Appendix C

Prime Farmland Assessment

Hayward Solar LLC
Docket No. IP-7053/GS-21-113
May 2021

Westwood

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MEMORANDUM

Date: **April 28, 2021**
Re: **Prime Farmland Impact Assessment**
Hayward Solar Project, Freeborn County, MN
File R0026599.00
To: **Project File**
From: **Joe Sedarski, Senior Project Manager**

1.0 Introduction

On behalf of and in coordination with Hayward Solar, LLC (Hayward Solar), Westwood Professional Services, Inc. (Westwood) prepared this memorandum to address requirements concerning siting and constructing a photovoltaic (PV) solar energy conversion project in prime farmland areas associated with Hayward Solar's up to 150-megawatt alternating current (MWac) Hayward Solar Project (Project), a planned utility-scale PV solar energy conversion project located in Hayward Township, Freeborn County, MN (see **Exhibit 1**).

In addition to the proposed Project site, Hayward Solar identified and evaluated two other sites for the Project in the Mankato, MN area in an attempt to find a site that would otherwise be compliant with the '*prime farmland exclusion rule'* found in Minnesota Rules 7850.4400, subp. 4 (Rule) (**Exhibit 2**). The other two sites evaluated by Hayward Solar are not considered alternates to the proposed Project site, but are being described in this memorandum to document other areas Hayward Solar reviewed when searching for a potential site for the Project. Hayward Solar ultimately ruled out the two Mankato area sites during its review of potential sites and does not have any leases or purchase options that would allow it to use the Mankato area sites for the Project. Hayward Solar does not have condemnation rights and therefore is unable to force any landowner to grant Hayward Solar any lease, easement or purchase option. The assessment of Mankato area sites included review of the feasibility of using these sites, the prime farmland impacts that would result from use of these sites and a determination that the two otherwise Rule compliant sites located near Mankato were not feasible. Accordingly, there are no feasible or prudent alternatives to the proposed Project Area (as herein defined) for the Project.

This prime farmland impact assessment for the Project follows guidance issued by the Minnesota Department of Commerce Energy Environmental Review Analysis (EERA) in May 2020 (Guidance - see **Attachment A-1**) as it relates to the Rule.[1] The EERA Guidance was prepared in an attempt to help define those factors a developer should consider and describe steps a developer should take when developing a permittable solar site on prime farmland. This assessment supports pertinent sections of the Certificate of Need (CON) application and the Site Permit Application (SPA) being prepared for the Project. The purpose of this assessment is to describe and document Hayward Solar's evaluation of other sites in Minnesota considered for the Project, evaluate applicable siting criteria regarding the proposed Project

[1] *Solar Energy Production and Prime Farmland – Guidance for Evaluating Prudent and Feasible Alternatives* (Minnesota EERA, May 19, 2020). See also https://mn.gov/eera/web/doc/13929/.

and other sites that were considered, and present evidence that the Project qualifies for an exception to the Rule as herein described.

The following presents a summary of the Rule, review of recent regulatory analysis of the Rule applicable to another proposed project in Minnesota, Project description, and the need for the Project and permitting requirements. This is followed by an analysis of siting constraints listed in the Guidance which addresses factors driving choice of region where the Project is located and assessment of suitable sites for compliance with the Rule. The assessment results show there are no feasible and prudent alternatives to the proposed Project location.

2.0 Prime Farmland Exclusion Rule

In its Guidance, EERA indicates "expansion of solar development frequently conflicts with the Public Utilities Commission (Commission or PUC) Rule to exclude energy generating installations from prime farmland (a federal designation of a quality soil type). Specifically, no such installation may be permitted that includes more than 0.5 acres of prime farmland per MW of net generating capacity" unless the project qualifies for an exemption or there is no feasible and prudent alternative to the chosen location.

Specifically, Minnesota Rule 7850.4400, subpart 4, provides:

> *No large electric power generating plant site may be permitted where the developed portion of the plant site*, excluding water storage reservoirs and cooling ponds, *includes more than 0.5 acres of prime farmland per megawatt of net generating capacity,* or where makeup water storage reservoir or cooling pond facilities include more than 0.5 acres of prime farmland per megawatt of net generating capacity, *unless there is no feasible and prudent alternative*. Economic considerations alone do not justify the use of more prime farmland. "Prime farmland" means those soils that meet the specifications of Code of Federal Regulations 1980, title 7, section 657.5, paragraph (a). *These provisions do not apply to areas located within home rule charter or statutory cities; areas located within two miles of home rule charter or statutory cities of the first, second, and third class*; or areas designated for orderly annexation under Minnesota Statutes, section 414.0325 (emphasis added).

The following assessment takes into account the above rule provisions, the Guidance, and the Commission's Order considering the Rule in relation to another solar energy project recently permitted by the Commission.

3.0 Recent Regulatory Background

The Rule was recently assessed in one other solar energy project before the PUC (i.e., Elk Creek Solar). As recently commented by the EERA in the Elk Creek Solar Project:

> "Relative to renewable energy development and prime farmland, the State of Minnesota has two conflicting mandates; on one hand is the advancement of solar energy production and on the other is the protection of prime farmland soils.
>
> The conflict arises out of the geological and geographical fact that the circumstances which make for excellent agriculture production and those that support the growth of solar energy generation overlap in the southwestern portion of Minnesota. The greatest concentration of solar irradiation

in Minnesota occurs in the southwest and this area also has a long history of agricultural activities, in part due to the nutrient rich soils." [2]

In its comments the EERA further noted that the Guidance was to serve as a balance between: 1) a strict reading of the "…unless there is no feasible and prudent alternative" provision of Minnesota Rule 4850.4400, Subpart 4, which essentially asks the applicant to prove a negative, exhausting every other site in the universe; or 2) either dismissing the rule as too onerous through a variance or establishing a bar so low as to forego the original intent of the legislation, and that if an applicant maintains its site selection processes satisfies the exclusion, the applicant is to show its work by providing a supporting narrative that addresses the factors listed in the Guidance. Elk Creek had identified an interconnection substation location with adequate capacity and limited its search for another site that is otherwise compliant with the Rule to an area that is within a five-mile radius of the chosen substation. After review of information filed on the record for Elk Creek Solar, the EERA questioned whether the applicant's limited geographical search for sites was adequate to meet the "no feasible and prudent alternative" exemption and concluded that the record did not support a finding that the threshold has been met. The EERA also noted that developing information identified in the Guidance does not equate to compliance with the prime farmland exclusion; it simply provides the PUC and stakeholders with the record necessary to make informed and defensible decisions related to the Rule.

The Minnesota Department of Agriculture (MDA) also commented on the Elk Creek Solar Project, indicating the Rule requires the applicant to clearly demonstrate that they could not find an alternative site to the one they propose.[3] The MDA agreed with the EERA comments that the applicant did not meet the alternative site threshold and that MDA believed feasible and prudent alternatives do exist (to the Elk Creek Solar Project site) as evidenced by North Star Solar, currently in operation, and other proposed projects (e.g., Regal Solar and Royal Solar[4, 5]). The MDA points out that those projects all avoid prime farmland and indicate that alternative sites with necessary access to grid interconnects do exist.

In its Order[6] issuing a site permit for Elk Creek Solar, the PUC disagreed with the analysis of EERA and MDA. The PUC found that Elk Creek took reasonable steps to explore and find an alternative site for the Elk Creek project but was unable to do so after searching for sites within 5-miles of the chosen substation location and more broadly within the county in which the project would be located and in a neighboring county. The PUC also noted that a solar facility, such as Elk Creek, had to be sited in a location that is conducive to substantial solar power production and ignoring that need would frustrate the Legislature's renewable energy policy goals.

4.0 Project Description

The Hayward Solar Project is an up to 150 MWac utility-scale solar powered-electric generation facility located on approximately 1,958 acres of overall land (Project Area) located in Hayward Township, Freeborn County, MN as indicated in **Table 1** below and **Exhibit 1**.

[2] See Docket No. IP7009/GS-19-495, Document 202011-168466-01 (November 20, 2020).
[3] See Docket No. IP7009/GS-19-495, Document 202011-168504-01 (November 23, 2020).
[4] Westwood searched the PUC docket for the Royal Solar Project on December 15, 2020 and no docket could be located. This may have been an inadvertent reference to a solar project in Minnesota or a non-public solar project.
[5] The North Star, Regal and Royal sites are located in another part of Minnesota and are not geographically close to the Elk Creek project or the substation with capacity and to which the Elk Creek project will interconnect.
[6] See Docket No. IP7009/GS-19-495, Document 202012-169454-02 (December 31, 2020).

Table 1: Project Location

Township	Range	Section
T102	R20	S1
T102	R20	S2
T102	R20	S3
T102	R20	S11
T102	R20	S12
T102	R20	S13
T102	R20	S14

Hayward Solar is planning to use photovoltaic (PV) solar panels installed on a single-axis tracking system to deliver up to 150 MWac of power to the electric grid. The total Project equivalent PV generating capacity as measured at the point of interconnection (POI, described below) of 150 MWac is from a mixture of 48 3150 kilovolt-ampere (kVA) and 48 3600kVA central inverters (these values do not include power factor [PF] assumptions and the system is sized for unity PF=1). This preliminary design and Project layout takes into account applicable energy loss (approximately 2% AC losses) and would allow for up to 150 MWac of solar energy generation and transmission onto the grid (which is capped at 150 MWac as part of the interconnection request and the interconnection agreement that will be signed upon completion of all interconnection studies). The current layout and proposed equipment are preliminary and subject to change as the design advances (**Exhibit 3**).

Hayward Solar has secured site control for the entire proposed Project PV array area via lease option agreements and will enter into a purchase option agreement for the new switchyard (SMMPA Switchyard, described below). Each landowner was given the option to either sell or lease their land to Hayward Solar. With the exception of the SMMPA Switchyard area (which will be purchased), in each instance, the landowners chose to lease their land because they wanted to retain control of the land after the leases expired. The use of Project-leased agricultural land for the planned solar energy facility is only temporary and is reversible. The term of the solar leases for the Project is 30 years (with a possible extension of 20 years via four 5-year extensions) and then the leases would expire. At the end of the leases, the land will be restored to its original condition and will likely return to agricultural use or any other use chosen by the landowners. The land will be temporarily converted to non-agricultural uses and a decommissioning plan and financial security will be in place to restore the land and preserve the ability to farm the land in the future.

The final Project design is expected to occupy approximately 1,272 acres (Preliminary Development Area) within the 1,958-acre Project Area as indicated in **Exhibit 3**. The excess acreage allows for planned buffers and flexibility in overall Project design. Certain portions of the Project Area that are not used for the Project may be used by the underlying landowner to continue farming operations. The electrical collection lines between the solar arrays/inverters and Project Substation will be 34.5 kilovolt (kV) feeders and may be either installed above ground or direct buried in a trench at a reasonable and standard industry practice depth. Directional boring may be used to install collectors at some portions of the Project, as applicable.

Site control for the Project includes the area where the Southern Minnesota Municipal Power Agency's (SMMPA's) existing Hayward-Murphy Creek 161 kilovolt (kV) high voltage transmission line (HVTL) crosses the Project Area (**Exhibit 3**). Current Project designs propose connecting the proposed Project to the grid

on the existing SMMPA Hayward-Murphy Creek 161 kV HVTL. All electricity generated by the Project will be routed to a new Project substation (Project Substation) via underground collector cables. The Project Substation will be connected to SMMPA's new switchyard (SMMPA Switchyard) using a short 200-300 foot long 161 kV overhead electrical transmission (Project Gen-Tie Line) (**Exhibit 3**). The new SMMPA Switchyard will contain switching gear/meter (which will be the POI) and connect to the existing SMMPA Hayward-Murphy Creek 161 kV HVTL via a 750 – 900 foot long 161 kV overhead electrical transmission line (SMMPA Line Tap). The Project Substation and Project Gen-Tie Line will be constructed owned and operated by Hayward Solar. The SMMPA Switchyard and SMMPA Line Tap will be permitted, constructed, owned and operated by SMMPA.

The Project's facilities will include:

- Solar modules, inverters, and tracking rack structures;
- Fencing;
- Access roads (as required);
- Operations and Maintenance (O&M) building;
- Project Substation;
- Power transformer;
- Overhead 161 kV Project Gen-Tie Line;
- On-site electrical collection lines; and
- Ancillary equipment or buildings as necessary.

Foundations for the solar arrays will be driven steel piles. Fencing will consist of an appropriately sized fence and material. Gates will be secured with lock boxes. Access will be controlled by the Project owner with access provided to local emergency response officials as needed. Access roads will be installed as necessary to allow access to Project facilities for O&M of the Project. Road design includes stripping surface vegetation root zone for the width of road and placing compacted aggregate over the stabilized subgrade. Mechanical stabilization, such as geotextile reinforcement, may also be employed on top of compacted subgrade before aggregate placement. The O&M building, Project Substation and SMMPA Switchyard will be located together at the north end of the Project Area with access via County Highway 46.

5.0 Project Need, Permitting & Schedule

The Hayward Solar Project is being developed, designed and permitted to meet or exceed applicable state and local requirements, including the Rule, to the extent practicable. The Project will specifically address Minnesota's mandate and goals found in the Renewable Energy Standard (RES), Governor Walz's "One Minnesota Path to Clean Energy" (to require 100% carbon-free energy by 2050), and applicable energy planning requirements.[7] It will serve consumers growing demand for renewable energy under various utility-sponsored programs and for utilities, independent power purchasers and corporations seeking to use renewable energy for business growth.

The Project will also benefit the local community through investment in construction spending, operation of the Project, property and business taxes, and landowner lease payments. The Project will generate up to 150 MWac of power which will provide electricity to approximately 28,000 homes annually and prevent

[7] See Minnesota Statutes §§216B.1691, 216C.05, and 216E.02, Subd. 1.

emission of approximately 261,871,072 pounds (118,783 metric tons) of carbon dioxide equivalent annually. [8]

The Project is needed to meet the growing demand for additional renewable resources in order to meet the Solar Energy Standard set forth in Minnesota Statutes and other clean energy requirements in Minnesota and neighboring states. Applications for a CON and SP are being submitted to the PUC for the Project in the first quarter 2021. Hayward Solar plans to construct the Project on a schedule that facilitates an in-service date in 2023.

6.0 Siting Constraints Analysis – Factors Driving Choice of Region

The following will show how Hayward Solar has considered each of the above factors and determined that, after minimizing impacts to prime farmland to the maximum extent practicable, it was unable to identify a feasible or prudent alternative to the proposed Project Area. We explain how Hayward Solar determined the proposed Project Area meets the requirements for siting the Project and describe how other evaluated areas near another substation that would otherwise be compliant with the Rule fail to do so.

Hayward Solar provides the following explanation of specific constraints that drove it to propose building the Project in this region of south central Minnesota (Hayward Township, Freeborn County). As discussed below, this area of south central Minnesota contains both a high quality solar resource and a high degree of prime farmland as shown in **Exhibits 4, 4a, 5** and **6** which makes identification of feasible and prudent alternative sites that are approximately 1,272 acres in size for the Project on exclusively non-prime farmland or otherwise compliant areas very challenging.

Hayward Solar initiated its search by determining which portion of the State of Minnesota would be best for siting the Project using the following factors:

- Good solar resource;
- Available electrical transmission capacity and likelihood of low interconnection costs; and
- Level/flat land and constructability (e.g., stable soils, no shallow bedrock or karst conditions, minimal existing infrastructure, etc.).

6.1 Choosing a Region & Description of Solar Resource in the Proposed Region v. Otherwise Complaint Areas - *Good Solar Resource*

General Identification of Good Solar Resource Sites in Minnesota

One of Hayward Solar's key goals in siting the proposed Project was to identify the most productive solar resource in Minnesota which will allow operation of a high net capacity factor solar energy generation facility to optimize the solar resource, allow for efficient and effective use of installed facilities and minimize impacts to human settlement and natural resources.

According to data compiled by the Minnesota Solar Suitability Analysis (MSSA) program, southern Minnesota has some of the best locations for exposure to the sun's solar radiation (insolation) and, thus,

[8] This is based upon the U.S. Environmental Protection Agency (EPA) Greenhouse Gas Equivalencies Calculator and 168,000,000 kWh (168,000 MWhs) annual production PVSYST model. See Greenhouse Gas Equivalencies Calculator | Energy and the Environment | US EPA.

highest net capacity factors in the state (see **Exhibit 7**)[9]. As shown in **Exhibit 7**, given the relatively large area in southern Minnesota with the best solar resource, Hayward Solar focused its efforts in locating a site in this general location (i.e., no sites were considered in central and northern Minnesota because they lacked a high solar resource).

Using this data, Hayward Solar then focused on identifying a suitable Project site near an existing substation to maximize solar generation which corresponds to sites located in the best solar resource areas in southern Minnesota. Using MSSA data on a state-wide scale, this eliminated looking for potential sites in the northern approximate +70% of the state and evaluating highest solar resource areas in the southerly portion of Minnesota and Minnesota counties along Minnesota/Iowa border (**Exhibit 7**). Rather than pursuing a separate region in Minnesota to pursue potential sites in areas that are otherwise compliant with the Rule, Hayward Solar elected to pursue compliant sites within southern Minnesota because the solar resource in southern Minnesota is significantly better than the solar resource in the northern + 70% of the state.

Specific Potential Sites Evaluated for the Project

As further detailed in Section 6.2 below, Hayward Solar next investigated interconnection and electrical transmission line capacity factors to identify potential interconnection locations and identify and assess available land that could be used for a solar energy generation project. Investigation findings further helped narrow potential Project sites and identified other possible constraints to help guide selection of land for the Project. This information was then used to evaluate potential sites for the Project.

Hayward Solar selected the proposed Project Area, Wilmarth Evaluation Site 1 and Wilmarth Evaluation Site 2 as a result of the above assessment findings and response from landowners. For each location Hayward Solar used site-specific MSSA data to further evaluate the three selected locations. At the proposed Project Area, MSSA data indicates the site as "good" in terms of solar energy generation (rated at approximately 88% of full sun), with maximum actual 100% sun occurring May through July (with peak insolation at 178 kWh/m^2) and total annual insolation of 1,167.6 kWh/m^2 (source date Fall 2008 – see **Exhibit 8** and attached MSSA report in **Attachment A-2a**).

The sites evaluated by Hayward Solar for solar resource included:

- *Wilmarth Evaluation Site 1* located in Le Sueur County on the east side of the Minnesota River between Mankato and Kasota - using the MSSA data, solar energy generation potential was evaluated and is shown in **Exhibit 9** for this site (see also MSSA report in **Attachment A-2b**); and
- *Wilmarth Evaluation Site 2* located in Le Sueur County north of the Mankato Regional Airport - using the MSSA data, solar energy generation potential was evaluated and is shown in **Exhibit 9** for this site (see also MSSA report in **Attachment A-2c**).

Solar resources at the proposed Project Area site and the other preliminary evaluation sites were evaluated using MSSA data and are summarized in **Table 2** below. The results indicate that the Project Area site has a high MSSA rating with significant peak and annual insolation from May through June with a slightly higher MSSA rating, peak insolation, annual insolation and more months of maximum sun than

[9] The MSSA is an ongoing project led by graduate students in the Masters of Geographic Information Science program at the University of Minnesota. The project aims to map solar potential on a large scale across Minnesota using LiDAR data and GIS technology with the goal of providing free and open source tools and data to the GIS community. See https://solar.maps.umn.edu/app/.

the evaluation sites. The other evaluated sites both have "good" MSSA ratings and have similar peak insolation, annual insolation and maximum sun ratings when compared to the Project Area. This evaluation also shows that Hayward Solar made a good faith effort to identify and evaluate similarly high solar resource sites which are comparable to the Project Area.

Table 2: Summary of Solar Energy Generation by Site

Site	Location	MSSA Rating or Project Data	Peak Insolation (kWh/m^2)	Annual Insolation (kWh/m^2)	Maximum 100% Sun (Months)
Project Area Site	Freeborn Co	MSSA - Good (87% full sun)	178	1,171.14	May-July
Wilmarth Evaluation Site 1	Le Sueur Co	MSSA - Good (83% full sun)	175	1,120.31	June
Wilmarth Evaluation Site 2	Le Sueur Co	MSSA- Good (84% full sun)	176	1,137.38	June

Based upon the above analysis the proposed Project Area site in Freeborn County has a slightly superior solar resource potential over the Wilmarth sites which supports determination that the otherwise Rule compliant sites evaluated are not feasible or prudent alternatives to the Project Area.

