July 2014

Aurora Distributed Solar, LLC
Multi-County

Aurora Distributed Solar Project

Application for a Site Permit

Distributed Solar Project
Alternative Permitting Process
PUC Docket No. E6928/GS-14-515

GERONIMO® ENERGY

AURORA SOLAR

Enel Green Power

Application for a Site Permit
Aurora Distributed Solar Project

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List of Acronyms

AADT	Annual Average Daily Traffic
AC	Alternating Current
ALTA	American Land Title Association
APLIC	Avian Power Line Interaction Committee
Applicant	Aurora Distributed Solar, LLC
AST	Aboveground Storage Tank
Aurora	Aurora Distributed Solar, LLC
BMPs	Best Management Practices
BWSR	Board of Water and Soil Resources
CN	Certificate of Need
Commission	Minnesota Public Utilities Commission
dB	Decibels
DC	Direct Current
DNR	Department of Natural Resources
EBH	Environmental Bore Hole
ECS	Ecological Classification System
EGP	Enel Green Power
EGPNA	Enel Green Power North America, Inc.
EMF	Electromagnetic Field
Enel	Enel Group
EPA	Environmental Protection Agency
ETSC	Endangered, Threatened or Special Concern
EWG	Exempt Wholesale Generator
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Administration
FTE	Full-Time Equivalent
GAP	Gap Analysis Program
Geronimo	Geronimo Wind Energy, LLC d/b/a Geronimo Energy, LLC
JEDI	Jobs and Economic Development Impacts

kV	Kilovolts
kW	Kilowatt
kWh	Kilowatt-hour
LEPGP	Large Electric Power Generating Plant
MBS	Minnesota Biological Survey
MISO	Midcontinent Independent System Operator, Inc.
MLCCS	Minnesota Land Cover Classification System
MW	Megawatts
MWh	Megawatt Hours
MDH	Minnesota Department of Health
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
NAAQS	National Ambient Air Quality Standards
NEMA	National Electrical Manufacturer Association
NHIS	Natural Heritage Information System
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NREL	National Renewable Energy Laboratory
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Properties
NWI	National Wetland Inventory
O&M	Operations and Maintenance
OASIS	Open Access Same-Time Information System
OATT	Open Access Transmission Tariff
PPA	Power Purchase Agreement
PV	Photovoltaic
RIM	Reinvest in Minnesota
SBS	Site of Biodiversity Significance
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office

SNAs	Scientific and Natural Areas
SPCC	Spill Prevention Control and Countermeasure
SPV	Special Purpose Vehicle
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife
USD	U.S. Dollar
VSQG	Very Small Quantity Generator
WMAs	Wildlife Management Areas
WPAs	Waterfowl Protection Areas

Application Content Requirements Completeness Checklist

Project Permit Application Requirements (Minn. Rules 7850.1900, Subp. 1)	Application Section
A. a statement of proposed ownership of the facility as of the day of filing and after commercial operation;	1.2
B. the precise name of any person or organization to be initially named as permittee or permittees and the name of any other person to whom the permit may be transferred if transfer of the permit is contemplated;	1.2
C. at least two proposed sites for the proposed large electric power generating plant and identification of the applicant's preferred site and the reasons for preferring the site;	Alternatives not required under alternative process; general description of identification of project locations, including description of why certain alternatives were rejected in 2.1 and 2.2
D. a description of the proposed large electric power generating plant and all associated facilities, including the size and type of the facility;	2.1, 2.2
E. the environmental information required under subpart 3;	See Environmental Information below
F. the names of the owners of the property for each proposed site;	Appendix C
G. the engineering and operational design for the large electric power generating plant at each of the proposed sites;	3.1; Appendix D
H. a cost analysis of the large electric power generating plant at each proposed site, including the costs of constructing and operating the facility that are dependent on design and site;	2.4
I. an engineering analysis of each of the proposed sites, including how each site could accommodate expansion of generating capacity in the future;	2.5, 3.1
J. identification of transportation, pipeline, and electrical transmission systems that will be required to construct, maintain, and operate the facility;	3
K. a listing and brief description of federal, state, and local permits that may be required for the project at each proposed site; and	1.4.2
L. a copy of the Certificate of Need for the project from the Public Utilities Commission or documentation that an application for a Certificate of Need has been submitted or is not required.	Exemption language included in 1.4.1

Environmental Information Requirements (Minn. Rules 7850.1900, Subp. 3)	Application Section
A. a description of the environmental setting for each site or route;	4.1
B. a description of the effects of construction and operation of the facility on human settlement, including, but not limited to, public health and safety, displacement, noise, aesthetics, socioeconomic impacts, cultural values, recreation, and public services;	4.2
C. a description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining;	4.3
D. a description of the effects of the facility on archaeological and historic resources;	4.4
E. a description of the effects of the facility on the natural environment, including effects on air and water quality resources and flora and fauna;	4.5
F. a description of the effects of the facility on rare and unique natural resources;	4.5.7
G. identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route; and	4.1 – 4.5
H. a description of measures that might be implemented to mitigate the potential human and environmental impacts identified in items A to G and the estimated costs of such mitigative measures.	4.1 – 4.5

1 Introduction

Aurora Distributed Solar, LLC (Aurora or Applicant), respectfully submits this application to the Minnesota Public Utilities Commission (Commission) for a Site Permit pursuant to the Minnesota Power Plant Siting Act (Minnesota Statutes Chapter 216E) and Minnesota Rules Chapter 7850.

Aurora proposes to construct distributed photovoltaic (PV) solar energy generating systems and associated facilities totaling 100 megawatts (MW) alternating current (AC) nameplate capacity, to be located at up to 24 facilities (together, the Project) interconnected to Northern States Power Company d/b/a Xcel Energy (Xcel Energy) distribution stations. The distributed solar facilities range in size from 1.5 MW to 10.0 MW in generating capacity and will utilize linear axis tracker systems. Aurora is seeking the Site Permit for all 24 facilities; however, as shown in Table 2.2-2, building the full capacity of all 24 facilities would result in over 100 MW, and, therefore, Aurora does not anticipate constructing all 24 facilities. The number, combination, and capacity of the individual facilities ultimately selected for construction will depend on a number of factors, including site-specific conditions, engineering studies, environmental survey results, and interconnection details. The Aurora Project is to be placed in service by the end of 2016 with the flexibility to bring a portion online in 2015 to meet demand and construction schedules as warranted. The Project is described in more detail throughout this Application.

The Project falls within the definition of a Large Electric Power Generating Plant (LEPGP) in the Power Plant Siting Act and, thus, requires a Site Permit from the Commission prior to construction. Aurora submitted a request to the Minnesota Department of Commerce for a size determination on June 27, 2014 in accordance with Minnesota Statutes Section 216E.021 (2014). Minnesota Rules Chapter 7850 provide for three different procedures for obtaining a site permit: full review, alternative review, and local review. Pursuant to 2014 Session Laws, Chapter 254, Aurora seeks approval of its application under the alternative review process provided for under Minnesota Statute 216E.04 and Minnesota Rules 7850.2800-7850.3900.

The Site Permit is the only site approval needed for construction of the Project (Minnesota Statutes 216E.10, subd. 1.).

1.1 Purpose and Need

In its March 5, 2013 Order on Xcel Energy's 2011-2025 Resource Plan, the Commission determined that Xcel Energy had demonstrated need for an additional 150 MW of generating capacity in 2017, increasing up to 500 MW in 2019. It further determined that the resource(s) selected to meet this need would be identified through a competitive resource acquisition process in which parties could propose a variety of resources to meet Xcel Energy's need, including resources that address all or a portion of the identified need; peaking resources, intermediate resources, or a combination of the two; and resources that rely on new or existing generation.

On April 15, 2013, Geronimo submitted a bid proposal for the Project into the competitive resource acquisition process established in Docket No. E002/CN-12-1240. The Project was evaluated with several natural gas proposals and one market capacity proposal through a full certificate-of-need-like contested case proceeding. On May 23, 2014, the Commission issued an *Order Directing Xcel to Negotiate Draft Agreements* in which it selected the Project as one of the most reasonable and prudent resources to meet Xcel Energy's identified need.

Accordingly, the Project is designed to provide distributed solar energy to meet Xcel Energy's needs for additional capacity in the 2017 to 2019 timeframe. The Project will provide 71 MW of MISO accredited capacity and supply Xcel Energy with approximately 200,000 megawatt hours (MWh) annually of reliable, deliverable on-peak energy. The geographic dispersion of the Project increases its reliability, because the total Project will be less susceptible to outages due to equipment failure or transmission outage. Because each facility will be located at a distribution substation, the Project will experience substantially lower losses than most conventional power plants. In addition, the distribution level interconnections will have less lead time, lower risk and lower cost than typical transmission interconnections. The solar energy produced by the Project can also be used by Xcel Energy

to meet its obligations under the Minnesota Solar Energy Standard (Minn. Stat. § 216B.1691, subd. 2(f).

1.2 Applicant Information

1.2.1 Permittee and Contact Information

The permittee for the Site Permit will be:

Aurora Distributed Solar, LLC
One Tech Drive, Suite 220
Andover, MA 01810

The contact persons regarding this Application are:

Nathan Franzen Director of Solar Geronimo Energy 7650 Edinborough Way, Suite 725 Edina, MN 55435 Nathan@GeronimoEnergy.com (952) 988-9000	Joan Heredia, Director, Environmental Compliance and Regulatory Services Enel Green Power North America, Inc. 3636 Nobel Drive #475 San Diego, CA 92122 Joan.Heredia@enel.com (619) 507-4130	Christina Brusven Attorney at Law Fredrikson & Byron, P.A. 200 S. Sixth Street, Suite 4000 Minneapolis, MN 55402 cbrusven@fredlaw.com (612) 492-7412

1.2.2 Ownership at Time of Filing

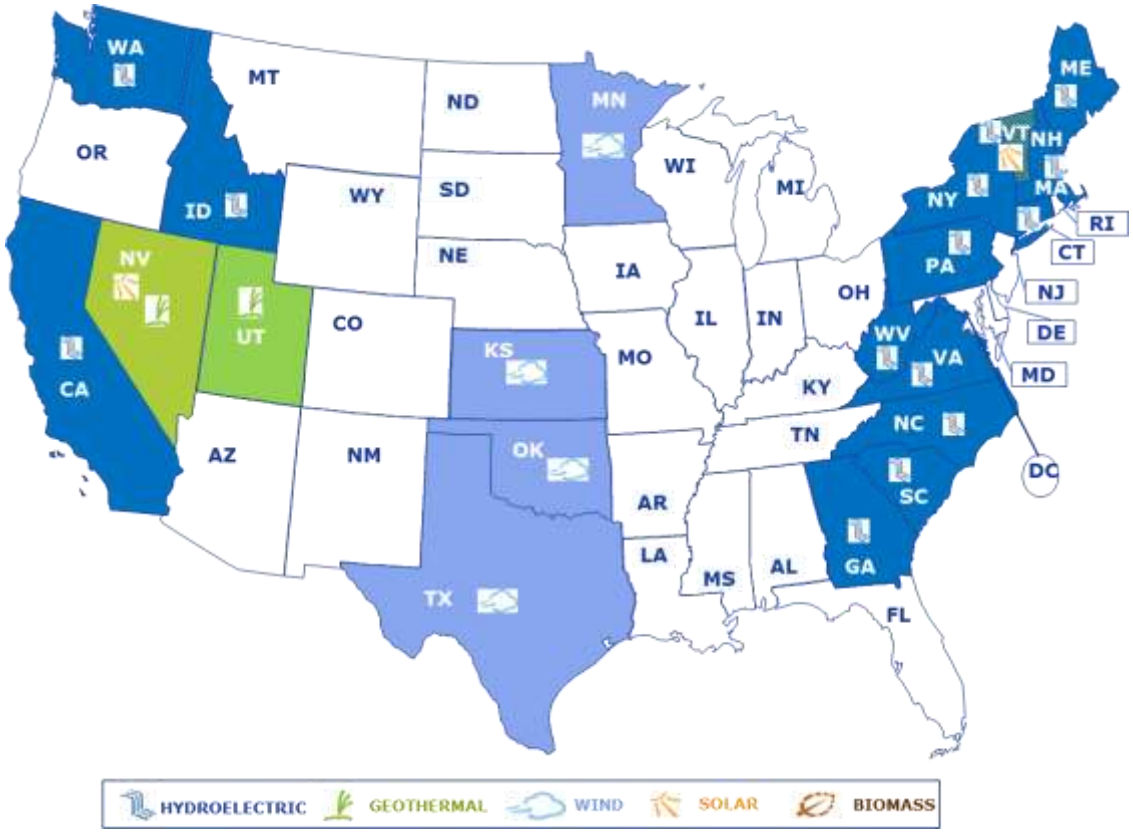
Aurora Distributed Solar, LLC (Aurora) is a Delaware limited liability company authorized to do business in Minnesota. Aurora is a wholly-owned subsidiary of Enel Kansas, LLC. Enel Kansas, LLC is a wholly-owned subsidiary of Enel Green Power North America, Inc. (EGPNA). Aurora is being developed utilizing the strategic partnership between EGPNA and Geronimo Wind Energy, LLC d/b/a Geronimo Energy, LLC (Geronimo).

EGPNA will direct project development, construction, financing and operations for the Project. With direction from EGPNA, Geronimo will continue to provide project

development services to Aurora to complete permitting, interconnection, construction, community outreach, and other project development tasks.

EGPNA is a leading owner and operator of renewable energy plants in North America with projects operating and under development in 21 U.S. states and two Canadian provinces. Figure 1.2-1 shows EGPNA's existing renewable energy facilities in the U.S. The company employs approximately 350 people in North America with strong technical and financial expertise. EGPNA owns and operates over 90 plants with an installed capacity of almost 2 GW powered by renewable hydropower, wind, geothermal, and solar energy. EGPNA has more than doubled its total installed capacity since 2010. As of May 2014, EGPNA's installed capacity in North America includes: 1,516 MW wind; 317 MW hydro; 72 MW geothermal; and 28 MW solar for a combined total capacity of 1,933 MW.

Figure 1.2-1 Map of EGPNA's Existing U.S. Renewable Energy Facilities



EGPNA is the North American wholly-owned subsidiary of Enel Green Power (EGP). EGP, which is devoted solely to the development and management of renewable power generation, has almost 3,600 employees and more than 750 operational plants in 16 countries with an installed capacity of almost 9,000 MW. EGP generates over 29 billion kWh (kilowatt-hour) annually from hydroelectric, solar, wind, biomass, and geothermal facilities. EGP is a wholly-owned subsidiary of Enel Group (Enel). Enel was founded in 1962 and is the second largest utility company by installed capacity in Europe with over 71,300 employees worldwide. Enel has an asset base of more than 98,900 MW across 40 countries and serves about 61 million customers in the eight countries in which it operates as an integrated utility. In 2013, Enel posted revenues around 80.5 billion euros (109.7 billion U.S. dollar [USD]) and EBITDA of 17 billion euros (23 billion USD).

EGPNA is an investor in Geronimo and has partnered with them for additional support in development of the Project. Geronimo is a Minnesota limited liability company and Midwest-focused renewable energy development company headquartered in Minneapolis, Minnesota with satellite offices in central Minnesota, southwest Minnesota, North Dakota, Illinois, and Michigan. Geronimo has fully developed three Minnesota wind energy projects, including the 20 MW Odin Wind Farm near Odin, Minnesota, the 18.9 MW Marshall Wind Farm near Marshall, Minnesota, and the 200 MW Prairie Rose Wind Farm near Hardwick, Minnesota. These wind farms became commercially operational in 2007, 2009, and 2012, respectively. Prairie Rose was completed in partnership with EGPNA and is currently owned by Enel Kansas, LLC. Additionally, in 2013, Geronimo partnered with Slumberland Furniture to install an aggregate of 400 kilowatt (kW) of solar capacity at 10 locations around the Twin Cities metro area through Xcel Energy's Solar*Rewards program.

1.2.3 Proposed Ownership After Commercial Operation

Aurora is expected to continue to own the Project after commercial operation. However, due to the distributed locations of the Project solar facilities and need to satisfy the requirements of the investment tax credit, a federal tax credit available to taxpayers

pursuant to the Internal Revenue Code, Aurora has determined that it is necessary to organize a separate limited liability company (commonly referred to as "special purpose vehicle" or "SPV") for each solar facility, which will serve as the investment entity for the tax equity investor. These SPVs are listed below in Table 1.2-1.

Table 1.2-1 List of Special Purpose Vehicle Names

Name
Albany Solar, LLC
Annandale Solar, LLC
Atwater Solar, LLC
Brooten Solar, LLC
Chisago Solar, LLC
Dodge Center Distributed Solar, LLC
Eastwood Solar, LLC
Fiesta City Solar, LLC
Hastings Solar, LLC
Lake Emily Solar, LLC
Lake Pulaski Solar, LLC
Lawrence Creek Solar, LLC
Lester Prairie Solar, LLC
Mayhew Lake Solar, LLC
Montrose Solar, LLC
Paynesville Solar, LLC
Pine Island Distributed Solar, LLC
Pipestone Solar, LLC
Scandia Solar, LLC
Waseca Solar, LLC

Name
West Faribault Solar, LLC
West Waconia Solar, LLC
Wyoming Solar, LLC
Zumbrota Solar, LLC

Aurora currently holds all assets, including the land rights for the Project. Prior to the start of construction of a facility, Aurora will transfer all land rights and other assets required to construct and operate the respective facility to its respective facility SPV to support tax equity financing. Each SPV will remain a wholly-owned subsidiary of Aurora until the date the SPV accepts the tax equity financing, which will likely be just prior to the facility's in-service date but may vary depending upon the tax investor and the final tax structure employed. Aurora anticipates that each SPV will have a substantially identical ownership structure. Aurora has determined that it must utilize the SPVs in order to satisfy the legal and logistical issues related to the different in-service dates (as determined for federal tax purposes) of each facility in the Project, as such relates to how Aurora will monetize the applicable tax credits and net operating losses related to each facility under current tax regulations. Aurora will remain responsible for ensuring all obligations under the Site Permit are satisfied.

1.3 Project Schedule

In order to meet Xcel Energy's summer 2017 capacity needs and meet the qualifications of the federal investment tax credit, the Project's proposed in-service date is December 1, 2016.

In order to meet the 2016 in-service date, the following schedule is anticipated for various phases of Project development.

