Appendix D

Prime Farmland Assessment

Westwood

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TECHNICAL MEMORANDUM

Date: March 25, 2024
Re: Prime Farmland Impact Assessment

Northern Crescent Solar, Faribault County, MN

File No. R0044069.00

To: Northern Crescent Solar LLC
From: Westwood Professional Services, Inc.

1. INTRODUCTION

On behalf of and in coordination with Northern Crescent Solar LLC, formerly known as Winnebago Solar, LLC, (Northern Crescent Solar), Westwood Professional Services, Inc. (Westwood) prepared this memorandum to describe the prime farmland assessment Northern Crescent Solar completed when siting a utility-scale photovoltaic (PV) solar energy conversion and battery storage facility in Minnesota; specifically, to determine whether there is a feasible and prudent alternative to locating the facility on land designated as prime farmland. The assessment described in this memorandum was completed when Northern Crescent Solar was an owned subsidiary of Glidepath Power Solutions, LLC (Glidepath). The Northern Crescent Solar and Storage Project is a proposed up to 150-megawatt alternating current (MWac) solar project and associated 50-megawatt (MW) battery storage facility to be located in Prescott and Verona Townships, Faribault County, Minnesota (Project; **Figures 1-3**). To support the Project, an area of approximately 1,200 to 1,300 acres (Project Area) within three miles of transmission infrastructure is needed. This analysis reviews the Project Area and a previously considered site pursued by Glidepath that contains less prime farmland, the Herbst site (**Figure 2**). After this assessment was completed and the current location of the Project was chosen, Northern Crescent Solar, and its assets, were purchased by Primergy Solar Management, LLC (Primergy). The Herbst site is not owned or controlled by Northern Crescent Solar or Primergy Solar.

The analysis is required to demonstrate compliance with Minnesota Rules 7850.4400, subp. 4 (Prime Farmland Rule or Rule). The Rule prohibits large energy power generating plants from being sited on more than 0.5-acre of prime farmland per MW of net generating capacity unless there is no feasible and prudent alternative or unless the Projects meets one of the Rule's exemptions. The Northern Crescent Solar and Storage Project design is expected to occupy approximately 929 acres (Preliminary Development Area) within the 1,179-acre Project Area. The Project Area is sited on prime farmland (see **Figures 4 and 4a**). Given the 150 MW net generating

capacity of the Project, the Rule would allow use of up to 75 acres of prime farmland for the Project. Approximately 443 acres of prime farmland and approximately 485 acres of prime farmland if drained are located within the Preliminary Development Area. Current land use within the Preliminary Development Area is predominately agricultural – specifically, row crop production. The Project would result in the temporary removal of these acreages from row crop production for the life of the Project.

In May 2020, the Minnesota Department of Commerce issued *Solar Energy Production and Prime Farmland: Guidance for Evaluating Prudent and Feasible Alternative* (Prime Farmland Guidance; DOC EERA, 2020). The Prime Farmland Guidance recognizes that, "the State of Minnesota has dual mandates to advance solar energy production and protect prime farmland" and is "meant to assist developers in defining feasible and prudent in relation to siting alternatives." An analysis of factors identified in the Prime Farmland Guidance with respect to site selection and alternative sites is provided in the following sections below.

2. PROJECT DESCRIPTION

The Project (as described above) is located in Verona and Prescott Townships, Faribault County, Minnesota as shown in **Figure 1**. The Point of Interconnection (POI) is located within the Project Area. The current layout and proposed equipment shown in the attached figures as well as the Preliminary Development Area are preliminary and subject to change as the design advances.

The Preliminary Development Area (i.e., the area to be used for construction and operation of the Project) contains approximately 929 acres (**Figure 4a**), which is approximately 79% of the 1,179-acre Project Area (**Figure 4**). Under the Rule (as applied to this proposed 150 MWac Project), no more than 75 acres of prime farmland could be impacted by the Project (i.e., 0.5 acres of prime farmland per MW of net generating capacity) unless there is no feasible and prudent alternative or unless the Project meets one of the Rule exemptions. The Project does not meet an exemption to the Rule. Of the 929 acres of Preliminary Development Area, 928 acres (99.8%) are considered prime farmland, which includes 443 acres (48%) are prime farmland, 485 acres (52%) are prime farmland if drained, and 1 acre (0.2%) is farmland of statewide importance or not prime farmland (see **Figure 4a**).[1] However, as demonstrated in this memorandum, there is no feasible or prudent alternative to the Project Area. Accordingly, the Project satisfies the Rule.

Northern Crescent Solar attempted to increase use of non-prime farmland to the maximum extent practicable at the Project Area. Northern Crescent Solar also identified and reviewed non-prime farmland and prime farmland designated areas within the Project Area (**Exhibits 4/4a**), within three miles of the Project Area (**Exhibit 5**) and within Faribault County (**Exhibit 6**) for

[1] Note that soils designated as '*prime farmland if drained'* and '*prime farmland if protected from flooding or not frequently flooded during the growing season'* were considered prime farmland and were included in prime farmland acreages provided in this memorandum; '*farmland of statewide importance'* is, by definition, not considered prime farmland and was not included in prime farmland acreages provided in this memorandum.

consideration of other sites for the Project. Northern Crescent Solar was unable to locate any sites within three miles of the POI or within Faribault County that would be below the prime farmland thresholds in the Prime Farmland Rule. Large tracts of non-prime farmland in Faribault County are generally associated with floodplains, streams, lakes, and wetlands (**Figure 6**).

Northern Crescent Solar has secured land rights for the entire Project Area via lease option agreements and will enter into a purchase option agreement for the new Xcel switchyard (Xcel Energy [Xcel] Switchyard (**Figure 3**). Each landowner was given the option to either sell or lease their land to Northern Crescent Solar. With the exception of the Xcel Switchyard area (which will be purchased), in each instance, the landowners chose to lease their land. The use of agricultural land for the Project is only temporary during the life of the Project and is reversible.

A Vegetation and Soil Management Plan (VSMP) and an Agricultural Impact Mitigation Plan (AIMP) will be implemented during construction and operation of the Project. The anticipated life of the Project is 30 years (with the possibility to extend the life of the Project upon securing the necessary approvals). At the end of the Project's operation, Northern Crescent Solar will restore the land to its original condition and the land will likely return to agricultural use or any other use chosen by the landowners. A Decommissioning Plan will be in place to restore the land after the useful life of the Project and, together with the AIMP, will preserve the ability to farm the land in the future after the Project ceases to operate.

Portions of the Project Area excluded from the Preliminary Development Area consist of land in a conservation easement as indicated in **Figure 3**. Additional acreage within the Preliminary Development Area allows for planned buffers and setbacks from the arrays, avoidance of county drain-tile and agricultural drainage ditches and flexibility in overall Project design. The electrical collection lines between the solar arrays/inverters and Project Substation (discussed below) will be 34.5 kilovolt (kV) feeders and may be either installed above ground or direct buried in a trench at a depth of 2 to 5 feet below ground. Directional boring may be used to install collectors across some portions of the Project, as applicable.

The Project will connect to the grid by tapping into the existing Xcel Energy Huntley – Blue Earth 161kV High Voltage Transmission Line (HVTL) (**Figure 3**). 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 the new Xcel Switchyard using a short, approximately 250-foot (or less) long, 161 kV overhead electrical transmission line (Project Gen-Tie Line) (**Figure 3**). The new Xcel Switchyard will contain switching gear/meter (which will be the POI) and connect to the existing Xcel Energy Huntley – Blue Earth 161kV HVTL via an approximate 250-foot (or less) long 161 kV overhead electrical transmission line (Xcel Line Tap). The Project Substation and Project Gen-Tie Line will be constructed, owned, and operated by Northern Crescent Solar. The Xcel Switchyard and Xcel Line Tap will be permitted, constructed, owned, and operated by Xcel.

The Project Area is comprised of open land primarily utilized for row crop agriculture. Topography within the Project Area is generally flat ranging from 1,090 to 1,110 feet above mean sea level (amsl). The Preliminary Development Area is mostly devoid of permanent landcover and environmental constraints. Northern Crescent Solar was able to secure sufficient lease agreements to allow design of the Project around existing water and natural resource features and a conservation easement. No other significant environmental constraints were identified in or near the Project Area (see **Figures 3, 4, 4a, 11, & 13**).

3. PROJECT NEED, PERMITTING & SCHEDULE

The Project is being developed, designed, and permitted to meet or exceed applicable state and local setback 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 2040), and applicable energy planning requirements.[2] 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 and easement payments. The Project will generate up to 150 MWac of power which will provide electricity to approximately 35,249 homes annually and prevent emission of approximately 262,228 metric tons of carbon dioxide equivalent annually.[3] Reduced emissions associated with the Project as compared to traditional carbon-based energy generation will further benefit the environment and overall health of the regional community (i.e., reduced potential mortality due to harmful air pollutants, associated health care costs, reduction in water consumption, etc.) which are summarized in the Site Permit Application (SPA).

A Generator Interconnection Agreement (GIA) is anticipated in the second half of 2024 after completion of applicable interconnection studies. Northern Crescent Solar plans to construct the Project on a schedule that facilitates an in-service date which is anticipated to be in late 2026.

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

3 This is based upon the U.S. Environmental Protection Agency (EPA) Greenhouse Gas Equivalencies Calculator and 375,368,000 kWh (375,368 MWhs) and the annual production PVSYST model as estimated in an emissions analysis for the Project. See also Greenhouse Gas Equivalencies Calculator | Energy and the Environment | US EPA.