6.2 Identification of Substations & Determination of Available Interconnection Points - *Available Interconnection Capacity and Likely Low Interconnection Costs*

As discussed above, Hayward Solar first identified general areas in southern Minnesota with a good solar resource. Within southern Minnesota, Hayward Solar, through its consultant, Quanta Engineering (Quanta), searched for existing substations and transmission lines that had available capacity to support the proposed 150 MWac interconnection capacity of the Project. This information was used to select the proposed Project Area Site and the two Wilmarth sites (Wilmarth Evaluation Site 1 and Wilmarth Evaluation Site 2).

In the process of identifying available electrical transmission capacity for the proposed Project, Hayward Solar learned that the Midcontinent Independent System Operator (MISO) has a real issue in getting power transmitted from west to east (as described in the MISO Minnesota Wisconsin Export [MWEX] interface). Through the MISO Definitive Planning Phase (DPP), Hayward Solar has seen that the interconnection sites in Minnesota that are further east have shown less of an issue than sites that are located further west in Minnesota (as shown in recent interconnection upgrade charges being required by MISO).

Additionally, Tenaska, Inc. (Tenaska) (development partner of the Hayward Solar Project) also has general and specific knowledge (from a previous renewable/wind energy project in southwest Minnesota) that interconnection cost in the southcentral and southeast part of the state is likely lower than in southwestern Minnesota. Coupling MISO data and information with previous Minnesota-specific project experience made it clear to Hayward Solar that many (but not all) renewable energy projects in southwest

Minnesota were not moving forward due to high interconnection costs and that siting the Project in southwest Minnesota was not ideal for this Project.

Transmission voltage is an additional concern when planning a 150 MWac solar energy generation project. Line voltages greater than 161 kV are transmission sized and more able to accept additional generation in the amount of a 150 MWac project compared to a lesser voltage line. The higher voltage (e.g., 500 kV) transmission facilities become much more expensive to install equipment and facilities to interconnect, and would also overbuild what is needed for a 150 MWac project. Through Tenaska's development experience the preferred and best transmission connection voltage for projects such as the Hayward Solar Project is 161 kV or 230 kV. Hayward Solar identified existing transmission lines in this voltage range for further evaluation as interconnection options for the Project.

To evaluate interconnection and transmission capacity, Hayward Solar engaged Quanta to model the MISO queue in southcentral/southeastern Minnesota and determine locations for interconnection that would be most prone to generation injection while being as cost efficient as possible for the Project. This analysis was conducted during the first quarter of 2018 just before the filing deadline for the MISO 2018 queue for this Project. This evaluation included the following steps:

- Researching MISO transmission line information in southern Minnesota and using the pre-screening of potential POI via MISO's public database detailing existing interconnection requests and current status;
- Identifying and avoiding of substations with other projects in the MISO queue;
- Identifying merchant transmission facilities and owner/operator of existing transmission lines near substations with capacity;
- Reviewing applicable utility transmission planning reports of operators near substations with capacity;
- Estimating potential transmission system or network upgrade costs and timing and then evaluating MISO information concerning costs at each stage of the DPP process; and
- Assessing Project transmission line needs from selected site to the POI, and evaluating costs associated with routing, permitting, designing and constructing the transmission line.

Based on the Quanta analysis, Hayward Solar elected to pursue a preliminary site selection analysis at two existing substations located near the cities of Mankato and Albert Lea. The Wilmarth Substation is located within the northern part of the City of Mankato, a 2nd class statutory city and the Hayward Substation is located approximately 2.4 miles from the eastern edge of Albert Lea, a 3rd class statutory city (**Exhibits 2, 5** and **12**). The Guidance indicates that "otherwise compliant areas" refers to areas not specifically prohibited (subpart 1) or generally excluded (subpart 3) for energy development as enumerated in Minnesota Rules 7850.4400, including subpart 1. Therefore, the area within either of these two statutory cities or within two miles of these two statutory cities would be otherwise compliant areas and siting a project in these areas, if an appropriate area could be found, would qualify the project for a statutory exemption to the Rule.

6.3 Identification of Suitable Developable Sites Near Substations; Site Selection & Avoidance of Other Prohibited Areas; Good Faith Consideration of Alternative Site Configurations or Technologies

Hayward Solar created and analyzed constraints mapping and other site selection criteria in a good faith effort to further consider the Wilmarth Evaluation Sites 1 and 2 in proximity to the Wilmarth Substation

to find otherwise compliant sites. The results indicate that a completely compliant site within 5 miles of the Wilmarth Substation could not be identified. As detailed below Hayward Solar evaluated potential regulatory, human settlement and environmental constraints of the Hayward Substation site (with a 5-mile search area) and Project Area and compared that to similar review of the Wilmarth Substation site (with a 5-mile search area) and Wilmarth Evaluation Sites 1 and 2.

Hayward Solar did not identify (as an alternate configuration) an option to include a greater length of transmission line to an alternate compliant site associated with the proposed POI primarily because there is grid capacity and existing transmission facilities that cross through the Project Area site and that the lack of equivalent or sufficient non-prime farmland areas in proximity to the POI.

Other alternate, otherwise compliant sites that were considered and ruled out due to other factors would have involved a longer length of transmission line with additional obstacles of connectivity to connect to the grid and possibly at a higher voltage. While this option would result in higher costs (for design, permitting, and construction), it would also necessitate completing a routing study, identifying possible suitable land and willing landowners, potentially impacting significantly more natural resources, potentially impacting cultural resources, creating additional visual impacts, and requiring additional operation and maintenance needs. This option would also go against the State policy of non-proliferation of transmission facilities to locate transmission lines in a manner that "minimize[s] adverse human and environmental impact while ensuring continuing electric power system reliability and integrity and ensuring that electric energy needs are met and fulfilled in an orderly and timely fashion" (Minnesota Statutes Section 216E.02, Subd. 1) and the efficient use of resources, especially if a viable, feasible and prudent alternative (such as minimizing transmission gen-tie to 200-300 feet as is the case with the proposed Project) exists.

Level/Flat Land & Constructability

After identifying the two potential substations, Hayward Solar conducted a desktop analysis to search for sites near each of the substations that could support the Project and also comply with the prime farmland exclusion rule. Hayward Solar used an initial search area of 2 miles search radius from the two identified substation sites to identify potential Project locations (**Exhibits 2, 5, 13 and 14**).

Attempting to site a project within 2-miles of Mankato or Albert Lea to qualify for an exemption to the Rule is a prudent approach to choosing a site for the Project. Accordingly, an initial 2 mile search radius was chosen to identify sites that may be exempt from the Rule, minimize transmission line losses, meet transmission-provider engineering/design and interconnection requirements, optimize engineering and design of the gen-tie line and the Project, minimize impacts to human settlement and land, simplify or avoid permitting needs, and lower costs. Tenaska also reached out to the economic development authorities for the City of Mankato Economic Development Authority (MEDA) and Albert Lea Economic Development Agency (ALEDA) to determine the degree to which the local governments, land, landowners and community would support a 150 MWac solar project and whether MEDA or ALEDA could provide any introductions to potential landowners.

Tenaska has found through its extensive project development experience that the distance between the POI should be as short as possible, but in nearly all circumstances should be less than 2 miles. For example, the cost of constructing a gen-tie line of 161 kV that is 2 miles would double or even triple the costs of constructing a project this size, depending on routing, topography, land availability, engineering/design and permitting factors. A 161kV gen-tie line costs between $400,000-$450,000 per mile on the low end and $600,000–$700,000 per mile on the high end (assuming use of mono-pole wood or a pre-engineered

steel pole, single conductor per phase, and a 5-15 mile total line length); as the gen-tie distance increases and a project moves further away from an interconnection point, these costs rise. Major cost variable adders include rock foundations, double circuiting, larger conductors, difficult terrain, large amount of turns, and union labor.

Additional issues also arise when longer gen-tie lines are considered which involve additional land owners along the right-of-way (ROW) of the gen-tie line (more land to obtain and secure under easement, proximity of people near the lines, visual and other impacts to farmsteads and rural residences around the line, environmental impacts, etc.). Furthermore, as project sites get larger and more spread out, the line loss just from one corner of the project to opposite is significant. In other words, the farther the project site is from the interconnection point the more the line losses and the larger the project must be (i.e., more megawatts) to compensate for the line loss. Nonetheless, Hayward Solar's 2-mile search area around the evaluated substations is consistent with that used for the Aurora Solar Project and the Elk Creek Solar Project[10].

Expansion of the 2-Mile to 5-Mile Search Area from Existing Substations

The initial search criteria for identifying potential sites within 2 miles of the existing substations was to identify undeveloped parcels of land within 2 miles Mankato or Albert Lea that are relatively flat and not impacted by an obvious constraint, and that, individually or when combined with neighboring parcels could comprise at least ~1,272 acres (**Exhibits 13 & 14**). In its search for sites within 2 miles of the Hayward and Wilmarth substations Hayward Solar found that there were no adequately sized, undeveloped parcels within 2 miles of Albert Lea and Mankato to support the Project that were not otherwise impacted by a significant environmental constraint.

For example, undeveloped land within 2 miles of the Hayward Substation and within 2 miles of Albert Lea is comprised of Myre-Big Island State Park, Albert Lea Lake and the shoreland area for the lake. Siting a project within a lake or within a state park is neither feasible nor prudent (**Exhibit 13**). Moreover, Hayward Solar desired to avoid the shoreland area of Albert Lea Lake if possible. After accounting for the above constraints, Hayward Solar was unable to locate ~1,272 acres of land that is both within 2 miles of the City of Albert Lea and within 2-miles of the Hayward substation for the proposed project. Therefore, siting a project within 2-miles of the Hayward substation is neither feasible nor prudent.

Most of the land within 2 miles of the Wilmarth Substation is either developed by existing land uses, is too small to support the Project or is comprised of the Minnesota River, its floodplain and adjacent wooded bluffs (**Exhibit 14**). Moreover, the Wilmarth Substation is located on the east side of the Minnesota River. Utilizing parcels on the western side of the Minnesota River would require crossing the river, climbing the river wooded river bluffs on the western edge of the river, crossing State Highway 169 and crossing significant sections of woodland. Accordingly, siting a project within 2 miles of the Wilmarth Substation is neither feasible nor prudent.

After initial search efforts did not yield a site within 2 miles of the Wilmarth and Hayward substations, Hayward Solar, in the interests of increasing the likelihood of identifying a potential site that is suitable for the Project, extended its site selection radius out to 5 miles from each of these two substations (**Exhibits 13 & 14**). The analysis presented in this memo highlight the results generated from the 5-mile search radius.

[10] See Aurora Distributed Solar Project Docket No. E6928/GS-14-515, Document 20147-101312-02, July 9, 2014, and Elk Creek Solar Project Docket No. IP7009/GS-19-495, Document 20199-155860-02, September 13, 2019.

Using the two substation locations (i.e., Hayward and Wilmarth substations) and the above selection criteria and constraints analyses, Hayward Solar was able to identify the Project Area site near the Hayward Substation and two potential sites near the Wilmarth Substation: Wilmarth Evaluation Site 1 and Wilmarth Evaluation Site 2 (**Exhibits 13 & 14**). The Project Area is not within the City of Albert Lea or the 2-mile buffer of the City, but is located on parcels of land that comprise one of the highest densities of non-prime farmland in Freeborn County (**Exhibits 5, 6** and **13** and see Section 7.0 below for the prime farmland discussion). The Wilmarth Evaluation Site 1 is not within the 2-mile buffer of the City of Mankato, but it is located nearly entirely on non-prime farmland (**Exhibits 12 & 14a** and Section 7.0 below). The Wilmarth Evaluation Site 2 is partially within two miles of Mankato just north of the Mankato airport (**Exhibit 12** and Section 7.0 below).

Overview of Constraints Analysis

In addition to the initial parcel search factors outlined above (e.g., undeveloped, flat, ~1,272 acre minimum, and no obvious constraints that would preclude development) Hayward Solar evaluated a number of additional factors to identify potential developable solar energy generation sites for the proposed Project within 5 miles of the two identified substations including: 1) proximity of a site to the identified substation and a viable path for interconnection; 2) willingness of landowners to participate; 3) existing land use of the parcel; 4) proximity to neighbors/homes/buildings/etc. (i.e., visual impacts and land use conflicts); 5) environmental/natural resources (flood zone, wetlands, woodland, prairie, other vegetated areas, prohibited areas); 6) cultural resources (archaeological and historical); 7) proximity and ease of transportation (e.g., Interstate Highway I-90 is just to the north of the Project Area site, State Highway 169 is located west of Wilmarth); 8) engineering and design considerations; 9) site constructability; 10) health and safety considerations; 11) accessibility to local labor and materials; and 12) other costs associated with the sites. Additionally, each substation was also physically visited, and observations made to compare the substations and surrounding areas to each other and to screen potential sites. In summary, Hayward Solar took into account a broad and comprehensive set of factors to identify and assess feasible sites and interconnection points/substations for the Project.

A detailed constraints analysis of the Hayward Substation, Project Area, Wilmarth Substation and Wilmarth Evaluation Sites 1 and 2 is presented below. All of the identified sites are relatively flat or contained slight slopes which on average did not exceed 4% (although the Wilmarth Evaluation Sites did have certain portions with slopes up to 28%). Therefore, Hayward Solar did not have to consider or compare different engineering, design or related technology to address steep slopes between the sites under preliminary review. Additionally, each of the identified sites contained areas which would allow design and operation of the PV arrays for optimal solar energy generation (e.g., mainly south facing slopes and ability to install PV panels with axis in north-south orientation to track the sun from east to west). Each of the preliminary evaluation sites contained contiguous land area of at least 1,272 acres which is sufficient to support development of a 150 MWac solar energy project (e.g., the Wilmarth Evaluation Site 2 involved review of separate groupings of potential land areas near the Wilmarth Substation as indicated in **Exhibits 2** and **14**).

Table 3 below provides a comparison of these factors of the proposed Project Area site and the Wilmarth sites which indicate the presence and/or absence of a factor and whether a given factor of a site has a higher preference over another site. Please note that a single factor is not definitive over another factor and that all factors were reviewed in selecting the proposed Project Area site.

Table 3: Summary of Factors to Identify Developable Site

Site	Location	Topo-graphy	Willing Landowners	Land Use(s)	Sites, Residences, & Businesses	Natural Resources
Project Area Site	Hayward, Freeborn Co	Flat	Yes as well as strong ALEDA/community support.	Agriculture. Public infrastructure (I-90 and local/County roads). Buried pipelines. Two County ditches and drain tiles.	Very limited.	Very limited acreage homes and neighbors. Very easy access to I-90. Very limited environmental issues (lack of cultural resources, sensitive species, wetlands, trees, etc.).
Wilmarth Evaluation Site 1	Mankato, Le Seuer Co	Some level areas and rolling terrain.	Interest not expected from mining operator. Rates likely higher than with proposed Project.	Adjacent land and portions of selected parcels being used and proposed to be used for sand and gravel quarries. Some agriculture. Several nearby residences. Near natural resource areas/Minnesota River. Local and County roads.	Limited with several residences adjacent to site. Site surrounded by mining operation.	Large tracts. Further out from existing substation with river, wetlands, existing and proposed rock and sand quarry development as an obstacle. Potential steep slopes and prohibited/exclusion areas nearby.
Wilmarth Evaluation Site 2	Mankato, Le Seuer Co	Rolling terrain.	Interest unknown. Rates likely higher than with proposed Project.	Ag. Local and County roads. Near Mankato Regional Airport. Near a significant number of small acreages.	Limited and adjacent to Mankato Regional Airport.	Acreage homes, yet large tracts. Further out from existing substation with existing and proposed development and Mankato Municipal Airport as obstacles.

In addition to landowner interest, steep slopes, topography, woodland, and other constraints discussed above, the following factors were evaluated in the constraints analyses to account for State regulated prohibited and exclusion sites and related factors:

- Prohibited sites: Minn. R. 7850.4400, subp.1 list areas where a large electric power generating plan may not be sited -

A. national parks;
B. national historic sites and landmarks;
C. national historic districts;
D. national wildlife refuges;
E. national monuments;
F. national wild, scenic, and recreational riverways;
G. state wild, scenic, and recreational rivers and their land use districts;
H. state parks;
I. nature conservancy preserves;
J. state scientific and natural areas; and
K. state and national wilderness areas.

- Exclusion sites: Minn. R. 7850.4400, subp.3 lists site exclusions when alternative sites exist (unless there is no feasible and prudent alternative, for which economic considerations alone do not justify approval of these areas) and include -

A. state registered historic sites;
B. state historic districts;
C. state wildlife management areas (except in cases where the plant cooling water is to be used for wildlife management purposes);
D. county parks;
E. metropolitan parks;
F. designated state and federal recreational trails;
G. designated trout streams; and
H. the rivers identified in Minnesota Statutes, section 85.32, subdivision 1.

Site Specific Constraints Analysis – Hayward Substation and 5-Mile Search Area

The existing Hayward Substation is located mainly within agricultural land use areas (see **Exhibits 1, 2, 4-6** for farmland areas and **Exhibits 10-11a, 13/13a** and **15** for topography and soil information for the Hayward Substation area). Most of the agricultural land surrounding the Hayward Substation is relatively flat and conducive to solar development with the exception of the land around Albert Lea Lake, which is also subject to a shoreland ordinance, is wooded and is partially included in Myre-Big Island State Park and the City of Hayward located 4 miles east of Albert Lea and east of the Hayward Substation.

The existing Hayward Substation is operated by SMMPA and is located ¾ miles west of Hayward and connects a number of 69-161 kV transmission lines (**Exhibits 4a** and **13**). The areas south and west of the Hayward Substation are much more developed as these areas are part of Albert Lea, Albert Lea Lake, and surrounding communities (**Exhibits 13/13a**). While the western portion of the five-mile search area around the Hayward Substation is located within two miles of Albert Lea (a home rule charter/3rd class city and area which is exempt from the prime farmland exclusion rule), only one location within the 5-mile search area contains sufficient land (~1,272 acres) that is not all prime farmland that could support a 150 MWac solar energy generation project (**Exhibits 6** and **13/13a**). This one area is the proposed Project Area site identified by Hayward Solar which is located approximately 3.3 miles east of the Hayward Substation and which contains about half non-prime farmland and half prime farmland designated soils.

To address cultural resources, Westwood made a database request of the Minnesota State Historic Preservation Office (SHPO) and then conducted a preliminary review of the 5-mile search area round the Hayward Substation. Updated information on the Project Area was also examined to give an accurate

current comparison of the Project Area to the other sites considered. SHPO provided an inventory of archaeological sites and historic/architectural resources within the 5-mile search area. In addition, Westwood reviewed the online portal maintained by the Office of the State Archaeologist (OSA) to confirm the archaeological site locations provided by the SHPO. The National Register of Historic Places (NRHP) dataset was also examined in this review. This review should be considered only a preliminary analysis and does not constitute a formal Phase Ia cultural resources desktop review. Although archaeological site locations provided in the database were confirmed with the OSA portal, historic/architectural locational information was restricted to what was provided in the database reports. These locations were not confirmed with review of inventory forms or SHPO mapping meaning some assumptions on locations were made. Results of this review is summarized in the bullet points below.

Few of the above-listed prohibited or exclusions areas are located within the 5-mile search area of the Hayward Substation site, none are located within the Project Area, and all such sites are avoided by the proposed Project (see **Exhibits 13/13a**):

- The Blazing Star State Trail and Myre-Big Island State Park (prohibited sites and exclusion area) are located approximately 1.3 miles west of the Hayward Substation and approximately 4.6 miles west of the Project Area;
- The Freeborn County Snowmobile Trails cross throughout the 5-mile search area and one trail (T-236) also crosses directly through the central portion of the Project Area (from south to north) and follows along the south side of I-90 at the north end of the Project Area. This snowmobile trail will be avoided by the Project;
- Various infrastructure and other development are more heavily focused in and around Albert Lea. East of Hayward (and including the Project Area) infrastructure and other development includes transportation infrastructure (I-90, County Road 46, township roads, a rail line, private roads, etc.), various overhead electric transmission and distribution lines, buried oil and gas lines, Freeborn County Trail, County drain tile and ditches, judicial ditches, a campground, farmsteads and rural residences;
- According to preliminary review of the SHPO database, 63 previously recorded archaeological sites are located in the 5-mile search area; and
- According to a preliminary review of the SHPO database, 80 previously recorded architectural history resources are listed in or adjacent the 5-mile search area. Of the recorded properties within the 5-mile search area, 12 are listed in the NRHP, one is certified eligible, and one is listed as determined eligible (DOE).

