per local, state and federal regulations.

8.17 Wetlands

Using the National Wetland Inventory dataset (NWI), a total of 71 potential wetlands, totaling 161 acres, were identified within the Project boundaries. Of these, 36 were categorized as freshwater emergent wetlands (146 acres), 30 were riverine (13 acres), one was freshwater forested/shrub (one acre) and four were freshwater ponds (one acre) (USFWS, 2018b). Using the PWI dataset, Zephyr identified no public water wetlands within the Project boundaries.

An updated field delineation of the wetlands within the Repower Project's temporary crane paths, staging/laydown yards and intersection improvement areas will be completed. A wetland

delineation report will be prepared and will be circulated to wetland agencies for review and approval prior to construction.

8.17.1 Potential Impacts and Mitigation Measures

Based on the current crane path layout, only minimal, if any, impacts to wetlands are anticipated. Minor, temporary impacts to wetlands may occur as a result of construction crane movements. Temporary placement of construction materials (e.g., timber mats, riprap, geotextile fabric, temporary stabilizing materials, culverts) into any waterbody or wetland for purposes of temporary stream crossings, cofferdams, or storage sites may require coordination with the Corps and Nobles County, administering Section 404 of the Clean Water Act and the Minnesota Wetland Conservation Act (WCA), respectively. Because all proposed impacts are temporary, any unavoidable fill activities are anticipated to qualify under Nationwide Permit 33 for temporary impacts and be eligible for a "no-loss" determination under the WCA.

The MPCA administers the National Pollutant Discharge Elimination System (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 streams and wetlands during and after construction. Mitigation measures included in the SWPPP will ensure that surface waters within the Repower Project area do not incur adverse construction-related stormwater impacts. Any additional best management practices (BMPs) that may be required due to the presence of special waters or impaired waters within one mile of the Project Area will be adhered to.

8.18 Vegetation

8.18.1 Description of Resources

Land cover mapping for the Repower Project area was obtained from the U.S. Geological Survey National Land Cover Database (NLCD). The data is based on a 16-class land cover classification methodology that has been applied consistently across the United States at a spatial resolution of 30 m and is created through a decision-tree classification of Landsat satellite data (circa 2011) (Homer et al. 2015). Based on NLCD data, about 86 percent of the proposed Repower Project area is cultivated cropland, six percent is herbaceous, six percent is developed open space, less than one percent mixed forest, and one percent emergent herbaceous wetlands.

Pasture and grassland areas mostly occur along stream corridors and are scattered around the center of the Repower Project area. Forested areas appear limited to areas around homesteads.

8.18.2 Potential Impacts and Mitigation Measures

The 2012 Site Permit required a prairie protection plan to the extent there were prairie impacts (Site Permit Condition C.6). Surveys completed in 2011 within the Project area did not identify native prairie, and therefore no impacts to native prairies were proposed. Because there were no impacts to native prairies when the CWS Project was originally constructed, a prairie protection and management plan was not required or prepared. Similarly, impacts to native prairie will be avoided by the repowering process.

It is the intent of the Applicant to utilize the same crane paths for repowering that were used during the original construction, to the extent possible, to minimize impacts to vegetation. Proposed crane paths have been routed primarily on agricultural lands. The Repower Project will avoid woodlands, shrublands, and grasslands to the degree practicable. However, some minor, unavoidable impacts to these areas may occur. 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, Zephyr is committed to restoring and seeding these areas with certified weed-free mixes appropriate for the region. It is the intent of Zephyr to minimize impacts to non-cultivated, plant communities within the Project area.

8.19 Wildlife Resources

8.19.1 Wildlife

Wildlife species likely to occur within the Project area are typical of those found in agricultural-dominated landscapes. Passerines likely to occur in the Project area include the western meadowlark (*Sturnella neglecta*), horned lark (*Eremophila alpestris*), American robin (*Turdus migratorius*), and red-winged blackbird (*Agelaius phoeniceus*). Killdeer (*Charadrius vociferous*), a shorebird, are also likely to occur within the Project Area. Waterfowl species likely include the Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), and blue-winged teal (*Anas discors*). Common raptors likely include the red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and northern harriers (*Circus hudsonius*).

Medium to large mammal species likely to occur within the Project Area include white-tailed deer (*Odocoileus virginianus*), striped skunk (*Mephitis mephitis*), red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), cottontail rabbit (*Sylvilagus floridanus*), fox squirrel (*Sciurus niger*). Small mammals typical of the area include house (*Mus musculus*) and deer (*Peromyscus maniculatus*) mice, and meadow voles (*Microtus pennsylvanicus*). Bat species typical of southwestern Minnesota include the hoary bat (*Lasiurus cinereus*), eastern red bat (*Lasiurus borealis*), big brown bat (*Eptesicus fuscus*), and silver-haired bat (*Lasionycteris noctivagans*).

Common reptiles and amphibians that occur in southwestern Minnesota include the common gartersnake (*Thamnophis sirtalis*), snapping turtle (*Chelydra serpentina*), western painted turtle (*Chrysemys picta*), American toad (*Anaxyrus americanus*), and northern leopard frog (*Lithobates pipiens*).

The proposed crane paths have been sited primarily in agricultural row-cropland; therefore, it is anticipated that repower activities will have minimal and temporary impacts on residential wildlife. Zephyr consulted with the USFWS and the MNDNR regarding any potential concerns or impacts to wildlife or habitats associated with the repowering of the Project (Appendix E). There are no known substantive changes to wildlife populations from those determined in the original site permit application.

As construction activities associated with Project repowering will primarily be conducted within agricultural areas, impacts to wildlife or wildlife habitats are anticipated to be minimal. Wildlife-specific mitigation is described throughout this document.

8.19.2 Waterfowl Feeding and Resting Areas

There are no established Migratory Waterfowl Feeding and Resting Areas (MWFRA) within Nobles County. The nearest MWFRAs (Heron Lake and South Heron Lake) are more than 24 miles east of the Project Area in Jackson County (MNDNR, 2016).