Land Acquisition

Aurora is responsible for all land acquisition and has obtained the necessary easements or purchase agreements from landowners at all of the facility locations.

Permitting

Aurora is responsible for obtaining all permits necessary for construction. Aurora anticipates receiving the Site Permit from the Commission by first quarter 2015, with other permits being applied for starting in the first half of 2015. Additional information on permits anticipated to be needed for the Project can be found in Section 1.4.2 of this Application.

Equipment Acquisition

Aurora is in the process of procuring solar equipment for the Project facilities. The equipment will be allocated to the Project after meteorological and economic studies are completed to achieve the best match of technology and facility location. Facility components could start arriving at facility locations in second quarter 2015.

Construction

Aurora personnel will oversee the primary contractors performing Project construction, including roads, solar array assembly, electrical, and communications work. The construction of the entire Project will take approximately one year to complete. Aurora anticipates it may begin construction at some facilities in 2015 and stage construction of each facility to ensure the entire Project is in-service by December 2016.

Section 3.2 of this Application provides additional information on the construction timeline and process on a per facility/MW basis.

1.4 Required Project Permits

1.4.1 Certificate of Need

A certificate of need (CN) is required for all "large energy facilities," as defined in Minnesota Statutes Section 216B.2421, subd. 2(1), unless the facility falls within a statutory exemption from the CN requirements. Because the Project is a generating plant

larger than 50 MW, it meets the definition of a large energy facility and would require a CN prior to issuance of a Site Permit and construction. The Project is exempt, however, from CN requirements because it was selected by the Commission through a competitive resource approval process to meet Xcel Energy's electricity generation needs and falls within the CN exemption found in Minnesota Statutes Section 216B.2422, subd. 5(b). Pursuant to the Commission's *Order Directing Xcel to Negotiate Draft Agreements* dated May 23, 2014 in Docket No. E002/CN-12-1240, Aurora is currently negotiating a power purchase agreement (PPA) with Xcel Energy for the full output of the Project.

1.4.2 Other Permits

Aurora will obtain all permits and licenses that are required following issuance of the Site Permit. The permits or approvals that Aurora has identified as potentially being required for the construction and operation of the Project are shown in Table 1.4-1. Copies of agency correspondence are included in Appendix A.

Table 1.4-1 Permits and Approvals

Regulatory Authority	Permit or Approval
Federal Approvals	
U.S. Army Corps of Engineers (USACE)	Wetland Delineation Approvals
	Jurisdictional Determination
	Federal Clean Water Act Section 404 and Section 10 Permit(s)
U.S. Fish and Wildlife Service	Review for Threatened and Endangered Species – informal coordination
Environmental Protection Agency (Region 5) (EPA) in coordination with the Minnesota Pollution Control Agency (MPCA)	Spill Prevention Control and Countermeasure (SPCC) Plan
Lead Federal Agency	Federal Section 106 National Historic Preservation Act Review – will occur if Project triggers a federal nexus such as USACE individual permit

Regulatory Authority	Permit or Approval
U.S. Department of Agriculture	Form AD-1006 Farmland Conversion Impact Rating – will occur if Project triggers a federal nexus such as USACE individual permit
	Conservation / Grassland / Wetland Easement and Reserve Program releases and consents
	Farm Services Agency Mortgage Subordination & Associated Environmental Review
Federal Energy Regulatory Commission	Exempt Wholesale Generator Self Cert. (EWG)
	Market-Based Rate Authorization
	Waiver of Open Access Transmission Tariff (OATT), Open Access Same-Time Information System (OASIS), and Standards of Conduct requirements applicable to transmission providers with respect to Seller's ownership of generator interconnection facilities
Federal Aviation Administration	Form 7460-1 Notice of Proposed Construction or Alteration (Determination of No Hazard)
State of Minnesota Approvals	
Board of Water and Soil Resources	Wetland Conservation Act Approval
Minnesota Department of Labor and Industry	Building Plan Review and Permits
Minnesota Public Utilities Commission	Site Permit for Power Plant Site
	Exemption from Certificate of Need for Power Plant
Minnesota State Historic Preservation Office (SHPO)	Cultural and Historic Resources Review and Review of State and National Register of Historic Sites and Archeological Survey

Regulatory Authority	Permit or Approval
Minnesota Pollution Control Agency	Section 401 Water Quality Certification
	National Pollutant Discharge Elimination System Permit (NPDES) – MPCA General Stormwater Permit for Construction Activity – one per facility
	Very Small Quantity Generator (VSQG) License – Hazardous Waste Collection Program
	Aboveground Storage Tank (AST) Notification Form
Minnesota Department of Health	Environmental Bore Hole (EBH)
	Water Supply Well Notification
	Plumbing Plan Review
Minnesota Department of Natural Resources	License to Cross Public Land and Water
Minnesota Department of Transportation (MnDOT)	Utility Permits on Trunk Highway Right-of-way
	Overweight Permit for State Highways – for transport of transformers, inverters
	Access Driveway Permits for MnDOT Roads
Local Approvals	
Watershed Districts	Stormwater, drainage, floodplain permits
Counties	Right-of-way permits, road access permits, driveway permits for access roads and electrical collection system, Wetland Conservation Act Approval, parcel splits, platting
Townships	Right-of-way permits, crossing permits, road access permits, and driveway permits for access roads and electrical collect system, parcel splits, platting

Per Minnesota Statutes 216E.10, subd. 1, the Site Permit is the only site approval Aurora must obtain to construct the Project, and it will supersede and preempt all zoning,

building, or land use rules, regulations, or ordinances put in place by regional, county, local and special purpose governments.

2 Project Description

2.1 Overall Project Description

The Project consists of distributed PV power plants to be located at up to 24 facilities serving Xcel Energy loads. The distributed solar facilities range in size from 1.5 MW to 10.0 MW and each facility will utilize a linear axis tracker system.

By locating the solar facilities in close proximity to existing substations, the Project is able to make efficient use of existing transmission facilities equipment. The land under Aurora's control at each facility ranges in size from approximately 13 to 262 acres and has been selected based on availability of land, proximity to Xcel Energy distribution substations, and limited environmental impacts.

Aurora has secured site control for the facility locations associated with the Project. This Application includes analysis for 24 facility locations that have been identified and 23 of which are located throughout the Midcontinent Independent System Operator, Inc. (MISO) Planning Zone 1, which, in general, is located in Minnesota, North Dakota, and western Wisconsin. Pipestone is located in MISO Planning Zone 3, which, in general, is located in southwestern Minnesota and Iowa.

The Project's primary components include PV modules mounted on a linear axis tracking system and a centralized inverter(s). The tracking system foundations will utilize a driven pier and are generally not anticipated to require concrete, although some concrete foundations may be necessary pending results of geotech surveys. Balance of plant components include electrical cables, conduit, electrical cabinets, switchgears, step up transformers, SCADA systems, and metering equipment. The solar facilities will be fenced and seeded in a low growth seed mix to reduce stormwater runoff and erosion.

Aurora believes that all 24 of the facilities are feasible locations for solar development, and the decision on which facilities will be selected for construction will be based on information

such as interconnection details, site-specific conditions, landowner discussions, and environmental or engineering survey results. Aurora, therefore, seeks to permit all 24 facility locations to have the flexibility to build the combination of facilities that best uses the resources to obtain 100 MW of solar power.

2.2 Facility Descriptions

2.2.1 Location

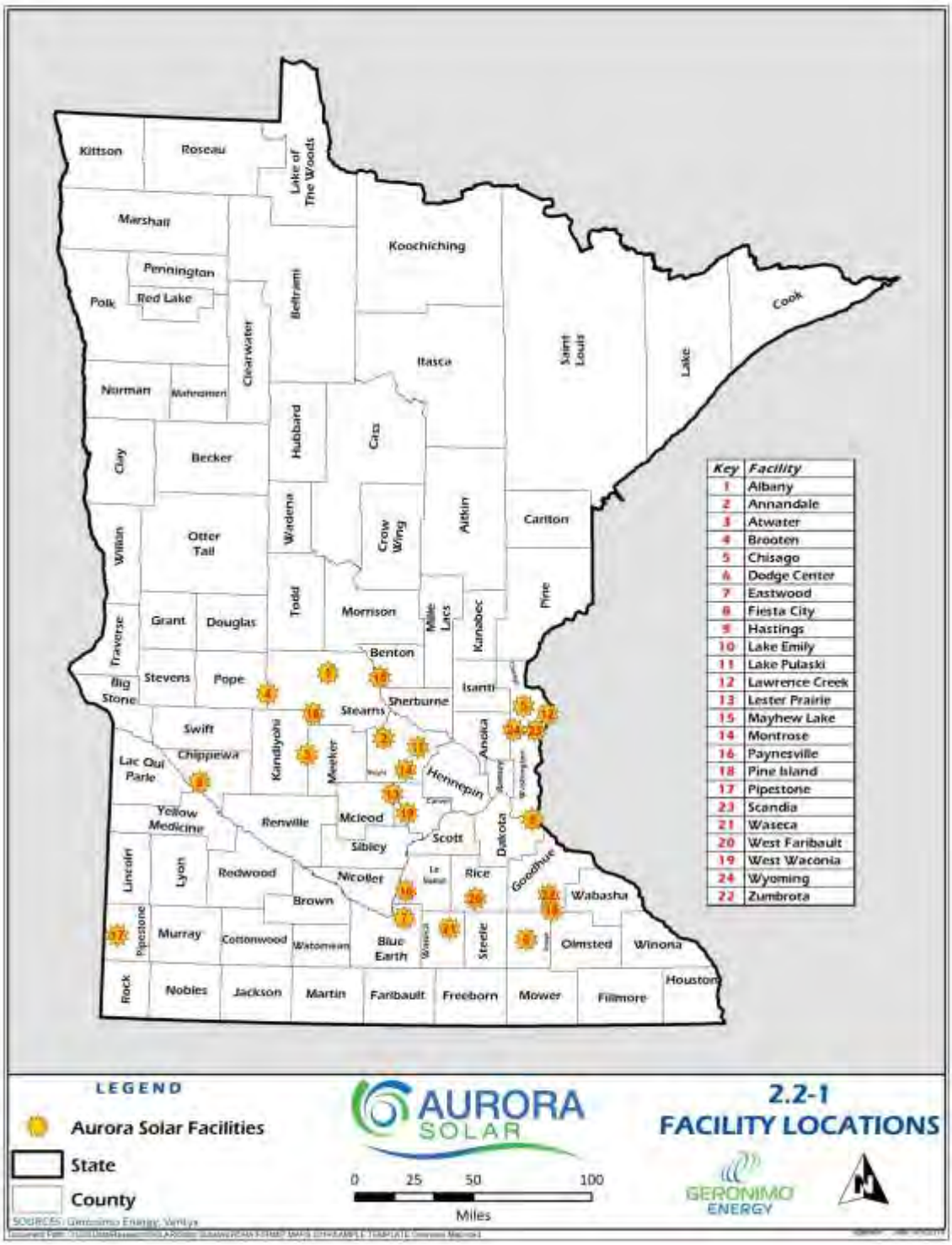
Aurora is proposing to build up to 24 facilities within 16 counties across Minnesota. Table 2.2-1 provides the location of the facilities; Figure 2.2-1 shows their locations.

Table 2.2-1 Location of Distributed Facilities

Facility	County	Township/Range/Section
Albany	Stearns	Sections 8 & 17, T 125N, R 31W
Annandale	Wright	Section 32, T 121N, R 27W
Atwater	Kandiyohi	Section 1, T 119N, R 33W
Brooten	Stearns	Section 31, T 124N, R 35W
Chisago County	Chisago	Section 12, T 34N, R 21W
Dodge Center	Dodge	Section 32, T 107N, R 17W
Eastwood	Blue Earth	Section 14, T 108N, R 66W
Fiesta City	Chippewa	Section 9, T 117N, R 40 W
Hastings	Washington	Section 8, T 26N, R 20W
Lake Emily	Le Sueur	Section 24, T 110N, R 26W
Lake Pulaski	Wright	Section 15, T 120N, R 25W
Lawrence Creek	Chisago	Section 27, T 34N, R 19W
Lester Prairie	McLeod	Section 25, T 117N, R 27W
Mayhew Lake	Benton	Section 12, T 36N, R 31W
Montrose	Wright	Section 2, T 118N, R 26W
Paynesville	Stearns	Section 4, 8 & 9, T 122N, R 32W
Pine Island	Goodhue	Section 31, T109N, R 15W

Facility	County	Township/Range/Section
Pipestone	Pipestone	Section 11, T106N, R 46W
Scandia	Chisago	Section 35, T 33N, R 20W
Waseca	Waseca	Section 12, T 17N, R 23W
West Faribault	Rice	Section 2, T 109N, R 21W
West Waconia	Carver	Section 1, T 115N, R 26W
Wyoming	Chisago	Section 32, T 33N, R 21W
Zumbrota	Goodhue	Section 25, T 110N, R 16W

Figure 2.2-1 Aurora Solar Project Facility Locations



The maps included in Appendix B provide additional information on the location of the facilities. The landowners of each of the facilities are provided in Appendix C, per Minnesota Rules 7850.1900, subp. 1(F).

2.2.2 Size and Capacity

The land under Aurora's control at each facility ranges in size from approximately 13 to 262 acres, and will have nominal generation capacities (MW-AC) ranging from 1.5 MW to 10.0 MW. Table 2.2-2 summarizes the acreage and capacities of the facilities. The land control column represents the acreage under Aurora's control at each facility location; the numbers in the facility components column represent the approximate acreage that would be taken up by development of the facilities, according to preliminary design.

Table 2.2-2 Area and Capacity of Distributed Facilities

Facility	Facility Land Control	Preliminary Development Area	MW-AC*
Albany	230.6	107.4	10.0
Annandale	70.6	70.6	6.0
Atwater	40.1	36.3	4.0
Brooten	13.0	13.0	1.5
Chisago County	62.4	60.6	7.5
Dodge Center	68.5	60.0	6.5
Eastwood	49.7	49.7	5.5
Fiesta City	25.6	25.6	2.5
Hastings	40.6	40.6	5.0
Lake Emily	46.9	42.4	5.0
Lake Pulaski	75.8	63.2	8.5
Lawrence Creek	74.3	39.4	4.0
Lester Prairie	29.9	26.0	3.5
Mayhew Lake	36.0	21.8	4.0

Facility	Facility Land Control	Preliminary Development Area	MW-AC*
Montrose	37.7	34.8	4.0
Paynesville	261.9	108.4	10.0
Pine Island	45.9	39.6	4.0
Pipestone	15.8	14.7	2.0
Scandia	24.4	23.3	2.5
Waseca	89.2	85.2	10.0
West Faribault	85.5	59.4	5.5
West Waconia**	75.7	78.1	8.5
Wyoming	67.3	62.0	7.0
Zumbrota	35.6	31.9	3.5

* The final MW-AC nameplate capacity of each solar energy generating system may vary based on the technology selected and final design.
** Preliminary Development Area boundary is larger than the Facility Land Control boundary in this particular instance to accommodate possible interconnection in the public right-of-way on the north side of Highway 5/25.

As shown above, the total capacity for all 24 facilities would total over 100 MW; Aurora does not anticipate constructing at all 24 locations. The final number and combination of facilities constructed, as well as the capacity and acreage that will be occupied by solar plant components at each facility that is selected for construction, will be determined during final design, and will depend on site-specific conditions, engineering studies, environmental survey results, and interconnection details. Additional information on the proposed facilities' design and layout can be found in Section 3.1 and Appendix D.

2.2.3 Prohibited and Exclusion Sites

Minnesota Rules 7850.4400 subp. 1 prohibits power generating plants from being sited in several prohibited areas, including: national parks; national historic sites and landmarks; national historic districts; national wildlife refuges; national monuments; national wild, scenic and recreational riverways; state wild, scenic, and recreational rivers and their land use districts; state parks; nature conservancy preserves; state scientific and natural areas

(SNAs); and state and national wilderness areas. The Project facilities are not located within any prohibited areas.

Additionally, Minnesota Rules 7850.4400 subp. 3 requires that Applicants avoid siting power generating plants in several exclusion areas unless there is no feasible and prudent alternative. These exclusion areas include: state registered historic sites; state historic districts; state wildlife management areas (WMAs); county parks; metropolitan parks; designated state and federal recreational trails; designated trout streams; and state water trails. The Project facilities are not located within any exclusion areas.

Subject to certain exceptions, Minnesota Rules 7850.4400, subp. 4 prohibits large energy power generating plants from being sited on more than 0.5 acre of prime farmland per MW of net generating capacity unless there is no feasible and prudent alternative. The Project's impacts to prime farmland are discussed in Section 4.3.1 and Appendix E.

2.3 Alternatives Considered but Rejected

Aurora considered building a single 100-MW solar facility, but did not carry that alternative forward due to the advantages of the distributed generation scenario (as described in Section 1.1).

In the April 2013 bid proposal, Geronimo considered 31 locations for potential solar facility development. Additional analysis and discussions with landowners resulted in 24 facilities being carried forward. The locations no longer considered were rejected because further information showed them to be economically infeasible or otherwise unavailable for solar development.

2.4 Cost Analysis

Total construction costs for constructing the Project are estimated to be approximately $247 million. Operating costs for the Project are estimated to be approximately $2.3 million on an annual basis, including labor, materials, and property taxes.

2.5 Future Expansion

Although the Project, including some facility locations, could be expanded in the future, Aurora is not currently planning any expansions. If expansion becomes an option in the future, it would necessitate additional PPAs from utilities and site approval.

