4.0 ENVIRONMENTAL INFORMATION

For the discussion in the following sections, the following terminology, assumptions and approach are used.

For existing conditions within the portions of land under Regal's control, calculations are based on the Land Control Area (802.4 acres). This reflects the fact that final design may necessitate development in areas within the overall area under Regal's land control. Additionally, for any discussions of resources that are located outside of a facility (such as parks within one mile), the Land Control boundary is used in order to discuss the vicinity of these features from anywhere within the portion under Regal's control.

For approximating areas of temporary impact, the Preliminary Development Area is used (approximately 711 acres); 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 (i.e., "permanent" for the life of the Project). For calculating anticipated permanent impacts for resources such as land use, wetlands, and soils, the permanent impacts are calculated using the preliminary design for permanent solar array components such as access roads, inverters, and the Project substation. 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 approximately 8 square inches because the I-beam is approximately 0.25-inches thick within the 6-inch by 4-inch I-shaped configuration. Similarly, the footprint for 198 18-inch diameter wooden poles for the above-ground electrical configuration is not included in the detail calculations. The footprint for these poles is 350 square feet or 0.008 acre.

4.1 Environmental Setting

The MNDNR and the U.S. Forest Service have developed an Ecological Classification System (ECS) for ecological mapping and landscape classification in Minnesota that is used to identify, describe, and map progressively smaller areas of land with increasingly uniform ecological features (MNDNR, undated). Through the ECS, the State of Minnesota is split into Ecological Provinces, Sections, and Subsections. The Project facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Province (222M). The Project is in the Anoka Sandplain ecological subsection.

The Anoka Sandplain ecological subsection is characterized a flat, sandy lake plain and terraces along the Mississippi River. Topography is level to gently rolling. The depth to bedrock in this subsection is usually less than 200 feet, with Cambrian and Ordovician dolomite, sandstone, and shale underlain. Soils are derived primarily from the fine sands of the sandy plain. Most of these sandy soils are droughty, upland soils, but there are organic soils in the ice block depressions and tunnel valleys and poorly drained prairie soils along the Mississippi River. Annual precipitation

in the Anoka Sandplain subsection ranges from 27 inches in the west to 29 inches in the east and the average growing season lasts approximately 136 to 156 days in length. Prior to Euro-American settlement, vegetation in this subsection was oak barrens and openings. Upland prairie formed a narrow band along the Mississippi River, as did areas of floodplain forest. Currently land used in this subsection is agricultural activity and urban development (MNDNR, 2019a).

The Project is in a rural area directly west of U.S. Highway 10 and Rice and Royalton located less than 0.1 mile east/southeast and 1.5 miles north/northwest, respectively. Residences are scattered throughout the rural area where the land use is dominated by center-pivot irrigation with tree rows serving as wind breaks along portions of most roads and some field edges. The major roadway in the area is U.S. Highway 10 along the east border of the Land Control Area. The Land Control Area is bisected by Halfway Crossing Road (County Road 40) in an east-west direction and 45th Avenue Northwest in a north-south direction (County Road 73). There is a Burlington Northern railroad adjacent to the east portion of the Land Control Area. The Project is located on relatively flat fields conducive to solar development.

4.2 Human Settlement

4.2.1 Public Health and Safety

The Project is in rural Langola Township which according to the 2010 U.S. Census, has a population density of 22.8 persons per square mile of land area (U.S. Census Bureau, 2010). If emergency personnel were needed at the Regal Solar Project, multiple agencies would likely respond, depending on the situation. These include the Benton County Sheriff, City of Rice and/or Royalton police departments, fire services from the City of Rice and/or City of Royalton, and ambulance services from CHI St. Gabriel's Health Hospital in Little Falls, approximately 12 miles north of the Project.

There are three towers that are a part of the Allied Radio Matrix for Emergency Response (ARMER) in Benton County (Minnesota Department of Public Safety, 2018). These ARMER towers are a part of Minnesota's Statewide Communication Interoperability Plan, which aims to improve communication for emergency responders. The ARMER radio system operates by line of sight, talking to other ARMER towers. In order for the system to operate effectively, multiple towers are needed to produce a solid blanket of coverage. The system can be interrupted if tall objects are proposed within the line-of-sight, typically at or near the top of a tower over 150 feet tall. There are no ARMER towers within one mile of the Project; the nearest ARMER tower is located in the city of Royalton, which is 2.2 miles north of the Land Control Area (Minnesota Department of Public Safety, 2018).

4.2.1.1 Impacts and Mitigation

Construction and operation of the Project will have minimal impacts on the security and safety of the local populace. Regal is gathering information to coordinate with all emergency and non-emergency response teams for the Project, including law enforcement agencies (Benton County Sheriff, Cities of Rice and Royalton police departments), fire departments from Rice and Royalton, and ambulance services from CHI St. Gabriel's Health Hospital in Little Falls and 911 services. The type and number of responding agencies will depend on the incident requiring emergency

services. Regal will develop an Operations and Emergency Action Plan that outlines local contacts (first responders and internal operation and maintenance staff) and emergency procedures for evacuation, fire response, extreme weather, injury, and criminal behavior. Additionally, construction will comply with local, state, and federal regulations regarding installation of the Project facilities and standard construction practices. Established industry safety procedures will be followed during and after construction of the Project; these include clear signage during all construction activities, and fencing of all Project facilities to prevent public access. Finally, Regal included an access road around the perimeter of the Project to provide an additional buffer from the railroad and any potential sparks that could ignite adjacent vegetation. This additional buffer serves as a safety measure to keep fire out of the solar facility. The access road around the entire perimeter of the facility is also necessary to provide effective and efficient access for operations and maintenance activities and safe ingress and egress for employees, visitors and emergency responders.

While there are ARMER towers in the Project vicinity (i.e., within 2.2 miles), the Regal Solar Project will not impact this communication system as Project facilities are proposed well below the typical height of a tower and line-of-sight near the top of these towers (i.e., greater than 150 feet above ground). Regal Solar anticipates the tallest solar facilities and transmission facilities to be approximately 15 feet (with a maximum height of 20 feet) and up to 150 feet above ground, respectively. As such, no mitigation is proposed.

4.2.1.2 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. The general consensus is that electric fields pose no health risk to humans (National Radiation Laboratory, Ministry of Health, New Zealand, 2008).

With the proposed Regal Solar Project, the sources of EMF will be from electrical collection lines, either buried below-ground or hung above-ground, the gen-tie transmission line, and from the transformers installed at each inverter. EMF from electrical collection lines, regardless of whether they are below-ground or above-ground, transmission lines, and transformers dissipates rapidly with distance from the source (National Institute of Environmental Health Sciences [NEIHS], 2002). Generally speaking, higher voltage electrical lines produce higher levels of EMF at the source before dissipating with distance. The internationally accepted guideline for the general public exposed to electric fields is 4.2 kV/m and 833 milliGauss (mG) for magnetic fields (NEIHS, 2002).

4.2.1.3 Impacts and Mitigation

Levels of EMF from the Project will be considerably below acceptable guidelines. Project-specific EMF levels were not modeled for the 34.5 kV electrical collection lines, 115 kV overhead gen-tie transmission line, or inverters and transformers. However, several studies have documented EMF

exposure of various high voltage transmission lines. The National Institute of Environmental Health Sciences provides typical EMF levels for power transmission lines (NIEHS, 2002). For 115 kV transmission lines, the lowest voltage with typical EMF levels reported in the study, electric fields directly below the transmission line were reported at 1.0 kV/m before dissipating to 0.5 kV/m at 50 feet (approximate edge of right-of-way). Similarly, average magnetic fields directly below the transmission line were reported at 29.7 mG before dissipating to 6.5 mG at 50 feet (NIEHS, 2002). A Canadian study of collection lines at a wind facility measured EMF (magnetic fields) of the Project's 27.5 kV collection lines, slightly lower voltage than the electrical collection lines proposed for the Regal Solar Project. This study found magnetic fields associated with buried electrical collection lines to be within background levels at 1m above ground and up to 16.5 mG directly beneath overhead 27.5 kV lines (McCallum et al., 2014). As demonstrated here, both electric and magnetic fields will be well below the international guidelines of 4.2 kV/m and 833 mG, respectively. Additionally, since the transformers are enclosed in a grounded metal case (shielded), they typically do not emit much EMF.

Stray voltage is often a concern in agricultural areas, particularly dairy farms. Stray voltage is an unintended transfer of electricity between two grounded objects, and is typically caused by improperly grounded electrical equipment in farm buildings or by a faulty utility connection. All electrical components in the Project, including inverters and transformers, will be grounded in accordance with National Electric Safety Code. Soil resistivity measurements will be taken on site as part of the Project's geotechnical analysis, and that data will be used to help design grounding systems. For these reasons, the potential for stray voltage as a result of the Project will be negligible. Should a fault occur during operation of the Project, it would be quickly identified by Project monitoring systems and corrected. The nearest residence to solar arrays is 319 feet and even greater distances to the nearest inverter, electrical collection line, and transformer. At this distance, both electric and magnetic fields would have dissipated to background levels. As such, impacts will be negligible and mitigation measures are proposed.

4.2.2 Displacement

There are no residences, business, or structures such as barns or sheds in the Land Control Area.

4.2.2.1 Impacts and Mitigation

Because there are no building structures in the Land Control Area, there will not be any displacement; as such, no mitigation is proposed.

4.2.3 Noise

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 decibel scale (dBA) 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. According to ANSI/ASA S12.9-

2013/Part 3, rural residential areas have a typical daytime noise level of 40 dBA and a typical nighttime noise level of 34 dBA.

Background noise in the vicinity of the Project facilities is typically a result of farming equipment/operations, wind, vehicles, and the railroad. A comparison of typical noise-generating sources is outlined below in Table 4.2-1.

Table 4.2-1 Common Noise Sources

Sound Pressure Level (dBA)	Common Noise Source
110	Rock band at 5 m
100	Jet flyover at 300 m
90	Gas lawn mower at 1 m
85	Food blender at 1 m
75	Shouting at 1 m
70	Vacuum cleaner at 3 m
60	Normal speech at 1 m
55	Large business office
50	Dishwasher in next room, quiet urban daytime
40	Library, quiet urban nighttime
30	Bedroom at night
20	Quite rural nighttime
0	Threshold of hearing

Source: Minnesota Pollution Control Agency (MPCA), 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 (L_{10}) and 50 percent of any hour (L_{50}). Household units, including farmhouses, are included in Noise Area Classification 1. Table 4.2-2 shows the MPCA state noise standards.

Table 4.2-2 MPCA State Noise Standards - Hourly A-Weighted Decibels

Noise Area Classification	Daytime (7:00 a.m. – 10:00 p.m.)		Nighttime (10:00 p.m. – 10:00 a.m.)	
	L_{10}	L_{50}	L_{10}	L_{50}
1 – Residential	65	60	55	50
2 – Commercial	70	65	70	65
3 - Industrial	80	75	80	75

Source: Minn. R. § 7030.0040

4.2.3.1 Impacts and Mitigation

During construction, noise will be emitted by the construction vehicles and equipment. The amount of noise will vary based on what type of construction is occurring at the Project on a given

day. Construction associated noise will likely be perceptible at adjacent residences (see Section 4.2.4 for locations) and the Two Rivers Campground (see Section 4.2.7 for its location). Grading equipment, bobcats, and other construction equipment are anticipated to emit noise between 76-85 dBA at 50 feet (USDOT, 2017). Noise associated with these types of equipment will primarily occur during the initial site set up – grading and access road construction which is expected to last approximately four weeks. Regal anticipates pile driving of the rack supports to create the most noise measured at 101 dBA at 50 feet (USDOT, 2017). Installation of each rack support takes between 30 seconds to 2 minutes depending on the soil conditions; Regal anticipates this activity will take up to 8 weeks across the site. Finally, installation of the solar panels on the tracking similar would emit noise levels similar to general construction equipment described above. Typically, a forklift is used to place individual panels on the tracking rack system. The noise from any of these construction activities would dissipate with distance and be audible at varying decibels, depending on the locations of the equipment and receptor. Note that construction activities will be sequenced; site preparation may occur at a portion of the site while pile driving occurs at a different location. As stated above, these noise impacts will be temporary and limited to daytime hours.