8.19.3 Important Bird Areas

The Project Area is approximately 18.1 miles southwest of the Heron Lake Important Bird Area (IBA) and 15 miles southeast of the Prairie Coteau Complex IBA (Audubon Society, 2016). The Heron Lake IBA encompasses a variety of lakes, wetlands, and grasslands, 11 WMAs, four WPAs, and two county parks. Seventy-seven bird species have been documented in the Heron Lake IBA. The Prairie Coteau Complex IBA provides prairie, marsh, and grassland habitats for a variety of bird species. A total of 251 bird species are known to use the Prairie Coteau Complex IBA, including special status species (i.e., Species of Greatest Conservation Need [SGCN], Species of Concern, and state-threatened or endangered species). Although the Project Area is located between two IBAs, the Project has been operating for the past 8 years with no known significant avian mortality events.

No wildlife impacts have been observed or reported by operations staff since Zephyr took ownership, and no impacts will occur to habitat within the IBAs. Consequently, impacts are not anticipated to either IBA as a result of repowering the Project.

8.20 Rare and Unique Resources

The Repower Project area was evaluated for the presence of federal and state listed species, their habitat, and the potential for the proposed repowering efforts to affect said species. An updated MNDNR Environmental Review (ER) was requested and a response was received (#ERDB 20200327) regarding special status species and rare habitats within or near (i.e., within one mile) the Project Area, and the MNDNR submitted an early coordination letter regarding guidance for rare species or habitats within the Project Area (Appendix F). Also, a USFWS (2020) Information for Planning and Consultation (IPaC) request was submitted to identify federally protected species known or likely to occur in the Project Area (Appendix J).

8.20.1 Review of Rare and Unique Natural Resources

In 2020, Zephyr requested an updated ER response from the MNDNR Natural Heritage Review to determine if there are records of any special status species or rare habitats that were not documented during the initial site permitting review process. The ER (#ERDB 20200327) indicated that repowering the Project is not anticipated to impact and special status species or rare habitats in or near the Project Area (Appendix F). The MNDNR early coordination letter identified the federally endangered Topeka shiner (*Notropis topeka*) and the state-threatened Blanding's turtle (*Emydoidea blandingii*) as species that may occur within or near the Project area with

recommended BMPs to avoid or minimize impacts to these species' habitats (i.e., wetlands and streams) (Appendix F).

The USFWS IPaC database indicated that three federally listed species have the potential of occurring within or near the Project area. The listed species identified include the federally threatened northern long-eared bat (NLEB) (*Myotis septentrionalis*) and prairie bush-clover (*Lespedeza leptostachya*), and the federally endangered Topeka shiner. The database also indicated the Project area is within designated critical habitat for the Topeka shiner.

Due to population-level declines caused by the fungus that manifests as white-nosed syndrome, the NLEB was federally listed as threatened. Although the Project Area is located within the known range of NLEB, no known NLEB hibernacula or maternity roost trees are located within Nobles County (MNDNR and USFWS, 2020). Forested habitat is largely limited within the Project Area and is unlikely to provide suitable roosting habitat for NLEB. Regardless, incidental take resulting from wind energy development and operation is not prohibited under the final 4(d) rule; provided that the conservation measures set forth in the rule are followed to protect hibernacula and known, occupied maternity roost trees (USFWS, 2018d). Zephyr will implement feathering below cut-in speed (FBCI) from April 1 to October 31 to reduce risk of bat mortality when there is no energy production. FBCI will prevent free-wheeling at low wind speeds when bats are most active.

Topeka shiner occur in small to mid-size prairie streams in the southwestern Minnesota. Topeka shiner have been documented in the nearby Kanaranzi Creek (Nagle and Larson, 2013). Preferred streams habitat for Topeka shiner are slow-moving, low-gradient, with sand, rubble, or silt-covered gravel substrates. They often occur in stream pool areas (USFWS, 2007b; USFWS, 2019b). Although the Project area is within designated critical habitat for Topeka shiner, and there are species records in the nearby Kanaranzi Creek that is connected to the canals and intermittent streams that are within the Project Area, the ER (#ERBD 20200327) did not indicate that repowering the Project would impact Topeka shiners. The MNDNR early coordination letter indicated that avoidance measures or best management practices (BMPs) should be followed to minimize potential impacts to Topeka shiners (Appendix F).

Blanding's turtles prefer shallow wetlands (or wetland complexes) and slow-moving streams. In the southwestern portion of Minnesota, Blanding's turtles use meandering streams and rivers, fens, prairie marshes, backwaters, and oxbows, and will use adjacent agricultural lands (Lang, 2003). Although the MNDNR early coordination letter indicated that Blanding's turtles have not been observed within the Project Area, the species is expanding its range in southwestern Minnesota. While none have been reported in the vicinity of this project, recent studies have indicated that the State threatened Blanding's Turtles have begun moving into this portion of the state, often overlapping with Topeka Shiner habitat. Most practices that will generally protect stream and upland habitat will also help protect Blanding's turtles – more information and specific recommendations are provided in the Blanding's Turtle Fact Sheet. We will also encourage on-site workers to keep an eye out for Blanding's turtles and report any sittings to our non-game staff. The Blanding's Turtle ID and Reporting Factsheet (Appendix J) can be provided to staff to help facilitate this. We generally recommend wildlife friendly erosion control and invasive species prevention practices (attached) to minimize risks to aquatic and terrestrial habitats.

The MNDNR early coordination letter also indicated that avoidance measures or BMPs similar to those suggested for Topeka shiner should be followed to minimize potential impacts to the species (Appendix F).

Prairie bush-clover is an obligate of tallgrass prairie habitats (USFWS, 2009). There are twelve Potentially Undisturbed Lands (PUDL) classified as Prairie Coteau grasslands within the Project Area that may contain prairie habitat. However, no MNDNR Native Plant Communities (NPC) were mapped within the Project Area. There are two NPCs, identified as southern dry hill prairies within one mile to the south of the Project Area. Prairie bush-clover may occur within the potential prairie and known prairie areas identified. However, no Project-related disturbance is planned within prairie habitats.