4. FACTORS DRIVING CHOICE OF REGION

4.1 Guidance

The Prime Farmland Guidance first directs an applicant to discuss why a project has been proposed in a particular region, including an assessment of: (1) the solar resource in the region; (2) available interconnection points; (3) and efforts to investigate developable sites (i.e., those with appropriate topography and willing participants). Northern Crescent Solar explored southern Minnesota to identify a suitable area for a solar project based on these factors. When Northern Crescent Solar began searching for Project locations, Minnesota was identified as a state supportive of solar deployment based on utility and regulatory interest, as well as previous development activity in the state. Northern Crescent Solar initially reviewed the entire state of Minnesota during the Project site selection process.

In addition to the solar resource quality, transmission interconnection feasibility was also a factor in determining the Project's location.

4.2 Solar Resource in the Region

Some of Northern Crescent Solar's key goals in siting the proposed Project were, (1) identify the most productive solar resource in Minnesota which will allow economic operation of a high net capacity factor solar energy generation facility to optimize the solar resources, (2) allow for efficient and effective use of installed facilities located in reasonable proximity to the transmission system, and (3) minimize impacts to human settlement and natural resources.

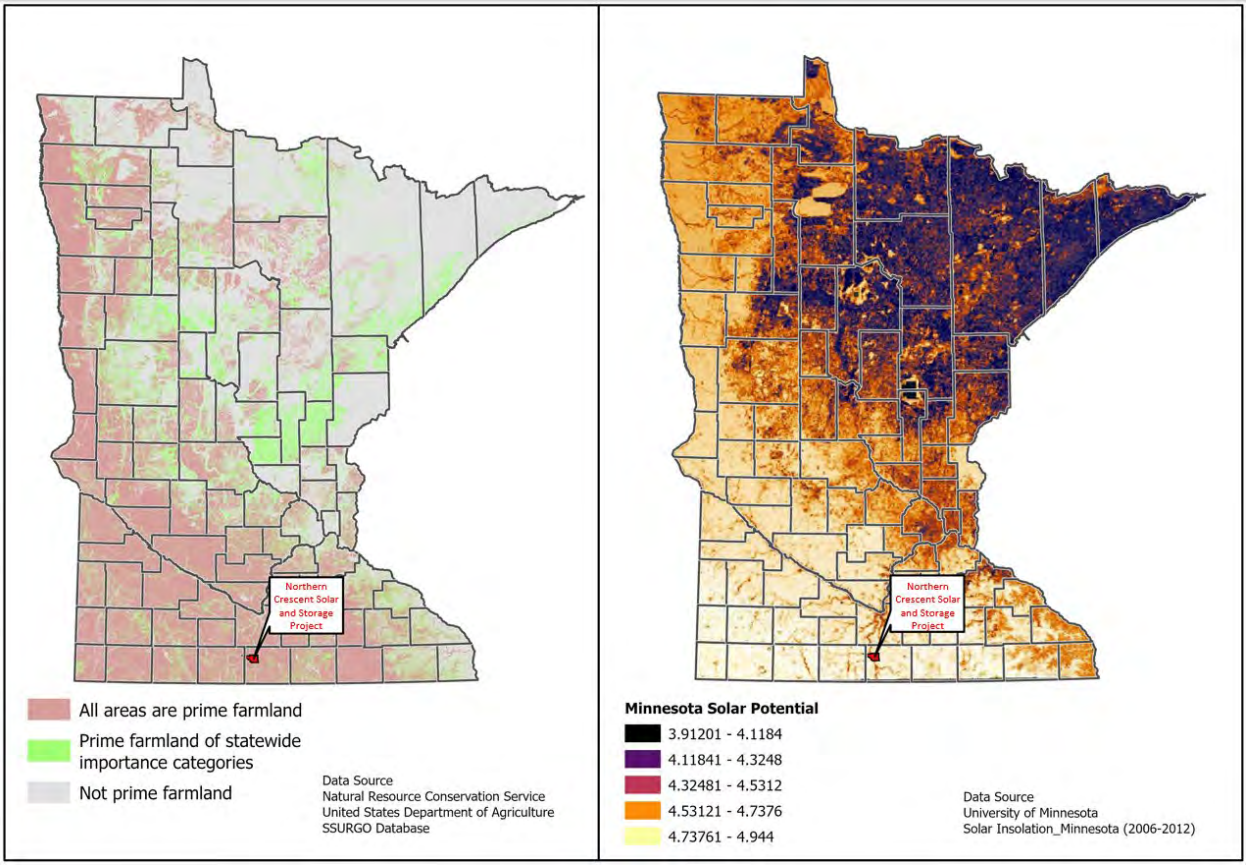
Northern Crescent Solar assessed publicly available solar generation data in Minnesota to determine solar potential in Minnesota. According to data compiled by the Minnesota Solar Suitability Analysis (MSSA) program, southern Minnesota has some of the best locations for exposure to the sun's solar radiation (insolation) and, thus, highest net capacity factors in the state (see **Figure 7**).[4] Pockets of higher net capacity areas in east-central Minnesota are also present (**Figure 7**). **Figures 8** and **9** provide MSAA Insolation for the proposed site and the Herbst site, another potential project location that was identified and assessed by Northern Crescent Solar for this Project. In Minnesota, there is a strong correlation between high solar resource and the prevalence of prime farmland (see **Image 1**). As displayed in **Image 1**, southwestern and southcentral Minnesota are characterized by the prevalence of prime farmland and the highest solar resource. Conversely, areas without prime farmland generally have a lower solar resource.

Northern Crescent Solar focused its efforts on locating a site in these general locations (i.e., no sites were considered in northeastern Minnesota because it lacked a high-capacity solar resource

[4] 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/.

and had a higher density of forested land cover). Using this data, Northern Crescent Solar then focused on identifying a suitable Project site near an existing substation with available capacity to maximize solar generation in an area where it can economically be delivered to the electrical grid. This analysis further eliminated looking for potential sites in the approximate +70% northeastern portions of the state and instead evaluating highest capacity solar resource areas in the southwesterly and southcentral portions of Minnesota and other areas of central Minnesota that had pockets of higher value solar resource (**Figure 7**).

Image 1: Prime Farmland and Solar Resource in Minnesota



At a high level, and in Northern Crescent Solar's assessment, the southwestern and southcentral portions of the state have high-capacity solar resources and existing land cover most conducive to solar development, including but not limited to, flat open agricultural lands that are more viable for hosting solar facilities, than other regions of Minnesota. However, Northern Crescent Solar also noted the potential for solar development opportunities in the east-central portion of Minnesota due to adequate solar resources and pockets of open land cover. As a result of these findings, Northern Crescent Solar proceeded to further evaluate these regions for potentially hosting the Project. See **Sections 5.1-5.3** below.

Large portions of the state were identified as being heavily wooded and were therefore determined unsuitable for solar development. While the Herbst site is generally located in a more heavily wooded portion of the state, this site was selected due to this portion of the state generally lacking

prime farmland near existing transmission infrastructure with available capacity. 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. When beginning a search for a site, Northern Crescent Solar assumed it would be able to identify an adequately size site near available transmission capacity that did not exceed the 0.5 acre/MW threshold due to the general scarcity of prime farmland in the east central part of the State but was ultimately unable to do so as described below.

4.3 Available Interconnection Points

The constrained electrical grid played a significant role in determining potential Project locations and the final site for the Project.

Identifying existing electrical infrastructure with available capacity was the largest driving factor in selecting a suitable Project location. Northern Crescent Solar searched within southwestern, and southcentral and east-central Minnesota for existing substations and transmission lines that had available capacity to support the proposed 150 MWac interconnection capacity of the Project and associated 50 MW of battery storage. This analysis was conducted during the first and second quarters of 2017, when Northern Crescent Solar was owned by Glidepath, just before the filing deadline for the MISO 2017 queue for this Project. Substations and transmission lines with available capacity where others had existing interconnection applications were excluded from further analysis. Northern Crescent Solar was able to identify the planned POI within the Project Area, and a substation located near the Herbst site, as locations with transmission infrastructure and available capacity to interconnect the Project where no pending interconnection applications existed.

Based on the MISO interconnection analysis, Northern Crescent Solar elected to pursue a preliminary site selection analysis at the two identified electrical interconnection locations located near the cities of Winnebago and North Branch. The Winnebago Junction Substation is located directly west of the Project Area (southeast of the city of Winnebago) on a section of the existing Xcel Huntley – Blue Earth 161kV HVTL (**Figures 5, 10,** and **11**). The Chisago County Substation is located between the cities of North Branch and Chisago City at the terminal end of the Wyoming – Chisago 161 kV HVTL.

The initial interconnection request was formerly submitted for the Herbst site to interconnect at the Chisago County Substation by another entity owned by Glidepath. Neither that entity nor the interconnection queue position for the Herbst site was sold to Primergy, as such, Primergy does not have access to this interconnection request or the Herbst site. Ultimately, as described below, Northern Crescent Solar and Glidepath determined there was not enough undeveloped and unforested land available to be secured for the Project and interconnection study results indicated the proposed project would be uneconomical if sited at the Herbst site.

The Applicant filed a Generator Interconnection Agreement (GIA) application with MISO for 150 MWs on the existing Xcel Huntley – Blue Earth 161kV HVTL. The Applicant entered the interconnect request into the MISO Definitive Planning Phase (DPP) study process in 2020. The Applicant expects to sign a GIA in the second half of 2024.

Options with longer transmission lines for the Project would also not further the State policies of non-proliferation of transmission facilities; locating 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 Project Gen-Tie Line to 250 feet or less as is the case with the proposed Project) exists.

Northern Crescent Solar then specifically identified potential project locations within three (3) miles of the potential interconnection points based on the following characteristics:

- Significant tracts of cleared contiguous land available within the area;
- Specific areas of the region that were determined suitably flat to allow for economical construction of solar energy generation equipment;
- Initial and ongoing community and landowner outreach indicated community support and acceptance of the Project in the proposed area; and
- Local landowners willing to enter into voluntary leases or easements. ~~and~~

Based on these analyses, the Project Area and the Herbst sites were identified. The results of further environmental analyses of the three (3) mile radius of the potential POIs that helped to further evaluate the two sites is presented below. Please note that a single factor is not definitive over another factor and that all factors were reviewed in selecting the proposed Project Area.