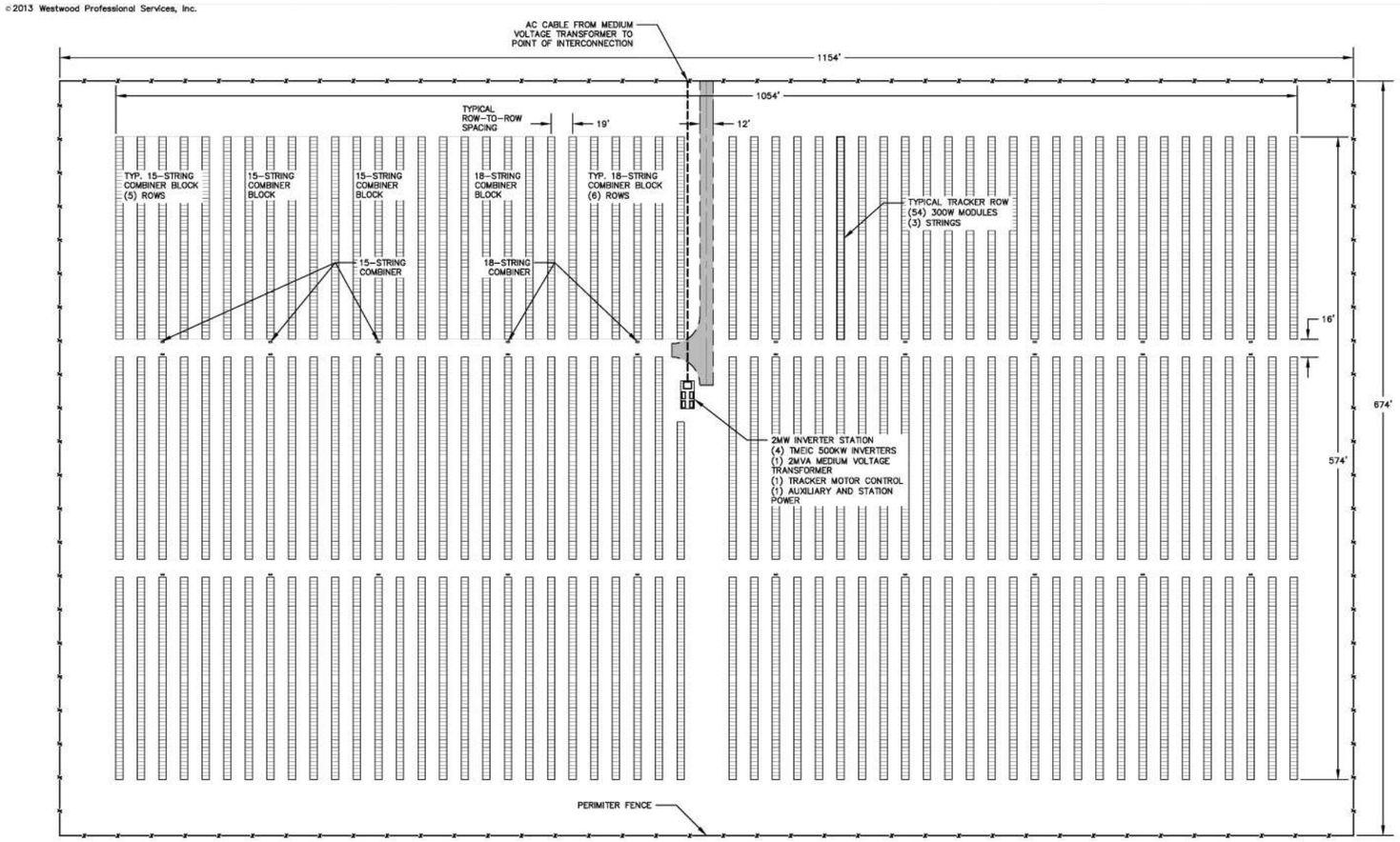
3 Engineering and Operational Design

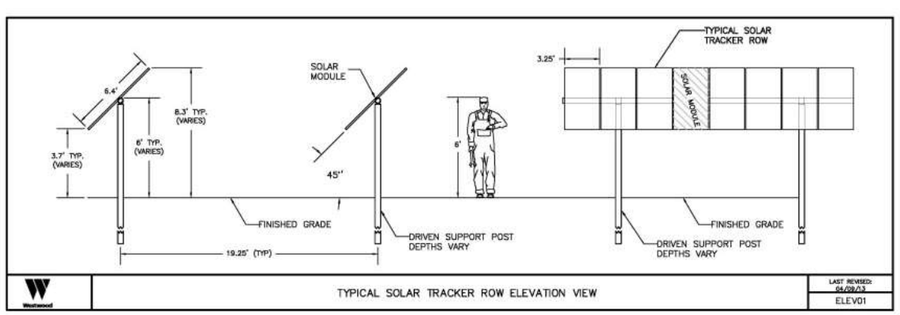
3.1 Design

As previously stated, the Project's primary components include PV modules mounted on a linear axis tracking system and a centralized inverter(s). The modules will have approximate dimensions of 4 to 6.5 feet long by 2 to 3.5 feet wide, and 1 to 2 inches thick. To the extent practical, the tracking system foundations will likely be a driven pier and will not require concrete, although some concrete foundations may be required; this will be determined by geotech soil tests. Balance of plant components include electrical cables, conduit, electrical cabinets, switchgears, step up transformers, SCADA systems, and metering equipment. The solar facilities contain operations and maintenance (O&M) areas and internal access roads; each facility will be fenced around the components and gated at the access point. Areas of bare ground at each facility will be revegetated with a low-growing seed mix (e.g., clover, short grasses or flowers, low-growing forbs, low-growing wetland seed mixes or some other low-growing perennial cover).

Figure 3.1-1 shows a 2-MW scalable image of the proposed facilities; for solar facilities that are larger than 2 MW, the area will be expanded and the rows repeated in a similar pattern either in the east-west direction or north-south direction to scale to the size (i.e., a 4-MW facility will be double the size shown in the drawing either by duplicating the row spacing north and south or by extending the rows east and west, or some combination thereof). Additional facility-specific figures are included in Appendix D, which provides preliminary designs for the 24 facilities.

Figure 3.1-1 Typical Solar Array – 2 MW Portion





GENERAL NOTES

1. PV FACILITY IS A 2MWac/2.619MWdc SINGLE-AXIS TRACKER.
   1.1. FACILITY SHALL BE COMPOSED OF:
      1.1.1. FOUR (4) 500KW ARRAYS, ONE INVERTER PER ARRAY.
      1.1.2. SIX (6) TRACKER BLOCKS.
2. ALL PV EQUIPMENT ON DC SIDE SHALL BE RATED FOR 1000V OPERATION.
3. MODULE: 300W CANADIAN SOLAR CS6X-300P 72-CELL MODULE
   3.1. SERIES STRING: 18 MODULES
   3.2. 485 STRINGS (8,730 MODULES) IN FACILITY
   3.3. 81 STRINGS PER TYPICAL TRACKER BLOCK
4. INVERTER: TMEIC SOLAR WARE 500
   4.1. Vmp FROM ARRAY: 669VDC, 1000VDC MAX.
   4.2. OUTPUT VOLTAGE: 300VAC
   4.3. FOUR (4) INVERTERS IN PV FACILITY. FACILITY SHALL USE FOUR (4) INVERTERS ON SINGLE SKID.
5. COMBINER: 1000V, INTEGRAL OUTPUT DISCONNECT, FUSED DC INPUTS
6. TRACKER: PV FACILITY SHALL USE SINGLE-AXIS HORIZONTAL TRACKER WITH BACKTRACKING.
   6.1. 19.25' ROW-TO-ROW SPACING.
7. PV SYSTEM SHALL BE INSTALLED PER NEC AND ALL APPLICABLE LOCAL, STATE AND NATIONAL CODES OR REGULATIONS.
8. PRELIMINARY DRAWINGS. NOT TO BE USED FOR CONSTRUCTION.

3.1.1 Photovoltaic Arrays and Solar Field

The solar field at each facility will consist of the following equipment:

a. *Solar field*: Linear arrays of PV modules approximately 4 to 10 feet above grade, variance will depend on the final design.
b. *Solar inverters skids and electrical cabinets*: Overhead shade will be 10 to 12 feet tall and the equipment enclosure, if used, will be up to approximately 45 feet long by 10 feet wide by 10 feet tall.
c. *Security fence*: Chain-link fence around the perimeter, approximately 8 feet tall, with 3-strand barbed wire.
d. *Weather station*: One or more meteorological stations up to approximately 10 feet tall.

The Project will include PV panels mounted on a single-axis tracking system, which will entail the installation of PV panels on a rack that tracks the sun. When the sun is directly overhead, the panels will be at a zero degree angle (level to the ground). The panels will follow the sun from approximately 45 degrees east to 45 degrees west through the course of the day.

At zero degrees, the panels will be about four to six feet off the ground. At 45 degrees (tilted to the highest position), the top of the panels will be about eight to ten feet off the ground. The design will involve no spinning machinery, no thermal cycle, and no water use (except for infrequent panel washing; refer to the Operations and Maintenance discussion in Section 3.3).

The project will require approximately 300,000 to 1,200,000 PV panels, which will be grouped into panel "blocks" ranging in size from 0.5 MW to 2.0 MW in rated nameplate capacity.

3.1.2 Balance of Plant Equipment

The panel blocks will be mounted on metal racks that will be installed on a series of posts that will be driven into the soil or in some cases installed on a concrete foundation. Each panel block contains internal access drives and electrical utilities to support the array. Each panel block will likely include one to four inverters, depending on the size of the

panel block. Inverters will be installed adjacent to the panel blocks on an inverter skid or on a concrete pad, either of which may be enclosed.

Inverters convert the direct current (DC) output of the panels to AC, which is required for delivery to the electrical distribution grid. The panels deliver DC power to the inverters through cabling that will typically be located in an underground trench (approximately three feet deep and one to two feet wide) or, in some limited circumstances aboveground conduit. Each inverter pad will also include one or more transformers to which the inverters will feed electricity. After the inverter has converted the electricity from DC to AC, the electricity is stepped-up via a transformer from low-voltage to medium voltage (up to 34.5 kilovolts [kV]). The final number of inverters for the Project will depend on the inverter size, inverter and panel availability as well as the final panel configuration and facilities selected for construction. The electricity will be taken from the facility into the grid via a gen-tie line. Aurora anticipates that the gen-tie line will be built underground to the edge of the facility boundary; however, in some limited circumstances there may be a utility overhead extension at the dead end of the gen-tie line.

3.1.3 Operations and Maintenance Area

The O&M area at each facility may consist of the following components:

a. *O&M Building*: A pre-engineered metal container or shed approximately 10 feet by 20 feet, and up 17 feet high at its peak. The structure will be used for material storage if necessary. Aurora will look at strategic storage locations to serve multiple facilities depending on the final locations of the project facilities constructed. An offsite centralized warehouse may also be used to house some strategic spare parts. However, Aurora is seeking to permit an O&M building on every facility to provide flexibility to construct at the optimal locations.
b. *Parking, and receiving/loading areas*
c. *Lighting*: During construction, temporary service poles will be 18 feet tall. During operations, lighting will be located near O&M areas, security gates and perimeter areas if necessary for safety and security. Lighting will be motion-activated and downlit to minimize effects.

3.1.4 Access Roads/Transportation System

Earthen or gravel roads, typically 12 to 20 feet wide, will also be constructed within each Project facility between some panel blocks and/or around the preliminary development area perimeter to provide access to the solar equipment and accommodate ongoing maintenance of the solar facilities and emergency vehicles. Because the final panel configuration will not be determined until final design and prior to construction, the locations of these roads shown in Appendix D are preliminary.

No upgrades or other changes to existing transportation systems will be necessary during either construction or operations of the Project (i.e., all new access road construction will be occurring within the facility parcel boundaries), with the limited possible exception of minor field access or driveway changes which may be needed on a facility-by-facility basis depending on final design.

3.1.5 Transmission System

A primary advantage of the Aurora Project is the lack of transmission interconnection requirements. The facilities will connect directly to the electrical distribution system, similar to a home or business. Xcel Energy will provide a service line (through an aboveground or belowground distribution feeder) to the points of interconnection, which are located within the facility land control area.

3.1.6 Pipeline System

Minnesota Rules 7850.1900, subp. 1(J) is not applicable to the Project because no pipelines will be accessed or built as part of the Project.

3.2 Construction and Restoration

After the necessary permits are received, construction will begin. At each facility, construction will begin with the initial site preparation work (such as grading and vegetation removal, including a limited amount of tree removal at some facilities), workforce mobilization, and construction of general site improvements, such as access improvements

and the staging/laydown area. The staging/laydown area will be located within the facility boundaries at each facility, and the area will depend on the overall size of that particular facility. This staging/laydown area will be used for storage of construction materials and receiving construction deliveries, including temporary parking for delivery trucks waiting to unload. Shipping containers with equipment will be temporarily placed in the laydown area, and there could be a temporary construction office onsite during construction. In addition, temporary containers may be used in this area to receive and store construction materials. There is a potential that a central laydown area may be used for a group of facilities. Any centralized laydown areas would be identified after the determination of which facilities will be constructed occurs, and once design is finalized and the construction contractors are selected.

The solar energy system (solar arrays and collection and distribution systems) will be installed next along with access roads within the arrays. The solar facilities will be constructed in blocks, and multiple blocks could be constructed simultaneously. Typically, a facility will be constructed in four to eight months. Electrical testing and equipment inspections will be conducted on each facility, and the construction of the Project's distributed facilities will allow individual solar facilities to become operational (generating electricity and delivering power to the grid) prior to full buildout of the 100-MW Project. As these areas near completion, temporary staging and laydown areas will be vacated and disturbed non-agricultural areas will be reseeded and revegetated consistent with a project-specific revegetation and restoration plan. Once installation is complete, the primary staging area will be reduced in size and the O&M facility and associated permanent infrastructure (storage, lighting, etc.) will be constructed in this area. All temporary restroom facilities will be removed.

Onsite construction personnel will consist of laborers, craftspeople, supervisory personnel, construction management personnel, civil and construction trades, as well as administrative and support staff. Typical onsite construction staff levels will depend on the number of concurrent tasks being performed and the phasing of the Project. The Project will create

approximately 296 direct construction jobs and 466 construction-related jobs. Aurora estimates that each site will require an average of six unique construction jobs, plus 3.3 jobs per installed MW (i.e., a 1-MW site will create approximately 10 construction jobs). Additionally, during construction, other non-construction jobs such as engineering and surveying will be needed. Aurora used the National Renewable Energy Laboratory's (NREL) Jobs and Economic Development Impacts (JEDI) PV tool to calculate jobs associated with the design, construction, and installation of the Project and estimated a total of 762 Full-Time Equivalent (FTE) jobs created during the construction cycle.

For every 2 MW of installed capacity, Aurora estimates that there will be between 25 and 35 trucks used for delivery during construction and light duty trucks on a daily basis for transportation of construction workers to and from the site during construction. Typical construction equipment such as scrapers, dozers, dump trucks, watering trucks, motor graders, vibratory compactors, and backhoes will be used during construction. Specialty construction equipment that may be used during construction will include:

- Skid steer loader;
- Vibratory pile driver;
- Medium duty crane;
- All-terrain forklift;
- Concrete truck and boom truck;
- High reach bucket truck; and
- Truck-mounted auger or drill rig.

Table 3.2-1 provides data on how Aurora will schedule the construction process for each facility, including task duration and key predecessors.

Table 3.2-1 Construction Timeline for Individual Facilities

Task	Duration	Key Predecessor
Site Preparation, Grubbing and Clearing	2 days per acre	Construction begins
Laydown and Temporary Job Site Trailers	7 days	Construction begins
Civil Construction	10 days per acre (may vary according to terrain)	Laydown and Temporary Job Site Trailers
PV Mounting Posts	5 days/MW	Site Preparation, Grubbing and Clearing
Underground Collection System	4 days/MW	Site Preparation, Grubbing and Clearing
Electrical Enclosure/Inverter	15 days/unit	Laydown and Temporary Jobsite Trailers
Tracker Installation	3 days/MW	PV Mounting Posts
PV Module Installation	3 days/MW	Tracker Installation
Interconnection Tie (portion within facility boundary)	10 days/facility	Laydown and Temporary Job Site Trailers
Testing	20 days	Interconnection Tie

After construction, temporarily disturbed areas will be restored. The site will be graded to natural contours and soil will be loosened and seeded if necessary. Once construction is complete, the access roads will be regraded, filled, and dressed as needed. Although few, if any, temporary roads will be constructed with the Project, any temporary roads will be decommissioned and restored. Erosion control methods will depend on the contours of the land, as well as requirements of the general contractor and relevant permits. Aurora anticipates that the post-construction clean-up and site restoration activities will last approximately two to four weeks per facility. Low-growing seed mixes will be used under the solar arrays during the restoration process.

3.3 Operation and Maintenance

The expected service life of the proposed facilities is 25 to 40 years, and Aurora estimates that the Project will result in up to 19 FTE permanent positions to operate and maintain the facilities. There will not be O&M offices located at all facility locations; rather the staff will visit the facilities on a regular basis as described in Section 3.3.4. A maintenance plan will be created for the Project to ensure the performance of the solar facilities, including a scheduled check of the main items and a predictive maintenance approach of the devices subjected to derating/degradation. Derating/degradation refers to the known process of components losing some efficiency or otherwise degrading over the course of the 20-year life cycle; like all technology and physical components, a certain amount of this is unavoidable, and Aurora will plan for it and maintain each facility as needed. Once construction is complete, the individual solar facilities will see one to two trucks on site periodically, at intervals associated with the maintenance schedule in Section 3.3.4 during normal operations. The main scheduled activities are described in more detail below in Sections 3.3.1 through 3.3.3.

All maintenance activities will be performed by qualified personnel. Maintenance activities will be performed during the day to the extent that they do not disrupt energy production. Upon occasion, it may be desirable to perform maintenance when the sun is down. Activities that have the potential for substantial noise generation will be performed during the day to minimize impacts in areas where residents are present. As an example, if a module needs repair, that particular section of the array can be disconnected from the array by opening the combiner box circuit. The module can then be replaced and the combiner box circuit closed. This temporary shutdown will affect less than one percent of the array's production capability for a 10-MW facility. Additionally, the power production circuits are separated from the tracking circuits. This allows the PV modules to operate during an unscheduled outage of the tracker system.

There will be an area for the storage of the spare parts and the tools as noted in Section 3.3.1 above. Although it is likely that there may be several centralized storage areas among the facilities so that not every facility location has a separate storage area, Aurora seeks permit

coverage to construct a storage shed at every one of the facilities that are constructed. The generating facilities will be remotely operated through a real-time control system for most operations functions. All the monitored data will be managed by Aurora or contracted out to a qualified subcontractor. Onsite operation will be performed from time to time as required for certain resets and troubleshooting activities.