Although records of special status species or habitats were not documented within the Project Area, Zephyr will adhere to the BMPs (such as for Topeka shiner and Blanding's turtles) to avoid or minimize potential impacts to listed species and sensitive habitats (i.e., prairies) within or near the Project area.

8.20.2 Native Prairie

The desktop mapping efforts were used to identify the presence of native prairie within the Project Area. Zephyr took into consideration historical land use, publicly available Potentially Undisturbed Lands in southwestern Minnesota GIS data, MNDNR Native Plant Communities GIS data, Minnesota Biological Survey (MBS) GIS data, and Conservation Reserve Program data to identify potential native prairie areas. Twelve Potentially Undisturbed Lands, classified as Prairie Coteau grasslands, were mapped within the Project Area. It is possible that some or all of these contain prairie habitat. Disturbance areas will be fully reviewed for potential native prairie prior to construction work and a native prairie protection plan provided in accordance with the site permit amendment.

8.20.3 Minnesota County Biological Survey Sites

Zephyr conducted desktop review of MBS Sites of biodiversity significance within the Project Area. No MBS sites were mapped within the Project area. Four MBS sites of moderate biodiversity significance, and one MBS site below biodiversity significance were mapped within one mile of the Project area. Crane walk paths will be re-evaluated for MBS sites if they are moved from the previously permitting locations.

8.20.4 Potential Impacts

The MNDNR ER (#ERBD 20200327) response recommended that Zephyr conduct post-construction fatality monitoring for birds and bats. Although, the CWS Project has been operating continuously since 2012, Zephyr will continue to implement the Wildlife Reporting and Response System (WRRS) with quarterly reports submitted to the MPUC and will use results from post-construction mortality monitoring (PCMM) studies from nearby windfarms to guide adaptive management strategies.

Per recommendations in the MNDNR's November 13, 2020 project comment letter (Appendix F), Zephyr will lock or feather the turbine blades 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. Additionally, the operating turbines will be equipped with operational software capable of adjusting turbine cut-in speeds. In order to adequately document and describe measures to identify, avoid, and manage risks to avian and bat species that may result from wind turbine upgrades, Zephyr prepared a draft Bird and Bat Conservation Strategy (BBCS) (Appendix K). BBCSs are based on recommendations provided in the USFWS's Land-Based Wind Energy Guidelines (USFWS, 2012). However, the original permitting effort occurred at or before the time of this guidance, so much of the current guidance was not applied. The CWS Project has been operating continuously since 2012, and only one bird mortality has been identified according to quarterly avian reports filed to the docket. This is consistent with the MNDNR's assessment of the site being generally low-risk to birds and bats during the original permitting process.

Given that the Project is comprised primarily of agricultural lands, wildlife species likely to occur within the Project Area is likely comprised of common species. As the proposed actions involve repowering an already operational wind turbine, impacts to wildlife or habitats are expected to be minimal and temporary. Project operation is expected to have impacts on wildlife comparable to other wind farms within the same region. As potential impacts to wildlife are anticipated to be minimal, no species-specific mitigation measures are proposed; however, Zephyr will employ BMPs to minimize or avoid impacts to Topeka shiner and Blanding's turtle habitat to the extent practicable.

8.20.5 Rare and Unique Natural Resources

No change from the original application concerning impacts to rare or unique natural resources is anticipated during the repowering process. Zephyr is familiar with the BMPs associated with avoiding or minimizing impacts to listed species and their habitats, and to prairie habitat that may be on-site or nearby, as demonstrated during construction of the original Project in 2012. Zephyr intends to work closely with MNDNR and USFWS staff, as needed, to ensure rare and unique resources are avoided to the extent practicable.

8.20.6 Mitigation Measures

Areas indicated by the MNDNR as sensitive within the Repower Project area will be avoided to the extent practicable. Impacts to wildlife and their habitats will be mitigated by: (1) siting temporary crane walks, pads, and laydown areas on cultivated agricultural land, when at all possible, (2) avoiding impacts to wetlands, streams, forested areas, shrublands, and native plant communities to the extent practicable, and (3) following the recommendations for avoiding or minimizing impacts to potential Topeka shiner habitat.

8.21 Climate Change

Minnesota is taking action against climate change. Executive Order (19-37), signed in December 2019, created the Governor's Advisory Council to promote coordinate climate change mitigation

and resilience strategies in the State of Minnesota. The Executive Order describes climate change as an existential threat that impacts all Minnesotans and our ability to thrive.

The Next Generation Energy Act of 2017 set statutory goals to reduce greenhouse gas emissions in the state by 30 percent of 2005 levels by 2025, and 80 percent by 2050. Minnesota fell short of its 2015 goal of 15 percent and is not on track to meet the 2025 goal (Executive Order 19-37).

The Repower Project will further the states' clean energy goals set forth by the Governor's Office by providing a renewable source of energy that will offset other greenhouse gas emissions, primarily from coal and natural gas. The existing wind farm is estimated to offset approximately 80,318 metric tons of carbon dioxide (CO_2) per year. With the repower, the offset is expected to increase to 95,436 metric tons of CO_2, the equivalent of 105.2 million pounds of coal burned for one year (USEPA, 2021).

Additionally, the project has been designed with resiliency in mind as our climate continues to change in Minnesota. Project equipment has been carefully engineered and selected to withstand the potential for an increase in the frequency of severe weather events, including low temperature operation and withstanding extreme wind gusts.

The Vestas V110 turbines have been designed to withstand extreme weather events such as high wind speeds and cold temperatures. The repowered turbines will stop when wind speeds reach 21 m/s (69 f/s) and are built to operate within a standard temperature range from -20℃ to 40℃ (-4°F to 104°F) (Vestas, 2021).