5. EFFORTS TO INVESTIGATE DEVELOPABLE SITES

5.1 Soils

In consideration of Minnesota Rules 7850.4400 subp. 4, Northern Crescent Solar examined the soils within the southwest and southcentral Minnesota regions. The prevalence of prime farmland is consistently high regardless of location in the region. Prime farmland, and its sub-categories, are mapped throughout the region (see **Figure 6 – Regional Prime Farmland**). For context, Faribault County encompasses about 462,132 acres of land, of which 403915 acres (87%) are classified as prime farmland and prime farmland if drained or protected from flooding (Soil Survey Staff, NRCS USDA, 2024). Accordingly, areas in the region with the best solar resource that is conducive to solar development of approximately 929 acres are also significantly likely to have the majority of its soils defined as prime farmland. To the contrary, the soils in east-central Minnesota near the Chisago County Substation include prime farmland and hydric soils.

Northern Crescent Solar studied the land within three (3) miles of the two (2) potential POIs to search for land suitable to construct the Project. The three (3) mile search radius was largely driven by Project economics of solar construction. Based on the experience of Northern Crescent Solar any solar projects requiring more than three (3) miles of electrical transmission infrastructure are generally uneconomical due to the costs of constructing the transmission infrastructure and the line losses that would be realized. Option sites that would require longer transmission facilities needed to connect a project to the grid (compared to the Project Area site and Herbst site) would result in higher costs (for design, permitting, and construction) that would not support a cost-effective project; it would also necessitate completing a routing study, identifying possible suitable land and willing landowners, potentially impacting significantly more natural and cultural resources, creating additional visual impacts, and requiring additional operation and maintenance needs.

The Northern Crescent Solar Project will be located up to 200 feet from the POI on the existing Xcel Huntley – Blue Earth 161kV HVTL.

Nearly all land defined and described as "prime farmland" in Minnesota is also prime solar land. Willing landowner participation and transmission interconnection were more significant factors in Project siting than utilization of prime vs non-prime farmland. Northern Crescent Solar relies on voluntary easements with landowners. Participants voluntarily decided that participation in the Project was a better and more economical use of their land than traditional agricultural uses.

5.2 Factors Driving Choice of Region

The Prime Farmland Guidance further identifies factors to assess when prime farmland is present within a proposed project site, including: (1) alternative sites in nonprime farmland in proximity to an interconnection site; (2) avoidance of other prohibited areas; and (3) alternative configurations or technologies. As displayed on **Image 1**, southwestern and southcentral Minnesota, including Faribault County, contains the best solar resource in the state.

With respect to avoidance of prohibited areas, Northern Crescent Solar evaluated potential constraints during site selection to determine whether the Project has avoided constraints to the maximum degree practicable. These include transmission interconnection, willing landowners to sell or lease land for project facilities, and environmental constraints that may prohibit or make development more challenging. The POI is located within the Project Area, a new Xcel Switchyard. Within three miles of the POI, Northern Crescent Solar avoided parcels:

- owned or managed by a state or federal agency (i.e., state park, WMA, or Waterfowl Production Area);
- within a municipality;
- within two miles of a public airport;

- under lease with a different developer;
- with Minnesota Department of Natural Resources (MNDNR) Sites of Biodiversity Significance (SOBS);
- with MNDNR mapped native plant communities (NPCs) and native prairie; and
- with MNDNR rare species records.

These constraints, and the area's most suitable for solar development without these features, are displayed on **Figure 11** (Project Area Site & POI Constraints). As shown on the constraints map, Northern Crescent Solar has sited the facility with voluntary leases and easements to avoid the sensitive resources identified above.

During development of the Solar Project, Northern Crescent Solar initially considered a different location for the solar site, the Herbst site, which is land located to the west of the Chisago County Substation. Glidepath, Northern Crescent Solar's original parent company, was able to identify one landowner in the vicinity of the Chisago County Substation willing to lease its land for an energy project. The boundary of that land is depicted as the "Herbst site." References to the Herbst site for this memorandum refer to the three-mile radius around the Chisago County Substation, which was the search area used to identify potential solar and storage locations. Constraints mapping was also completed for a three-mile radius around the Chisago County Substation as shown on **Figure 12**. By comparing **Figures 11 and 12**, it is easily discernable that the proposed Project region contains fewer natural resources such as wetlands, floodplains, public waters and less potential habitat for threatened and endangered species than the Herbst site area. In fact, there is a relatively small amount of land within three miles of the Herbst site that is not encumbered by a natural resource constraint compared to the Northern Crescent Solar Project Area.

Northern Crescent Solar took the analysis a step further and generated buildable area maps within three miles of each POI for the Project site and the Herbst site (**Figures 14a** and **14b**). Using GIS, Northern Crescent Solar used many of the constraint layers identified in **Figures 11 and 12** and added other constraints that would prevent land from being developed to solar, regardless of prime farmland status. The analysis used National Land Cover Data (NLCD) and heads-up digitizing to identify forested areas, National Wetlands Inventory (NWI) and National Hydrography Datasets (NHD) to map streams and wetlands, FEMA data to identify floodplains, and slope information to identify slopes in excess of 12 percent (considered too steep for solar development). Additionally, public infrastructure corridors and features such as roads, railroads, pipelines, transmission lines, substations and existing homes and solar facilities were identified and, in some cases, buffered.

Figure 14a shows the estimated buildable area within three miles of the POI for the Project. The primary exclusion areas are associated with the city of Winnebago and the sloped and wooded floodplain and channel associated with the Blue Earth River, Resource Management Areas located directly west of the Project Area, as well as Rice Lake tributaries and headwater wetlands located

east of the Project Area. Overall, the Northern Crescent Solar Buildable Area Map demonstrates approximate 12,032 buildable acres within three miles of the planned POI, an area roughly 9.5 times the size of the proposed Project. Most importantly is that the three-mile search area contains contiguous acreage large enough to host a 150MW the solar and battery storage project.

Northern Crescent Solar completed the same buildable area analysis for the three mile radius around the Chisago County Substation (**Figure 14b**). The difference in contiguous buildable area is stark when compared with the Project site. Large portions of the Herbst site three mile search area was removed due to the significant presence of woodlands, wetlands, lakes, and rural residential developments. Additionally, there are a number of existing operating solar facilities within the search area, most notably the North Star Solar Project footprint located north and east of the Herbst site and the Chisago County substation. The North Star Solar Project is an operating 100 MW facility located on approximately 800 acres. An additional 11 community solar gardens are also located within the three mile search radius. The North Star Solar Project is one developed feature, along with other natural resource constraints, which limits the three-mile search area to just 5,478 buildable acres. While this represents approximately 4.4 times the area required by the Northern Crescent Solar facility in gross acreage, the parcels are not contiguous and are significantly separated by natural resources, existing solar projects, and rural residential developments. The North Star Solar Project footprint provides context for contiguous land required to build a 100 MW project (800 acres). The Northern Crescent Solar Project would require at least 455 more contiguous acres than North Star Solar, which does not exist within the three-mile search area of the Herbst site. Due to required buffers and other design considerations, constructing the same Project within non-contiguous parcels would require more land than constructing the Project in a contiguous block of land.

Neither Glidepath nor Northern Crescent Solar pursued additional land leasing opportunities to host a solar and storage project the size or magnitude of the Project in or near the Herbst location due to the existing environmental and development constraints described above. Moreover, the interconnection application for the Herbst site is not owned or controlled by Northern Crescent Solar or Primergy.

Based on the analysis above, there are no feasible or prudent alternatives to the proposed Project Area (as herein defined) for the Project.

5.3 Avoidance & Minimization Considerations

As discussed above, the Project Area is an optimal site for development of the proposed 150 MWac solar generating and 50 MW storage facility and is superior to the other evaluated site considered for various reasons. Northern Crescent Solar has avoided impacts to prime farmland to the degree practicable. There is relatively little opportunity to avoid impacts to prime farmland in the southern portion of the state given the relative lack of non-prime farmland. Non-prime farmland that is available is generally associated with steep slopes, forested areas, wetlands and floodplains, and other areas not suitable for solar development.

Northern Crescent Solar has also considered several design options to minimize impacts on soils and prime farmland including minimizing the overall Preliminary Development Area, minimizing solar facility placement in areas with slopes that would require excess grading, reducing access road lengths, incorporating an electrical collection system that minimizes soil disturbance, and minimizing the space between rows. Similarly, access road construction requires grading and soil segregation. Northern Crescent Solar has minimized access roads to the extent required for safety and maintenance activities, and because the access roads do not traverse the perimeter of the Preliminary Development Area, grading and soil disturbance is minimized to the extent practicable. The installation of the electrical collection system involves trenching a portion of the electrical collection cables to a depth of 2 to 5 feet. Northern Crescent Solar's design will also include DC electrical collection cabling that will be installed either below-ground, underhung beneath the PV panels and racking, or suspended above ground via the solar cable management (CAB) system. Implementing the CAB system greatly reduces soil disturbance because trenching is not required along every row of panels. Together, these design considerations minimize the Project's impact on prime farmland and other sensitive resources.

5.4 Mitigations and Offsetting Benefits

In addition to the minimization measures described above, the Project includes an Agricultural Impact Mitigation Plan (AIMP) and Vegetation and Soil Management Plan (VSMP) as mitigation measures, as well as offsetting benefits such as reducing nitrogen pollution. Each of these is described further below.