3.3.1 Equipment Inspection

Inspection of the main equipment will occur at regular intervals, including:

- PV panels: visual check of the panels, tracking system and surrounding grounds to verify the integrity of the panels and tracking structure, the presence of animals and nests, etc.
- Inverters, transformer and electrical panels: visual check of the devices including the connection cabinet and the grounding network. Check for presence of water and dust;
- Electrical check: measurement of the insulation level and dispersion. Check of the main switches and safety devices (fuses);
- Noise: check of abnormal sounds.
- Cabling and wiring: visual check of the buried and aerial electrical line and connection box to verify their status.

3.3.2 Performance Monitoring

Performance monitoring of the Project facilities will consist of a weekly or monthly download of the data acquired by the onsite meteorological station (energy produced, alarms, faults, etc.).

3.3.3 Facility Maintenance

Housekeeping of the Project facilities will include road maintenance, vegetation maintenance including mowing the ground cover that is planted under the arrays at each facility, fence and gate inspection, lighting system checks, and PV panel washing (if required; minimal to no washing is anticipated to be needed at Project facilities).

3.3.4 Frequency

Table 3.3-1 provides more information on the anticipated frequency of the operations and maintenance tasks associated with the Project. The table represents the anticipated preliminary frequency of these tasks; the frequency of inspection may be varied based on facility demands and experience with performance of certain components and project features.

Table 3.3-1 Operations and Maintenance Tasks and Frequency

Plant device and job	Preliminary Frequency
Photovoltaic Field	
PV modules visual check	*Every two months*
Wirings and junction boxes visual check	*Quarterly*
PV strings measurement of the insulation	*Quarterly*
PV strings and string boxes faults	*Weekly (1)*
PV panels washing	*No regular washing planned, (only as site-specific conditions warrant)*
Grass cutting *(if necessary at site)*	*Once in Spring, once in Summer*
Electric boards	
Case visual check	*Twice Yearly*
Fuses check	*Twice Yearly*
Surge arresters check	*Twice Yearly*
Torque check	*Twice Yearly*
DC voltage and current check	*Twice Yearly*
Grounding check	*Twice Yearly*
Inverter	
Case visual inspection	*Every two months*
Air intake and filters inspections	*Every two months*
Conversion stop for lack of voltage	*Twice Yearly*
AC voltage and current check	*Twice Yearly*

Plant device and job	Preliminary Frequency
Conversion efficiency inspection	*Twice Yearly*
Datalogger memory download	*Twice Yearly*
Fuses check	*Twice Yearly*
Grounding check	*Twice Yearly*
Torque check	*Twice Yearly*
Support structures	
Visual check	*Twice Yearly*
PV modules torque check on random sample	*Twice Yearly*

3.4 Decommissioning and Repowering

At the end of the useful life of the facility, the facility can be decommissioned or repowered. Decommissioning would include removing the solar arrays, transformers, electrical collection system, underground lines, fencing, lighting and substations, and possibly the O&M facility from the facility. Standard decommissioning practices would be utilized, including dismantling and repurposing, salvaging/recycling, or disposing of the solar energy improvements, and restoration.

Aurora will implement the following decommissioning plan:

Timeline

Decommissioning is estimated to take two to three weeks per facility to complete and the decommissioning crew will ensure that all equipment is recycled or disposed of properly.

Financial Resource Plan

A decommissioning escrow will be established between Aurora and the landowner. The facility lease provides for an escrow account to secure Aurora's obligations to remove the facilities upon the end of the PV system's useful life or at the end of the

lease term. The escrow shall be held, administered, and disbursed by a title company, bank or other qualified escrow agent mutually satisfactory to the parties.

If Aurora does not remove the solar facilities within twelve (12) months after the expiration of the lease or earlier termination of the lease, the landowner may draw from the escrow an amount sufficient to reimburse lessor for the difference between lessor's out-of-pocket costs of removing the solar facilities, less the salvage value of the solar facilities.

Removal and Disposal of Project Components

The removal and disposal details of the Project components are found below.

Modules: Modules inspected for physical damage, tested for functionality, and removed from racking. Functioning modules packed and stored for reuse (functioning modules may produce power for another 25 years or more). Non-functioning modules packed and palletized and sent to the manufacturer or a third party for recycling or other appropriate disposal method.

Racking: Racking uninstalled, sorted, and sent to metal recycling facility.

Poles: Steel poles removed and sent to a recycling facility. Holes backfilled.

Wire: aboveground wire sent to facility for proper disposal and recycling. Belowground wire abandoned in place at depths greater than four feet.

Conduit: Aboveground conduit disassembled onsite and sent to recycling facility.

Junction boxes, combiner boxes, external disconnect boxes, etc.: Sent to electronics recycler.

Inverter: Sent to manufacturer and/or electronics recycler. Functioning parts can be reused.

Concrete pad(s): Sent to concrete recycler.

Fence: Sent to metal recycling facility.

Computers, monitors, hard drives, and other components: Sent to electronics recycler. Functioning parts can be reused.

Restoration/Reclamation of Facility

After all equipment is removed, the facility will be restored. Holes created by poles, concrete pads, and other equipment will be filled in with soil to existing conditions and seeded. This will include the revegetation.

Aurora reserves the right to extend operations instead of decommissioning at the end of the site permit term. As necessary, Aurora may apply for an extension of the Site Permit to continue operation of the Project. In this case, a decision may be made on whether to continue operation with existing equipment or to retrofit the facilities with upgrades based on newer technologies.

4 Environmental Information

For the discussion in the following sections, along with the detailed calculations presented in Appendix E through Appendix I, the following terminology, assumptions and approach are used.

For existing conditions within the portions of land under Aurora's control at each facility, calculations are based on the boundaries of the Facility Land Control (see Table 2.2-2 for acreages). This reflects the fact that final design may necessitate development in areas within the overall areas under Aurora's land control. Additionally, for any discussions of resources that are located outside of a facility (such as parks within one mile), the Facility Land Control boundary is used in order to discuss the vicinity of these features from anywhere within the portion under Aurora's control.

For approximating areas of temporary impact, the Preliminary Development Area is used (see Table 2.2-2 for acreages); this reflects the possibility for resources to be temporarily impacted within the area that preliminary design indicates is needed for construction and operation of the facility. For some resources, such as land cover, and agricultural production or other land uses, the Preliminary Development Area is also referred to for "permanent impacts" discussions ("permanent" for the life of the Project). For calculating anticipated permanent impacts for resources such as wetlands, the permanent impacts are calculated using the preliminary design for permanent solar array components such as access roads and inverters. It should be noted that preliminary design does not identify locations of the posts for the solar arrays, so detailed calculations of impacts are not included. However, due to the fact that the posts of the solar arrays are anticipated to be installed via vibration or a pile driver for the majority of the locations, the permanent impacts associated with these features are expected to be negligible. To illustrate, the I-beam shaped posts are anticipated to be approximately 6 inches by 4 inches, with a surface area of less than 24 square inches (less than 0.17 square feet) because of the "I" shaped profile. In general, Aurora is anticipating up

to an average of 926 of these posts per MW at each facility, which would result in less than 0.005 acre per MW.

Additionally, the preliminary design has incorporated areas that may need to be graded for installation of the solar facilities; those areas are shown in Appendix D, and discussed in the detailed calculations for some resources such as wetlands and soils.

4.1 Environmental Setting

The Project facilities are located in 16 counties in Minnesota, as shown in Table 2.2-1. The majority (15) of the facility locations lie within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Province, as defined by the Minnesota Department of Natural Resources (DNR) Ecological Classification System (ECS); five facility locations are in the North-Central Glaciated Plains Section of the Prairie Parkland Province, two are in the Western Superior Uplands Section of the Laurentian Mixed Forest Province, and two are in the Paleozoic Plateau of the Eastern Broadleaf Forest Province (Table 4.1-1).

Table 4.1-1 Ecological Classification Systems

ECS Section	Facilities
Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Province	Albany, Annandale, Chisago, Dodge Center, Eastwood, Hastings, Lake Emily, Lake Pulaski, Lester Prairie, Montrose, Scandia, Waseca, West Faribault, West Waconia, Wyoming
North-Central Glaciated Plains Section of the Prairie Parkland Province	Atwater, Brooten, Fiesta City, Paynesville, Pipestone
Western Superior Uplands Section of the Laurentian Mixed Forest Province	Lawrence Creek, Mayhew
Paleozoic Plateau of the Eastern Broadleaf Forest Province	Pine Island, Zumbrota

The majority of the facilities are located in rural areas with scattered residences where the land use is dominated by cultivated agriculture; some of the facilities are located adjacent to

major highways, and a few are within a mile of residential developments. In general, the facilities are located on relatively flat fields conducive to solar development.

4.2 Human Settlement

4.2.1 Public Health and Safety

The Project facilities are located in rural and municipal fringe settings that have low to moderate population densities. Construction and operation of the Project will have minimal impacts on the security and safety of the local populace. Aurora is gathering information to coordinate with all emergency and non-emergency response teams for the Projects, including law enforcement agencies, ambulance services, fire departments, and 911 services. Construction will comply with local, state, and federal regulations regarding installation of the facilities and standard construction practices. Established industry safety procedures will be followed during and after construction of the Project. This will include clear signage during all construction activities, and fencing of all facilities to prevent public access.

EMF

The term electromagnetic field (EMF) refers to electric and magnetic fields that are present around any electrical device. Electric fields arise from the voltage or electrical charges and magnetic fields arise from the flow of electricity or current that travels along transmission lines, power collection lines, substation transformers, house wiring, and electrical appliances. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors (wire). EMF can occur indoors and outdoors.

While the general consensus is that electric fields pose no risk to humans, the question of whether or not exposure to magnetic fields potentially causes biological responses or even health effects continues to be the subject of research and debate.

With the proposed Aurora Project, the sources of EMF will be from electrical collection lines, that for the most part will be buried underground, and from the transformers installed at each inverter pad. EMF from underground electrical collection lines dissipates very close to the lines because they are installed belowground within insulated shielding. The electrical fields are negligible, and there is a small magnetic field directly above the lines that, based on engineering analysis, dissipates to levels indistinguishable from other sources within 70 feet on either side of the installed cable. Worst-case EMF associated with the transformers that would be used for the largest (10 MW) facilities dissipates to levels indistinguishable from other sources within approximately 200 feet. The nearest home to the edge of the solar arrays according to preliminary design is 184 feet (at the Atwater facility, a 4-MW facility) and the transformers will not be located at the edges of solar arrays, so the Project will not affect EMF levels at residences.

Mitigative Measures

Aurora and its contractors will follow standard industry safety practices during construction and operation of the Project, including clear signage during all construction activities, and fencing of all facilities. No additional mitigation measures are proposed.

4.2.2 Displacement

With the exception of one facility, no displacement of residential homes or businesses will occur. Table 4.2-1 provides distances to nearest homes for each facility, including approximate distance to the preliminary development boundary and approximate distance to the edge of solar arrays (per preliminary design). Homes are also shown on the maps in Appendix B.1-1.

Table 4.2-1 Distance to Homes

Facility	Closest Distance from Preliminary Development Area Boundary (feet)	Closest Distance from Edge of Solar Array (per Preliminary Design; feet)
Albany	192	552
Annandale	537	573
Atwater	81	184
Brooten	46	415
Chisago County	179	240
Dodge Center	50	230
Eastwood	217	1,150
Fiesta City	1669	1,742
Hastings	645	749
Lake Emily	508	621
Lake Pulaski	462	279
Lawrence Creek	233	491
Lester Prairie	137	240
Mayhew Lake	0 (home within preliminary development boundary would be removed if built)	487
Montrose	83	330
Paynesville	0 (remains of home structure within preliminary development boundary) 1,405 (nearest standing home)	1,479
Pine Island	815	941
Pipestone	114	189
Scandia	232	333
Waseca	132	1,176
West Faribault	188	1,138

Facility	Closest Distance from Preliminary Development Area Boundary (feet)	Closest Distance from Edge of Solar Array (per Preliminary Design; feet)
West Waconia	436	636
Wyoming	87	234
Zumbrota	287	319

If the Aurora Solar Project - Mayhew Facility is selected for construction, an existing home would be removed prior to construction of the facility. The residence is currently being rented out by the landowner, and Aurora would coordinate with this landowner and the renter if this facility were to be constructed. Aurora has a signed agreement with the landowner, and it is anticipated that the renters would be able to find comparable housing within the same five-mile radius of the Sartell/Sauk Rapids area. The buildings located within the Aurora Solar Project - Paynesville Facility include the remains of one structure that used to be a home. If this facility is constructed, the remains would be removed along with the other outbuilding structures.

Mitigative Measures

If the Aurora Solar Project - Mayhew Facility is selected to be constructed, Aurora will work with the landowner and the renter regarding the removal of the home, and provide sufficient notice so the landowner can appropriately coordinate with the renters. No other displacement will occur as a result of the Project, and no additional mitigation measures are proposed.

4.2.3 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).

The background noise in the vicinity of the Project facilities is typically a result of farming equipment/operations, wind, and vehicles. A comparison of typical noise-generating sources is outlined below in Table 4.2-2.

Table 4.2-2 Decibel Levels of Common Noise Sources

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

Sound Pressure Level (dBA)	Noise Source
40	Bedroom
30	Secluded Woods
20	Whisper

SOURCE: "A Guide to Noise Control in Minnesota" Minnesota Pollution Control Agency (2008)

The Minnesota Pollution Control Agency (MPCA) has the authority to adopt noise standards pursuant to Minnesota Statute Section 116.07, subd. 2. The adopted standards are set forth in Minnesota Rule 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 (L10) and 50 percent of any hour (L50). Household units, including farmhouses, are included in Land Use Classification 1. Table 4.2-3 shows the MPCA State noise standards.

Table 4.2-3 MPCA State Noise Standards – Hourly A-Weighted Decibels

Land Use Classification		Daytime L10	Daytime L50	Nighttime L10	Nighttime L50
Residential	NAC-1	65	60	55	50
Commercial	NAC-2	70	65	70	65
Industrial	NAC-3	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 a specific facility on a given day. These noise impacts will be temporary.

The main source of noise from the Project during operation will be from the inverters, and to a lesser extent from the transformers and rotation of the tracking system. All electrical equipment will be designed to National Electrical Manufacturer Association (NEMA) Standards. Table 4.2-4 summarizes the anticipated distance to reach the most stringent MPCA noise standard (50 dBA) from a range of inverters under consideration for use in the Project facilities.

Table 4.2-4 Inverter Noise Levels

Inverter	Distance to 50 dBA
AE 1000NX	30 feet
SMA SC800 CP-US	165 feet
Bonfiglioli 2MW RPS	98 feet
GE Brilliance 1MW	224 feet
SMA 900CP-US	75 feet
SMA 2x SC800CP	111 feet

Results of the noise modeling of the inverters under consideration show that noise levels will be below the quietest MPCA noise limits (nighttime residential) at a range of approximately 30 to 224 feet from the inverter, depending on which inverter is selected. Additionally, it should be noted that the inverters are not anticipated to be emitting peak noise nor would the tracking system rotate during the nighttime since the facilities will not be generating electricity, so actual nighttime noise emission levels would be anticipated to be lower than what is shown in Table 4.2-4. According to preliminary design (Appendix D), the closest home to any facility is 184 feet away from the edge of a solar array (at the Aurora Solar Project - Atwater Facility), and no inverter or transformer would be closer than 20 feet from a property line. Because the inverters are located within the middle of the solar arrays, the noise levels from Project equipment are not expected to be discernible from background noise levels at homes in the vicinity.

Aurora will confirm during final design once specific inverter types are selected that MPCA noise limits will be met at sensitive receptors.

Mitigative Measures

During construction, Aurora plans to limit construction to between the hours of 6 AM and 7 PM Monday through Saturday, with the potential for limited low-noise activities on Sundays. No noise impacts during operation are anticipated; therefore no mitigation measures are proposed.

4.2.4 Aesthetics

The Project will convert approximately 1,194 acres of land (primarily agricultural land [1,056.4 acres], along with small percentages of other land covers [137.6 acres]) to multiple solar facilities characterized by complex geometric forms, lines, and surfaces that may be novel to and divergent from the surrounding rural landscape. Most of the developed area will be utilized with rows of solar PV panels. Solar PV employs glass panels that are designed to maximize absorption and minimize reflection to increase electricity production efficiency. Figure 4.2-1 is a photograph of the existing Saint John's University Solar Farm in Collegeville, Minnesota. The Project will utilize similar components and look very similar to the Saint John's Solar Farm.

Figure 4.2-1 Photograph of Saint John's University Solar Farm

To limit reflection, solar PV panels are constructed of dark, light-absorbing materials and covered with an anti-reflective coating. Today's panels reflect as little as two percent of the incoming sunlight depending on the angle of the sun and assuming use of anti-reflective coatings.

Figure 3.1-1 (in Section 3.1) shows a typical solar array drawing for a 2-MW facility. The solar fields will occupy most of the disturbed area for the solar facilities. The electrical transformers and inverters, an O&M area (if one is built at a particular facility), and access roads will take up the rest of the disturbed area. Most of the facility, including the solar field, will be low-profile. Within the facility boundaries, the gen-tie line will be built underground to the edge of the parcel. Depending on specific site conditions, Xcel Energy may connect to the facilities with either underground or overhead facilities, and

in some limited circumstances there may be a utility overhead extension at the dead end of the gen-tie line within the facility boundary.

The solar arrays will be visible from adjacent roadways and parcels, but given their relative low profile and the fact that all the facilities will be fenced for security, they will not be visible from long distances. For the majority of the Project facilities, the surrounding land use is cultivated crop fields, with a few of the facilities located adjacent to recreational uses such as snowmobile trails or hunting areas, as described in more detail in Section 4.2.7. Although recreational users will be able to see the solar facilities from some locations, it will not affect the recreational use. And as described above, the solar panels are specifically designed to absorb light, minimizing glare; therefore no negative effects to road or air travel will occur.

Mitigative Measures

Because no negative visual impacts are anticipated, no mitigative measures are proposed. If during Project development a specific concern is raised about visual effects to properties adjacent to a facility, Aurora may consider measures such as redesign, vegetative screening or privacy slats in the security fencing. However, no such measures are generally anticipated to be necessary.

New light sources will be minimized, and lighting shall be designed (e.g., using shielding, motion detectors, and/or downcast lights) to limit the lighted area to the minimum necessary.