While wind turbines do no release emissions, a minor amount of emissions will be generated during construction when heavy equipment is moving around the site, but this will be a short term increase in emissions. A small amount of emissions will be generated from vehicles used for maintenance and operations of the Project.

8.22 Potential Cumulative Impacts

Cumulative impacts are combined, incremental effects of human activity. While an individual activity may be insignificant by itself, minor impacts in combination with other actions may cause a larger issue in a region or to an important resource.

A review of MnDOT District 7 construction projects did not reveal any road projects proposed with similar timing and within close proximity to the Project Area that would be expected to interact negatively or create significant cumulative impacts with the proposed project (MnDOT, 2021).

According to Nobles County, several road projects are being planned for 2021 and 2022 (Nobles County, 2021). The nearest road projects include mill and overlays on CSAH 7 between CSAH 18 to Murray County (about 7.5 miles northeast of the Repower Project), and on CSAH 35 between Rock County and Worthington (about 4 miles south of the Repower Project). Both projects are planned for 2022.

Zephyr is not aware of any proposed residential or commercial development projects within the vicinity of the Project area.

As mentioned in previous sections, Zephyr is coordinating with Xcel Energy regarding their planned use of roadways for a similar repowering project at the adjacent Nobles Wind Farm. Zephyr is working with Xcel on sharing the roads and lease agreements between the two farms. The Repower Project also shares several of the 3 RD x 5 RD wind buffer setbacks within lands encumbered by wind lease agreements for the Nobles Wind Project. Zephyr has coordinated with Xcel regarding revising existing agreements that permits Zephyr to encroach upon those properties covered by Xcel leases, as was done for the original permit approval.

8.23 Unavoidable Impacts

The Repower Project has been designed to avoid natural environment effects by using existing access roads and crane paths. However, with all construction projects, impacts to the natural environmental are not entirely avoidable; temporary, minor impacts will occur in some circumstances. Zephyr has taken steps to minimize the long-term effects of these impacts by implementing mitigation measures where warranted. Environmental effects related to the Project, and efforts to minimize and mitigate these effects, are discussed in detail within this application. Environmental impacts that are not entirely avoidable, but will be minimized and mitigated, are described below. The majority of these unavoidable impacts will be temporary in nature, will occur during Project construction, and will be rectified through BMPs and site restoration activities.

The primary unavoidable impacts that will resolve following construction include the following:

- Construction-related noise,
- Dust related to construction traffic,
- Construction-related traffic,
- Wildlife displacement, and
- Exposed soils from grading activities and potential for soil erosion and sedimentation.

The primary unavoidable impacts that are anticipated to remain for the life of the project include the following:

- Aesthetic changes to the landscape (taller wind turbines), and
- Infrequent vehicle trips from maintenance vehicles traveling to and from the site.

9.0 SITE CHARACTERIZATION

9.1.1 Description of Resources

One 60 m tall tubular tilt-up met tower collected data at the Project area from November 2007 to September 2012. It was instrumented with three anemometers to measure wind speeds at 40, 50, and 60 m above ground. One wind vane to measure wind direction was installed at 60 m. A temperature sensor was installed at 3 m.

Temperature data from the met tower were correlated with an 18-year temperature dataset recorded at the Automated Surface Observing System (ASOS) unit at the National Weather Service Forecast Office in Sioux Falls, SD. The long-term hub height temperature expected at the met tower is 6.8° C (44.2° F), with a maximum of 36.6° C (97.9° F) and minimum of -33.4° C (-28.1° F).

According to the MNDNR State Climatology Office, the average annual precipitation at the Project is approximately 29-30 inches (MNDNR, 2020b).

9.1.2 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 Automated Surface Observation System (ASOS) long term reference stations varied by up to 9% (year 2010 at the Sioux Falls and Redwood station) during the reference period from 1997 to 2010.

9.1.3 Seasonal Variation

Seasonal variation is represented by the change in wind speeds from one month to the next. Table 9.1.3 shows the estimated average seasonal variation at 60 m based on correlations between the on-site met data and long-term reference datasets. Generally, the spring and autumn are expected to have the highest wind speeds, while the summer is expected to have the lowest wind speeds.

Table 9.1.3: Composite Monthly Wind Speeds (60 m)

Month	Wind Speed (m/sec)
January	8.2
February	7.6
March	8.2
April	8.9
May	8.3
June	6.8
July	6.0
August	6.5
September	6.9
October	7.5
November	8.2
December	7.9
Annual Average	**7.6**

9.1.4 Diurnal Conditions

As shown in Figure 9.1.4, the annual daily wind speed pattern at 40, 50, and 60 m from the Project's met tower has an increase in wind speeds during the evening and overnight hours.

During the summer and late autumn/early winter the largest variations occur between daytime and nighttime wind speeds, whereas there is generally less variation in the diurnal pattern the remainder of the year.