5.5 Agricultural Impact Mitigation Plan

Northern Crescent Solar has developed an AIMP detailing methods to minimize soil compaction, preserve topsoil, and establish and maintain appropriate vegetation that will help to ensure the Project is designed, constructed, operated, and ultimately decommissioned and restored in a manner allowing the land to be returned to its original agricultural use in the future. Moreover, conversion of the Project footprint to non-row-crop uses for the life of the Project may also have beneficial environmental impacts such as soil building, erosion control, habitat for wildlife, and protection of groundwater and surface water resources from nitrogen pollution (see **Sections 4.5.3.1** and **2.3.3.3**).

5.6 Vegetation and Soil Management Plan

Northern Crescent Solar has developed a VSMP that provides a guide to site preparation, installation of prescribed seed mixes, management of invasive species and noxious weeds, and control of erosion/sedimentation. As discussed further below, shifting the land cover in the Project area to perennial vegetation instead of row crops for the life of the Project, could prove to be beneficial for limiting nitrogen infiltration into groundwater supply and nitrogen runoff, thereby improving groundwater and surface water quality. Additionally, perennial plants improve the soil

with organic matter over the 30 year life the Project, allowing soil animals (i.e. soil fauna) to recover after years of intensive compaction and pesticide and fertilizer application.

5.7 The Project May Reduce Nitrogen Pollution and Avoid Impacts to Sensitive Groundwater Resources

Nitrogen, in the form of fertilizer, is a critical component to agricultural productivity. However, nitrogen is a potent water pollutant that is exceedingly difficult to contain once it has been introduced into the environment. Elevated nitrate levels can be harmful to fish and aquatic life and pollute drinking water wells as it moves both in surface water and in groundwater. In Minnesota, concern about nitrates, from nitrogen fertilizer, in groundwater has been well documented (MDA, 2019).

A study by the Minnesota Pollution Control Agency (MPCA) found that more than 70% of nitrates in the Minnesota environment comes from cropland; the rest is from sources such as wastewater treatment plants, septic and urban runoff, forest, and the atmosphere (MPCA, 2013). Nitrate concentrations and loads in surface water are high throughout much of southern Minnesota, largely as a result of leaching through large areas of intensely cropped soils and into underlying drain tiles and groundwater.

Minnesota state agencies and private organizations are working to address nitrogen levels by evaluating irrigation and fertilizer application practices. The MNDNR, local soil and water conservation districts, and the University of Minnesota are all evaluating irrigation strategy improvements centered around smarter irrigation. They are developing tools that assess soil moisture levels, crop stage (maturity), and precipitation received. Researchers are also evaluating the economics of subsurface irrigation. These strategies are designed to more efficiently water crops when and where they need it while conserving groundwater resources and limiting the vehicle (i.e., water deposits on the land) by which nitrogen can pollute groundwater.

Similarly, the Minnesota Department of Agriculture (MDA) is working to protect groundwater from agricultural contamination. The agency passed the Groundwater Protection Rule in late 2018 (MDA, 2019). The two-part rule minimizes potential sources of nitrate pollution to the state's groundwater and protects drinking water. Part one of the rule restricts fall application of nitrogen fertilizer in areas vulnerable to contamination; part two outlines steps to reduce the severity of the problem in areas where nitrates in public water supply wells are already elevated.
While the State works to identify vulnerable areas for groundwater contamination and protect groundwater resources through a variety of programs, perhaps the most prudent method is to simply shift the cropping system on the vulnerable soils, as practicable, from a nitrogen-intensive row-crop agriculture to land cover that does not involve nitrogen applications. The Northern Crescent Solar Project does just that by converting acres of nitrogen-intensive cropland to perennial vegetation that will not receive nitrogen application and further acts as a mechanism of capturing nitrogen and reducing the ability of that nitrogen to leave the Project boundary (Christianson et al., 2016).

Even though the Project Area is considered prime farmland, shifting the land cover in the Project Area to perennial vegetation instead of row crops for the life of the Project could be beneficial for limiting nitrogen infiltration into groundwater supply and nitrogen runoff to the Blue Earth River and Rice Lake, thereby improving groundwater and surface water quality. According to the MPCA, the segment of Blue Earth River by the Project is impaired, partially due to nitrogen runoff (MPCA, 2021).

5.8 Other Project Benefits

Northern Crescent Solar is committed to being a good steward to the community, landowners and environment as part of development of the Project. As introduced above, upon construction of and implementation of the mitigative measures described in the SPA, AIMP and VSMP, the Project will directly and indirectly provide benefits and improve the water quality in the Le Sueur River Watershed (LSRW) and the Blue Earth River Watershed (BERW) districts. These benefits include:

- decreasing the amount of nutrients (including phosphorous and nitrogen) applied to the Preliminary Development Area during the 30 year life of the Project (i.e., row crop agricultural operations would temporarily cease during Project construction and operation) thereby protecting groundwater resources from surface contaminants (**Figure 13**);
- managing nutrients at the Project site through incorporation, installation, and establishment and maintenance of native vegetative plant species, as detailed in the VSMP 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 National Pollutant Discharge Elimination System (NPDES) Construction Stormwater (CSW) permit from the MPCA and the Stormwater Pollution Prevention Plan (SWPPP) during construction to address, manage and control erosion, stormwater runoff from construction activities and re-establishment of vegetative cover post-construction;
- potentially increasing the water storage capacity and managing surface water runoff with the installation and establishment of perennial vegetation and other vegetative cover in combination with the stormwater management facilities (ponds) to be installed for operation of Project which will help improve soil health and downstream water quality; and
- maintaining current county drain tile and judicial drainage ditches across the Project to ensure no impact to neighboring agricultural land uses and field drainage.

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

6. CONCLUSIONS & RECOMMENDATIONS

For the reasons demonstrated in the above analysis, Northern Crescent Solar believes it has met prime farmland Guidance and requirements of the Rule to determine that there is no feasible or prudent alternative site to the Project Area.

Attachments

A: MSSA Report - Project Area Site (Faribault County)
B: MSSA Report - Herbst Site (Chisago County)

Figures

References

Christianson, L.E., J. Frankenberger, C. Hay, M.J. Helmers, and G. Sands, 2016. Ten Ways to Reduce Nitrogen Loads from Drained Cropland in the Midwest. Pub. C1400, University of Illinois Extension.

Minnesota Pollution Control Agency (MPCA). 2021. *Blue Earth River Watershed Stressor Identification Report*, August, 2021. https://www.pca.state.mn.us/sites/default/files/wq-ws5-07020009a.pdf

Minnesota Department of Commerce (DOC), Environment and Energy Analysis (EERA). 2020. *Solar Energy Production and Prime Farmland – Guidance for Evaluating Prudent and Feasible Alternatives.* May 19, 2020. https://mn.gov/eera/web/doc/13929/

Minnesota Department of Commerce and Minnesota Department of Agriculture. 2019. *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

Soil Survey Staff, Natural Resources Conservation Service (NRCS), United States Department of Agriculture (USDA). 2024. Official Soil Series Descriptions. https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

Solar Suitability Report

Latitude: 43.734922 Longitude: -94.125043

mn.gov/solarapp

Fri Feb 02, 2024

Northern Crescent

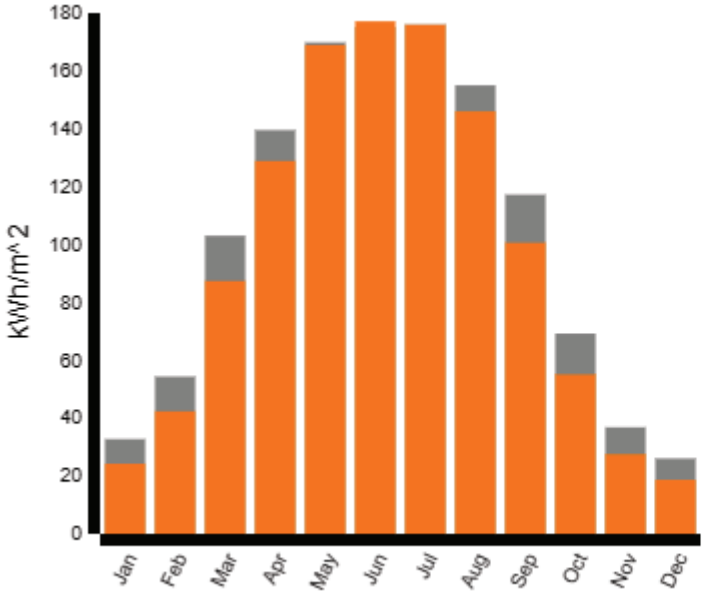
94°7'33.54"W, 43°44'4.17"N

This site is **Good**. It would need a **4.87 kW** system to generate **50%** of average household use. This system would cost approximately **$18,244**. System payback is **13.3 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: 1150.65 kWh/m^2
Avg Insolation per Day: 3.15 kWh/m^2
Source Data: Spring and Fall 2010

Amount Actual Sun



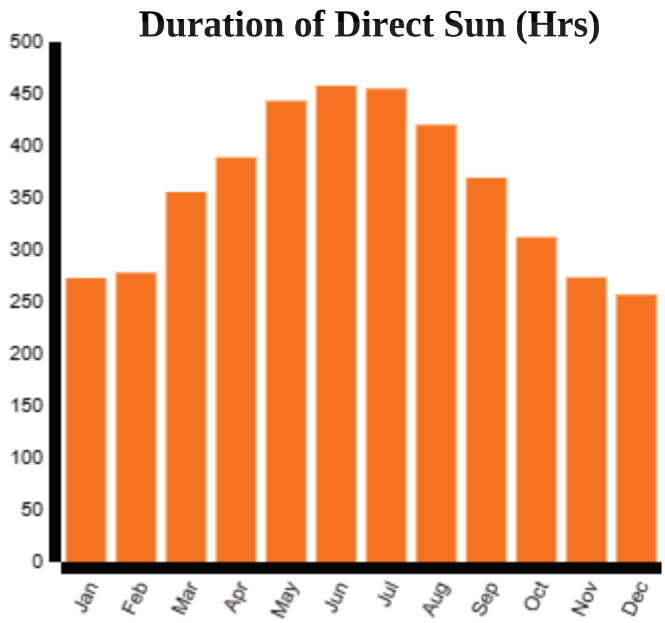
Solar Calculator

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	4.87 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	$18,244	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	17.93 years	Result assumes that electricity costs will rise 3.5% each year over 25 years.
Payback with Tax Credit	13.27 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	74%	24.25	273.0
February	78%	42.33	278.1
March	85%	87.36	355.8
April	92%	128.85	388.9
May	99%	168.94	443.3
June	100%	177.13	457.9
July	100%	175.92	455.1
August	94%	145.95	420.3
September	86%	100.58	369.4
October	80%	55.03	312.2
November	75%	27.46	273.6
December	72%	18.64	256.9

