

Appendix D

Draft Vegetation Management Plan

SUMMIT LAKE SOLAR ENERGY CONVERSION FACILITY AND BATTERY ENERGY STORAGE SYSTEM NOBLES COUNTY, MINNESOTA VEGETATION MANAGEMENT PLAN



**SOLAR FACILITY DOCKET NO. IP-7153/GS-25-89
BESS FACILITY DOCKET NO. IP-7153/ESS-25-88**

Prepared for:



8400 Normandale Lake Blvd., Suite 1200
Bloomington, MN 55437

FEBRUARY 2025

Prepared by:



EXECUTIVE SUMMARY

Summit Lake Solar, LLC (Summit Lake), a wholly owned subsidiary of National Grid Renewables Development, LLC proposes to construct the Summit Lake Solar Facility (Solar Facility or Project) in Summit Lake and Elk Townships, Nobles County, Minnesota (see Figure 1). The Solar Facility is a solar energy conversion facility with a 200-megawatt (MW) alternating current (AC) nameplate capacity. The Project also includes a Battery Energy Storage System (BESS); land within the BESS will be graveled for operation of the facility and therefore the goals and objectives outlined throughout this plan do not apply to the BESS.

If approved, the Project will operate under a Site Permit issued by the Minnesota Public Utilities Commission in accordance with the Minnesota Power Plant Siting Act (Minnesota Statutes §216E) and Minnesota Administrative Rules Chapter 7850, in addition to other required federal, state, and local permits. Currently, the Project is scheduled to commence construction activities in the second quarter of 2026, with commercial operations anticipated to begin in the fourth quarter of 2027.

The proposed Project is primarily located on agricultural land (95 percent) in a rural landscape. Land use data indicates that the Land Control Area is primarily managed for row-crop production of predominantly corn and forage crops. The Project is located on level to nearly-level topography, which is consistent with the current agricultural production.

A comprehensive Vegetation Management Plan (VMP) has been developed to manage soil and vegetation across all phases of the Project, from site preparation to ongoing long-term maintenance, and to aid qualified contractors. This VMP outlines steps for installing prescribed native seed mixes, controlling invasive and noxious weeds, and mitigating erosion and sedimentation.

The VMP covers the Preliminary Development Area (also referred to as the Site; see Figure 2, Land Cover/Land Use), which includes both the solar facility and surrounding lands that may be impacted, with designated zones of perennial native vegetation beneath and between solar panels and in a buffer outside the perimeter fence. The VMP's primary objective is to support Summit Lake's restoration and vegetation propagation goals by establishing resilient, site-specific vegetation that enhances soil stability, biodiversity, and aligns with local ecological goals, while also minimizing long-term maintenance costs.

This document is intended to be a working document, and revisions will be made as new information on vegetation management practices becomes available or if the Project layout changes.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	I
1.0 GOALS AND OBJECTIVES	5
1.1 Short-Term Goals	5
1.2 Long-Term Goals	5
1.3 Vegetation Management Phases	6
2.0 SITE DESCRIPTION	6
2.1 Project Location and Size	7
2.1.1 Vegetation and Land Use	7
2.1.2 Topography	8
2.1.3 Soil Characteristics	8
2.1.4 Hydrological Characteristics	11
3.0 MANAGEMENT UNITS	11
4.0 VEGETATION INSTALLATION	12
4.1 Site Preparation and Vegetation Clearing	12
4.1.1 Permanent Seeding Prior to Solar Installation	12
4.1.2 Permanent Seeding After Solar Installation	13
4.2 Temporary Seed Mixes	13
4.3 Seeding Timing	13
4.4 Permanent Seed Mixes	14
4.5 Seed Mix Substitutions	15
4.6 Seed Installation	15
4.7 Soil Amendments	16
4.8 Wet Weather Considerations	16
4.9 Pesticide Drift	16
4.10 Landscape Screening	16
5.0 VEGETATION MANAGEMENT	18
5.1 Undesirable Species	18
5.1.1 Prescribed Treatment for Common Invasive Species and Weeds	18
5.2 Establishment Phase	21
5.2.1 General Tasks for Managing Vegetation	22
5.2.2 Herbicide Specifications	23
5.2.3 Reseeding Bare Soil	24
5.3 Transition Phase	24
5.4 Long-term Maintenance Phase	24
5.5 Haying	24
5.6 Grazing	24
5.6.1 Site Setup for Grazing	25
5.6.2 Stocking Rate and Management	26
6.0 LONG-TERM MONITORING	26
6.1 Monitoring Protocol	27
6.2 Targets and Projected Outcomes	28
6.2.1 Native Vegetation Targets	28
6.2.2 Noxious Weeds and Problem Plants	29

6.3 Reporting30

6.4 Adaptive Management30

7.0 REFERENCES.....31

LIST OF TABLES

Table 2.1.1-1 Land Use within the Preliminary Development Area 7

Table 2.1.3-1 Summary of Soils within the Land Control Area 9

Table 2.1.3-2 Farmland Classifications within the Preliminary Development Area10

Table 4.2-1 Temporary Cover Crops13

Table 5.1.1-1 Problematic Annual Cropland Weeds19

Table 5.1.1-2 Problematic Perennial Cropland Weeds19

Table 5.1.1-3 Abbreviated List of Minnesota Prohibited/Restricted Noxious Weeds and
Invasive Plants21

LIST OF FIGURES

Figure 1 Project Location

Figure 2 Land Cover / Land Use

Figure 3 Topographic Map

Figure 4 NRCS Soils Map

Figure 5 Surface Waters

Figure 6 Seeding Plan

Figure 7 Transitional Vegetation Growth

LIST OF ATTACHMENTS

Attachment A Habitat Friendly Solar Site Assessment Forms

Attachment B Project Historical Climate Data

Attachment C Seed Mixes

ACRONYMS AND ABBREVIATIONS

AC	alternating current
AIMP	Agricultural Impact Mitigation Plan
AUM	animal unit month
BESS	Battery Energy Storage System
BWSR	Board of Water and Soil Resources
DC	direct current
General Permit	Construction Stormwater General Permit
GIS	geographic information system
Land Control Area	1,989.6 acres of privately-owned land for which for which Summit Lake Solar, LLC has leases and purchase options to allow siting and construction of the Project.
Merjent	Merjent, Inc.
MNDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
MW	megawatt
NLCD	National Land Cover Database
NRCS	Natural Resources Conservation Service
Preliminary Development Area	Approximately 1,481.6-acre area that falls entirely within the Land Control Area where Summit Lake Solar, LLC proposes to build the Summit Lake Solar Project facilities.
Project	Summit Lake Solar Facility
Project Area	General area surrounding and including the solar energy facility
USDA	U.S. Department of Agriculture
Site	Approximately 1,481.6 acres of the Land Control Area, also referred to as the Preliminary Development Area
Solar Facility	Summit Lake Solar Facility
SSURGO	Soil Survey Geographic Database
Summit Lake	Summit Lake Solar, LLC
USEPA	U.S. Environmental Protection Agency
VMP	Vegetation Management Plan
WEG	Wind Erodibility Group

1.0 GOALS AND OBJECTIVES

Merjent Inc. (Merjent), on behalf of Summit Lake Solar, LLC (Summit Lake), developed this Vegetation Management Plan (VMP) to guide site preparation, develop and install prescribed seed mixes, manage undesirable species, implement erosion and sediment controls, and establish vegetation goals. This VMP incorporates best practices for establishing native vegetation, guided by the Minnesota Board of Water and Soil Resources (BWSR, 2019) and the Minnesota Department of Commerce (2021). Summit Lake's primary vegetation management goals are outlined below, with corresponding steps to achieve each goal.

1.1 Short-Term Goals

Short-term goals are goals applicable to the post-construction establishment phase of the proposed Summit Lake Solar Project (Project) in Years 1 to 5. The general goal is to establish a sustainable, diverse, perennial grassland community, appropriate to site conditions and safe operation, maintenance, and inspection that complies with all permits and regulations pertaining to the Site. The primary short-term goals are:

- Comply with permit conditions for site revegetation, per the Minnesota Pollution Control Agency (MPCA) Construction Stormwater General Permit (General Permit).
- After the first growing season, vegetate at least 70 percent of the Site, and ideally 80 percent of the Site.
- Establish sustainable, diverse, perennial grassland community, appropriate to conditions on 70 percent of the Site and comprised of 90 percent native vegetation by Year 5.
- Implement cover crops to effectively assist in establishment of native vegetation, if practicable.
- Manage invasive species and noxious weeds per Minn. Stat., Sections 18.75 to 18.78, and 18.86.
- Install and establish vegetative screening as requested. The landscaping screening area should be established, with limited ongoing plant mortality, within one year of installation. At the end of the establishment phase, 80 percent of the installed shrubs and trees shall be present in the landscaping/screening area.

1.2 Long-Term Goals

Long-term goals are defined as goals beyond Year 5, following implementation of the short-term goals. Summit Lake will implement adaptive management of vegetation cover, guided by strategic integration of site-specific environmental conditions to maintain a perennial grassland community that keeps the soils on the Site stabilized, improves soil conditions and preserves the Site for agricultural use in the future. The primary long-term goals include:

- Maintain 95 percent of the Site in a vegetated state, and at least 90 percent of the cover comprised of native species.

- Establish 6 or more species of planted native graminoids and 12 or more species of planted native forbs across the Site.
- Establish a Site that is suitable for haying and/or grazing during facility operations, if determined to be a viable management strategy following construction. Accommodate vegetative management of the Site using traditional vegetative management methods for areas not managed by haying or grazing.
- Prioritize the implementation of all required vegetation management activities for safe and efficient operations support, including woody species control, height control of herbaceous species, wet area management, and landscape/screening management.

The Project's vegetation management program is eligible for the Board of Water and Soil Resources (BWSR) Habitat Friendly Solar Program. The Project meets and exceeds the minimum habitat friendly standards when scored using the Habitat Friendly Solar Site Assessment Form for Project Planning (see Appendix A).

1.3 Vegetation Management Phases

The VMP describes the Establishment, Maintenance, and Long-term Maintenance and Monitoring Phases in detail.

- The Establishment Phase addresses the initial three years of vegetation installation and management. The first year of establishment is focused on consistent undesirable plant control on a Site-wide basis through a variety of management techniques. The second year of establishment continues undesirable plant control, but generally employs more targeted techniques. In the third and fourth years of the Establishment Phase, undesirable plant control will consist of spot treatment to control the remaining small patches of undesirable species.
- The Maintenance Phase, which generally begins in the fifth year after initial seed mix installation, promotes and maintains the desired vegetation community, controls the reestablishment or spread of any undesired species, and combats the establishment of invading trees and shrubs.
- The Long-term Maintenance and Monitoring Phase includes quantitative and qualitative measures to assess how well the Project goals and performance standards are being achieved. During these years, the frequency of maintenance is greatly reduced and dependent on yearly soil moisture and vegetation growth.

2.0 SITE DESCRIPTION

To understand the ecosystem and landform characteristics surrounding the Project, a baseline Site analysis was conducted to inform the appropriate seed mix composition(s), anticipated period(s) of establishment, and maintenance perspectives required for a successful Establishment Phase. The baseline Site analysis consists of a desktop review of publicly available datasets, such as soil characteristics, land use, landform, historical aerial photos, linear hydrology, wetlands, and historical climate data. Additional considerations, such as annual

precipitation, weather, and historical climate data inform the likelihood of adequate establishment of propagated seed mixtures.

2.1 Project Location and Size

Summit Lake is proposing to build its solar facility in Township 103N, Range 40W, Sections 18 and 19 and Township 103N, Range 41W, Sections 10-15, and 22-24, Nobles County, Minnesota as shown on Figure 1 (Goggle Earth). Summit Lake has obtained leases and purchase options for 1,989.6 acres of privately-owned land (Land Control Area). Based on preliminary design, the Project will cover approximately 1,481.6.0 acres of the Land Control Area (Preliminary Development Area or Site). There are approximately 508.0 acres of the Land Control Area for which Summit Lake has site control but are not currently contemplated for occupation by the Solar Facility or BESS. The 508.0-acre portion of the Land Control Area that will not be used by the Project is currently under lease with the underlying landowner and will be excluded from the area leased by Summit Lake during operation of the Project. The underlying landowner can then continue to farm the area released from the lease for the life of the Projects. The total nameplate capacity for the Solar Facility is 200 MW and the BESS is 200 MW / 800-megawatt hour.

2.1.1 Vegetation and Land Use

Prior to Euro-American settlement, vegetation in this area was almost entirely tallgrass prairie. Wet prairies were restricted to narrow stream margins and forests were similarly restricted to ravines along a few streams, such as the Redwood River. Land in this area is currently used for agricultural activity and there are few remnants of pre-settlement vegetation left (Minnesota Department of Natural Resources [MNDNR], 2024).

Based on the National Land Cover Database (NLCD) land use/cover data as presented in Table 2.1.1-1 and Figure 2, the Preliminary Development Area would affect predominately agricultural land (1,479.4 acres/99 percent). Developed lands make up approximately 1.6 acres 0.10 percent of the Site. Herbaceous and barren lands consist of less than 0.1 percent of Project-related impacts, respectively. In addition, the NLCD data indicate potential wetland impacts; these impacts are further discussed in Section 2.1.4.

TABLE 2.1.1-1		
Land Use within the Preliminary Development Area		
Land Use Type	Acres in Preliminary Development Area	Percent of Preliminary Development Area
Agricultural ^a	1,479.4	99.8%
Developed	1.6	0.1%
Forested	--	--
Herbaceous	--	--
Emergent Herbaceous Wetlands	0.6	< 0.1%
Barren Land	< 0.1	< 0.1%
Open Water	--	--
PROJECT TOTAL	1,481.6	100%
^a Agricultural land consists of the NLCD categories cultivated cropland and hay/pasture. Source: Dewitz and U.S. Geological Survey, 2021. Note: A double dash indicates that this land use/cover category is not present in the Preliminary Development Area.		

In the NLCD data used for Summit Lake's environmental analysis agricultural land is used for row-crop production of predominantly corn and forage crops. Developed land generally consists of public roads, and a few small areas around the municipal boundary of Reading. The small amount of barren land identified in the NLCD data is associated with a roadside ditch along McCall Avenue.

2.1.2 Topography

The Project is located in a region characterized as a transition from shallow deposits of windblown silt (loess) over glacial till to deeper deposits of loess. The depth to bedrock is 600 to 800 feet through most of the Land Control Area. Soils are loamy and well-drained with thick dark surface horizons (MDNR, 2024).

The Land Control Area is relatively flat in gradient (see Figure 3; USGS, 2022) due to the overall historic topographical range and mass grading operations to facilitate current agricultural practices. The mean annual precipitation of the Land Control Area averages 24 to 32 inches and hosts a frost-free period of 155 to 175 days per year (MDNR, 2024). See Appendix B to reference historical climate data (NOAA 1981-2010; USEPA, 2021).

2.1.3 Soil Characteristics

An important factor that influences revegetation is the soil characteristics. A full understanding of the affected soil profiles on a project provides insight into vegetative growth, compaction, erosion, and the types of equipment required to implement seeding requirements. A soil analysis determines the ground's slope, hydric and flooding capabilities, and overall vegetative parameters for seed root penetration.

Soil characteristics within the Land Control Area (which is inclusive of the Site) were assessed using the Soil Survey Geographic Database (SSURGO) (Soil Survey Staff, 2024). The SSURGO database is a digital version of the original county soil surveys developed by Natural Resources Conservation Service (NRCS) for use with geographic information system (GIS). It provides the most detailed level of soils information for natural resource planning and management. Soil maps are linked in the SSURGO database to information about the component soils and their properties (U.S. Department of Agriculture [USDA], NRCS, 2024). Table 2.1.3-1 lists the soil types located within the Land Control Area, which are also shown on Figure 4.

TABLE 2.1.3-1

Summary of Soils within the Land Control Area

Map Unit Symbol	Soil Name	Land Control (acres / %)	Farmland Designation	Hydric Soil	K-Factor	Wind Erodibility Group
L78A	Canisteo clay loam, 0 to 2 percent slopes	138.7 / 7.0%	Prime farmland if drained	Yes	.28	4L
L107A	Canisteo-Glencoe complex, 0 to 2 percent slopes	11.0 / 0.6%	Prime farmland if drained	Yes	.28	4L
L79B	Clarion loam, 2 to 6 percent slopes	645.6 / 32.4%	All areas are prime farmland	No	.24	6
L134B	Clarion-Crooksford complex, 1 to 5 percent slopes	8.4 / 0.4%	All areas are prime farmland	No	.28	6
L102C2	Clarion-Storden complex, 6 to 10 percent slopes, moderately eroded	18.5 / 0.9%	Farmland of statewide importance	No	.28	6
L136A	Crooksford silty clay loam, 1 to 3 percent slopes	15.9 / 0.8%	All areas are prime farmland	No	.32	6
L170B	Estherville-Round lake complex, 2 to 6 percent slopes	24.9 / 1.3%	Farmland of statewide importance	No	.20	3
L146A	Glencoe silty clay loam, 0 to 1 percent slopes	38.7 / 1.9%	Prime farmland if drained	Yes	.28	6
L152B	Lowlein-Round lake complex, 1 to 6 percent slopes	5.1 / 0.3%	All areas are prime farmland	No	.20	5
L85A	Nicollet clay loam, 1 to 3 percent slopes	421.3 / 21.2%	All areas are prime farmland	No	.28	6
L140A	Ocheda silty clay loam, 1 to 3 percent slopes	9.0 / 0.5%	All areas are prime farmland	No	.28	4
L135A	Okabena silty clay loam, 1 to 3 percent slopes	19.1 / 1.0%	All areas are prime farmland	No	.32	6
L163A	Okoboji silty clay loam, 0 to 1 percent slopes	11.6 / 0.6%	Prime farmland if drained	Yes	.32	4
L158B	Round lake sandy loam, 1 to 6 percent slopes	6.2 / 0.3%	Farmland of statewide importance	No	.20	3
L129B	Terril loam, 2 to 6 percent slopes	3.6 / 0.2%	All areas are prime farmland	No	.28	6
L133A	Waldorf silty clay loam, 0 to 2 percent slopes	2.0 / 0.1%	Prime farmland if drained	Yes	.32	4
L83A	Webster clay loam, 0 to 2 percent slopes	610.2 / 30.7%	Prime farmland if drained	Yes	.28	6
PROJECT TOTAL		1,989.6 / 100.0%				
Source: Soil Survey Staff, 2024.						

Approximately 40.8 percent of the Land Control Area is underlain by hydric soils or soils containing hydric inclusions, indicating some wetlands are likely to be present as one of many wetland characteristics is hydric soil (see Section 2.1.4). All soils in the Land Control Area have low to moderate susceptibility to erosion by water (i.e., K-factors from 0.1 to 0.4). All soils in the Land Control Area are in Wind Erodibility Group (WEG) 3, 4, 4L, 5 or 6. WEG values of 3, 4, 4L, and 5 correspond to Wind Erodibility Indices of 86 tons/acre/year, and WEG values of 6 correspond to 48 tons/acre/year (USDA, NRCS, 2024).

Soils prone to compaction and rutting are subject to dramatic and adverse changes in soil porosity and structure as a result of mechanical deformation caused loading by equipment during construction. Compaction and rutting are related to moisture content and texture and are worse when medium and fine textured soils are subject to heavy equipment traffic when wet. Soils in the Land Control Area are prone to compaction and rutting.

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pasture, woodland, or other lands). Urbanized land and open water cannot be designated as prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods and is not subject to frequent or prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., by draining or irrigating) (USDA NRCS, 2024).

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

As shown in Table 2.1.3-2, all of the soils within the Preliminary Development Area (Site) are classified as prime farmland, prime farmland if a limiting factor is mitigated, or farmland of statewide importance; however, it is important to note that the prime farmland designation is independent of current land use (USDA NRCS, 2024).

TABLE 2.1.3-2	
Farmland Classifications within the Preliminary Development Area	
Farmland Classification	Preliminary Development Area (acres / %)
Prime Farmland	894.16 / 60.358%
Prime Farmland if Drained	560.9 / 37.86%
Farmland of Statewide Importance	26.47 / 1.78%
Not Prime Farmland	0.0 / 0.0%
PROJECT TOTAL	1481.62 / 100.0%
Source: Soil Survey Staff, 2024.	

For additional information regarding soils, best practices for segregation of topsoil and subsoil, as well as decompaction methods that will foster long term soil health and vegetative outcome success, refer to the Agricultural Impact Mitigation Plan (AIMP). The contractor is encouraged to visit the NRCS web soil survey to review detailed information about the soils across the Site in more detail.

2.1.4 Hydrological Characteristics

The hydrology of a site proposed informs the locations where specific seed mixes may need to be developed, along with the parameters for implementation. Upland and lowland/wetland/riparian seed mixes can greatly differ in seeding species, rates, application techniques, and timing when considering how much water, saturation, or inundation a vegetation species can tolerate.

Hydraulic features within the Land Control Area include wetlands, waterways, and waterbodies. The Project is within the Des Moines River – Headwaters and Rock River Hydrologic Unit Code 8 Watersheds (U.S. Environmental Protection Agency [USEPA], 2023a). Upon review of FEMA's National Flood Hazard Layer, the project area is categorized as a minimal flood hazard (FEMA, 2021).

Tetra Tech, Inc, conducted wetland and other waters delineations in 2023 and 2024 within the Land Control Area. Based on field delineations, 34 wetlands totaling approximately 48.66 acres were delineated within the Land Control Area. In addition, Judicial Ditch Number Nine is located in the northeast portion of the Land Control Area and East Fork Beaver Creek is located in the southwestern portion of the Land Control Area (see Figure 5).

The Project has been designed to minimize impacts to surface waters to the extent practicable. Impacts to waterbodies are not anticipated. The proposed electrical collection and communication lines associated with the Project intersect approximately 0.09 acre of wetlands. Directional boring will be used during construction of the proposed electrical collection and communication lines to avoid impacting these wetlands.

The access roads within the Solar Facility intersect approximately 0.02 acre of delineated wetlands. In addition, 0.9 acres of wetlands are located within the fenced solar facility; however, the wetlands will not be impacted by any Project components. These wetlands are all currently farmed and will be enhanced through seeding and management in accordance with the Vegetation Management Plan.

3.0 MANAGEMENT UNITS

The Site is anticipated to be separated into smaller construction and management units for a common point of communication in management. For ease of reference, the management units will likely be designated by the array block numbering system already established as a part of the final engineering process. Each array block, which consists of an approximately 10- to 20-acre area of panels, is designated per the direct current (DC) collection system from the solar modules to a common inverter. Using an array block is a common point of understanding for onsite managers to quickly and effectively communicate the area undergoing final Site stabilization, requiring noxious weed treatment, or other vegetation management needs. As restoration progresses, a more simplified set of management units may be established by aggregating array blocks into larger units. This will be determined by onsite managers based on Site outcomes and monitoring reports.

Generally, three distinct types of management are possible on the Site. These include the possibility of haying, mowing, or grazing, and these methods are laid out in more detail later in the VMP. This VMP has been drafted to allow a 'scaling' of each management measure based upon availability at the time such a management measure could be deployed. The goals and objectives for each management unit are the same and are provided in Section 1.0 of this VMP.

4.0 VEGETATION INSTALLATION

4.1 Site Preparation and Vegetation Clearing

Prior to vegetation installation, management techniques can be used that will lead to more successful vegetation establishment for the short- and long-term goals. Most of the soil and vegetation disturbances will occur during the first phase of construction when the grading activities take place. The construction contractor will follow the recommendations of the AIMP to ensure that best practices are used during construction and to prepare the Site for final stabilization. Additionally, to stabilize the soils, existing vegetation or plant material will be retained on the surface in areas that do not need to be graded. Any topsoil that is stripped or otherwise stockpiled during construction will be replaced and spread or otherwise stockpiled prior to seed bed preparation activities. Recommendations for weed control and implementation of cover crops to assist in Site stabilization prior to construction are provided in Section 5.1.

Following soil disturbing activities, any compacted areas, such as laydown areas, heavily travelled corridors, or portions of the access road corridors that were used as temporary roadbeds will be decompacted as described in the AIMP.

Seeding Contractors Qualifications:

Seeding contractors must possess a minimum of five years of experience in native seed installation, with specific expertise in utility-scale solar projects in Minnesota or the Upper Midwest. Contractors are required to provide references that demonstrate their capability to successfully execute similar projects, including vegetation establishment under and around solar panels.

4.1.1 Permanent Seeding Prior to Solar Installation

There are two permanent seeding timing options to consider. One of the options is to seed prior to the installation of solar infrastructure. The advantage to this approach is that it establishes vegetation to help reduce potential erosion by establishing ground cover. Additionally, the restoration contractor will be able to avoid solar panels during seeding, which reduces labor costs. The disadvantage is the potential for additional seeding in heavily trafficked areas.

Permanent seeding should occur two to three months ahead of the installation of solar panels to allow the vegetation to establish. Prior to seeding, an herbicide treatment is recommended to treat undesired plant species and noxious or invasive weeds. Soil tillage can create an optimal seed bed and may be required at select locations based on soil profiles. If tillage occurs, rock picking may be required for rock equal to or larger than four inches in diameter. If tillage is necessary, seeding options include Brillion, Trillion, broadcast, or drill seeding. With most of the land currently being farmed, it is anticipated that drill seeding directly after herbicide treatment will be adequate for a large portion of the Site. The seeding method will be determined at the time of installation and will be dependent on soil conditions, weather, and time of year. If tillage is not needed, the

vegetation may need to be mowed once depending on the height and density of the vegetation during seed installation.

During solar installation, there is a likelihood that portions of the Site will require reseeding. To minimize seedling disturbance, it is recommended that specialized low-impact equipment and/or construction mats be used on heavily traveled areas during construction to minimize soil compaction.

4.1.2 Permanent Seeding After Solar Installation

The other permanent seeding option occurs after the solar panels are installed. This creates challenging seeding conditions and requires specialized equipment and more time to complete. The advantage of this method is that only one mobilization for the restoration contractor is required and no reseeding due to construction activities will be required.

4.2 Temporary Seed Mixes

A temporary cover crop will help mitigate erosion, decrease the need for erosion control devices, increase soil moisture, and suppress weed growth. Cover crops assist in Site stabilization during construction activities and are especially helpful in areas that do not require grading activities. Early season cover crop installation is typically seed oats (*Avena sativa*), but Summit Lake will work with the Project Contractor/s to select the best option. A cover crop will not be planted prior to construction unless there is adequate time between the start of the growing season and the start of construction for the cover crop to grow to a sufficient height to provide soil surface protection during construction. Cover crop recommendations vary by location and season; however, oats and/or winter wheat (*Triticum aestivum*) are recommended for Nobles County. Suggested cover crop seeding rates per season are given in Table 4.2-1 below.

TABLE 4.2-1			
Temporary Cover Crops			
Season	Seed	Seeding Rate as Nurse Crop ^a	Seeding Rate as Cover Crop ^a
Spring and Summer	Oats (<i>Avena sativa</i>)	16-32 pounds/acre	96
Fall	Winter Wheat (<i>Triticum aestivum</i>)	10-60 pounds/acre	90-120
Fall	Cereal Rye (<i>Secale cereale</i> L.)	10-60 pounds/acre	90-120
^a Seed rates are based on drill seed application and will vary based on site-specific conditions, final seed mix, and seasonal considerations.			

4.3 Seeding Timing

An optimal planting time for native species is in the fall (October to November). A fall planting allows seeds to naturally go through the cold stratification process, which many native species need to break dormancy (University of Minnesota Extension, n.d.s). Spring planting can occur between and early spring (April to early May). In their *Native Vegetation Establishment and Enhancement Guidelines*, BWSR encourages monitoring soil temperatures and adjusting planting schedules based on local conditions (2022).

Below is breakdown of seeding recommendations based on time of year:

- Spring Seeding: May 1 to July 1 when soil temperatures are at least 60 degrees Fahrenheit or higher.
- Fall Seeding: Should occur when soil temperatures fall below 50 degrees Fahrenheit for a consistent period of time (usually around November 1).
 - Fall dormant seedings can help reduce weed pressure during the first year of growth because cool-season grasses and forbs germinate earlier and start competing with weed species right away. Frost seedings are also an option if the snow cover is not too deep.
 - For a frost seeding, seeding rates may need to be increased by 25 percent due to lower germination rates and loss of seed that is consumed by wildlife over the winter months.

If Site preparation and grading is completed between the summer and early fall, dry soils may pose a challenge and require deeper soil tilling to create a good seed bed. If delaying seeding until late fall is an option, a temporary cover crop will be planted after construction is complete (see Section 4.2). Installation of a temporary cover crop will help mitigate erosion, reduce the requirement for sediment control structures, and suppress weed growth. Recommended applications of temporary cover crops vary by season, as described in Table 4.2-1 above.