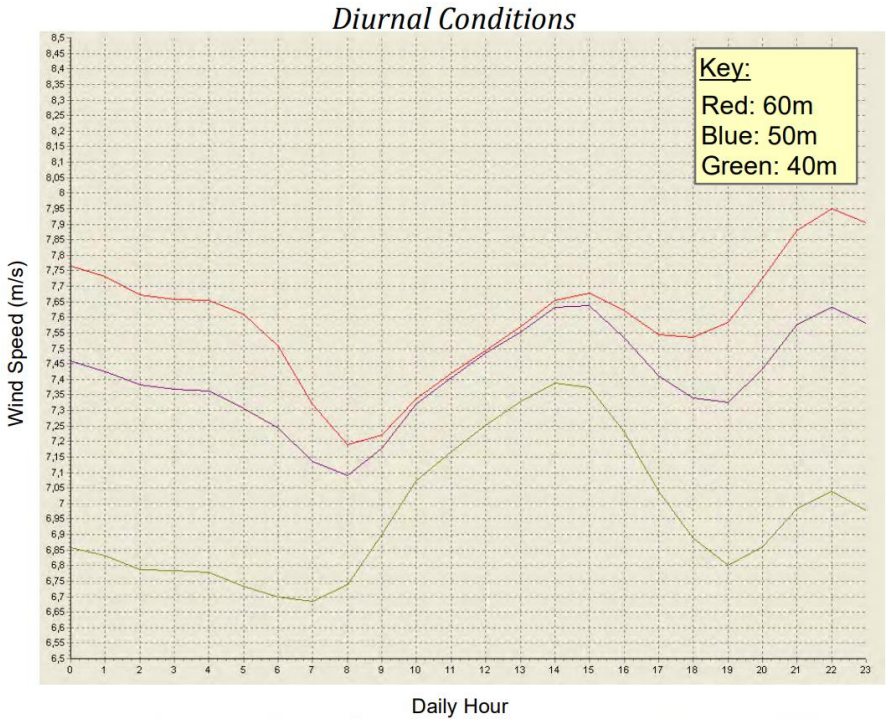

Figure 4: Average Diurnal Wind Speed

9.1.5 Atmospheric Stability

The stability of the atmosphere can be characterized based on temperature gradients. The estimated annual average of the thermal stability leads to near-neutral or weak to moderately stable conditions.

9.1.6 Hub Height Turbulence

Turbulence intensity (TI) is an indicator of the variability of wind speed. Mean turbulence intensities are 0.08 – 0.11 in winds greater than 5 meters per second at the site. Mean turbulence intensity at 15 m/sat "TI15" is 0.09; this value is considered low to moderate turbulence per International Electrotechnical Commission (IEC) document 61400-1, Edition 3.

9.1.7 Extreme Wind Conditions

An extreme wind speed estimation based on a Gumbel distribution and the met tower measurement at the highest level (60 m) resulted in an extreme wind speed of 35.1 m/s with addition of two standard deviations for a 50- year return period.

9.1.8 Wind Speed Frequency Distribution

Table 9.1.8 shows the anticipated long-term annual wind speed frequency distribution at the met tower at hub height.

Table 9.1.8: Wind Speed (m/s) Frequency Distribution

Lower Limit	Upper Limit	Freq. %
0.0	0.5	0.45
0.5	1.5	01.56
1.5	2.5	3.22
2.5	3.5	5.67
3.5	4.5	7.85
4.5	0.5	9.67
5.5	6.5	11.18
6.5	7.5	11.65
7.5	8.5	11.08
8.5	9.5	9.75
9.5	10.5	8.25
10.5	11.5	6.37
11.5	12.5	4.68
12.5	13.5	3.18
13.5	14.5	2.08
14.5	15.5	1.36
15.5	16.5	0.79
16.5	17.5	0.51
17.5	18.5	0.30
18.5	19.5	0.18
19.5	20.5	0.13
20.5	21.5	0.04
21.5	22.5	0.02
22.5	23.5	0.01
23.5	24.5	0.01

9.1.9 Wind Variation with Height

The wind shear exponent describes how quickly the wind speed changes as a function of height. It can vary greatly due to terrain, surface roughness, and atmospheric stability. A mean wind shear factor of 0.252 was calculated over all heights.

9.1.10 Spatial Wind Variation

The estimated mean annual long-term wind speeds in the general project area at a height of 60 m are estimated to range from 7.7 to 7.9 m/s. These estimates result from analysis of the project's

historical operational data along with data from four additional weather stations in the general project area.

9.1.11 Wind Rose

The frequency with which the wind blows from each direction during the year is best represented by a wind rose. Figure 9.1.11 shows the met tower's annual wind rose. Prevailing winds are from the south, with a secondary peak from the north-northwest, consistent with the region.

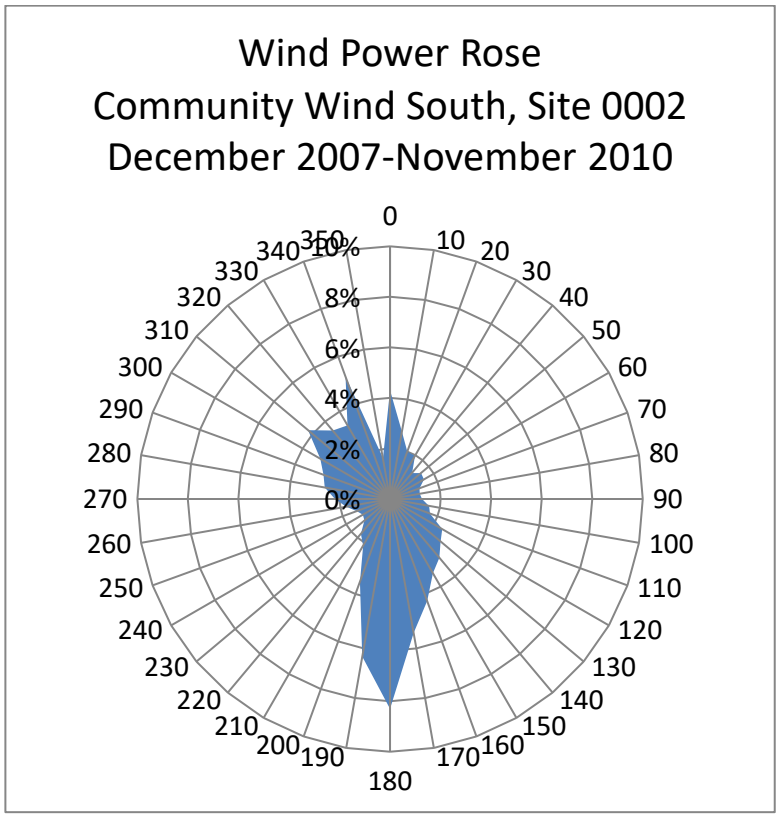

Figure 5: Wind Rose

9.1.12 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. Extreme weather events in the Repower Project area have been recorded by the National Oceanic and Atmospheric Administration (NOAA) in the U.S. Storm Events Database for the period of time from January 1950 through September 2020. Extreme weather events during this period include tornadoes, hail, thunderstorm winds, high wind, winter storms, blizzards, extreme cold, heavy snow, excessive

heat, dense fog, floods, and flash floods (among others). NOAA recorded 500+ extreme weather events in Nobles 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 61 event days with property damage reported during this period (NOAA, 2020).