**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

Solar Suitability Report

Latitude: 45.460687 Longitude: -92.920334

mn.gov/solarapp

Fri Feb 02, 2024

Herbst Parcel

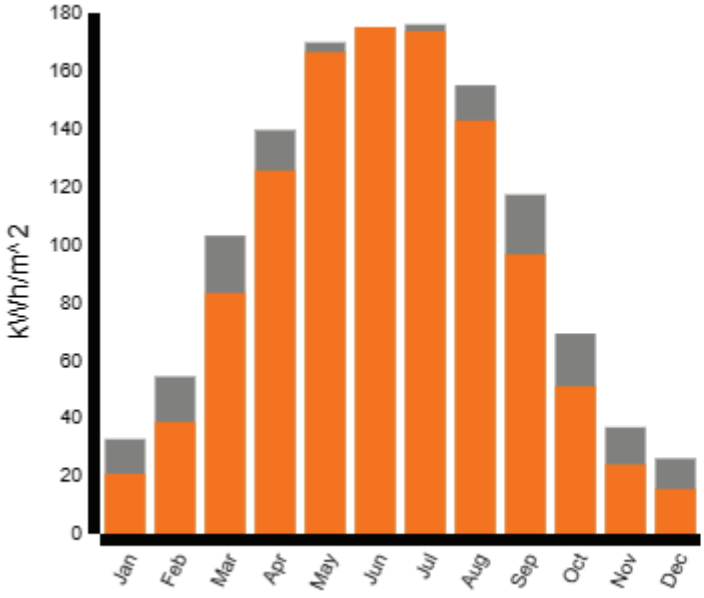
92°55'11.72"W, 45°27'40.54"N

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**. System payback is **13.6 years** after tax credit.

Utility Service Provider:
East Central Electric Association
P.O. Box 69
Braham, MN 55006
(320) 396-3351
www.eastcentralenergy.com

Site Details:
Total Annual Insolation: 1121.18 kWh/m^2
Avg Insolation per Day: 3.07 kWh/m^2
Source Data: Spring 2007

Amount Actual Sun



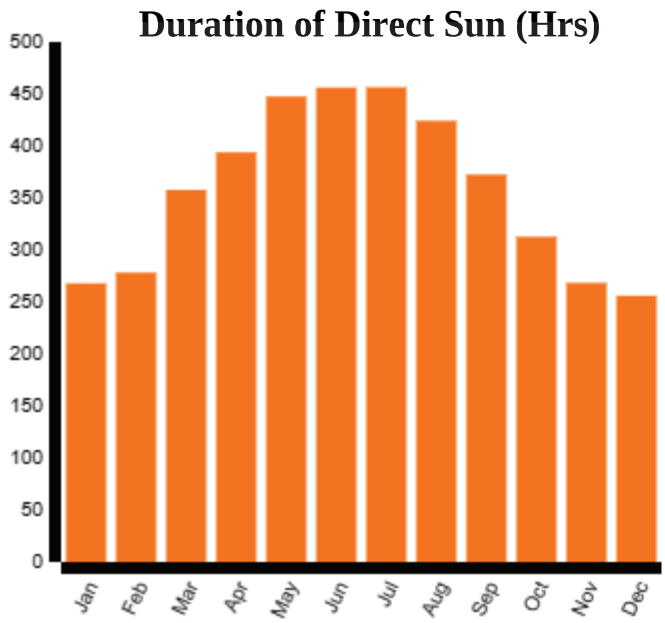
Solar Calculator

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.

Month	Actual % Sun**	Total kWh/m2	Duration (Hrs)
January	63%	20.75	267.8
February	71%	38.61	278.2
March	81%	83.22	357.8
April	90%	125.51	393.8
May	98%	166.45	447.5
June	100%	175.17	456.2
July	99%	173.64	456.4
August	92%	142.82	424.2
September	82%	96.57	372.4
October	74%	50.96	312.7
November	65%	23.90	268.3
December	59%	15.45	256.0

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



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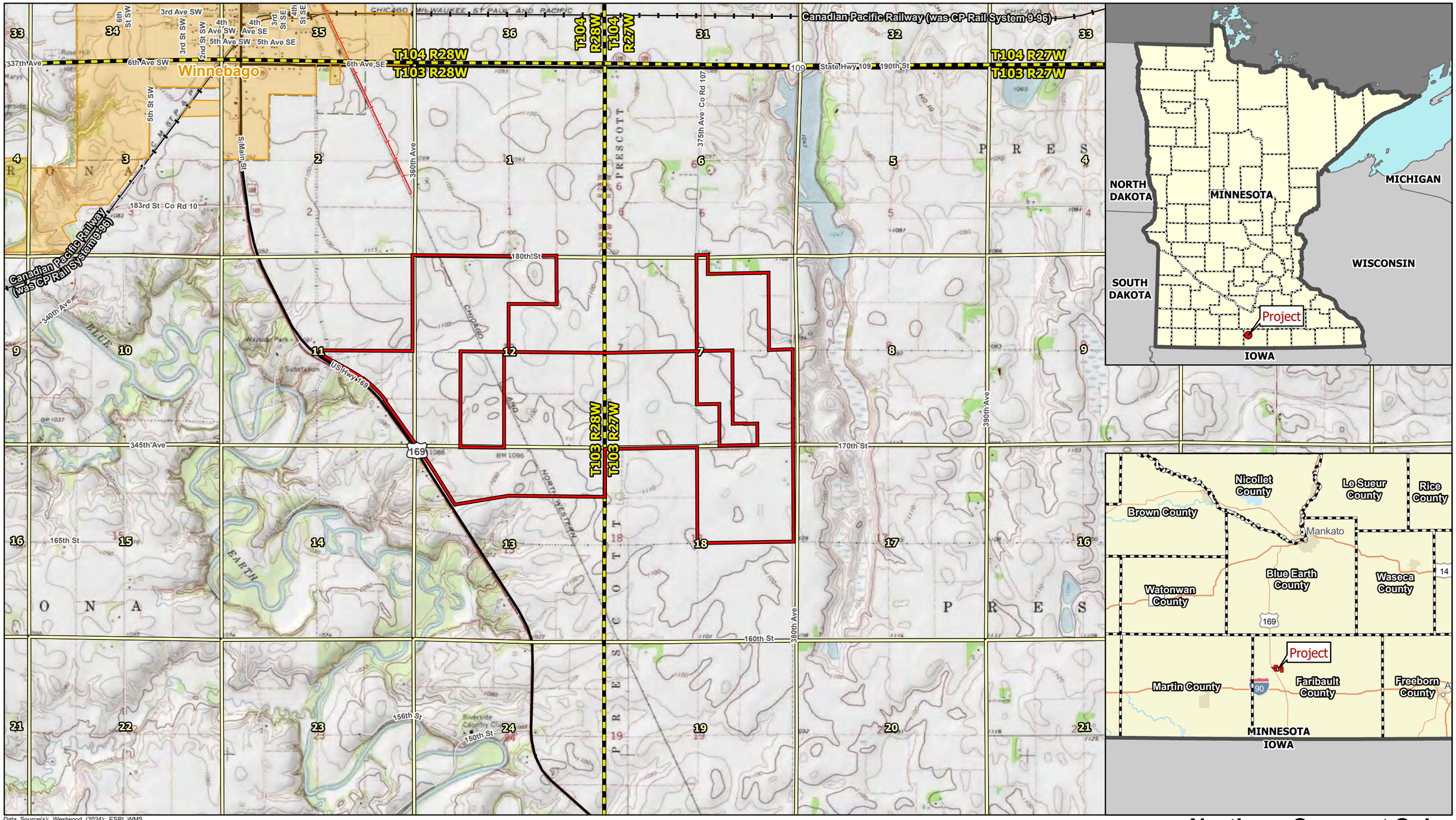

Data Source(s): Westwood (2024); ESRI WMS USGS Topographic & World Streets Basemaps (Accessed 2023); U.S. Census Bureau (2021 & 2022); PLSS (2022).