The main source of noise from the Project during operation will be from the inverters, which includes the air conditioners housed in each, and to a lesser extent from the transformers and rotation of the tracking system. Table 4.2-3 summarizes the anticipated distance to reach the most stringent MPCA noise standard (50 dBA) from a range of inverters and trackers under consideration for use at the Regal Solar Project. Table 4.2-3 also provides the dBA at 50 feet so noise levels can be calculated at greater distances.

Table 4.2-3 Inverter and Tracker Noise Levels

Facility Type	Equipment Model	Distance to 50 dBA	dBA at 50 feet
Inverter	TMEIC Solar Ware Ninja PVU-L0920GR	58 feet	51
	SMA Sunny Central 2750-EV-US	160 feet	60
	ABB PVS980	260 feet	64
Tracker	ATI DuraTrack HZ v3	5 feet	30
	NexTracker	82 feet	54

The results of noise modeling conducted by technology manufactures outlined in Table 4.2-3 show that noise levels will be less than 50 dBA between 58 and 260 feet from the inverter, depending on which model is selected. Similarly, noise levels will be less than 50 dBA between 5 and 82 feet from the trackers, depending on which model is selected. As such, the Project has been designed to meet the nighttime L_{50} dBA noise standard, as the closest home to the facility is 319 feet away from the edge of a solar array. Further, because the inverters are typically 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.

During construction, Regal plans to limit construction to daylight hours. No noise impacts are anticipated during operation; therefore, no mitigation measures are proposed.

4.2.4 Aesthetics

The topography of the Land Control Area is flat with elevations ranging from 1070 to 1080 feet above sea level. As discussed in Section 4.1, land use within the Land Control Area is predominantly agricultural as center-pivot irrigation, with corn and potatoes being the most common crops. There are windbreaks along most roads and some property boundaries in the Project vicinity. The Burlington Northern railroad, U.S. Highway 10, and a portion of a snowmobile trail are adjacent to the eastern boundary of the Land Control Area. Additionally, an existing substation, communication tower, and distribution lines all occur within or adjacent to the Land Control Area and are current man-made focal points. There are three residences and a campground on parcels adjacent to the Land Control Area (see Figures 3 and 5 (Below-Ground Preliminary Project Layout and Above-Ground Preliminary Project Layout, respectively).

There are no residences within the Land Control Area; there are three residences on parcels adjacent to the Land Control Area. Additionally, there are no businesses, barns, or other agricultural structures in the Land Control Area. Table 4.2-4 provides distances to the nearest homes to the Project, including approximate distance to the Preliminary Development Area boundary and approximate distance to the edge of solar arrays (per preliminary design). Residences are also shown on the Figures 3 and 5 (Below-Ground Preliminary Project Layout and Above-Ground Preliminary Project Layout, respectively).

Table 4.2-4 Proximity of Residences to Regal Solar Facility

Residence	Distance to Development Boundary (feet)	Distance to Solar Arrays[1]
A	95	319 to the north 332 to the south
B	178	345
C	560	470

[1] Based on preliminary design

Residence A is located immediately adjacent to the Land Control Area in the center of the Project. This is a newly constructed home by a relative of the current landowner of the Land Control Area. While there is not currently existing vegetative screening around the homesite itself, there is an existing vegetative screening/wind break along Halfway Crossing Road and around the wetland the home is built on that would provide screening at various vantage points.

Residence B is located adjacent to the central portion of the Land Control Area south of Halfway Crossing Road. This residence has vegetative screening around most of the property and will also be at least partially screened by the wind break along Halfway Crossing Road.

Residence C is located west of the central portion of the Land Control Area with a long (two-thirds of a mile) driveway south off of Halfway Crossing Road. This residence has existing vegetative screening around most of the homesite; the driveway is adjacent to a field edge and is not screened.

The Two Rivers Campground is located adjacent to the southern portion of the Land Control Area, south of 145th Street NW. This seasonal campground is located at the confluence of the Mississippi and Platte Rivers and has existing vegetative screening around the property, including existing vegetative screening along 145th Street NW, within the Land Control Area that will not be removed for the Project.

As mentioned in Section 4.2.5, the municipal boundary of Rice is approximately 230 feet west of the Land Control Area and zoned as heavy and light industrial. The closest building to the Project that is within City limits is approximately 0.84 miles to the southeast of the Land Control Area on the east side of U.S. Highway 10. The closest residence to the Land Control Area that is within City limits is approximately 0.56 miles to the southeast of the Land Control Area. The Land Control Area is not located within an orderly annexation area for the City of Rice.

4.2.4.1 Impacts and Mitigation

The Project will convert approximately 706.5 acres of predominately agricultural land (see Table 4.2-6 in Section 4.2.8 and associated discussion) to a solar facility characterized by complex geometric forms, lines, and surfaces that may be divergent from the surrounding rural landscape. Most of the Preliminary Development 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. The images in Section 3.1.1 provide a reference for how the Regal Solar Project will appear during operation. 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.

The solar arrays will occupy most of the disturbed area for the solar facility. The electrical transformers and inverters, a substation and O&M building, and access roads will utilize the rest of the disturbed area. Most of the facility, including the solar arrays, will be low-profile. The Project substation will be of similar vertical profile as the existing Platte River Substation adjacent to the Land Control Area. In the above-ground electrical configuration, poles would be up to 30 feet in height and predominately parallel access roads. From outside the facility, these poles would be most visible from existing roadways. However, along some roads, like 45th Avenue NW, there is existing vegetative screening that would help minimize the pole aesthetic. Most poles on the interior of the facility would not be visible outside the facility due to a combination of line of sight with other components (arrays, inverters), distance from observer, and existing vegetative screening.

Regal coordinated with the landowners of Residences A, B, C, and the Two Rivers Campground. Residence C requested additional vegetative screening along their driveway. Regal will install vegetative screening along the Project fence for approximately 970 feet to mitigate any aesthetic concerns. The vegetative screening is displayed on Figure 3 – Below-Ground Preliminary Project Layout and in Appendix B – Site Plan.

The 2-3 transmission structures of less than 150 feet in height will be limited to the area between the proposed Project substation and the existing Platte River Substation, approximately 300 feet apart. This area already hosts distribution lines (see Section 4.2.9 and Figure 9 – Existing Infrastructure and AADT). These structures will be visible from the local roadways and blend with the two existing substations, communication tower, distribution lines, and railroad.

The solar arrays will be visible from adjacent roadways and parcels but given their relative low profile, they will not be visible from long distances. Additionally, Regal has designed the Project to avoid tree clearing of windbreaks and pine plantations, as defined by Benton County for the

solar arrays, access roads, inverters, substation, and O& building. There is one location at the crossing of Halfway Crossing Road that may require tree removal should above-ground electrical configuration be used. Regal would coordinate with Benton County for any tree removal. Alternatively, Regal may bore collection under the road and associated trees if below-ground collection is used. In addition, the existing vegetative screening along roads, around residences, and along property lines will remain. The solar facility will be visible to vehicles on adjacent roads, snowmobilers, local residences, and the Two Rivers Campground; more information on potential impacts to recreation, including snowmobilers and the Two Rivers Campground is provided in Section 4.2.7. As previously mentioned, the closest residence to preliminary design is approximately 319 feet immediately adjacent to the west side of the Preliminary Development Area. Regal has coordinated with the owners and they have not expressed concerns with the Project. A rendering of the proposed Project from U.S. Highway 10 is provided below in Image 9 for the below-ground configuration and Image 10 for the above-ground configuration.

Image 9: Visual Rendering of Regal Solar Facility from U.S. Highway 10 (below-ground configuration)

Image 10: Visual Rendering of Regal Solar Facility from U.S. Highway 10 (above-ground configuration)

Operation of the Project will require down lit security lighting at the entrance of the Project and there will be down lit, switch controlled lights at each inverter for repair purposes. Impacts to light-sensitive land uses are not anticipated given the rural Project location coupled with minimal required lighting for operations.

4.2.5 Socioeconomics

The Project is in a rural area within Langola Township and no incorporated communities are located within the Land Control Area. The incorporated communities that are geographically closest to the Land Control Area are Rice (less than 0.1 mile [approximately 230 feet outside of the municipal boundary] east/southeast), Royalton (1.5 miles north/northwest), St. Stephen (3.9 miles southwest), and Bowlus (5.9 miles west/northwest). The nearest metropolitan area is St. Cloud which is approximately 12.8 miles south of the Project.

Table 4.2-5 presents population and economic information gathered from the U.S. Census Bureau 2010 Census and 2013-2017 American Community Survey 5-year Estimates about Minnesota and Benton County (U.S. Census Bureau, 2010 and 2017). The 2010 U.S. Census gathered a wide variety of data points. The discussion herein does not address every socioeconomic measure, but instead addresses the most applicable statistics related to the Project. The socioeconomic statistics that best characterize the demographic and economic context of the Land Control Area, and represent the socioeconomic characteristics that potentially could be affected by construction and operation of the Project, include: total population, vacant housing units, per capita income, the percentage of the population below poverty level, and the unemployment rate (see Table 4.2-5).

Based on the 2010 U.S. Census, the population of Benton County is 38,451 persons, which represents less than 1 percent of the total population of Minnesota. The per capita income of Benton County is $27,018, which is lower than the state average. Although the unemployment rate in Minnesota and Benton County is relatively low at 4.3 and 4.2 percent, respectively, slightly more than 11 percent of individuals in the state and 14 percent of individuals in the county are classified as living below the poverty level. The primary industries in Benton County are classified as educational services, health care, and social assistance (24.7 percent), followed by manufacturing (14.0 percent) and retail trade (13.2 percent) (U.S. Census, 2017).

According to the U.S. Census Bureau 2013-2017 American Community Survey 5-year Estimates, approximately 1,061 vacant housing units exist in Benton County. In the nearest metropolitan area, St. Cloud, there are approximately 1,899 vacant housing units (U.S. Census Bureau, 2017). In addition, according to the Visit Greater St. Cloud website (Visitstcloud.com, n.d.) 29 hotels, motels, and campgrounds are available in the greater St. Cloud area. These residence and temporary housing statistics suggest the local area could support an influx of construction workers, if needed.

Table 4.2-5: Socioeconomic Characteristics of the Project Vicinity					
State/County	Total Population (2010)	Vacant Housing Units	Per Capita Income (U.S. Dollars)	Individuals Below Poverty Level (percent)	Unemployment Rate (percent)
Minnesota	5,303,925	259,974	34,712	10.5	4.3
Benton	38,451	1,061	27,018	14.1	4.2

Sources: U.S. Census Bureau, 2010 and 2017.

4.2.5.1 Impacts and Mitigation

The Project is designed to be socioeconomically beneficial to the landowner, local governments, and communities. Landowner compensation is established by voluntary purchase agreements between the landowner and Regal for Regal's purchase of the land. Regal will establish the Regal Education Fund upon commercial operation, to which Regal will contribute $20,000 annually for the first 20 years of Project operation. Because the Project is located within the Royalton and Sauk Rapids-Rice school districts, the fund will be distributed to both. Regal will continue to coordinate with both of these school districts on establishing the fund as the Project develops.