9.1.13 Other Nearby Wind Turbines

Six other wind projects are located in the vicinity of the Repower Project (USGS et. al, 2021). The projects include Nobles, Nobles 2, Missouri River Energy Services, Wilmont Hills, Arnold Wind Farm, and Don Sneve Wind Farms. Table 9.1.13 provides the number of turbines, capacity, and the operational year of nearby wind turbines.

Table 9.1.13: Nearby Turbines

Project Name	Number of Turbines	Capacity (MW)	Year Online
Nobles Project	134	201	2010
Nobles 2 Project	74	250	2020
Missouri River Energy Services Project	6	3.6	2002
Wilmont Hills Project	1	1.5	2001
Arnold Wind Farm Project	1	1.6	2005
Don Sneve Wind Farms Project	1	0.9	2003

10.0 CONSTRUCTION

Repowering will consist of the following general construction steps: completing improvements to existing gravel roads and intersections to accommodate truck deliveries, preparing laydown and staging areas, compacting road shoulders and installing temporary crane crossings over streams (if needed), offloading new turbine components near operating turbines, removing and replacing existing hubs, blades, and nacelles with a construction crane, raising of the existing met tower, performing engineering inspections on new components, returning turbines to operation, and restoring temporarily disturbed areas to pre-construction conditions.

Because this is a repowering project, earthmoving will be fairly minimal and generally limited to laydown, staging, and crossing areas. 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 staging/laydown yard(s) 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. Zephyr 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 routes, gear box, nacelle and blade installations, electrical infrastructure, as well as the coordination of materials receiving, inventory, distribution and disposal of replaced equipment.

10.1 Roads and Infrastructure

Area roadways will be accessed by a variety of small (standard pickup trucks) to large (semi-tractor delivery trucks) construction vehicles during Project repowering. Once the repower is completed, only small-to-medium sized vehicles will access local roadways to perform routine maintenance on turbines and associated facilities as they do currently. The Applicant estimates that the maximum traffic the Repower Project will create is approximately 100 additional trips per day on local roadways during peak repowering when turbine components and equipment are being delivered. It is anticipated that total trips per day will decrease to approximately five vehicle trips to and from the site per day following repowering.

Because of the size of the equipment to be installed, and the turning radii of the delivery trucks, some local roadways may require upgrades to improve drivability and access. This typically includes widening select intersections to allow for the long delivery trucks to turn and upgrading road surfaces (grading and/or the addition of gravel). The degree to which existing roadways will require upgrading for the Repower Project remains under evaluation. However, due to the short-term nature of the repower work, gravel road improvements will generally consist of placement of additional gravel, as needed, and compacting the surface. All proposed upgrades will be coordinated through agreements in advance with county and township personnel.

10.2 Access Roads and Crane Crossings

The Repower Project will not require construction of new, permanent access roads. Some access roads will be temporarily widened to allow for crane movement and delivery of equipment to the base of each turbine, which will be detailed on site plans prior to construction. Temporary crane pads will be constructed along the access roads to enable removing and replacing turbine components. Zephyr will coordinate with landowners throughout the repowering process to minimize disturbances to active agricultural lands. Upon completion of repowering, temporary materials will be removed, and access roads will be returned to their standard 16-foot widths.

Based on a review of known wetlands and waterway resources on the site, significant, permanent impacts to water resources are not anticipated to accomplish the repower. No stream crossings are anticipated; however, some wetlands may be temporarily impacted to accommodate access road widening and crane paths and pads, and staging/laydown areas. If unavoidable impacts become necessary, wetland crossings will be installed and restored in accordance with issued wetland permits and generally following these steps:

1. Plan crane walks according to unique area conditions where crane walk will occur
2. Install down grade perimeter controls such as fiber rolls, silt fence and erosion control blanket to protect conveyances as field conditions dictate
3. Install geotextile fabric, timber mats
4. Walk cranes across wetlands during dry conditions whenever possible

5. Restore disturbed areas to pre-construction conditions following construction activity by removing timber mats and geotextile fabric, seeding disturbed areas, installing erosion control blankets on disturbed slopes greater than 3:1, and then removing erosion control measures once final stabilization has occurred

10.3 Associated Facilities

10.3.1 Operation and Maintenance Facility

The Project currently does not have an on-site O&M facility, and one is not proposed with repowering. The current O&M facility is located in Luverne, Minnesota as described in Section 6.3.1. Zephyr is moving the O&M from the existing building into a building owned by Vestas at 1404 South Street, Pipestone, Minnesota.

10.3.2 Electrical Substation

The CWS Project's collection cable system routes to the project substation/switchyard located north and west of Turbine T-1, then to the point of grid interconnection at the Nobles Substation, located 3.8 miles east of the project area. As described in Section 6.1, the existing Project substation/switchyard will need to be expanded to accommodate the addition of capacitor banks for each medium voltage circuit in order to meet voltage and power factor requirements once the new Vestas wind turbines are installed.

10.3.3 Laydown and Staging Areas

A secure staging/laydown yard(s) will be arranged where wind turbine components are temporarily stored, assembled, or processed, as part of the repowering process. The parcel(s) will be approximately five to ten acres in size, may house temporary construction offices and facilities, and will be sited on agricultural lands outside of native landscapes. The staging/laydown yard(s) will be relatively flat, near the substation/switchyard, and central to the proposed turbine sites. The areas will make use of gravel pads and geotextile fabric (or similar) placed in between the gravel and the soil on the site to increase the ease of restoration. In addition, a one-acre working area around each turbine is anticipated for installing the new wind turbine components. Laydown and staging areas will be in place for approximately 6 to 8 months and then restored. General laydown, staging and work area preparation and restoration steps are provided below, and will be completed in accordance with the site specific SWPPP.