A late fall or winter seeding is referred to as dormant seeding. When seeding in late fall the seeding is timed to avoid germination. To prevent seed germination, seeding should occur after soil temperatures fall below 50 degrees Fahrenheit for a consistent period. Seeding that occurs before the soil is frozen is planted with a shallow-seeding drill. When seeding after soils have frozen, a broadcast seeder is used since the freeze-thaw cycle in winter causes soil cracks to open and draw seed into the soil (BWSR, 2022).

4.4 Permanent Seed Mixes

Reestablishing native vegetation can serve multiple purposes, including soil stabilization, reducing erosion, lessening the sediment load to any nearby ditches or streams, increasing nutrient retention through deep root systems, carbon sequestration, and providing wildlife habitat. A mixture of native grasses that includes forbs will produce a high-quality prairie habitat that is more resilient to drought, pests, and disease than monoculture grasslands or low diversity vegetation stands.

An **Array Mix** is used to establish vegetation within the solar arrays, as shown in Figure 6. This seed mix will consist of short-statured (< 24 inches) grasses, sedges, and forbs adapted to full sun and partial shade and may include flowering species that bloom in spring and summer. Outside of the arrays and to the fence line, a **Perimeter Mix** is used (see Figure 6). This seed mix contains greater plant diversity and provides increased benefit to pollinators. A diverse mix of forbs and grasses in the perimeter will provide natural screening of the array and could include flowering species across the spring, summer, and fall. A **Wetland Mix** is used in moist soil conditions and selected species will tolerate damp soil environments (see Figure 6). This seed mix will consist of medium length grasses, sedges, and forbs that are flowering and adapted to full sun and partial shade.

Specific species were selected that align with local climate and particular soil conditions found throughout the Site, as identified in Appendix C, and on the seeding plan (see Figure 6). The seed mixes were tailored to the regional soil conditions, each incorporating a unique selection of low-growing, low-maintenance prairie grasses and forbs adapted to the Project region. The genetic source origin of all native seed must be local, preferably sourced within a 150-mile radius of the Site. Plant species should be native to Nobles County (BWSR, 2019), though considerations of range shifts due to climate change may necessitate adjustments to this guidance. Species shall be true to their scientific name as specified in Appendix C. Seed tags or nursery confirmation of the order must be provided to Summit Lake prior to installation. Any species eliminations, substitutions, or source origin exceptions must be approved by Summit Lake prior to installation. If necessary, seeds shall be properly stratified and/or scarified to break seed dormancy. If applicable, all legumes shall be inoculated with proper rhizobia at the appropriate time prior to planting.

The Array Native Seed Mix includes grasses, sedges, and forbs that are low growing, will not impact the operation of the solar arrays, and are adaptable to full sun and partial shade. In addition, the Array Native Seed Mix offers a diverse variety of forage species suitable for sheep grazing. Outside of the arrays, a Perimeter Native Pollinator Seed Mix will be used. The Perimeter Seed Mix is more diverse and includes grasses, sedges, and forb species of greater height which provide increased benefit for high quality prairie and pollinator habitat. To ensure the Perimeter Seed Mix does not impact operations, it will be planted 12 feet from the solar arrays. In addition, the Perimeter Native Pollinator Seed Mix offers a diverse variety of forage species suitable for sheep grazing. Seeding of temporary and permanent sediment basins, as well as contractor laydown yards or other disturbed areas if included in final Contractor design, may require additional seed mixes suitable to those applications to ensure appropriate vegetation coverage and viability.

4.5 Seed Mix Substitutions

Procurement of seeds can be difficult to obtain in quantities necessary for large solar sites. Sourcing of proposed seed mixes should be done as soon as practicable. Substitutions to seed mixes will be completed by a qualified professional with sufficient botanical experience in identifying native plants, native plant communities, invasive species, and non-native species typical of Minnesota. Any substitution will be approved by Summit Lake prior to implementation, and substitutions will have no effect on the short- and long-term goals of this VMP.

For consistency in management across the Site, it is desired that the uniform seed mix recommended in the VMP be used. However, should sourcing issues arise, Summit Lake has developed alternative species to use should procurement be problematic. Seed mix substitutions are listed beneath each seed mix shown in Appendix C.

4.6 Seed Installation

Native seeds require special considerations related to planting depth and application method. Many native grasses and larger-seeded forbs require a shallow planting depth of 0.125 inch to a maximum depth of 0.25 inch. For small seeds, 0.125 inch is the maximum depth and surface sowing is the ideal method. Equipment may require modification so the small seed is not drilled at all, but dropped on the surface, as some seeds planted too deep may never be able to emerge. Depending on site conditions and timing of seeding, a variety of specialized seeding methods will be considered on a site-by-site basis; the Contractor shall evaluate the site and determine which

technique will produce the best results. Seeding options include drill, Brillion, Trillion, and broadcast seeding. Equipment capable of handling seeds of varying sizes is required. Drill seeding typically produces higher observed plant density, so broadcast seeding may require an increased seeding rate or overseeding during the establishment period to achieve performance standards. Seed installed into a previous cover crop or other vegetation must be installed with a seed drill. Prior to installation, seed shall be divided into two equal parts. The first half shall be installed in one pass, and the second half installed in a second pass (perpendicular to the first pass, where possible). In areas where broadcast seeding is employed, raking, harrowing, or culti-packing of seeded areas shall be used to ensure good seed-to-soil contact. After seeding, an application of mulch will be required to prevent erosion and promote seed germination.

If a cover crop has been installed at any time during the calendar year, native seed mixes must be installed the same year with a fall dormant seeding, unless the Summit Lake gives permission to the Contractor for a spring seeding. Prior to seeding into a cover crop, the Contractor shall evaluate the planting area and determine if any preparation is required prior to installation. Mowing may be required if the cover crop is too dense/robust. All native seeding into a cover crop must be completed by drill seeding.

4.7 Soil Amendments

A preliminary desktop evaluation of the soil substrates within the Site determined it was unlikely that lime or fertilized implementation will be required to adequately restore soils and achieve vegetation goals.

It is recommended to conduct soil sampling to confirm soil profiles and determine if soil amendments are warranted.

4.8 Wet Weather Considerations

During seed installation, certain activities may be suspended in saturated soil conditions. Rainfalls between 0.25 and 0.5 inch could have the potential to cause soil rutting. If rutting occurs, the contractor will cease work in rutting-prone areas until site conditions improve. Weather forecasts will be monitored daily to help determine if above rainfall amount is anticipated during seed or solar panel installation. Construction site managers will ultimately decide if wet weather shutdown is necessary. Incidental damage, such as tire ruts, should be repaired in accordance with the General Permit.

4.9 Pesticide Drift

During the establishment phase, Summit Lake will contact each owner of land surrounding the Site to inform them of the native plants planted pursuant to this VMP, the likely use of the vegetation by pollinators and the need to avoid and minimize pesticide drift from land that is adjacent to the Land Control Area. The installation of access roads on the periphery of the entire Project Area will operate as a buffer from potential pesticide spraying adjacent to the Land Control Area.

4.10 Landscape Screening

The Project may involve landscape screening as a requirement through the regulatory process or landowner requests. This may include a combination of planted trees and shrubs to block the

view from roads or nearby landowners. This VMP will be updated with additional landscape screening requirements once available.

DRAFT

5.0 VEGETATION MANAGEMENT

5.1 Undesirable Species

Following permanent seeding, a variety of undesired species may germinate in the Site as native species are establishing. Summit Lake will manage undesirable species defined as follows:

1. Noxious Weeds according to Section 18.78 of the 2023 Minnesota Statutes
2. Invasive Species according to Part 6216.0250 of the Minnesota Administrative Rules
3. Project-designated “weeds” or undesired plants

Tables 5.1.1-1, 5.1.1-2 and 5.1.1-3 provide lists of invasive and weed species of concern for the Site. Because each site is unique, an adaptive management approach to managing invasive and weedy populations will be used.

Site management will be conducted, as needed, to reduce the spread of invasive and weedy species, improve establishment and success of permanent seed mixes, and minimize vegetation interference with solar infrastructure. This may include cleaning and inspecting equipment prior to use at the Site.

Invasive and weed plant populations must be effectively managed during the Establishment Phase to ensure that the desired species are given the opportunity to establish. Management activities in the first three years strongly determine the success of planting and are referred to as the Establishment Phase, while Long-Term Maintenance Phase refers to management activities occurring after the first three years. Sections 5.2, 5.3 and 5.4 describe the management activities that will be implemented during these three phases, respectively.

5.1.1 Prescribed Treatment for Common Invasive Species and Weeds

This VMP describes common techniques to manage a variety of invasive plants and common weeds growing in the Southwest Minnesota and Nobles County, though actual techniques required are dependent on Project conditions. During each site visit, the site will be photo-documented and general notes collected regarding site conditions, species present, and areas of bare soil. Management techniques for five categories of weeds are described in the following sections.

5.1.1.1 Annual Weeds

Annual weeds include all unwanted species that grow for a single year, set seed, and die. A list of problematic and common annual weeds that may be encountered on the site are shown in Table 5.1.1-1 below.

TABLE 5.1.1-1	
Problematic Annual Cropland Weeds ^a	
Species	Growth Form
Common cocklebur (<i>Xanthium strumarium</i>)	Annual Forb
Common lamb's-quarters (<i>Chenopodium album</i>)	Annual Forb
Common ragweed (<i>Ambrosia artemisiifolia</i>)	Annual Forb
Common sunflower (<i>Helianthus annuus</i>)	Annual Forb
Eastern black nightshade (<i>Solanum ptychanthum</i>)	Annual Forb
Field pennycress (<i>Thlaspi arvense</i>)	Annual Forb
Giant ragweed (<i>Ambrosia trifida</i>)	Annual Forb
Green foxtail (<i>Setaria viridis</i>)	Annual Grass
Horseweed (<i>Conyza canadensis</i>)	Annual Forb
Kochia (<i>Bassia scoparia</i>)	Annual Forb
Large barnyard grass (<i>Echinochloa crus-galli</i>)	Annual Grass
Redroot pigweed (<i>Amaranthus retroflexus</i>)	Annual Forb
Shepherd's purse (<i>Capsella bursa-pastoris</i>)	Annual Forb
Velvetleaf (<i>Abutilon theophrasti</i>)	Annual Forb
Woolly cupgrass (<i>Eriochloa villosa</i>)	Annual Grass
Yellow foxtail (<i>Setaria pumila</i>)	Annual Grass
^a University of Minnesota Extension (n.d.b)	

The goal of treating annual weeds is to prevent seed production. Beginning in spring, inspections will take place to evaluate the need for treating annual weeds (see Section 6.0 for discussion of monitoring protocols). It is recommended sites be mowed as described in Section 5.2.1 to prevent annual weeds from flowering and setting seed.

5.1.1.2 Perennial Weeds

Perennial weeds include all unwanted species that persist for two or more years after germination. Many of these weeds greatly diminish during the Establishment Phase with proper maintenance, but several require special attention when establishing native vegetation due to their highly competitive behavior. A list of common Minnesota perennial weeds that colonize and compete with native vegetation is provided in Table 5.1.1-2 below.

TABLE 5.1.1-2*	
Problematic Perennial Cropland Weeds ^a	
Species	Growth Form
Blackseed plantain (<i>Plantago rugelii</i>)	Perennial Forb
Common yarrow (<i>Achillea millefolium</i>)	Perennial Forb
Curly dock (<i>Rumex crispus</i>)	Perennial Forb
Dandelion (<i>Taraxacum officinale</i>)	Perennial Forb
Field bindweed (<i>Convolvulus arvensis</i>)	Perennial Forb
Ground ivy (<i>Glechoma hederacea</i>)	Perennial Forb
Horsenettle (<i>Solanum carolinense</i>)	Perennial Forb
Perennial sow thistle (<i>Sonchus arvensis</i>)	Perennial Forb
Quackgrass (<i>Agropyron repens</i>)	Perennial Grass
White clover (<i>Trifolium repens</i>)	Perennial Forb
Yellow nutsedge (<i>Cyperus esculentus</i>)	Perennial Sedge
Yellow wood sorrel (<i>Oxalis stricta</i>)	Perennial Forb

TABLE 5.1.1-2*	
Problematic Perennial Cropland Weeds ^a	
Species	Growth Form
Yellow rocket (<i>Barbarea vulgaris</i>)	Perennial Forb
^a University of Minnesota Extension (n.d.b), the Minnesota Department of Agriculture (MDA), 2024	

Mowing is important to prevent seed production, but herbicide is generally required to prevent the spread of perennial weeds. Perennial grasses should be treated by spot-spraying or boom spraying, as warranted, with glyphosate or an appropriate grass-selective herbicide. Perennial broadleaf weeds should be treated by spot-spraying or boom spraying, as warranted, with glyphosate, triclopyr, clopyralid, or comparably effective herbicides. All herbicides will be applied by a licensed applicator, following instructions and prohibitions provided by the herbicide label.

5.1.1.3 Problematic Native Plants

Native species present in the soil seed bank or entering the Site from neighboring properties may have the potential to interfere with the functioning of the solar panels or ecological goals. Knotweed colonies can grow in dense clusters that crowd out any native species. Giant ragweed (*Ambrosia trifida*) grows tall enough to shade the panels. Several native vines have the potential to overgrow installations, including wild grape (*Vitis riparia*), wild cucumber (*Echinocystis lobata*), and Virginia creeper (*Parthenocissus* spp.). Giant ragweed and Phragmites or any other native species shading the arrays should be controlled by mowing. If growing under or near the solar panels, wild cucumber and bur cucumber will be pulled and removed manually, but woody vines such as wild grape and Virginia creeper will be cut to within one inch of the ground and the stump treated with glyphosate, triclopyr, or a comparable herbicide by a licensed applicator (BWSR. 2022) following instructions provided on the herbicide label. Other native plants with weedy tendencies will be controlled with the same methods as non-native weeds and invasive plants.

5.1.1.4 Woody Species

Woody species can shade or otherwise interfere with the operation of solar panels. Native tree seedlings of concern are box elder (*Acer negundo*), sugar maple (*Acer saccharum*), and green ash (*Fraxinus pennsylvanica*). During the Establishment Phase, all woody plants require removal. This can be accomplished by mowing, herbicide application, or a combination of both methods. All woody plants over 0.5 inch in diameter at breast height should be cut to within one inch of the ground and the stump treated with triclopyr or a comparable herbicide by a licensed applicator and following instructions provided by the herbicide label. Cut brush will be removed from the Site.

5.1.1.5 State-Listed Noxious Weeds

Each state maintains a list of prohibited noxious plants that must be eradicated and controlled. All state-listed species be treated by manual removal, mowing, herbicide application, or a combination of these methods, with the intention of preventing the weeds from setting seed. If using herbicide, a licensed applicator with knowledge of the herbicide treatments should apply herbicide at appropriately timed windows depending on target species. Table 5.1.1-3 below provides an abbreviated list of prohibited noxious plants in Minnesota.

TABLE 5.1.1-3

Abbreviated List of Minnesota Prohibited/Restricted Noxious Weeds and Invasive Plants

Species	Growth Form	Regulatory Category ^a
Amur maple (<i>Acer ginnala</i>)	Tree	SR
Bell's honeysuckle (<i>Lonicera X bella</i>)	Shrub	RN
Black locust (<i>Robinia pseudoacacia</i>)	Tree	RN
Canada thistle (<i>Cirsium arvense</i>)	Perennial Forb	PN
Common barberry (<i>Berberis vulgaris</i>)	Shrub	PN
Common or European buckthorn (<i>Rhamnus cathartica</i>)	Shrub/Tree	RN
Common reed – non-native subspecies (<i>Phragmites australis</i> subsp. <i>australis</i>)	Grass	PN, PPI
Common tansy (<i>Tanacetum vulgare</i>)	Perennial Forb	PN
Crown vetch (<i>Securigera varia</i>)	Perennial Forb	RN
Garlic mustard (<i>Alliaria petiolata</i>)	Biennial Forb	RN
Glossy buckthorn (<i>Frangula alnus</i>)	Shrub	RN
Japanese barberry (<i>Berberis thunbergii</i>)	Shrub	RN
Leafy spurge (<i>Euphorbia esula</i>)	Perennial Forb	PN
Morrow's honeysuckle (<i>Lonicera morrowii</i>)	Shrub	RN
Norway maple (<i>Acer platanoides</i>)	Tree	SR
Plumeless thistle (<i>Carduus acanthoides</i>)	Biennial Forb	PN
Poison hemlock (<i>Conium maculatum</i>)	Perennial Forb	PN
Purple loosestrife (<i>Lythrum salicaria</i>)	Perennial Forb	PN, PI
Siberian peashrub (<i>Caragana arborescens</i>)	Shrub	RN
Spotted knapweed (<i>Centaurea stoebe</i>)	Biennial Forb	PN
Tatarian honeysuckle (<i>Lonicera tatarica</i>)	Shrub	RN
Wild carrot/Queen Anne's Lace (<i>Daucus carota</i>)	Biennial Forb	RN
Wild parsnip (<i>Pastinaca sativa</i>)	Biennial Forb	PN
Winged burning bush (<i>Euonymus alatus</i>)	Shrub	RN

^a SR = Minnesota Department of Agriculture (MDA) Specially Regulated Plant; RN = MDA Restricted Noxious Weed; PN = MDA Prohibited Noxious Weed; PPI = Minnesota Department of Natural Resources (MNDNR) Proposed Prohibited Invasive Species; PI = MNDNR Prohibited Invasive Species

5.2 Establishment Phase

Within the Establishment Phase, the first three years of vegetation management will be a concerted effort to remove any undesired species, while helping to establish planted seeds. Native perennial plantings will require several years to establish and will involve frequent site management to limit undesirable species, which could impact the growth of planted native seeds. Site management will ensure a focus on achieving the required Site goals and performance standards. An adaptive management approach is recommended to respond to construction site conditions, challenges, and successes over time. As time progresses, the temporary cover crop will begin to subside, and the native species will start to germinate gradually.

Establishment Years one to five will require the most maintenance and monitoring to control any undesired species. Figure 7 portrays the Site conditions as the vegetation transitions from the establishment phase into the Long-Term Maintenance Phase.

Once the native seeds are fully established, the Site will require less yearly maintenance. Recommendations for Establishment Years one to five are outlined below.

5.2.1 General Tasks for Managing Vegetation

5.2.1.1 Establishment Year 1

The first year of establishment is focused on consistent invasive plant control on a site-wide basis. Mowing the grassland areas during the first year should prevent invasive plants from adding new seeds to the soil and begin to exhaust the soil seed bank (a process that often requires several years to complete). From June 1 of the first establishment year, site-wide mowing to a height of 6 to 9 inches shall occur whenever vegetation reaches a height of 18 to 24 inches. The landscaped/screening area shall be spot sprayed during the establishment phase to control invasive plants. Attempting to mow between the landscaping plants will likely be difficult and may lead to unanticipated damages to the new plants. Mowing in wet areas will also be limited to those periods of time when the wet areas are not susceptible to rutting or compaction (i.e. frozen or dry conditions). Spot-spraying, use of a swing arm, brush saws, weed whips or similar equipment may be used in wet areas as necessary to prevent soil damage when the soils are wet.

Monthly evaluations of the plantings shall be conducted by a botanist employed by the Contractor, during the growing season (May to September) to determine the appropriate treatment techniques to use and the timing of those treatments based on the presence and development stage of both invasive plants and the native plantings. Invasive species should be treated prior to such plants flowering or seeding, with the goal of preventing seed set by noxious and invasive species.

Repeated mowing may produce a buildup of organic thatch, which discourages the development and persistence of diverse native vegetation. To help prevent thatch buildup onsite, mowing shall be conducted with a flail-type mower to mulch the cut vegetation, or the Project Site shall be hayed so that cut vegetation is removed. A swing arm specifically designed for mowing under solar panels is recommended for cutting beneath panels, but spot-mowing with brush saws, weed whips, and similar equipment is also permitted. It may be possible to coordinate with Summit Lake to adjust the orientation of the panels to increase the ease of mowing, but the Contractor should not depend on this coordination to complete its work. Any other techniques must be approved by Summit Lake prior to the start of work. Mowing equipment shall be cleaned prior to use onsite to prevent the introduction and spread of invasive and non-native species. This mowing regime will prevent annual and perennial weeds from flowering and setting seed, prevent weeds from shading out the solar panels, and help control woody plant growth onsite. Additionally, noxious and perennial weeds shall be treated by spot-herbicide treatment, as described below, to prevent roots from resprouting.

5.2.1.2 Establishment Year 2

The second year of establishment continues invasive plant control but generally employs more targeted techniques. Site-wide mowing to a height of 6 to 9 inches shall occur when vegetation height reaches 18 to 24 inches.

Spot-mowing may be employed to treat specific problem areas as needed. Noxious and perennial weeds shall be treated with spot-herbicide during the growing season, typically in late May/early June and late July/early August, with the focus on preventing seed set and achieving the required performance standards (described in Section 5.2.2).

The landscaped/screening area shall be spot sprayed during the establishment phase to control invasive plants. Attempting to mow between the landscaping plants will likely be difficult and may lead to unanticipated damages to the new plants. Mowing in wet areas will also be limited to those

periods of time when the areas are not susceptible to rutting or compaction. Spot-spraying or use of brush saws, weed whips, or similar equipment may be employed in wet areas as necessary to prevent soil damage when the soils are wet.

Monthly evaluations of the plantings shall be conducted by a qualified botanist, during the growing season (May to September) to determine the appropriate treatment techniques to use and the timing of those treatments based on the presence and development stage of both invasive plants and the native plantings. Invasive species should be treated prior to such plants flowering or seeding, with the goal of preventing seed set by noxious and invasive species.

5.2.1.3 Establishment Years 3-5

In the third, fourth, and fifth years of the establishment phase, invasive plant control should consist of spot-herbicide treatment to control the remaining small patches of persistent weeds. Efforts should be focused on achieving the required performance standards (described below).

Site-wide mowing to a height of 6 to 9 inches shall occur when vegetation height reaches 18 to 24 inches. Spot-mowing should be employed as needed to prevent vegetation interference with energy generation and infrastructure. Additional onsite treatment with spot-mowing or hand weeding may be employed at the discretion of the Contractor.

5.2.2 Herbicide Specifications

All herbicide treatments shall be restricted to those pesticides and methods of application approved by the Minnesota Department of Agriculture, MNDNR, and USEPA. Spraying should be conducted by certified applicators holding all necessary permits and licenses. All herbicides shall be applied in accordance with the applicable regulations and the label requirements and in a safe and cautious manner to avoid damaging adjacent properties. Herbicide shall be applied selectively where applicable to avoid damaging existing native vegetation.

Approved pre-emergent herbicides include indaziflam (trade name Esplanade) and aminopyralid/metsulfuron-methyl (trade name Opensight) or equivalent. Additionally, pre-emergent formulations are recommended to include an adjuvant such as trade name Grounded or equivalent. Approved foliar herbicides include glyphosate (trade name Aquaneat), triclopyr (trade name Garlon), and aminopyralid (trade name Milestone) or equivalent. The Contractor shall submit a list of all herbicides to be used on the project to Summit Lake for written approval prior to the start of work.

Pre-emergent herbicides are recommended to be applied in the spring once the temperature is above 55°F. Foliar herbicides shall be applied during the growing season as a control measure to prevent noxious weeds and invasive species from flowering or setting seed. The Contractor shall have knowledge of the phenology of species to treat on site to conduct herbicide treatments at the appropriate time and shall submit a schedule of planned visits each year prior to May 1.

The landowner shall be contacted at least 14 days prior to any application of herbicide on their property. Apiaries known by Summit Lake to be present within three miles of the Project should be notified of any herbicide spraying at least 14 days prior to such application. The herbicide applicator must keep documentation of location and timing of herbicide use, weather conditions on site during application, type of herbicide used, volume of herbicide used, number of acres treated, and species of plants treated, and submit a copy of all herbicide records to Summit Lake to be included in an annual report.

5.2.3 Reseeding Bare Soil

Areas of bare soil are detrimental to successful establishment of native vegetation. Bare soil provides opportunities for the common invasive and weed species described above to colonize and spread. Bare soil is also likely to contribute to soil loss by erosion. Site performance standards and goals may indicate reseeding is required in these areas using the seed mix previously installed and following the timing instructions laid out in Section 4.0.

5.3 Transition Phase

After the establishment phase of vegetation management, yearly management is required to control the spread of invasive species and combat the establishment of undesirable and invading trees and shrubs. Two trips during the growing season are recommended. Some degree of weed whipping and spot-mowing, and/or spot herbicide treatment may be warranted to maintain vegetation quality and achieve the Site goals and performance standards.

5.4 Long-term Maintenance Phase

The long-term maintenance phase follows the end of the Transition Phase of vegetation management. The phase includes yearly management to promote and maintain the desired vegetation community, control the reestablishment, and spread of invasive species, combat the establishment of undesirable and invading trees and shrubs, and reduce biomass/fuel load onsite. The primary tools for this management are weed whipping, spot-mowing, and spot-herbicide treatment, which may be warranted thereafter to maintain vegetation quality and achieve the Project goals. It's likely that these activities may be warranted every other year depending on soil moisture and growth of vegetation.

5.5 Haying

Summit Lake may elect to use haying as a long-term management technique in a portion of the Project that is not otherwise occupied by the solar array. These areas are primarily located around the periphery of the facility (within the fence) and in areas that were used as laydown areas during construction. Annual haying to a height of 6 to 9 inches shall occur each September prior to prairie plants going dormant to maximize forage value of the hay crop.

5.6 Grazing

Grazing can be an effective vegetation management strategy, offering an eco-friendly alternative to mowing or herbicides to control plant growth around solar panels. Grazing animals naturally recycle nutrients back into the soil, which can improve soil health, reduce erosion, and support a more diverse ecosystem. Grazing can also restrict woody vegetation and non-native species encroachment into grasslands, prevent excessive litter accumulation, improve forage production, and accelerate decomposition and nutrient cycling. Managed grazing also supports pollinator-friendly habitats by maintaining a variety of plant species that can thrive under periodic grazing. Additionally, grazing programs can support local farmers by providing a seasonal grazing area. Careful planning is essential to ensure grazing is done at appropriate times and intensities to prevent overgrazing and maintain plant cover, ultimately contributing to both vegetation management goals and sustainability objectives for the solar project.

Summit Solar may decide to use grazing with sheep, as a long-term vegetation management technique in portions of the Project occupied by the solar array or those areas surrounding the

arrays. Grazing using livestock is a developing management approach; therefore, the instructions in this VMP should be considered a guide, and actual practices must adapt year-to-year to the specific vegetation conditions at the Project Site. This VMP describes the grazing methods to be used on a small unit of the overall portion of the Project occupied by the array. These specifications can be scaled appropriately to accommodate grazing in larger or smaller portions of the array depending on the availability of livestock and appropriate partners to conduct the grazing operations. Any area that is not grazed can be managed using mowing or haying management techniques as outlined above. Should grazing be selected as a management technique for some or all of the Project Site, the following methodologies will be followed:

- Grazing should not be started until after the start of the third growing season after vegetation installation.
- Grazing should only be used if the Project is able to identify and form a partnership with a local livestock farmer who is willing and able to use a portion of the Site for grazing in accordance with this VMP. The chosen partner must be able to comply with Site security requirements and Site management processes outlined in this VMP.
- The partner must have sufficient insurance to cover any damages caused during grazing of the Site.
- The seed mix has been formulated to be used for livestock grazing and to also function well if livestock grazing is not used.

5.6.1 Site Setup for Grazing

If an appropriate partner is identified to provide livestock grazing, portions of the Site will be managed with rotational grazing, wherein animals are moved periodically among the four paddocks within each grazing unit, with the aim of maintaining a vegetation height of 10 to 12 inches across the portions of the Site that are grazed. The area of the Site to be grazed will be divided into grazing units of approximately 16 acres each in preparation for grazing, although grazing unit size may change with input from the grazing partner. The number of grazing units used in any given year will be determined at the beginning of each growing season based on the number of acres to be grazed and the number of sheep available for grazing. For best outcomes for pollinator species, it is recommended that no more than 50 percent of the available forage be removed by grazers. The preferred method for dividing the Site is poly-wire or net electric fencing with plastic step-in poles; the grazing operator shall consult with the Summit Lake before other options are installed. Sensitive areas will also be fenced off to avoid inadvertent disturbance. The electric fencing shall be grounded independently of the Project infrastructure, with the grounding stakes at least 66 feet from the Project's grounding systems. The grazing operator shall consult Gopher State One Call before siting the grounding stakes and take underground utilities and travel corridors into consideration when placing the grounding stakes. The energizing unit for the electric fence must be independent of the solar facility infrastructure. The energizer can run on 110 volt electrical current or be charged from a battery. The grazing operator shall be responsible for any damage to the solar facility infrastructure due to improper setup or maintenance of the electric fence. Fencing for sheep will not be greater than 5 feet in height, which should not significantly impact wildlife movement.