Site Specific Constraints Analysis – Project Area Site

The Project Area site that Hayward Solar selected is primarily owned by seven private landowners (Edwards, Larson, Thompson, Hindrichs, Ladlie, Flusek and Petran), all of whom actively work their land as agricultural use (**Exhibits 1, 3** and **4-4a**). One of the landowners maintains approximately 900 acres of the 1,958-acre Project Area. Hayward Solar has secured all necessary land rights (lease agreements) for construction and operation of the proposed Project. Under the leases, land used for the Project would be returned to applicable landowners upon completion of the 35-year term of the Project. While several utilities and existing linear infrastructure cross through the Project Area, the Project facilities are being designed and located within appropriate setback distances from such features (e.g., a rail line, County and local roads, two buried pipelines, two overhead electric transmission lines, etc.).

Similar to the Hayward Substation review (discussed above), Westwood also reviewed SHPO records to evaluate cultural resources at the Project Area site. These locations were not confirmed with review of

inventory forms or SHPO mapping meaning some assumptions on locations were made. Results of this review is summarized in the bullet points below.

The Project Area site is located on relatively flat terrain used for various agricultural crops that generally slopes to the northeast, with elevations ranging from approximately 1,240 to 1,250 feet mean sea level (msl) (**Exhibits 3, 4-4a, 5 10,** and **11/11a**). Shallow bedrock and karst conditions have not been identified specifically at the Project Area site. According to the Minnesota Pollution Control Agency (MPCA) the Project Area is located within a "covered karst" region of the state[11] (**Exhibit 15**); "covered karst" is defined as areas underlain by carbonate bedrock but with more than 100 feet of sediment cover; data indicates carbonate rocks at the Project Area site are buried under more than 50 feet of glacially derived insoluble sediments in a humid climate. Engineering and design of planned Project solar array foundations and associated Project facilities take into account geotechnical and soil conditions of the Project Area to address site conditions. The planned array foundations would be mechanically installed/direct-embedded piers into the ground which are typically installed to approximately 8-15 feet into the ground depending on site specific soil conditions.

The Project Area also lies within a natural bowl-shaped depression that collects water from the surrounding area with slopes of less than 1% (though there are a few locations where slopes reach 4%). A number of drainage ditches are located within and surrounding the Project Area. Other infrastructure that either crosses or is near the Project Area includes Interstate Highway I-90, a railroad line, a Freeborn County Trail, buried natural gas and oil pipelines and associated facilities, overhead electric transmission and distribution lines, County and local roads, water wells, farmsteads and rural residences (**Exhibits 1, 3, 4-4a, 5, 10, 11-11a** and **13**).

Review of Minnesota Department of Natural Resources (MnDNR) Natural Heritage Information System (NHIS) data indicated a vascular plant was identified in an area that encroaches a very small area of the northeast corner of the Project Area (**Exhibits 13/13a**). Additionally, a small corridor area surrounding the railroad line outside of the northern end of the Project area contains a native plant community identified in the NHIS data. Both of these areas can be avoided during development of the Project. The Project Area is located within the Shell Rock River Watershed District (SRRWD); several small wetland areas and the Peter Lund Creek are located within the Project Area (**Exhibits 3, 11,** and **13/13a**). These areas can also be avoided during development of the Project. A detailed description of the SRRWD relative to the Project Area and Project benefits to improve water quality within the SRRWD is provided below.

None of the above-listed prohibited or exclusions areas are located within the Project Area and all such sites are avoided by the Project (see **Exhibits 4, 11** and **13/13a**):

- No prohibited sites are located within the Project Area;
- No exclusion sites are located within the Project Area;
- No previously recorded archaeological sites are located within the Project Area; one previously recorded archaeological site is located in the one-mile buffer;
- No previously recorded historic/architectural resources are located within the Project Area; four historic/architectural resources have been previously recorded in the one-mile buffer;
- No NRHP listed properties were identified within the Project Area or the one-mile buffer; and

[11] See Minnesota Karst Lands (2006) produced by the MPCA and found at Minnesota_karst_lands.png (1403×927) (state.mn.us).

- Initial file review (completed in February 2020) and follow up field survey results of a Phase I Cultural Resources Survey of the Project Area (completed in early May 2020) indicated no previously documented archaeological sites are located within the Project Area or one-mile buffer area. No previously inventoried architectural resources were identified within the Project Area; however, one previously inventoried architectural resource was identified within the one-mile buffer area. Petran Farms (FE-HRD-001) is located immediately northwest of the Project Area and is currently unevaluated for listing in the NRHP. Since Petran Farms (FE-HRD-001) is currently unevaluated for listing in the NRHP, no additional assessment activities was recommended. The Hayward Project was investigated by a Phase I Cultural Resources Survey in 2020 so the possibility of unrecorded cultural resources at the Hayward Project is low.

Site Specific Constraints Analysis - Wilmarth Substation and 5-Mile Search Area

The Wilmarth Substation is located within two miles of the City of Mankato (a home rule charter/2nd class city and area which is exempt from the prime farmland exclusion rule). Two land parcel groupings (Wilmarth Evaluation Site 1 and 2) located within the 5-mile search area were identified to possibly support a 150 MWac solar energy generation project (**Exhibits 12** and **14/14a**).

The existing Wilmarth Substation is near the highly developed and populated municipality of Mankato (see **Exhibits 2** and **12** for agricultural areas and **Exhibits 14/14a** and **15a** for topography and soil information for the Wilmarth Substation area). There are pockets of flat undeveloped land near the Wilmarth Substation, but those pockets of land are more than 2 miles from the substation and are spread between and around several large topographic and land features that are not conducive to solar development, including: the Minnesota River and its floodplain; the Minnesota River bluffs; several existing and proposed sand and gravel quarries and mining operations; existing residential and commercial developments; extensive woodlands; and the Mankato Regional Airport.

Pursuant to Minnesota Statutes Section 85.32, Subd. 1, the Minnesota and Blue Earth rivers are designated as a historic, recreational and scenic value rivers which the MnDNR has authority to manage as a state water trail. These rivers, and the land adjacent to them that are zoned as historic, recreational or scenic districts, are also considered exclusion sites from siting a renewable energy project, as listed above. As such, siting a 150 MWac solar energy generation project is not possible in areas associated within and adjacent to these designated rivers.

The existing Wilmarth Substation is operated by Northern States Power (NSP) and is located ~2.9 miles southwest of Evaluation Site 1 and ~ 3.7 miles southwest of Evaluation Site 2 that were identified by Hayward Solar to possibly support the Project (**Exhibits 2** and **14**). The Wilmarth Substation is a significant electrical hub that connects a number transmission lines up to 345 kV (**Exhibit 14**) and serves the Mankato area and south-central Minnesota. Most of area surrounding the Wilmarth Substation is heavily developed with municipal, industrial, commercial/retail and residential uses (**Exhibits 14/14a**). The Minnesota River is located west of and adjacent to the Wilmarth Substation.

Additionally, a number of the above-listed prohibited or exclusions areas are located within the 5-mile search area of the Wilmarth Substation as summarized below. Given the number and proximity of these prohibited/exclusion sites to the substation and high probability that they cannot all be avoided, development of a 150 MWac solar project in the Wilmarth Substation search area will be difficult, if not impossible, at this time (see **Exhibits 14/14a**).

Similar to the Hayward Substation and Project Area review (discussed above), Westwood also reviewed SHPO records to evaluate cultural resources at the Wilmarth Substation site and a 5-mile search area. These locations were not confirmed with review of inventory forms or SHPO mapping meaning some assumptions on locations were made. Results of this review is summarized in the bullet points below:

- The Minneopa State Park, Bison Drive and Ranger Station is located along the southwest edge of the 5-mile search area (prohibited sites and exclusion area) located approximately 4 miles from the Wilmarth Substation;
- The Kasota Prairie Scientific and Natural Area (SNA) is located at the north portion of the five-mile search area (a prohibited site);
- The Swan Lake Wildlife Management Area (WMA) is located along shores of the Minnesota River within the search area north of the Wilmarth Substation;
- Seven Mile Creek County Park is located on the west side of the Minnesota River within the search area north of the Wilmarth Substation;
- The Minnesota and Blue Earth rivers are designated state water trails with historic, recreational and scenic values;
- A high potential zone for the rusty patched bumble bee is located along the Minnesota River south of the Wilmarth Substation (the entire five-mile search area is included as a low potential zone for the rusty patched bumble bee);
- Several MnDNR NHIS rare/endangered species are mapped within the five-mile search area and focused along the Minnesota and Blue Earth Rivers and tributaries;
- The Minnesota River Valley Trails and Faribo-Sno-Go Trails cross throughout the five-mile search area;
- A number of conservation reserve program (CRP), conservation reserve enhancement program (CREP), Farm Service Agency (FSA) interest of Minnesota, Reinvest in Minnesota (RIM), and wetland reserve program (WRP) areas are located within the five-mile search;
- Various infrastructure and other development are more heavily focused in and around Mankato, North Mankato, Kasota, and the Mankato Regional Airport including transportation infrastructure (State Highways 14 and 169, County Roads 57, 26, 60, 66 and others, city streets, township roads, rail lines, private roads, etc.), various overhead electric transmission and distribution lines, buried oil and gas lines, County drain tile and ditches, judicial ditches, city parks, commercial, industrial, retail, government, residential, rural residential and farmsteads;
- According to a preliminary review of the SHPO database, 70 previously recorded archaeological sites are located in the 5-mile search area; and
- According to a preliminary review of the SHPO database, 577 previously recorded architectural history resources are listed in or adjacent the 5-mile search area. Of the recorded properties within the search area, 251 are listed in the NRHP while 7 are certified eligible.

Site Specific Constraints Analysis - Wilmarth Evaluation Site 1

The Wilmarth Evaluation Site 1 is not prime farmland and is comprised of approximately 1,200 acres; it is located on the east side of and adjacent to the Minnesota River and is part of and is surrounded by an active sand and gravel mining operation (further discussed below) (**Exhibits 12** and **14/14a**). Due to the existing land use (mining), this area can not be developed for a solar project at this time.

According to the Le Seuer County Assessor's online property records, the Wilmarth Evaluation Site 1 is currently owned by Covia Holdings Corporation d/b/a Unimin Minnesota Corp (Covia) (**Exhibits 14/14a**). Covia owns several silica sand mines, including the nearby Kasota Mine, which mines silica sand for use as

frac-sand in extracting underground petroleum resources. Based on historic aerial photographs, Covia was actively expanding its sand quarry on adjacent property and onto the parcels being reviewed by Hayward Solar. The existence of active sand quarry activities on the site as well as extensive historic uses of quarry activities on adjacent sites that appear to be further expanding across the site indicates this site is neither a feasible nor a prudent alternative for the Project.

Review of aerial photography and topographic data indicate the Wilmarth Evaluation Site 1 is located on relatively level terrain with some rolling slopes that contains a wooded/vegetated area and several small waterbodies on the northern half of the site. Some small portions of the site appear to be in agriculture use. This site generally slopes toward the Minnesota River to the west, with elevations ranging from approximately 750 to 850 feet msl (**Exhibit 14/14ad**). Shallow bedrock and karst conditions have not been identified at Wilmarth Evaluation Site 1. Review of available data and desktop analysis indicate that shallow bedrock is found at this site ranging from 1.3 to greater than 6.6 feet below ground surface. This site is located at the western fringe of an area of southeast Minnesota that contains a number of karst features (**Exhibit 15a**); according to the MPCA this site is located within both "active karst" (along the east side of the Minnesota River) and "covered karst" regions of the state[12]. As indicated above "active karst" is defined as areas underlain by carbonate bedrock with less than 50 feet of sediment cover and "covered karst" as areas underlain by carbonate bedrock but with more than 100 feet of sediment cover. Additional site-specific geotechnical and soil studies would be required to determine whether karst is present at this site, to inform design/engineering considerations, and the impact and risk of construction of the Project.

Given its proximity to the confluence of the Minnesota and Blue Earth rivers, topography and location in the State, the Wilmarth Evaluation Site 1 contains a number of water bodies and wetlands within and near the site parcels with several drainage features (**Exhibit 14/14a**). Overall, these parcel sites drain to the nearby Minnesota River, Blue Earth River, Sevenmile Creek, County Ditches and a number of lakes with slopes ranging from 0 to 28%.

A significant amount of infrastructure either crosses or is near this site and most notably includes: two pipelines (oil and gas) cross through the southwest corner the site, a rail line crossed along the east border, a number of water wells are located within and near the site, a number of overhead electric transmission and distribution lines, a number of existing substations, a local road crosses between the site parcels and other County and local roads are located along west and northwest boundaries, several residences and a farmstead area located adjacent to the site, and an active mining operation is present north, northeast, east and south of the site (as discussed above). Identifying a route for an HVTL to connect a 150 MWac solar energy generation project at this site to the Wilmarth Substation would be difficult and require extensive studies, development of routes, and likely involve a vigorous and strongly contested route permit process.[13]

Additionally, conservation easement areas along the Minnesota River, recreational areas, several WMAs, wetland and conservation reserve areas, and several State trails/roads and snowmobile trails are located in the vicinity of the site (**Exhibits 14/14a**). Notably, the Kasota Prairie and Kasota Prairie Scientific and Natural Area (SNA) is located at the northwest corner of the site which is considered a prohibited site.

[12] See footnote 10 for reference to karst features.

[13] Note that the recently permitted Huntley-Wilmarth 345 kV HVTL project that connects the Wilmarth Substation to the Huntley Substation south of Winnebago experienced a challenged and lengthy permit process that included a full environmental impact statement (EIS); the permit process started in January 2018 and completed in summer of 2019 (see MPUC Docket No. TL-17-185).

West and north of the Kasota Prairie/SNA is the Swan Lake Wildlife Management Area (WMA) which is located northwest of the site along shores of the Minnesota River. Seven Mile Creek County Park is located west of the site on the west side of the river.

Review of MnDNR NHIS data identified a significant amount of rare and/or endangered species within or near Wilmarth Evaluation Site 1 (**Exhibits 14/14a**). Notably, most of the Wilmarth Evaluation Site 1 is located within a low potential zone for the rusty patched bumble bee with certain areas long the Minnesota River within the high potential zone for the rusty patched bumble bee. Native plant community, MBS Sites of Biodiversity Significance, national conservation easements and Minnesota WMA sites were all identified nearby or within small portions of Wilmarth Evaluation Site 1. Additionally, vascular plants and vertebrate animals were similarly identified nearby or within a small portion of Wilmarth Evaluation Site 1 (**Exhibits 14/14a**).

As indicated above, a number of WMA, Conservation Preserve Program (CRP), Conservation Reserve Enhancement Program (CREP), an SNA, Waterfowl Protection Area (WPA), Reinvest in Minnesota (RIM) Wetland Reserve Program (WPR), and permanent wetland preserve sites are located throughout the region and nearby Wilmarth Evaluation Site 1. These conservation areas would need to be avoided from development of the Project if the Project were to be built in this area. This Wilmarth Evaluation Site 1 is located within the Minnesota River-Mankato Watershed District (MRMWD); numerous wetland areas, several creeks, and a number of lakes are located near the site (**Exhibits 14/14a**). These areas would need to be avoided from development of the project in this location.

The following summarizes constraint analysis findings relative to the above-listed prohibited or exclusions areas within or near the Wilmarth Evaluation Site 1 location:

- The Kasota Prairie/SNA (a prohibited site) is located at the northwest corner of Wilmarth Evaluation Site 1;
- The Swan Lake Wildlife Management Area (WMA) is located along shores of the Minnesota River west of Wilmarth Evaluation Site 1;
- Seven Mile Creek County Park is located on the west side of the Minnesota River west of the Wilmarth Evaluation Site 1;
- The Minnesota River is a designated state water trail with historic, recreational and scenic value and is located west of the Wilmarth Evaluation Site 1;
- A high potential zone for the rusty patched bumble bee is located along the Minnesota River south of the Wilmarth Evaluation Site 1 and the site is included in an area listed as a low potential zone for the rusty patched bumble bee;
- Several MnDNR NHIS rare/endangered species are mapped and focused along the Minnesota and Blue Earth rivers and tributaries;
- As discussed above, preliminary review of the SHPO database indicated 70 previously recorded archaeological sites within the 5-mile search area of the Wilmarth Substation; and
- Preliminary review of the SHPO database identified 577 previously recorded architectural history resources are listed in or adjacent the 5-mile search area of the Wilmarth Substation. Of the recorded properties within the search area, 251 are listed in the NRHP while 7 are certified eligible.

In summary, an extensive number of constraints were identified and assessed that indicate development of the Project and connection to the Wilmarth Substation would be extremely difficult given the location

of the Wilmarth Evaluation Site 1 and its proximity to the Wilmarth Substation in a highly developed area of Mankato. The presence of these constraints, the current and planned use of the site as a quarry and difficulty of project development indicates the Wilmarth Evaluation Site 1 is neither a feasible nor a prudent alternative for the Project.

Site Specific Constraints Analysis - Wilmarth Evaluation Site 2

Wilmarth Evaluation Site 2 is located on somewhat rolling terrain used for agricultural crops that generally slopes toward the Minnesota River and the Blue Earth River, with elevations ranging from approximately 810 to 1050 feet msl (**Exhibits 12** and **14/14a**). The Wilmarth Evaluation Site 2 is a prime farmland area of approximately 2,810 acres (several grouped parcels) and is located north of the Mankato Regional Airport; development of this site/parcels would be difficult due to its proximity to the airport, identifying routes for a transmission line to connect to the Wilmarth Substation (e.g., it would need to traverse through rural residential, some farmstead and residential/commercial/industrial areas), the presence and location of State lands and conservation areas, and potential interference with other existing infrastructure. No other adjacent land areas were identified by Hayward Solar to create a developable site in the vicinity of the Wilmarth Substation.

Shallow bedrock and karst conditions have not been identified at the Wilmarth Evaluation Site 2. Review of available data and desktop analysis indicates shallow bedrock is found at this site at greater than 6.6 feet below ground surface. This site is located at the western fringe of an area of southeast/south central Minnesota that contains a number of karst features (**Exhibit 15a**); according to the MPCA this site is located within both "active karst" (along the east side of the Minnesota River) and "covered karst" regions of the state[14]. As indicated above "active karst" is defined as areas underlain by carbonate bedrock with less than 50 feet of sediment cover and "covered karst" as areas underlain by carbonate bedrock but with more than 100 feet of sediment cover. Additional site-specific geotechnical and soil studies would be required to determine whether karst is present at this site, to inform design/engineering considerations, and the impact and risk of construction of the Project.

Given its proximity to the confluence of the Minnesota and Blue Earth Rivers and location in the State, the Wilmarth Evaluation Site 2 contains a high number of water bodies and wetlands within and near the site parcels with several drainage features (**Exhibits 14/14a**). Overall, the Wilmarth Evaluation Site 2 drains to the Minnesota River, Blue Earth River, Sevenmile Creek, County Ditches and a number of lakes with slopes ranging from 0 to 20%.

There is a significant amount of infrastructure that either crosses or is near the Wilmarth Evaluation Site 2 and most notably includes: the Mankato Regional Airport (south and adjacent to the site), several County and local roads, railroad lines, buried natural gas and oil pipelines and associated facilities, a number of overhead electric transmission and distribution lines, a number of existing substations, a number of water wells, nearby residential, commercial and industrial developments associated with Mankato, North Mankato, Eagle Lake, Madison Lake, Kasota, and St. Peter, farmsteads and rural residences (**Exhibits 14/14a**). Several recreational areas, WMAs, wetland and conservation reserve areas, State trails/roads and snowmobile trails are also located near the Wilmarth Evaluation Site 2.

The Wilmarth Evaluation Site 2 is located directly north of the primary runway of the Mankato Regional Airport. The land comprising this potential site is subject to the Mankato Regional Airport Zoning

[14] See footnote 10 for reference to karst features.