1. Install perimeter sediment controls and provide stable accesses to area; install culverts as necessary and according to the plan for the accesses
2. Install additional silt fence and other sediment controls as necessary and as detailed in the plan
3. Strip and stockpile topsoil around the up-gradient perimeter of the lay down yard, staging area or work area for a diversion of water, or downgrade perimeter of the yard for runoff control
4. Apply geotextile fabric, or something similar, and then rock base to designed thickness for laydown/staging areas or compact native materials for working areas

5. Temporarily cover the stockpiles with hydro-mulch or wood-fiber blanket after seeding with temporary seed mix
6. Provide necessary secondary containment, secure storage and maintenance activities during operation
7. Remove rock if present
8. Decompact and then reapply topsoil to the area after the areas are no longer needed
9. Return disturbed areas to preconstruction condition, which may include applying seed and mulch cover for restoration in non-agricultural areas

10.3.4 Permanent Met Towers

No new permanent met towers are required for repowering. As described in Section 4.5 and 6.3.2, the existing permanent met tower at CWS is free-standing and will be raised to meet the hub height of the repowered turbines (105.05 m). The upgraded met tower will stay in place for the duration of the project.

10.4 Turbine Site Selection

No new turbine sites are proposed.

10.4.1 Foundation Design

Turbine foundations were designed by Renewable Resource Consultants in 2012 and assumed the Repower turbine specifications. According to the Uprate Evaluation of Existing 58'6-inch and 63'-6-inch diameter turbine foundations prepared by RRC in December 2020, (Appendix D), the existing wind turbines have an octagonal spread foundation design. Turbines T-3, T-6 and T-9 all have the wider, 63'-6-inch foundation, and the remaining turbines have a 58'6-inch diameter foundation. The turbine towers utilized a foundation mounting piece (FMP) embedded into the foundation. As described in Section 5.3, RRC completed an evaluation of the existing turbine foundations and their integrity to support the proposed loads of the Vestas turbine components. Both foundations passed the extreme load checks using the proposed V110 loads.

10.4.2 Tower

The existing towers are conical tubular steel with a hub height of 98.5 m (323 ft). Changes to towers include replacement of turbine tower internals, hubs, nacelles, and blades. The hub height of the repowered turbines will be increased to 105.05 m (345 ft) because of the addition of an adapter for the new Vestas turbines. The 7 m adapter will be bolted on to the top of the existing towers.

A tower design life analysis has been prepared that analyzes the structural requirements of the repower turbines and suitability of the towers (Appendix L). As described in the analysis, the integrity of the existing towers will support the new turbine components.

10.5 Post-Construction Cleanup and Site Restoration

During repowering, some areas will be temporarily impacted. Activities causing temporary impacts are associated with the widening of existing access roads for equipment transport, crane pads, crane walk path, and laydown areas. At the completion of repowering activities, temporary impact areas will be graded back to natural contours with soil loosened and seeded as needed with certified weed-free seed mixes, planted with crops, or seeded with temporary transition grasses until crops are planted. Erosion control practices will be kept in operating condition until seeded areas are stabilized. Zephyr anticipates that cleanup and restoration will take no longer than 30 days but will be completed in accordance with the issued site permit. Zephyr is committed to cleaning up construction debris and restoring temporarily impacted areas, and to the satisfaction of landowners, following project repowering.

10.6 Operation and Maintenance of Project

Upon completion of the Repower Project, Zephyr will enter into a contractual agreement with the turbine vendor, Vestas, to provide service and maintenance for the Project under an operations and maintenance contract. The service and maintenance activities will be performed by qualified technicians, trained specifically on the applicable wind turbines.

Turbine maintenance will be accomplished as an ongoing cyclical function during the life of the Project to minimize downtime. Switchyard maintenance will be accomplished on an annual basis and will be scheduled and performed during non- or low-wind periods.

The project includes a computer-controlled communications system that permits automatic, independent operation and remote supervision of each turbine and the facility collectively, thus allowing the simultaneous control of all wind turbines. The SCADA system, located in a building within the switchyard, collects data on wind turbine generation, availability, alarms, turbine conditions, communication system status, and meteorological data. Performance data and parameters for each machine can also be viewed in real time, and machine status can be changed. The SCADA system also reports and archives generation data.

10.7 Costs

The capital cost of the Repower Project is estimated to be between $35-45 million; the actual cost will be finalized after component procurement, construction, and contractual arrangements are complete. The bulk of Repower Project costs are attributed to the wind turbine components required for repowering.

10.8 Schedule

Repowering is expected to begin in spring 2022 and take approximately 6 to 8 months to complete. Zephyr anticipates returning to full production in late-2022.

10.9 Energy Projections and Wake Loss

Zephyr engaged an independent third party, Arcvera Renewables, to conduct wake loss and energy projection calculations for the Repower Project. Based on Arcvera's analysis using Eddy Viscosity DAWN wake models, the Repower Project is expected to have an overall wake loss of 5.39 percent compared to the existing project's overall wake loss of 6.03 percent.

10.10 Decommissioning and Restoration

A decommissioning plan outlining the anticipated means and cost of removal was completed in accordance with the Nobles County requirements and state guidelines (Appendix M). At the time turbines are no longer operated physically or the Project is not viable economically, turbines will be decommissioned. Restoration of the area will be completed according to Nobles County permitting and zoning requirements, leases, and the Commission's site permit. At the time turbines are decommissioned, they will be removed from site and either refurbished or salvaged depending on condition.

Section 9.2 of the site permit requires removal of wind facilities to a depth of four feet and restoration and reclamation of the site to the extent feasible. All subsurface infrastructure will be removed to four feet below ground level and reclaimed as specified in the land leases, and all surface infrastructure will be removed and reclaimed to pre-construction conditions. Underground utility lines deeper than forty-eight (48) inches below ground may be left in place to minimize land disturbance and associated impacts to future agricultural land use. Any agreement for removal of project infrastructure to a depth of less than forty-eight (48) inches, or no removal, will be recorded with the county and will show the locations of all such foundations.