The grazing rotation in each 16-acre grazing unit will be managed by dividing the unit into four, four-acre paddocks (e.g., unit 1, paddocks A-D), which will be grazed over the course of one month. For the first week of the month, the sheep in each unit will graze Paddock A. For the second week, the sheep will graze Paddock B, and so on. This pattern will result in each paddock being grazed for one week and rested for three weeks each month. Grazing will continue for the entire growing season (approximately May 15 to September 15).

When livestock are grazing each unit, they will need to be provided with drinking water. The method of watering the flock will be left to the grazing operator, with approval from Summit Lake. A mobile watering trough, especially one that does not kill vegetation while it remains in place, is preferred. Moving the watering trough from paddock to paddock as the flock moves will reduce damage to the vegetation under the trough and prevent areas of dead vegetation from forming. Watering shall occur as near to the center of the paddock as possible; water is an attractant, and a trough set too far to a paddock side or corner can lead to uneven grazing of the paddock.

5.6.2 Stocking Rate and Management

The number of sheep in a grazing unit at any time is the stocking rate. The standard way to describe the stocking rate, or grazing pressure, is by animal unit month (AUM). One animal unit is 1,000 pounds of livestock, and one AUM is 1,000 pounds of livestock grazing for one month. AUM is usually calculated on a per acre basis, so the final unit for stocking rate is AUM/acre. If the livestock being used to graze are sheep, depending on the variety of sheep used, one animal unit is approximately six ewes. If grazing units are 16 acres each (as described previously), this would mean an initial stocking rate of about 50 sheep per unit. Each 16-acre grazing unit would start with 50 sheep grazing Paddock A for one week, then all 50 sheep will be moved to Paddock B for the second week, then Paddock C in the third week, then Paddock D in the fourth week, and then back to Paddock A to start the rotation over again. Since the Site is anticipated to cover approximately 1,500 acres, grazing the entire Site would require approximately 94 grazing units and 4,700 sheep. The actual number of sheep used will depend on the amount of forage present and will be adjusted by the grazing partner throughout the growing season.

The grazing partner shall be responsible for monitoring the response of the vegetation to grazing. The management goal is to have an average vegetation height of 10 to 12 inches when the livestock are first moved into a paddock and to remove the livestock when the vegetation is an average of 6 to 8 inches. If grazing does not achieve the desired vegetation height and is shading the arrays, the Contractor shall immediately contact Summit Lake and be responsible for mowing the paddock to a uniform height of 4 to 6 inches. The Contractor shall determine with Summit Lake a change in stocking rate to improve the effect of grazing in the future. The grazing partner shall have access to additional livestock in case the stocking rate needs to be increased to achieve the vegetation management goal. Should the entire Site be found to have met the vegetation height and forage removal, the livestock will be relocated offsite until grazing management is once again necessary.

If maintenance by grazing is no longer feasible or desired, vegetation height can be managed by mowing as outlined in Section 5.2.1 of this VMP.

6.0 LONG-TERM MONITORING

Long-term monitoring methods include quantitative and qualitative measures to assess how well the Project goals and performance standards are being achieved.

- Quantitative techniques allow for comparisons of subsequent reporting to understand the progression of vegetation establishment over time. Vegetation is sampled using standardized techniques with fixed sample locations and photo points and includes percent vegetation cover and estimated species richness.
- Qualitative monitoring consists of documentation of onsite vegetation through visual inspections.

Long-term monitoring will evaluate seed mixes and associated planting areas for establishment including the number of species present and percent cover; presence of invasive species, and subsequent management activities needed, to include both species on site and early detection of new invasions. Three monitoring visits will generally occur in the spring, summer, and fall.

6.1 Monitoring Protocol

Vegetation monitoring shall occur three times per year during the Establishment Phase (Years 1 to 5) and annually thereafter over the lifetime of the Project. During the Establishment Phase, inspections shall occur three times in the growing season to accurately document the presence of installed native species: late May/early June, mid-July, and late August/early September. After the Establishment Phase has concluded, inspections shall occur once per year, in mid-July. Once every five years during the Management Phase, inspections shall occur three times during the year, on the same schedule as the Establishment Phase, to record the continued presence of native species across the growing season.

The monitoring protocol shall include both microplots and a meander survey. Microplots provide accurate data for the Site but cover a small area. Vegetation can be patchy due to microtopography and other factors, so scattered microplots have the potential to miss species assemblages or new invasive species populations. For this reason, a meander survey shall also be conducted to provide a broad assessment of vegetation across the Site.

Microplot surveys shall be conducted during each inspection in the Establishment Phase. During the Management Phase, surveys should be undertaken at a time when spring- and fall-blooming species can be identified, usually July; the Monitor should assess the best timing for microplot surveys based on the advancement of the growing season. 50 microplots of 1 meter by 1 meter each shall be distributed at locations that represent conditions across the Project Site. For instance, lowland and upland areas should be sampled in proportion to their acreage. Microplots will be first selected using available maps and air photos, with the final location selected in the field on the day of sampling to represent the general area of the microplot. Before entering the field, the Monitor will provide the project with a map of the general locations of the 50 microplots. In each microplot all plant species present shall be recorded and assessed using a 1 to 10 scale (1 = $\leq 10\%$, 2 = $>10\%$ but $\leq 20\%$, etc.), based on the percent cover of the species in the microplot. The total percentage of vegetative cover and bare ground will also be recorded.

While traversing the Site from microplot to microplot, the Monitor will follow a meandering path, recording all plants species seen. Upon completing the meander survey, each plant species recorded will be assessed on a 1 to 4 scale (1 = $\leq 10\%$, 2 = $>10\%$ but $\leq 30\%$, 3 = $>30\%$ but $\leq 50\%$, 4 = $>50\%$) based on the percent cover of the species across the entire Site along the meander path.

After each survey event, the percent cover of native and noxious plant species in microplots and along the meander survey, the total native and invasive vegetation cover and the total native species richness will be entered in an Excel spreadsheet or similar. Each survey event's data will be compared to past survey event data to detect positive, negative, or neutral trends. A positive trend would be decreasing cover by invasive plants and increasing cover by native plants from one survey event to the next.

Each monitoring visit shall also conduct a hazard assessment. While on Site and during the meander survey, the Monitor shall record the location of noxious weeds/invasive species, adventive trees/shrubs, large areas of bare soil, areas of significant erosion, and damage to the vegetative screening area. Any observed significant erosion or damage to the vegetative screening area should be reported to the Summit Lake immediately. The remaining hazards will be compiled in an annual report (see Section 6.4). Hazard assessments should also be conducted by the Contractor any time they are on Site performing vegetation management. The Contractor hazard assessments should be submitted to the Monitor for review and inclusion in the annual report.

6.2 Targets and Projected Outcomes

6.2.1 Native Vegetation Targets

A typical best practice for achieving soil stabilization and water quality on solar conversion sites is to include a minimum of 15 native species (graminoids and forbs) when using native vegetation (BWSR, 2019). Vegetation management should result in a diverse plant community dominated by native species and lack noxious and prohibited species, as outlined in this VMP. Construction stormwater permits, local requirements, and regulations may impose additional requirements on the final quality and performance of native plantings.

The following are typical goals for native revegetation and will be revised when targets for the Project are identified. Short-term goals are goals applicable to the post-construction establishment phase of the proposed Summit Lake Solar Facility Project (Project) in Years 1 to 5. Long-term goals are defined as goals beyond Year 5, following implementation of the short-term goals.

Short-Term Goals:

- Comply with permit conditions for site revegetation, per the MPCA General Permit.
- After the first growing season, vegetate at least 70 percent of the Site, and ideally 80 percent of the Site.
- Establish sustainable, diverse, perennial grassland community, appropriate to conditions on 70 percent of the Site and comprised of 90 percent native vegetation by Year 5.
- Implement cover crops to effectively assist in establishment of native vegetation, if practicable.
- Manage invasive species and noxious weeds per Minn. Stat., Sections 18.75 to 18.78, and 18.86.

- By the end of the Establishment Phase (approximately 36 to 60 months after vegetation installation), at least 95 percent of the Site shall be vegetated, and at least 90 percent of the cover shall be comprised of native species. Six or more species of planted native graminoids and 12 or more species of planted native forbs shall be well-established across the Project.
- Install and establish vegetative screening as requested. The landscaping screening area should be established, with limited ongoing plant mortality, within one year of installation. At the end of the establishment phase, 80 percent of the installed shrubs and trees shall be present in the landscaping/screening area.

Long-Term Goals:

- Maintain 95 percent of the Site in a vegetated state, and at least 90 percent of the cover comprised of native species.
- Establish six or more species of planted native graminoids and 12 or more species of planted native forbs across the Site.
- Maintain a mature landscaped screen that minimizes views of the solar array from an adjacent target parcel over the life of the Project.
- Establish a Site that is suitable for haying and/or grazing during facility operations, if determined to be a viable management strategy following construction. Accommodate vegetative management of the Site using traditional vegetative management methods for areas not managed by haying or grazing.
- Prioritize the implementation of all required vegetation management activities for safe and efficient operations support including woody species control, height control of herbaceous species, wet area management, and landscape/screening management.

6.2.2 Noxious Weeds and Problem Plants

All prohibited noxious weeds and other plants previously identified in Tables 5.1.1-1, 5.1.1-2, and 5.1.1-3 will be treated repeatedly with herbicide and/or mowed, where appropriate, at a frequency sufficient to prevent seed set and to remove target weeds over time. The following are typical targets for controlling weeds and problem plants:

- Each treatment will show evidence of at least 90 percent of the target vegetation having been affected by herbicide or removed.
- Two weeks after treatment, at least 95 percent of all plants treated with herbicide will be removed, dead, or dying within any 100 square foot area.
- All herbicides must be approved by the appropriate land management agency and applied by permitted applicators.

- Applications of herbicides must also consider wind drift, which may transfer herbicides to nontarget areas and buffers or setbacks from sensitive locations such as water resources or sensitive habitats.
- By the end of the Establishment Phase (approximately 36 months after vegetation installation), all prohibited noxious and other problem plants will not exceed 5 percent aerial cover within any 100 square foot area across the Site.

6.3 Reporting

An independent third-party inspector, qualified to conduct native plant inspections and assessments and retained by Summit Lake shall prepare a report documenting the status of the established vegetation and hazards encountered during such year (i.e., a report every year for years 1 to 5 and a report for every fifth year thereafter). The report shall include the results of inspection and monitoring activities during the prior year and shall report how the vegetation on the Project Site has achieved or is achieving the goals and objectives set forth in this VMP. The report shall be submitted by February 1 of the following year in order to provide sufficient time to review the recommended actions for the upcoming growing season.

In addition to the above report content requirements, the reports shall also include descriptions of adaptive management actions to be completed in the upcoming year to meet management objections and management challenges encountered during the reporting period. These recommended actions may include, but are not limited to, mowing, spot-mowing, targeted herbicide application, or overseeding bare soil.

6.4 Adaptive Management

Every year during years 1 to 5 and every fifth year thereafter, a third-party independent monitor will be retained by the Project and produce a report summarizing the status of the vegetation established on site and identifying hazards encountered during the reporting period. This report will address any areas of noncompliance and plan targeted remediation efforts for the upcoming reporting period, including altering the timing or extent of mowing or herbicide application, adjusting the rate or formulation of herbicide applied, or conducting targeted overseeding of appropriate seed mixes. The report will also record the presence and location of any noxious or invasive weeds to be treated, which will both guide the Contractor and document changes in the vegetation establishment and management approach over time. This protocol will ensure that timely management activities reflect reporting from the previous monitoring observations.

7.0 REFERENCES

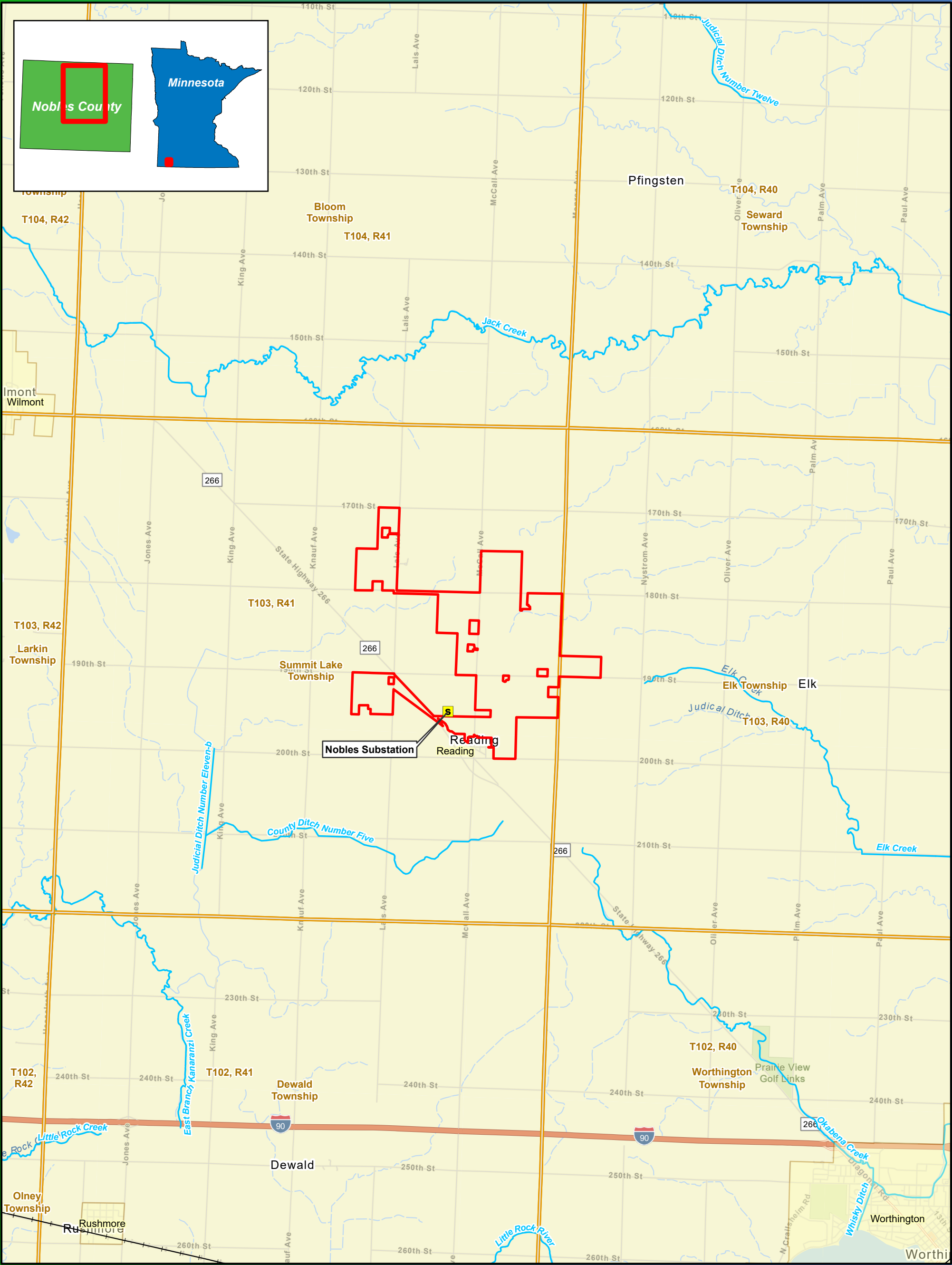
- Board of Water and Soil Resources (BWSR). 2019, Sample Specifications for the Establishment of Native Vegetation as Part of Habitat Friendly Solar Projects. Available online at: [Solar Project Seeding Specifications-5-9-19 0.pdf](#).
- BWSR. 2022. *Native Vegetation Establishment and Enhancement Guidelines*. Available online at: [Native Vegetation Establishment and Enhancement Guidelines](#).
- Dewitz, J. and U.S. Geological Survey (USGS). 2021. National Land Cover Database (NLCD) 2021 Products. Available online at: <https://www.usgs.gov/data/national-land-cover-database-nlcd-2021-products>. Accessed November 2024.
- Federal Emergency Management Agency (FEMA). 2021. FEMA National Flood Hazard Layer. Available online at: [National Flood Hazard Layer | FEMA.gov](#). Accessed Nov 2024.
- Google Earth Pro. 2005-2021. Geospatial Aerial Analysis. Available online at: [Google Earth](#). Accessed November 2024.
- Minnesota Department of Agriculture. (n.d.). *[Minnesota Noxious Weed List]*. Available online at: [Minnesota Noxious Weed List | Minnesota Department of Agriculture](#) Accessed Nov 2024
- Minnesota Department of Commerce. 2021. Guidance for Developing a Vegetation Establishment and Management Plan for Solar Facilities. Division of Energy Resources Energy Environmental Review and Analysis.
- Minnesota Department of Natural Resources. 2024. Ecological Classification System, North Central Glaciated Plains Section (251B). Available online at: <https://www.dnr.state.mn.us/ecs/251B/index.html>. Accessed November 2024.
- National Oceanic & Atmospheric Administration, National Weather Service Milwaukee/Sullivan 30 Year Average Precipitation. 1981-2010. Available online at: [avg_30_year_precip.png \(800×960\) \(weather.gov\)](#). Accessed Nov 2024.
- Soil Survey Staff. 2024. Soil Survey Staff, Natural Resources Conservation Service (NRCS), U.S. Department of Agriculture (USDA). Web Soil Survey. Available online at <https://websoilsurvey.sc.egov.usda.gov/>. Accessed November 2024.
- University of Minnesota Extension. (n.d.a). *Planting native plants: Timing and techniques*. University of Minnesota Extension. <https://extension.umn.edu>
- University of Minnesota Extension. (n.d.b) "Annual Broadleaf Weeds." University of Minnesota Extension. Available online at <https://extension.umn.edu>.
- U.S. Department of Agriculture - Natural Resources Conservation Service (USDA - NRCS). 1973. Web Soil Survey. Available online at: [Web Soil Survey \(usda.gov\)](#). Accessed Nov 2024.
- USDA - NRCS. 2024. Plants Database. Available online at: [USDA Plants Database](#) Accessed Nov 2024.

USEPA. 2021. Antecedent Precipitation Tool. Available online at: <https://www.epa.gov/wotus/antecedent-precipitation-tool-apt>. Accessed Nov 2024.

USGS. 2022. Survey Topographic Maps. Available online at: [The National Map - Advanced Viewer](#). Accessed Nov 2024.

DRAFT

FIGURES



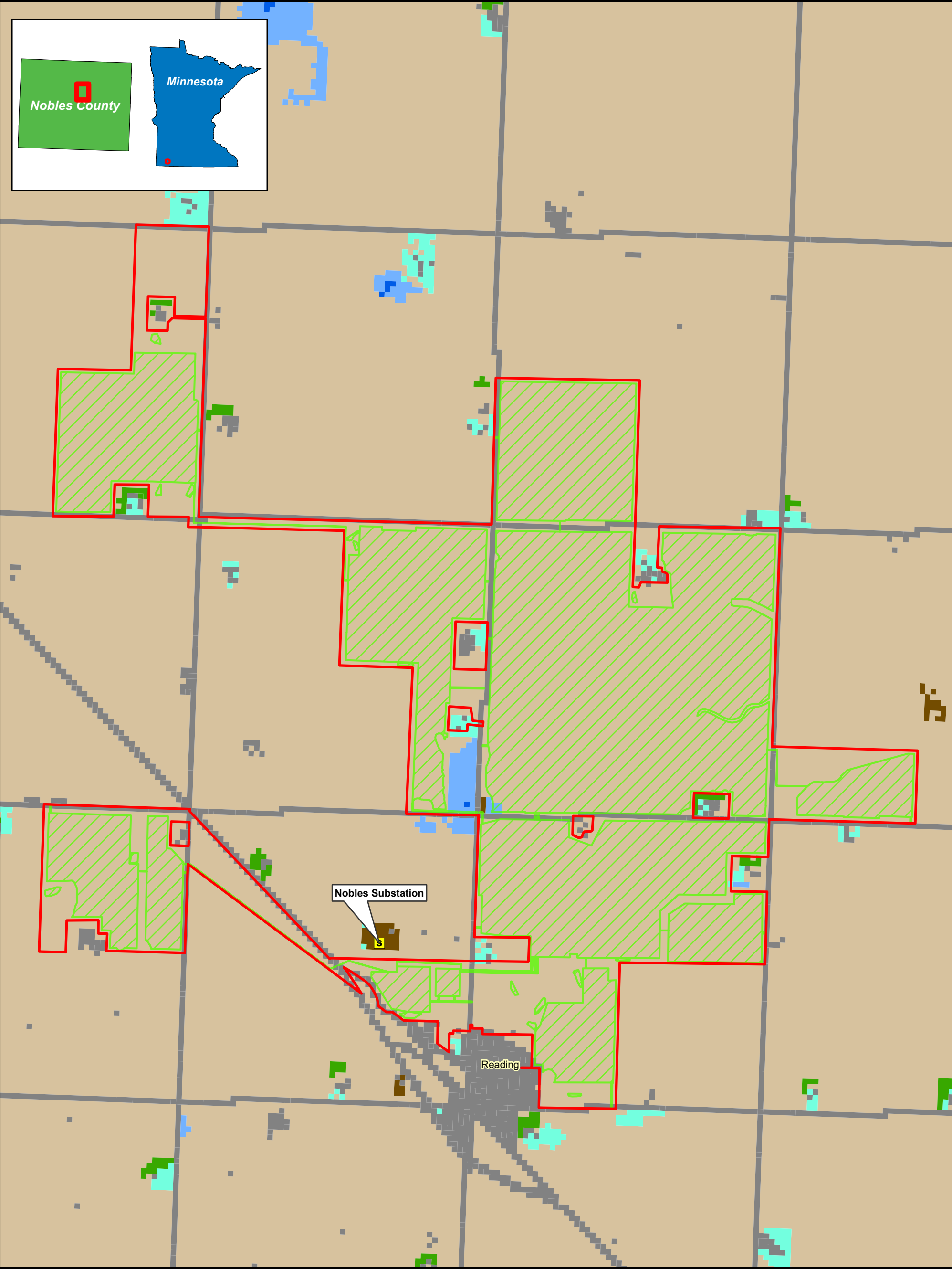
0 0.5 1 Miles

1:70,000

Figure1
Project Location
Summit Lake Solar Project
Nobles County, MN

- | | |
|---------------------|------------------|
| Existing Substation | Township |
| Land Control Area | County Boundary |
| City/Town | NHD Named Stream |
| | Railroad |

Imagery: USGS
Sources: National Grid Renewables, MN Geospatial Commons, MDNR, ESRI



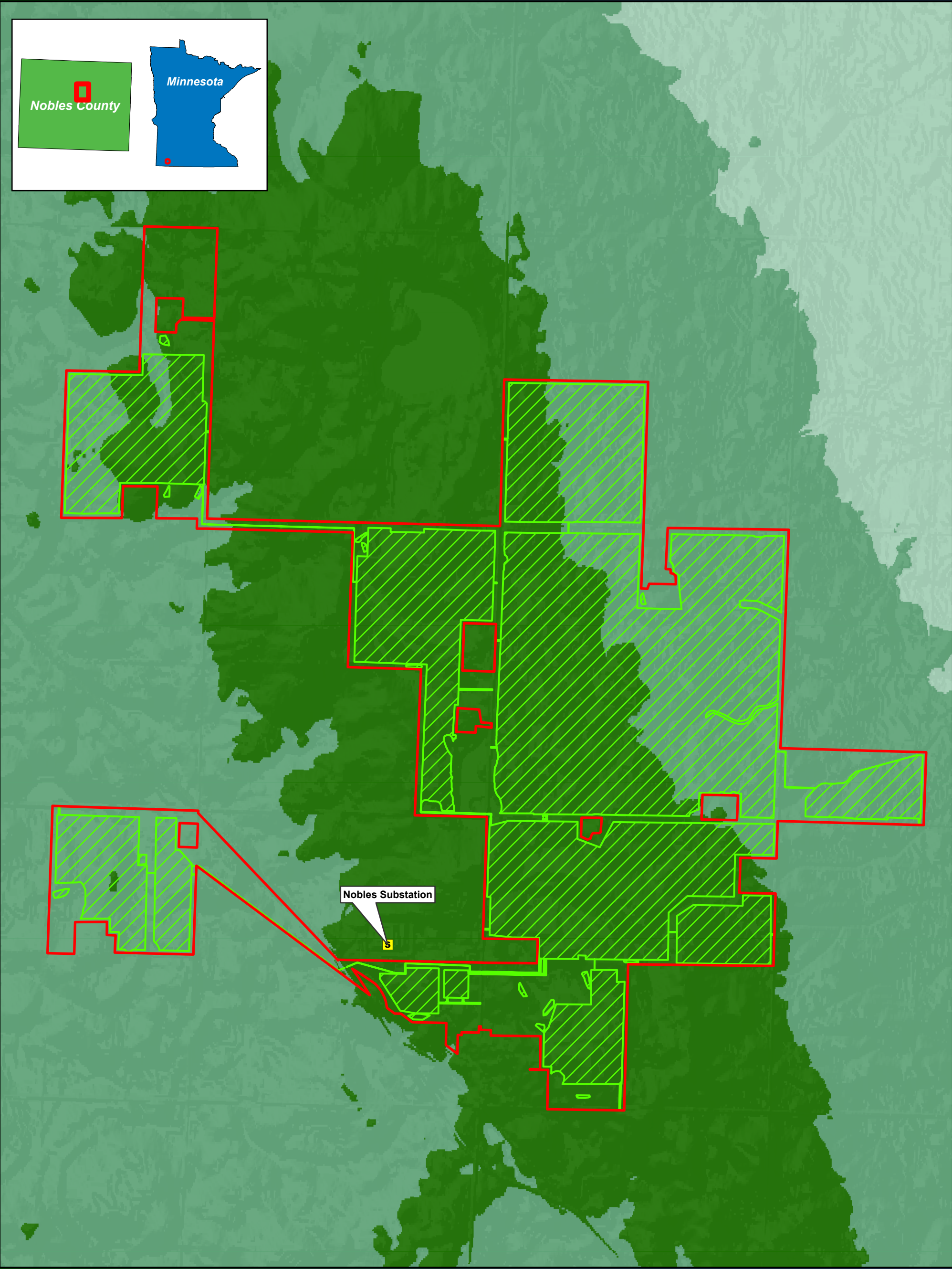
0 1,500 3,000 Feet

1:20,000

Figure 2
Land Cover/Land Use
Summit Lake Solar Project
Nobles County, MN

- | | |
|------------------------------|---------------------|
| Existing Substation | Agricultural Land |
| Land Control Area | Forested Land |
| Preliminary Development Area | Developed Land |
| Barren Land | Emergent Wetlands |
| | Herbaceous Wetlands |
| | Herbaceous |
| | Open Water |

Sources: National Grid Renewables, MN Geospatial Commons, MDNR, ESRI, USGS NLCD Database

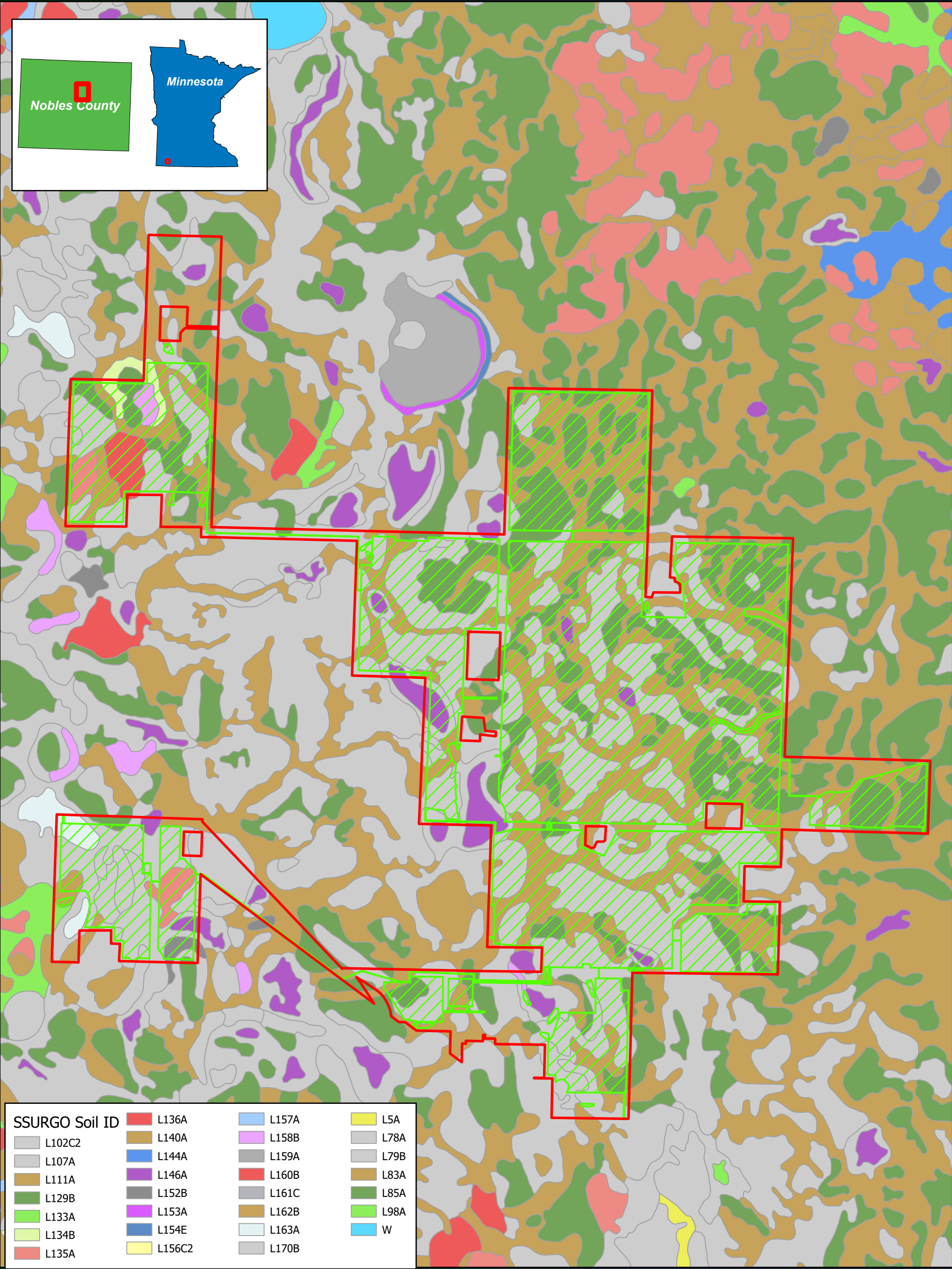


0 1,500 3,000 Feet
1:20,000

Figure 3
Topographic Map
Summit Lake Solar and
BESS Projects
Nobles County, MN

- Existing Substation
- Land Control Area
- Preliminary Development Area
- Elevation (ft)**
 - 1,525 - 1,600
 - 1,600 - 1,650
 - 1,650 - 1,700
 - 1,700 - 1,764