Construction of the Project would provide temporary increases to the revenue of the area through increased demand for lodging, food services, fuel, transportation and general supplies. The Project will also create new local job opportunities for various trade professionals that live and work in the area and it is typical to advertise locally to fill required construction positions. Opportunity exists for sub-contracting to local contractors for gravel, fill, and civil work. Additional personal income will also be generated by circulation and recirculation of dollars paid out by the Project as business expenditures and state and local taxes.

General skilled labor is expected to be available in Benton County or Minnesota to serve the Project's basic infrastructure and site development needs. Specialized labor will be required for certain aspects of the Project. It may be necessary to import specialized labor from other areas of Minnesota or neighboring states because the relatively short construction duration often precludes special training of local or regional labor and much of the workforce needed to construct a solar facility must be comprised of Minnesota licensed electricians because most of the assembly and wiring work for solar installations is considered electrical work under the Minnesota State Electrical Code.

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

In general, the socioeconomic impacts associated with the Project will be positive; therefore, no mitigative measures are proposed. Wages will be paid, and expenditures will be made to local businesses and landowners during the Project's construction and operation. The Project will provide production tax payments to Benton County of approximately $176,000 annually for 25

years. Additionally, Langola Township will receive approximately $44,000 annually for 25 years. In addition, purchase payments paid to the landowner will offset potential financial losses associated with removing a portion of their land from agricultural production.

4.2.6 Cultural Values

Cultural values include those perceived community attitudes or beliefs that provide a framework for community unity. The Project is in Benton County, Minnesota and according to the U.S. Census Bureau (2010), the majority of the population in Benton County identifies as Caucasian with an ethnic background of European origin. Cultural representation in community events appears to be more closely tied to geographic features (such as the Platte River), seasonal events, national holidays, and municipal events than to those based in ethnic heritage. Examples of regional cultural events include annual winter holiday festivals, such as Christmas on the Platte in Royalton, and summertime events like Platte River Days and the Rough Fish Contest hosted by the City of Royalton (royaltonmn.com, 2011).

4.2.6.1 Impacts and Mitigation

Construction and operation of the Project would not impact public participation in the regional community cultural events noted above, as the Land Control Area is located outside of municipal areas. Therefore, no impacts to cultural values are anticipated and no mitigation measures are proposed.

4.2.7 Recreation

There are various recreational opportunities in or near the Land Control Area, including snowmobile trails, a private campground, and the Mississippi and Platte Rivers (refer to Figure 7 - Recreation). Each of these offers recreation opportunities that attract residents and tourists.

Snowmobile trails are mapped by MNDNR and managed locally by each county and their respective snowmobile clubs. There is one snowmobile trail within the Land Control Area, managed by the Benton County Snowmobile Club, that runs southeast along Highway 10 and then turns south through the eastern portion of the Land Control Area.

As discussed in Section 4.2.4, the Two Rivers Campground is just south of the Land Control Area on the south side of 145th Street NW at the confluence of the Mississippi and Platte Rivers (Tworiverscampground.net, 2017). The campground is privately owned, seasonally operated, and provides 221 campsites, a large campground lodge, pool area, mini golf, boat access, and innertube rentals for tubing on the Platte River.

WMAs are managed to provide wildlife habitat, improve wildlife production, and provide public hunting and trapping opportunities. These MNDNR lands were acquired and developed primarily with hunting license fees. There are no WMAs within 1 mile of the Land Control Area. The nearest MNDNR WMA is the Sartell WMA, located 2.4 miles east of the Land Control Area.

There are no MNDNR Scientific and Natural Areas, state trails, state water trails, Aquatic Management Areas, state parks, or migratory waterfowl feeding and resting areas within one mile

of the Land Control Area. Similarly, there are no county or city parks within one mile of the Land Control Area.

The nearest city is the City of Rice, whose municipal boundary is located less than 0.1 mile southeast of the Land Control Area.

4.2.7.1 Impacts and Mitigation

Due to the location of the snowmobile trail within the Preliminary Development Area, Regal will coordinate with the Benton County snowmobile club to reroute the trail around the solar facility. Based on an informational discussion with the Benton County snowmobile club, they indicated that the reroute of the snowmobile trail will occur after the Project receives its site permit and prior to construction. While the specific location of the re-route has not been discussed with the Benton County snowmobile club, it is likely the trail would be rerouted to follow the railroad right-of-way for an additional 1,900 feet to get beyond the proposed fence along the perimeter of the Preliminary Development Area before turning south through the agricultural fields. Because snowmobile trails are often located on private land, rerouting trails is a common practice as land uses change. In addition to re-routing the snowmobile trail, snowmobilers will notice the different aesthetic along the portion of the snowmobile trail in the vicinity of the Regal Solar Project. Instead of riding through center-pivot irrigation fields that are open space during the winter months, the trail would route around the facility and the rider would encounter the agricultural fence along the perimeter and solar arrays and access roads on the interior. In general, snowmobile trails form a network between cities. While portions of snowmobile trails pass more rural areas, other portions pass through municipalities and various developments. The introduction of a solar facility is not expected to affect the snowmobile trail's use. Finally, by its nature, snowmobiling is a mobile activity; snowmobilers are expected to pass the Regal Solar Project on the established trails. Therefore, any aesthetic impacts would be limited to the rider's duration in the Project vicinity.

Impacts to the campground and Mississippi River access during construction would be temporary and minor and related to transportation, aesthetics, and noise. From a transportation standpoint, Regal Solar will construct the Project facilities within the limits of the Land Control Area and no road closures are anticipated to be necessary during active construction. Recreation users of the Two Rivers Campground and those obtaining boat access to the Mississippi River may experience additional traffic on roadways that bisect the Project. Traffic during construction is estimated to be approximately on average 50-100 pickup trucks, cars, and/or other types of employee vehicles onsite for the majority of construction. It is estimated that approximately 10-20 semi-trucks per day will be used for delivery of facility components. Semi-truck delivery will vary per day depending on time of construction and delivery timeline of equipment.

The presence of construction equipment and vehicles across the road from the campground will create a different aesthetic than the current agricultural use. However, the Project has been designed to avoid tree clearing near Two Rivers Campground; the existing vegetative screening along 145th St NW will remain intact. Immediately adjacent to the campground, the existing vegetative screening is approximately 75 feet wide, providing a dense screen towards the Regal Solar Project.

Finally, users of the campground may experience construction noise because of construction activities. Potential noise levels are described in Section 4.2.3.1.

During operation, impacts would be visual in nature. As discussed in above, Regal has designed the Project to avoid tree clearing, including windbreaks and pine plantations, as defined by Benton County. The existing vegetative screening along roads, including 145th Street NW will also remain.

4.2.8 Land Use and Zoning

4.2.8.1 Land Use

The Regal Solar Project is within a rural landscape, and as such the primary land use in the Land Control Area is agricultural (95.8 percent; U.S. Geological Survey [USGS], 2011; Table 4.2-6; Figure 8 – Land Use). The remainder of the Land Control Area consists of developed land (2.6 percent) and a small amount of forested land (1.5 percent), shrubland (<0.1 percent), introduced and semi natural vegetation (< 0.1 percent) and open water (<0.1 percent). Most of the agricultural land in the Land Control Area is center-pivot irrigation. Corners around the center-pivots are also generally farmed or hayed. Developed land within the Land Control Area generally consists of public roads, namely Halfway Crossing Road and 45th Avenue NW. Forested land is a category in the U.S. Geological Survey (USGS) Gap Analysis Program (GAP) data used for Regal's environmental analysis; however, forested land within the Land Control Area consists of isolated rows of relatively young trees that were planted for use as shelter belts or wind breaks along the edges of agricultural fields and roads. The is a very small area of shrubland associated with Residence A within the Land Control Area. Similarly, the very small area (0.1 acre) of open water in the Land Control Area is associated with the wetland/pond near Residence A. There are no wetlands identified in the Land Control Area by the USGS GAP data. See Section 4.5.5 for more information on wetlands.

Table 4.2-6 Land Use Within the Land Control Area

Land Use Type	Acres in Land Control Area	Percent of Total Acreage
Agricultural	768.7	95.8%
Developed	20.6	2.6%
Forested	12.0	1.5%
Shrubland	0.8	0.1%
Introduced & Semi Natural Vegetation	0.2	<0.1%
Open Water	0.1	<0.1%
Total	**802.4**	**100%**

Source: USGS, 2011

Farmsteads are sparsely scattered throughout the Project vicinity, generally situated near public roads. Based on review of available aerial photography, there are three occupied or occupiable residences located on parcels adjacent to the Land Control Area; however, the Project will not cause displacement or relocation of residences (see Section 4.2.2).

4.2.8.2 Zoning

Based on Benton County zoning data, the Land Control Area is zoned as agricultural (Benton County, 2019a). As noted in Section 7.1 of the Benton County Development Code, development of solar energy systems within the agricultural district is a permitted accessory use in accordance with Section 9.20.3 (Benton County, 2019b). Section 9.20.3 of the Development Code applies to solar energy systems that are not otherwise subject to siting and oversight by the State of Minnesota under the Minnesota Power Plant Siting Act (Minnesota Statute 216E); because the Project requires a Site Permit from the State of Minnesota, Section 9.20.3 of the Benton County Development Code does not apply (Benton County, 2016).

4.2.8.3 Land Use and Zoning Impacts and Mitigation

Table 4.2-7 provides the total acres of each land use type impacted by both the below-ground and above-ground configurations. Based on the USGS GAP landcover data, the Project would affect predominately agricultural land (98.8 percent for below-ground configuration and 98.7 percent for above-ground configuration). Developed, forest, shrubland, and introduced & semi natural vegetation within the Preliminary Development Area total 1.2 percent for the below-ground configuration and 1.3 percent for the above-ground configuration. While within the Preliminary Development Area, Regal will not impact developed land. Solar facilities will be setback from the two roads that bisect the Project (125 feet from the road centerline). Electrical cables that connect the three main units of panels will be directionally bored under or spanned over county roads. Similarly, areas categorized as forest & woodland land will not be impacted by the solar facilities. Regal has designed the solar facility to avoid tree clearing.

Table 4.2-7 Land Use Impacts

Land Use Type	Below-Ground Configuration		Above-Ground Configuration	
	Acres	Percent	Acres	Percent
Agricultural	698.6	98.8%	702.6	98.7%
Developed	6.9	1.0%	6.9	1.0%
Forest & Woodland	1.5	0.2%	1.9	0.3%
Introduced & Semi Natural Vegetation	0.1	<0.1%	0.1	<0.1%
Total	**707.1**	**100.0%**	**711.4**	**100%**

Source: USGS, 2011.

Agricultural land will be converted from an agricultural use to solar energy use for the life of the Project. The conversion of agricultural land to solar facility within the Preliminary Development Area will have a minimal impact on the rural character of the surrounding area or Benton County. As discussed further in Section 4.3, Land-based Economies, of the 261,120 acres in Benton County, approximately 72 percent (approximately 188,735 acres) are classified as agricultural land. Impacts of up to 702.6 acres of agricultural land within the solar facility (above-ground configuration) would reduce the amount of agricultural land in the County by less than one percent.