4.2.5 Socioeconomics

The socioeconomic effect of the Project is anticipated to be positive. The development of solar energy will diversify and strengthen the economic base of the counties where the solar facilities are located. Wages and salaries paid to contractors and workers will contribute to the total personal income of the region. At least part of the wages paid to temporary and permanent Project workers will be circulated and recirculated within the county and the state. Expenditures made by Aurora for equipment, operating supplies,

and other products and services will benefit businesses in the host counties and the state. Aurora will also pay property and production taxes on the solar facilities, which is expected to generate additional revenue for the counties and local jurisdictions compared to the current property tax rates for the parcels.

As discussed in Section 3.2, the Project will create approximately 296 direct construction jobs and 466 construction-related jobs. Additionally, 19 permanent positions will be created to operate and maintain the facilities.

Negative impacts to socioeconomic resources will be relatively minor. Less than 1,000 acres of land will be temporarily removed from its current use in pasture or agricultural production as a result of Project construction. In addition, due to the low impact design of the proposed facility, the land can be easily converted back to its current use at the end of the useful life of the facility (see Section 3.4).

Project construction will not negatively impact leading industries within southern Minnesota; as described in more detail in Section 4.3.1, the removal of land from agricultural production during the life of the Project is not anticipated to affect the county or regional production capacity. There is no indication that any minority or low-income population will be adversely impacted by the Project. Additionally, the Project does not consume fuel and is therefore largely insulated from risks associated with the future costs, availability, and transportation of fuels.

Mitigative Measures

The owners of the parcels directly affected by Project facilities will be compensated by Aurora through the negotiated purchase or lease of the land. Because the socioeconomic impacts are anticipated to be positive, no mitigative measures are proposed.

4.2.6 Cultural Values

Cultural values include those perceived community attitudes or beliefs that provide a framework for community unity. The Project contains facilities within 16 counties across

Minnesota. According to the U.S. Census Bureau, the populations of these counties derive from a diverse ethnic heritage, with a majority of the reported ethnic backgrounds being of European origin. Cultural representation in community events appears to be more closely tied to geographic features (such as the St. Croix River), seasonal events, national holidays, and municipal events than to those based in ethnic heritage. Examples of regional cultural events include: the annual Fourth of July Celebrations and winter holiday festivals in the municipalities in the vicinity of Project facilities; the Rapids River Days and Rapids River Food Fest in Sauk Rapids; Town and Country Days in Paynesville; Albany Pioneer Days in Albany; Rivertown Days in Hastings; Wannigan Days in Taylors Falls; the Pipestone Pow Wow and Pipestone Civil War Days in Pipestone; and the Sleigh and Cutter festival and Waseca County Free Fair in Waseca. Construction of the proposed Project is not expected to conflict with any of the cultural values in the vicinity of the facilities. No impacts to cultural values are anticipated.

Mitigative Measures

Because no impacts to cultural values are anticipated, no mitigative measures are proposed.

4.2.7 Recreation

Recreational opportunities in the Project include hiking, biking, boating, fishing, camping, swimming, horseback riding, cross country skiing, bird watching, snowmobiling, hunting, and nature viewing. The maps in Appendix B.3-2 show recreational areas in the vicinity of the facilities.

Federal, State and County Lands

No county or state parks are located within any of the Project facilities. Several facilities are within one-half mile of county or local parks, including the Pipestone Facility (Westview Park and middle/high school ball fields); Waseca Facility (a city Nature Area and Loon Lake Park), the West Faribault Facility (Spring Greenway), and the Wyoming Facility (Banta Park).

Minnesota WMAs are managed to provide wildlife habitat, improve wildlife production, and provide public hunting and trapping opportunities. These DNR lands were acquired and developed primarily with hunting license fees. WMAs are closed to all-terrain vehicles and horses because of potential detrimental effects on wildlife habitat. There are no WMAs within any of the Project facilities; the Paynesville Facility is located directly west of the Spirit Lake WMA. Five other Project facilities are within one mile of WMAs: the Chisago Facility (Carlos Avery WMA), the Hastings Facility (Rutstrum WMA), the Lake Emily Facility (Ottawa WMA), the Montrose Facility (Malardi Lake WMA), and the Pipestone Facility (Pipestone Indian WMA).

SNAs are areas designated to protect rare and endangered species habitat, unique plant communities, and significant geologic features that possess exceptional scientific or educational values. There are no SNAs within one mile of any of the Project facilities.

Waterfowl Protection Areas (WPAs) are managed to protect breeding, forage, shelter, and migratory habitat for waterfowl or wading birds, such as ducks, geese, herons, and egrets. WPAs provide opportunities for viewing wildlife and intact ecosystems. The Aurora Solar Project - Annandale Facility is located north of the Annandale WPA, and the Aurora Solar Project - Pipestone Facility is located within one mile of the Pipestone WPA. There are no other WPAs within one mile of any of the remaining Project facilities.

No National Wildlife Refuges were identified within one mile of the Project facilities. The Aurora Solar Project - Pipestone Facility is located approximately half a mile from the southern boundary of the Pipestone National Monument. The Pipestone National Monument is managed by the National Park Service, and offers an opportunity to explore cultural and natural resources. The Monument contains active quarry pits where American Indians continue the traditions of quarrying pipestone. The quarries are surrounded with native tallgrass prairies, and there are trails located within the Monument for the public to explore.

The Aurora Solar Project - Hastings Facility is located approximately half a mile west of the St. Croix National Scenic Riverway. Recreational use of the river includes boaters and rafters. Given the wooded bluffs on the banks of the river, and the low profile nature of the solar facility, the Hastings Facility is not anticipated to be visible to recreational users on this river.

One facility, the Aurora Solar Project - Mayhew Lake Facility, is located within a state designated Sauk Rapids-Rice Goose Refuge. Goose Refuges provide habitat and protection for geese, but hunting of other waterfowl is allowed on public lands within the refuge boundaries. The Mayhew Lake Facility parcel is located on a private parcel located within the Goose Refuge boundaries, and the Pipestone Facility is located on a private parcel within the boundaries of the Hiawatha State Game Refuge, where small game hunting is allowed on public parcels. Hunting activities could occur on other parcels within the Refuge boundaries. The potential for hunting activities on adjacent properties could be present for most Project facility locations, including the Mayhew Lake and Pipestone facilities, and does not preclude development of solar facilities (or other commercial or residential construction).

Trails

The Faribo Sno-Go Trail snowmobile trail crosses the West Faribault Facility. Construction of the facility at this location will require realignment of the snowmobile trail around the fenced area, and Aurora is coordinating with the Sno-Go Club that maintains the Trail (Appendix A). The preliminary development areas of additional facilities also overlap with snowmobile trails that are located in road ditches; these include the Annandale and Montrose facilities (trails maintained by Wright County Trails Association); Lester Prairie Facility (maintained by the Crow River Sno Pros); the Waseca Facility (maintained by the Waseca County Trails Association), and the Mayhew Lake Facility (maintained by the Benton County Trails Association). These trails likely will not be affected and would not need to be realigned; however, Aurora is coordinating with the trail associations for these trails as well. Three other facilities are within half a

mile of snowmobile trails mapped by the DNR (Atwater, Dodge Center, and West Waconia facilities). Additionally, several of the facilities are within approximately one-half mile of other recreational trails, including the Albany Facility (Lake Wobegon Trail), the Wyoming Facility (Sunrise Trail), and the Waseca Facility (a local bike trail).

The Project facilities will avoid all WMAs, WPAs, SNAs, U.S. Fish and Wildlife (USFWS) and other federal lands, and public parks. In general, recreational impacts will be visual in nature affecting individuals using public land or trails directly adjacent to Project facilities for recreation. Visual impacts will be most evident to visitors using any recreational resource within a one-half mile radius of facilities; there are very few designated recreational areas within this distance, and impacts will be minimal due to the low profile of the solar components. If the Mayhew Lake facility is developed, it will not affect the recreational uses of the public lands within the Sauk Rapids-Rice Goose Refuge. If the West Faribault Facility is developed, Aurora will continue to coordinate with the Faribo Sno-Go Club to determine the best course of action to realign the trail and allow continued recreational use of that resource. If the Pipestone Facility is developed, the majority of the preliminary development area is not anticipated to be visible from within the Pipestone National Monument, based on an examination of the intervening topography and worst-case height assumptions for solar array components. The Pipestone facility may be visible from limited vantage points within the Monument; however, the solar facility is located directly adjacent to existing residential developments, and there are residences located between the Monument and the facility location. Therefore, the Project is not expected to significantly affect the existing viewshed from the Monument.

Mitigative Measures

Aurora is coordinating with the National Park Service (NPS) regarding the Pipestone Facility; however, as described above, very little of the facility is expected to be visible from the Pipestone National Monument. Beyond the coordination with the snowmobile clubs and trail associations (particularly for the West Faribault Facility where

realignment may be necessary), no further mitigative measures are proposed because no impacts to recreational resources will occur.

4.2.8 Public Services and Infrastructure

Utilities and Infrastructure

The municipalities and townships where the Project facilities are located provide water, sewer, fire, and police services. Some of the facilities are located in areas where private wells and septic systems are used at rural residences. Distribution and transmission lines are located along roadways in the vicinity of most of the Project facilities. The Project will not impact these public services. American Land Title Association (ALTA) surveys will identify the locations of underground utilities. The location information will be incorporated into the final design to avoid and minimize impacts to the existing utilities, and utility locations will be marked prior to construction to avoid impacts from construction activities. Limited, temporary impacts may occur when Xcel Energy interconnects the facilities to the distribution system; these outages will be of short duration. Review of the Minnesota Department of Health (MDH) County Well Index identified only one well within the preliminary development area for the Scandia Facility and an additional well within the facility land control area of the Lawrence Creek Facility.

Roadway

Access to the Project facilities will be via existing township, county or state roads. With the limited possible exception of minor field access or driveway changes which may be needed on a facility-by-facility basis depending on final design, no changes to existing roadways will occur. The roads used for access to each facility are shown on the maps in Appendix B.1-1 and Appendix D. During the construction phase, temporary impacts are anticipated on some public roads within the vicinity of Project facilities, primarily through additional traffic and slow-moving construction vehicles.

Construction traffic will use the existing county and state roadway system to access the Project facilities and deliver construction materials and personnel. The maximum construction workforce is expected to generate approximately 25 to 35 additional vehicle trips per day per facility associated with materials delivery, with some additional light truck trips delivering workers to facilities that are under construction. For purposes of comparison, the functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day, or Annual Average Daily Traffic (AADT). Since many of the area roadways have AADTs that are well below capacity, this increased traffic may be perceptible to area residents, but the slight increase in volume is not expected to affect traffic function. Slow-moving construction vehicles may also cause delays on smaller roads, similar to the impact of farm equipment during planting or harvest. However these delays should be minimal for the relatively short construction delivery period at each facility.

After construction is complete, traffic impacts during the operations phase of the Project will be minimal. A small maintenance crew driving through the area in pickup trucks on a regular basis will monitor and maintain the facilities as needed, but traffic function will not be impacted as a result.

Other Transportation Infrastructure

There are no railroads that cross any of the Project facilities, so rail traffic will not be affected. Eight of the Project facilities are located within three nautical miles of Federal Aviation Administration (FAA)-registered airports: the Brooten, Dodge Center, Fiesta City, Lake Pulaski, Lester Prairie, Pipestone, Waseca, and West Faribault facilities. Aurora has conducted the FAA's Notice Criteria screening tool on these facilities to determine if further aeronautical study or FAA filing is needed. The screening tool indicated that one of the Project facilities, the Fiesta City Facility, is in proximity to a navigation facility and the FAA requests that Aurora file a 7460-1 Notice of Proposed Construction for that facility. The Fiesta City facility is located approximately 1.5 miles southeast of the Montevideo Airport. The FAA's screening tool indicated that the

remainder of the facilities within three nautical miles of an airport do not exceed Notice Criteria and therefore no 7460-1 forms need to be filed for these facilities.

On behalf of Aurora, Capital Airspace has performed a glare analysis for the Fiesta City facility, following the FAA's Solar Glare Hazard Analysis Tool methodology. The results indicate that the facility will create, at various times throughout the year, a low potential for temporary after-image glare on three runways, and no potential for glare on a fourth runway. According to the FAA, low potential for temporary after-image is acceptable for pilots.

Mitigative Measures

If private wells are located within development areas, Aurora would follow appropriate procedures to shut down the wells, and work with affected landowners to install new wells outside of the solar facilities as needed. Aurora will also coordinate with Gopher State One Call and the pipeline companies before and during construction to fully understand infrastructure and safety concerns and to avoid possible structural conflicts. Final design will minimize and avoid impacts to underground utilities; if conflicts are unavoidable Aurora will coordinate with the utility to develop an approach to reroute or otherwise protect the utility. Underground utilities will be marked prior to construction start.

Aurora is coordinating with the city of Montevideo and the FAA regarding the Fiesta City facility's proximity to the Montevideo airport, and will file a 7460-1 Notice of Proposed Construction for that facility. In general, the low profile of the solar arrays will be within FAA height limits, and as discussed in Section 4.2.4, the solar panels are designed to absorb rather than reflect light. The results of the glare analysis indicating low potential for after-image will also be shared with the FAA. Therefore no additional mitigation is anticipated to be necessary or proposed.

4.2.9 Land Use and Zoning

Aurora is coordinating with municipal and county officials regarding the Project; however, it should be noted that per Minnesota Statutes 216E.10, subd. 1, the Site Permit is the only site approval required for construction of the Project. A Site Permit supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances put in place by regional, county, local and special purpose governments, although the review by the Commission will take land use into consideration.

The majority of the Project facilities are located in areas that are zoned for agriculture or transitional uses. Several Project facilities are located in areas that are within an urban reserve district, urban expansion districts, annexation areas, rural residential or within municipality boundaries. As of May 2014, three counties where facilities are located (Kandiyohi [Atwater Facility], Le Sueur [Lake Emily Facility], and Stearns [Albany, Brooten and Paynesville facilities]) have existing ordinances that address solar development; the remainder of the counties do not specifically address utility-scale solar projects, although some are considering amending ordinances to directly address it. Table 4.2-5 provides the zoning district for each facility. Additionally, the table provides information on which facilities are located within areas that are designated for orderly annexation per the criteria of Minnesota Statutes Section 414.0325.

Table 4.2-5 Zoning Districts

Facility	Zoning District	Orderly Annexation
Albany	Agricultural District A-40	No
Annandale	Transitional Area	No
Atwater	A: 1 Agricultural within Urban Growth District	No
Brooten	Municipality	No
Chisago County	Agricultural District	No
Dodge Center	Urban Expansion District	No

Facility	Zoning District	Orderly Annexation
Eastwood	Agricultural District	Yes
Fiesta City	Agricultural District	No
Hastings	Agricultural A-2 District	No
Lake Emily	Agricultural District	No
Lake Pulaski	AG-Agricultural District	No
Lawrence Creek	Agricultural District	No
Lester Prairie	Agricultural District	No
Mayhew Lake	Sauk Rapids Annexation Area	Yes
Montrose	Transitional Area	Yes
Paynesville	Transition District T-20/Agricultural A-40	No
Pine Island	Agricultural District	No
Pipestone	Municipality	Yes
Scandia	Agricultural District	No
Waseca	Agricultural Protection District A-1	No
West Faribault	Urban Reserve	No
West Waconia	Agricultural	No
Wyoming	R-2 Rural Residential	No
Zumbrota	Agricultural A-3 Urban Fringe	Yes

In some areas, facilities may be located in areas where there is a planned extension of water, sewer, or other services. Construction of the facilities would not preclude the future orderly extension of these services across property under Aurora's control. The Project will change the land use in the parcels where facilities are built, from agricultural to industrial (solar power plants). The current agricultural land use could be restored after the useful life of the Project by removing the facilities. The Project is not anticipated to preclude current or planned land use on any of the adjacent parcels; and upon

decommissioning and removal of facilities, the facility parcels themselves may be used for existing agricultural use or transitioned to other planned land uses.

Mitigative Measures

In general, the location of the facilities was determined based on the general proximity to the interconnection substations; in order to avoid the necessity of transmission line connections, Aurora was limited to a certain distance from the interconnections. Once general areas around potential interconnections were identified, Aurora contacted landowners of parcels with the potential for a viable facility and coordinated with local officials as well. As the maps in Appendix B.2-1 show, in a 5-mile radius around the interconnection substations, the zoning and land use tends to be a mix of agricultural, rural residential or municipal boundaries. All of the parcels where proposed facilities are located are currently in agricultural land use, minimizing the impacts to commercial or residential development, and as described above, reversion to this land use or a change to another land use can occur after the solar facilities are removed at the end of the Project's useful life. Because no permanent land use impacts are anticipated, no additional mitigative measures are proposed.

4.3 Land-Based Economies

4.3.1 Agriculture

The majority of the area within the Project facilities is currently agricultural crop land. Of the 1,194 acres associated with the preliminary development areas of the 24 facilities, approximately 1,056.4 acres, or 88.5 percent of the total area, are in agricultural production, according to Gap Analysis Program (GAP) data. This includes both crop and pasture land covers, but aerials and site visits show that the majority of these facilities are in crop production rather than pasture. Table 4.3-2 and Appendix E provide facility-specific information on acres of agricultural land for the Project facilities.

The counties where Project facilities are located all have some economic dependence on agricultural production. Table 4.3-1 provides information on the acres of agricultural

lands within the Project counties, along with the acres of cultivated lands associated with the preliminary development areas of Project facilities within each county, which would represent the acres that would be taken out of agricultural production during the life of the Project. This represents an overestimation of agricultural economic impacts, as it includes acreages for all 24 facilities.

Table 4.3-1 Agricultural Land Acreage by County

County	Acres of Agricultural Land within County	Acres of Agricultural Land in Preliminary Development Areas	Percent (of County Ag Land)
Benton	188,735	18.4 (Mayhew Lake)	0.01%
Blue Earth	376,460	43.6 (Eastwood)	0.01%
Carver	155,253	66.0 (West Waconia)	0.04%
Chippewa	335,109	25.6 (Fiesta City)	<0.01%
Chisago	113,744	157.4 (Chisago, Lawrence Creek, Scandia, Wyoming)	0.14%
Dodge	225,418	56.9 (Dodge Center)	0.03%
Goodhue	398,152	69.1 (Pine Island, Zumbrota)	0.02%
Kandiyohi	415,090	36.0 (Atwater)	<0.01%
Le Sueur	241,870	42.3 (Lake Emily)	0.02%
McLeod	263,885	24.6 (Lester Prairie)	<0.01%
Pipestone	241,970	14.2 (Pipestone)	<0.01%
Rice	236,542	44.5 (West Faribault)	0.02%
Stearns	757,637	185.6 (Albany, Brooten, Paynesville)	0.02%
Waseca	231,713	85.2 (Waseca)	0.04%
Washington	80,901	35.3 (Hastings)	0.04%
Wright	288,140	151.7 (Annandale, Lake Pulaski, Montrose)	0.05%
Total*	**4,550,619**	**1,056.4**	**0.02%**

*Total acres for preliminary development areas overestimates the amount taken out of production for the Project because not all facilities will be constructed.
Source: USDA 2012 Census of Agriculture

As Table 4.3-1 shows, the small amount of acreages of agricultural land that will be unavailable during the life of the Project do not represent significant percentages of the counties' land in farms. Additionally, the facilities may revert to cultivation or other agricultural production after the useful life of the Project and decommissioning; therefore the Project does not represent a permanent reduction in potential agricultural production.