Legend

- Project Area
- County Boundary
- PLSS Township
- PLSS Section
- City/Civil Township Boundary
- Major Road
- Road
- Railroad
- Abandoned Rail

N

0 — 2,500 Feet

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Northern Crescent Solar & Storage Project

Faribault County, Minnesota

Project Location & USGS Topography

FIGURE 1 (July, 2024)

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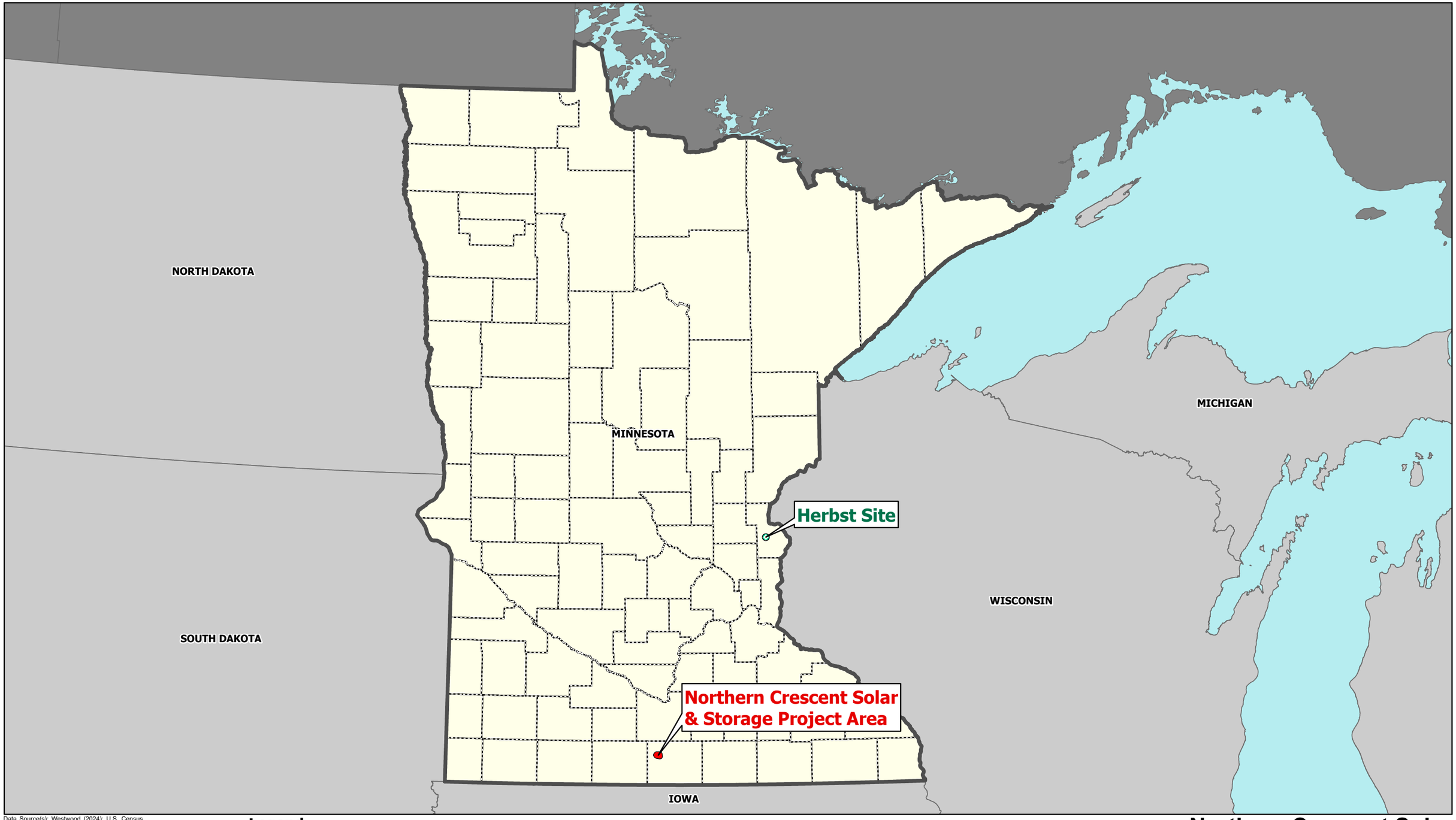

Data Source(s): Westwood (2024); U.S. Census Bureau (2020); MNDOT (2021).

Legend

- Winnebago Solar Project Area
- Herbst Site
- County Boundary
- State Boundary

N

0 50 Miles

Northern Crescent Solar & Storage Project

Faribault County, Minnesota

Preliminary Identification of Potential Project Sites

FIGURE 2 (February, 2024)

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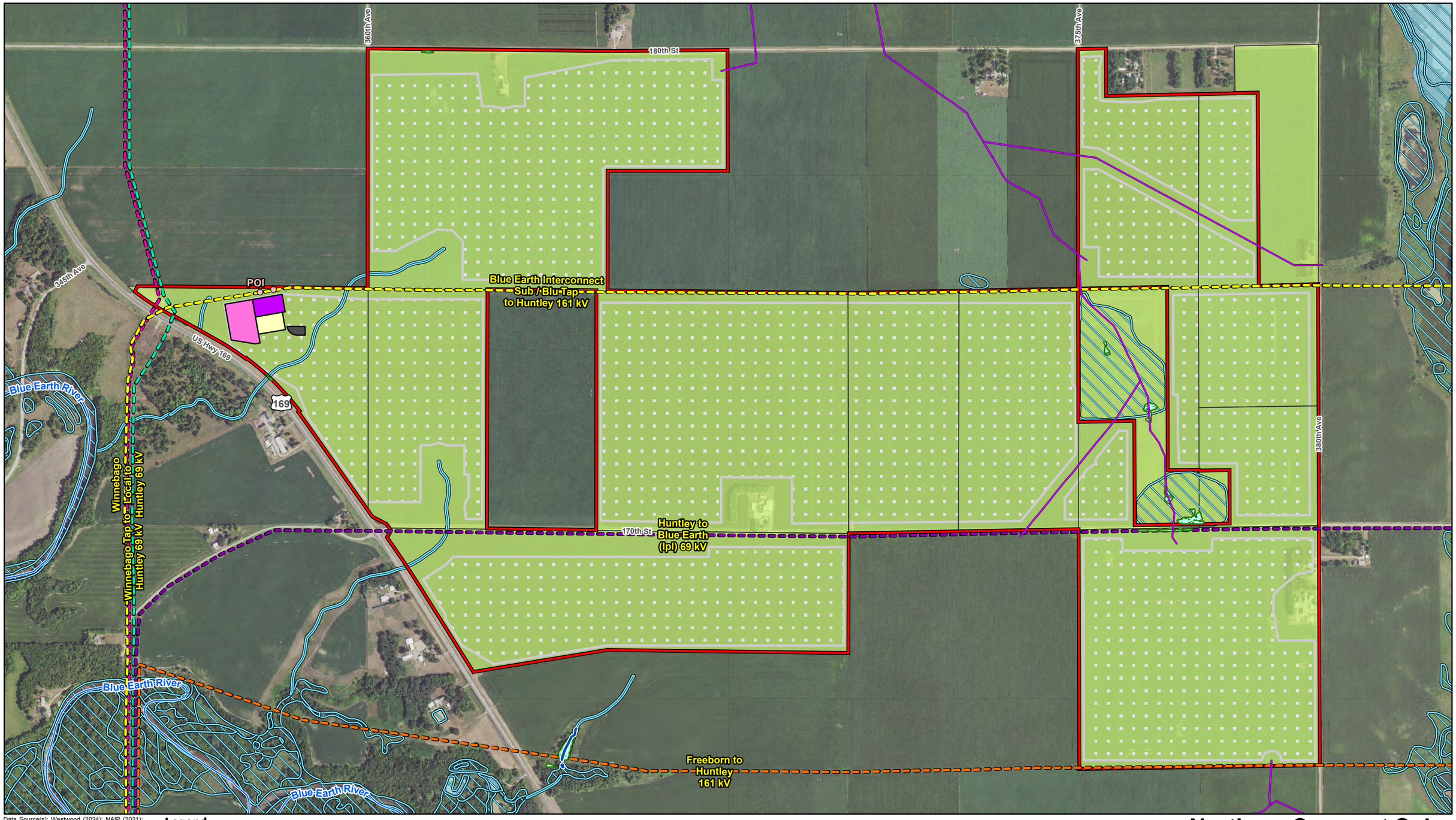

Data Source(s): Westwood (2024); NAIP (2021); U.S. Census Bureau (2021 & 2022); HIFLD (2023); NHD (2023); NWI (2022); Faribault County (2020).

Legend

- Project Area
- Preliminary Development Area
- Proposed Point of Interconnection (POI)
- Proposed Switchyard
- Proposed Substation
- Proposed BESS Facility
- Proposed O&M Building
- Field Delineated Waterway (2021)
- Field Delineated Wetland (2021)
- NWI Wetland
- Named NHD Flowline
- NHD Waterbody
- Faribault County Public Drainage System Drain Tile
- Parcel Boundary
- Participating Lease Agreement

Existing Transmission Line

- Blue Earth Interconnect Sub / Blu Tap to Huntley 161 kV
- Freeborn to Huntley 161 kV
- Huntley to Blue Earth (Ipl) 69 kV
- Winnebago Local to Huntley 69 kV
- Winnebago Tap to Huntley 69 kV

N

0 1,000 Feet

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Northern Crescent Solar & Storage Project

Faribault County, Minnesota

Site Control & Preliminary Development Area

FIGURE 3 (July, 2024)