Due to the amount of agricultural land impacted by the Project, Regal has coordinated with Minnesota Department of Agriculture (MDA) on an AIMP (Appendix C). This AIMP has been

designed to incorporate best management practices (BMPs) into siting procedures; pre-construction, construction, and post construction methods; operational procedures; and closure and restoration procedures to avoid and minimize impacts to soil and site productivity such that pre-construction agricultural productivity (anticipated use, appropriate management) is rapidly returned to the site following closure. Regal met with MDA on April 9, 2019 to discuss the AIMP's contents and site-specific characteristics. On May 23, 2019, Regal Solar provided a draft of the Regal AIMP; MDA reviewed and provided comments the draft AIMP on June 27, 2019. Regal provided a redline version of the final AIMP, including updates to address the agency's comments on July 16, 2019.

As noted above, development of solar energy systems within the Benton County agricultural district is a permitted accessory use (Benton County, 2019b). As the Regal Solar Project is subject to siting and oversight by the State of Minnesota under the Minnesota Power Plant Siting Act, the Site Permit will serve as the land use permit.

4.2.9 Public Services and Infrastructure

This section describes the public services and infrastructure within the Land Control Area and impacts this Project may have on public services.

Public Services

Public services are those typically provided by a government entity to its citizens and those services are used to benefit public health and safety. These services can include emergency services (i.e., Benton County Sheriff, City of Rice and/or Royalton police departments, fire services from the City of Rice and/or City of Royalton, and ambulance services from CHI St. Gabriel's Health Hospital in Little Falls), potable water, sanitary systems, and utilities. The city of Rice is the closest municipality to provide emergency services. Most rural residences outside of Rice have wells that supply their water (see Section 4.5.2). Sewage is serviced by residential septic tanks and/or drain fields. Telecommunication services are provided by Benton Cooperative Telephone or InteleCONNECT, Inc. (Benton County, 2019c).

Public Utilities

The Project is adjacent to the existing Minnesota Power Platte River Substation and the Great River Energy/East Central Energy Langola Substation. There are several distribution lines operated by Minnesota Power and East Central Energy (Minnesota Geospatial Commons, 2018) along the roads in the Project vicinity that provide power to rural residents. Approximate locations of these distribution lines are displayed on Figure 9 – Existing Infrastructure and AADT based on Google Earth. There are no pipelines in the Land Control Area.

Transportation

The major roadway in the area is U.S. Highway 10 along the east border of the Land Control Area. The Land Control Area is bisected by Halfway Crossing Road (County Road 40) in an east-west direction and 45th Avenue Northwest in a north-south direction (County Road 73). Average Annual Daily Traffic (AADT) counts based on Minnesota Department of Transportation's

(MNDOTs) 2017 Publication of traffic volumes for Benton County are provided in Table 4.2-8 and displayed on Figure 9 – Existing Infrastructure and AADT (MNDOT, 2017).

Table 4.2-8 Average Annual Daily Traffic in the Project Vicinity

Roadway	Year	AADT Traffic Volume Total
US-Highway 10	2017	23,000
Halfway Crossing Road between US 10 and Royalton	Prior to 2013	270
45th Ave NW between Halfway Crossing Road and 125th St NW	Prior to 2013	980

Source: MNDOT, 2017

There will be four access points to the Project: two off of Halfway Crossings NW and two off of 45th Ave NW. The Project will not be accessed from U.S. Highway 10.

MNDOT provided early review comments on the Regal Solar Project on March 5, 2019. These early comments revolved around access, vegetation management, and permitting. Regal held a follow-up meeting with MNDOT on May 9, 2019 and confirmed, that according to its records, mesic prairie is not located within the Land Control Area near Highway 10 and vegetative screening along Highway 10 is not necessary due to the existing vegetation present along the highway and overall low potential for glare.

There is a Burlington Northern railroad adjacent to the east portion of the Land Control Area.

The nearest Federal Aviation Administration (FAA)-registered airport to the Regal Solar Project is the Little Falls/Morrison County-Lindbergh Field Airport located approximately eleven miles north of the Project. This airport operates two runways, one asphalt and one turf. Based on aerial imagery, there appears to be an unregistered landing strip (Fussy) located three miles west of the Project.

4.2.9.1 Impacts and Mitigation

Public Services

Regal will coordinate with Gopher State One Call before and during construction to fully understand infrastructure locations and safety concerns and to avoid possible structural conflicts. Regal Solar will also conduct an American Land Title Association (ALTA) survey to identify the locations of underground utilities. Final design will minimize and avoid impacts to underground utilities; if conflicts are unavoidable Regal 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.

Public Utilities

As described in Section 3.1.7, the Project will interconnect into the existing Platte River Substation via a gen-tie 115 kV transmission line of less than 1,500 feet. Multiple System Impact Studies will be completed by MISO to review the direct electrical connection of the Project to the Platte

River substation. The System Impact Study contains information about the adequacy of the electrical interconnection equipment and serves to protect Regal and other users of the Platte River Substation and the larger electrical system. The information contained in the System Impact Study will determine the impacts to all systems, answer all electrical interconnection questions and dictate the electrical updates that are necessary for Regal to safely and effectively interconnect the Project to the electrical transmission system. Regal is responsible for all costs associated with MISO's review of the Project and with all upgrade costs MISO determines to be necessary to safely and effectively interconnect the Project at the Platte River Substation. During interconnection, customers will experience short outages when the Platte River Substation is shut down and temporary service is being established. The timing and duration of any service interruptions would be determined and communicated by the interconnecting utility (Minnesota Power).

Transportation

Access to the Project will be via existing county roads. With the limited possible exception of minor field access or driveway changes depending on final design, no changes to existing roadways will occur. The roads used for access to the Regal Solar Project are shown on Figure 9 (Existing Infrastructure and AADT). 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 roadway system to access the Project facilities and deliver construction materials and personnel. Traffic during construction is estimated to be approximately on average 50-100 pickup trucks, cars, and/or other types of employee vehicles onsite for the majority of construction. It is estimated that approximately 10-20 semi-trucks per day will be used for delivery of facility components. Semi-truck delivery will vary per day depending on time of construction and delivery timeline of equipment. Overweight or oversized loads are unlikely. If they are required, Regal will obtain the appropriate approvals prior to construction. For purposes of comparison, the functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day (AADT). Since 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.

After construction is complete, traffic impacts during the operations phase of the Project will be negligible. 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.

The Project has been designed to avoid impacts to the Burlington Northern railroad. The closest Project facility to the railroad is the perimeter agricultural fence, which, at its closest is 95 feet to the railroad centerline and 55 feet to the railroad right-of-way. The closest distance of the solar racks and panels to the railroad centerline is 120 feet. Additionally, as discussed in Section 3.1.3, Regal included an access road around the perimeter of the Project to provide an additional buffer

from the railroad and any potential sparks that could ignite adjacent vegetation. This additional buffer serves as a safety measure to keep fire out of the solar facility. The access road around the entire perimeter is also necessary to provide effective and efficient access for operations and maintenance and safe ingress and egress for employees, visitors and emergency responders.

Regal filed FAA 7460-1 Notice of Proposed Construction forms for the perimeter of the Land Control Area. On October 12, 2018, the FAA provided Determinations of No Hazard to air navigation for each of the seven points around the Land Control Area. As such, Project facilities will not exceed obstruction standards and would not be a hazard to air navigation. No mitigation measures are necessary or proposed for air traffic.

4.3 Land-Based Economies

4.3.1 Agriculture

According to the U.S. Department of Agriculture's (USDA's) 2012 Census of Agriculture, of the 261,120 acres that comprise Benton County, approximately 188,735 acres (72 percent) are farmland. A total of 958 individual farms are located in Benton County, with the average farm size at 197 acres. The top crops (in acres) include corn, soybeans, foraging crops (hay and haylage, grass silage, and greenchop), wheat (predominantly spring wheat for grain), oats, barley, and other vegetables harvested for sale. Cattle tops the list of livestock inventory in Benton County, followed by poultry (layers), hogs and pigs, and sheep and lambs (USDA, 2012).

The market value of agricultural production in Benton County in 2012 was approximately $167 million. Livestock, poultry, and their products accounted for approximately 55.9 percent of the total value of agricultural production, while crop sales accounted for the remaining 44.1 percent (USDA, 2012).

As discussed further in Section 4.5.3, no prime farmland is present within the Land Control Area.

4.3.1.1 Impacts and Mitigation

The Project will impact up to 702.6 acres of agricultural land within the Preliminary Development Area and will not result in a significant impact to land-based economies in the Project vicinity, as this acreage constitutes less than one half of one percent of the agricultural land in Benton County (188,735 acres). Agricultural production would continue in the surrounding areas during construction and operation of the Project. The revenue lost from removing land from agricultural production will be offset by the purchase option with the landowner. Areas disturbed during construction will also be repaired and restored to pre-construction contours and characteristics to the extent practicable. This restoration will allow the Project's land surfaces to drain properly, blend with the natural terrain, re-vegetate, and avoid erosion.

Center-pivot irrigation systems are present within the Preliminary Development Area. These wells will then be marked with flagging and a five-foot buffer around them fenced so as to avoid impacts to these structures. If Regal identifies a need for wells during operations, these wells may be uncapped or new wells will be installed.

Based on discussions with Project landowners, Regal Solar does not believe drain tile is present in the Land Control Area. However, Regal Solar will gather additional information about the existence of drain tile from landowners and other data sources, possibly including, but not limited to, infrared aerial photographs. In the event that damage occurs to drain tile or private ditches as a result of construction activities or operation of the Project, Regal Solar will repair any damages.

No areas used for animal husbandry are located within the Land Control Area; therefore, no impacts to livestock are anticipated.

4.3.2 Forestry

There are no forestry operations in the Land Control Area; therefore, no forestry resources will be affected by the Project. Additionally, Regal has designed the Project to avoid any tree clearing. This includes wooded areas classified by Benton County as pine plantations and windbreaks and areas along roads that run within or along the boundary of the Land Control Area.

4.3.2.1 Impacts and Mitigation

As none of the trees in the Land Control Area are considered forestry resources, and all trees will be allowed to remain, 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 local community festivals and other events.

Two Rivers Campground is just south of the Land Control Area on the south side of 145th Street NW (Tworiverscampground.net, 2017). The campground is privately owned, seasonally operated, and provides 221 campsites, a large campground lodge, pool area, mini golf, and shuttle access and innertube rentals for tubing on the Platte River.

According to their website, the Town of Royalton hosts a few annual events and festivals including Platte River Day, Alzheimer's Ride for the Mind, Rough Fish Contest, and Christmas on the Platte (royaltonmn.com, 2011). With the exception of Christmas on the Platte, which is held the first Saturday of December, these events are held during the summer months.

Review of the City of Rice's website did not identify any annual festivals hosted by the city beyond the Rice City Wide Garage Sale (Cityofrice.com, 2019). In 2019, the city-wide garage sale will be held between May 30th and June 2nd.

4.3.3.1 Impacts and Mitigation

Regal Solar will construct the Project facilities within the limits of the Land Control Area and no road closures are anticipated to be necessary during active construction. The annual events hosted by the Town of Royalton and the City of Rice do not occur within the Land Control Area; most of these events are held within city limits or in areas outside of the Land Control Area. No impacts to public access to these events is anticipated during construction or operation of the Project.

Impacts to the Two Rivers Campground are discussed in Section 4.2.7.1 (Recreation); no additional impacts to tourism are anticipated and therefore no additional mitigative measures are proposed.

4.3.4 Mining

Based on MNDOTs Aggregate Source Information System and County Pit Map for Benton County, there are no gravel pits in the Land Control Area (MNDOT, 2018; MNDOT, 2002). On the Benton County Pit Map, three gravel pits are shown between 0.7- and 0.9-mile northwest of the Land Control Area, near the Platte River.

4.3.4.1 Impacts and Mitigation

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

4.4 Archaeological and Historical Resources

Area M Consulting (Area M) conducted a Phase I cultural resources investigation of the Land Control Area. A copy of the Phase I inventory report is provided in Appendix D.