Prime Farmland

The U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) identifies prime farmland as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pasture land, forestland, or other land. Of the 1,194 acres associated with the preliminary development areas of the facilities, approximately 452 acres, or 38 percent of the total area, is considered prime farmland; approximately 285 acres (24 percent) are considered prime farmland if drained, and approximately 8.4 acres (less than 1 percent) are considered prime farmland if drained and protected from flooding or not frequently flooded during the growing season. Table 4.3-2 provides prime farmland acreages for each facility's preliminary development area.

Table 4.3-2 Prime Farmland in Preliminary Development Area

Facility	All Areas Prime Farmland (acres)	Prime Farmland if Drained (acres)	Prime Farmland if Drained and Protected from Flooding (acres)
Albany	67.6	29.8	0
Annandale	9.8	23.3	0
Atwater	29.3	4	0
Brooten	0	0	0
Chisago County	0	0	0
Dodge Center	44	11.7	0

Facility	All Areas Prime Farmland (acres)	Prime Farmland if Drained (acres)	Prime Farmland if Drained and Protected from Flooding (acres)
Eastwood	8.5	41.2	0
Fiesta City	16.7	5.6	0
Hastings	40.4	0	0
Lake Emily	27.6	10.4	0
Lake Pulaski	10.2	13.4	0
Lawrence Creek	17.6	16.1	0
Lester Prairie	10.7	15.2	0
Mayhew Lake	9	1.7	0
Montrose	17.7	16.2	0
Paynesville	0	2.8	0
Pine Island	15.4	20.8	2.9
Pipestone	9.9	4.7	0
Scandia	0	1	0
Waseca	15.7	29.2	0
West Faribault	41.6	10.3	0
West Waconia	40	21.9	0
Wyoming	0	0	0
Zumbrota	20.8	5.5	5.5

Minnesota Rules 7850.4400 subp. 4 prohibits use of more than 0.5 acre of prime farmland per MW of net generating capacity for sites where large generating plants are located, unless no feasible and prudent alternative exists. Given the approximately 23.4-MW net generating capacity of the Project, this rule would allow use of up to 11.7 acres of prime farmland for the Project.

Additionally, the provisions do not apply to areas located within home rule charter or statutory cities; areas located within two miles of home rule charter or statutory cities of the first, second, and third class; or areas designated for orderly annexation under Minnesota Statutes, section 414.0325. First class cities are those with populations of more than 100,000, second cities are those with populations of more than 20,000 and no more than 100,000, and third class cities are those with populations of more than 10,000 and not more than 20,000. Twelve of the facilities are therefore exempt from the provisions because they are within statutory cities, within two miles of a first, second or third class city and/or in areas designated for orderly annexation. These twelve exempt facilities include: Brooten, Chisago, Eastwood, Hastings, Lake Emily, Lake Pulaski, Mayhew Lake, Montrose, Pine Island, Pipestone, West Faribault, and Zumbrota.

Within the twelve non-exempt facilities, approximately 251 acres of prime farmland and 161 acres of prime farmland if drained soils are located within the preliminary development areas. These acreages of prime farmland would be taken out of production for the life of the Project, but as described above would not be permanently removed.

Preliminary engineering indicates that approximately 65 acres of prime farmland and 38 acres of prime farmland if drained soils would be directly affected by the non-exempt facility components including access roads, panels and inverters. Additionally, preliminary engineering indicates that approximately 153 acres of prime farmland and 75 acres of prime farmland when drained would be affected by grading within the non-exempt facility components.

As described in Section 2.1, the facilities are sited in close proximity to existing substations in order to make efficient use of existing equipment, minimize line loss and avoid the need for transmission construction. During site selection for the Project, Aurora considered potential locations within a two-mile radius of interconnections to Xcel Energy distribution substations as a distance where the advantage of proximity would also provide the potential for suitable parcels with interested landowners. As shown on

the maps in Appendix E, the majority of the soils in the two-mile radius are prime farmland, and there are scant parcels available for development that do not impact prime farmland. In consideration of Minnesota Rules 7850.4400 subp. 4, Aurora examined the soils located even farther from the substations than two miles, and determined that a larger radius would not have resulted in decreased prevalence of prime farmland, while the increased distance would increase the necessary interconnection infrastructure.

Appendix E provides facility-specific maps and data associated with those facilities that are not exempt from the provisions of Minnesota Rules 7850.4400 subp. 4.

Mitigative Measures

The owners of the parcels directly affected by Project facilities will be compensated by Aurora through the negotiated purchase or lease of the land.

During construction, impacts to prime farmland will be minimized by using erosion control best management practices (BMPs). The topsoil will generally be removed and stockpiled where the roads and laydown or graded areas are constructed and then spread back over the disturbed areas.

The construction equipment that will be used for the Project is not as heavy as most other large energy generating projects with larger components minimizing soil compaction impacts. The heaviest components will be the inverters, which will be delivered along the access roads, and lifted into place using a small crane. The solar arrays will be installed using a skid steer loader (a type of forklift), and the piers will be installed with a vibratory pile driver. Some compaction will likely occur along the access roads and in the O&M area both during construction and through the operation of the Project; however, Aurora will limit the traffic outside of the access roads as much as practicable during construction to limit soil compaction.

At the end of the Project, the facility components will be removed. Some limited areas under the access roads may have compaction issues, but in the vast majority of the

development area, prime farmland will undergo negligible effects, and may be positively affected by being taken out of cultivation for 20 to 30 years and instead covered in permanent vegetation.

Because no other impacts are anticipated, no additional mitigative measures are proposed.

4.3.2 Forestry

Aurora is aware of no forested areas on Project facilities where trees are harvested for economic purposes. The primary tree cover in the vicinity of Project facilities is associated with shelterbelts, homesteads, and waterways. No economically significant forestry resources will be affected by the Project.

Mitigative Measures

No impacts to forestry resources are anticipated and therefore no mitigative measures are proposed.

4.3.3 Tourism

Primary tourism activities in the vicinity of Project facilities are associated with the recreational activities discussed in Section 4.2.7, and the festivals and other events discussed in Section 4.2.6. As discussed in those sections, the Project will not affect these uses, and no impacts to tourism are anticipated.

Mitigative Measures

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

4.3.4 Mining

There are multiple gravel pits, rock quarries, and commercial aggregate sources in the general vicinity of the Project facilities. Aurora is not aware of any active gravel pits located within or directly adjacent to any of the preliminary development areas proposed for the Project facilities. The northern portion of the area under land control for the Paynesville Facility is located south of a sand or gravel operation, and the Mayhew Lake

Facility is located across the street from an inactive quarry that now has a restaurant and bar associated with it. A number of inactive pits and registered prospected sources exist in the general vicinity of Project facilities. Construction and operation of the solar Project will not affect the use of mining operations on parcels adjacent to or near the Project facilities. If new mining operations are opened on adjacent parcels, dust from those operations could settle on the panels, potentially affecting the output. However, mining operations would be anticipated to follow appropriate dust control measures, minimizing this potential. Panel washing frequency could also be adjusted. If unknown resources are discovered on the parcels directly affected by Project facilities, these resources could be mined after decommissioning.

Mitigative Measures

No impacts to mining operations are anticipated and therefore no mitigative measures are proposed.

4.4 Archaeological and Historical Resources

A Minnesota Historic Preservation Office (SHPO) file search was requested for each of the facilities (see Appendix A). The search area included the facility areas and an additional buffer. The results of the SHPO file search provide a list of recorded historical, cultural, architectural, and archeological resources, including any National Register of Historic Properties (NRHP)-listed properties.

For the 24 facilities, only eight facilities (Atwater, Hastings, Montrose, Pine Island, Pipestone, West Faribault, Zumbrota, and Dodge Center) had identified records within one mile of the facility. One facility, the Mayhew Lake facility, had a structure that was recorded in the SHPO records located on the farmstead property within the parcel boundary. The Paynesville facility also had several SHPO records associated with the section within which the facility will be built. No NRHP-listed properties were identified coincident with the facility areas. Additional investigation, including archaeological field surveys, will be completed for all the Project facilities during the summer of 2014.

If the Mayhew Lake Facility is selected for construction, additional architectural investigation on the recorded building that will be removed in the parcel will be undertaken. Similar investigations will occur associated with the remains of the buildings in the Paynesville Facility.

It is not anticipated that the construction of a solar array at any of the facilities will impact any historical, cultural, architectural, and archeological resources located on adjacent properties or within one mile of any facility. Based on the information obtained from the additional field investigations that are being undertaken in summer 2014, it will be determined whether there are historical, cultural, architectural, and archeological resources that Aurora must avoid. If complete avoidance is not possible, Aurora will coordinate with the SHPO regarding the mitigation process.

As discussed in Section 4.2.4, the Pipestone facility is located approximately one-half mile south of the southern boundary of the Pipestone National Monument; American Indians continue the traditions of quarrying pipestone at this location. As described more in the Aesthetics section, it is not anticipated that the facility would be visible from the majority of the Monument. Additionally, because the Pipestone facility is located next to existing residential development, and other development is located between the facility and the Monument, the Project would not significantly affect the viewshed from the Monument.

Appendix A (Agency Correspondence) and Appendix B.4-1 (Figures) contain section-level facility-specific information obtained as part of the SHPO file search.

Mitigative Measures

Aurora will coordinate with SHPO in the event that new, unrecorded sites are discovered during any phase of the Project. Before the Project's construction, Aurora will also prepare an Unanticipated Discoveries Plan. The plan will detail a process for prompt communication and action regarding the discovery of previously unknown archaeological resources or human remains should they be encountered.

4.5 Natural Environment

4.5.1 Air

The air quality in Minnesota is generally good. Emissions from large facilities have decreased dramatically since the Clean Air Act was enacted in 1970, resulting in lower concentrations of many pollutants including fine particles, ozone and air toxics. According to the 2009 legislative report, Air Quality in Minnesota: Emerging Trends (MPCA, 2009), air quality in Minnesota has been improving for most pollutants since 2002.

The entirety of Minnesota is currently in attainment for CO, N_2O, PM_{10} and $PM_{2.5}$, and SO_2 National Ambient Air Quality Standards (NAAQS). Currently the only area designated as a non-attainment area in Minnesota is the area around Gopher Resources in Eagan, Minnesota (Dakota County) which currently exceeds the October 2008 standard for lead (0.15 $\mu m/m^3$) (EPA, 2014).

Short-term air emissions will be generated during the construction phase of the Project. Operation of heavy duty construction equipment will generate exhaust emissions from fuel combustion (primarily criteria pollutants and greenhouse gases) as well as potential fugitive dust emissions due to travel on unpaved roads and limited amounts of excavation that may be needed for foundations (either for inverter boxes, or in some limited cases, the solar array piers, depending on soil type). These minor, short-term emissions are not anticipated to have any measureable impact on regional air quality and will not affect NAAQS attainment status for any of the counties where the facilities are located. Operation of the facilities will not generate criteria pollutants or carbon dioxide.

Mitigative Measures

When necessary, dust from construction traffic will be controlled using standard construction practices such as watering of exposed surfaces, covering of disturbed areas, and reduced speed limits at each facility. Emissions from construction vehicles will be minimized by keeping construction equipment in good working order.

4.5.2 Geology, Soils and Groundwater

Soils, underlying bedrock formations and other geologic features were identified during desktop evaluations using applicable GIS layers, e.g., NRCS. Susceptible geologic features, including sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions are not present at any of the facility locations, with the exception of the Hastings facility, where geotechnical surveys show the presence of limestone. DNR records show a recorded karst feature within 0.5 mile of the Pine Island facility land control boundary.

The soils at the facility locations are typically well-drained and suited for the existing agricultural production. Most of the facility locations are on level to nearly-level topography, which is consistent with the current agricultural production. Small areas of hydric soils are present at facility locations where wetlands are present. There are no known springs or seeps at any of the facility locations.

Among wells in the MDH database within one mile of Project facilities, average depth to groundwater ranges from 17 to 167 feet. The preliminary development areas of the following facilities coincide with MDH Wellhead Protection Areas: Albany, Annandale, Lawrence Creek, Paynesville, Pine Island, and West Faribault. Review of the broader facility land control area did not identify any additional MDH Wellhead Protection Areas. Review of the MDH County Well Index identified only one well within the preliminary development area for the Scandia Facility and an additional well within the facility land control area of the Lawrence Creek Facility.

Impacts to soils will occur during both the construction and operational stages of the Project. Construction of each of the facilities may require some amount of grading to provide a level surface for the solar arrays. Preliminary design indicates that grading acreages at individual facilities will range in size from zero (no grading necessary) to 62.8 acres, with an average of approximately 20.8 acres. The preliminary development areas for the facilities range in size from approximately 13 acres to 108 acres, with an

average size of 49.6 acres. Because the majority of the facility locations are on relatively level existing agricultural fields, Aurora will minimize grading to the extent practicable. Additional soils impacts during construction will come from the installation of the direct-embedded piers that support the structural framework of the solar arrays, and small areas of foundations for the inverters and O&M structures. During construction, measures will be put in place to stabilize recently-graded exposed soils. Soil replacement and/or amendments may be necessary in limited areas of some of the facilities, especially in hydric soil units near wetlands, or other areas with soil limitations.

During operation of the facilities, soil compaction could occur from the movement of maintenance vehicles between the rows of the solar arrays. This impact is expected to be negligible, and will be primarily confined to the gravel access roads. Overall, the Project is expected to improve erosion conditions, since the area under the arrays will be in permanent low-growth vegetation rather than cultivated fields.

There will be no impacts to groundwater from the construction or operation of the Project. The direct-embedded piers will be installed at a depth of approximately 5 to 12 feet, foundations for the inverters and O&M structure will extend approximately 5 to 12 feet below the soil surface. The Project's disturbances are generally anticipated to be limited to the ground surface and upper soil column. It is anticipated that for the majority of the facilities there will be minimal contact with the surficial water table, and no contact with deeper groundwater or aquifers. It is possible that well installation may be required at certain facilities to support O&M activities; if these are necessary Aurora will obtain the appropriate permits. There are no expected impacts to MDH wellhead protection areas.

Appendix F contains facility-specific information on NRCS (SCS) classifications and acreage of grading/soil disturbance per facility, and summarizes the presence of existing wells at each facility and the wellhead protection areas located within one mile of each facility.

Mitigative Measures

A National Pollutant Discharge Elimination System (NPDES) permit application to discharge stormwater from construction facilities will be acquired by Aurora from the MPCA; it is anticipated a separate NPDES permit will be obtained for each facility due to the different construction schedules. BMPs will be used during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion, whether the erosion is caused by water or wind. Practices may include containment of excavated material, protection of exposed soil, stabilization of restored material, and treating stockpiles to control fugitive dust. A Stormwater Pollution Prevention Plan will be developed for each facility prior to construction that will include BMPs such as silt fencing (or other erosion control devices), revegetation plans, and management of exposed soils to prevent erosion.

Additionally, a Phase I Environmental Site Assessment will be conducted at all Project facilities to identify any existing hazardous material contamination. If contamination is identified, Aurora will avoid disturbing those areas through siting and design, or work on additional site assessments to determine the best mitigation procedures.

4.5.3 Rivers, Streams and Lakes

The maps in Appendix B.3-1 show surface water features in the vicinity of the facilities. There are no rivers, streams or lakes within the preliminary development area boundaries of any of the facility locations. A non-jurisdictional ditch crosses one facility's preliminary development area (Albany Facility). A mapped ditch also crosses the Waseca Facility; however, aerial photography and site visits indicate that a stream feature is not present. At one of the facility locations (Pine Island), the North Branch Middle Fork Zumbro River (a DNR Public Water) is located approximately 0.1 mile north of and across the street from the facility's preliminary development area. The Pine Island facility's preliminary development area is located outside of the mapped 100-year Federal Emergency Management Administration (FEMA) floodplain area associated with the Zumbro River.

One facility location (Lake Pulaski) has a small pond adjacent to the facility boundary; otherwise there are no rivers, streams or lakes adjacent to any of the facility locations.

Mitigative Measures

Project impacts to the North Branch Middle Fork Zumbro River are not expected because the facility is separated from the river by the existing road; additionally, the potential for impacts will be avoided through the use of appropriate erosion control BMPs. Similarly, BMPs will be put in place to protect the small pond north of the Lake Pulaski facility.

Aurora will minimize and avoid placing structures in FEMA-mapped floodplains to the greatest extent feasible. If avoidance is not possible, the Project is not anticipated to significantly affect flood levels, as fill associated with the Project is relatively small, confined to direct-embedded piers, inverter boxes and O&M structures. Aurora will secure the appropriate floodplain fill permits if complete avoidance is not feasible.

4.5.4 Wetlands

A desktop evaluation was conducted for each of the facilities to make a preliminary determination of the presence of wetlands. Field delineations will be conducted in 2014 to confirm and accurately establish the limits of wetlands at each Project facility. Based on the desktop evaluations, wetlands are absent or consist of a small percentage of the preliminary development area for the majority of the facilities. Table 4.5-1 shows the total acreage of wetlands (according to National Wetland Inventory [NWI] files) in the overall facility land control areas, and the preliminary development areas for each facility. See Appendix G for detailed data on site-specific wetlands and potential impacts; the maps in Appendix B.3-1 show NWI wetland features in the vicinity of the facilities. Eight facilities have no mapped wetlands within either the preliminary development area or the overall facility land control boundaries. Ten facilities have less than 5 percent of the preliminary development area in wetland cover. The preliminary development area percent wetland cover is between 5 and 10 percent on only three facilities (Albany, Lake Pulaski, and Wyoming), and exceeds 10-percent cover at only three facilities (Lawrence

Creek, Montrose, and Paynesville). As shown in the table, for facilities where the wetland coverage is relatively higher in the overall land control area (Albany and Paynesville facilities), the preliminary development area has been designed to minimize the amount of wetlands within the area proposed for development.