Sources: National Grid Renewables, MN Geospatial Commons, MDNR, ESRI, USGS



SSURGO Soil ID		L136A	L157A	L5A
L102C2	L140A	L158B	L78A	
L107A	L144A	L159A	L79B	
L111A	L146A	L160B	L83A	
L129B	L152B	L161C	L85A	
L133A	L153A	L162B	L98A	
L134B	L154E	L163A	W	
L135A	L156C2	L170B		



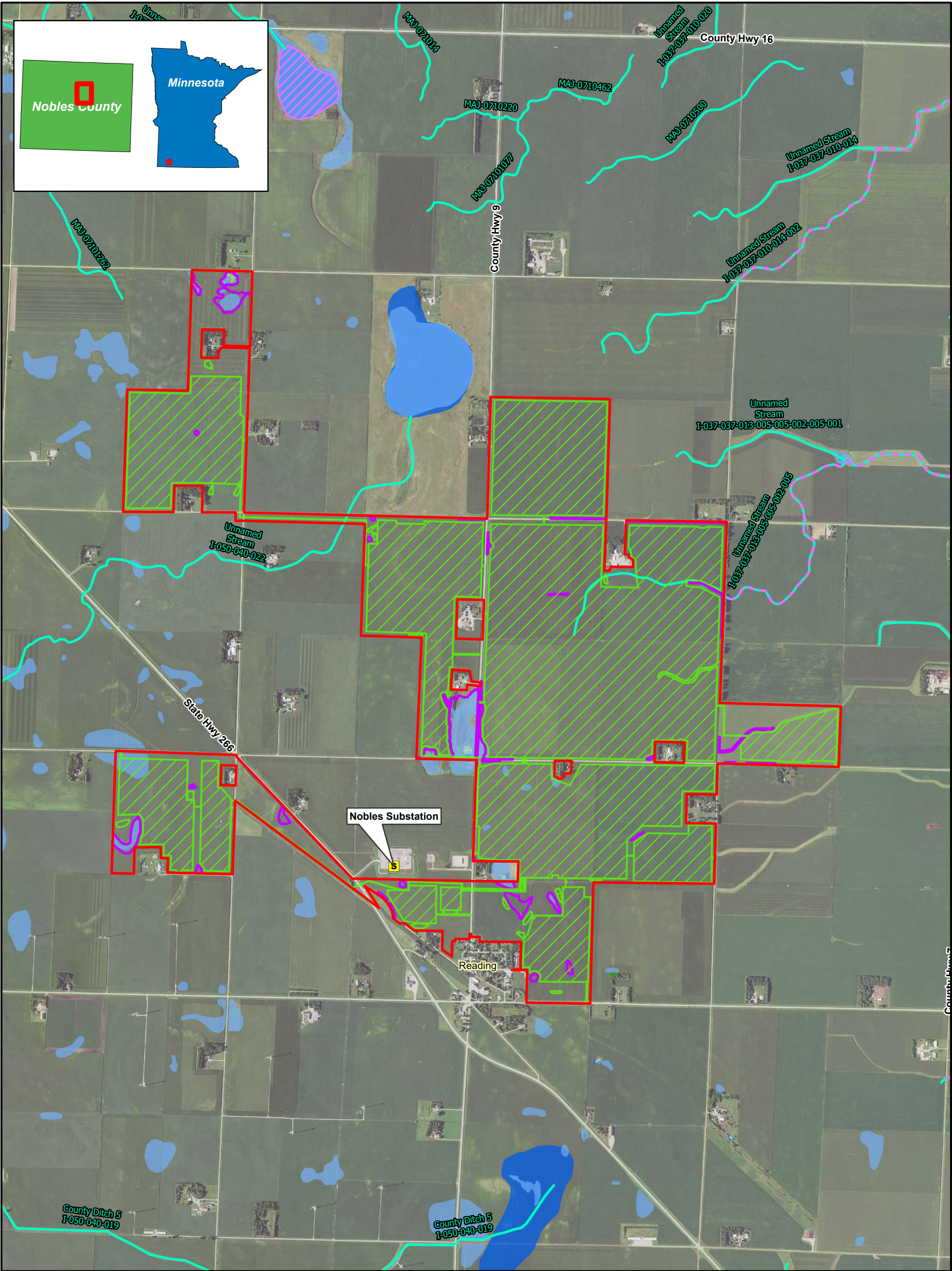
0 1,500 3,000 Feet

1:20,000

Figure 4
NRCS Soils Map
Summit Lake Solar Project
Nobles County, MN

 Land Control Area
 Preliminary Development Area

Imagery Source: 2021 FSA
Sources: National Grid Renewables, MN Geospatial Commons,
MDNR, ESRI, NRCS Web Soil Survey



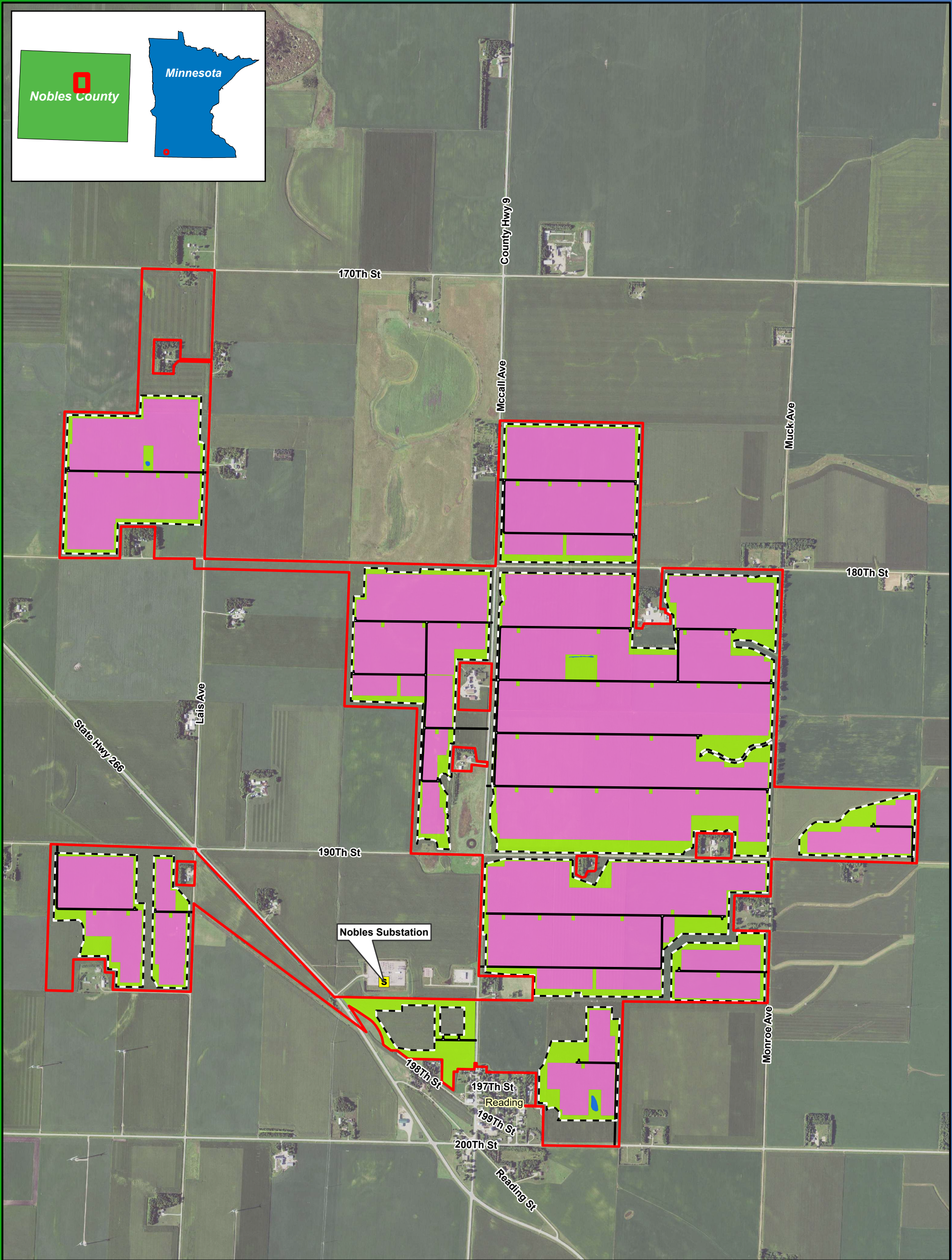
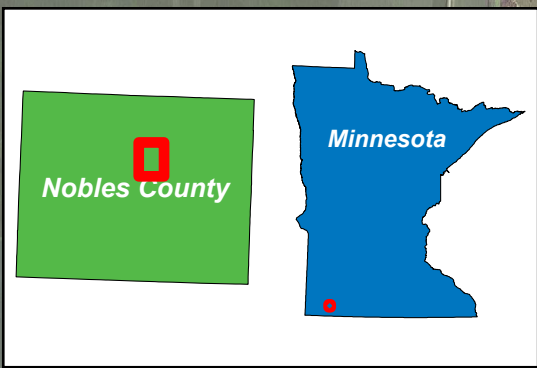
0 1,500 3,000 Feet

1:24,000

Figure 5
Surface Waters
Summit Lake Solar Project
Nobles County, MN

Imagery Source: 2021 FSA
Sources: National Grid Renewables, MN Geospatial Commons,
MDNR, ESRI

- | | |
|------------------------------|--------------------------|
| Existing Substation | Freshwater Pond |
| Land Control Area | Freshwater Shrub Wetland |
| Preliminary Development Area | Riverine |
| NWI Wetland Type | Lake/Pond (MDNR) |
| Freshwater Emergent Wetland | Watercourse (MDNR) |
| Freshwater Forested Wetland | PWI Watercourse |
| | PWI Waterbody |
| | Delineated Wetland |

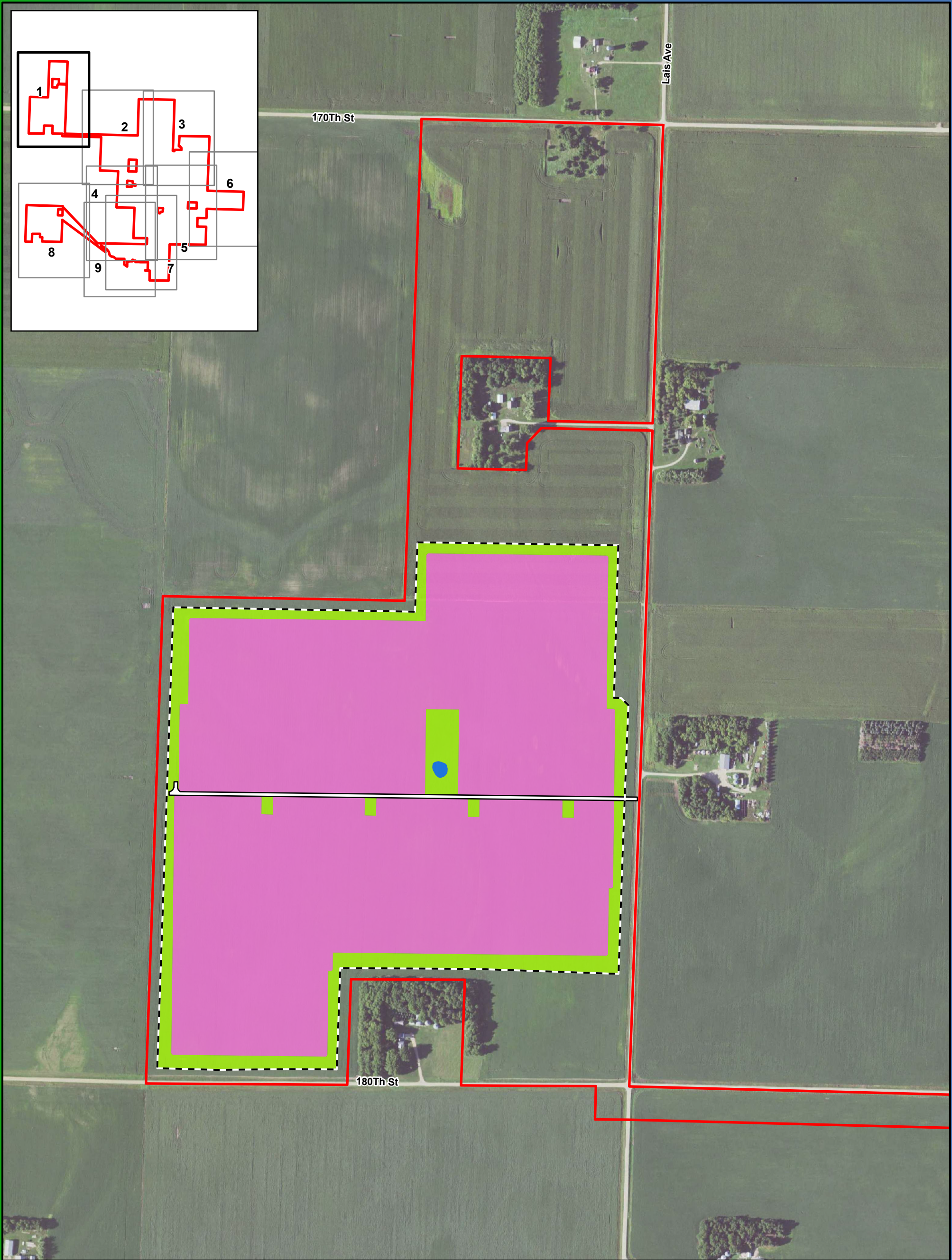


0 1,500 3,000 Feet
1:20,000

Figure 6
Seeding Map Overview
Summit Lake Solar and
BESS Projects
Nobles County, MN

- Existing Substation
- Land Control Area
- Security Fence
- Access Road
- Seed Mix Type
 - Array Native Seed Mix (1186.28 acres)
- Perimeter Native Pollinator (294.04 acres)
- Wet Mix (0.91 acres)

Imagery Source: 2021 FSA
Sources: National Grid Renewables, MN Geospatial Commons, MDNR, ESRI



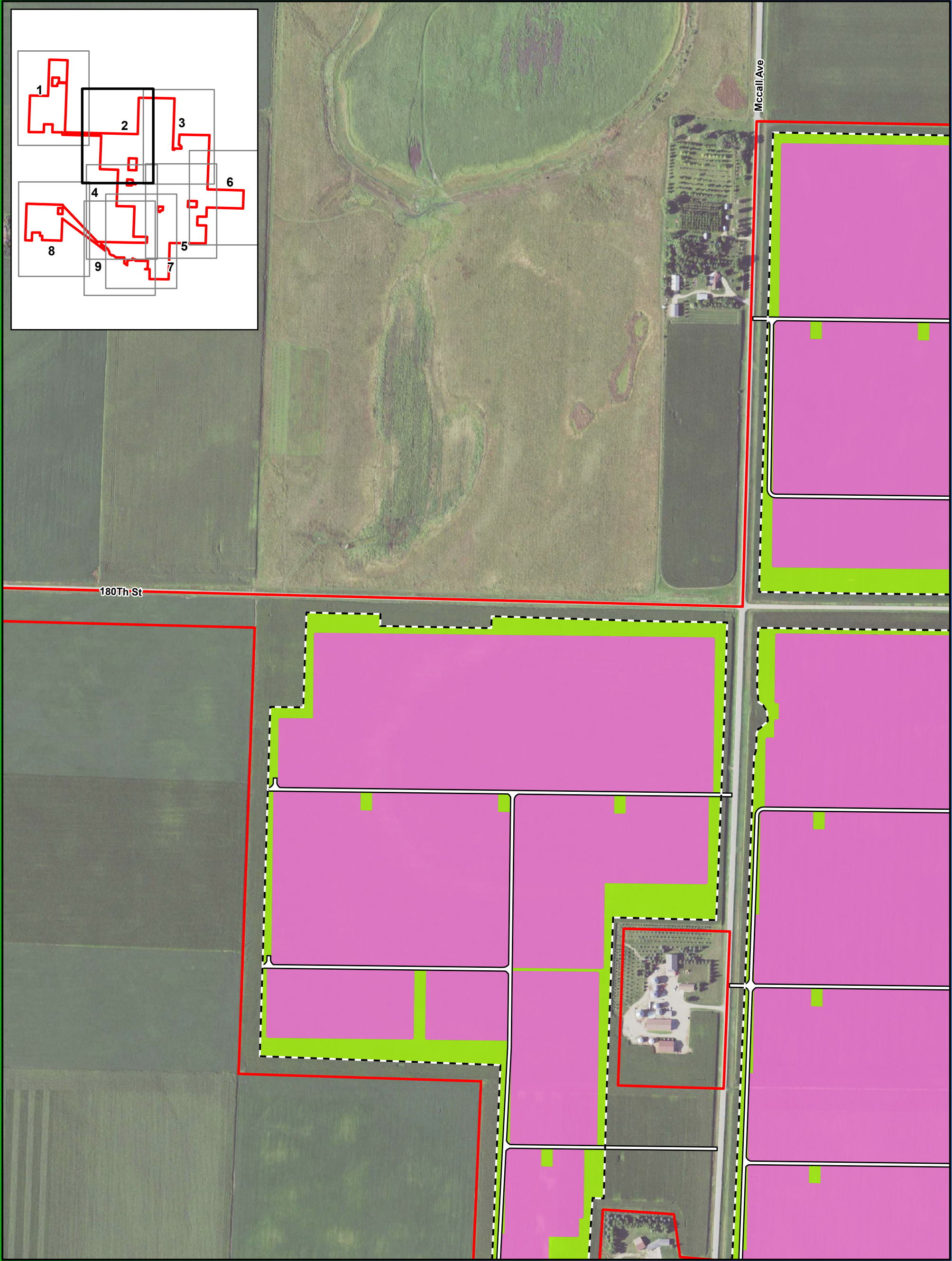
0 250 500 Feet

1:6,000

Imagery Source: 2021 FSA
Sources: National Grid Renewables, MN Geospatial Commons,
MDNR, ESRI

Figure 6
Seeding Map
Summit Lake Solar and
BESS Projects
Nobles County, MN

- Land Control Area
- Security Fence
- Access Road
- Seed Mix Type**
 - Array Native Seed Mix (1186.28 acres)
- Perimeter Native Pollinator (294.04 acres)
- Wet Mix (0.91 acres)



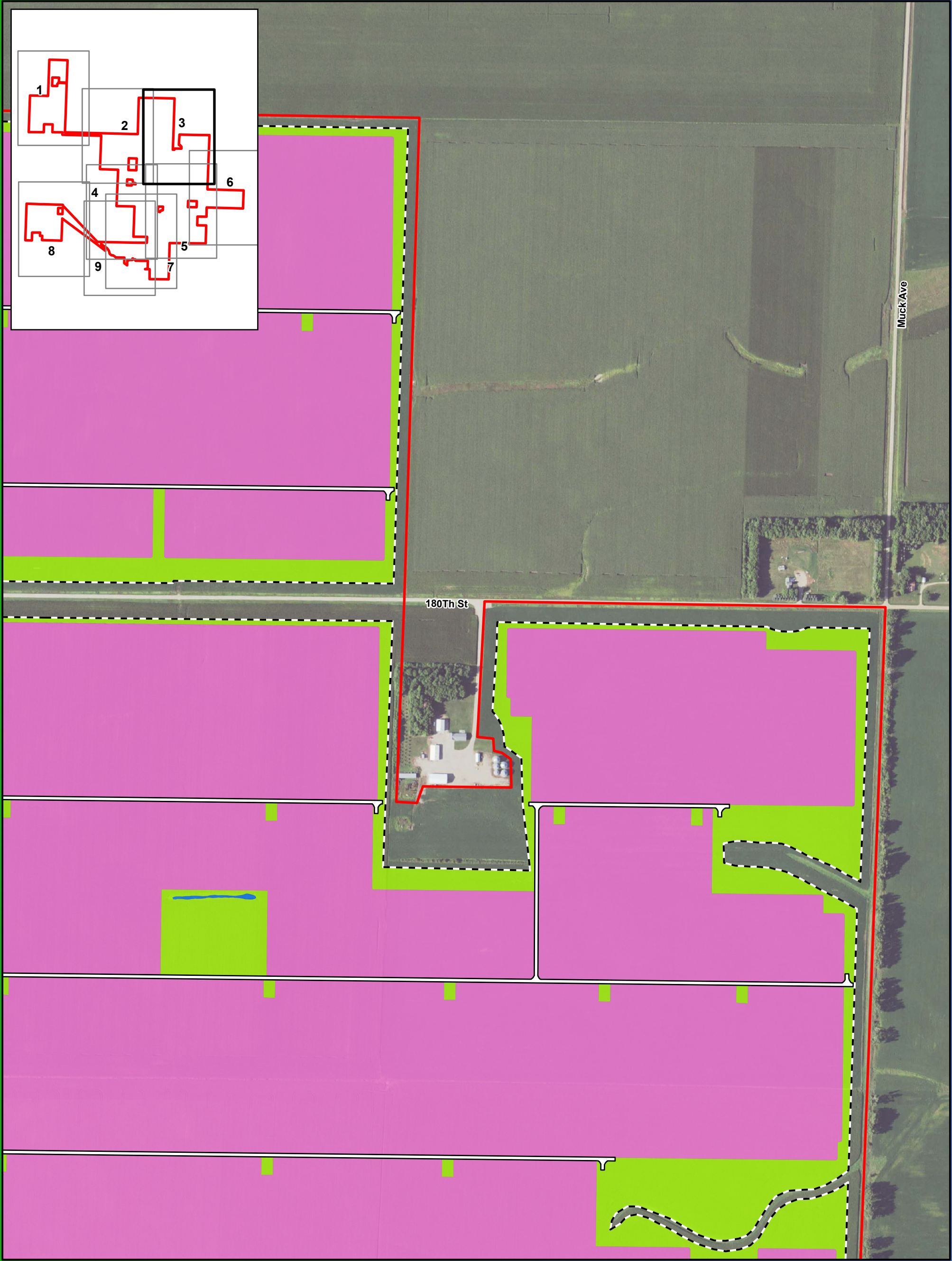
0 250 500 Feet

1:6,000

Imagery Source: 2021 FSA
Sources: National Grid Renewables, MN Geospatial Commons, MDNR, ESRI

Figure 6
Seeding Map
Summit Lake Solar and
BESS Projects
Nobles County, MN

- Land Control Area
- Security Fence
- Access Road
- Seed Mix Type**
- Array Native Seed Mix (1186.28 acres)
- Perimeter Native Pollinator (294.04 acres)
- Wet Mix (0.91 acres)



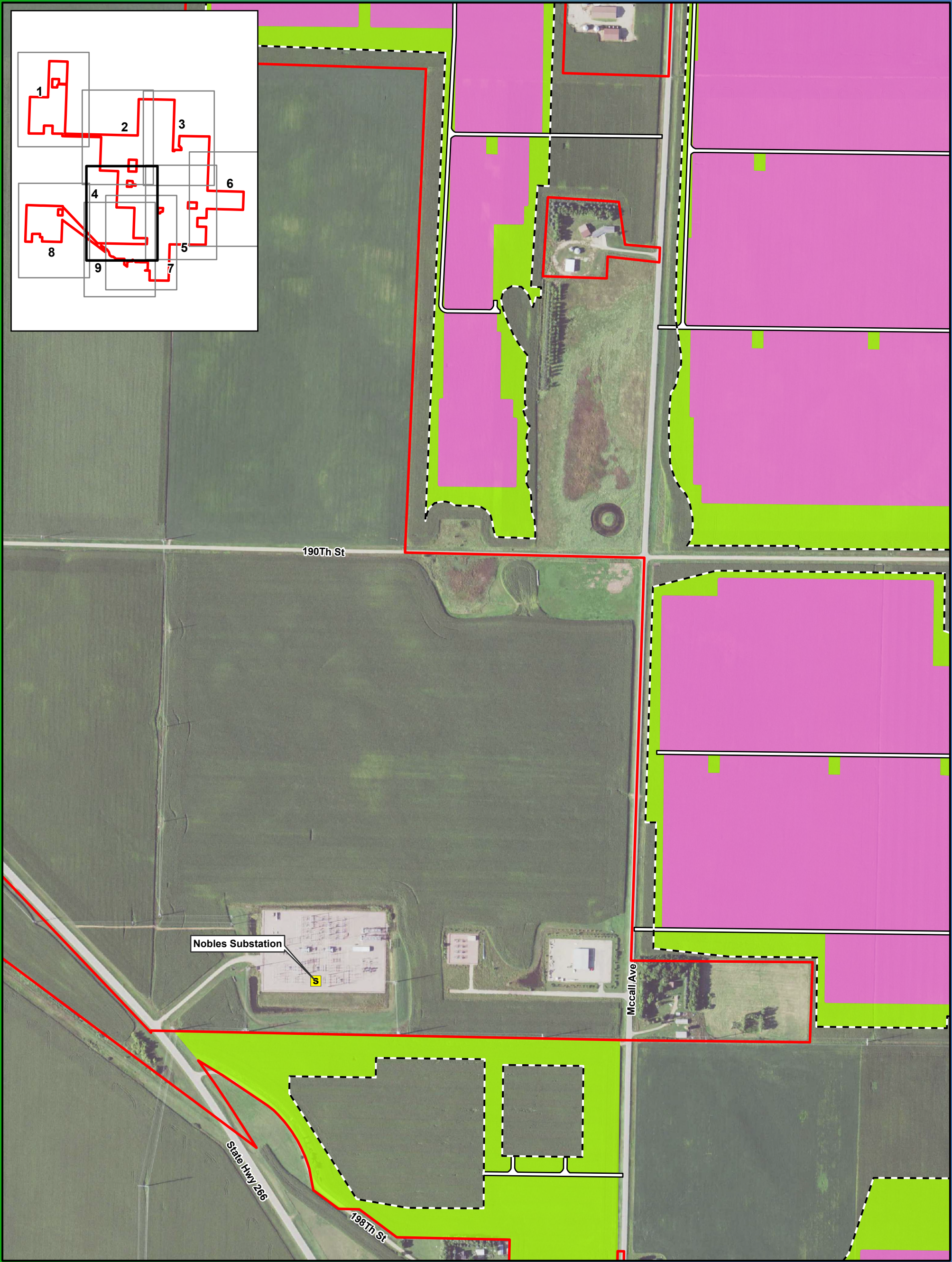
0 250 500 Feet

1:6,000

Imagery Source: 2021 FSA
Sources: National Grid Renewables, MN Geospatial Commons,
MDNR, ESRI

Figure 6
Seeding Map
Summit Lake Solar and
BESS Projects
Nobles County, MN

- | | |
|---------------------------------------|--|
| Land Control Area | Perimeter Native Pollinator (294.04 acres) |
| Security Fence | Wet Mix (0.91 acres) |
| Access Road | |
| Seed Mix Type | |
| Array Native Seed Mix (1186.28 acres) | |