The Phase I inventory included a review of documentation on file at the Minnesota State Historic Preservation Office (SHPO), as well as various historical maps (i.e., Century Public Land Survey maps, Andreas maps, General Land Office maps, Trygg maps, and historic aerial photographs), to identify archaeological or historic sites, historic architectural resources, and previous cultural resource inventories within one-half mile of the Land Control Area. Area M also reviewed the online database of archaeological data managed by the Office of the State Archaeologist and conducted extensive review of LiDAR imagery as part of the Phase I inventory. No previously recorded archaeological or historic sites, historic architectural resources, or previous cultural resources inventories were noted within one-half mile of the Project.

Area M conducted a Phase I field inventory of the entire 802-acre Land Control Area in June 2018. The Phase I field inventory included systematic pedestrian survey along transects spaced 3 meters apart and subsurface shovel testing along transects placed 15 meters apart. Ground visibility at the time of survey ranged from 50 to 100 percent; no cultural resources were identified as a result of survey.

Area M submitted the Phase I inventory report for the Project to the Minnesota SHPO in March 2019. In a letter dated April 18, 2019, the Minnesota SHPO concurred with Area M's recommendations that the Project would not affect historic properties listed in or eligible for listing in the National Register of Historic Places (NRHP). A copy of the Minnesota SHPO's letter is provided in Appendix A.

4.4.1 Impacts and Mitigation

No archaeological or historic sites, or historic architectural resources were identified during Phase I inventory of the Land Control Area; therefore, the construction and operation of the Project will not impact historic properties listed in, eligible for, or potentially eligible for listing in the NRHP.

Before construction of the Project begins, Regal will prepare an Unanticipated Discoveries Plan that will outline the steps to be taken if previously unrecorded cultural resources or human remains are encountered during construction.

4.5 Natural Environment

4.5.1 Air

Section 109(b) of the Clean Air Act (CAA) requires that the U.S. Environmental Protection Agency (EPA) establish National Ambient Air Quality Standards (NAAQS) "requisite to protect" public health and welfare (40 Code of Federal Regulations Part 50). The CAA identifies two classes of NAAQS: primary standards, which are limits set to protect the public health of the most sensitive populations, such as asthmatics, children and the elderly; and secondary standards which are limits set to protect public welfare, such as protection against visibility impairment or damage to vegetation, wildlife and structures. The EPA has promulgated NAAQS for six criteria pollutants: ozone (O_3), particulate matter ($PM_{10}/PM_{2.5}$), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), and lead (Pb). Minnesota has been in compliance with the primary and secondary NAAQS for all criteria pollutants since 2002 (MPCA, 2019a).

In Minnesota, air quality is tracked using air quality monitoring stations across the State. The MPCA uses data from these monitors to calculate the Air Quality Index (AQI), on an hourly basis, for O_3, $PM_{2.5}$, SO_2, NO_2, and CO. The pollutant with the highest AQI value for a particular hour sets the overall AQI for that hour. The AQI is used to categorize the air quality of a region as one of five levels of quality: good, moderate, unhealthy for sensitive groups (USG), unhealthy, or very unhealthy (MPCA, 2019b).

The Project is located nearest to the air quality monitor in St. Cloud, Minnesota. This station monitors for O_3 and $PM_{2.5}$. The AQI for St. Cloud for the past five years is provided in Table 4.5-1 (MPCA, 2019c).

Table 4.5-1
Days in Each Air Quality Index Category (St. Cloud, Minnesota)

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
2017	329	36	0	0	0
2016	338	28	0	0	0
2015	327	27	1	0	0
2014	318	40	0	0	0
2013	312	47	0	0	0

Source: MPCA, 2019c.

Air quality has been considered good for the majority of the past five reported years in St. Cloud. Since 2013, the largest number of days classified as moderate or USG occurred in 2015. No days have been classified as unhealthy or very unhealthy.

4.5.1.1 Impacts and Mitigation

Soils at the Regal Solar Project are susceptible to wind erosion, creating dust. The AIMP (Appendix C) outlines several BMPs related to dust control, particularly with the sandy soils, including mulching exposed soils, wetting exposed soils, maintaining vegetative cover (both cover crops and permanent vegetation), and reduced speed limits. Emissions from construction vehicles will be minimized by keeping construction equipment in good working order. Overall, dust emissions currently experienced annually in the area through farming activities will be reduced for the life of the Project through the establishment of perennial vegetative cover.

4.5.2 Geology and Groundwater Resources

The major landform in the Anoka Sandplain ecological subsection is a broad sandy lake plain, which contains small dunes, kettle lakes, and tunnel valleys. Topography is level to gently rolling and there are small inclusions of ground moraine and end moraine. The other important land form is a series of sandy terraces associated with historic levels of the Mississippi River (MNDNR, undated).

Minnesota is divided into six groundwater provinces based on bedrock and glacial geology. The aquifers within these provinces occur in two general geologic settings: bedrock, and unconsolidated sediments deposited by glaciers, streams, and lakes. The Regal Solar Project is within the Central Province, which is characterized by sand aquifers in generally thick sandy and clayey glacial drift overlying Precambrian and Cretaceous bedrock. In this province, groundwater is typically derived from surficial sand and gravel aquifers versus fractured bedrock (MNDNR, 2001).

Regal reviewed the Land Control Area for EPA designated sole source aquifers (SSA), wells listed on the Minnesota County Well Index (CWI), and Minnesota Department of Health (MDH) Wellhead Protection Areas (WHPAs).

The EPA defines a SSA or principal source aquifer area as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer, where contamination of the aquifer could create a significant hazard to public health, and where there are no alternative water sources that could reasonably be expected to replace the water supplied by the aquifer (EPA, 2016). There are currently no EPA-designated SSAs in the Project vicinity (EPA, 2017).

The CWI is the most complete record of well construction and location in Minnesota and is kept up-to-date and maintained by the Minnesota Geological Survey, in cooperation with the MDH. A search of the CWI (MDH, 2019a) identified seven active wells used for irrigation within the Land Control Area (Figure 9 – Existing Infrastructure and AADT).

Under the Safe Drinking Water Act (SDWA), each state is required to develop and implement a Wellhead Protection Program to identify the land and recharge areas contributing to public supply wells and prevent the contamination of drinking water supplies. The SDWA was updated in 1986 with an amendment requiring the development of a broader-based Source Water Assessment Program, which includes the assessment of potential contamination to both groundwater and surface water through a watershed approach. A WHPA encompasses the area around a drinking water well where contaminants could enter and pollute the well.

Public and non-public community water supply source-water protection in Minnesota is administered by the MDH through the Wellhead Protection program. WHPAs for public and community water-supply wells are delineated based on a zone of capture for 10-year groundwater time-of-travel to the well and are available through a database and mapping layer maintained by MDH (2019b). A search for WHPAs in the MDH database indicated there are none in the Land Control Area; the nearest WHPA is located in the town of Rice, approximately 1.1 miles southeast of the Regal Project.

4.5.2.1 Impacts and Mitigation

Impacts of the proposed Project to available geologic resources are likely to be limited. Due to the thickness of surficial materials (approximately 151-250 feet [Setterholm, 2010]), excavation or blasting of bedrock is extremely unlikely.

Impacts to geologic resources are not anticipated and mitigation is not expected to be necessary. Project facilities are not likely to affect the use of existing water wells because the facilities will not be sited within 319 feet of occupied residences. Any dewatering required during construction will be discharged to the surrounding surface, thereby allowing it to infiltrate back into the ground to minimize potential impacts. If dewatering is necessary, Regal will obtain a Water Appropriation Permit from MNDNR.

Impacts to groundwater resources, including aquifers, are not anticipated as water supply needs will be quite limited. It is probable that operations and maintenance water requirements will be satisfied with a single domestic-sized water well. Based on the small amount of increased impervious surface area that will be created by Project components (access roads, inverter skids, and Project substation/O&M building - 26.3 acres for the below-ground configuration and 26.4 acres for the above-ground configuration [see Table 3.3-1 in Section 3.3]), the Project will likely have minimal impacts on regional groundwater recharge. The foundations of the tracking rack system will likely be a driven steel pier and will likely not require concrete, although some concrete foundations may be required. Geotechnical soil testing will determine final installation process. Similarly, the exterior agricultural fence may require concrete foundations in some locations. If concrete is needed, it will be locally sourced; an on-site concrete batch plant will not be required for the Project.

In addition, Project facilities (i.e., the Preliminary Development Area) are located at least 319 feet from the nearest occupied residence, thereby minimizing the risk of impacts on private wells in the area. Per the purchase option agreement with the landowner, the landowner will be required to remove irrigation equipment and cap existing wells prior to construction.

A National Pollutant Discharge Elimination System (NPDES) permit application to discharge stormwater from construction facilities will be acquired by Regal 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 SWPPP will be developed for the Project prior to construction that will include BMPs such as silt fencing (or other erosion control devices such as fiber logs or erosion control blankets), revegetation plans, and management of exposed soils to

prevent erosion. Because the Project will disturb more than 50 acres, Regal will submit the SWPPP to MPCA for review and approval prior to construction and obtaining coverage under the General Construction Stormwater Permit.

4.5.3 Soils and Prime Farmland

Soil characteristics within the study area were assessed using the Soil Survey Geographic database (SSURGO) (Soil Survey Staff, 2019). The SSURGO database is a digital version of the original county soil surveys developed by NRCS for use with GIS. It provides the most detailed level of soils information for natural resource planning and management. Soil maps are linked in the SSURGO database to information about the component soils and their properties (USDA, NRCS, 2019). Table 4.5-2 lists the soil types located within the Regal Land Control Area.

Less than one percent of the Land Control Area is underlain by hydric soils or soils containing hydric inclusions, indicating few, if any, wetlands as one of many wetland characteristics is hydric soil (see Section 4.5.5). All of the soils in the Land Control Area (with the exception of areas mapped as "Water") have low to moderate susceptibility to erosion by water (i.e., K-factors from 0.1 to 0.4). All of soils in the Land Control Area are in Wind Erodibility Group 2 or 3 which correspond to Wind Erodibility Indices of 134 tons/acre/year and 86 tons/acre/year, respectively (USDA NRCS, 2019).

Soils prone to compaction and rutting are subject to dramatic and adverse changes in soil porosity and structure as a result of mechanical deformation caused loading by equipment during construction. Compaction and rutting are related to moisture content and texture and are worse when medium and fine textured soils are subject to heavy equipment traffic when wet. Compaction and rutting are not anticipated to be significant issues because the soils are coarse textured and are typically excessively drained. None of the soils are particularly susceptible to compaction.

Table 4.5-2 Summary of Soils within the Regal Land Control Area

Map Unit Symbol	Soil Name	Acres	Percent of Study Area	Farmland Designation	Compaction Prone	Hydric Soil	K-Factor	Wind Erodibility Group
D20A	Isan-Isan, frequently ponded, complex, 0 to 2 percent slopes	3.7	0.5%	Not prime farmland	0.0	Yes	.20	3
D67A	Hubbard loamy sand, 0 to 2 percent slopes	462.3	57.6%	Not prime farmland	0.0	No	.02	2
D67B	Hubbard loamy sand, 1 to 6 percent slopes	308.4	38.4%	Not prime farmland	0.0	No	.02	2
D67C	Hubbard loamy sand, 2 to 12 percent slopes	26.4	3.3%	Not prime farmland	0.0	No	.02	2
D8E	Sandberg loamy coarse sand, 6 to 30 percent slopes	1.6	0.2%	Not prime farmland	0.0	No	.15	2
		802.4	**100%**		**0.0**			

Source: Soil Survey Staff, Natural Resources Conservation Service (NRCS), U.S. Department of Agriculture (USDA), 2019.