Ordinance (Airport Ordinance).[15] The Airport Ordinance regulates and restricts the height of structures otherwise restricts uses of the property subject to the Airport Ordinance that may be hazardous to the operational safety of aircraft operating to and from the Mankato Regional Airport and to further limit building density in the runway approach areas to protect life and property in case of an accident.[16] No use of the restricted property is allowed that, among other things, results in the glare in the eyes of pilots using the airport.[17] Nearly the entire Wilmarth Evaluation Site 2 is located within Safety Zone C of the Airport Ordinance. Additional portions of the Wilmarth Evaluation Site 2 are located within Safety Zones A and B of the Airport Ordinance.[18]

Review of MnDNR NHIS data identified rare and/or endangered species within or near the Wilmarth Evaluation Site 2 (**Exhibits 14/14a**). Notably, most of the Wilmarth Evaluation Site 2 area is located within a low potential zone for the rusty patched bumble bee with certain areas along the Minnesota River within the high potential zone for the rusty patched bumble bee. Native plant community, MBS Sites of Biodiversity Significance, national conservation easements and Minnesota WMA sites were all identified nearby the Wilmarth Evaluation Site 2. Additionally, vascular plants and vertebrate animals were similarly identified nearby the site. Several impaired lakes are located east of the site (e.g., Lake Washington, Shanaska Creek, George Lake, Lake Jefferson – **Exhibit 14**). As indicated in the discussion of the Wilmarth Substation search area constraints above, a number of WMA, CRP, CREP, SNAs, WPA, RIM, WPR, and permanent wetland preserve sites are located throughout this area and nearby the Wilmarth Evaluation Site 2. These conservation areas would need to be avoided from development of the Project if the Project were to be built in this area. The Wilmarth Evaluation Site 2 is located within the Minnesota River-Mankato Watershed District (MRMWD); numerous wetland areas, several creeks, and a number of lakes (several of which are impaired waters) are located near the site (**Exhibits 14/14a**). These areas would also likely need to be avoided from development of the Project on the Wilmarth Evaluation Site 2:

- No prohibited or exclusion sites are located within the Wilmarth Evaluation Site 2;
- The Mankato Regional Airport is located south of and adjacent to the Wilmarth Evaluation Site 2 and nearly the entire Wilmarth Evaluation Site 2 is encumbered by the Mankato Regional Airport zoning ordinance, which restricts development on the land subject to the ordinance;
- In addition to the airport, additional infrastructure as well as more intense land use (residential, commercial, industrial, agricultural) development is located near or at the Wilmarth Evaluation Site 2,which is located between several municipalities (Mankato, North Mankato, Eagle Lake, Kasota, St. Peter, etc.);
- Several recreational areas, WMAs, wetland and conservation reserve areas, State trails/roads and snowmobile trails are also located near the Wilmarth Evaluation Site 2.
- A high potential zone for the rusty patched bumble bee is located along the Minnesota River southwest of the site and the western portion of the Wilmarth Evaluation Site 2 is included in an area listed as a low potential zone for the rusty patched bumble bee;
- Several impaired waters are located east of the Wilmarth Evaluation Site 2;
- Several MnDNR NHIS rare/endangered species are mapped and focused along the Minnesota and Blue Earth rivers and tributaries;
- As discussed above, preliminary review of the SHPO database indicated 70 previously recorded archaeological sites within the 5-mile search area of the Wilmarth Substation; and

[15] Mankato Regional Airport Zoning Ordinance (May 16, 2006).
[16] Mankato Regional Airport Zoning Ordinance (May 16, 2006) at 8.
[17] Mankato Regional Airport Zoning Ordinance (May 16, 2006) at 10.
[18] Mankato Regional Airport Zoning Ordinance (May 16, 2006) at 23 and 24.

- Preliminary review of the SHPO database identified 577 previously recorded architectural history resources are listed in or adjacent the 5 mile search area of the Wilmarth Substation. Of the recorded properties within the search area, 251 are listed in the NRHP while 7 are certified eligible.

Similar to the Wilmarth Evaluation Site 1, the extensive number of constraints identified and assessed for the Wilmarth Evaluation Site 2 indicate development of the Project and connection to the Wilmarth Substation would also be very challenging given this sites' location and proximity to the Wilmarth Substation in a highly developed area near the Mankato Regional Airport and within the airport zoning area. The presence of these constraints and difficulty of Project development indicates this site is neither a feasible nor a prudent alternative for the Project.

Landowner Outreach

During the last half of 2018 Hayward Solar initiated contact with landowners to see if they would be willing to participate in the Project and lease land. Hayward Solar contacted a couple of landowners near Mankato (Wilmarth Evaluation Site 2) to discuss land lease option; the landowners indicated farming is the prime and ongoing activity of this land and they had a major concern over routing new HVTL lines and were not willing to participate in the Project. Landowners of the Project Area site (with the assistance of the ALEDA) came together very quickly and early in this process and showed very strong interest and support of the Project. Hayward Solar learned of the strong positive community sentiment, positive potential for land leasing and interested landowners associated with the Project Area site. The ALEDA introduced Hayward Solar to interested landowners/farmers in Hayward Township. Discussions with economic development agencies in the Mankato area did not show similar interest or support. As such, and due to the information gained during the constraints analysis for each substation, Hayward Solar then began to focus its siting and development efforts for the Project on the Project Area site.

The Hayward Substation is located approximately 3.5 miles west/southwest of the Project Area west of the City of Hayward. As indicated above, this interconnection point was selected based upon modeling of the substation by Quanta. The Quanta analysis, in addition to showing capacity at the Hayward substation also showed capacity on SMMPA's existing Hayward-Murphy Creek 161kV HVTL. Importantly, the ability to connect anywhere along the SMMPA HVTL to connect to the Hayward Substation provided Hayward Solar the ability to move the POI closer to the Project Area where prime farmland impacts can be minimized to the maximum extent practicable and other impacts associated with a 3.5 mile gen-tie line can be avoided. Hayward Solar can accomplish the interconnect on the SMMPA Hayward-Murphy Creek 161 kV HVTL using the new SMMPA Switchyard and SMMPA Line Tap to connect the Project to the grid at a location within the Project Area (**Exhibit 3**).

Shell Rock River Watershed District and Benefits of the Project Area Site

The Project Area is located within the Shell Rock River Watershed (SRRW) which extends from south-southeastern Minnesota (in Freeborn County) into north-northcentral Iowa (in nine counties) (**Exhibit 11**); the physical watershed forms part of the larger Cedar River Watershed[19]. The SRRW (hydrologic unit code [HUC]-8: 07080202) in Minnesota encompasses approximately 246 square miles and lies completely

[19] See *2014 Second Generation Water Management Plan*, Shell Rock River Watershed District, WSB, December 31, 2015.

within Freeborn County[20]. The watershed is located in the Western Corn Belt Plains ecoregion and is a tributary to the Cedar River. Most of the land in the watershed area is cropland (~72%).

The Project is further located in the eastern portion of the subwatershed boundary called the Peter Lund Creek Subwatershed (**Exhibits 11/11a**). The Project Area drains to the Peter Lund Creek (Minor Steam ID 49005; Stream Order 2) which is a minor watershed district encompassing approximately 17.9 square miles. As indicated in the *2014 Second Generation Water Management Plan,* dated December 31, 2015, (WMP), the SRRW begins in the extensive tile networks of its agricultural lands which flow into a network of ditches and straightened streams before entering a series of lakes around Albert Lea. The Shell Rock River begins at Albert Lea Lake and flows south to the Iowa border.

In Minnesota's water management context, the SRRW District lies within the Lower Mississippi River Basin. The District includes 19 lakes many of them interconnected by streams or drainage ditches. This interconnectedness among the SRRW's lakes and streams allows pollutants to travel easily from one area to another. Upon creation of the SRRW District in 2003, the stated purpose of the District was ***to improve water quality, reduce erosion and sedimentation, and implement best management practices (BMPs)***. The WMP identified several priority issues that determine the Districts priorities over the next decade and include[21]:

- *Reducing internal loading of phosphorus from the District's interconnected lakes and streams;*
- *Improving water quality*;
- Removing carp from lakes and restrict their movement;
- Dredging and properly disposing of nutrient rich sediments within the District's lakes;
- *Conserving and restoring upland and wetland to provide natural buffering to upstream pollutants*;
- Restoring desirable fish, waterfowl, and wildlife habitat;
- *Enhancing native vegetation to increase fish habitat areas and waterfowl nesting areas;*
- Stabilizing and restoring streambanks to decrease downstream loading of sediment;
- *Achieving a net reduction in pollutant generation from urban areas by revising and applying the District's rules*;
- Annually submitting grant applications to the State for restoration and protection projects;
- *Finding a way to engage more local capacity and funding sources*;
- *Engaging the public through BMP cost share projects; and*
- *Conducting education and public outreach*.

Among other concerns, the WMP discusses pollutant sources and issues related to water quality and water designated use (see WMP, Section 2.14) as well as the responsibilities of the MPCA. As the regulatory agency responsible for protecting water quality and regulating water quality to meet the waterbody's intended uses, the MPCA completed a Total Maximum Daily Load (TMDL) study of the SRRWD that identified pollution sources and helped prioritize actions to restore applicable water bodies to their designated uses. The TMDL work is also part of the Shell Rock – Winnebago One Watershed, One Plan (1W1P) process which is under development and being led by SRRWD staff (including staff from Freeborn SWCD, Freeborn County, and the City of Albert Lea). The studies included analysis of total

[20] See *Draft Shell Rock River Watershed Restoration and Protection Strategy Report,* MPCA, July 2020 (Doc. No. wq-ws4-70a).

[21] Note that the Hayward Solar Project may provide a number of beneficial improvements and enhancements to the WMP-listed water quality priorities highlighted in italics, as further discussed below.

suspended solids (TSS), nitrate plus nitrite-nitrogen (nitrate-N), total phosphorous (TP), dissolved orthophosphate (DOP), fecal coliform bacteria, pH, temperature, dissolved oxygen (DO) and other things associated with land use, climate, soils, slopes and other watershed features from both non-point and point pollutant sources.

The WMP indicates that Peter Lund Creek has been monitored since 2005 by the SRRWD for Nitrates, Phosphates, TSS and DO; the data indicates high DO concentrations. Monitoring was a part of the Shell Rock River Watershed approach that began in 2009 and the first cycle was completed in 2020 with publication of the *Draft Shell Rock River Watershed Restoration and Protection Strategy Report* (MPCA July 2020) (WRAPS Report). Restoration and protection strategies listed in the WRAPS Report will be the basis for developing local implementation plans, through the Shell Rock River/Winnebago One Watershed One Plan, to restore and protect water resources. The report lays out goals, milestones and responsible entities to address protection and restoration priorities in the watershed. The targets are intended to provide guidance and "measuring sticks" to assess the watershed's health and success of actions taken. The MPCA and local partners began conducting the second round of intensive water monitoring in this watershed in 2019 and 2020.

The WRAPS Report presents the findings of biological monitoring of the District, which used 18 monitoring sites across the watershed (i.e., intensive watershed monitoring) and was completed in 2020[22]. The MCPA determined the following impairments to water resources situated west/southwest of the Project Area:[23]

1. the Shell Rock River has low DO at times (making it hard for fish and other aquatic species to survive);
2. the Shell Rock River has nutrient, sediment/turbidity and pH levels too high to meet standards (all these factors result in the number of fish and bug species being lower than expected for similar rivers) – phosphorous in the river needs to decrease by as much as 75%, depending on flow and other conditions, to meet standards. The river also has bacteria (*E. coli*) levels too high to meet standards; it is impaired by eutrophication and has impaired fish and macroinvertebrate communities; and
3. Albert Lea Lake has a nutrient level too high to meet standards; phosphorous levels need to decrease by 46-71% in the lake.

The WRAPS Report indicated the following key conclusions of the first cycle work:

- excess phosphorus is causing severe algal blooms in several lakes throughout the watershed;
- chemical responses from excess nutrients are leading to low dissolved oxygen levels and high pH that are negatively impacting fish and macroinvertebrates in the Shell Rock River;
- algae growth is fueled by excess phosphorus in the Shell Rock River, also causing a turbidity impairment, meaning the water has sediment levels that clog fish gills and make the water too cloudy for fish to find food, avoid predators, reproduce and perform other life functions;
- altered hydrology causes low stream baseflows and high peak flows, worsening habitat conditions and intensifying low oxygen and high pH levels throughout the year;
- nitrates are negatively impacting fish and macroinvertebrates in the Shell Rock River;

[22] See *Shell Rock River Watershed Monitoring and Assessment Report,* MPCA, June 2012 (Doc. No. wq-ws4-70a).
[23] Note the MPCA made other impairment determinations concerning Bancroft Creek, part of Wedge Creek, part of Schoff Creek, and Pickerel, White, and Fountain lakes which are not located near the Project Area.

- bacteria impairments are not widespread, but exist in two headwater streams and the Shell Rock River; and
- the MPCA and partners now have data from water monitoring to assess additional lakes and streams in the watershed for meeting standards.

The WRAPS Report states that the headwater streams in the SRRW are predominately impacted by agricultural land use and focused implementation of best management practices to reduce nutrient and sediment runoff in priority agriculture areas will help improve stream water quality. The impaired lakes in the SRRW are connected through water channels and upstream conditions impact the condition of downstream lakes. According to the WRAPS Report, continued restoration activities in headwater upland areas paired with in-lake management will aid in meeting lake water quality goals. Recommended strategies include:

a. reducing nutrients (particularly phosphorous) from point sources;
b. reducing phosphorous and nitrogen from non-regulated sources such as ag fields/cropland (through better managing nutrients and incorporating cover crops; building soil health);
c. increasing water storage through wetland restorations, controlled drainage structures, drainage ditch system management, and soil health practices;
d. reducing bacteria levels (e.g., fixing failing septic systems, improving animal manure management and ensuring animal feedlot compliance; and
e. continuing to implement lake management strategies for shallow lakes (such as rough fish control, native aquatic plant restorations and water level drawdowns).

The WRAPS Report indicates the focus of the report is the restoration of water quality in the SRRW. The Report indicates there are some potential restorative measures on agricultural lands, such as grassed waterways or vegetative strips, though a majority of practices involve a more structured engineering approach; erosion control is mentioned throughout the Report with agricultural production and urban developments. It states that there are promising trends in water quality improvement; however, continued support for comprehensive and sustainable implementation is needed to further improve and restore surface water quality. The report indicates sustained citizen outreach and landowner involvement are also key elements for the restoration effort and the 1W1P discussed above. It concludes that partnerships established through the development of 1W1P will be another critical component of restoration progress.

As part of its agency outreach and public involvement process for the Project, Hayward Solar has been in contact with SRRWD, Freeborn SWCD and other Freeborn County staff. In late December 2020, Hayward Solar sent a request for comment letter and map of the Project Area to a number of agency and municipal contacts; the letter introduced the Project, indicate the proposed Project Area and requested comments or concerns regarding the Project. A follow up meeting with SRRWD staff and Hayward Solar was conducted on January 29, 2021; the Project team made a short presentation to further discuss the Project, parties involved, technical details, environmental/permitting status and related management plans, Project benefits to the County (taxes, landowner lease payments, jobs, economic development, etc.), other stakeholder outreach, and schedule. In the meeting Hayward Solar responded to a number of questions (e.g., Project size, acreage of leased land and land where PV panels would be installed, road setbacks, power purchaser, planned storage facilities [i.e., batteries, not currently planned], permitting process, infrastructure constraints, wetland impacts, decommissioning plan, vegetation management/pollinator friendly site, vegetation maintenance/mowing and benefits of year-round cover, County drain tile and potential impacts, drainage questions, taxes and landowner lease payments, SRRWD

construction rules); a summary of the meeting minutes is included in the SPA (see SPA Section 5.0 and Appendix A). At the conclusion of the meeting Hayward Solar asked for support of the Project by the SRRWD and staff reviewed potential response to this request.

On March 9, 2021 the SRRWD held its monthly board meeting; among other topics, the Hayward Solar Project was discussed and on March 26, 2021 the SRRWD issued a letter of support for the Project (see **Attachment A-3**). The SRRWD letter indicates that the District is in the process of completing its One Watershed, One Plan, water management plan and that habitat and native vegetation are critical factors of success to the plan. The SRRWD indicated support of the vegetation and habitat management plans that are being included in the SPA for the Project and that such grasses and plantings will reduce some issues the SWWRD is seeing near the Project with erosion, stream sedimentation and increased phosphorous. The SRRWD also indicated that this Project can be restorative to soil nutrient levels while providing stabilization to topsoil that can be lost when agricultural lands are tilled. Hayward Solar will continue to discuss the Project with SRRWD staff as permitting of the Project advances. Stakeholder outreach efforts and results like this are included in the SPA document.

Specific to the SRRWD, there are a number of measures and actions that Hayward Solar would take in designing, constructing and operating the Project that would directly and indirectly benefit and improve the water quality in this District, including:

1. the Project would decrease the amount of nutrients (including phosphorous and nitrogen) applied to the Preliminary Development Area during the 30-35 year life of the Project (i.e., row crop agricultural operations would temporarily cease during Project operation);
2. nutrients at the Project site would be better managed through incorporation, installation, establishment and maintenance of native vegetative plant species, as detailed in the Vegetation Management Plan (VMP) and Agriculture Impact Mitigation Plan (AIMP) that will be implemented for the life of the Project;
3. a stormwater management system (i.e., stormwater pond) will be designed, engineered, constructed and operated in accordance with applicable MPCA rules and regulations which will effectively address stormwater runoff from the Project site;
4. during construction of the Project, a NPDES construction stormwater runoff permit will be obtained from the MPCA and a SWPPP will be implemented before, during and after construction to address, manage and control erosion, stormwater runoff from construction activities and re-establishment of vegetative cover post-construction;
5. with the installation and establishment of native prairie vegetative cover in combination with the stormwater management facilities (ponds) to be in place during operation of Project facilities, water storage capacity may be increased and control structures could help improve site soil health and related conditions. While existing county drain tile and judicial drainage ditches will be maintained across the Project site to maintain neighboring agricultural land uses and field drainage, installation of the above Project facilities will improve downstream water quality, and improve site soils over time; and
6. in addition to the above benefits, Hayward Solar will explore active involvement in additional WMP-stated goals, including assisting with on-going monitoring of water quality at the Project site, conserving and restoring upland and wetland to provide natural buffering to upstream pollutants (in addition to Project plans that accomplish this already), enhancing native vegetation to increase waterfowl nesting areas, finding ways to engage more local capacity and funding sources, engaging the public through BMP cost share projects, and conducting education and public outreach using the Project as an example.

7.0 Assessment of Suitable Sites for Compliance with Prime Farmland Exclusion Rule

The following analysis follows the Guidance to apply the exception to the prime farmland exclusion (i.e., no "feasible and prudent" alternative site). This assessment will show how Hayward Solar has considered each of the Guidance factors and determined that the proposed Project Area site is the only feasible and prudent alternative site it was able to identify for the Project. It explains how Hayward Solar determined the proposed Project Area meets the Guidance requirements and describes how the evaluated sites near the Wilmarth Substation (which would otherwise be compliant with the prime farmland exclusion rule) are not feasible or prudent alternatives to the proposed Project Area.

7.1 Good Faith Consideration of Non-Prime Farmland Sites Near Interconnection Sites

Hayward Solar initially searched for available project locations within 2-miles of an existing substation and statutory cities that are available for an exemption from the Rule. Hayward Solar identified no potential sites within 2-miles of the City of Mankato or Albert Lea. As discussed above, Hayward Solar then expanded the search area from 2 to 5-miles from the existing Hayward and Wilmarth substations and identified the Project Area site and two other potential sites in Mankato (Wilmarth Evaluation Sites 1 and 2).

The proximity of the Mankato Regional Airport to the Wilmarth Evaluation Site 2 and its associated zoning restrictions indicates this site is not a feasible and prudent alternative to the chosen Project Area location. Hayward Solar also identified a site near Wilmarth (Wilmarth Evaluation 1) that would be sited entirely on non-prime farmland. However, as outlined in this memo, this land and adjacent land is owned and utilized by a sand mining company, which at the time Hayward Solar searched for its site, was actively being mined and expanded. Accordingly, this site is not a feasible and prudent alternative to the chosen Project Area.

The chosen Project Area is located on one of the largest contiguous areas of non-prime farmland soils in Freeborn County. As indicated in **Exhibit 6**, a major portion of land in the County (~76%) is classified as prime farmland, prime farmland if drained, and prime farmland if protected from flooding. Additionally, only a few areas not containing prime farmland in the County would be of sufficient size to completely support a 150 MWac, ~1,272 acre solar energy project (further discussed below).