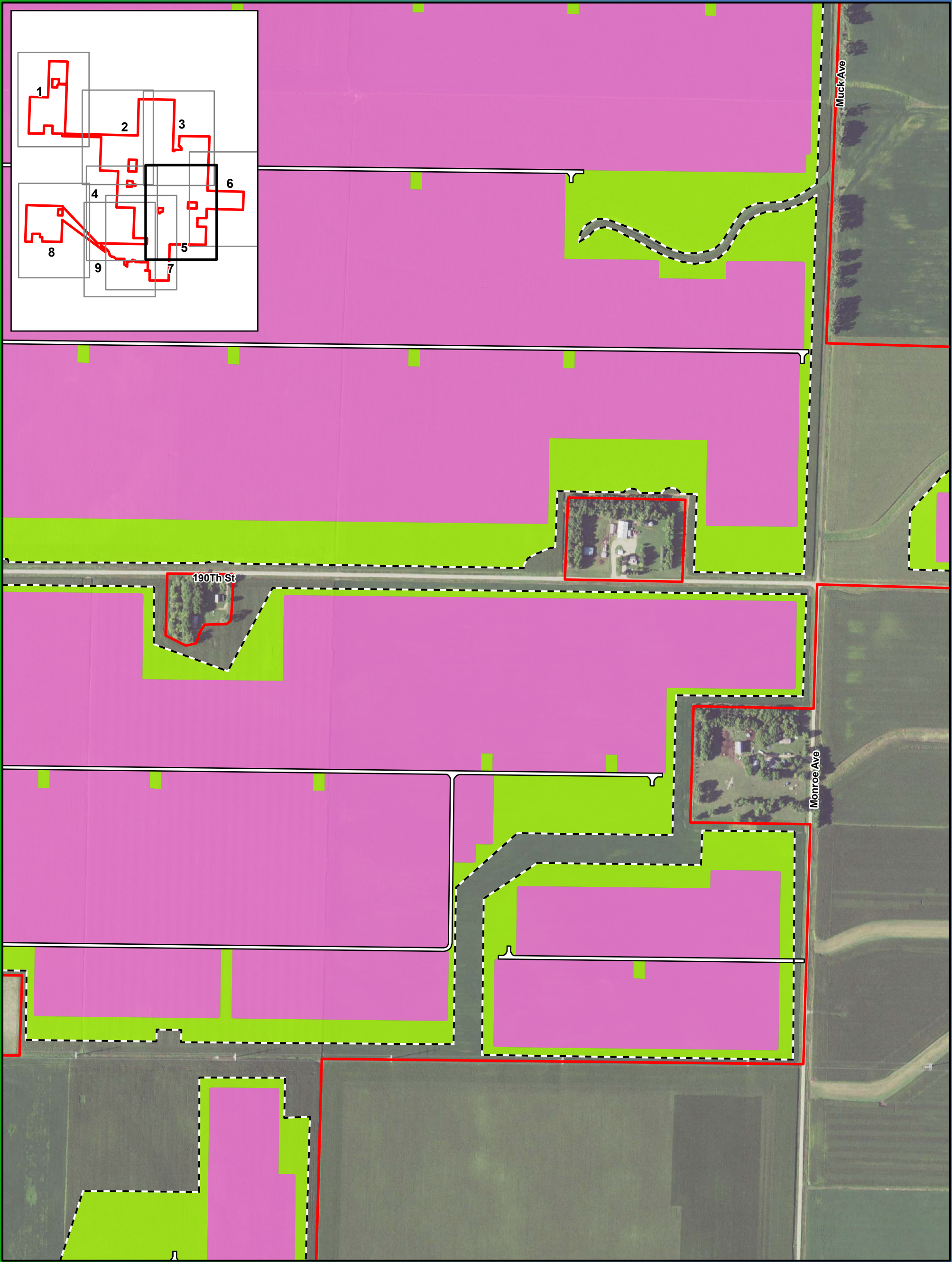
0 250 500 Feet

1:6,000

Imagery Source: 2021 FSA
Sources: National Grid Renewables, MN Geospatial Commons,
MDNR, ESRI

Figure 6
Seeding Map
Summit Lake Solar and
BESS Projects
Nobles County, MN

- Existing Substation
- Land Control Area
- Security Fence
- Access Road
- Array Native Seed Mix (1186.28 acres)
- Perimeter Native Pollinator (294.04 acres)
- Wet Mix (0.91 acres)



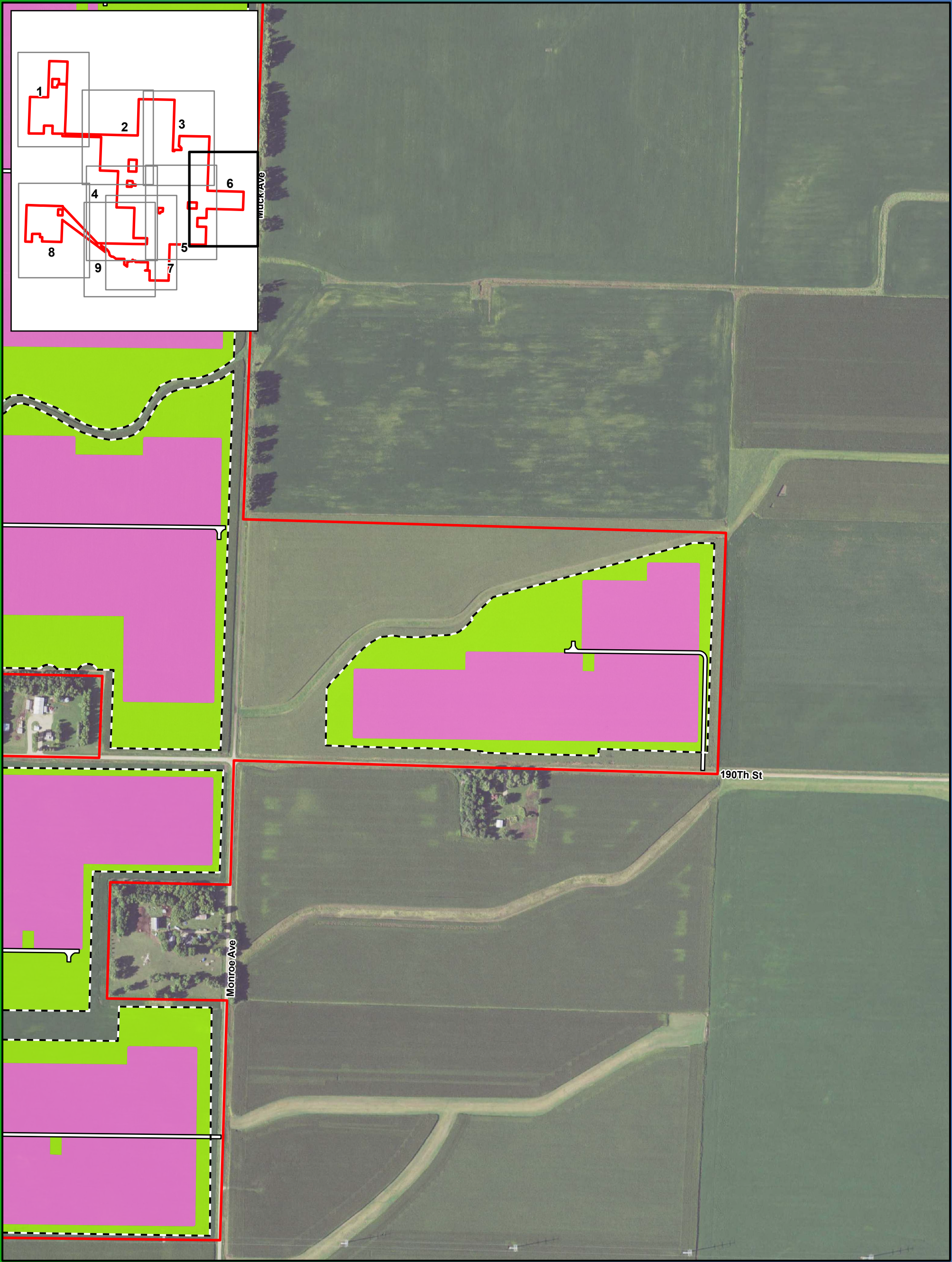
0 250 500 Feet

1:6,000

Imagery Source: 2021 FSA
Sources: National Grid Renewables, MN Geospatial Commons,
MDNR, ESRI

Figure 6
Seeding Map
Summit Lake Solar and
BESS Projects
Nobles County, MN

- Land Control Area
- Security Fence
- Access Road
- Seed Mix Type**
- Array Native Seed Mix (1186.28 acres)
- Perimeter Native Pollinator (294.04 acres)
- Wet Mix (0.91 acres)



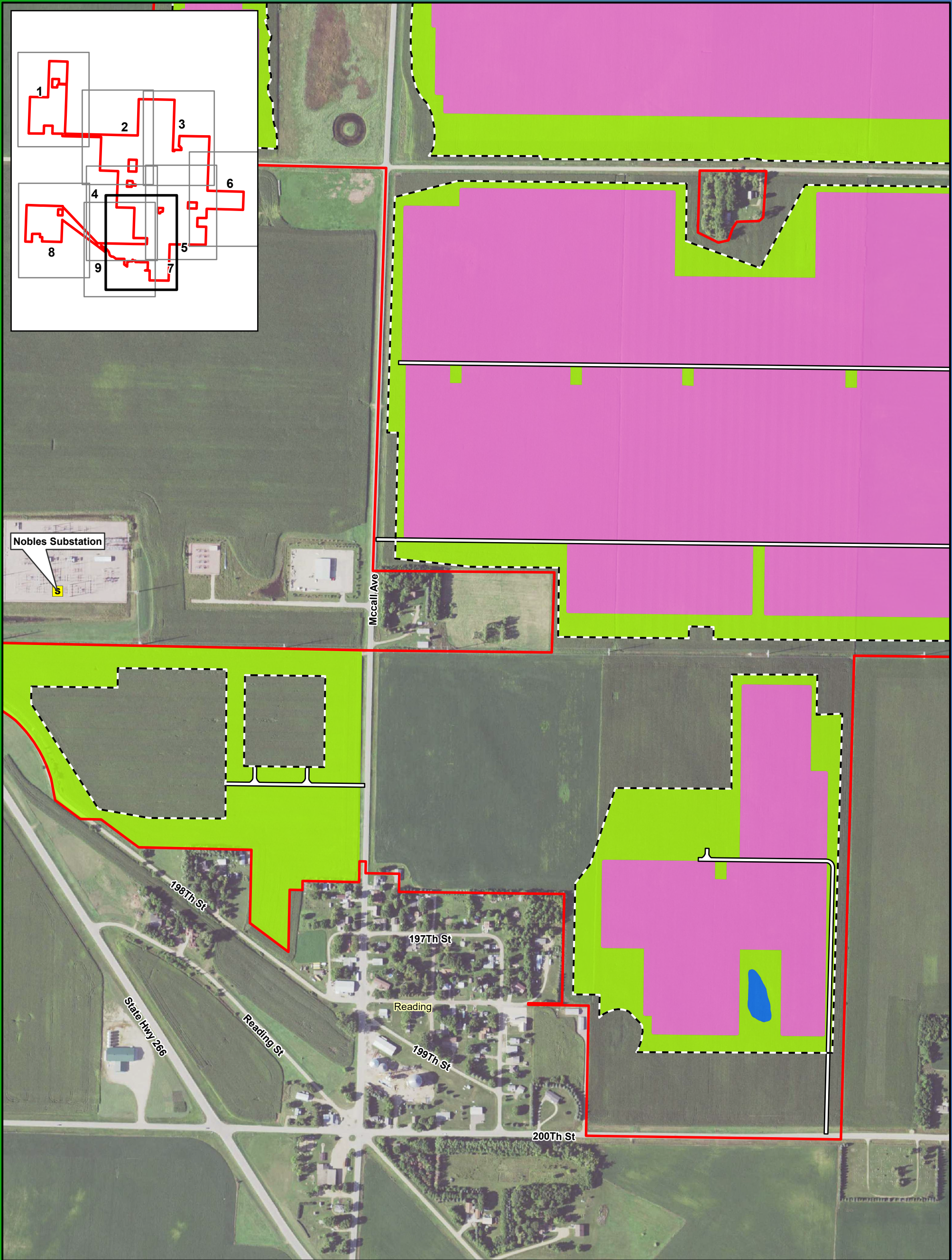
0 250 500 Feet

1:6,000

Figure 6
Seeding Map
Summit Lake Solar and
BESS Projects
Nobles County, MN

- Land Control Area
- Security Fence
- Access Road
- Seed Mix Type**
- Array Native Seed Mix (1186.28 acres)
- Perimeter Native Pollinator (294.04 acres)
- Wet Mix (0.91 acres)

Imagery Source: 2021 FSA
Sources: National Grid Renewables, MN Geospatial Commons, MDNR, ESRI



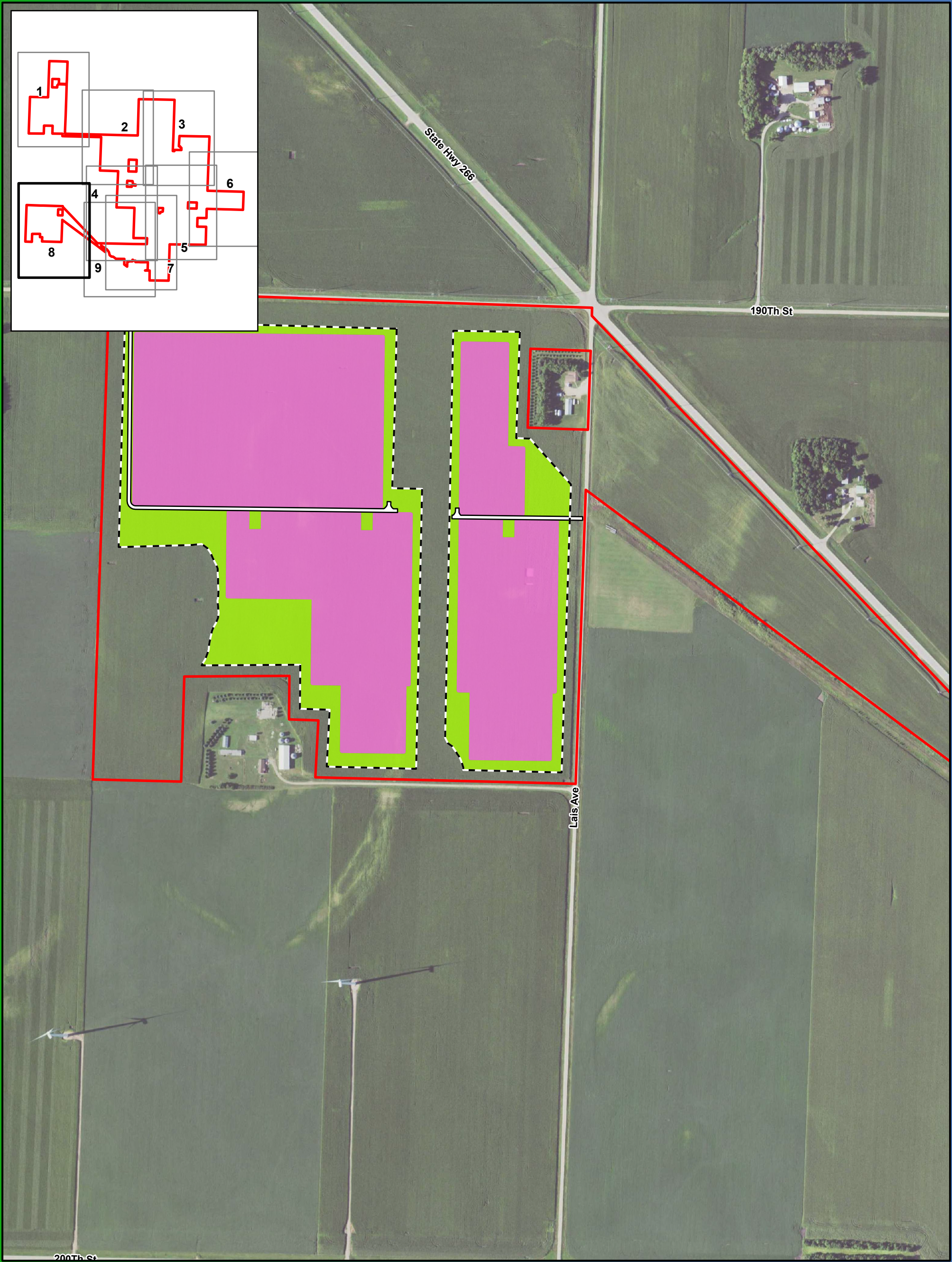
0 250 500 Feet

1:6,000

Imagery Source: 2021 FSA
Sources: National Grid Renewables, MN Geospatial Commons,
MDNR, ESRI

Figure 6
Seeding Map
Summit Lake Solar and
BESS Projects
Nobles County, MN

- Existing Substation
- Land Control Area
- Security Fence
- Access Road
- Seed Mix Type**
 - Array Native Seed Mix (1186.28 acres)
 - Perimeter Native Pollinator (294.04 acres)
 - Wet Mix (0.91 acres)

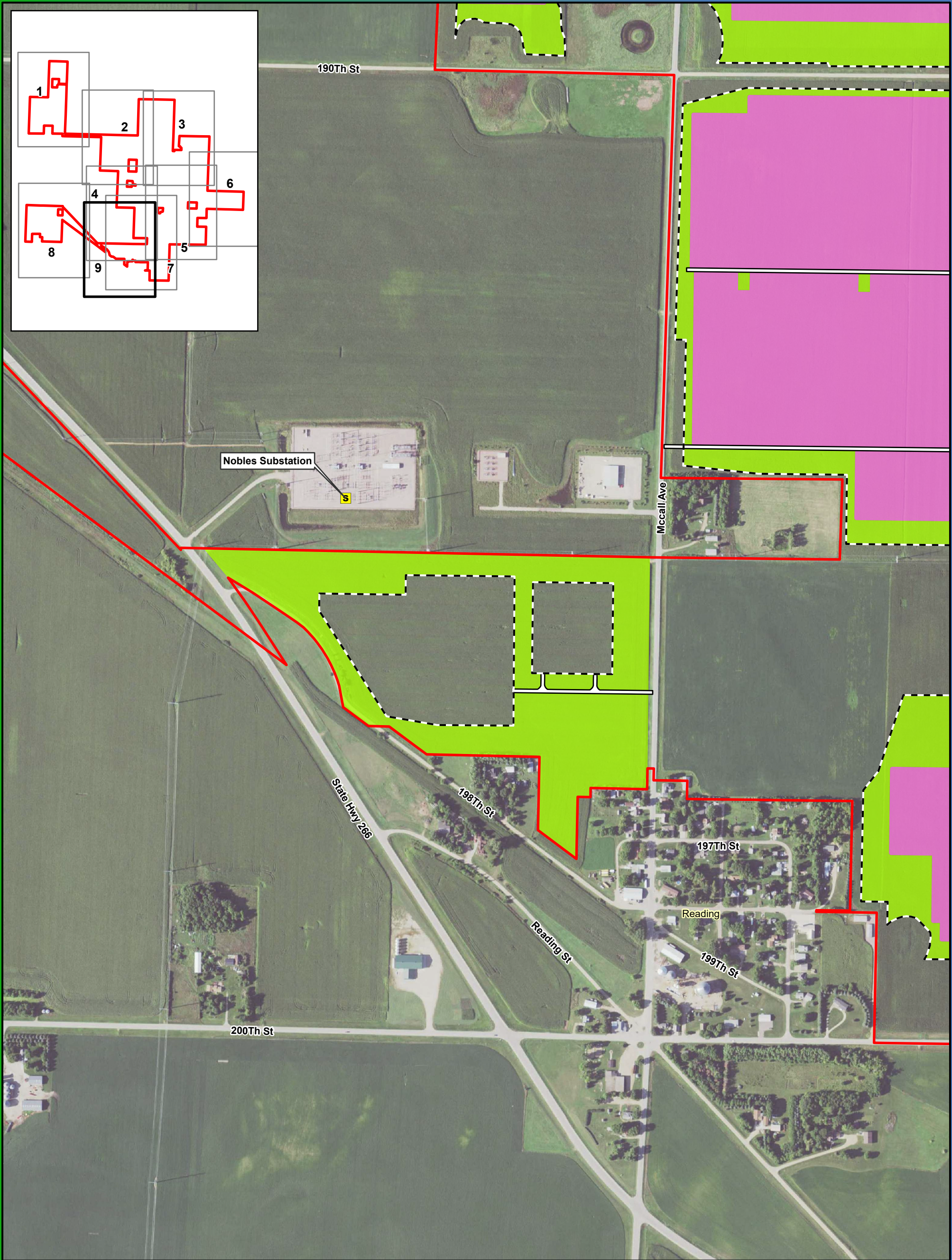


0 250 500 Feet

1:6,000

Figure 6
Seeding Map
Summit Lake Solar and
BESS Projects
Nobles County, MN

- Land Control Area
- Security Fence
- Access Road
- Seed Mix Type**
- Array Native Seed Mix (1186.28 acres)
- Perimeter Native Pollinator (294.04 acres)
- Wet Mix (0.91 acres)



0 250 500 Feet

1:6,000

Imagery Source: 2021 FSA
Sources: National Grid Renewables, MN Geospatial Commons, MDNR, ESRI

Figure 6
Seeding Map
Summit Lake Solar and
BESS Projects
Nobles County, MN

- S Existing Substation
 - Land Control Area
 - Security Fence
 - Access Road
 - Array Native Seed Mix (1186.28 acres)
 - Perimeter Native Pollinator (294.04 acres)
 - Wet Mix (0.91 acres)
- Seed Mix Type**
Array Native Seed Mix (1186.28 acres)

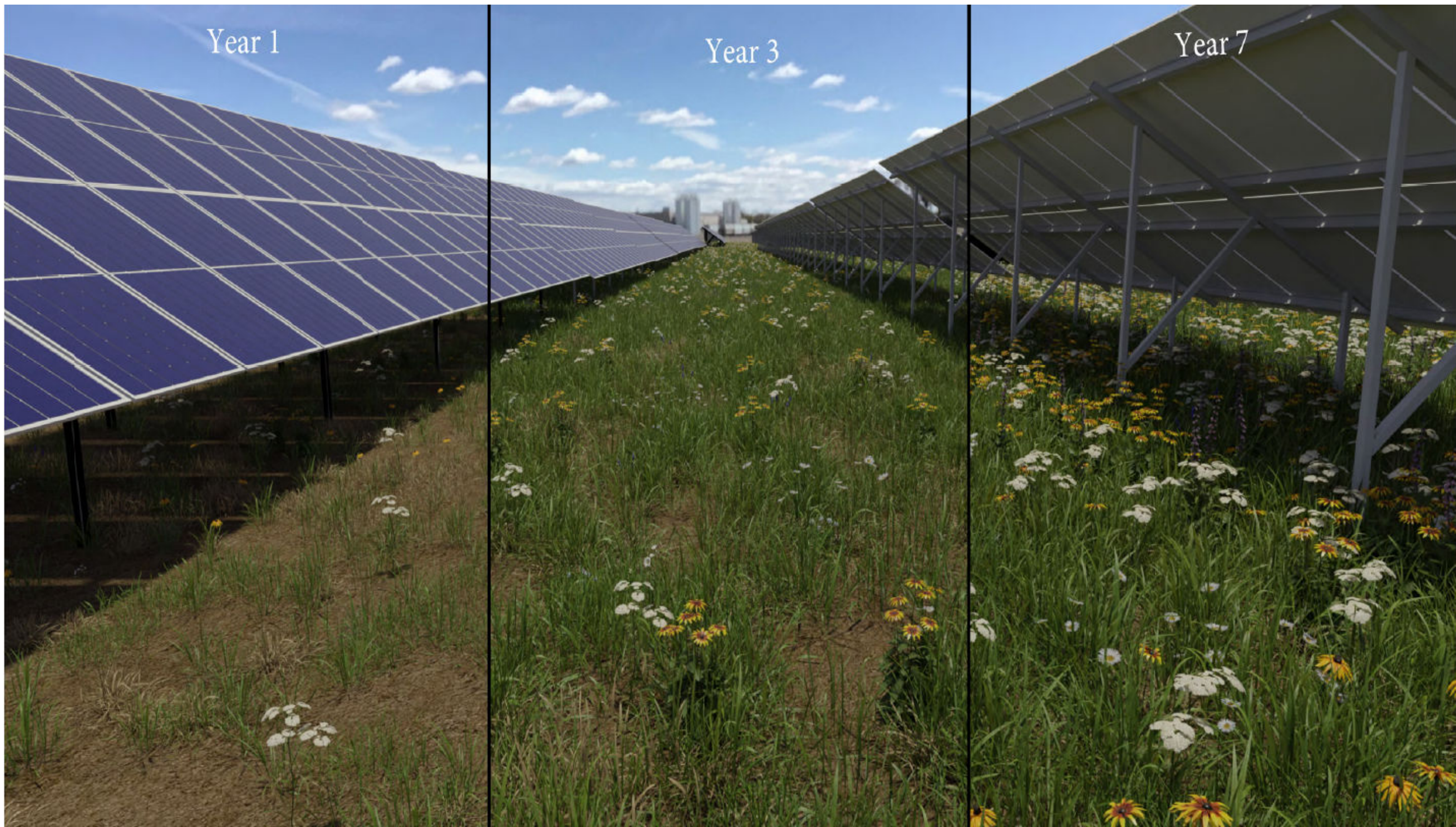


Figure 7
Transitional Vegetation Growth
Summit Lake Solar and BESS Projects
Nobles County, MN

ATTACHMENT A

HABITAT FRIENDLY SOLAR SITE ASSESSMENT FORMS



Habitat Friendly Solar Site Assessment Form for Project Planning

For Solar Companies, Local Governments and Other Partners to Meet Habitat Friendly Solar Standards

Updated 12-22-23

Note: The use of state developed [solar seed mixes](#) over 70% of the plantable area of a site will result in automatically meeting the standard.

- 1) PLANNED PERCENT OF PLANTABLE AREAS WITHIN PROJECT FOOTPRINT DOMINATED BY NATIVE SPECIES COVER (forbs, grasses, sedges, rushes, ferns). PROJECTS MUST HAVE A GOAL OF AT LEAST 70% COVER OF NATIVE VEGETATION TO MEET HABITAT FRIENDLY SOLAR STANDARDS

☐ 70-84%	+15 points	Total Points	20
☒ 85% and above	+20 points		

- 2) PERCENT OF PROPOSED SITE VEGETATION COVER TO BE DOMINATED BY FORBS (not grasses, sedges and rushes)

☒ 10-19%	+5 points	Total Points	5
☐ 20-29%	+10 points		
☐ 30-39%	+15 points		
☐ 40 and above	+15 points		

Note: Projects may have "array" mixes and diverse border mixes; forb dominance should be averaged across the entire site. The dominance should be calculated from total numbers of forb seeds vs. grass seeds based on seeds per square foot (from all seed mixes to be planted).

- 3) PLANNED COVER DIVERSITY (# of species in seed mixes; numbers from upland and moist soil mixes can be combined)

☐ 10-19 species	+5 points	Total Points	10
☒ 20-25 species	+10 points		
☐ 26-39 species	+15 points		
☐ 40 and above	+20		

- 4) PLANNED SEASONS WITH AT LEAST THREE BLOOMING SPECIES (check all that apply)

☒ Spring (April-May)	+4 points	Total Points	7
☒ Summer (June-August)	+3 points		
☐ Fall (September-October)	+3 points		

See BWSR [pollinator toolbox](#) about bloom season

- 5) SITE PLANNING

☒ Detailed establishment and management plan (see notes)	+20 points	Total Points	30
☒ Seed Mixes are composed of at least 40 seeds per square foot	+5 points		
☐ All seed genetic origin is within 200 miles of site (see notes)	+5 points		
☐ At least .5% milkweed cover within each seed mix	+5 points		
☒ Plant species with more than 3 flower colors in mixes (see notes)	+5 points		

- 6) INSECTICIDE RISK

☐ Planned on-site insecticide use (excluding buildings/electrical boxes, etc.)	-30 points	Total Points	10
☒ Communication with local chemical applicators/neighbors about need to prevent drift from adjacent areas.	+10 points		

GRAND TOTAL

Gold Standard 85+ points
Meets Standard 70 points

Project Name: Summit Laker Solar [Array Native Seed Mix]
Project County: Nobles County
Project Size:
Evaluation Date: 11/15/2024

See notes related to the questions on the back side of this form

Notes:

Estimates of percent “cover” should be based on “absolute cover” (the percent of the ground surface that is covered by a vertical projection of foliage as viewed from above).

All project plans must include detailed vegetation establishment and management specifications to ensure the success of projects (see sample specifications on [BWSR’s Habitat Friendly Solar Webpage](#)).

Seed mixes provided for projects need to show seeds per square foot for each species in the mix.