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pasture, woodland, or other lands). Urbanized land and open water cannot be designated as prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods and is not subject to frequent or prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., by draining or irrigating) (USDA NRCS, 2019).

The NRCS also recognizes farmlands of statewide importance, which are defined as lands other than prime farmland that are used for production of specific high-value food and fiber crops (e.g., citrus, tree nuts, olives, fruits, and vegetables). Farmlands of statewide importance have the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality or high yields of specific crops when treated and managed according to acceptable farming methods. Farmland of statewide importance is similar to prime farmland but with minor shortcomings such as greater slopes or less ability to store soil moisture. The methods for defining and listing farmland of statewide importance are determined by the appropriate State agencies, typically in association with local soil conservation districts or other local agencies.

Table 4.5-3 lists the soils considered prime farmland and soils of statewide or local importance within the Land Control Area. Figure 10 (Farmland Classifications) depicts the distribution of prime farmland, prime farmland if drained, and not prime farmland in the Project vicinity.

Table 4.5-3 Farmland Classifications within the Land Control Area

Farmland Classification	Area (acres)	Percent of Land Control Area
Prime Farmland	0.0	0%
Prime Farmland if Drained	0.0	0%
Farmland of Statewide Importance	0.0	0%
Not Prime Farmland	802.4	100%
TOTAL	**802.4**	**100%**

Source: Soil Survey Staff, NRCS, USDA, 2019. Web Soil Survey.

4.5.3.1 Impacts and Mitigation

Impacts and mitigation for soils are described at a high level below. A more detailed discussion is provided in the AIMP (Appendix C).

The sandy soils that will be impacted by the Project are typically excessively-drained and suited for the existing agricultural production. The Project is located on level to nearly-level topography, which is consistent with the current agricultural production.

As shown in Table 4.5-3, none of the soils impacted by the Project are classified as prime farmland soils, or prime farmland if drained; however, it is important to note that the prime farmland designation is independent of current land use (USDA NRCS, 2019).

Impacts to soils will occur during the construction and decommissioning stages of the Project. Construction may require some amount of grading to provide a level surface for the solar arrays. Because the Project location is on relatively level existing agricultural fields, the Project will minimize grading to the extent practicable (preliminary estimates are 230 acres). Additional soil 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 inverter skids, the Project Substation, and O&M structures. Based on the electrical configuration, impacts to soils will differ. Should the below-ground collection configuration be used, installation of electrical cables will require trenching all of the cables to a depth of four feet below grade for installation. If the hybrid below-ground and above-ground collection system is used, soil impacts due to trenching will be limited to the areas between the rows of panels to the inverter / transformer skids and then to the Project Substation. Conversely, should the above-ground configuration be used, soil impacts due to the below-ground installation of the electrical cables will be limited to the areas between the rows of panels and the inverter / transformer skid and then to the wooden poles and to the direct imbedding of approximately 198 18-inch diameter wooden poles. From a soils perspective, the above-ground collection configuration would have least amount of soil impacts because only a small portion of the DC and AC collection would be trenched into the ground (see Image 7 in Section 3.1.2.2). The hybrid below-ground and above-ground collection system will have the more soil impacts than the above-ground system, but less than the below-ground system. Details about construction and operation activities for the Project are provided in Sections 3.4 and 3.5, respectively.

Areas of the site to be graded will have topsoil and organic matter stripped and segregated from the subsoil. Topsoil shall have temporary and permanent stabilization measures established in accordance with the Project's SWPPP. Internal roads will be constructed of inorganic fill (road aggregate base) to match the surrounding existing ground elevations to allow existing drainage patterns to persist. Once the necessary grading is complete, subsoil will be placed followed by topsoil, blending the grade into existing topography

Following construction, Regal will restore disturbed areas to pre-construction conditions to the extent practicable. Soil erosion will be minimized by implementing environmental protection measures. These measures will include BMPs for erosion and sediment control, such as temporary seeding, permanent seeding, mulching, filter strips, erosion blankets, and sod stabilization. The soils at the Regal Solar Project are not susceptible to compaction (Table 4.5-2).

Additionally, recent research on the environmental impacts of solar farms indicates that there could be some net benefits to soil resources over the lifecycle of the Project. Writing in Cleantechnica, one of the world's top cleantech-focused news sites, engineer Jeff Briberg highlights the utility and specific benefits of using native plants on solar sites (Briberg, 2016 and Selbig and Balster, 2010).

> *"[Compared to row crops,] storm water runoff is reduced 23 percent for the 2-year storm (2.9 inches of rain) and 8 percent for the 100-year storm.*
>
> *Further, we expect a mix of prairie plants to provide superior hydrologic performance compared to monocrop turf-grasses that are common on solar sites in some areas of the country. In 2008, the U.S. Geological Survey completed a five-year storm water study in*

cooperation with a consortium of 19 cities and towns in the area of Madison, Wisconsin that revealed "striking differences between turf and prairie vegetation.

The study found "prairie vegetation had greater median infiltration rates than those with turf grass," and roots in the prairie vegetation plot were "found to a depth of 4.7 feet compared with 0.46 feet in the turf."

In addition to superior stormwater management, native plants improve the soil with organic matter over the 20 to 30-year life the Project, allowing microorganisms and soil fauna to recover after years of intensive compaction, pesticide and fertilizer application. And, over time, native plants out-compete weeds allowing ground cover to be maintained with just a single annual mow, reducing operating costs."

With the proper implementation of environmental protection measures intended to prevent, minimize, and/or reclaim soil erosion effects, no unmitigated loss of soil will result from the Project. Additionally, taking 674.3 acres for the below-ground (and hybrid) configuration and 678.2 acres for the above-ground configuration of agricultural land out of production will give the soils an opportunity to rest and regenerate. Agricultural land within the fenced area of the solar facility will be converted to open, herbaceous (i.e., grassland) cover with the exception of the substation and O&M building, inverters, and access roads which will be converted to developed land and impervious surfaces (24.3 acres and 24.4 acres for the below- (and hybrid) and above-ground configurations, respectively). Seed mixes are discussed in more detail in Section 4.5.6.

4.5.4 Surface Waters and Floodplains

The Regal Solar Project is located in the Mississippi River-Sartell Watershed Basin. Surface waters in the Project vicinity include the Mississippi and Platte Rivers. The Mississippi River is listed by MPCA as an impaired water. There are no lakes or rivers in the Land Control Area; as such, there are no MNDNR Public Waters Inventory watercourses or waterbodies in the Land Control Area. Surface waters in the Land Control Area are limited to wetlands, which are valuable for surface and subsurface water storage, nutrient cycling, retention of sedimentation, and plant and animal habitats. Wetlands are described further in Section 4.5.5.

The Regal Solar Project is in an area mapped by the Federal Emergency Management Agency (FEMA) as Flood Zone X, an area of minimal flood hazard.

4.5.4.1 Impacts and Mitigation

Because the Project is within one mile of an impaired water, Regal will submit the SWPPP to MPCA for review and approval prior to construction and obtaining coverage under the General Construction Stormwater Permit. The Project will not impact any FEMA-mapped floodplains.

4.5.5 Wetlands

The potential for wetlands within the Land Control Area was identified by reviewing desktop resources (i.e., National Wetlands Inventory (NWI) data, aerial photography, hydric soils map unites, LiDAR, and digital elevation models) followed by a formal wetland delineation within the Land Control Area in June 2018 (see Appendix E). At the time of the delineation, two palustrine

emergent wetlands (PEM) were identified at least partially within the Land Control Area. Additionally, Regal confirmed absence of an NWI-mapped north-south drainage through most of the Land Control Area. The Project boundary was revised post-delineation to avoid the wetland in the northwest portion of the Land Control Area (Wetland 1). Wetland 2 is located in the southeast portion of the Land Control Area, with the majority of the wetland located outside of the Land Control Area boundary. Two additional farmed PEM wetlands were identified within the Land Control Area during a field review of the Project by the Benton County Technical Evaluation Panel (TEP) on April 23, 2019 (see Figure 11 – Water Resources and Appendix E).

4.5.5.1 Impacts and Mitigation

The Project has been designed to avoid permanent fill to wetlands. The two farmed PEM wetlands identified by the Benton County TEP will be temporarily impacted by construction activities. Neither of the wetlands will be impacted by "permanent" facilities (i.e., those requiring permanent fill such as access roads, inverters, substation/O&M). Rather, they are both located in areas that will have racking and associated pilings. Driven pilings are not considered fill or impact that would require a wetland permit. Regal will permit temporary impacts associated with construction access and trenching within the wetlands under U.S. Army Corps of Engineers (USACE) Nationwide Permit (NWP) 51 – Land-Based Renewable Energy Generation Facilities and by the Local Government Unit (LGU) for the Minnesota Wetland Conservation Act (WCA). Regal will coordinate with both the USACE and LGU prior to construction for temporary wetland impacts. Additionally, these wetlands will be restored with a wet seed mix (Appendix C). Impacts to these two seasonal depressions that are farmed during years of normal precipitation are not expected to affect surface water drainage or off-site wetlands.

4.5.6 Vegetation

The Regal Solar Project is in the Anoka Sand Plain Subsection of the Eastern Broadleaf Forest Province (MNDNR, 2019a). The Anoka Sand Plain Subsection consists of flat, sandy lake plain and terraces along the Mississippi River. Pre-settlement vegetation consisted of oak barrens and openings. Table 4.2-6 in Section 4.2.8.1 provides the total acres of each land use type within the Preliminary Development Area. Based on the GAP landcover data, the Project would affect predominately agricultural land (98.8 percent for below-ground [and hybrid] and 98.7 percent for above-ground configurations). Developed, forest, shrubland, and introduced & semi natural vegetation within the Preliminary Development Area total 1.2 percent and 1.3 percent, respectively, for the below- (and hybrid) and above-ground configurations. Forested land within the Land Control Area consists of isolated rows of relatively young trees that were planted for use as shelter belts or wind breaks along the edges of agricultural fields and roads. In addition, based on the wetland delineation discussed in Section 4.5.5, there are three wetlands located within the Land Control Area. A discussion of wetland impacts is provided in Section 4.5.5.1.

4.5.6.1 Impacts and Mitigation

As discussed in Section 4.2.8.3, agricultural land will be converted from an agricultural use to solar energy use for the life of the Project, but most will be preserved, and the soils given the opportunity to rest and regenerate (674.3 acres for the below-ground and hybrid configurations and 678.2 acres for the above-ground configuration). Agricultural land within the Preliminary

Development Area will be converted to open, herbaceous (i.e., within the racking area) cover with the exception of the substation and O&M building, inverter skids, and access roads which will be converted to developed land and impervious surfaces (24.3 acres for the below-ground and hybrid configurations and 24.4 acres for the above-ground configuration). As noted in Sections 3.1.3 and 4.2.1, Regal has included an access road around the perimeter of the Project to provide an additional buffer from the railroad and any sparks that may ignite a grass fire.

Additionally, Regal has designed the Project to avoid any tree clearing. This includes wooded areas classified by Benton County as pine plantations and windbreaks and areas along roads that run within or along the boundary of the Land Control Area.

Typically, a solar site has a shorter prairie mix within the panel footprint, taller prairie plantings in the open space between the agricultural fence and array, and a wet seed mix for any wetlands or areas anticipated to hold water. The mixes are designed to be native and are developed with prairie specialists in coordination with the MNDNR to design a mix that will achieve Regal's goals for operating the solar facility, promote pollinator habitat, establish stable ground cover successfully, reduce erosion, reduce runoff, and improve infiltration. Regal's Vegetation Management Plan, including the three seed mixes, is included in Appendix C.