Table 4.5-1 Wetland Acreages

Facility	Preliminary Development Area (acres of wetland)	Percent of Preliminary Development Area	Facility Land Control Area (acres of wetland)	Percent of Facility Land Control area
Albany	10.7	10.0%	61.2	26.5%
Annandale	1.6*	2.3%	1.6*	2.3%
Atwater	0.0	0.0%	0.0	0.0%
Brooten	0.0	0.0%	0.0	0.0%
Chisago	1.1	1.8%	1.1	1.7%
Dodge Center	0.0	0.0%	0.0	0.0%
Eastwood	0.4	0.9%	0.4	0.9%
Fiesta City	0.0	0.0%	0.0	0.0%
Hastings	0.0	0.0%	0.0	0.0%
Lake Emily	0.0	0.0%	0.0	0.0%
Lake Pulaski	3.9*	6.2%	4.8*	6.3%
Lawrence Creek	4.0*	10.2%	14.5*	19.5%
Lester Prairie	0.6*	2.3%	0.6*	2.0%
Mayhew	0.0	0.0%	0.0	0.0%
Montrose	5.0*	13%	5.4*	16%
Paynesville	12.3	11.4%	80.0	30.5%
Pine Island	0.0*	0.0%	0.2*	0.5%
Pipestone	0.2	1.3%	0.2	1.2%
Scandia	0.0	0.0%	0.0	0.0%
Waseca	<0.0	<0.0%	<0.0	<0.0%

Facility	Preliminary Development Area (acres of wetland)	Percent of Preliminary Development Area	Facility Land Control Area (acres of wetland)	Percent of Facility Land Control area
West Faribault	0.0*	<0.0%	0.3*	<0.0%
West Waconia	1.6*	2.0%	1.4*	1.8%
Wyoming	4.5*	7.3%	4.5*	6.7%
Zumbrota	0.1*	0.3%	0.1*	0.3%

*Wetland acreages for these facilities were calculated using the National Wetland Inventory Update Area database, which is more recent and updated (as coordinated by the DNR) than the overall NWI mapping for the state. The remaining facilities do not yet have updated NWI mapping available.

Wetlands that are present at the Project facilities are typically small wetlands that have been farmed or are otherwise disturbed. Wetland function and quality is typically low in most of the wetlands present.

DNR data records show that there is a state-designated calcareous fen located between one-half and one mile from the Lake Emily Facility; no other fens were identified within a mile of any other facilities. Due to the distance, and because the Project will result in negligible sub-surface impacts, the potential for impacts to a calcareous fen is extremely low.

Layout of arrays, access roads, and other facilities will be designed to avoid and minimize wetland impacts to the extent practicable. Preliminary design indicates that grading may affect between 0.1 to up to 3.9 acres of NWI-mapped wetlands at eight facilities (Albany, Annandale, Lake Pulaski, Lawrence Creek, Paynesville, Montrose, West Waconia, and Wyoming; see Appendix G) during construction. Preliminary design also shows that access roads and inverters may permanently impact between 0.1 to 0.2 acre of NWI-mapped wetlands at seven facilities (Albany, Lake Pulaski, Lawrence Creek, Paynesville, Montrose, Wyoming, and Zumbrota; see Appendix G). These impacts will be reevaluated based on the field-delineated wetland boundaries, and design will be modified to further avoid and minimize impacts to delineated wetland boundaries

wherever practicable. The solar array and small structural piers are not expected to result in jurisdictional fill of wetlands under Section 404 of the Clean Water Act if the wetlands are not filled with material other than the piers because low-growing wetland vegetation will still be allowed to grow beneath the arrays, and the arrays would not be expected to affect the existing hydrology or hydric soil features of the wetlands (personal communication from Chad Konickson at USACE, 2/27/2014). Moreover, the driven piers that will be used for the Project's solar arrays are similar to the driven piers that have traditionally been considered minor impacts that are exempt or otherwise not subject to regulations governing wetland impacts, including Section 404 of the Clean Water Act and the Wetland Conservation Act (personal communication from Chad Konickson at USACE, 2/27/2014 and MN Rule 8420.0111, Subps. 26 and 32). However, depending upon the final geotechnical report and design, it may be necessary to fill or otherwise impact wetlands in some locations. At facilities where wetlands are present, the facility will incorporate design measures to avoid and minimize wetland impacts to the extent practicable. In addition, during construction and operation of the facilities, BMPs will be utilized around unaffected wetland areas to prevent contamination by sediment-laden water.

In locations where the solar array is placed over a wetland, the potential indirect impacts may include alteration of the wetland plant community composition due to shading and/or the use of a low-growing wetland seed mix.

Appendix G provides facility-specific wetland information that identifies wetlands on the Project facilities, and identifies Public Waters wetlands, if any. Finally, Appendix G provides facility-specific estimations of potential wetland impacts, including impacts from access road crossings, inverter foundations and any other sources of direct wetland impact based on preliminary design.

Mitigative Measures

Aurora will minimize and avoid direct or indirect impacts to wetlands during construction and operation by avoiding wetlands in facility design and layout to the extent practicable, protecting topsoil, minimizing soil erosion and protecting adjacent wetland resources. Practices may include properly containing/stockpiling excavated material, use of silt fences, protecting exposed soil, stabilizing restored material, and revegetating disturbed areas with non-invasive species.

If wetland impacts cannot be avoided, Aurora will obtain Section 404 and Minnesota Wetland Conservation Act permits from the U.S. Army Corps of Engineers (USACE) and the applicable local government unit prior to construction.

4.5.5 Vegetation

Vegetation cover at the facility locations is predominantly maintained row-crop agriculture, with some pasture or other grassed areas at some of the facilities. Small groupings of trees and wind breaks are common near the periphery of most of the facility locations. According to GAP landcover data, eight of the 24 facility locations have no wooded vegetation cover in the preliminary development areas (Fiesta City, Hastings, Lake Emily, Lester Prairie, Pine Island, Pipestone, Waseca, and Zumbrota), thirteen have less than 10 percent wooded cover, and only three facility locations have between 10 to 25 percent wooded cover in the preliminary development areas (Chisago, Montrose, and West Faribault). It should be noted that the wooded area within the West Faribault preliminary development area is located in the northeast portion of the facility land control area, where the distribution connection will be extended to Highway 93, as shown in Appendix D, and not where the solar arrays would be placed. Therefore it is not anticipated that all of the wooded area in the preliminary development area would need to be removed.

Additionally, according to GAP landcover data, 21 of the 24 facility locations have no mapped non-agricultural production grassland or shrubland vegetative cover. The

Hastings facility has approximately 8 percent grassland/shrubland cover in the preliminary development area. Grassland/shrubland cover is less than 1 percent at the only two other facilities where this cover type is present, Pipestone and West Faribault.

As shown in Table 4.1-1, the majority of the facility locations (15 of 24) lie within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Province, as defined by the DNR ECS (MNDNR, 2005). Five facility locations are in the North-Central Glaciated Plains Section of the Prairie Parkland Province, two are in the Western Superior Uplands Section of the Laurentian Mixed Forest Province (MNDNR, 2003), and two are in the Paleozoic Plateau of the Eastern Broadleaf Forest Province. However, the ECS is typically used to describe native plant communities and their distribution. Because of the level of existing disturbance at the facility locations, extant native plant communities are uncommon, and a more appropriate means of classifying vegetation cover is the DNR Minnesota Land Cover Classification System (MLCCS) (MNDNR, 2004), which includes categories for artificial and/or maintained land cover. Under the MLCCS, most of the facility locations fall into the MLCCS Level 24000 category "cultivated herbaceous vegetation."

With the exception of the Dodge Center facility, there are no DNR-identified sensitive native plant communities (communities ranked S1, S2 or S3) at any of the facility locations. As noted above, native plant communities in general are absent from the facility locations, and the overwhelming majority of the vegetative cover is non-native and planted and maintained by humans. This cover type includes row crops, pasture and maintained grass areas. Non-native invasive species cover is generally low as well, because of the intensive weed management associated with agriculture. The Dodge Center preliminary development area intersects 0.2 acre of the mapped native community, Southern Wet-Mesic Hardwood Forest. This native plant community is ranked S2 or S3, depending on the specific vegetation composition of the native community. There are no DNR statutory protections for native plant communities; however, under the Wetland Conservation Act, the native plant community cannot be

"permanently adversely affected" if it is also a wetland (MN Rule 8420.0515, Subp. 3). Wetland delineations are occurring in the summer of 2014, including in this area.

Aurora is currently conducting a title search to identify conservation easements on any Project properties, and is coordinating with landowners and the Farm Service Agency to determine the presence of Conservation Reserve Program lands. The USFWS administers a program by which it holds easements on private lands that have wetlands and/or grassland habitat. The Minnesota DNR and Minnesota Board of Water and Soil Resources (BWSR) also administer conservation programs such as Reinvest in Minnesota (RIM), in which the DNR and/or BWSR holds easements on private lands for conservation purposes. No RIM or USFWS easements have been identified on any of the facilities.

Project impacts to vegetation communities will be negligible. This is because the majority of the facility locations are currently row-crop agriculture or pastureland, and wooded vegetative cover is less than 10 percent of the preliminary development areas at the majority of the facility locations. In addition to removal of trees within the preliminary development areas, it is possible that limited tree removal or trimming may occur in the larger facility land control areas, in order to reduce shading effects on the generating capacity. Subject only to an agreement with neighboring landowners, Aurora may also conduct limited tree trimming on neighboring parcels if trees on adjacent parcels produce shading effects in the future.

The Project will have a positive impact on facility locations that are dominated by agricultural land, because the facilities will be revegetated with low-growing species, providing better quality habitat and soil-building conditions.

Appendix H provides facility-specific vegetation information, including tables showing vegetative cover types.

Mitigation Measures

Aurora plans to implement mitigation measures to avoid and minimize impacts to vegetation in the Project during siting, construction and operation to the extent practicable, including:

- Avoid impacts to native plant communities, including native prairie remnants, during siting and design, construction and operations;
- Avoid and minimize disturbance to wetlands and drainage systems;
- Avoid impacts to wildlife management areas;
- Minimize the area disturbed during construction of the Project;
- Minimize clearing of trees and shrubs;
- Utilize BMPs during construction and operations to protect topsoil and minimize soil erosion;
- Reseed disturbed non-cropland areas with non-invasive species and regularly mow to control for invasive plant species.

Additionally, Aurora will avoid conducting Project activities within conservation easements held by public agencies or private organizations to the extent practicable. In the event that impacts do occur, Aurora will work with the landowner, DNR, USFWS or other relevant authority to develop appropriate mitigation.

4.5.6 Wildlife

As noted in Section 4.5.5, vegetative cover on the facility locations is generally dominated by agriculture and/or pastureland. These are non-native cover types that are typically utilized by a relatively small number of common wildlife species. Wildlife species that currently utilize the area include deer, smaller mammals (squirrels, raccoons, mice, voles, etc.), common perching birds and common raptors such as red-tail hawks, and reptiles and amphibians accustomed to agriculture habitats. However, due to the relative lack of diverse vegetation cover and habitat structure, even these common

species' use of the existing habitats is likely limited to occasional foraging in the fields and shelter within wooded areas near the edges of the fields.

There are no fish or other aquatic species currently utilizing the facility locations, because there are no surface water resources present (see Section 4.5.3). Species of Greatest Conservation Need (SGCN) (MNDNR, 2006) are not discussed here, because these are relatively uncommon species that typically do not utilize the highly-disturbed habitats found at the facility locations. SGCN is a designation for a relatively large group of wildlife species that are not truly rare (endangered or threatened or otherwise regulated), but are also not common, mainly due to habitat loss and competition from non-native species. They include mammals, fish, birds, mussels, insects, amphibians/reptiles and spiders.

Impacts to wildlife associated with the Project will be minor. During construction, most wildlife, including the common species currently utilizing the habitats at the facility locations, will temporarily be displaced from the area, due to construction noise and the close proximity of humans. This will be a minor and temporary impact, because the wildlife species currently utilizing the area tend to be habitat generalists, and can find abundant suitable replacement habitat near the facility locations. Species that are habitat specialists will likely not be affected by construction of the Project, because the specific required habitats are not present at any of the facility locations.

Construction noise will potentially cause reduced nest attendance or nest abandonment in nests in trees and shrubs near the perimeter of the facilities. This impact is anticipated to be minor, infrequent and temporary.

Proper placement and maintenance of BMPs at the Pine Island facility will prevent any construction or operational impacts to aquatic species in the North Branch Middle Fork Zumbro River. Similar BMP placement and maintenance will prevent any construction or operational impacts to aquatic species in the small pond north of the Lake Pulaski facility. Moreover, conversion of the facilities to a permanent vegetative community will

reduce nutrient and sediment runoff from the facility parcels during the life of the Project.

Impacts to wildlife during the operational stage of the Project will potentially be both positive and negative. Positive impacts to wildlife will occur due to the better quality habitat created by the revegetation of the facilities with low-growing permanent vegetative communities. Access to the facilities will be limited by perimeter fencing; however, a variety of birds, smaller mammals, reptiles and amphibians will likely still be able to access the facility, and will utilize the habitats beneath and around the solar arrays.

The existing habitats will be modified. However, as noted above, the current habitats at the facility locations are dominated by non-native vegetation cover types that are utilized almost exclusively by common habitat generalist species. Therefore, modification of the current habitats at the facility locations will be a negligible negative impact.

The Project will not disrupt or block access to known regional wildlife movement corridors.

As shown in Appendix A, Aurora has coordinated with the Minnesota DNR. In their response, the Minnesota DNR had the following general recommendations for minimizing effects to wildlife:

- Following construction, seed disturbed areas with native grasses and leave undisturbed to create habitat for area wildlife.
- Place solar panels at a height that allows for grasses to grow beneath them.
- Place fenced areas such that waterbirds that may mistake the solar arrays for water can take off again.
- Stripe solar panels with white to detract insects from the area, and therefore help prevent birds and bats from congregating.
- Removal of trees outside of bat breeding season.

- Use wildlife-friendly erosion control mesh as erosion control in disturbed areas.
- Install bird diverters and raptor shields on transmission wires and utility poles to reduce the risk of bird mortality.

Mitigative Measures

As stated above, Geronimo will be using a low-growing seed mix, which will be grown below the panels. Native grasses often require regular burns to stay viable, and this is not compatible with a solar facility; therefore Aurora may use other permanent low-growing seed mixes below the arrays, such as clover, forbs, or other low-growing permanent cover. Because the collection system is anticipated to be underground, no raptor shields or bird diverters are needed; if a specific location requires limited aboveground conduit, the design would follow APLIC (Avian Power Line Interaction Committee) guidelines. Aurora will use standard solar panels that typically have a frame around the perimeter of the panel. Panel and security fencing design will be dependent on industry's production process (it is not customizable) and security and safety standards, respectively. Aurora will use wildlife-friendly erosion mesh for facilities in the vicinity of protected reptile species such as the Blanding's turtle; for facilities that are located in areas where these species are not found, Aurora reserves the right to use other mesh or fencing type based on cost and availability. Aurora is continuing to coordinate with the DNR on the Project, and is considering the incorporation of appropriate mitigation measures on a facility-by-facility basis.

4.5.7 Rare and Unique Natural Resources

The presence of rare and unique resources, including endangered, threatened or special concern (ETSC) and tracked species, is summarized in Appendix I. The summary shows ETSC and tracked species sorted by the 16 counties in which the Project is located. Based on the distribution of ETSC and tracked species across the 16 counties in which the Project is located, the total number of these species ranges from a high of 83 in Washington County to a low of 12 in McLeod and Waseca counties. Appendix I also summarizes the presence and/or proximity of ETSC and tracked species by the individual

facilities. ETSC and tracked species are not present on the majority of the facility locations.

Review of the DNR Natural Heritage Information System (NHIS) database and desktop evaluation of potential suitable habitat for listed species indicate that there are no documented federally listed species within the land control boundary of any of the facilities. Additionally, eleven of the facilities have no documented state or federally listed ETSC species within a mile of the land control boundary (Albany, Annandale, Atwater, Brooten, Eastwood, Fiesta City, Lake Pulaski, Lester Prairie, Montrose, Scandia, and West Waconia).

There are no anticipated impacts from the Project to rare and unique resources, including ETSC species. At thirteen of the 24 facility locations, there is at least one documented ETSC or tracked species within a mile of the facility land control. For most of these locations, there is no suitable habitat within the facility boundary. At four facility locations (Chisago, Pine Island, Pipestone, and Zumbrota), there is at least one ETSC or tracked species documented in NHIS within the preliminary development area of the facility boundary. However, NHIS records can be old or not recently updated, and do not definitively establish that a documented species is currently present on the facility. Currently, the Pine Island and Pipestone facilities are entirely in agricultural row crop or pastureland. Thus, there is no suitable habitat present for any of the ETSC or tracked species documented in NHIS as being present within the preliminary development areas for these facilities.

At Chisago and Zumbrota, suitable habitat may be present, but these facilities also have human disturbances and alterations, and the potential habitat appears to be marginal for the ETSC species documented in NHIS. At Chisago, six of the eight NHIS records are for mussel species. These are not present on the Chisago facility, because there are no aquatic habitats within the facility boundaries. The two remaining documented ETSC species, are a vascular plant (Toothcup, *Rotala ramasior*), and the Blanding's turtle

(*Emydoidea blandingii*). Toothcup typically occurs along sandy shores of small, shallow lakes set in a savanna landscape. This habitat type does not occur at the Chisago facility. Blanding's turtle could potentially use the lesser disturbed grassland portions of the Chisago facility location for nesting habitat, but no wetland habitats that will provide over-wintering habitat exist within the facility boundaries. At the Zumbrota facility, the NHIS-documented species are vascular plants. The majority of the Zumbrota facility is currently in row-crop agricultural production, with some remnant habitat at the extreme south end of the facility. It is unlikely that this area provides the habitat requirements for the three vascular plant species documented in NHIS for the Zumbrota preliminary development area.