There are generally three areas of contiguous non-prime farmland areas of more significant size in Freeborn County; farmland of statewide importance is located in the Hollandale area, east of Hayward (including the Project Area site), and south of Glenville (**Exhibit 6**). The Hollandale area consists of a number of water resources and wetlands and Hayward Solar did not identify an existing substation near this location that could support the Project and utilizing this area would require a 7.5-mile long gen-tie line to the Hayward Substation. Similarly, the area south of Glenville contained similar constraints, would require a 4.5-mile long gen-tie line to the Hayward Substation and was not considered further.

Hayward Solar is working with the five initial participating landowners associated with the original Project Area and two new adjacent landowners who recently wanted to be involved in the Project which is sufficient for development of the Project and contains non-prime farmland. Hayward Solar tried to increase use of non-prime farmland (and minimize use of prime farmland) by contacting the landowner of a large non-prime farmland area east and adjacent to the Project Area and another landowner that owns property in the center of the Project Area (**Exhibits 5 and 6**). Those landowners were not interested

in participating in the Project. Accordingly, Hayward Solar has sited the Project on one of the largest areas of non-prime farmland in Freeborn County, but has also eliminated the need for a long gen-tie line to the Hayward Substation.

The proposed Project includes the crossing area of SMMPA's existing 161 kV HVTL and the Project will connect to the grid via an in-out transmission line connection at a new switchyard which would be located approximately 2.7 miles east of the Hayward Substation (**Exhibits 3 and 4/4a**). The new SMMPA Switchyard will be used to interconnect the Project to the existing 161 kV line. The Project connection will be an approximate 200-foot long overhead 161 kV HVTL (gen-tie) between the Project substation to the SMMPA Switchyard (**Exhibits 3 & 4a**). This is the shortest, least impactful, most efficient and most optimal gen-tie option for the proposed Project in comparison to the two other sites (**Table 4**).

Table 4: Transmission Line Interconnection and Prime Farmland within 5 Miles of Site

Site	**Existing Substation Name/Utility**	**Min. Distance between Site and Existing Substation & Prime Farmland Crossed**	**Existing HVTL Location**	**Min. Distance between Site and Existing HVTL & Prime Farmland Crossed**	**Nearby Sites, Residences, & Businesses**	**Notes**
Project Area Site	Hayward Substation (SMMPA)	2.7 miles (to west) ~0.0 miles prime farmland crossed	161 kV (SMMPA) crosses Project Area	0 miles - New SMMPA Switchyard located within Project Area ~750-900 feet prime farmland crossed	I-90 and rail line located on north side of Project, several farmsteads, several County and local roads, KOA campground north of I-90.	Proposed plan is for new switchyard to be permitted, built and operated by SMMPA within the Project Area.
Wilmarth Evaluation Site 1	Wilmarth Substation (Northern States Power)	2.9 miles (to southwest) ~1 mile prime farmland crossed	161 kV (Dairyland Power)	0 miles – a 345 kV HVTL is located on the east side of the site crossing from north to south 0 miles prime farmland crossed	Closer proximity to nice, larger homes and acreages. Major infrastructure constraints.	On the outskirts of Mankato, near and within an active mining operation, very close to several residences, natural resource areas and the Minnesota River.

Wilmarth Evaluation Site 2	Wilmarth Substation (Northern States Power)	3.7 miles (to southwest) ~1.5 miles prime farmland crossed	115 kV (Northern States Power)	0 miles – a 345 kV HVTL crosses through this site from northeast to southwest 0 miles prime farmland crossed	Very near to Mankato with various homes and businesses. Major infrastructure constraints.	North of and adjacent to the Mankato Regional Airport. Development of the area offer additional challenges; proximity to residential/commercial/industrial/agricultural areas.

Outside of the home rule charter/statutory cities exemption, a single exception applies if there is no feasible and prudent alternative to a proposed project site. As indicated above the Project Area site encompasses approximately 1,958 acres of land (see **Exhibits 1 and 2**), it is not located within two miles of a home rule charter city or statutory city of the first, second and third class[24], and it contains prime farmland (**Exhibits 4, 4a & 5**). Of the 1,958-acre Project Area, approximately 1,272 acres would be used for construction of the Project as shown on the Preliminary Development Area map (**Exhibit 3**). None of the Project Area is exempt from the prime farmland exclusion rule due to proximity to applicable city designations.

Of the 1,272 acres of development area, a total of 648.4 acres (51%) are considered prime farmland (~58.1 acres/4.57% are *prime farmland*, ~590.3 acres/46.4% are *prime farmland if drained)*, and ~623.7 acres/49.03% are *farmland of statewide importance* [(**Exhibit 4a**).[25] Under the Rule (as applied to this proposed 150 MWac Project), no more than 75 acres of prime farmland can be used without seeking an exception (0.5 acres of prime farmland per MW of net generating capacity). Because the Project is planned to be up to 150 MW and the area required for Project development includes ~648.4 acres (51% of the development area) of prime farmland, it does not meet the Rule.

The proposed Project Area contains no acreage within the exempt home rule charter/statutory city areas compared to the Wilmarth evaluation sites. However, the 1,272 acres of the development area contains 624 acres (49%) of non-prime farmland area which Hayward Solar attempted to increase by including additional non-prime farmland to the east and in the center of the Project Area (the landowners were not willing to participate in the Project) which shows a good faith effort by Hayward Solar to avoid prime farmland in selecting the Project Area site. As discussed below, other criteria evaluated at the sites (including the amount of prime farmland acreage) revealed the Project Area site is optimal for the Project and superior to the two evaluated sites near the Wilmarth substation.

[24] According to League of Minnesota Cities data, the City of Hayward is a 4th Class City and a Plan A statutory city (see Handbook for Minnesota Cities - League of Minnesota Cities (lmc.org)).

[25] Note that the *prime farmland if drained* and *prime farmland if protected from flooding or not frequently flooded during the growing season* designations acreages are considered prime farmland and to be included in prime farmland acreage; *farmland of statewide importance* is not considered prime farmland and not included.

Hayward Solar determined that the proposed Project Area is justifiably located within south central Minnesota where a conflict may be present with the prime farmland exclusion. As noted herein, the best solar resource areas generally overlap with more heavily focused prime farmland areas and agriculture land use in southern Minnesota. Hayward Solar provides the following further explanation for selecting the Project location in this region which is mainly driven by access to transmission, highway access, land availability, landowner willingness to participate, avoidance of households constructability, potential for tax abatement, favorable topography and limited environmental impacts.

In addition to the proposed Project Area site Hayward Solar evaluated two other sites that would otherwise be compliant with the Rule but has determined that neither are a feasible or prudent alternative to the selected Project Area.

Hayward Solar also identified and reviewed non-prime farmland and prime farmland designated areas within the Project Area (**Exhibits 4/4a**), within five miles of the Project Area (**Exhibit 5**) and within Freeborn County (**Exhibit 6**) for consideration of other sites for the Project.

In Freeborn County there are three categories of land that are considered prime farmland (see **Exhibit 6** - all areas are prime farmland indicated in light red in the exhibits, prime farmland if drained indicated in light blue, and prime farmland if protected from flooding indicated in light purple). **Exhibit 6** also shows areas of non-prime farmland (indicated in light gray) and farmland of statewide importance (which are not considered prime farmland and indicated in light yellow).

A summary of non-prime farmland v. prime farmland areas is summarized in **Table 5** below.

Table 5: Summary of Non-Prime Farmland and Prime Farmland by Site

Site	**Map**	**Prime Farmland, Prime Farmland if Drained & Prime Farmland Protected (acres)[26]**	**Not Prime Farmland & Farmland of Statewide Importance (acres)**	**Total (acres)**	**Percent of Prime Farmland of Total Acres**
Project Area Site	Exhibits 4 & 4a	Project Area 1,207.76 Preliminary Development Area 648.62	Project Area 750.63 Preliminary Development Area 623.71	1,958 1,272	61.7% 51.0%
Five Mile Buffer of Project Area	Exhibit 5	24,309.35+40,704.80+0 = 65,014.15	12,920.76	77,934.91	83.4%

[26] Note the acreages and percentages of prime and non-prime farmland indicated in this table refer to areas within the applicable site that are not located within a 2-mile buffer of a statutory city according to the Rule. Please note that the Project Area Site is entirely outside of a 2-mile statutory city buffer; a small area of the Wilmarth Evaluation Site 1 is located within a 2-mile statutory city buffer (~14 acres); and a larger portion of the Wilmarth Evaluation Site 2 area is located with the 2-mile statutory city buffer (~369 acres). See **Exhibits 12 and 14a**.

Freeborn County	Exhibit 6	128,478.60+222,715.82+244.87 = 351,439.29	110,976.78	462,416.07	76.0%
Five Mile Buffer of Wilmarth Substation	Exhibit 12	28,834.40	21,430.45	50,264.85	57.4%
Wilmarth Evaluation Site 1	Exhibits 12 & 14a	0	1,239.40	1,239.40	0%
Wilmarth Evaluation Site 2	Exhibits 12 & 14a	120.46+193.05+0= 313.51	46.15	359.66	87.2%

Review of Freeborn County land designation indicates larger pockets non-prime farmland located east of Hayward (and part of the Project Area – see **Exhibit 6**), in the northeast corner of the County in Holland Township, in the southcentral portion of the County south of Glenville, and waterbodies distributed across the County and mainly located in the central portion of the County. Smaller pockets of non-prime farmland runs north-south through the central portion of the County, as well as the southwest corner of the County.

Exhibit 4 indicates the location of non-prime farmland within the Preliminary Development Area which totals 624 acres (or ~49% of the Preliminary Development Area) v. prime farmland which totals 649 acres (or ~51% of the Project Area). Within a 5-mile buffer of the Project Area, non-prime farmland totals 12,921 acres (or ~17% of the buffer area) v. prime farmland which totals 65,014 acres (or ~83% of the buffer Area), inclusive of Project Area land (**Exhibit 5**). Finally, within Freeborn County, non-prime farmland totals 110,977 acres (or 24% of the County) v. prime farmland which totals 351,439 acres (or 76% of the County), inclusive of Project Area land (**Exhibit 6**). The exhibits and summary of acreages above confirm the prevalence of prime farmland areas within Freeborn County which is fairly uniformly distributed across the County, as well as confirming the lack of large contiguous areas on non-prime farmland areas which could be considered to support a 150 MW solar energy generation project.

As indicated in **Exhibits 4/4a, 5 and 6** and acreages listed in **Table 5**, it is clear that the proposed Project Area is sited in an area containing a sizable amount of non-prime farmland acreage and a significant amount of the larger pocket of non-prime farmland located east of Hayward. Additionally, within the 5-mile buffer of the Project Area there is only one area (located north of the Project Area at the edge of the buffer area near Hollandale) that contains a similar contiguous amount of non-prime farmland that could be considered as a potential site.

While the Hollandale area non-prime farmland is mainly in use as crops, this area also contains a significant amount of water resources, waterbodies and wetlands and it is located approximately 6.5 miles northeast of the Hayward Substation (**Exhibit 6**). For these reasons, Hayward Solar did not further identify potential land or contact landowners in the Hollandale area. The proposed Project Area at the Hayward site provided the best in access from the interstate highway system (I-90 is located along the northern border of the Project Area), access to transmission, limited environmental issues and landowners interested in participating in the Project by leasing their land. Also, while Hayward Solar discussed the Project with the Mankato Economic Development office, the ALEDA was very receptive, interested and helpful in

discussing the potential for the Project and related economic development opportunity that might be available to county landowners and Hayward Solar.

In summary, assessment results as discussed above caused Hayward Solar to determine the Wilmarth Substation and associated sites were not prudent or feasible alternatives for the Project Area. These were eliminated from consideration due to lack of available development area due to constraints (Wilmarth Evaluation Site 1), little or no landowner interest (e.g., active mining operation near Wilmarth Evaluation Site 1), conflicts with existing land use/airport (Wilmarth Evaluation Site 2), and conflicts with landowners concerns about siting solar on their property or allowing a HVTL to be sited to interconnect the project (Wilmarth Evaluation Site 2) and conflicts with prime farmland acreage (Wilmarth Evaluation Site 2). While the Wilmarth Evaluation Site 1 contained little prime farmland, its location adjacent to the Minnesota River, natural resources and sensitive species and the active mining operation present significant development issues. The Wilmarth Evaluation Site 2 contained a significant amount of prime farmland, even though a certain amount of the areas considered are located within city designation exemption areas under the Rule (e.g., otherwise compliant areas) it would have violated the Rule. Hayward Solar focused the site selection and avoidance of other prohibited areas at the Hayward Substation in comparison to Wilmarth Substation sites as discussed below.

Avoidance & Minimization Considerations

As discussed above, the Project Area is an optimal site for development of the proposed 150 MWac solar generating facility and is superior to the other evaluation sites considered for various reasons. Hayward Solar has avoided and minimized impacts to prime farmland given the amount of non-prime farmland in the developable Project Area at the site in comparison to the other evaluation sites considered. Hayward Solar further minimized impacts to prime farmland within the Project Area by siting and designing Project facilities in non-prime farmland areas to the greatest extent possible and focusing use of Project facilities in areas with no prime farmland.

Impacts, Mitigative Measures and Benefits

In addition to this assessment, the SPA provides a description of prime farmland at the Project site and potential impacts to prime farmland from the Project. It also discusses a number of mitigative actions and the numerous benefits the Project will provide to site soil and affected prime farmland area within the Project Area. The following is a brief summary of each:

Impacts

Soil characteristics within the Project Area were assessed using the Soil Survey Geographic database (SSURGO) (Soil Survey Staff, 2020). The SSURGO database provides a 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, 2020). Approximately 62% of the ~1,958 acre Project Area is located on prime farmland (~108 acres prime farmland and ~1,100 acres prime farmland if drained) as shown on **Exhibits 4/4a**. The remaining 38% (~751 acres) of the Project Area is not prime farmland.

The 1,272 acre Preliminary Development Area[27] contains approximately ~58 acres of prime farmland (4.6%), ~590 acres of prime farmland if drained (46.4%), and ~624 acres of non-prime farmland (49.0%) which would be removed from agricultural/row crop production by construction and operation of the Project during its 30-35 year life (**Exhibit 4a**). These acreages would be temporarily taken out of agricultural production for the ~30 year life of the Project but not permanently removed.

Impacts to Project site soils (and prime farmland areas where present) will occur during the construction and decommissioning stages of the Project. Because the Project location is on relatively level existing agricultural fields, construction will require minimal grading to provide a level surface for the Project PV panels/solar arrays, foundations, inverter skids, transmission poles and associated facilities. During construction, grading activities associated with site preparation will create the most potential to temporarily affect topsoil conditions and soil erosion. While the Project site is relatively level and requires comparatively little grading, some grading will be necessary. To minimize these impacts, spot grading will be used to the extent possible for constructing the PV solar arrays, access roads, and Project facilities (Project substation, O&M building, new switchyard site). Preliminary grading estimates completed for the Preliminary Development Area total approximately 19 acres to prepare stormwater retention areas and correct soil (~1.8% of the Preliminary Development Area). This does not include site preparation areas for the access roads [~78 acres], inverters [~0.6 acres], Project substation [~1.7 acres], SMMPA Switchyard [~4 acres], O&M building [~0.9 acres], PV panels within fenced area [~1,117 acres] collection line [~56 acres], temporary laydown areas [~10-15 acres] and unused area [~686 acres].

Grading activities with the greatest potential to affect topsoil conditions is likely to be for the grading associated with construction of access roads and the Project Substation. A total of 2,700 cubic yards of cut and fill is estimated for construction of the Project arrays. Cut and fill volume estimates for the access roads, stormwater basins, inverter pads, Project Substation and the SMMPA Switchyard are pending.

In addition, some soil compaction may result from the installation of the direct-embedded piers for the solar arrays and inverter skids. Soil replacement and/or amendments may be necessary in limited areas of the Projects, especially in hydric soil units near wetlands, or other areas with soil limitations. During operation of the Project, ongoing soil compaction could occur from the use of access roads. This impact is expected to be negligible and confined to the road bed. Overall, the Project is expected to reduce the potential for erosion because vegetation will be established over the Project Area that is occupied by solar arrays, in contrast to the amount of exposed soils typical of row crop agricultural production. Potential erosion will be further minimized by dressing access roads with gravel and installing culverts under access roads where necessary to redirect concentrated runoff. For the overall Project, construction activities will employ engineered erosion and sediment control best management practices (BMPs) implemented as part of the SWPPP specifically prepared for the Project.

Hayward Solar has conducted a detailed evaluation of overall Project impacts in the SPA in addition to impacts to specific prime farmland areas. Impacts to agricultural land use was evaluated and is being discussed with a number of stakeholders including, but not limited to, the MDA, MnDNR, DOC, MPCA, SRRWD, Freeborn SWCD, Freeborn County, etc. As discussed above and in the SPA, the Project site was chosen due to the proximity to the Hayward Substation and the substation's available capacity to interconnect the Project to the transmission system without extensive system upgrades. It was

[27] As defined in the SPA (Section 1.0), the Preliminary Development Area is the area where the Project facilities (PV panels, collection lines, access roads, fencing, Project substation, O&M building, new switchyard, etc.) would be constructed and operated for the Project.

additionally selected due to the lack of other environmental constraints, adequate roads for access, flat terrain, willing landowners for leasing land for the Project, and proximity to the Hayward Substation which minimizes transmission line losses.

Mitigative Measures

As stated above, the Project Area will only temporarily be taken out of production. A number of mitigative measures will be taken to address prime farmland, soil and agriculture impacts from the Project. Mitigation actions will include various interwoven engineering, design, vegetation management, permitting, construction stormwater management, stormwater management during Project operation, agriculture management and related steps. Because the Project will result in temporary change in land use without significant grading, minimal loss of soils is expected once construction is completed, and cover vegetation is installed, established and maintained.

While the Project Area is the permittable area for the Project, portions of the Project Area will not be used for development of the Project due to land use or other constraints. The areas between the Preliminary Development Area and the Project Area will be avoided and not be impacted by the Project (**Exhibits 3 and 4a**). Any laydown yard or other temporary construction areas needed to build the Project will be returned to pre-construction conditions and returned to pre-Project land use(s). Temporary construction areas have not yet been determined and, to the extent possible, these temporary areas will be located in the vicinity of planned construction disturbance areas (e.g., Project Substation, O&M building and new SMMPA Switchyard). In all land areas disturbed during construction, Hayward Solar will implement measures to reduce soil compaction and will commit to decompaction of soils during restoration of Project workspaces.

Impacts to soils would be temporary and minor and would be mitigated through the proper use and installation of BMPs such as stockpiling topsoil for later spreading and seeding and minimizing soil compaction to work areas to the degree practicable. Hayward Solar will obtain, implement and comply with an applicable National Pollutant Discharge Elimination System (NPDES) construction stormwater permit which includes development of a Stormwater Pollution Prevention Plan (SWPPP) that complies with MPCA rules and guidelines. Implementation of the protocols outlined in the NPDES permit and SWPPP will minimize the potential for soil erosion during construction.

Additionally, Hayward Solar has prepared and will implement a Vegetation Management Plan (VMP) outlining how soils and vegetative cover will be identified, installed, established and maintained at the Project site during and after construction (for preservation of soils and wildlife habitat enhancement as part of construction and operation). Hayward Solar is committed to working with applicable agencies and stakeholders to develop a VMP that is best for wildlife and the maintaining of the soils. Initial post-construction revegetation efforts and maintenance of vegetation during operations and maintenance will consider selecting suited plants, managing seeding times for late spring early summer when soil moisture is optimum for germination, use of mulch, and other BMPs.

The VMP was developed to include as many “stackable” benefits as possible that work for the Project and the Project site (including pollinator-friendly native plants, possible suitable grazing plants, etc.) to provide to the extent possible the following: improved soil health, water storage, water filtration, carbon sequestration, reduction in wind and surface water erosion, wildlife habitat, etc. Hayward Solar has committed the Project to meet the requirements of the Minnesota Board of Water & Soil Resources (BWSR) pollinator habitat friendly standard as part of the VMP process. The VMP follows recently issued DOC, MDA, MnDNR, BWSR and Freeborn SWCD guidelines. The VMP is being reviewed and commented

on by a number of regulatory agencies and will be required by the Site Permit expected to be issued for the Project. Hayward Solar will utilize an adaptive management approach for vegetation management in order to provide the best care and protection for the prime farmland from year to year. Hayward Solar is committed to ensuring the vitality of the soils during and after the Project. Hayward Solar has engaged a qualified consultant to prepare the VMP and will engage equally qualified contractors to implement the VMP. The VMP is included in an appendix of the SPA.