4.5.7 Wildlife

4.5.7.1 Avian Species

The Regal Solar Project is within the Mississippi Flyway, one of the primary north-south migration routes between migratory bird nesting and wintering habitat (Audubon, undated). The Land Control Area is also located within the Prairie Hardwood Transition Bird Conservation Region (BCR) (U.S. Fish and Wildlife Service [USFWS] 2008). The U.S. Fish and Wildlife Service (USFWS) identified 30 species of birds within Prairie Hardwood Transition BCR as Birds of Conservation Concern (BCC); BCC are avian species that represent the agency's highest conservation priorities. The BCC in the Prairie Hardwood Transition BCR include the bald eagle (*Haliaeetus leucocephalus*), upland sandpiper (*Bartramia longicauda*), red-headed woodpecker (*Melanerpes erythrocephalus*), brown thrasher (*Toxostoma rufum*), black-billed cuckoo (*Coccyzus erythropthalmus*), and dickcissel (*Spiza americana*) (USFWS, 2008).

Migratory birds are federally protected under the Migratory Bird Treaty Act (MBTA), and bald eagles are protected under the MBTA and Bald and Golden Eagle Protection Act (BGEPA) (USFWS, 2007; USFWS, 2018a). The MBTA protects migratory birds and most resident birds that are native to the U.S. from impacts and take. BGEPA protects and conserves bald eagles and golden eagles (*Aquila chrysaetos*) from intentional take of an individual bird, chick, egg, or nest, including alternate and inactive nests (USFWS, 2007). Unlike the MBTA, BGEPA prohibits disturbance that may lead to biologically significant impacts, such as interference with feeding, sheltering, roosting, and breeding or abandonment of a nest (USFWS, 2007).

Land uses in the Land Control Area are primarily agricultural (95.8 percent), with some small amounts of developed areas (2.6 percent), forested land (1.5 percent), shrub (0.1 percent), and open water (<0.1 percent). The forested land that is present is generally limited to shelter belts along roads. As a result, few migratory bird species that use trees or forested areas as habitat will be

present, such as bald eagle, black-billed cuckoo, and red-headed woodpecker. The Land Control Area also has little open water and two farmed wetlands; thus, few wetland- or water-dependent birds such as waterfowl and waterbirds would use the Land Control Area for nesting, although some species may forage in the agricultural fields currently present in the Land Control Area. Species of migratory birds associated with grasslands would also be limited or absent. Overall, few if any BCC are likely to use the Land Control Area as habitat.

The USFWS is also concerned about avian species that are at risk from habitat fragmentation. Species of habitat fragmentation concern are impacted when larger areas of habitat are divided into smaller areas with concomitant reductions in habitat connectivity (USFWS, 2012). At present, the Land Control Area is highly fragmented given 98.4 percent is used for agriculture or is developed. If species of habitat fragmentation concern are present in the Land Control Area, they have adapted to the fragmentation and current land uses.

4.5.7.2 Other Wildlife Species

In addition to birds, other groups of wildlife that may occur in the Land Control Area include mammals, reptiles, amphibians, and insects. Mammals that may be present include white-tailed deer (*Odocoileus virginianus*), striped skunk (*Mephitis mephitis*), red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), and coyote (*Canis latrans*). Reptiles and amphibians that may occur in the Land Control Area are northern leopard frog (*Lithobates pipiens*), gopher snake (*Pituophis catenifer*), plains gartersnake (*Thamnophis radix*), eastern hognose snake (*Heterodon platirhinos*), and common gartersnake (*Thamnophis sirtalis*) (MNDNR, 2019b). Given the small open water amount (<0.1 acre) in the Land Control Area, no fish species are present. Some pollinator insects may be present in the Land Control Area including native bees, butterflies, and moths.

Based on the Land Control Area's proximity to the Mississippi River, wildlife species that live in or near the river or use the river as a corridor may occasionally move through or forage in the Land Control Area. These species may include river otter (*Lontra canadensis*), North American beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), Canada geese (*Branta canadensis*), and other waterfowl; however, overall use by these species is anticipated to be low.

4.5.7.3 Impacts and Mitigation

Given that the Project is comprised primarily of agricultural lands, occurrence of wildlife within the Project is likely low. As a result, impacts on wildlife are expected to be minor, regardless which electrical configuration is implemented. Restoration of the Preliminary Development Area may result in wildlife benefits because will be revegetated with a seed mix that may promote pollinators. Common species of wildlife adapted to agricultural land use may be present in the Project such as white-tailed deer, red fox, striped skunk, wild turkey (*Meleagris gallopavo*), ring-necked pheasant (*Phasianus colchicus*), sandhill crane (*Grus canadensis*), passerines, rodents, snakes, and insects. During construction, highly mobile species of wildlife including deer, birds, and snakes are expected to divert to areas surrounding the Project. Less mobile species and ground nests of birds, eggs, and chicks may be impacted; however, given that the Land Control Area is cropland, these impacts may have occurred regardless of the Project. Overall, construction of the Project is expected to have minimal impacts on individuals of common wildlife species, and no impact on populations of these species. During operations, any potential impacts on wildlife are

also expected to be minimal and insignificant. These impacts may be related to vehicle traffic and parking or mowing. Although some individuals of common wildlife species may be impacted, no impacts would occur at the population-level, and no species-specific mitigation is proposed.

After construction and during operations, the Project may provide more wildlife habitat than the current land use provides. Regal will restore with a pollinator-friendly seed mix that may provide habitat for wildlife, including grassland birds, rodents, reptiles, and insects. In sum, although 26.3 acres for the below-ground and hybrid configurations or 26.4 acres for the above-ground configuration within the Project would have permanent facilities (i.e., access roads, Project substation and O&M building, and inverter skids) and would not serve as wildlife habitat during operations, 680.8 acres for the below-ground and hybrid configurations or 685.0 acres for the above-ground configuration would be restored as herbaceous cover, including a seed mix with some native plants, thereby potentially benefitting and increasing the overall populations of wildlife species in the area, including birds, small mammals such a moles and voles, reptiles, and pollinator insects.

4.5.8 Rare and Unique Natural Resources

Regal reviewed the USFWS Information for Planning and Conservation (IPaC) website for the federal endangered and threatened species, candidate species, and designated critical habitat that may occur in Benton County, Minnesota (USFWS, 2019). Regal also reviewed the MNDNR's Natural Heritage Information System (NHIS) for documented occurrences of federally listed species, state-listed species, and state species of concern within one mile of the Land Control Area (MNDNR, 2019c and Appendix A). Although these reviews do not represent a comprehensive survey, they provide information on the potential presence of protected species and habitat (refer to Table 4.5-4).

Table 4.5-4
Federal- and State-Listed Species Documented within One Mile of the Land Control Area

Common Name	Scientific Name	Habitat	Within One Mile of Land Control Area	Within Land Control Area	Status [a]	
					State [b]	Federal [c]
Mammals						
Northern long-eared bat [d]	*Myotis septentrionalis*	In winter, hibernates in caves and mines. In fall, swarms in forested areas surrounding hibernation sites. During late spring and summer, forages and roosts in upland forests (USFWS, 2018b)	No	No	SC	T
Birds						

Table 4.5-4
Federal- and State-Listed Species Documented within One Mile of the Land Control Area

Common Name	Scientific Name	Habitat	Within One Mile of Land Control Area	Within Land Control Area	Status [a]	
					State [b]	Federal [c]
Loggerhead Shrike	*Lanius ludovicianus*	Breeding habitat is upland prairies, agricultural fields, and grasslands with scattered shrubs and trees. In winter, migrates to southern U.S. and Mexico (Minnesota Breeding Bird Atlas [MNBBA], 2019a)	Yes	Yes	E	None
Lark Sparrow	*Chondestes grammacus*	Breeding habitat includes oak savannas, dry grasslands, and pastures with scattered shrubs and trees. In winter, occurs in Texas through Central America (MNBBA, 2019b)	Yes	No	SC	None
Freshwater Mussels						
Black Sandshell	*Ligumia recta*	Preferred habitat is medium to large rivers with sand or gravel substrates (MNDNR, 2019d).	Yes	No	SC	None

[a] E = Endangered, T = Threatened, SC = Special Concern
[b] MNDNR, 2019c
[c] USFWS, 2019
[d] Regal's review of the NHIS did not indicate any records of the northern long-eared bat within a mile of the Land Control Area or within the Land Control Area; however, review of the USFWS IPaC indicated that the species has the potential to occur in Benton County.
[e] Regal's review of the NHIS also showed four records of two other freshwater mussel species within one mile of the Land Control Area, but these species are not listed as state threatened, endangered, or special concern.

4.5.8.1 Federal Listed Species

According to Regal's review of the USFWS IPaC, the northern long-eared bat (NLEB) (*Myotis septentrionalis*) is the only species that is listed as threatened or endangered under the federal Endangered Species Act (ESA) that may occur in Benton County, Minnesota. There is no federally designated critical habitat in Benton County (USFWS, 2019).

The NLEB is listed as threatened under the federal ESA. It is medium-sized bat species that occurs across the eastern and central U.S. (Caceres and Barclay, 2000). The annual life history of the

NLEB includes an inactive period when the species is hibernating and an active period when the species forages, raises its young, and breeds. Hibernation generally occurs in caves and mines between November 1 and March 31 (USFWS, 2016a; USFWS, 2016b). In April, the species emerges from its hibernacula and moves to summer habitat. NLEB typically forage on flies, moths, beetles, caddisflies, and other insects in the understory of wooded areas (USFWS, 2016b). Adult females form breeding or maternity colonies that are variable in size, ranging from a few individuals to as many as 60 adults (Caceres and Barclay, 2000; Wisconsin Department of Natural Resources, 2015). During the summer, the species roosts in live and dead trees in cavities and crevices and under bark (Timpone et al., 2010). The NLEB forages primarily in forested areas (USFWS, 2016b). The NLEB is currently seeing a population decline due to a disease that affects hibernating bats called white-nose syndrome (WNS).

The Land Control Area is primarily agricultural lands with small amounts of forested areas and developed lands. During their active season (April 1 through October 31), NLEB may roost in the trees within the Land Control Area or may fly through the Land Control Area to forage in larger forested areas near the Mississippi and Platte Rivers.

4.5.8.2 State Listed Species

State-listed species with documented occurrences within one mile of the Land Control Area are shown in Table 4.5-4. Based on Regal's NHIS review, there is one record of a state-endangered loggerhead shrike that partially overlaps the Land Control Area. Two species of special concern were documented within one mile of the Land Control Area, lark sparrow and black sandshell.

Loggerhead shrike occur in grasslands, agricultural fields, and upland prairies with suitable perches for hunting for prey and scattered shrubs and trees for nesting. Farms with fence lines, shelterbelts, and hedgerows may be particularly suitable. Loggerhead shrike nest within narrow windbreaks and hedgerows or in isolated trees near grasslands, pastures, and agricultural fields. The diet of loggerhead shrike includes large insects and small mammals, birds, and reptiles; prey is often impaled on barbed wire or a thorny shrub prior to consumption (MNBBA, 2019a). Habitat for the loggerhead shrike is likely present within the Land Control Area, given the predominance of agriculture along with the isolated rows of trees along the edges of agricultural fields and roads.

The lark sparrow is an edge-dependent species of open-country habitats, including dry grasslands, oak savannahs, and pastures with scattered small trees and shrubs. The species is often present in small flocks even in the breeding season. It typically nests on the ground at the base of a small woody plant or forb or in small trees and shrubs. The lark sparrow is an omnivore that eats primarily arthropods and seeds (MNBBA, 2019b). Because habitats used by the lark sparrow are not present within the Land Control Area, no lark sparrows are expected to nest within the Land Control Area.