Question 1 - Native plant species provide benefits to a wide range of pollinators and other wildlife species. The [Minnesota DNR List](#) should be used to determine if a species is native. Native species include wildflowers, graminoids (grasses, sedges, rushes), shrubs and trees. The percent areal cover of native vs. non-native species should be estimated based on the seeds per square foot of all species to be used across all seed mixes. As non-native fescues tend to have a high seeding rate, but also small seeds with a lower germination success the number of fescue seeds per square foot in mixes can be decreased by half when calculating native species dominance of mixes. This should result in a more accurate representation of native dominance.

Question 2 - There is a focus on native forbs on this assessment form to maximize benefits to the approximately 500 species of native bees in Minnesota, honeybees and other pollinators. Forbs are (flowering plants that are not woody or graminoids such as grasses and sedges) and can include introduced clovers and other non-native species beneficial to pollinators. No noxious weeds or invasive plants can be included in the total.

Question 3 - Plant diversity adds to wildlife benefits, as well as the resiliency of projects. For this question, planned native and non-native species from all seed mixes can be combined for the total.

Question 4 - Having blooming species throughout the season helps support pollinator species. See BWSR’s [Pollinator Toolbox](#) for a listing of bloom seasons for species.

Question 5 - To meet requirements for a long-term management plan projects must provide information about:

- Timing of yearly inspections,
- A detailed native vegetation establishment plan with detailed instructions for contractors.
- A detailed maintenance schedule for the first three years of the project (establishment period) listing timing of establishment mowing/ trimming, spot herbicide application, prescribed grazing or other management actions.
- Proposed maintenance schedule for year four and beyond.
- List of weed species that may become problematic at the site and how they will be managed if needed.

All mixes being used for the project must include at least 40 seeds per square foot to receive points for the first category. Using seed with a genetic origin within 200 miles helps ensure that species will be adapted to site conditions and decrease the risk of introducing invasive species in seed mixes. Please refer to pages 7-8 of [BWSR’s Native Vegetation Establishment and Enhancement Guidelines](#) for more information about appropriate seed sources. To obtain points for including milkweed in projects mixes must contain at least .5% milkweed seed based on seeds per square foot, or a combination of seed and containerized plugs could be used with a plan to cover .5% of the ground surface with milkweed. Flower colors can include blue, pink, purple, yellow, white, orange, red, green and brown. The Minnesota Wildflowers website allows for searching species based on flower color [Minnesota Wildflowers Categorized by Color](#).

Question 6 - It is important that seeds treated with insecticides are not used at project sites and that insecticides are not being sprayed at the site. To meet requirements for communication/registration with local landowners/applicators about the need to prevent drift from adjacent areas, information provided can be in the form of email communication or copies of letters. Communication must be provided to all landowners adjacent to the property including municipalities.

Send completed forms, project plans, seed mixes (showing seeds per square foot for each species) and any communications with pesticide applicators to BWSR at Dan.Shaw@state.mn.us as well as any local government staff involved in reviewing the project.



Habitat Friendly Solar Site Assessment Form for Project Planning

For Solar Companies, Local Governments and Other Partners to Meet Habitat Friendly Solar Standards

Updated 12-22-23

Note: The use of state developed [solar seed mixes](#) over 70% of the plantable area of a site will result in automatically meeting the standard.

- 1) **PLANNED PERCENT OF PLANTABLE AREAS WITHIN PROJECT FOOTPRINT DOMINATED BY NATIVE SPECIES COVER** (forbs, grasses, sedges, rushes, ferns). **PROJECTS MUST HAVE A GOAL OF AT LEAST 70% COVER OF NATIVE VEGETATION TO MEET HABITAT FRIENDLY SOLAR STANDARDS**

☐ 70-84%	+15 points	Total Points	20
☒ 85% and above	+20 points		

- 2) **PERCENT OF PROPOSED SITE VEGETATION COVER TO BE DOMINATED BY FORBS** (not grasses, sedges and rushes)

☐ 10-19%	+5 points	Total Points	15
☐ 20-29%	+10 points		
☐ 30-39%	+15 points		
☒ 40 and above	+15 points		

Note: Projects may have “array” mixes and diverse border mixes; forb dominance should be averaged across the entire site. The dominance should be calculated from total numbers of forb seeds vs. grass seeds based on seeds per square foot (from all seed mixes to be planted).

- 3) **PLANNED COVER DIVERSITY** (# of species in seed mixes; numbers from upland and moist soil mixes can be combined)

☐ 10-19 species	+5 points	Total Points	20
☐ 20-25 species	+10 points		
☐ 26-39 species	+15 points		
☒ 40 and above	+20		

- 4) **PLANNED SEASONS WITH AT LEAST THREE BLOOMING SPECIES** (check all that apply)

☒ Spring (April-May)	+4 points	Total Points	10
☒ Summer (June-August)	+3 points		
☒ Fall (September-October)	+3 points		

See BWSR [pollinator toolbox](#) about bloom season

- 5) **SITE PLANNING**

☒ Detailed establishment and management plan (see notes)	+20 points	Total Points	30
☒ Seed Mixes are composed of at least 40 seeds per square foot	+5 points		
☐ All seed genetic origin is within 200 miles of site (see notes)	+5 points		
☐ At least .5% milkweed cover within each seed mix	+5 points		
☒ Plant species with more than 3 flower colors in mixes (see notes)	+5 points		

- 6) **INSECTICIDE RISK**

☐ Planned on-site insecticide use (excluding buildings/electrical boxes, etc.)	-30 points	Total Points	10
☒ Communication with local chemical applicators/neighbors about need to prevent drift from adjacent areas.	+10 points		

GRAND TOTAL

Gold Standard 85+ points
Meets Standard 70 points

Project Name: Summit Lake Solar [Perimeter Native Seed Mix]
Project County: Nobles
Project Size:
Evaluation Date: 11/15/2024

See notes related to the questions on the back side of this form

Notes:

Estimates of percent “cover” should be based on “absolute cover” (the percent of the ground surface that is covered by a vertical projection of foliage as viewed from above).

All project plans must include detailed vegetation establishment and management specifications to ensure the success of projects (see sample specifications on [BWSR’s Habitat Friendly Solar Webpage](#)).

Seed mixes provided for projects need to show seeds per square foot for each species in the mix.

Question 1 - Native plant species provide benefits to a wide range of pollinators and other wildlife species. The [Minnesota DNR List](#) should be used to determine if a species is native. Native species include wildflowers, graminoids (grasses, sedges, rushes), shrubs and trees. The percent areal cover of native vs. non-native species should be estimated based on the seeds per square foot of all species to be used across all seed mixes. As non-native fescues tend to have a high seeding rate, but also small seeds with a lower germination success the number of fescue seeds per square foot in mixes can be decreased by half when calculating native species dominance of mixes. This should result in a more accurate representation of native dominance.

Question 2 - There is a focus on native forbs on this assessment form to maximize benefits to the approximately 500 species of native bees in Minnesota, honeybees and other pollinators. Forbs are (flowering plants that are not woody or graminoids such as grasses and sedges) and can include introduced clovers and other non-native species beneficial to pollinators. No noxious weeds or invasive plants can be included in the total.

Question 3 - Plant diversity adds to wildlife benefits, as well as the resiliency of projects. For this question, planned native and non-native species from all seed mixes can be combined for the total.

Question 4 - Having blooming species throughout the season helps support pollinator species. See BWSR’s [Pollinator Toolbox](#) for a listing of bloom seasons for species.

Question 5 - To meet requirements for a long-term management plan projects must provide information about:

- Timing of yearly inspections,
- A detailed native vegetation establishment plan with detailed instructions for contractors.
- A detailed maintenance schedule for the first three years of the project (establishment period) listing timing of establishment mowing/ trimming, spot herbicide application, prescribed grazing or other management actions.
- Proposed maintenance schedule for year four and beyond.
- List of weed species that may become problematic at the site and how they will be managed if needed.

All mixes being used for the project must include at least 40 seeds per square foot to receive points for the first category. Using seed with a genetic origin within 200 miles helps ensure that species will be adapted to site conditions and decrease the risk of introducing invasive species in seed mixes. Please refer to pages 7-8 of [BWSR’s Native Vegetation Establishment and Enhancement Guidelines](#) for more information about appropriate seed sources. To obtain points for including milkweed in projects mixes must contain at least .5% milkweed seed based on seeds per square foot, or a combination of seed and containerized plugs could be used with a plan to cover .5% of the ground surface with milkweed. Flower colors can include blue, pink, purple, yellow, white, orange, red, green and brown. The Minnesota Wildflowers website allows for searching species based on flower color [Minnesota Wildflowers Categorized by Color](#).

Question 6 - It is important that seeds treated with insecticides are not used at project sites and that insecticides are not being sprayed at the site. To meet requirements for communication/registration with local landowners/applicators about the need to prevent drift from adjacent areas, information provided can be in the form of email communication or copies of letters. Communication must be provided to all landowners adjacent to the property including municipalities.

Send completed forms, project plans, seed mixes (showing seeds per square foot for each species) and any communications with pesticide applicators to BWSR at Dan.Shaw@state.mn.us as well as any local government staff involved in reviewing the project.



Habitat Friendly Solar Site Assessment Form for Project Planning

For Solar Companies, Local Governments and Other Partners to Meet Habitat Friendly Solar Standards

Updated 12-22-23

Note: The use of state developed [solar seed mixes](#) over 70% of the plantable area of a site will result in automatically meeting the standard.

- 1) **PLANNED PERCENT OF PLANTABLE AREAS WITHIN PROJECT FOOTPRINT DOMINATED BY NATIVE SPECIES COVER** (forbs, grasses, sedges, rushes, ferns). **PROJECTS MUST HAVE A GOAL OF AT LEAST 70% COVER OF NATIVE VEGETATION TO MEET HABITAT FRIENDLY SOLAR STANDARDS**

☐ 70-84%	+15 points	Total Points	20
☒ 85% and above	+20 points		

- 2) **PERCENT OF PROPOSED SITE VEGETATION COVER TO BE DOMINATED BY FORBS** (not grasses, sedges and rushes)

☐ 10-19%	+5 points	Total Points	15
☐ 20-29%	+10 points		
☐ 30-39%	+15 points		
☒ 40 and above	+15 points		

Note: Projects may have “array” mixes and diverse border mixes; forb dominance should be averaged across the entire site. The dominance should be calculated from total numbers of forb seeds vs. grass seeds based on seeds per square foot (from all seed mixes to be planted).

- 3) **PLANNED COVER DIVERSITY** (# of species in seed mixes; numbers from upland and moist soil mixes can be combined)

☐ 10-19 species	+5 points	Total Points	20
☐ 20-25 species	+10 points		
☐ 26-39 species	+15 points		
☒ 40 and above	+20		

- 4) **PLANNED SEASONS WITH AT LEAST THREE BLOOMING SPECIES** (check all that apply)

☐ Spring (April-May)	+4 points	Total Points	6
☒ Summer (June-August)	+3 points		
☒ Fall (September-October)	+3 points		

See BWSR [pollinator toolbox](#) about bloom season

- 5) **SITE PLANNING**

☒ Detailed establishment and management plan (see notes)	+20 points	Total Points	30
☒ Seed Mixes are composed of at least 40 seeds per square foot	+5 points		
☐ All seed genetic origin is within 200 miles of site (see notes)	+5 points		
☐ At least .5% milkweed cover within each seed mix	+5 points		
☒ Plant species with more than 3 flower colors in mixes (see notes)	+5 points		

- 6) **INSECTICIDE RISK**

☐ Planned on-site insecticide use (excluding buildings/electrical boxes, etc.)	-30 points	Total Points	10
☒ Communication with local chemical applicators/neighbors about need to prevent drift from adjacent areas.	+10 points		

GRAND TOTAL

Gold Standard 85+ points
Meets Standard 70 points

Project Name: Summit Lake Solar [Wet]
Project County: Nobles
Project Size:
Evaluation Date: 11/15/2024

See notes related to the questions on the back side of this form

Notes:

Estimates of percent “cover” should be based on “absolute cover” (the percent of the ground surface that is covered by a vertical projection of foliage as viewed from above).

All project plans must include detailed vegetation establishment and management specifications to ensure the success of projects (see sample specifications on [BWSR’s Habitat Friendly Solar Webpage](#)).

Seed mixes provided for projects need to show seeds per square foot for each species in the mix.

Question 1 - Native plant species provide benefits to a wide range of pollinators and other wildlife species. The [Minnesota DNR List](#) should be used to determine if a species is native. Native species include wildflowers, graminoids (grasses, sedges, rushes), shrubs and trees. The percent areal cover of native vs. non-native species should be estimated based on the seeds per square foot of all species to be used across all seed mixes. As non-native fescues tend to have a high seeding rate, but also small seeds with a lower germination success the number of fescue seeds per square foot in mixes can be decreased by half when calculating native species dominance of mixes. This should result in a more accurate representation of native dominance.

Question 2 - There is a focus on native forbs on this assessment form to maximize benefits to the approximately 500 species of native bees in Minnesota, honeybees and other pollinators. Forbs are (flowering plants that are not woody or graminoids such as grasses and sedges) and can include introduced clovers and other non-native species beneficial to pollinators. No noxious weeds or invasive plants can be included in the total.

Question 3 - Plant diversity adds to wildlife benefits, as well as the resiliency of projects. For this question, planned native and non-native species from all seed mixes can be combined for the total.

Question 4 - Having blooming species throughout the season helps support pollinator species. See BWSR’s [Pollinator Toolbox](#) for a listing of bloom seasons for species.

Question 5 - To meet requirements for a long-term management plan projects must provide information about:

- Timing of yearly inspections,
- A detailed native vegetation establishment plan with detailed instructions for contractors.
- A detailed maintenance schedule for the first three years of the project (establishment period) listing timing of establishment mowing/ trimming, spot herbicide application, prescribed grazing or other management actions.
- Proposed maintenance schedule for year four and beyond.
- List of weed species that may become problematic at the site and how they will be managed if needed.

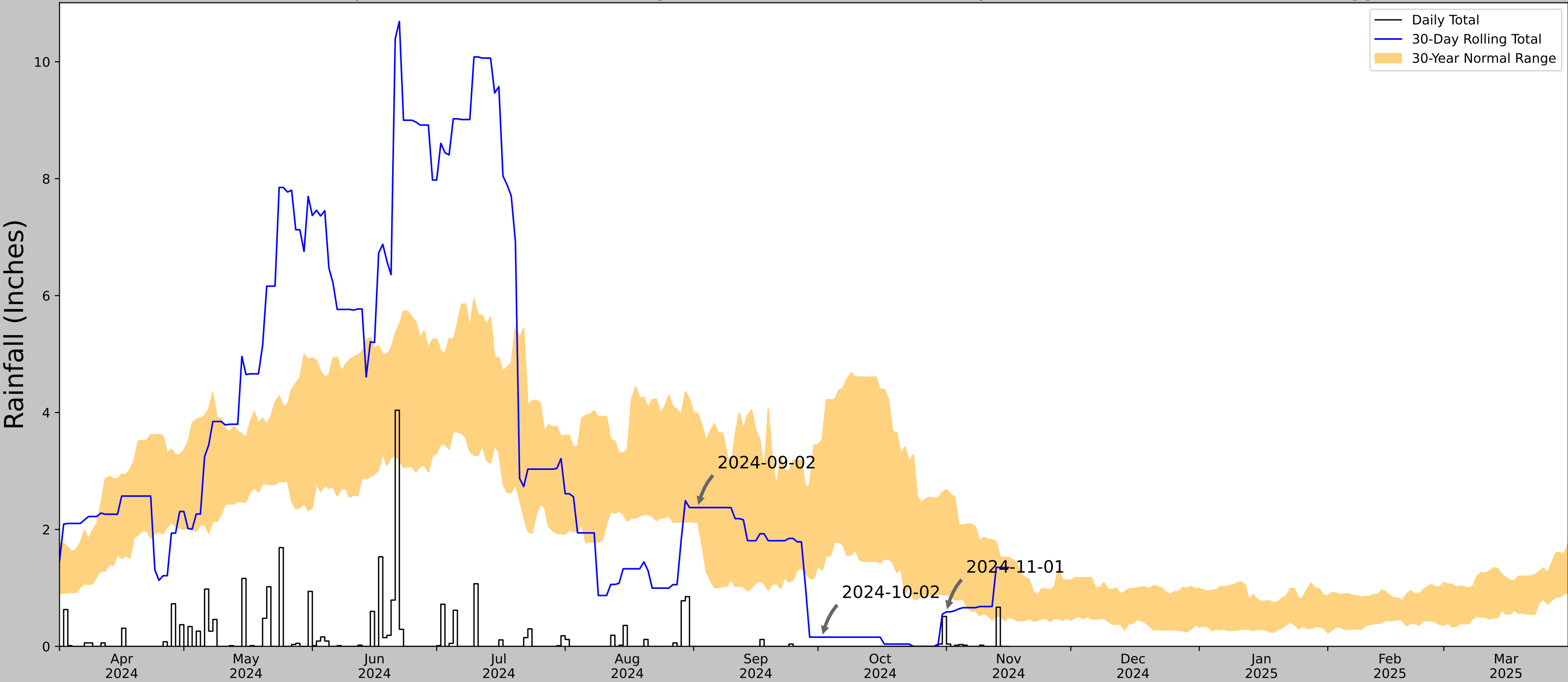
All mixes being used for the project must include at least 40 seeds per square foot to receive points for the first category. Using seed with a genetic origin within 200 miles helps ensure that species will be adapted to site conditions and decrease the risk of introducing invasive species in seed mixes. Please refer to pages 7-8 of [BWSR’s Native Vegetation Establishment and Enhancement Guidelines](#) for more information about appropriate seed sources. To obtain points for including milkweed in projects mixes must contain at least .5% milkweed seed based on seeds per square foot, or a combination of seed and containerized plugs could be used with a plan to cover .5% of the ground surface with milkweed. Flower colors can include blue, pink, purple, yellow, white, orange, red, green and brown. The Minnesota Wildflowers website allows for searching species based on flower color [Minnesota Wildflowers Categorized by Color](#).

Question 6 - It is important that seeds treated with insecticides are not used at project sites and that insecticides are not being sprayed at the site. To meet requirements for communication/registration with local landowners/applicators about the need to prevent drift from adjacent areas, information provided can be in the form of email communication or copies of letters. Communication must be provided to all landowners adjacent to the property including municipalities.

Send completed forms, project plans, seed mixes (showing seeds per square foot for each species) and any communications with pesticide applicators to BWSR at Dan.Shaw@state.mn.us as well as any local government staff involved in reviewing the project.

ATTACHMENT B
PROJECT HISTORICAL CLIMATE DATA

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2024-11-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Mild wetness (2024-10)
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-11-01	0.885039	2.680709	0.590551	Dry	1	3	3
2024-10-02	1.300787	3.536614	0.15748	Dry	1	2	2
2024-09-02	2.12126	3.988583	2.374016	Normal	2	1	2
Result							Drier than Normal - 7



**US Army Corps
of Engineers®**

Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center



ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11193	86
WORTHINGTON 1.9 SW	43.6081, -95.625	1598.097	3.406	30.184	1.636	0	4
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2024-10-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Mild wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-10-01	1.367717	3.453937	0.15748	Dry	1	3	3
2024-09-01	2.124803	3.988583	2.374016	Normal	2	2	4
2024-08-02	1.991339	3.609843	2.610236	Normal	2	1	2
Result							Drier than Normal - 9



**US Army Corps
of Engineers®**

Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

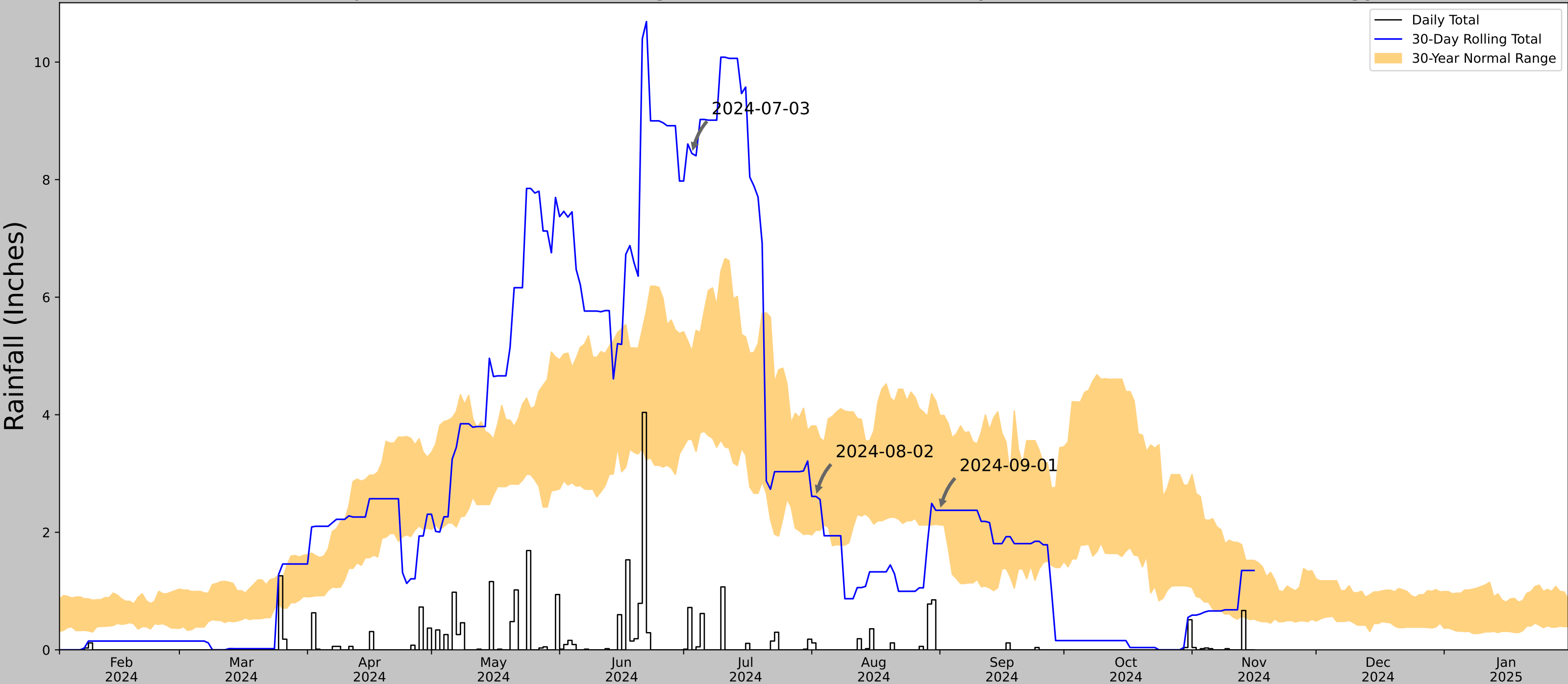
Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center



ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11193	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2024-09-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Moderate wetness
WebWIMP H ₂ O Balance	Dry Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-09-01	2.124803	3.988583	2.374016	Normal	2	3	6
2024-08-02	2.033465	3.81063	2.610236	Normal	2	2	4
2024-07-03	3.579134	5.080709	8.444882	Wet	3	1	3
Result							Normal Conditions - 13



**US Army Corps
of Engineers®**

Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

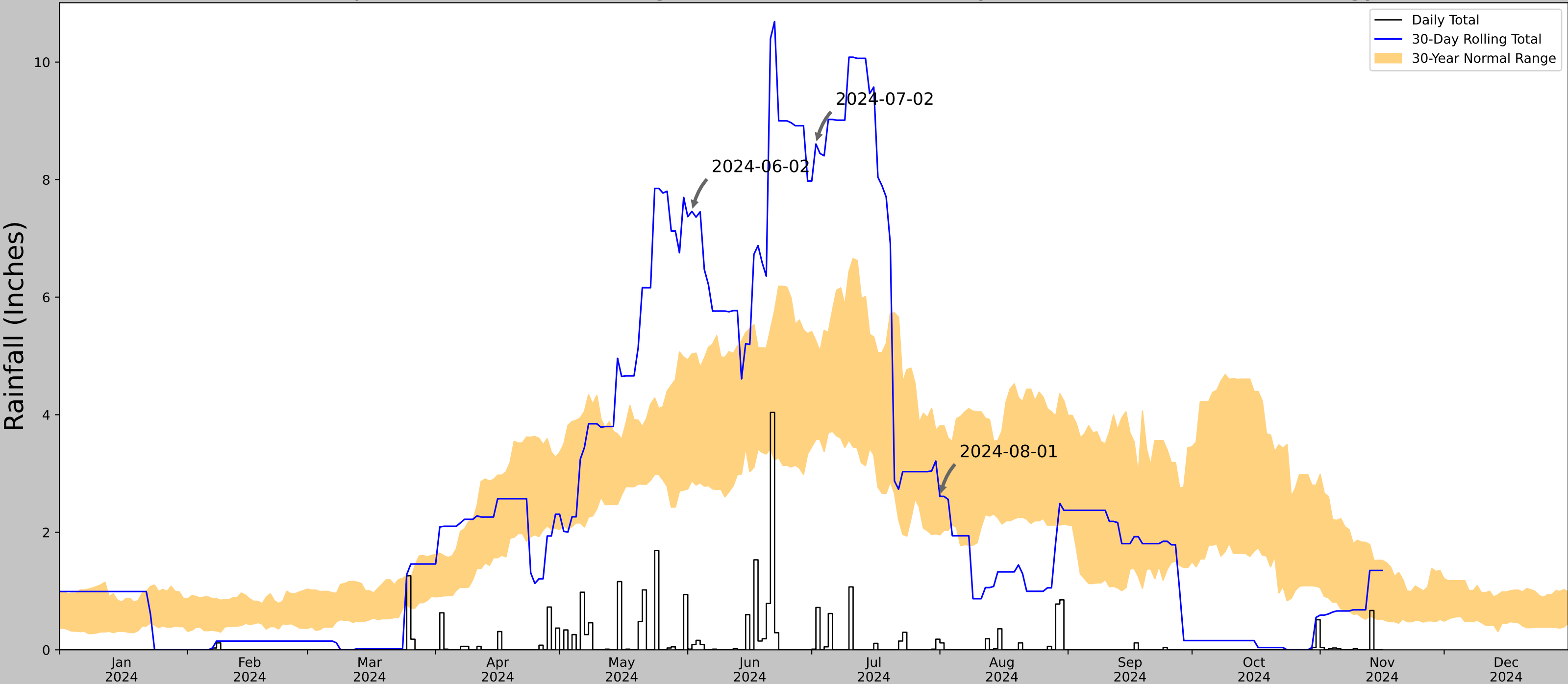
Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center



ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2024-08-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Severe wetness
WebWIMP H ₂ O Balance	Dry Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-08-01	1.957087	3.81063	2.610236	Normal	2	3	6
2024-07-02	3.579134	5.255512	8.606299	Wet	3	2	6
2024-06-02	2.877559	5.033858	7.46063	Wet	3	1	3
Result							Wetter than Normal - 15



**US Army Corps
of Engineers®**

Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

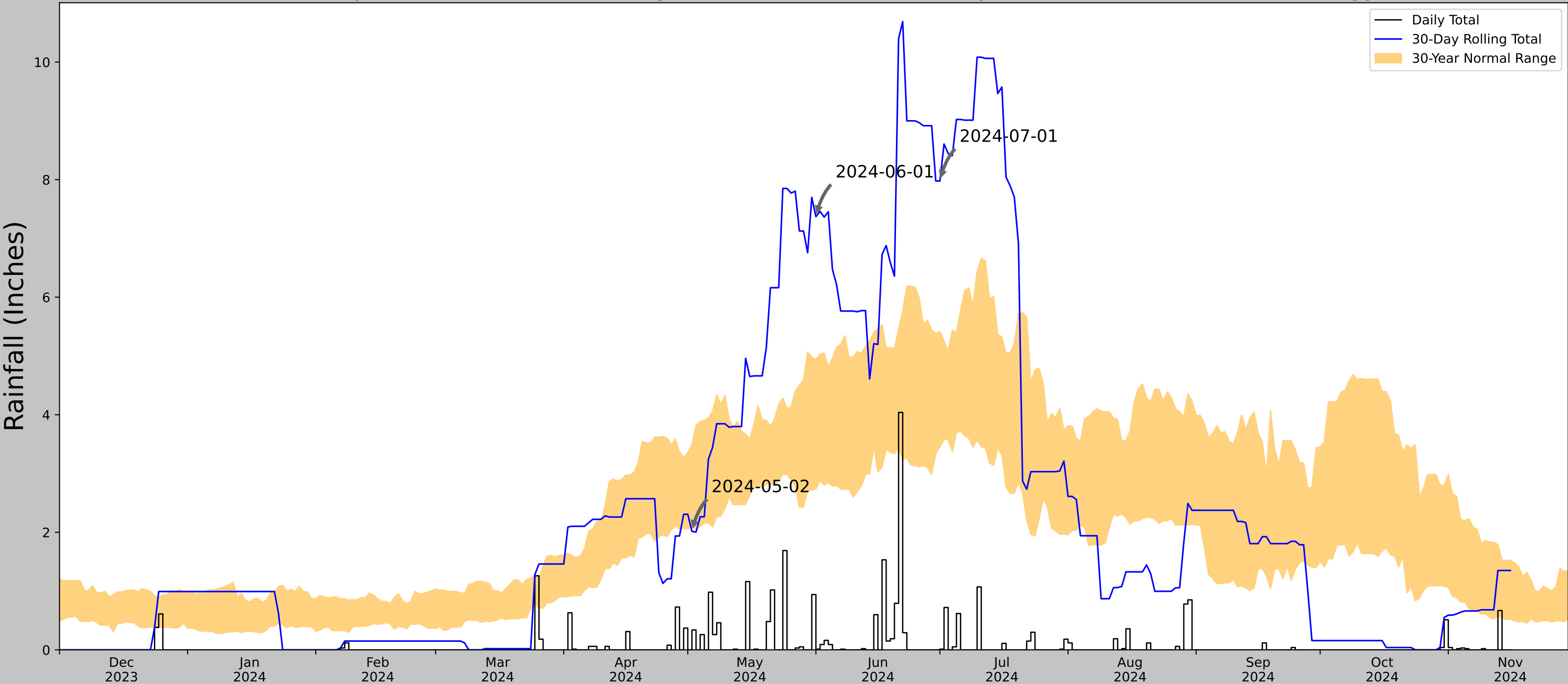
Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center



ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2024-07-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Extreme wetness
WebWIMP H ₂ O Balance	Dry Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-07-01	3.454331	5.412992	7.976378	Wet	3	3	9
2024-06-01	2.737402	4.93504	7.370079	Wet	3	2	6
2024-05-02	2.122835	3.497638	2.015748	Dry	1	1	1
Result							Wetter than Normal - 16



**US Army Corps
of Engineers®**

Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

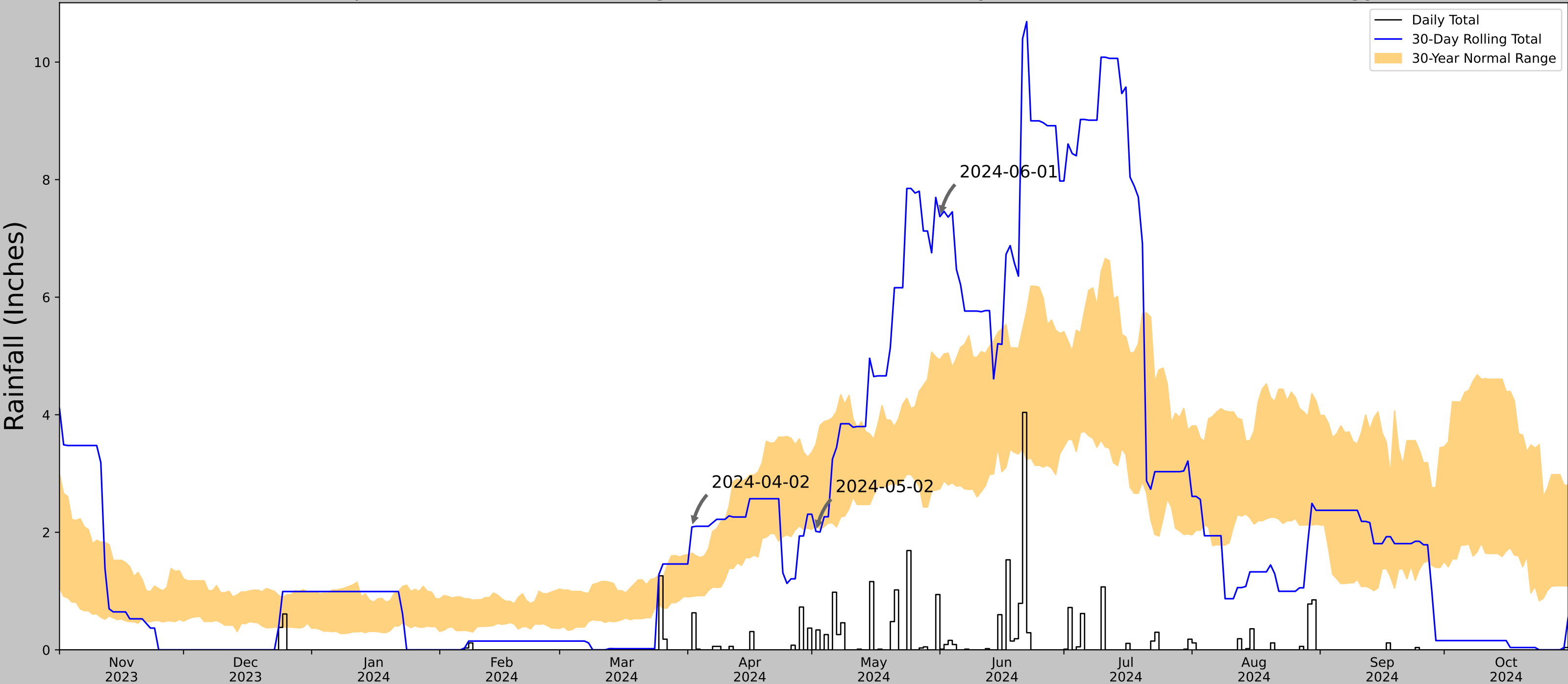
Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center



ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2024-06-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Extreme wetness
WebWIMP H ₂ O Balance	Dry Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-06-01	2.737402	4.93504	7.370079	Wet	3	3	9
2024-05-02	2.122835	3.497638	2.015748	Dry	1	2	2
2024-04-02	0.907087	1.646063	2.090551	Wet	3	1	3
Result							Normal Conditions - 14



**US Army Corps
of Engineers®**

Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

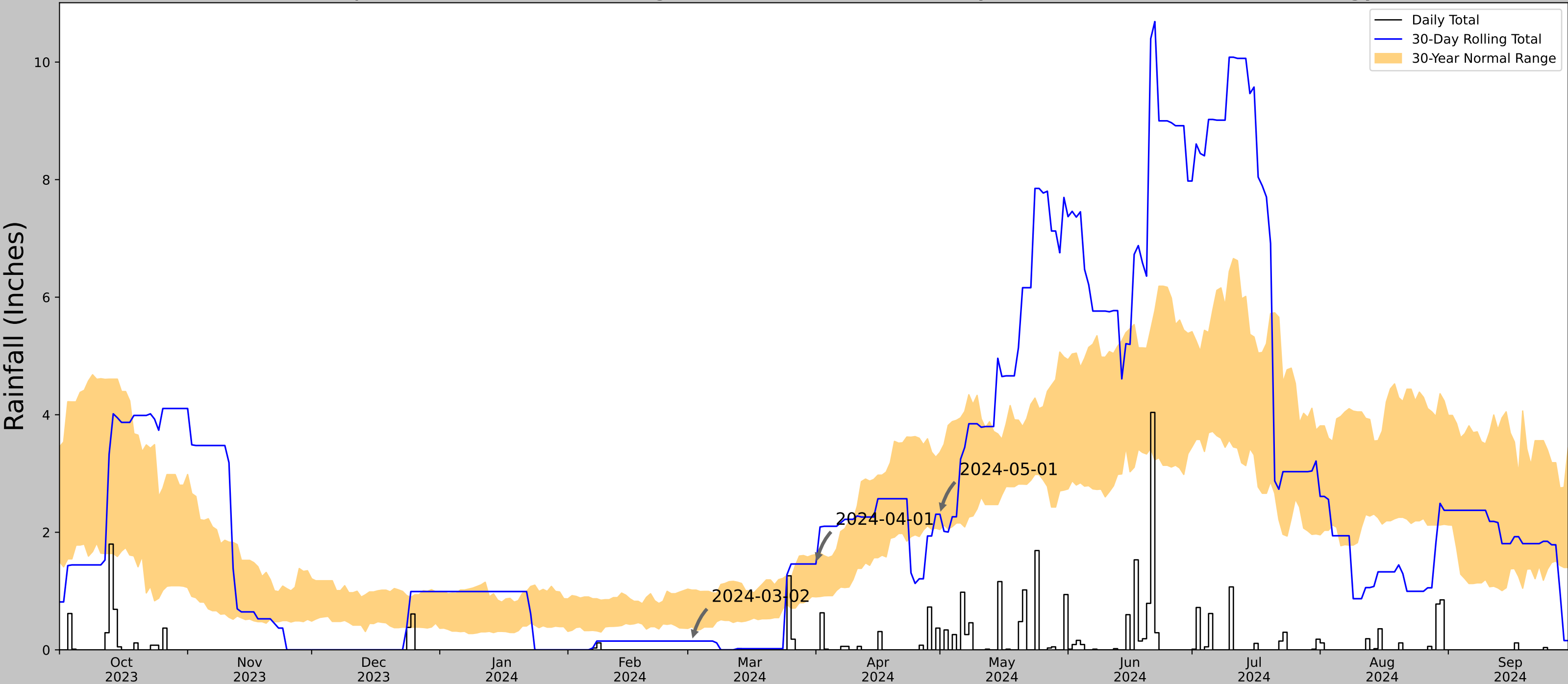
Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center



ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2024-05-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Moderate wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-05-01	2.047638	3.358662	2.307087	Normal	2	3	6
2024-04-01	0.901575	1.62126	1.46063	Normal	2	2	4
2024-03-02	0.393307	1.016929	0.149606	Dry	1	1	1
Result							Normal Conditions - 11



**US Army Corps
of Engineers®**

Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

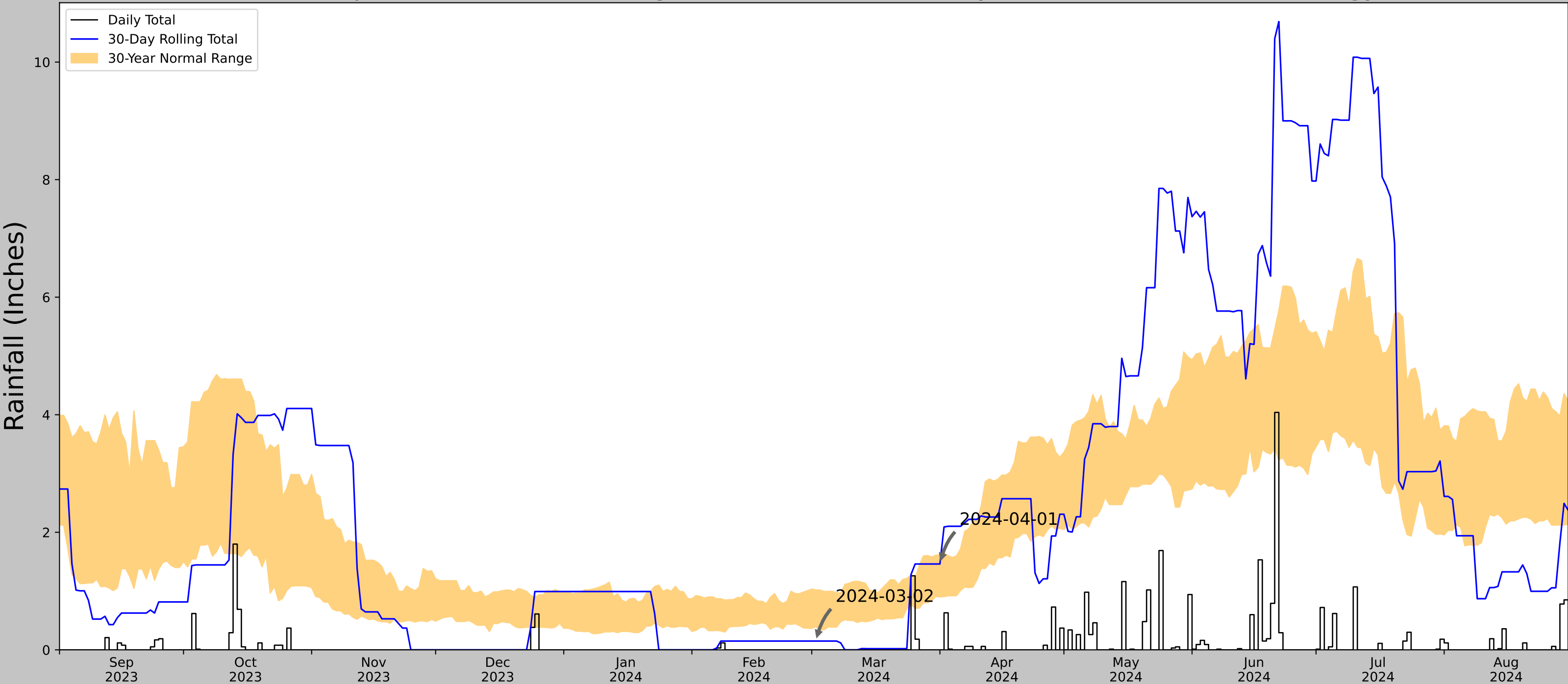
Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center



ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2024-04-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Moderate wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-04-01	0.901575	1.62126	1.46063	Normal	2	3	6
2024-03-02	0.393307	1.016929	0.149606	Dry	1	2	2
2024-02-01	0.31378	0.866929	0.0	Dry	1	1	1
Result							Drier than Normal - 9



**US Army Corps
of Engineers®**

Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

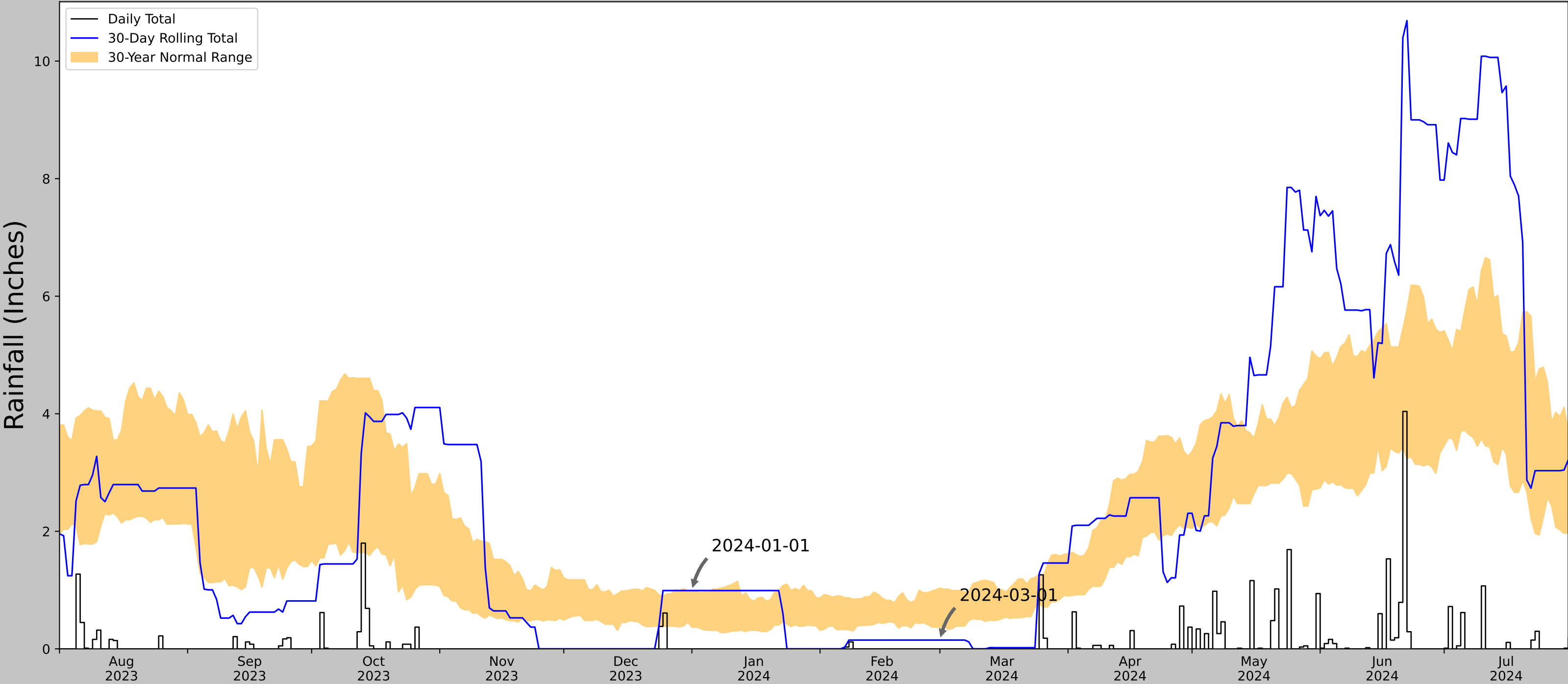
Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center



ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2024-03-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Mild wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-03-01	0.364567	1.032677	0.149606	Dry	1	3	3
2024-01-31	0.394488	0.870472	0.0	Dry	1	2	2
2024-01-01	0.366535	0.99252	0.992126	Normal	2	1	2
Result							Drier than Normal - 7



**US Army Corps
of Engineers®**

Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

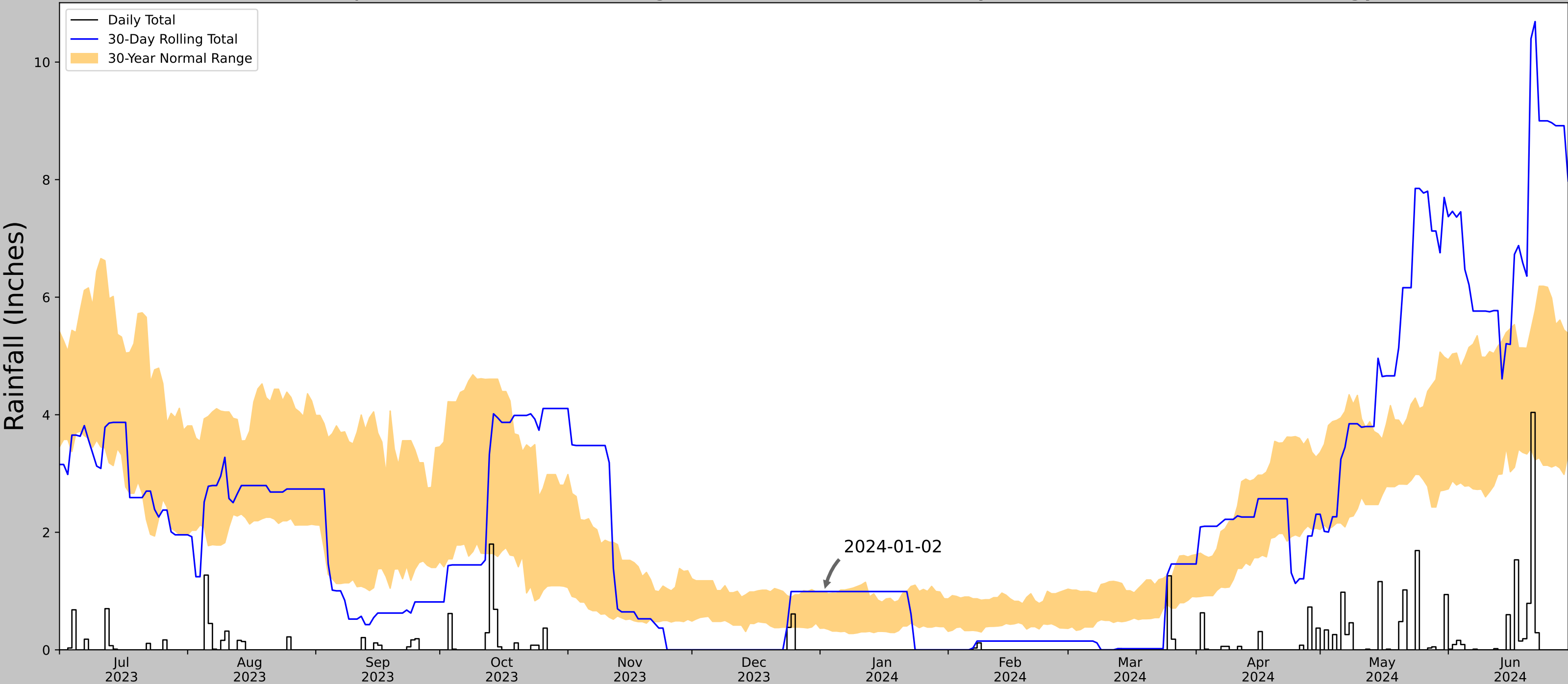
Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center



ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2024-02-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Mild wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-02-01	0.31378	0.866929	0.0	Dry	1	3	3
2024-01-02	0.369685	0.991339	0.992126	Wet	3	2	6
2023-12-03	0.551181	1.175984	0.0	Dry	1	1	1
Result							Normal Conditions - 10



US Army Corps of Engineers®

Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

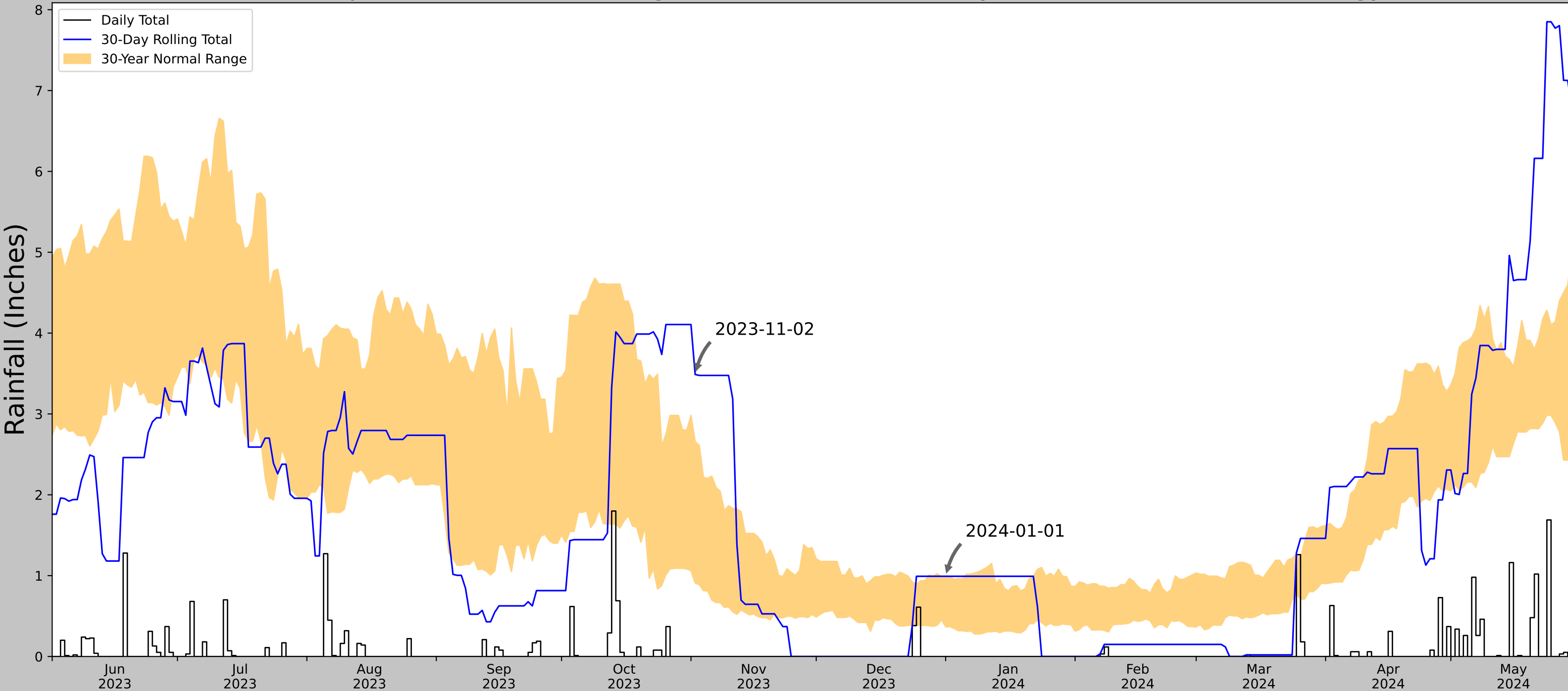
Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center



ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2024-01-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Mild wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-01-01	0.366535	0.99252	0.992126	Normal	2	3	6
2023-12-02	0.523228	1.175984	0.0	Dry	1	2	2
2023-11-02	0.908661	2.659449	3.488189	Wet	3	1	3
Result							Normal Conditions - 11



**US Army Corps
of Engineers®**

Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

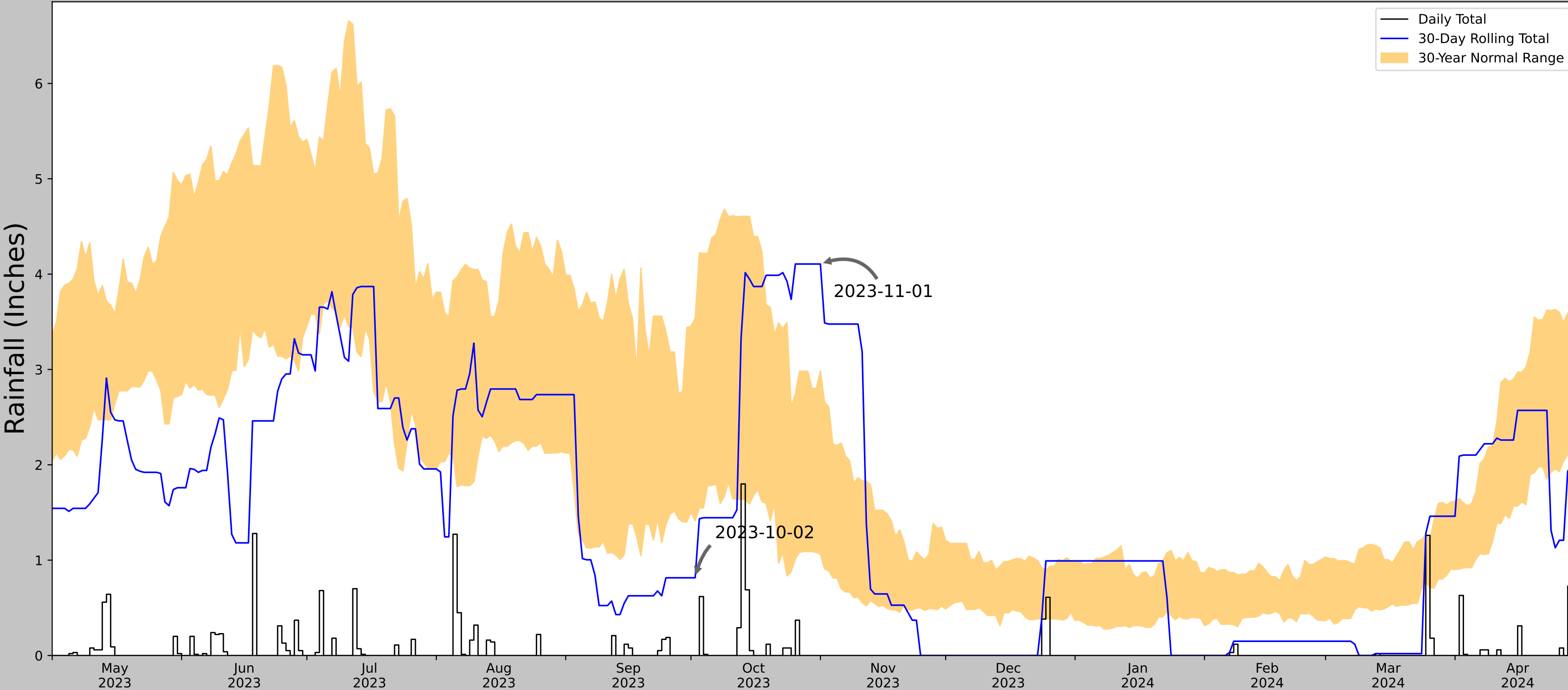
Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center



ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2023-12-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Mild wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-12-01	0.488583	1.209055	0.0	Dry	1	3	3
2023-11-01	1.060236	2.983858	4.106299	Wet	3	2	6
2023-10-02	1.412205	3.536614	0.814961	Dry	1	1	1
Result							Normal Conditions - 10