Also, Hayward Solar also prepared an Agriculture Impact Mitigation Plan (AIMP) to identify and address impacts to soils and agriculture to allow return of Project land to agricultural operations after the life of the Project. The AIMP identified locations and areas within the Project Area not impacted by the Project or part of Project development that can continue to be used for agricultural uses. The AIMP works in conjunction with the VMP and will help preserve soils and assist in enhancing wildlife habitat. The AIMP is included in an appendix of the SPA.

As a form of mitigation, landowners are being compensated through lease payments based on the value of the land being currently used for row crop agriculture production. The lease agreements between Hayward Solar and participating landowners contains terms and conditions that require Hayward Solar to return leased lands in a condition that allows for agricultural use and that Project facilities are decommissioned and removed from the leased lands at the end of the Project life. Through the lease provisions, VMP, AIMP and other Project plans and actions, the Project lands will be available for future agricultural production (similar to current land use) once the Project is decommissioned.

Hayward Solar will complete a Phase I Environmental Site Assessment (ESA) of the Project Area to identify any Recognized Environmental Conditions (RECs) associated with the site. This assessment will be used to evaluate other potential environmental impacts or risks from identified RECs relative to Project plans. The Phase I ESA will be used as a way to identify and mitigate risk. The ESA will be completed at a later date and before final design and engineering are completed for the Project.

Project Benefits

Hayward Solar is committed to being a good steward to the community, landowners and environment as part of development of the Project. In addition to mitigative measures discussed above, other Project offsetting benefits are described in this section. As discussed in the SRRWD section above, upon construction of and implementation of the mitigative measures described above, the Project will directly and indirectly provide benefits and improve the water quality in the District. These benefits include:

- decreasing the amount of nutrients (including phosphorous and nitrogen) applied to the Preliminary Development Area during the 30-35 year life of the Project (i.e., row crop agricultural operations would temporarily cease during Project operation);
- managing nutrients at the Project site through incorporation, installation, establishment and maintenance of native vegetative plant species, as detailed in the VMP and AIMP that will be implemented for the life of the Project;
- designing, engineering, permitting, constructing, operating and maintaining a stormwater management system (i.e., stormwater pond) in accordance with applicable MPCA rules and regulations to effectively address stormwater runoff from the Project site;
- obtaining and implementing a NPDES construction stormwater runoff permit/SWPPP from the MPCA during construction to address, manage and control erosion, stormwater runoff from construction activities and re-establishment of vegetative cover post-construction;

- possibly increasing the water storage capacity and controlling flow structures with the installation and establishment of native prairie vegetative cover in combination with the stormwater management facilities (ponds) to be installed for operation of Project facilities which will help improve site soil health and related conditions (installation of these Project facilities will improve downstream water quality, and improve site soils over time);
- maintaining current county drain tile and judicial drainage ditches across the Project site to ensure no impact to neighboring agricultural land uses and field drainage; and
- exploring active involvement in additional WMP- and SRRWD-stated goals, including assisting with on-going monitoring of water quality at the Project site, conserving and restoring upland and wetland to provide natural buffering to upstream pollutants (in addition to Project plans that accomplish this already), enhancing native vegetation to increase waterfowl nesting areas, finding ways to engage more local capacity and funding sources, engaging the public through BMP cost share projects, and conducting education and public outreach (using the Project site as an example).

As the permitting process advances and the Project becomes more developed, additional offsetting benefits may be identified. Hayward Solar is committed to identifying additional benefits and evaluating incorporating such benefits into Project plans as it deems possible.

Conclusions & Recommendations

In accordance with the Rule and Guidance, Hayward Solar completed a thorough and complete assessment of prime farmland exclusion criteria and associated factors to determine that there are not feasible or prudent alternatives to the Project Area and that the Project qualifies for an exception to the Rule. The above assessment included review of the numerous Guidance criteria and has presented the results of the assessment to show the exception has been met.

To show it meets this test, Hayward Solar provides a substantial review of the robust process it used to identify whether any feasible and prudent alternatives exist and demonstrates it was unable to find one. It provides the PUC and DOC necessary information to decide if the exemption criteria has been satisfied or information to allow the PUC to issue a variance to its Rule (under Minn. Rule 7829.3200). Hayward Solar believes it has analyzed and assessed the prime farmland exclusion rule extensively and that no further effort should be required or necessary for the PUC to determine there are no feasible or prudent alternatives to the Project Area site.

Hayward Solar considered all prohibited and exclusion sites as part of the identifying an existing substation to interconnect the Project and the siting process for the Project with the goal of avoiding these sites. As discussed above, the areas surrounding the Wilmarth Evaluation Sites 1 and 2 includes significantly more constraints, prohibited and/or exclusion sites and other difficulties which would have prevented development of the Project if these sites were utilized for the Project. The proposed Project Area avoids these constraints and prohibited/excluded sites, and allows for a permittable Project, as well as providing a number of benefits to soil and water quality in the Project Area.

While Hayward Solar has avoided use of prime farmland area to the greatest extent possible for the Project, it provides detailed and comprehensive discussion of numerous offsetting benefits and mitigative actions (in both this assessment and the Site Permit Application for the Project). An extensive list of benefits and mitigation are presented above. We conclude that the proposed Project Area is an optimal

site for development of the proposed 150 MW solar generating facility and is superior to the other sites considered for the reasons assessed herein.

Hayward Solar has avoided and minimized impacts to prime farmland given the amount of non-prime farmland in the developable Project Area at the site in comparison to the other sites considered. Hayward Solar further minimized impacts to prime farmland within the Project Area by siting and designing Project facilities in non-prime farmland areas to the greatest extent possible and focusing use of Project facilities in areas with no prime farmland. For these reasons, we respectfully recommend that the PUC find that Hayward Solar has met the requirements to show there are no feasible or prudent alternatives to the proposed Project site and an exception to the Rule should be granted for the Project.

In summary, assessment results as discussed above helped Hayward Solar determine the Wilmarth Substation and associated Wilmarth Evaluation Sites 1 and 2 were not feasible or prudent alternatives to the Project Area site. The Wilmarth Evaluation Site 1 was eliminated from consideration because it was located near and within an active mining operation which conflicts with that use, it is in a heavily developed area of Mankato, it contains or is near sites that are prohibited/excluded from solar energy generation use, there are several potential urban/power conflicts, there would be high competition for land and other land use, there was a lack of community interest in the Project, there are potential HVTL/gen-tie routing issues, there would be potential impacts to businesses, neighboring residences and landowners from the Project, and there are potential impacts to the environment and nearby natural resources (e.g., Minnesota River, conservation areas, SNA, shoreland, wetlands, parks, sensitive species, etc.).

The Wilmarth Evaluation Site 2 was also ruled out for similar reasons as the Wilmarth Evaluation Site 1; additional major constraints of this site include being located north and adjacent to the Mankato Regional Airport, significant HVTL/gen-tie routing concerns (e.g., the gen-tie line would have to cross through residential, commercial and rural areas), and potential HVTL permitting concerns (e.g., the recent Xcel Energy's Huntley-Wilmarth 345 kV HVTL project recently went through a difficult permitting process).

The Project Area site was selected because it has relatively few development conflicts or constraints (e.g., few land use, human settlement, environmental, natural resources and related concerns, and few potential regulatory issues), maximum use of aggregate non-prime farmland acreage of sufficient size to support the Project, access to the grid and positive MISO process, a unique transmission interconnection opportunity (e.g., ability to use a line connection via a new switchyard at the existing SMMPA 161 kV HVTL that crosses through the Project Area), very willing landowners, strong community support, and minimal and optimal costing factors.

For all of these reasons and as shown in the above analysis, Hayward Solar believes it has met prime farmland Guidance and requirements of the Rule to determine that no alternative sites relative to prime farmland have been identified, that the Project Area is a feasible and prudent site, and that the Project should be exempt from the Rule.

Attachments

A-1 *Solar Energy Production and Prime Farmland – Guidance for Evaluating Prudent and Feasible Alternatives* (Minnesota EERA, May 19, 2020)
A-2 MSSA Reports (Project Area Site, Wilmarth Evaluation Sites 1 and 2)
A-3 SRRWD Letter of Support (March 26, 2021)

Tables

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Table 4 Transmission Line Interconnection and Prime Farmland within 5 Miles of Site
Table 5 Summary of Non-Prime Farmland and Prime Farmland by Site

Exhibits

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Exhibit 2 Preliminary Identification of Potential Project Sites
Exhibit 3 Site Control & Preliminary Development Area
Exhibit 4 Project Area Prime Farmland & Proximity Map
Exhibit 4a Preliminary Development Area & Prime Farmland Map
Exhibit 5 5-Mile Project Area Buffer Prime Farmland Map
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Exhibit 7 Solar Resources in Minnesota
Exhibit 8 MSSA Insolation at Project Area Site
Exhibit 9 MSSA Insolation at Wilmarth Evaluation Sites
Exhibit 10 Topography & Soils of Project Area
Exhibit 11 Regional Watershed Districts Within Project Area
Exhibit 11a Drainage Ways, Surface Waters & Watersheds in Project Area
Exhibit 12 Wilmarth Evaluation Sites Prime Farmland & Charter Cities
Exhibit 13 Hayward Substation Constraints Map
Exhibit 13a Hayward Substation Prime Farmland & Topography
Exhibit 14 Wilmarth Substation Constraints Map
Exhibit 14a Wilmarth Substation Prime Farmland & Topography
Exhibit 15 Project Area Karst Lands
Exhibit 15a Wilmarth Evaluation Sites Karst Lands

References

C.F.R. 657.5(a)
Minn. Rule 7850.4400, subpart 4
Solar Energy Production and Prime Farmland – Guidance for Evaluating Prudent and Feasible Alternatives (Minnesota EERA, May 19, 2020). https://mn.gov/eera/web/doc/13929/
Solar Siting in Agricultural Landscapes: Stakeholder Input Summary" September 16, 2019, MN Management and Budget, Management Analysis and Development, https://mn.gov/eera/web/doc/13928

Attachment A-1

Solar Energy Production and Prime Farmland

Guidance for Evaluating Prudent and Feasible Alternatives

May 19, 2020

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Introduction

The growth of solar, combined with the requirement for relatively large, flat parcels needed to install large solar facilities, is highlighting the issue of the potential repurposing of agricultural land in Minnesota. Ground-mounted solar energy production uses significantly more land than other types of electric generation. Solar photovoltaic facilities require approximately seven to 10 acres per megawatt (MW) as opposed to less than an acre per MW for wind projects. In addition, wind projects allow shared land use with agriculture, while solar production removes the entire area of the facility from agricultural production. Though many entities are developing agricultural models to co-locate agricultural uses with community-level solar facilities, work remains to scale those uses to utility scale installations.

Since the best solar resources are generally coterminous with some of Minnesota's most productive farmland, the expansion of solar development frequently conflicts with the Public Utilities Commission (Commission) Rule to exclude energy generating installations from prime farmland (a federal designation of a quality soil type[i]). Specifically, no such installation may be permitted that includes more than 0.5 acres of prime farmland per MW of net generating capacity.[ii]

The only exception to the Rule is if there is no "feasible and prudent" alternative.[iii] Since the State of Minnesota has dual mandates to advance solar energy production and protect prime farmland, and due to the inherent difficulties in avoiding prime farmland, this guidance is meant to assist developers in defining feasible and prudent in relation to siting alternatives and encourage them to build a record early in the site selection process showing whether or not an exception to the prime farmland exclusion is warranted. There are a series of factors that should be considered. This guidance document attempts to help define those factors and describes steps a developer should take in developing a permittable solar site.

Siting Constraints

The Commission requested input from both the Minnesota Department of Agriculture (MDA) and Department of Commerce (EERA) on the issue of solar siting and agricultural land use, to assist them in making solar siting decisions. MDA and EERA convened a study group in the summer of 2019 to gather information and identify the interests and priorities of a wide range of stakeholders. In particular, these stakeholders included utility and smaller scale solar developers, farmers' organizations, energy nonprofits, local governments, and academic planners. Minnesota Management and Budget facilitated the study group and prepared a report detailing those meetings and stakeholders' interests.[iv] See that report for a better understanding of the siting constraints leading to conflicts between solar development and farmland preservation.

Generally, siting on farmland is going to be the most favorable option for developers because it often meets the primary siting factors considered in a siting a solar facility. The primary siting factors for developers are 1) best available source (Where is the most productive solar resource?); 2) access to the grid (Is there access to

transmission or reasonably affordable interconnection?); 3) a developable site (Does the site offer favorable ground slope and limited environmental liability?); and 4) willing participants (Are there landowners willing to lease or sell the land or energy rights?). When considering the difficulty of meeting these factors, if a site effectively checks off all four, and is the only site the developer has been able to ascertain that does so, it may well be the only feasible and prudent alternative.

Of course, that means the developer should show their work: how was it determined that the site meets all the requirements; and what other sites were evaluated that failed to do so (and why)?

Factors driving choice of region

The first guidance provided herein is that the developer should offer an explanation of the particular constraints driving them to build a facility in a region of the state that may conflict with the prime farmland exclusion as opposed to a non-conflicting site (i.e., they must show that alternatives are not feasible or prudent). When submitting an application for a site permit to the Commission, developers should describe the following assessment of prime farmland use in detail:

1. Describe the solar resource in the proposed region vs. otherwise compliant areas[v] reviewed;
2. Describe the process of determining available interconnection points;
3. Describe efforts in investigating developable sites (sites with appropriate topography and willing participants) in otherwise compliant areas.

These elements need to be examined and explained, as the Rule states explicitly that "Economic considerations alone do not justify the use of more prime farmland."[vi]

Factors to consider when prime farmland is present

If the previous assessment results in a determination that the facility is justifiably located within a region of the state that may conflict with the prime farmland exclusion, further explanation should be presented for the location within that region. Proximity to interconnection is likely the primary consideration for siting on prime farmland. However, there are precedents for LEPGFs located several miles from interconnects, typically making that connection through high voltage transmission line (HVTL) construction. The developer should make the case why, for example, distance, required transmission upgrades, or required buried power lines among other matters, to a particular interconnection point makes alternative construction sites neither feasible nor prudent.

1. If there are areas of nonprime farmland within a chosen radius of an interconnection site, demonstrate a good faith consideration of those sites.
2. Describe how avoidance of other prohibited areas influenced site selection.
3. Demonstrate a good faith consideration of alternative site configurations or technologies:

    a. Explain why, in addition to economic reasons, an alternate configuration such as transmission to an alternate, compliant site or the use of multiple dispersed sites is not feasible and prudent.
    b. Demonstrate how alternative technologies, such as panel/rack designs that allow siting on steeper slopes, or any other alternative technologies reviewed are not feasible and prudent.

Scoping Alternatives

Solar generating facilities permitted by the Public Utilities Commission (facilities of at least 50 MW) require the preparation of an Environmental Assessment (EA). EERA is responsible for scoping and preparing this document. It is one more opportunity to identify and evaluate potentially feasible and prudent alternatives.

Scoping alternatives may be identified by the developer, EERA, MDA, the public or even the Commission during the review process. It would be up to EERA to recommend which alternatives warranted further study or inclusion in the EA; it would be up to the Commission to make a final determination of which alternatives are considered. For those alternatives forwarded for review in the EA, EERA would pursue essentially the same review requirements noted above, with the same goal of establishing their prudence and feasibility.

The scoping process is also critical as a test in the Commission's review of the outcomes. If there is substantial review of potential alternatives in the application, and a robust scoping process does not identify any feasible and prudent alternatives, the Commission should reasonably be able to say the test has been adequately met.

Exemption or Variance Determination

In the end, the review in the application and the scoping process should provide the Commission the necessary information to decide if its exemption criteria have been satisfied. In certain cases, where the record does not support an exemption, the Commission could still vary its own Rule. The Commission has the authority to do so under Minn. Rule 7829.3200 under certain restrictions, particularly if the exclusion were to "impose an excessive burden upon the applicant."[vii] The onus to define and defend an "excessive burden" would be on the developer. However, if the above reviews have developed a satisfactory record, a variance should not be necessary.

Mitigations and Offsetting Benefits

A separate but important consideration in using farmland for solar facilities is the implementation of mitigations and offsetting benefits. Participants discussed several possibilities in the stakeholder process for solar sites generally. While these alone do not constitute an excuse for exemption or variance, a critical determination could be any mitigations employed by the developer or any offsetting benefits inherent in the location or installation of a particular facility. These could include:

- Locating on areas of vulnerable groundwater, protecting aquifer from nitrates.
- Perennial vegetation which would preserve or improve the current soil quality over time.
- Pollinator habitat preserved or developed.
- Co-locating with agricultural uses, such as grazing or harvesting forage.

The developer should describe the above or any other offsets and delineate any mitigations considered or being employed, such as an Agricultural Impact Mitigation Plan (AIMP) or any vegetation management plans.

[i] C.F.R. 657.5(a) provides, in part,

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses . . . . It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding.

[ii] Minn. Rule 7850.4400, subpart 4,

No large electric power generating plant site may be permitted where the developed portion of the plant site, excluding water storage reservoirs and cooling ponds, includes more than 0.5 acres of prime farmland per megawatt of net generating capacity, or where makeup water storage reservoir or cooling pond facilities include more than 0.5 acres of prime farmland per megawatt of net generating capacity, unless there is no feasible and prudent alternative. Economic considerations alone do not justify the use of more prime farmland. "Prime farmland" means those soils that meet the specifications of Code of Federal Regulations 1980, title 7, section 657.5, paragraph (a). These provisions do not apply to areas located within home rule charter or statutory cities; areas located within two miles of home rule charter or statutory cities of the first, second, and third class; or areas designated for orderly annexation under Minnesota Statutes, section 414.0325.

[iii] ID

[iv] "Solar Siting in Agricultural Landscapes: Stakeholder Input Summary," September 16, 2019, MN Management and Budget, Management Analysis and Development, https://mn.gov/eera/web/doc/13928

[v] Otherwise compliant areas refers to areas not specifically prohibited (subpart 1) or generally excluded (subpart 3) for energy development as enumerated in Minn. Rule 7850.4400, including subpart 1.

[vi] Minn. Rule 7850.4400, subpart 4

[vii] Minn. Rule 7829.3200, subpart 1

The commission shall grant a variance to its rules when it determines that the following requirements are met:

A. enforcement of the rule would impose an excessive burden upon the applicant or others affected by the rule;
B. granting the variance would not adversely affect the public interest; and
C. granting the variance would not conflict with standards imposed by law.

Appendix A-2a

Project Area Site

Solar Suitability Report

Latitude: 43.645818 Longitude: -93.192461

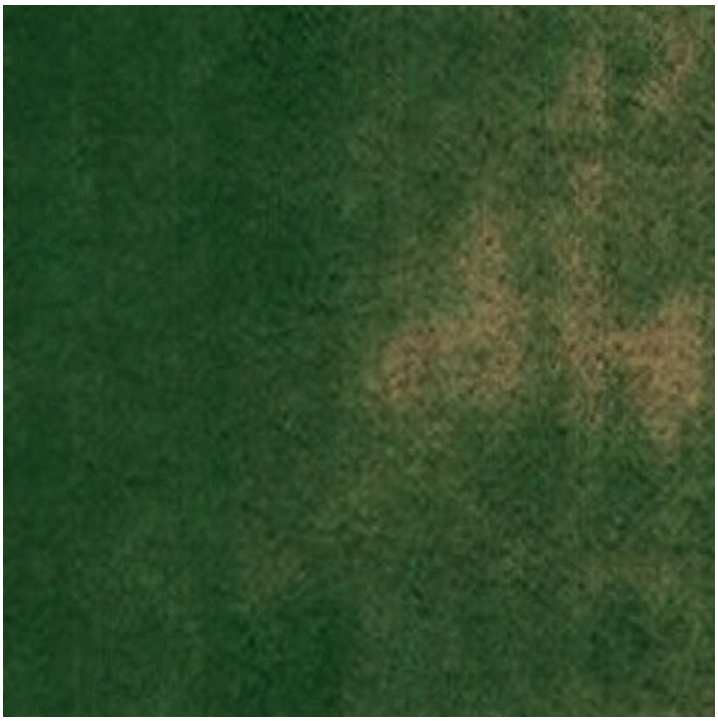
mn.gov/solarapp

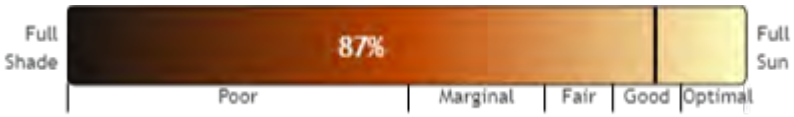
Thu Dec 03, 2020

Site Name

Site Address

Site Notes



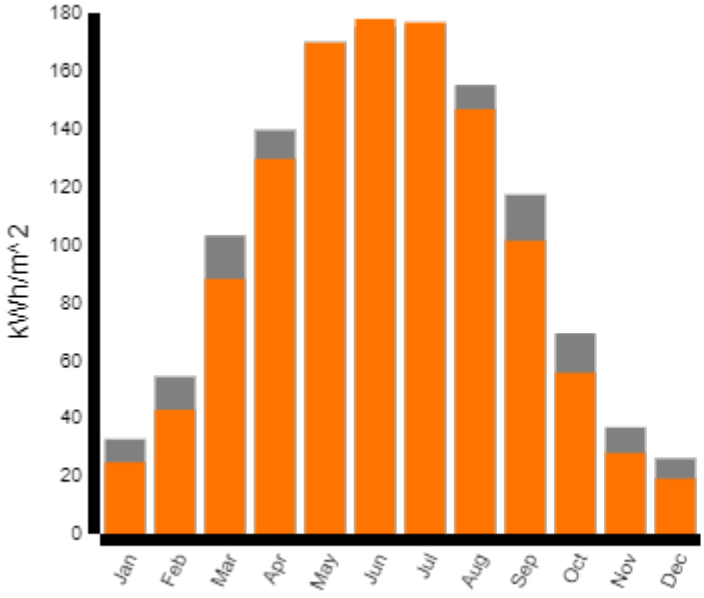


This site is **Good**. It would need a **4.77 kW** system to generate **50%** of average household use. This system would cost approximately **$17,903**. System payback is **13.0 years** after tax credit.