Black sandshell inhabit the riffle and run areas of medium to large rivers with sand or gravel substrates. Like other species of freshwater mussels, the black sandshell has a complex reproductive cycle. Fish hosts of the species' glochidial larvae include largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), white crappie (*Pomoxis annularis*), and sauger (*Stizostedion canadense*) (MNDNR, 2019d). No rivers are located in the Land Control Area, and thus, no black sandshell will be present.

4.5.8.3 MNDNR High Value Areas

The MNDNR issued guidance for commercial solar sites entitled Commercial Solar Siting Guidance (May 2016) (Solar Guidance) that recommends identification of high value resources during Project development. High value resources include (1) rare species and native plant communities (NPCs); (2) native prairie; (3) species and habitats included in the Wildlife Action Network and Minnesota Wildlife Action Plan; (4) lakes, wetlands, streams, and rivers; (5) large block habitats; (6) public conservation and recreation lands; and (7) properties in government programs or with conservation easements (MNDNR, 2016a).

Rare Species and Native Plant Communities

Rare species including federal- and state-listed species are discussed in Sections 4.5.8.1 and 4.5.8.2. This includes records of federal and state-listed species tracked by the MNDNR in the NHIS database. Additionally, the MNDNR has classified native plant communities (NPCs) within the state using plant species, soils, and other site-specific data from vegetation plots. The current NPC classification covers most of the wetland and terrestrial vegetation in the state and was completed in 2003. It is a six-level hierarchical classification that accounts for vegetation structure and geology, ecological processes, climate and paleohistory, local environmental conditions, canopy dominants, substrate, and environmental conditions (Aaseng et al., 2011). Based on a review of the MNDNR's data, there are no NPCs or mapped native prairie within the Land Control Area.

MNDNR's Minnesota Biological Survey (MBS) assesses Minnesota landscapes for NPCs, rare animals, rare plants, and animal communities through desktop review and follow-up field survey. Based on this assessment, MBS designates and assigns rankings to Sites of Biodiversity Significance (SOBS), based landscape context, NPC, and occurrence of rare species populations. The MBS groups and ranks SOBS for each Minnesota's system subsections for the purpose of designating and cataloguing the state's most notable examples of NPCs and rare species. There are four ranks for SOBS: outstanding, high, moderate, and below (MNDNR, 2009). Based on a review of the MNDNR's data, there are no SOBS within the Land Control Area.

Native Prairie

Native prairie is defined as a grassland that has not been plowed with plant species typical of prairies (MNDNR, 2016a). The MNDNR's railroad prairie rights-of-way are native prairie remnants that occur along railroad rights-of-way. The railroad rights-of-way program was instituted in 1997 by the Minnesota legislature in the Prairie Parkland and Eastern Broadleaf Forest ECS Provinces. The MNDNR ranks railroad rights-of-way into three categories: very good, good, and fair. There is no DNR-mapped native prairie in the Land Control Area. The Land Control Area is adjacent to a railroad prairie right-of-way that was ranked as fair in 1998; a ranking of fair means that the prairie remnant has greater than 25 percent native grass cover, greater than 5 percent native forb cover, and less than 50 percent woody cover.

Wildlife Action Network and Minnesota Wildlife Action Plan

The Wildlife Action Network is comprised of areas with high concentrations or persistent or viable populations of Species of Greatest Conservation Need (SGCN), in addition to SOBS, Lakes of

Biological Significance, and streams with exceptional indices of biological integrity. Minnesota's State Wildlife Action Plan (SWAP) (2015-2025) proactively addresses the state's conservation needs and catalyzes actions to prevent species from becoming listed under the state or federal ESAs. The SWAP also entailed revisions to the state's list of SGCN. SGCN are native animals with rare, declining, or vulnerable populations and species for which the state has a stewardship responsibility (MNDNR, 2016b).

The Land Control Area does not intersect any habitats within the Wildlife Action Network including SOBS, lakes of biological significance, or streams with exceptional indices of biological integrity. Based on Regal's review of the MNDNR's NHIS, no SGCN have been documented within the Land Control Area.

Lakes, Wetlands, Streams, and Rivers

Lakes, wetlands, streams, and rivers are discussed in sections 4.5.4 and 4.5.5. There are no lakes, streams or rivers in the Land Control Area; there are two farmed wetlands in the Land Control Area.

Large Block Habitats

Large block habitats are grassland habitats of greater than 40 acres (MNDNR, 2016b). The Land Control Area is over 95 percent agricultural land use and contains no large block habitats.

Public Conservation and Recreation Lands

Public conservation and recreation lands include state lands administered by the MNDNR or by counties; scientific and natural area units; publicly accessible state WMAs; state forest statutory boundaries and management units; state parks, recreation areas, and waysides; state trails of Minnesota; public water access sites in Minnesota; and state aquatic management area acquisitions (MNDNR, 2016a). There are no public conservation and recreation lands in the Land Control Area; public conservation and recreation lands in the Project vicinity are discussed in Section 4.2.7.

Properties in Government Programs or with Conservation Easements

Based on the MNDNR's Solar Guidance, properties in government programs or with conservation easements include MNDNR Native Prairie Bank, Reinvest in Minnesota, Forest Legacy easements, and USFWS conservation easements (MNDNR, 2016a). There are no properties in government programs or with conservation easements in the Land Control Area.

4.5.8.4 Impacts and Mitigation

Federal Listed Species

The USFWS published a final 4(d) rule for the NLEB on January 14, 2016. In the final 4(d) rule, the agency limited prohibitions for the species to those that would protect the bat in WNS-affected geographic areas during the most vulnerable stages in the species' life history—specifically, during hibernation, spring staging, fall swarming, and pup rearing (USFWS, 2016a). The Land Control Area is located within the USFWS-designated WNS Zone (USFWS, 2018c). Per the USFWS

Final 4(d) for the NLEB, within the WNS Zone, incidental take due to tree removal is prohibited as follows:

- If it occurs within 0.25 mile of a documented hibernaculum, or
- If it involves a documented maternity roost tree or other trees within 150 feet of the documented maternity roost tree during June or July.

In addition, all take within known hibernacula is prohibited (USFWS, 2016a).

Records of documented hibernacula and roost trees are maintained in the MNDNR's NHIS. Based on a review of NLEB NHIS records, Regal determined that there are no documented NLEB maternity roost trees within 150 feet of the Land Control Area or hibernacula within 0.25 mile of the Land Control Area. Although there are no records of NLEB, the species may still be present in the Land Control Area. Under Section 7(a)2 of the federal ESA, federal action agencies may rely upon the Programmatic Biological Opinion for the Final 4(d) Rule developed by USFWS on January 5, 2016 to meet its Section 7 consultation responsibilities for the NLEB (USFWS, 2016b). Under the Programmatic Biological Opinion, Project proponents may use a streamlined approach involving an online NLEB 4(d) rule determination key and consultation form. After submittal of the consultation form, the USFWS has 30 days to respond. If no response is received, the federal action agency can assume that the Project may affect but is not likely to cause prohibited take of individual NLEB, and consultation requirements for the species under Section 7(a)2 are complete. Regal will use the streamlined approach and Programmatic Biological Opinion for the Final 4(d) rule and will submit an online NLEB consultation form for the Regal Solar Project prior to construction.

Overall, Regal does not anticipate that the Project will impact NLEB during construction or operation. Construction of the Project will not require tree clearing; thus, Regal does not anticipate that any individuals would be injured or killed due to clearing of occupied trees during the species' active window (April 1 – October 31). NLEB may be temporarily disturbed during construction activities due to human presence or noise if they are roosting in the trees within the Land Control Area, but Regal anticipates that any impacts due to noise and human presence would be insignificant.

State Listed Species

Based on Regal's NHIS review, one state-endangered species, the loggerhead shrike, was documented within one mile of the Land Control Area; this species' record also intersects and is within the Land Control Area (refer to Table 4.5-4). Potential impacts on the loggerhead shrike would be related to tree clearing and disturbance from equipment or humans during construction. Tree-nesting birds such as the loggerhead shrike may be affected during tree clearing if nests with eggs or chicks are present in the trees that are cleared. No tree clearing is needed for construction and operation of the Regal Solar Project. Thus, no impacts on nests are anticipated. Loggerhead shrike in the area are acclimated to human activity and equipment because of the predominant agricultural land-use in the Land Control Area and surrounding areas. Regal will implement the BMPs for the loggerhead shrike recommended by the MNDNR in their October 11, 2018 letter on the Project. Specifically, Regal has designed the Project to avoid tree and shrub removal.

Additionally, Regal will also report any loggerhead shrike sightings to the MNDNR. Overall, impacts on loggerhead shrike due to the Project are expected to be insignificant.

Regal's review of MNDNR's NHIS records showed two records of state species of special concern within one mile of the Land Control Area, lark sparrow and black sandshell; there are no records of state species of special concern within the Land Control Area (refer to Table 4.5-4). The state's designation as a species of special concern for these two species does not afford protections under the Minnesota Endangered Species Statute (Minnesota Statutes, Section 84.0895). Regal does not expect any impacts on the lark sparrow due to Project construction or operations. Habitat used by the lark sparrow (i.e., dry grasslands, oak savannahs, and pastures with scattered small trees and shrubs) is not present in the Land Control Area, and thus, Regal does not expect that Project construction would impact any lark sparrow nests. After restoration and during operation, habitat more suitable for the lark sparrow may be present. However, lark sparrow are not expected to nest in the Land Control Area given the solar panels and associated facilities present and the abundance of more suitable habitat in the Project vicinity. Regal also does not anticipate impacts on the black sandshell because no suitable aquatic habitat is present in the Land Control Area.

MNDNR High Value Areas

Federal- and state-listed species are described above. There are two farmed wetlands in the Preliminary Development Area. There are no additional MNDNR High Value Areas in the Land Control Area, including NPCs; native prairie; SGCN species; large block habitats; lakes, streams, and rivers; public conservation and recreation lands; and properties in government programs or with conservation easements. As such, impacts to MNDNR High Value Areas will be minimal and no mitigative measures are proposed.

4.6 Unavoidable Impacts

Regal developed the Project to avoid impacts to environmental resources whenever possible. In some cases, impacts to environmental resources could not be entirely avoided, but could be minimized by implementation of mitigation measures. A detailed discussion of the environmental impacts of the proposed Project, as well as the mitigation measures that would be used to minimize impacts is presented in Sections 4.1 through 4.5 of the Site Permit Application. Environmental impacts that would be minimized by the use of mitigation measures, but not entirely avoided are provided below. Most of these unavoidable impacts would occur during construction of the Project and would resolve with the completion of construction.

Unavoidable impacts related to the Project that would last only as long as the construction period include:

- noise emitted from vehicles and equipment during construction that will be audible to neighboring landowners, including the Two Rivers Campground;
- increased traffic on roads that bisect the Land Control Area;
- minor air quality impacts due to fugitive dust;
- potential for soil erosion; and
- disturbance to and displacement of some species of wildlife.

Unavoidable impacts related to the Project that would last as long as the life of the Project would include:

- changes to existing aesthetics of landscape (from agrarian to solar facility), which will be visible from local roadways, parcels, a snowmobile trail, and Two Rivers Campground;
- a snowmobile trail will be rerouted around the solar facility; and
- changes in land use and vegetation from agricultural land of predominately corn with above-ground irrigators to a solar facility with herbaceous vegetation underneath and around the Preliminary Development Area.