**US Army Corps
of Engineers®**

Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

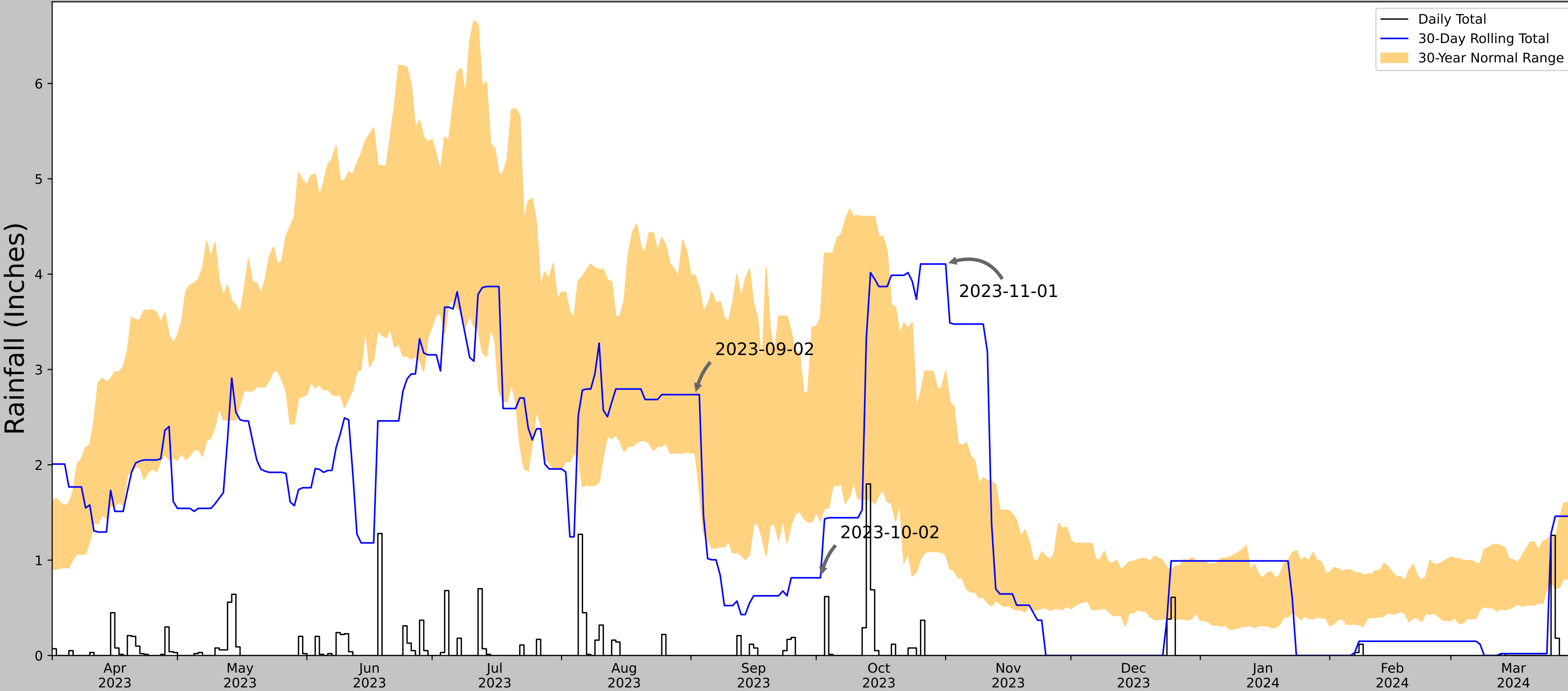
Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center



ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2023-11-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Incipient wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-11-01	1.060236	2.983858	4.106299	Wet	3	3	9
2023-10-02	1.412205	3.536614	0.814961	Dry	1	2	2
2023-09-02	2.12126	3.988583	2.736221	Normal	2	1	2
Result							Normal Conditions - 13



**US Army Corps
of Engineers®**

Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

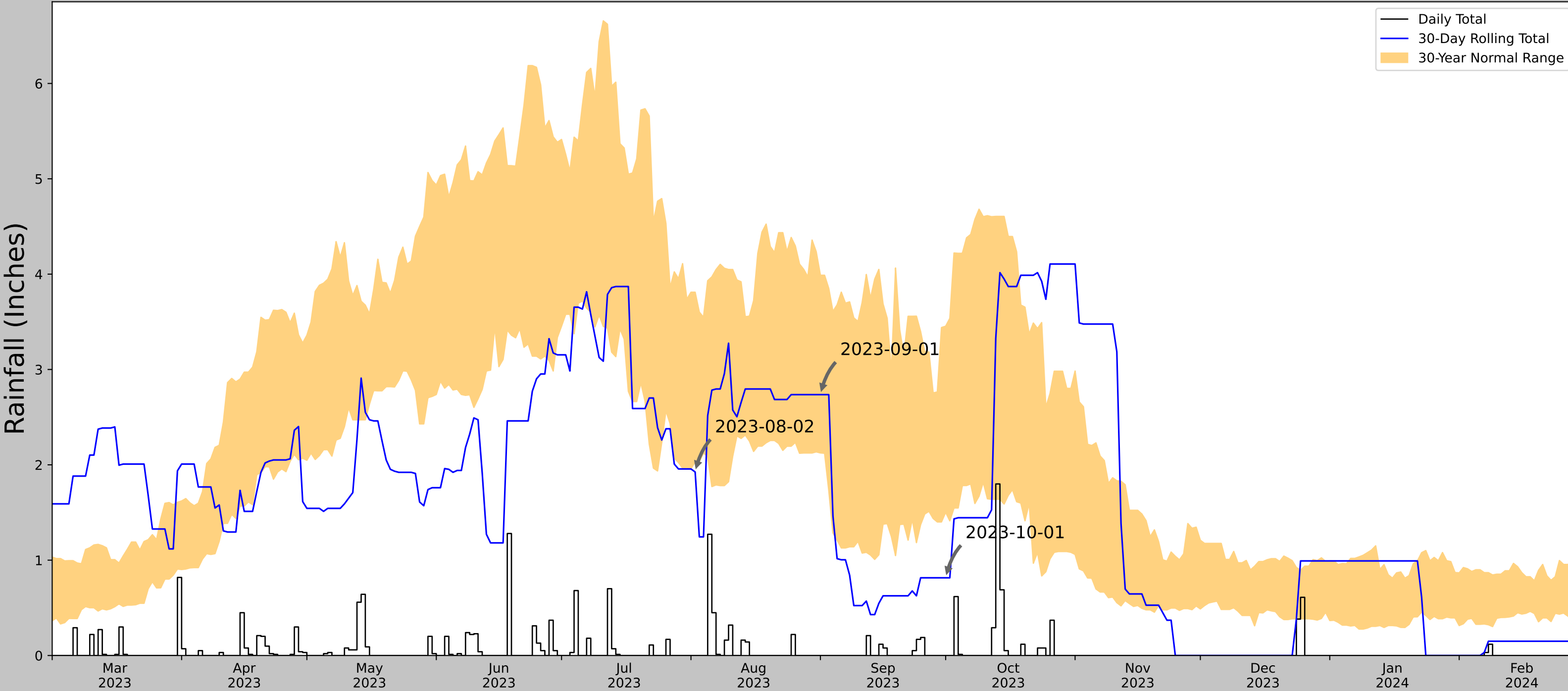
Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center



ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2023-10-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Mild wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-10-01	1.501969	3.453937	0.814961	Dry	1	3	3
2023-09-01	2.124803	3.988583	2.736221	Normal	2	2	4
2023-08-02	2.033465	3.81063	1.925197	Dry	1	1	1
Result							Drier than Normal - 8



**US Army Corps
of Engineers®**

Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center



ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

ATTACHMENT C

SEED MIXES

Array Native Seed Mix Nobles County, Minnesota							
Scientific Name	Common Name	Height in	Bloom Season	Drill Rate (PLS)		Broadcast Rate (PLS)	
				lb/ac	seeds/sq ft	lb/ac	seeds/sq ft
Grasses, Sedges & Rushes							
<i>Bouteloua curtipendula</i>	Sideoats Grama	12–24	A S	3.500	7.7	4.375	9.6
<i>Carex blanda</i>	Eastern Woodland Sedge	6–18	M J	0.350	1.7	0.438	2.2
<i>Carex brevior</i>	Short-Beak Sedge	12–24	J J	1.050	11.2	1.313	14.0
<i>Carex grisea</i>	Inflated Narrow-Leaf Sedge	6–24	M J	1.050	3.5	1.313	4.3
<i>Carex molesta</i>	Troublesome Sedge	12–24	J J	0.190	1.7	0.238	2.2
<i>Dichanthelium oligosanthes</i>	Heller's Rosette Grass	8–24	M J J A S O	0.088	0.3	0.109	0.4
<i>Juncus tenuis</i>	Lesser Poverty Rush	6–18	J J A S	0.175	64.3	0.219	80.3
<i>Muhlenbergia mexicana</i>	Mexican Muhly	12–30	A S	0.175	11.2	0.219	14.1
<i>Sporobolus heterolepis</i>	Prairie Dropseed	12–24	A S O	1.050	5.4	1.313	6.7
Grass, Sedge & Rush Total				7.628	107.1	9.535	133.9
Forbs							
<i>Allium canadense</i>	Meadow Garlic	6–18	M J J	0.500	0.1	0.625	0.1
<i>Anemone canadensis</i>	Round-Leaf Thimbleweed	12–18	M J	0.010	0.0	0.013	0.0
<i>Aquilegia canadensis</i>	Red Columbine	12–24	A M J	0.050	0.7	0.063	0.9
<i>Blephilia hirsuta</i>	Hairy Pagoda-Plant	16–24	J J A S	0.100	7.3	0.125	9.2
<i>Chamaecrista fasciculata</i>	Sleepingplant	6–24	J A S	0.250	0.2	0.313	0.3
<i>Dalea candida</i>	White Prairie-Clover	12–24	J J A S	0.450	3.6	0.563	4.5
<i>Gentiana andrewsii</i>	Closed Bottle Gentian	12–24	A S O	0.010	1.0	0.013	1.3
<i>Heuchera richardsonii</i>	Richardson's Alumroot	18–24	M J J	0.005	0.6	0.006	0.8
<i>Osmorhiza claytonii</i>	Hairy Sweet-Cicely	12–24	M J	0.250	0.2	0.313	0.3
<i>Potentilla arguta</i>	Tall Cinquefoil	12–24	J J A S	0.075	6.3	0.094	7.9
<i>Rosa arkansana</i>	Prairie Rose	6–24	J J A	0.040	0.0	0.050	0.0
<i>Rudbeckia hirta</i>	Black-Eyed-Susan	12–24	J J A S O	0.063	2.1	0.078	2.6
<i>Oligoneuron album</i>	Prairie Goldenrod	12–18	J J A S	0.040	0.6	0.050	0.7
<i>Zizia aurea</i>	Golden Alexanders	12–24	A M J	0.062	0.3	0.077	0.3
Forb Total				1.904	23.3	2.380	29.1
SEED MIX TOTAL				9.532	130.4	11.915	163.0

Potential Substitutions:
<i>Achillea millefolium</i>
<i>Anemone canadensis</i>
<i>Carex cephalophora</i>
<i>Carex molesta</i>
<i>Dalea candida</i>
<i>Gentiana andrewsii</i>
<i>Stylophorum diphyllum</i>

Perimeter Pollinator Native Seed Mix

Nobles County, Minnesota

Scientific Name	Common Name	Height in	Bloom Season	Drill Rate (PLS)		Broadcast Rate (PLS)	
				lb/ac	seeds/sq ft	lb/ac	seeds/sq ft
Grasses, Sedges & Rushes							
<i>Andropogon gerardii</i>	Big Bluestem	24–78	J J A S	1.307	4.8	1.699	6.2
<i>Bromus kalmii</i>	Kalm's Brome	20–36	J A S	0.800	2.4	1.040	3.1
<i>Carex bicknellii</i>	Bicknell's Sedge	18–36	J J	0.048	0.6	0.062	0.8
<i>Carex brevior</i>	Short-Beak Sedge	12–24	J J	0.120	1.3	0.156	1.7
<i>Carex gravida</i>	Heavy Sedge	12–36	M J	0.014	0.1	0.019	0.1
<i>Carex molesta</i>	Troublesome Sedge	12–24	J J	0.087	0.8	0.113	1.0
<i>Carex pellita</i>	Woolly Sedge	6–36	J	0.024	0.2	0.031	0.3
<i>Carex scoparia</i>	Pointed Broom Sedge	12–30	J J	0.052	1.6	0.068	2.1
<i>Carex tribuloides</i>	Blunt Broom Sedge	12–36	J	0.054	2.4	0.070	3.1
<i>Elymus canadensis</i>	Nodding Wild Rye	12–54	J A S O	1.037	2.0	1.348	2.6
<i>Elymus virginicus</i>	Virginia Wild Rye	12–48	J A	1.037	1.3	1.348	1.7
<i>Juncus tenuis</i>	Lesser Poverty Rush	6–18	J J A S	0.040	14.7	0.052	19.1
<i>Muhlenbergia racemosa</i>	Green Muhly	10–42	A S	0.080	2.4	0.104	3.1
<i>Panicum virgatum</i>	Wand Panic Grass	36–66	J A S	0.544	2.8	0.707	3.6
<i>Sorghastrum nutans</i>	Yellow Indian Grass	36–78	A S	1.136	4.6	1.477	6.0
<i>Spartina pectinata</i>	Freshwater Cord Grass	36–84	J A S	0.400	0.9	0.520	1.1
<i>Sphenopholis obtusata</i>	Prairie Wedgescale	0	J J A	0.120	6.3	0.156	8.1
<i>Sporobolus heterolepis</i>	Prairie Dropseed	12–24	A S O	0.400	2.1	0.520	2.7
Grass, Sedge & Rush Total				7.301	51.1	9.491	66.4
Forbs							
<i>Allium canadense</i>	Meadow Garlic	6–18	M J J	0.225	0.0	0.293	0.1
<i>Anemone canadensis</i>	Round-Leaf Thimbleweed	12–18	M J	0.016	0.0	0.020	0.1
<i>Anemone virginiana</i>	Tall Thimbleweed	0	J J A	0.015	0.2	0.020	0.2
<i>Asclepias incarnata</i>	Swamp Milkweed	12–48	J J A	0.068	0.1	0.088	0.2
<i>Asclepias syriaca</i>	Common Milkweed	24–48	J J A	0.061	0.1	0.080	0.1
<i>Baptisia alba</i>	White Wild Indigo	24–36	J J	0.074	0.0	0.097	0.1
<i>Chamaecrista fasciculata</i>	Sleepingplant	6–24	J A S	0.450	0.4	0.585	0.6
<i>Desmodium canadense</i>	Showy Tick-Trefoil	24–66	J A	0.111	0.2	0.145	0.3
<i>Eryngium yuccifolium</i>	Button Eryngo	24–54	J A S	0.098	0.3	0.127	0.4
<i>Eutrochium maculatum</i>	Spotted Trumpetweed	24–96	J A S	0.013	0.4	0.017	0.5
<i>Euthamia graminifolia</i>	Flat-Top Goldentop	12–48	J A S	0.007	0.9	0.009	1.1
<i>Galium boreale</i>	Northern Bedstraw	12–30	J J	0.009	0.2	0.012	0.2
<i>Gentiana andrewsii</i>	Closed Bottle Gentian	12–24	A S O	0.009	0.9	0.012	1.2
<i>Glycyrrhiza lepidota</i>	American Licorice	12–36	J J	0.032	0.0	0.041	0.1
<i>Helenium autumnale</i>	Fall Sneezeweed	24–54	A S O	0.189	9.0	0.246	11.7
<i>Helianthus grosseserratus</i>	Saw-Tooth Sunflower	36–156	A S O	0.011	0.1	0.015	0.1
<i>Heliopsis helianthoides</i>	Smooth Oxeye	24–66	J J A S	0.270	0.6	0.351	0.8
<i>Heuchera richardsonii</i>	Richardson's Alumroot	18–24	M J J	0.001	0.1	0.001	0.2
<i>Liatris pycnostachya</i>	Cat-Tail Gayfeather	24–54	J A S	0.044	0.2	0.058	0.2
<i>Lobelia siphilitica</i>	Great Blue Lobelia	12–42	J A S O	0.025	4.5	0.032	5.9
<i>Monarda fistulosa</i>	Oswego-Tea	24–48	J A S	0.070	1.8	0.091	2.3
<i>Oligoneuron rigidum</i>	Stiff Goldenrod	12–54	A S O	0.090	1.4	0.117	1.8
<i>Pycnanthemum tenuifolium</i>	Narrow-Leaf Mountain-Mint	12–30	J J A S	0.013	1.4	0.017	1.9
<i>Pycnanthemum virginianum</i>	Virginia Mountain-Mint	12–36	J J A S	0.023	1.7	0.029	2.1
<i>Ratibida pinnata</i>	Pinnate Prairie Coneflower	36–78	J A S	0.326	3.6	0.424	4.7
<i>Rudbeckia hirta</i>	Black-Eyed-Susan	12–24	J J A S O	0.056	1.9	0.073	2.5
<i>Rudbeckia subtomentosa</i>	Sweet Coneflower	24–66	A S O	0.114	1.8	0.148	2.3
<i>Rudbeckia triloba</i>	Brown-Eyed-Susan	12–60	A S O	0.072	1.1	0.094	1.4
<i>Silphium integrifolium</i>	Entire-Leaf Rosinweed	36–66	J A S	0.070	0.0	0.091	0.1
<i>Silphium laciniatum</i>	Compassplant	36–96	J J A S	0.203	0.0	0.263	0.1
<i>Symphyotrichum laeve</i>	Smooth Blue American-Aster	12–36	A S O	0.044	0.9	0.058	1.2
<i>Symphyotrichum lanceolatum</i>	White Panicked American-Aster	12–60	S O	0.008	0.5	0.010	0.6
<i>Symphyotrichum novae-angliae</i>	New England American-Aster	36–72	A S O	0.037	1.1	0.048	1.4
<i>Symphyotrichum praealtum</i>	Willow-Leaf American-Aster	24–60	S O	0.002	0.1	0.002	0.1
<i>Teucrium canadense</i>	American Germander	24–42	J A S	0.030	0.1	0.039	0.2
<i>Thalictrum dasycarpum</i>	Purple Meadow-Rue	24–72	J J	0.023	0.1	0.029	0.1
<i>Tradescantia ohiensis</i>	Bluejacket	18–36	M J J	0.016	0.0	0.020	0.1
<i>Verbena hastata</i>	Simpler's-Joy	12–66	J A S	0.113	3.8	0.146	5.0
<i>Vernonia fasciculata</i>	Prairie Ironweed	18–60	J A S	0.051	0.4	0.067	0.5

Scientific Name	Common Name	Height in	Bloom Season	Drill Rate (PLS)		Broadcast Rate (PLS)	
				lb/ac	seeds/sq ft	lb/ac	seeds/sq ft
<i>Veronicastrum virginicum</i>	Culver's Root	36-66	J J A	0.006	1.8	0.008	2.4
<i>Zizia aurea</i>	Golden Alexanders	12-24	A M J	0.111	0.5	0.145	0.6
Forb Total				3.205	42.4	4.167	55.1

SEED MIX TOTAL	10.506	93.5	13.657	121.5
----------------	--------	------	--------	-------

Potential Substitutions:
<i>Agrimonia gryposepala</i>
<i>Allium cernuum</i>
<i>Angelica atropurpurea</i>
<i>Apocynum cannabinum</i>
<i>Baptisia alba</i>
<i>Boltonia asteroides</i>
<i>Carex annectens</i>
<i>Carex bicknellii</i>
<i>Desmanthus illinoensis</i>
<i>Echinacea angustifolia</i>
<i>Gentiana flavida</i>
<i>Helianthus maximiliani</i>
<i>Heuchera richardsonii</i>
<i>Oligoneuron riddellii</i>
<i>Phlox maculata</i>
<i>Phlox pilosa</i>
<i>Rosa arkansana</i>
<i>Silphium perfoliatum</i>
<i>Teucrium canadense</i>
<i>Verbena hastata</i>

Wet Mix							
Summit Solar Project- Nobles County, Minnesota							
Scientific Name	Common Name	Height in	Bloom Season	Drill Rate (PLS)		Broadcast Rate (PLS)	
				lb/ac	seeds/sq ft	lb/ac	seeds/sq ft
Grasses, Sedges & Rushes							
<i>Andropogon gerardii</i>	Big Bluestem	24–78	J J A S	1.389	5.1	1.736	6.4
<i>Bromus ciliatus</i>	Fringed Brome	20–40	J A S	0.170	0.6	0.213	0.8
<i>Bromus kalmii</i>	Kalm's Brome	20–36	J A S	0.170	0.5	0.213	0.6
<i>Calamagrostis canadensis</i>	Bluejoint	24–48	J J A	0.034	3.5	0.043	4.4
<i>Carex bebbii</i>	Bebb's Sedge	8–36	J J	0.043	0.5	0.053	0.7
<i>Carex comosa</i>	Bearded Sedge	24–42	J	0.051	0.7	0.064	0.9
<i>Carex cristatella</i>	Crested Sedge	12–36	J J A	0.040	1.4	0.050	1.8
<i>Carex hystericina</i>	Porcupine Sedge	10–36	J	0.085	0.9	0.106	1.2
<i>Carex molesta</i>	Troublesome Sedge	12–24	J J	0.026	0.2	0.032	0.3
<i>Carex pellita</i>	Woolly Sedge	6–36	J	0.017	0.2	0.021	0.2
<i>Carex scoparia</i>	Pointed Broom Sedge	12–30	J J	0.085	2.6	0.106	3.3
<i>Carex stricta</i>	Uptight Sedge	24–48	J J	0.026	0.5	0.032	0.6
<i>Carex stipata</i>	Stalk-Grain Sedge	12–36	J	0.051	0.6	0.064	0.8
<i>Carex tribuloides</i>	Blunt Broom Sedge	12–36	J	0.057	2.5	0.072	3.2
<i>Carex vulpinoidea</i>	Common Fox Sedge	12–36	J J	0.194	5.7	0.242	7.1
<i>Elymus virginicus</i>	Virginia Wild Rye	12–48	J A	1.102	1.4	1.377	1.8
<i>Glyceria grandis</i>	American Manna Grass	36–54	J J A S	0.116	3.4	0.145	4.3
<i>Glyceria striata</i>	Fowl Manna Grass	12–36	J J A S	0.116	4.3	0.145	5.3
<i>Juncus dudleyi</i>	Dudley's Rush	8–24	J J A S	0.017	20.0	0.021	25.0
<i>Juncus effusus</i>	Lamp Rush	16–36	J A S	0.034	12.5	0.043	15.6
<i>Juncus torreyi</i>	Torrey's Rush	12–30	J A S O	0.017	10.0	0.021	12.5
<i>Leersia oryzoides</i>	Rice Cut Grass	24–54	J J A S O	0.043	0.5	0.053	0.7
<i>Panicum virgatum</i>	Wand Panic Grass	36–66	J A S	0.578	3.0	0.723	3.7
<i>Poa palustris</i>	Fowl Blue Grass	12–42	J J A S	0.170	8.4	0.213	10.5
<i>Scirpus atrovirens</i>	Dark-Green Bulrush	36–60	J J A	0.051	8.6	0.064	10.8
<i>Scirpus cyperinus</i>	Cottongrass Bulrush	36–66	A S O	0.014	8.7	0.017	10.9
<i>Spartina pectinata</i>	Freshwater Cord Grass	36–84	J A S	0.085	0.2	0.106	0.2
Grass, Sedge & Rush Total				3.050	100.4	3.812	125.5
Forbs							
<i>Anemone canadensis</i>	Round-Leaf Thimbleweed	12–18	M J	0.065	0.2	0.081	0.2
<i>Asclepias incarnata</i>	Swamp Milkweed	12–48	J J A	0.184	0.3	0.231	0.4
<i>Astragalus canadensis</i>	Canadian Milk-Vetch	12–40	J J A	0.260	1.4	0.325	1.8
<i>Bidens cernua</i>	Nodding Burr-Marigold	6–42	J J A S	0.025	0.2	0.031	0.3
<i>Cicuta maculata</i>	Spotted Water-Hemlock	36–72	J J A S	0.074	0.2	0.092	0.3
<i>Desmodium canadense</i>	Showy Tick-Trefoil	24–66	J A	0.130	0.3	0.163	0.3
<i>Doellingeria umbellata</i>	Parasol White-Top	24–72	J	0.033	0.7	0.041	0.8
<i>Epilobium coloratum</i>	Purpleleaf Willowherb	12–36	J A S	0.014	1.5	0.017	1.9
<i>Eutrochium maculatum</i>	Spotted Trumpetweed	24–96	J A S	0.037	1.1	0.047	1.4
<i>Eupatorium perfoliatum</i>	Common Boneset	24–48	J A S	0.022	1.3	0.027	1.6
<i>Euthamia graminifolia</i>	Flat-Top Goldentop	12–48	J A S	0.030	3.9	0.038	4.8
<i>Galium boreale</i>	Northern Bedstraw	12–30	J J	0.013	0.3	0.016	0.3
<i>Gentiana andrewsii</i>	Closed Bottle Gentian	12–24	A S O	0.013	1.3	0.016	1.7
<i>Helenium autumnale</i>	Fall Sneezeweed	24–54	A S O	0.065	3.1	0.081	3.9
<i>Helianthus grosseserratus</i>	Saw-Tooth Sunflower	36–156	A S O	0.033	0.2	0.041	0.2
<i>Heliopsis helianthoides</i>	Smooth Oxeye	24–66	J J A S	0.195	0.4	0.244	0.6
<i>Iris virginica</i> var. <i>shrevei</i>	Shreve's Iris	24–36	M J J	0.130	0.0	0.163	0.0
<i>Liatris ligulistylis</i>	Strap-Style Gayfeather	12–48	A S	0.026	0.1	0.033	0.1
<i>Liatris pycnostachya</i>	Cat-Tail Gayfeather	24–54	J A S	0.080	0.3	0.101	0.4
<i>Lobelia siphilitica</i>	Great Blue Lobelia	12–42	J A S O	0.026	4.8	0.033	6.0
<i>Lycopus americanus</i>	Cut-Leaf Water-Horehound	6–24	J A S	0.052	2.5	0.065	3.1
<i>Lysimachia quadriflora</i>	Four-Flower Yellow-Loosestrife	8–36	J A	0.008	0.1	0.010	0.2
<i>Lythrum alatum</i>	Wing-Angle Loosestrife	12–48	J J A S	0.013	14.3	0.016	17.9
<i>Mimulus ringens</i>	Allegheny Monkey-Flower	12–24	J J A S	0.013	11.0	0.016	13.7
<i>Penthorum sedoides</i>	Ditch-Stonecrop	6–24	J J A S	0.013	6.2	0.016	7.8
<i>Physostegia virginiana</i>	Obedient-Plant	12–48	A S	0.026	0.1	0.033	0.2
<i>Polygonum pensylvanicum</i>	Pinkweed	12–48	J J A S O	0.137	0.3	0.171	0.3
<i>Pycnanthemum virginianum</i>	Virginia Mountain-Mint	12–36	J J A S	0.033	2.4	0.041	3.0
<i>Silphium perfoliatum</i>	Cup-Plant	36–84	J A S	0.013	0.0	0.016	0.0
<i>Sium suave</i>	Hemlock Water-Parsnip	24–60	J A S	0.020	0.2	0.024	0.3
<i>Oligoneuron riddellii</i>	Riddell's Goldenrod	12–36	A S O	0.039	1.3	0.049	1.7
<i>Symphotrichum lanceolatum</i>	White Panicked American-Aster	12–60	S O	0.023	1.3	0.028	1.6
<i>Symphotrichum novae-angliae</i>	New England American-Aster	36–72	A S O	0.039	1.1	0.049	1.4
<i>Symphotrichum praealtum</i>	Willow-Leaf American-Aster	24–60	S O	0.007	0.3	0.008	0.4
<i>Thalictrum dasycarpum</i>	Purple Meadow-Rue	24–72	J J	0.065	0.3	0.081	0.3
<i>Verbena hastata</i>	Simpler's-Joy	12–66	J A S	0.076	2.6	0.095	3.3
<i>Veronicastrum virginicum</i>	Culver's Root	36–66	J J A	0.013	3.8	0.016	4.8

Scientific Name	Common Name	Height in	Bloom Season	Drill Rate (PLS)		Broadcast Rate (PLS)	
				lb/ac	seeds/sq ft	lb/ac	seeds/sq ft
<i>Zizia aurea</i>	Golden Alexanders	12–24	A M J	0.065	0.3	0.081	0.3
Forb Total				2.043	69.7	2.554	87.1

SEED MIX TOTAL				5.093	170.1	6.367	212.7
----------------	--	--	--	-------	-------	-------	-------

Potential Substitutions:
Acorus americanus
Alisma subcordatum
Alisma triviale
Ammannia coccinea
Beckmannia syzigachne
Bidens coronata
Bidens frondosa
Bidens polylepis
Boltonia asteroides
Carex annectens
Carex atherodes
Carex diandra
Carex granularis
Carex haydenii
Carex prairea
Carex scoparia
Carex utriculata
Eleocharis acicularis
Eleocharis erythropoda
Eleocharis obtusa
Eleocharis palustris
Epilobium glandulosum
Juncus balticus
Juncus interior
Lycopus asper
Lysimachia hybrida
Persicaria amphibia
Persicaria pensylvanica
Persicaria punctata
Physostegia virginiana
Ranunculus sceleratus
Rumex orbiculatus
Sagittaria latifolia
Scirpus acutus
Scirpus fluviatilis
Scirpus pungens
Scirpus validus
Scolochloa festucacea
Scutellaria lateriflora
Sparganium americanum