Utility Service Provider:
Interstate Power Company
1000 Main Street P.O. Box 769
Dubuque, MN 52004
(800) 255-4268
www.alliantenergy.com

Site Details:
Total Annual Insolation: 1171.14 kWh/m^2
Avg Insolation per Day: 3.21 kWh/m^2
Source Data: Fall 2008

Amount Actual Sun



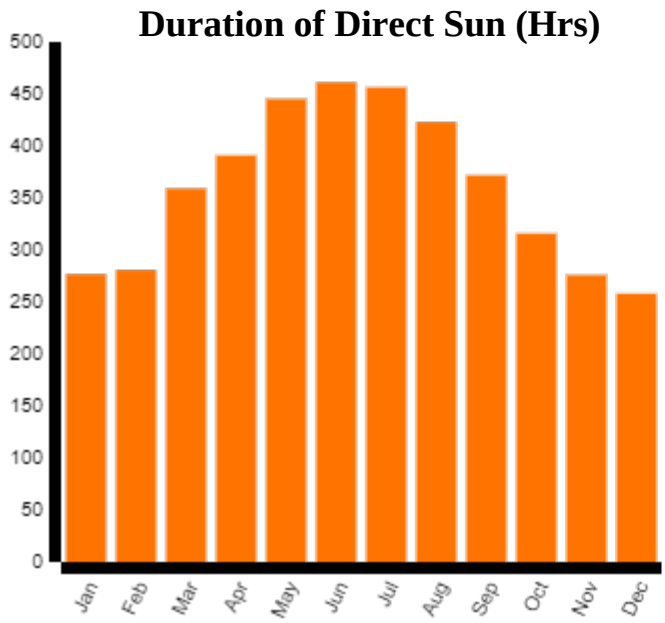
Solar Calculator

User Input	Value	Tips and Notes
Average utility use (per month)	800 kWh	The average residential household uses 800 kWh/month. If you know your monthly usage, fill it in here.
Cost / kWh	$0.12/kWh	Minnesota's average residential cost of electricity is $0.12/kWh. If you know your cost of electricity enter it here.
Percent of electricity provided by solar	50%	Experiment with different percentages here to see how system cost varies. Think about how energy efficiency improvements bring down the cost of your solar system.

Outputs	Value	Tips and Notes
Size of system needed	4.77 kW	Result is based on values provided for monthly electricity use and desired percentage covered by solar. It also includes a derate of 0.87. A factor accounting for conversion of the array's DC nameplate capacity to the system's AC power rating at Standard Test Condition.
System cost estimate	$17,903	Result is based on an average 2020 Minnesota residential system cost of $3,750 per kW. Costs will vary depending on the specifics of your system.
Payback without incentives	17.60 years	Result assumes that electricity costs will rise 3.5% each year over 25 years.
Payback with Tax Credit	13.02 years	Your system may be eligible for a federal tax credit. This result shows the payback of your system with the 26% tax credit in 2020 applied.

Month	Actual % Sun**	Total kWh/m2	Duration (Hrs)
January	76%	24.74	276.6
February	79%	42.89	280.6
March	86%	88.10	359.0
April	93%	129.63	390.9
May	100%	169.79	445.3
June	100%	177.96	461.1
July	100%	176.77	456.4
August	95%	146.78	422.9
September	86%	101.34	371.8
October	80%	55.67	315.9
November	76%	27.96	275.9
December	73%	19.08	258.0

**These percentages should be used as the monthly shading derate factors % on the Xcel Solar Rewards application



This service made possible by:

COMMERCE DEPARTMENT
ENERGY RESOURCES

Appendix A-2b

Wilmarth Evaluation Site 1

Solar Suitability Report

Latitude: 44.255583 Longitude: -93.992022

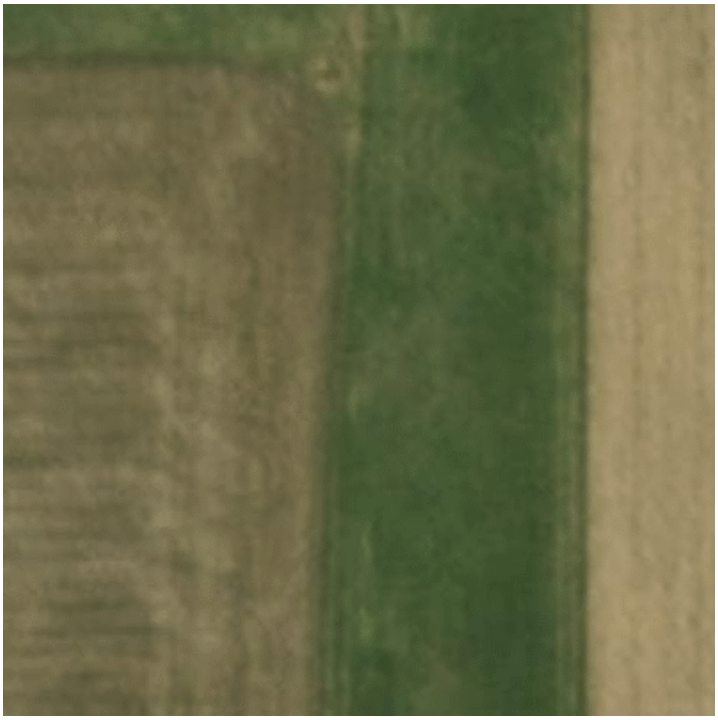
mn.gov/solarapp

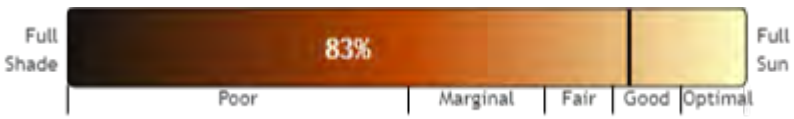
Fri Feb 05, 2021

Site Name

Site Address

Site Notes



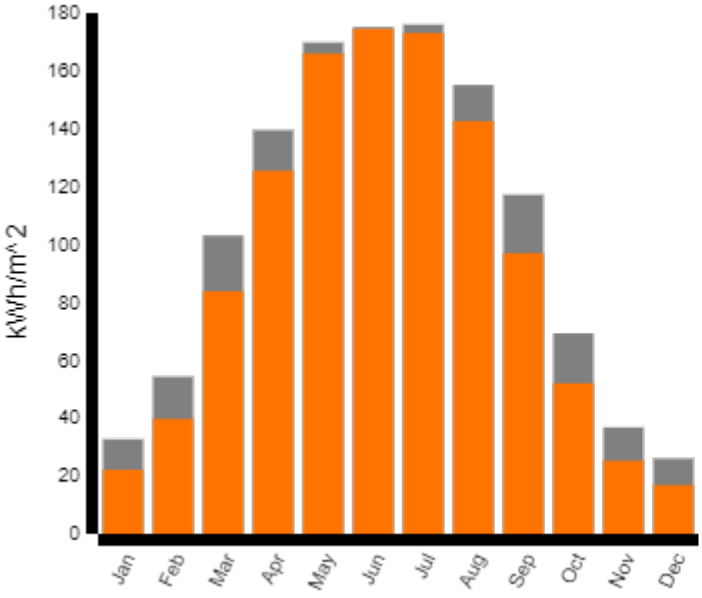


This site is **Good**. It would need a **4.99 kW** system to generate **50%** of average household use. This system would cost approximately **$18,720**. With *Xcel Solar Rewards* and other incentives estimated system payback is **8.1 years**.

Utility Service Provider:
Xcel Energy
414 Nicollet Mall
Minneapolis, MN 55401
(612) 330-5500
www.xcelenergy.com

Site Details:
Total Annual Insolation: 1120.31 kWh/m^2
Avg Insolation per Day: 3.07 kWh/m^2
Source Data: Spring and Fall 2010

Amount Actual Sun



Solar Calculator

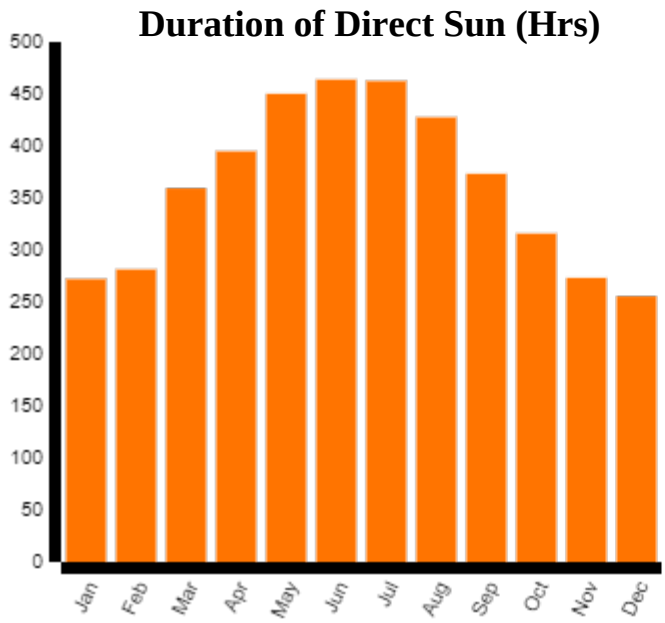
User Input	Value	Tips and Notes
Average utility use (per month)	800 kWh	The average residential household uses 800 kWh/month. If you know your monthly usage, fill it in here.
Cost / kWh	$0.12/kWh	Minnesota's average residential cost of electricity is $0.12/kWh. If you know your cost of electricity enter it here.
Percent of electricity provided by solar	50%	Experiment with different percentages here to see how system cost varies. Think about how energy efficiency improvements bring down the cost of your solar system.

Outputs	Value	Tips and Notes
Size of system needed	4.99 kW	Result is based on values provided for monthly electricity use and desired percentage covered by solar. It also includes a derate of 0.87. A factor accounting for conversion of the array's DC nameplate capacity to the system's AC power rating at Standard Test Condition.
System cost estimate	$18,720	Result is based on an average 2020 Minnesota residential system cost of $3,750 per kW. Costs will vary depending on the specifics of your system.
Payback without incentives	18.40 years	Result assumes that electricity costs will rise 3.5% each year over 25 years.
Payback with Tax Credit	13.61 years	Your system may be eligible for a federal tax credit. This result shows the payback of your system with the 26% tax credit applied.

Outputs	Value	Tips and Notes
Payback with Tax Credit and Solar*Rewards incentive	8.10 years	The Xcel Solar*Rewards Incentive Program utilizes a performance-based incentive (PBI). A PBI pays an incentive based on the amount of annual energy (kWh) generated by the system. Therefore, the more shading a system has the lower the PBI will be. Applications are accepted by Xcel Energy on a first come first serve basis through 2021.Read More »

Month	Actual % Sun**	Total kWh/m2	Duration (Hrs)
January	68%	22.14	272.1
February	73%	39.71	281.3
March	81%	83.85	359.5
April	90%	125.48	394.9
May	98%	165.98	450.2
June	100%	174.56	463.9
July	98%	173.10	462.5
August	92%	142.62	427.6
September	83%	97.00	373.3
October	75%	52.01	315.8
November	69%	25.24	273.2
December	65%	16.81	255.6

**These percentages should be used as the monthly shading derate factors % on the Xcel Solar Rewards application



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COMMERCE DEPARTMENT
ENERGY RESOURCES

Appendix A-2c

Wilmarth Evaluation Site 2

Solar Suitability Report

Latitude: 44.247422 Longitude: -93.928806

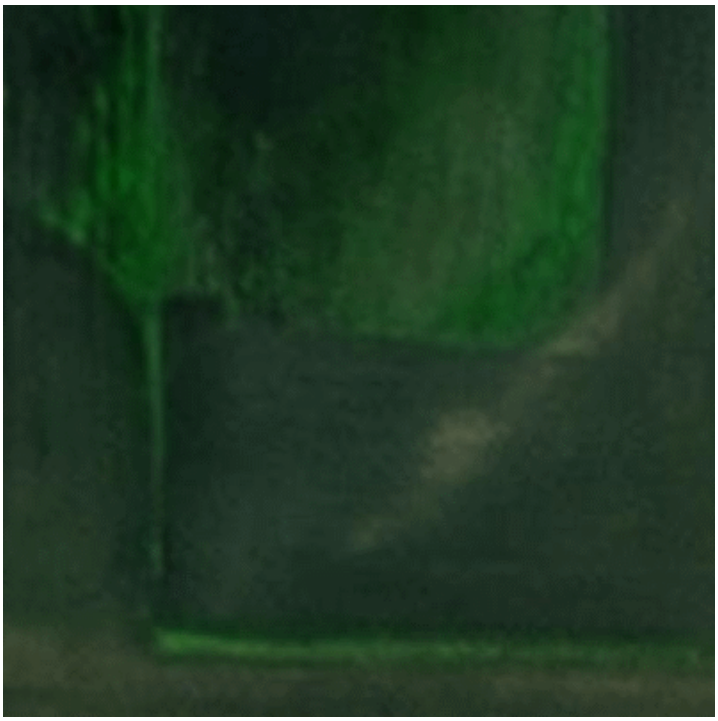
mn.gov/solarapp

Fri Feb 05, 2021

Site Name

Site Address

Site Notes

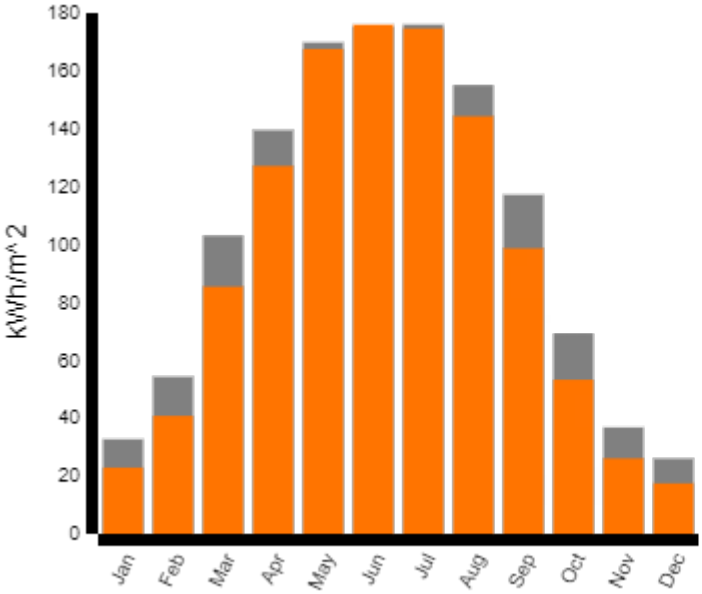


This site is **Good**. It would need a **4.91 kW** system to generate **50%** of average household use. This system would cost approximately **$18,420**. System payback is **13.4 years** after tax credit.

Utility Service Provider:
Frost Benco Wells Cooperative Electric Association
P.O. Box 8
Mankato, MN 56002
(507) 387-7963
www.benco.org

Site Details:
Total Annual Insolation: 1137.38 kWh/m^2
Avg Insolation per Day: 3.12 kWh/m^2
Source Data: Spring and Fall 2010

Amount Actual Sun



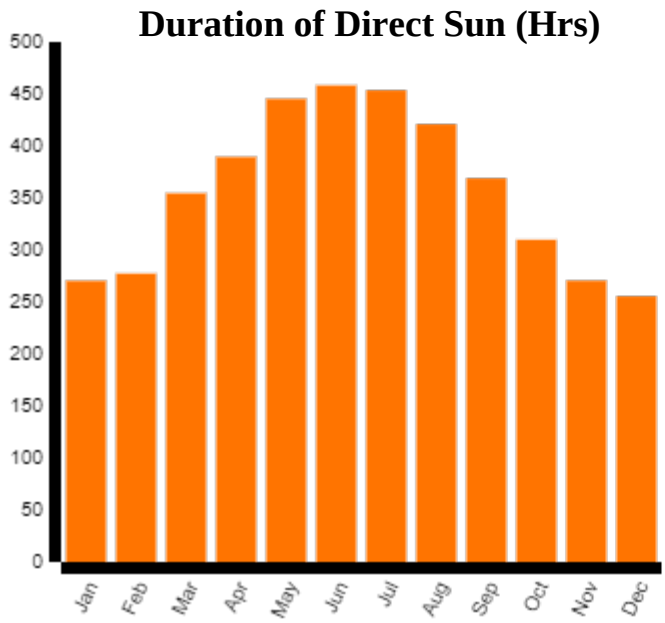
Solar Calculator

User Input	Value	Tips and Notes
Average utility use (per month)	800 kWh	The average residential household uses 800 kWh/month. If you know your monthly usage, fill it in here.
Cost / kWh	$0.12/kWh	Minnesota's average residential cost of electricity is $0.12/kWh. If you know your cost of electricity enter it here.
Percent of electricity provided by solar	50%	Experiment with different percentages here to see how system cost varies. Think about how energy efficiency improvements bring down the cost of your solar system.

Outputs	Value	Tips and Notes
Size of system needed	4.91 kW	Result is based on values provided for monthly electricity use and desired percentage covered by solar. It also includes a derate of 0.87. A factor accounting for conversion of the array's DC nameplate capacity to the system's AC power rating at Standard Test Condition.
System cost estimate	$18,420	Result is based on an average 2020 Minnesota residential system cost of $3,750 per kW. Costs will vary depending on the specifics of your system.
Payback without incentives	18.10 years	Result assumes that electricity costs will rise 3.5% each year over 25 years.
Payback with Tax Credit	13.40 years	Your system may be eligible for a federal tax credit. This result shows the payback of your system with the 26% tax credit applied.

Month	Actual % Sun**	Total kWh/m2	Duration (Hrs)
January	70%	22.90	270.4
February	75%	40.77	277.3
March	83%	85.43	354.5
April	91%	127.13	389.5
May	99%	167.56	445.4
June	100%	175.99	458.3
July	99%	174.63	453.6
August	93%	144.30	421.0
September	84%	98.65	369.0
October	77%	53.27	309.9
November	71%	26.06	270.6
December	67%	17.44	255.6

**These percentages should be used as the monthly shading derate factors % on the Xcel Solar Rewards application



This service made possible by:

COMMERCE DEPARTMENT
ENERGY RESOURCES

Attachment A-3

SRRWD
Shell Rock River Watershed District
Working Together to Improve Water Quality

Shell Rock River Watershed District
214 West Main Street
Albert Lea, MN 56007
Phone: 507-377-5785
www.ShellRock.org

Minnesota Public Utilities Commission
121 7th Place East - Suite 350
St Paul, Minnesota 55101-2147

Re: Hayward Solar Project

Dear Chairperson Katie Sieben,

The Shell Rock River Watershed District, located wholly in Freeborn County, was formed in 2003 out of necessity for improvement to impaired waters. We are in the process of our completing our One Watershed, One Plan, water management plan to restore and repair upstream areas and waterways that flow into the Shell Rock River. Habitat and native vegetation are critical factors in the success of a Watershed District's Water Management Plan.