10.10.1 Anticipated Life of the Project

Zephyr estimates the service life of the Repower Project to be approximately 30 additional years.

10.10.2 Estimated Decommissioning Costs in Current Dollars

Zephyr estimates the total decommissioning cost would be approximately $1,233,000 ($82,200 per turbine) including a ten percent (10%) contingency on the demolition costs and engineering/administration costs and crop loss. The salvage/scrap value of the turbines, transformers, and other materials is approximately $650,000, or $43,400 per turbine. Including resale and salvage values the net cost is approximately $583,000, or $38,800 per turbine.

10.10.3 Method for Updating that Funds are Available and Updating Decommissioning Costs

Zephyr will be responsible for costs to decommission the Project and associated facilities. Over the life of the Repower Project, Zephyr will provide financial assurance to cover decommissioning costs. The form of financial assurance is a financial resource mutually agreed upon by Nobles County Board of Commissioners and Zephyr and will be adjusted upward or downward to offset any increases or decreases in decommissioning costs and salvage values determined during periodic decommissioning plan updates. The financial

resource will be established on dates mutually agreed to by Zephyr and the Nobles County Board. The Decommissioning Plan will be updated and re-filed with the Minnesota Public Utility Commission at five-year intervals starting five years after the commercial operation date (COD) of the repower project. The revised plans will update the cost estimate to reflect the changes in anticipated costs.

10.10.4 Method for Ensuring that Funds are Available for Decommissioning

As described in Section 10.10.3, Zephyr proposes to establish a form of financial assurance mutually agreed upon with the county that will be adjusted upward or downward to offset any increases or decreases in decommissioning costs and salvage values determined during periodic decommissioning plan updates. This will provide a funding source to pay for decommissioning and site restoration costs after operations cease, to the extent that Zephyr doesn't decommission the project per the requirements and the salvage value does not cover decommissioning. Including resale and salvage values, the net cost of decommissioning is estimated at approximately $583,000, or $38,800 per turbine.

10.10.5 Anticipated Methods of Site Decommissioning and Restoration

After the Wind Farm has reached the end of its useful life, and prior to the start of decommissioning activities, Zephyr will notify the Commission, Nobles County, landowners, affected parties, and other local units of government in writing, of the intended decommissioning activities and schedule.

Decommissioning includes several phases and activities such as:

- Removal of above ground components (turbines, transformers, met towers, and substation)
- Removal of turbine, transformer, met tower, substation foundations to a depth of forty-eight (48) inches
- Removal of underground collection system and fiber optic cables to a depth of forty-eight (48) inches
- Removal of access roads (unless the landowners request the roads to remain) and crane paths
- Restoration of access roads, including decompaction
- Reclamation, re-grading, and restoration of disturbed areas including topsoil reapplication and decompaction of soils
- Application of necessary sediment and erosion controls during and following decommissioning
- Repair of public roads and culverts to pre-construction condition

Removed components will either be scrapped by the project EPC contractor or sold to another Vestas project owner. The determination will be made based on the expected market for the used components.

Decommissioning of the wind farm will be initiated after (1) year without energy production unless other mitigating circumstances prevail. It is anticipated that the decommissioning activities for the project can be completed in a 90-day period, and in general accordance with the requirements of Minn. R., Chapter 7854.0500, Subpart 13, and applicable county requirements.

Zephyr requests the right to re-evaluate decommissioning alternatives prior to the end of the LWECS Site Permit term and to update decommissioning costs. Zephyr also requests the right to re-apply for a LWECS Site Permit to continue operation of the Repower Project upon expiration of the LWECS Site Permit, and to retrofit, repower or replace the turbines and power system with upgrades based on new or available technology to continue to operate the Project.

11.0 IDENTIFICATION OF OTHER POTENTIAL PERMITS

The federal, state and local permits or approvals that have been identified as potentially being required for the construction and operation of the Repower Project are provided in Table 11. Permits dependent on the final site layout will be applied for after receiving Commission approval, but prior to construction.

Table 11.0: Potential Permits and Approvals Required for Repowering and Operation of the Facility

Agency		Name and Type of Permit/Approval
Federal	Federal Aviation Administration	Form 7460-1 Notice of Proposed Construction or Alteration (Determination of No Hazard)
		Notice of Actual Construction or Alteration (Form 7460-2)
	U.S. Army Corps of Engineers	Federal Clean Water Act Section 404 Nationwide Permit; Wetland Delineation Approvals; Jurisdictional Determinations
	U.S. Fish and Wildlife Service	Review for Threatened and Endangered Species
	Environmental Protection Agency (EPA)/(MPCA)	Spill Prevention Control and Countermeasure (SPCC) Plan
State of Minnesota	Minnesota Public Utilities Commission	Large Wind Energy Conversion System (LWECS) Site Permit Amendment
	Minnesota State Historic Preservation Office	Cultural and Historical resources review; State and National Register of Historic Sites review
	Minnesota Department of Natural Resources	Potential Native Prairie Review
		Utility Crossing License, if needed.
	Minnesota Pollution Control Agency	NPDES Permit for Construction Activities and Storm Water Pollution Prevention Plan
		License for Very Small-Quantity Generator of Hazardous Waste
		Section 401 Water Quality Certification, or waiver
	Minnesota Department of Transportation	Utility Access Permit
		Work within Right-of-Way Permit
		Driveway Permit
		Aviation clearance from Office of Aeronautics
		Oversize and Overweight Permit

Table 11.0: Potential Permits and Approvals Required for Repowering and Operation of the Facility		
Agency		**Name and Type of Permit/Approval**
Local	Nobles County	Driveway Permit
		Utility Permits
		Moving Permit
	Nobles County Soil and Water Conservation District	Wetland Conservation Act Permit
	Summit Lake Township	Roadway access/use and utility agreements and permits.
	Larking Township	Roadway access/use and utility agreements and permits.

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