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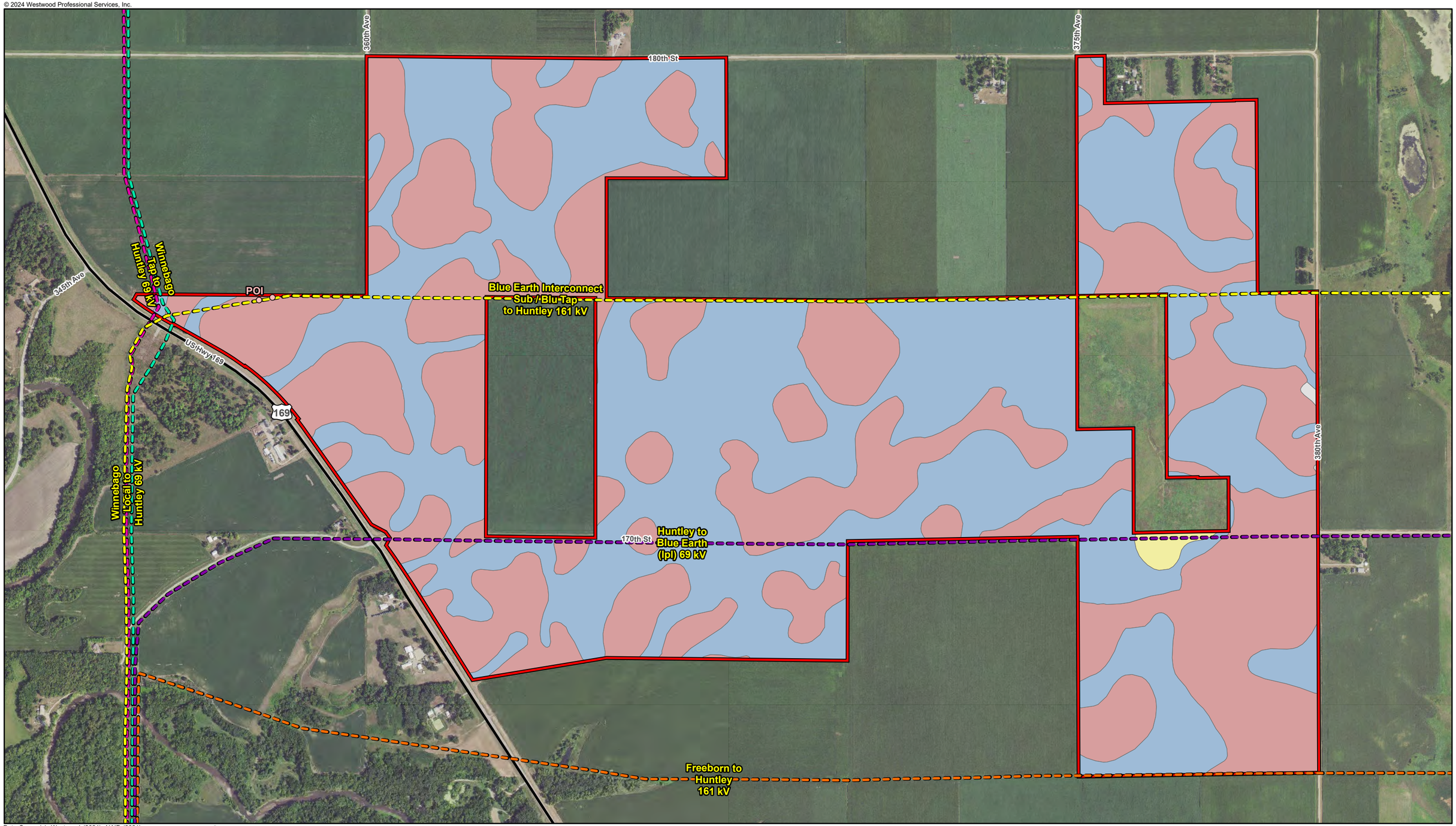

Data Source(s): Westwood (2024); NAIP (2021); U.S. Census Bureau (2021 & 2022); NRCS Web Soil Survey (Accessed 2023); HIFLD (2023).

Legend

- Project Area
- Proposed Point of Interconnection (POI)
- Major Road

Prime Farmland Classification - Project Area Acreage (Percent Total)

- All areas are prime farmland - 561.27 Acres (47.61%)
- Farmland of statewide importance - 5.02 Acres (0.43%)
- Prime farmland if drained - 611.85 Acres (51.9%)
- Not prime farmland - 0.7 Acres (0.06%)

Existing Transmission Line

- Blue Earth Interconnect Sub / Blu Tap to Huntley 161 kV
- Freeborn to Huntley 161 kV
- Huntley to Blue Earth (Ipl) 69 kV
- Winnebago Local to Huntley 69 kV
- Winnebago Tap to Huntley 69 kV

N

0 Feet 1,000

Northern Crescent Solar & Storage Project

Faribault County, Minnesota

Project Area
Prime Farmland

FIGURE 4 (July, 2024)

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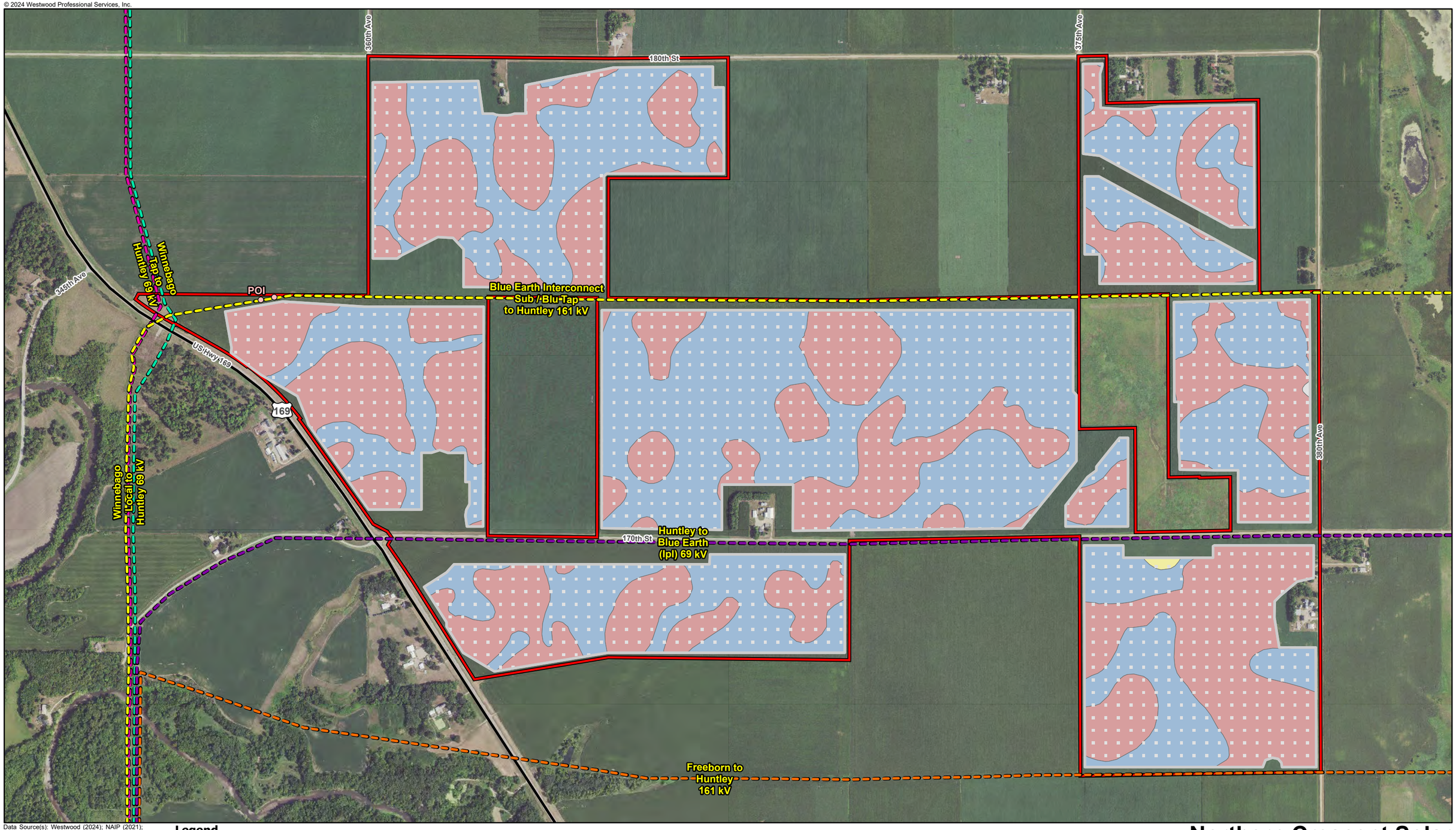

Data Source(s): Westwood (2024); NAIP (2021); U.S. Census Bureau (2021 & 2022); NRCS Web Soil Survey (Accessed 2023); HIFLD (2023).

Legend

- Project Area
- Preliminary Development Area
- Proposed Point of Interconnection (POI)
- Major Road

Prime Farmland Classification - Project Area Preliminary Development Area Acreage (Percent Total)

- All areas are prime farmland - 442.78 Acres (47.65%)
- Farmland of statewide importance - 0.89 Acres (0.1%)
- Prime farmland if drained - 485.38 Acres (52.23%)
- Not prime farmland - 0.23 Acres (0.02%)

Existing Transmission Line

- Blue Earth Interconnect Sub / Blu Tap to Huntley 161 kV
- Freeborn to Huntley 161 kV
- Huntley to Blue Earth (Ipl) 69 kV
- Winnebago Local to Huntley 69 kV
- Winnebago Tap to Huntley 69 kV

N

0 Feet 1,000

Northern Crescent Solar & Storage Project

Faribault County, Minnesota

Project Area
Prime Farmland

FIGURE 4a (July, 2024)