As noted above, there is 0.2 acre of mapped native plant community in the Dodge Center Facility's preliminary development area; this area is also mapped as moderate quality in the Minnesota Biological Survey (MBS) Site of Biodiversity Significance (SBS). The only other mapped SBS areas within any of the facility locations are associated with the Paynesville and Pine Island facilities. At the Paynesville Facility, approximately 60 acres of the facility land control area and approximately 0.7 acre of the preliminary development area is mapped as a high quality SBS site; at the Pine Island Facility, approximately 2 acres of the facility land control area and approximately 0.7 acre of the preliminary development area is mapped as a high quality SBS site. There are no outstanding SBS sites in any of the facility land control areas. Appendix B.5-1 shows rare and unique features in the vicinity of the facilities.

At the Paynesville facility, two of the four documented ETSC species are bird species, and one is a butterfly species. Suitable habitat for these species is present within the Paynesville facility boundary; however, there are several large areas of suitable habitat near the facility, as well as within the region. Therefore, the loss of suitable habitat within the Paynesville facility boundary will have only a minor impact on habitat availability for these species, and will be unlikely to directly take any of these species. The remaining documented ETSC species at the Paynesville facility is a vascular plant,

the small white lady's slipper (*Cypripedium candidum*). Suitable habitat may occur within portions of the Paynesville facility location. A field survey targeted for this species occurred in June 2014 at the Paynesville preliminary development area, and no small white lady's slippers were documented.

The northern long-eared bat (*Myotis septentrionalis*) is known to occur in suitable forested habitats throughout Minnesota. This bat was proposed as a federally-endangered species in October 2013, with an anticipated decision on the listing to be provided in early 2015. In January 2014, the USFWS published the Northern Long-eared Bat Interim Conference and Planning Guidance. The Project will consult this guidance document to avoid impacts to northern long-eared bat until a listing proposal decision is made and further USFWS guidance is provided. However, given the dominance of agricultural vegetative cover at the majority of the facility locations, there is a low probability of Project impacts on northern long-eared bat.

Based on NHIS records, bald eagle (*Haliaeetus leucocephalus*) nests are documented within one mile of the facility land control for only one facility, Hastings. Additionally, through a review of publicly available reports, there has been a bald eagle nest documented within one mile of the facility land control for the Zumbrota Facility. There are no documented bald eagle nests within one mile of the facility land control for any of the remaining facility locations.

Mitigative Measures

The mitigative measures described for Vegetation and Wildlife in Sections 4.5.5 and 4.5.6 will also serve to avoid and minimize impacts to threatened and endangered species. Additional mitigation measures include:

- Aurora will use wildlife-friendly erosion mesh for facilities in the vicinity of protected reptile species such as the Blanding's turtle. Aurora will provide training to construction workers so they can identify and avoid impacts to Blanding's turtles for those facilities that may be located near the species' habitat.

Any trenches that are left open will be checked for trapped turtles before being filled in; any turtles located within construction activity zones will be moved out of harm's way.

- Aurora will continue to coordinate with the USFWS regarding the northern long-eared bat.
- Aurora will continue to coordinate with the Minnesota DNR and USFWS on the Project in order to determine what species-specific surveys may be warranted, particularly on the Paynesville facility.

5 Summary and Conclusions

In summary, Aurora is avoiding all prohibited and exclusion areas as defined in Minnesota Rules 7850.4400 subp. 1 and 3, respectively. The Project is sited on more than 0.5 acre of prime farmland per MW of net generating capacity; Minnesota Rules 7850.440 subp. 4 prohibits this unless there is no feasible and prudent alternative. As described in more detail in Section 4.3.1 and Appendix E, Aurora did consider prime farmland in siting, but the overall siting conditions and soil units around the interconnection substations resulted in it not being practical to completely avoid prime farmland.

Additionally, Aurora has sited and will construct the Project facilities to avoid and minimize impacts to the human natural and environment to the extent feasible. A summary of potential impacts and mitigation measures is presented in Table 5.1-1.

Table 5.1-1 Summary of Potential Environmental Impacts and Mitigation – Aurora Project

Public Health and Safety (Section 4.2.1)
Impacts - Minimal impacts anticipated; construction may introduce temporary hazards such as slow-moving vehicles.
Mitigation – Facilities will be fenced. Standard industry safety practices will be followed during construction and operation of the Project, including clear signage during all construction activities.
Displacement (Section 4.2.2)
Impacts - One home would be removed if Mayhew Facility is constructed; no other impacts anticipated.
Mitigation - If the Aurora Solar Project – Mayhew Facility is selected to be constructed, Aurora will work with the landowner and the renter regarding the removal of the home, and provide sufficient notice so the landowner can appropriately coordinate with the renters.

Noise (Section 4.2.3)
Impacts - Construction noise may be discernible at each facility from nearest residences. Once in operation, main noise source will be from inverters – loudest inverter under consideration would meet most stringent MPCA noise standards at 224 feet.
Mitigation - Aurora will confirm during final design once specific inverter types are selected that MPCA noise limits will be met at sensitive receptors. During construction, Aurora plans to limit construction between the hours of 6 AM and 7 PM. Monday through Saturday, with the potential for limited low-noise activities on Sundays.
Aesthetics (Section 4.2.4)
Impacts - The Project will result in change in viewshed at each facility; however, the relatively low profile of the arrays and the security fencing would minimize the distance from which the facilities will be visible.
Mitigation - New light sources will be minimized, and lighting shall be designed (e.g., using shielding, motion detectors, and/or downcast lights) to limit the lighted area to the minimum necessary.
Socioeconomics (Section 4.2.5)
Impacts - Impacts are anticipated to be primarily beneficial via tax revenue to counties and townships, and creation of 296 construction jobs, 466 construction-related jobs, and 19 permanent positions during operation and maintenance. Less than 1,000 acres of land will be temporarily removed from current use in agricultural production for the life of the Project.
Mitigation - The owners of the parcels directly affected by Project facilities will be compensated by Aurora through the negotiated purchase or lease of the land.
Cultural Values (Section 4.2.6)
No impacts are anticipated.
No mitigation measures necessary or proposed.
Recreation (Section 4.2.7)
Impacts - No direct impacts would occur to existing recreational areas, with the exception of the Sno-Go snowmobile trail, which would be realigned if the West Faribault Facility is constructed. Some facilities may be visible from adjacent recreational areas, but this would not affect recreational use.

Mitigation - Aurora is coordinating with the NPS on the Pipestone National Monument's proximity to the Pipestone Facility in order to share the results of the visual assessment that shows little of the facility would be visible from the Park. Aurora is coordinating with the Faribault Sno-Go Club and other snowmobile clubs with trails in the vicinity of facilities in order to develop realignment plans that will allow the continued use of the trails.
Public Services and Infrastructure (Section 4.2.8)
Impacts – Temporary construction impacts will occur in vicinity of facilities, primarily through additional traffic and slow-moving construction vehicles. Underground and overhead utilities may be temporarily impacted during construction of the facilities. One existing well is documented within the preliminary development area for the Scandia Facility; no other existing wells are known. One facility within three nautical miles of an FAA-registered airport, the Fiesta City Facility, will require a 7460-1 Notice of Proposed Construction, according to the FAA's screening tool and additional coordination with the FAA and the Montevideo Airport. Results of the FAA's Solar Glare Hazard Analysis Tool indicate that the Fiesta City Facility would have low potential for temporary after-image on three of the four runways, and no potential for temporary after-image on the fourth runway. Preliminary design indicates that the Fiesta City Facility would meet structure height requirements for the airport. No other impacts to airports are anticipated from any of the facilities. No railroads would be impacted.
Mitigation - Aurora would follow appropriate procedures to shut down any wells affected by construction, and work with affected landowners to install new wells outside of the solar facilities as needed. Final design will minimize and avoid impacts to underground utilities; if conflicts are unavoidable Aurora will coordinate with the utility to develop an approach to reroute or otherwise protect the utility. Underground utilities will be marked prior to construction start. Aurora is coordinating with the city of Montevideo and the FAA regarding the Fiesta City facility's proximity to the Montevideo airport, and will file a 7460-1 Notice of Proposed Construction for that facility.

Land Use and Zoning (Section 4.2.9)
Impacts - The Project will change the land use in the parcels where facilities are built, from agricultural to industrial (solar power plants). The Project is not anticipated to preclude current or planned land use on any of the adjacent parcels; and upon decommissioning and removal of facilities, the facility parcels themselves may be used for existing agricultural use or transitioned to other planned land uses. In some areas, facilities may be located in areas where there is a planned extension of water, sewer, or other services.
Mitigation - Construction of the facilities would not preclude the future orderly extension of these services across property under Aurora's control. Reversion to agricultural land use or a change to another land use can occur after the solar facilities are removed at the end of the Project's useful life.
Agriculture and Prime Farmland (Section 4.3.1)
Impacts – Less than 1,000 acres of land currently agricultural production would be removed for the life of the Project (exact acreage will depend on final number and design of facilities constructed to reach 100 MW). This represents approximately 0.02 percent of the total land in production within the 16 counties where Project facilities are located. Less than 450 acres of prime farmland, less than 280 acres of prime farmland if drained, and less than 8 acres of prime farmland if drained and protected from flooding would be removed from production for the life of the Project (exact acreage will depend on final number and design of facilities constructed to reach 100 MW).
Mitigation - The owners of the parcels directly affected by Project facilities will be compensated by Aurora through the negotiated purchase or lease of the land. During construction, impacts to prime farmland will be minimized by using erosion control BMPs. The topsoil will generally be removed and stockpiled where the roads and laydown or graded areas are constructed and then spread back over the disturbed areas. Aurora will limit the traffic outside of the access roads as much as practicable during construction to limit compaction. At the end of the Project, the facility components will be removed. Some limited areas under the access roads may have compaction issues, but the vast majority of the development area prime farmland will undergo negligible effects, and may be positively affected by being taken out of cultivation for 20 to 30 years and instead covered in permanent vegetation.
Forestry (Section 4.3.2)
No impacts are anticipated.
No mitigation measures necessary or proposed.

Tourism (Section 4.3.3)
No impacts are anticipated.
No mitigation measures necessary or proposed.
Mining (Section 4.3.4)
No impacts are anticipated.
No mitigation measures necessary or proposed.
Archaeological and Historical Resources (Section 4.4)
Impacts – Construction of facilities have the potential for impacting previously unknown cultural resources, including archaeological sites.
Mitigation – Archaeological surveys will be conducted for all facilities, and Aurora will coordinate with SHPO in the event that new, unrecorded sites are discovered during any phase of the Project. Before the Project's construction, Aurora will also prepare an Unanticipated Discoveries Plan. The plan will detail a process for prompt communication and action regarding the discovery of previously unknown archaeological resources or human remains should they be encountered.
Air (Section 4.5.1)
Impacts – During construction, temporary air quality impacts will occur due to construction vehicle emissions and dust. Once in operation, no air quality impacts will occur.
Mitigation - When necessary, dust from construction traffic will be controlled using standard construction practices such as watering of exposed surfaces, covering of disturbed areas, and reduced speed limits at each facility. Emissions from construction vehicles will be minimized by keeping construction equipment in good working order.

Geology, Soils and Groundwater (Section 4.5.2)
Impacts – No impacts to geology or groundwater are anticipated. Soil impacts will occur due to construction of the Project. Preliminary design indicates that grading acreages at individual facilities will range in size from zero (no grading necessary) to 62.8 acres, with an average of approximately 20.8 acres. Additional soils impacts during construction will come from the installation of the direct-embedded piers that support the structural framework of the solar arrays, and small areas of foundations for the inverters and O&M structures. During operation of the facilities, soil compaction could occur from the movement of maintenance vehicles between the rows of the solar arrays. This impact is expected to be negligible, and will be primarily confined to the gravel access roads. Overall, the Project is expected to improve erosion conditions, since the area under the arrays will be in permanent low-growth vegetation rather than cultivated fields.
Mitigation - During construction, measures will be put in place to stabilize recently-graded exposed soils. Soil replacement and/or amendments may be necessary in limited areas of some of the facilities, especially in hydric soil units near wetlands, or other areas with soil limitations. A NPDES permit application to discharge stormwater from construction facilities will be acquired by the Aurora from the MPCA. BMPs will be used during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion, whether the erosion is caused by water or wind. Practices may include containment of excavated material, protection of exposed soil, stabilization of restored material, and treating stockpiles to control fugitive dust. A Stormwater Pollution Prevention Plan will be developed for each facility. Additionally, a Phase I Environmental Site Assessment will be conducted at all Project facilities to identify any existing hazardous material contamination. If contamination is identified, Aurora will avoid disturbing those areas through siting and design, or work on additional site assessments to determine the best mitigation procedures.
Rivers, Streams and Lakes (Section 4.5.3)
Impacts – No direct impacts to rivers, streams or lakes are anticipated. Indirect impacts to these features adjacent to construction areas could occur during construction due to erosion or sedimentation. No mapped FEMA floodplains are within the preliminary development areas.
Mitigation – BMPs described in Section 4.5.2 will minimize and avoid indirect impacts to surface water features during construction. If floodplains are identified that cannot be avoided, Aurora will secure the appropriate floodplain permits.

Wetlands (Section 4.5.4)
Impacts - Preliminary design indicates that grading may affect between 0.1 to up to 3.9 acres of NWI-mapped wetlands at eight facilities (Albany, Annandale, Lake Pulaski, Lawrence Creek, Paynesville, Montrose, West Waconia, and Wyoming; see Appendix G) during construction. Preliminary design also shows that access roads and inverters may permanently impact between 0.1 to 0.2 acre of NWI-mapped wetlands at seven facilities (Albany, Lake Pulaski, Lawrence Creek, Paynesville, Montrose, Wyoming, and Zumbrota; see Appendix G). These impacts will be reevaluated based on the field-delineated wetland boundaries, and design will be modified to further avoid and minimize impacts to delineated wetland boundaries wherever practicable. In locations where the solar array is placed over a wetland, the potential indirect impacts may include alteration of the wetland plant community composition due to shading and/or the use of a low-growing wetland seed mix.
Mitigation - Aurora will minimize and avoid direct or indirect impacts to wetlands during construction and operation by avoiding wetlands in facility design and layout to the extent practicable, protecting topsoil, minimizing soil erosion and protecting adjacent wetland resources. Practices may include properly containing/stockpiling excavated material, use of silt fences, protecting exposed soil, stabilizing restored material, and revegetating disturbed areas with non-invasive species. If wetland impacts at a facility cannot be avoided and are over permitting thresholds, Aurora will obtain Section 404 and Minnesota Wetland Conservation Act permits from the USACE and the applicable local government unit prior to construction.
Vegetation (Section 4.5.5)
Impacts – Approximately 88.6 percent of the preliminary development areas are in agricultural production, which will be converted to permanent low-growing vegetative cover under the arrays. Project impacts to vegetation communities will be negligible. This is because the majority of the facility locations are currently row-crop agriculture or pastureland, and wooded vegetative cover is less than 10 percent at the majority of the facility locations. The Project will have a positive impact on facility locations that are dominated by agricultural land, because the facilities will be revegetated with low-growing species, providing better quality habitat and soil-building conditions. The preliminary development area of one facility, the Dodge Center facility, intersects 0.2 acre of a mapped native community, a southern wet-mesic hardwood forest.

Mitigation - Aurora plans to implement mitigation measures to avoid and minimize impacts to vegetation in the Project during siting, construction and operation to the extent practicable, including: • Avoid impacts to native plant communities, including native prairie remnants, during siting and design, construction and operations; • Avoid and minimize disturbance to wetlands and drainage systems; • Avoid impacts to wildlife management areas; • Minimize the area disturbed during construction of the Project; • Minimize clearing of trees and shrubs; • Utilize BMPs during construction and operations to protect topsoil and minimize soil erosion; and • Reseed disturbed non-cropland areas with non-invasive species and regularly mow to control for invasive plant species.
Wildlife (Section 4.5.6)
Impacts - Impacts to wildlife associated with the Project will be minor. During construction, most wildlife, including the common species currently utilizing the habitats at the facility locations, will temporarily be displaced from the area, due to construction noise and the close proximity of humans. This will be a minor and temporary impact, because the wildlife species currently utilizing the area tend to be habitat generalists, and can find abundant suitable replacement habitat near the facility locations. Species that are habitat specialists will likely not be affected by construction of the Project, because the specific required habitats are not present at any of the facility locations. Impacts to wildlife during the operational stage of the Project will potentially be both positive and negative. Positive impacts to wildlife will occur due to the better quality habitat created by the revegetation of the facilities with low-growing permanent vegetative species. Access to the facilities will be limited by perimeter fencing; however, a variety of birds, smaller mammals, reptiles and amphibians will likely still be able to access the facility, and will utilize the habitats beneath and around the solar arrays. The existing habitats will be modified. However, modification of the current agricultural habitats at the facility locations will be a negligible negative impact.

Mitigation - Because the collection system is anticipated to be underground, no raptor shields or bird diverters are needed; if a specific location requires limited aboveground conduit, the design would follow APLIC guidelines. Aurora will use wildlife-friendly erosion mesh for facilities in the vicinity of protected reptile species such as the Blanding's turtle; for facilities that are located in areas where these species are not found, Aurora reserves the right to use other mesh or fencing type based on cost and availability. Aurora is continuing to coordinate with the DNR on the Project, and is considering the incorporation of appropriate mitigation measures on a facility-by-facility basis.
Rare and Unique Natural Resources (Section 4.5.7)
Impacts – In general, there are no anticipated impacts from the Project to rare and unique resources. Due to the habitat (cultivated fields) of the majority of the facility areas, little to no potential habitat for rare species exists.
Mitigation - The mitigative measures described for Vegetation and Wildlife in Sections 4.5.5 and 4.5.6 will also serve to avoid and minimize impacts to threatened and endangered species. Additional mitigation measures include: • Aurora will use wildlife-friendly erosion mesh for facilities in the vicinity of protected reptile species such as the Blanding's turtle. Aurora will provide training to construction workers so they can identify and avoid impacts to Blanding's turtles for those facilities that may be located near the species' habitat. Any trenches that are left open will be checked for trapped turtles before being filled in; any turtles located within construction activity zones will be moved out of harm's way. • Aurora will continue to coordinate with the USFWS regarding the northern long-eared bat. • Aurora will continue to coordinate with the Minnesota DNR and USFWS on the Project in order to determine what species-specific surveys may be warranted.

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