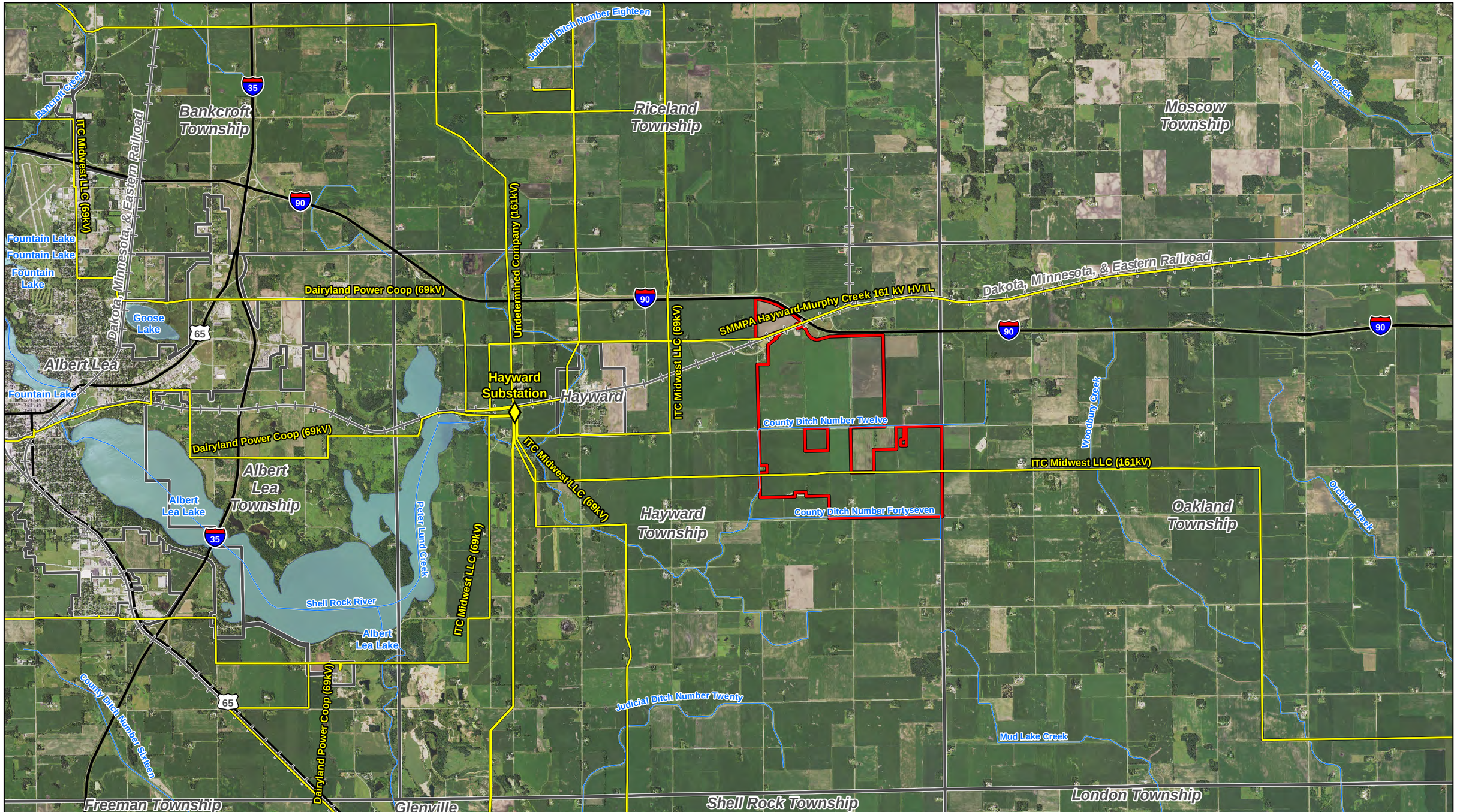
We are writing to you today in support of the vegetation and habitat management plans that are included in the Hayward Solar Project's Public Utilities Commission application. Tenaska and Arevon brought us into their plan early on by presenting their strategies to improve groundcover with native vegetation within their project boundary in Hayward Township. This area is part of the tributary system that feeds into the Shell Rock River. With native grasses and plantings in place year-round, this will reduce some of the issues we are seeing near the project location with erosion, stream sedimentation and increased phosphorous. A project of this nature and over its lifespan can be restorative to soil nutrient levels while providing stabilization to topsoil that can be lost when agricultural lands are tilled.

We plan to continue our discussions and dialog with the Tenaska and Arevon development team to mitigate any potential run-off or drainage risks that may be present during their 12-14 month construction phase. The Shell Rock River Watershed Board supports the permitting of the Hayward Solar Project based on the principles and plans included in the application.

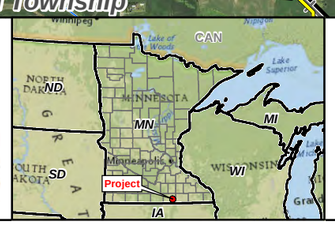
Sincerely,

Mitchell Delger
Chairman- Shell Rock River Watershed District

Exhibits



Data Source(s): Westwood (2021); Minnesota NAIP Imagery (2019); Census Bureau (2019); USGS NHD Dataset (2019).



Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

Legend

- Project Area
- Hayward Substation
- Existing Transmission Line
- Municipal Boundary
- Major Road
- Railroad
- Named NHD Flowline
- Named NHD Waterbody

N
0 Miles 1

Hayward Solar Project

Freeborn County, Minnesota

Project Area

EXHIBIT 1

Map Document: N:\0026599.00\GIS\Prime Farmland Exhibits\Hayward_PrimeFarm_Ex01_ProjectAreaMap_210427.mxd 4/27/2021 3:42:24 PM radevito

Wilmarth Evaluation Site 1

Wilmarth Evaluation Site 2

Wilmarth Substation

Hayward Substation

Hayward

Nicollet County

Le Sueur County

Rice County

Goodhue County

Brown County

Blue Earth County

Waseca County

Steele County

Dodge County

Olmsted County

Watonwan County

Martin County

Faribault County

Freeborn County

Mower County

Emmet County

Kossuth County

Winnebago County

Worth County

Mitchell County

Minnesota

Iowa

Sleepy Eye

New Ulm

Traverse

Peter

Faribault

Kenyon

Zumbrota

Pine Island

Watertown

Mankato

Janesville

Waseca

Owatonna

Dodge Center

Kasson

Byron

Lake Crystal

Madelia

St James

Mapleton

Blooming Prairie

Wells

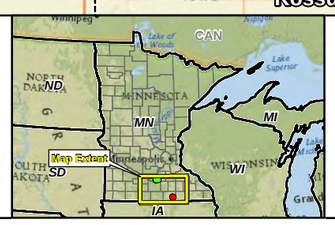
Fairmont

Blue Earth

Albert Lea

Austin

Data Source(s): Westwood (2021); ESRI WMS World Streets & National Geographic Basemaps (Accessed 2021).



Legend

- Hayward Project Area
- Wilmarth Evaluation Site
- County Boundary
- Preferred Existing Substation
- 2-Mile Search Buffer
- 5-Mile Search Buffer

N

0 7 Miles

Hayward Solar Project

Freeborn County, Minnesota

Preliminary Identification of Potential Project Sites

EXHIBIT 2

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

Map Document: N:\0026599.00\GIS\Prime Farmland Exhibits\Hayward_PrimeFarm_Ex02_PreliminaryIdentificationOfPotentialProjectSitesMap_210429.mxd 4/29/2021 4:04:08 PM radevalo

Market Area (Northern Natural Gas Company)
810th Ave
Market Area (Northern Natural Gas Company)
820th Ave
830th Ave
840th Ave
215th St
I- 90
I- 90
215th St Co Rd 117
SMMPA Hayward-Murphy Creek 161kV HVTL
816th Ave
805th Ave
Co Hwy 26
Koa Campgr
Koa Campgr
E Main St
Co Hwy 46
816th Ave
Dakota, Minnesota, & Eastern Railroad
Underland Rd
Undetermined Company (161kV)
Co Hwy 102
Edwards Rd
840th Ave
Alliance Pipeline LTD (Alliance Pipeline L.P.)
Co Hwy 30
850th Ave
2 Rod Rd
205 St
800th Ave
County Ditch Number Thirty-two
Commerical St
E Front St
Hayward
W 2nd St
E 2nd St
3rd St W 3rd St
Main St
West St
Noland Ave
Walin St
ITC Midwest LLC (69kV)
Dairyland Power Coop (69kV)
Albert Lea Lake
Hayward Substation
Masonville To Lerdal (Pembina Cochin LLC)
County Ditch Number Twelve
200th St
ITC Midwest LLC (69kV)
800th Ave
Dairyland Power Coop (69kV)
810th Ave
ITC Midwest LLC (161kV)
ITC Midwest LLC (66kV)
820th Ave
830th Av
County Ditch Number Fortyseven
190th St
190th St
190th St
840th Ave
Peter Lund Creek

N
0
Feet
2,000

Data Source(s): Westwood (2021); Minnesota NAIP Imagery (2019); Census Bureau (2019); Ventyx Velocity Suite, Ventyx Energy LLC. (2020); USGS NHD Dataset (2019); U.S. Fish and Wildlife Service (2020); Ducks Unlimited (2020); TetraTech (2020); NPMS (2021). Existing pipeline routes are approximate..

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

Legend

- Project Area
- Current Site Control Area
- Preliminary Development Area
- Municipal Boundary
- Hayward Substation
- Proposed Project Substation
- SMMPA Switchyard
- Proposed Project O&M Building
- POI
- SMMPA Line Tap
- Project Gen-Tie Line
- Existing Transmission Line
- Existing Natural Gas Pipeline
- Existing Crude Oil Pipeline
- Railroad
- Field Delineated Wetland
- Field Delineated Waterway
- Named NHD Flowline
- NWI Wetland

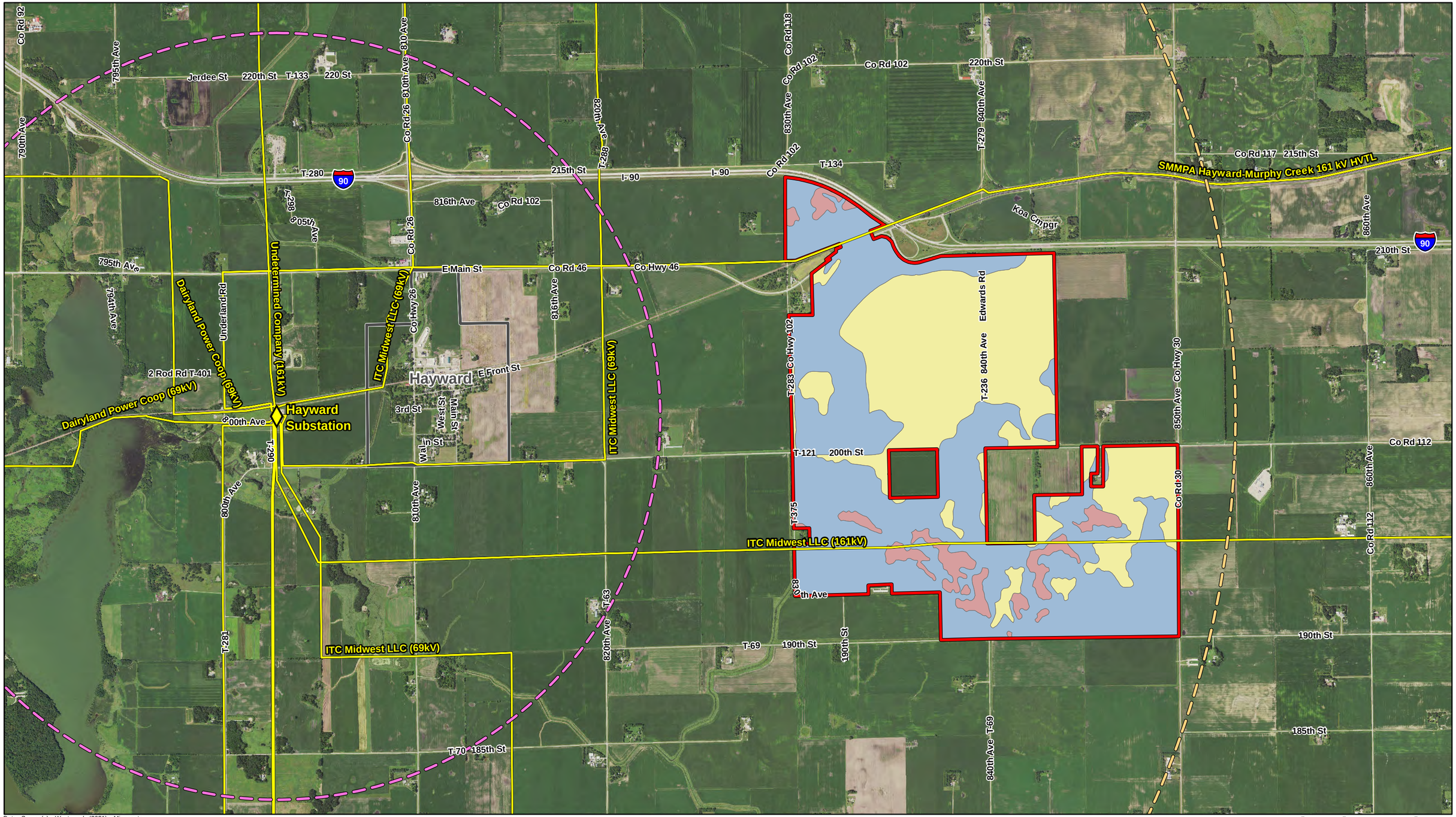
Hayward Solar Project

Freeborn County, Minnesota

Site Control & Preliminary Development Area

EXHIBIT 3

Map Document: N:\0026599.00\GIS\Prime Farmland Exhibits\Hayward_PrimeFarm_Ex03_SiteControl&PreliminaryDevelopmentAreaMap_210427.mxd 4/27/2021 1:18:33 PM radevito



Data Source(s): Westwood (2021); Minnesota NAIP Imagery (2019); Census Bureau (2019); U.S. Department of Agriculture, Natural Resources Conservation Service (2020); Ventyx Velocity Suite, Ventyx Energy LLC. (2021).

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

Legend

- Project Area
- Existing Transmission Line
- Municipal Boundary
- Hayward Substation
- 2-Mile Search Buffer
- 5-Mile Search Buffer

Prime Farmland Classifications

- All areas are prime farmland - 107.66 Acres (5.50%)
- Farmland of statewide importance - 750.63 Acres (38.33%)
- Prime farmland if drained - 1,100.10 Acres (56.17%)

N

0 Feet 2,500

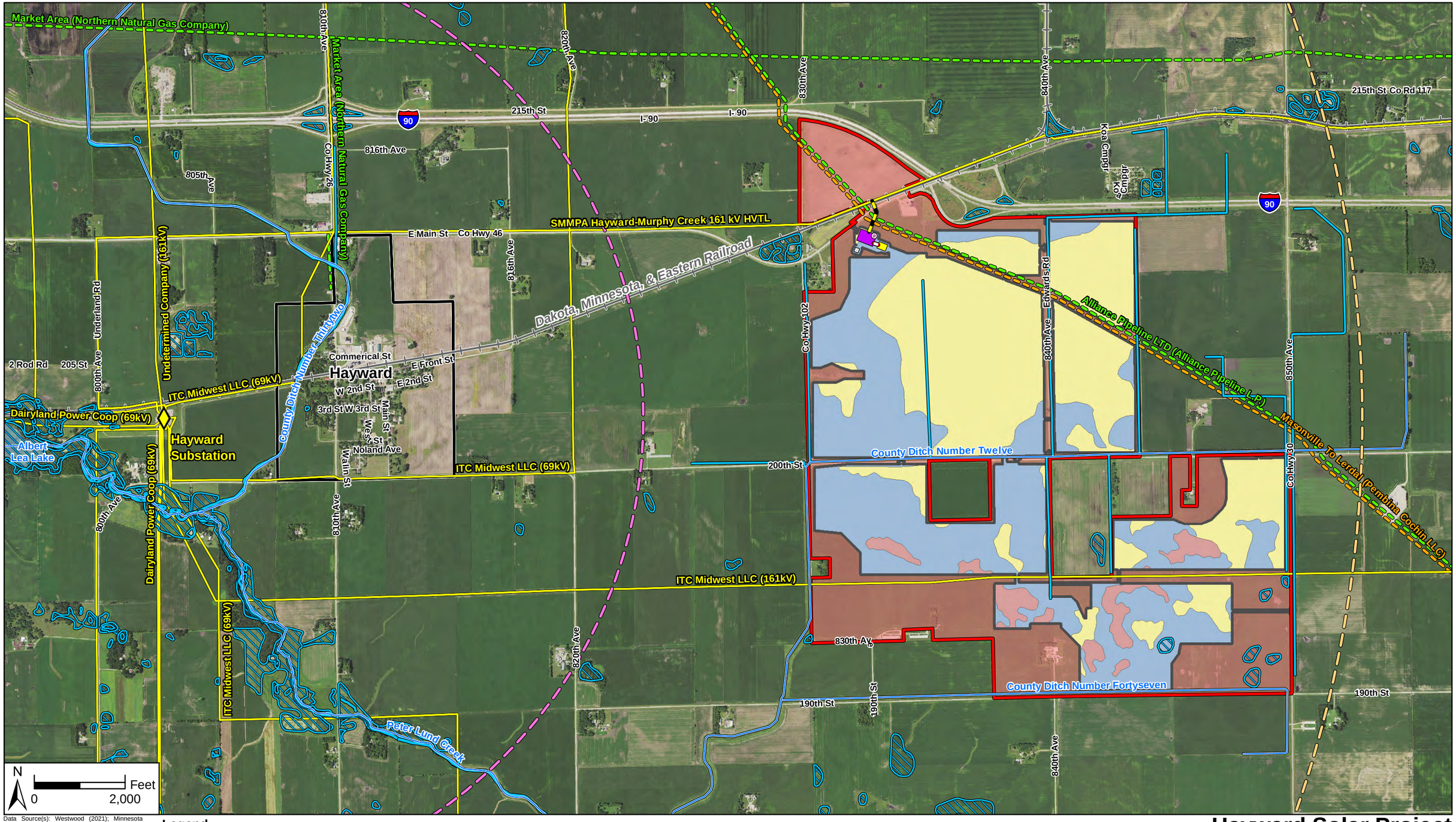
Hayward Solar Project

Freeborn County, Minnesota

Project Area Prime Farmland & Proximity Map

EXHIBIT 4

Map Document: N:\0026599.00\GIS\Prime Farmland Exhibits\Hayward_PrimeFarm_Ex04_ProjectAreaPrimeFarmland&ProximityMap_210427.mxd 4/27/2021 3:01:43 PM radevitp



Data Source(s): Westwood (2021); Minnesota NAIP Imagery (2019); Census Bureau (2019); Ventyx Velocity Suite, Ventyx Energy LLC. (2020); USGS NHD Dataset (2019); U.S. Fish and Wildlife Service (2020); Ducks Unlimited (2020); NPMS (2021). Existing pipeline routes are approximate..

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

Legend

- Project Area
- Current Site Control Area
- Preliminary Development Area
- Municipal Boundary
- Hayward Substation
- 2-Mile Search Buffer
- 5-Mile Search Buffer
- Proposed Project Substation
- SMMPA Switchyard
- Proposed Project O&M Building
- Railroad
- POI
- SMMPA Line Tap
- Project Gen-Tie Line
- NWI Wetland
- Existing Transmission Line
- Existing Natural Gas Pipeline
- Existing Crude Oil Pipeline
- Named NHD Flowline

Prime Farmland Classifications

- All areas are prime farmland - 58.05 Acres (4.56%)
- Farmland of statewide importance - 623.71 Acres (49.02%)
- Prime farmland if drained - 590.57 Acres (46.42%)

Hayward Solar Project

Freeborn County, Minnesota

Preliminary Development Area & Prime Farmland Map

EXHIBIT 4a

Map Document: N:\0026599.00\GIS\Prime Farmland Exhibits\Hayward_PrimeFarm_Ex04a_PreliminaryDevelopmentArea&PrimeFarmlandMap_210427.mxd 4/27/2021 3:46:15 PM radevito