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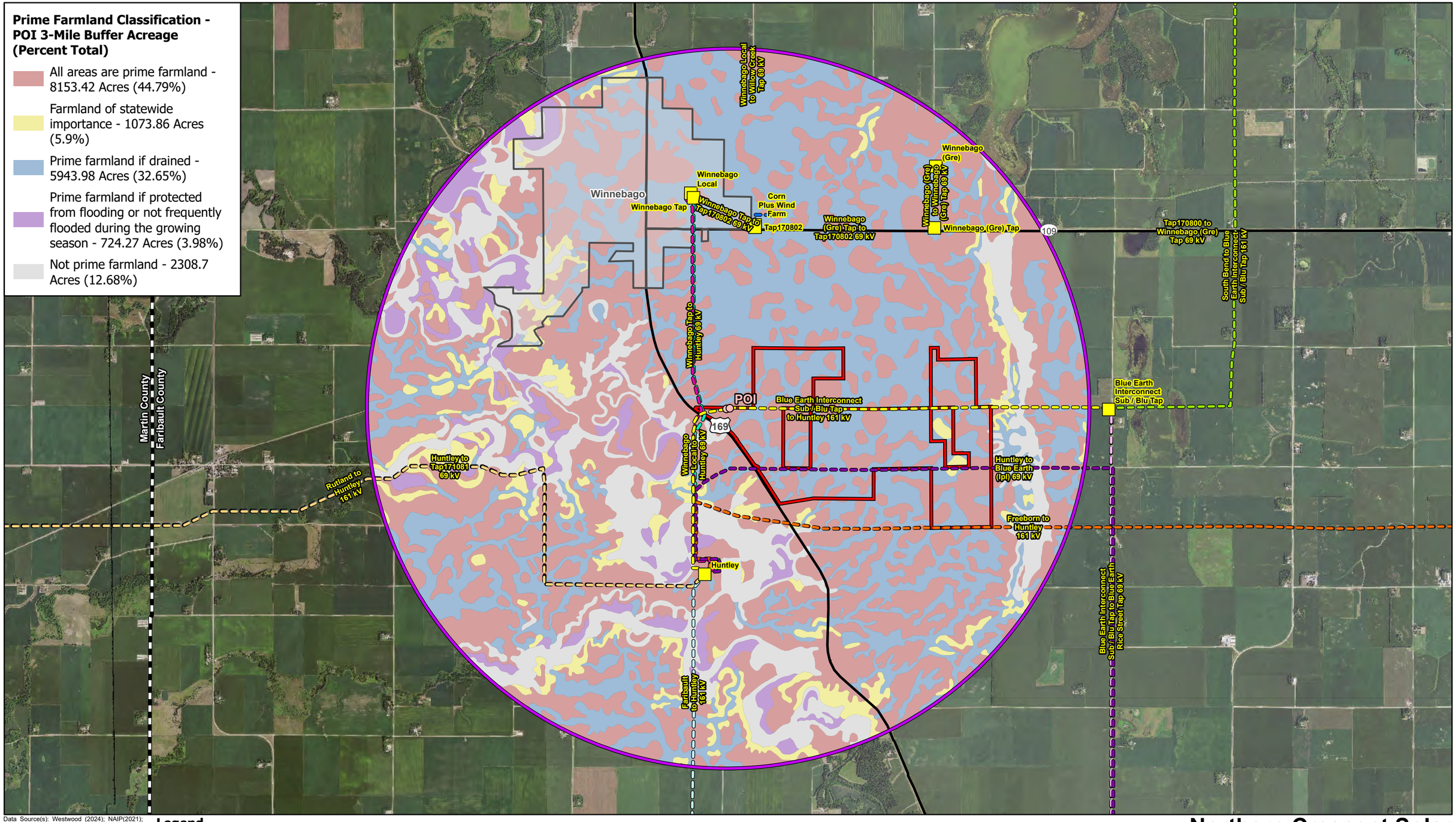
Prime Farmland Classification - POI 3-Mile Buffer Acreage (Percent Total)

- All areas are prime farmland - 8153.42 Acres (44.79%)
- Farmland of statewide importance - 1073.86 Acres (5.9%)
- Prime farmland if drained - 5943.98 Acres (32.65%)
- Prime farmland if protected from flooding or not frequently flooded during the growing season - 724.27 Acres (3.98%)
- Not prime farmland - 2308.7 Acres (12.68%)



Data Source(s): Westwood (2024); NAIP(2021); U.S. Census Bureau (2021); NRCS Web Soil Survey (Accessed 2024); HIFLD (2022 & 2023).

Legend

- Project Area
- POI 3-Mile Buffer
- County Boundary
- City/Civil Township Boundary
- Proposed Point of Interconnection (POI)
- Substation
- Major Road

Existing Transmission Line

- Blue Earth Interconnect Sub / Blu Tap to Blue Earth Rice Street Tap 69 kV
- Blue Earth Interconnect Sub / Blu Tap to Huntley 161 kV
- Faribault to Huntley 161 kV
- Freeborn to Huntley 161 kV
- Huntley to Blue Earth (Ipl) 69 kV
- Huntley to Tap171081 69 kV
- Rutland to Huntley 161 kV
- South Bend to Blue Earth Interconnect Sub / Blu Tap 161 kV
- Winnebago Local to Huntley 69 kV
- Winnebago Tap to Huntley 69 kV
- Unknown129758 to Not Available 69 kV

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N

0 4,000 Feet

Northern Crescent Solar & Storage Project

Faribault County, Minnesota

Prime Farmland within Three Miles of POI

FIGURE 5 (July, 2024)

Map Document: N:\0044069.00_GIS_ArcPro\R0044069_040_PrimeFarmlandExhibits_240201\R0044069_040_PrimeFarmlandExhibits_240201\R0044069_040_PrimeFarmlandExhibits_240201.aprx 7/10/2024 4:42 PM MMQuade

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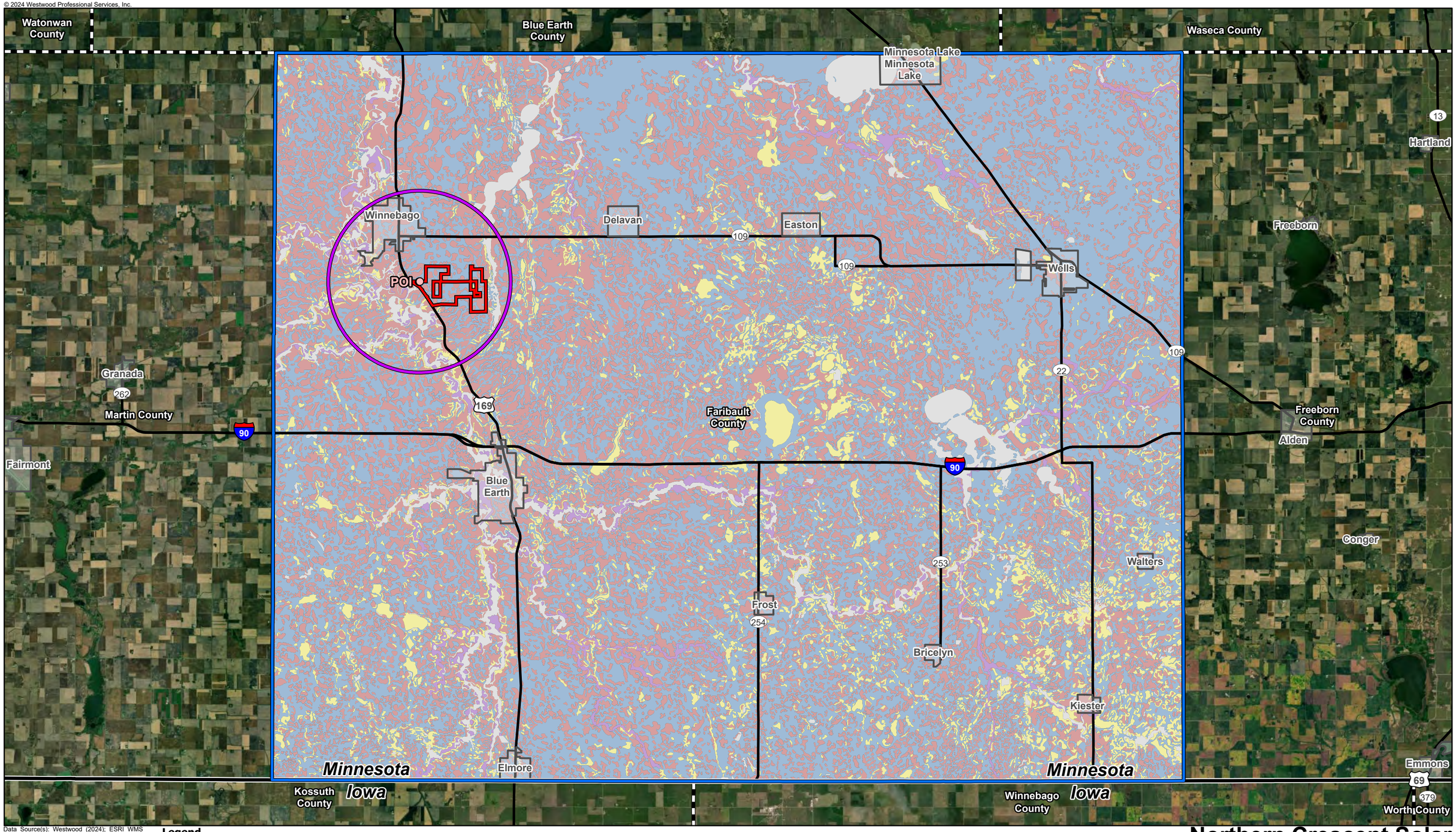

Data Source(s): Westwood (2024); ESRI WMS Imagery Basemap (Accessed 2024); U.S. Census Bureau (2021); NRCS Web Soil Survey (Accessed 2024).

Legend

- Project Area
- POI 3-Mile Buffer
- Faribault County Boundary
- State Boundary
- County Boundary
- City/Civil Township Boundary
- Proposed Point of Interconnection (POI)
- Major Road

Prime Farmland Classification - Faribault County Acreage (Percent Total)

- All areas are prime farmland - 165514 Acres (35.82%)
- Farmland of statewide importance - 37010 Acres (8.01%)
- Prime farmland if drained - 229415 Acres (49.65%)
- Prime farmland if protected from flooding or not frequently flooded during the growing season - 8927 Acres (1.93%)
- Not prime farmland - 21193 Acres (4.59%)

N

0 3 Miles

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Northern Crescent Solar & Storage Project

Faribault County, Minnesota

Prime Farmland within Faribault County

FIGURE 6 (July, 2024)

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