

## **Appendix H Cultural Resources**

In accordance with Minnesota Rules, part 7829.0500, and Minnesota Statutes Chapter 13, Lemon Hill Solar has designated portions of Appendix H as **NONPUBLIC DATA–NOT FOR PUBLIC DISCLOSURE** because it contains sensitive cultural resource. The Minnesota State Historic Preservation Office Manual for Archaeological Projects in Minnesota provides for restricted access to sensitive cultural resource information. Given the need to include nonpublic information, Lemon Hill Solar has prepared and is electronically filing both **NONPUBLIC** and public versions of Appendix H.



March 3, 2025

Aaron Armstrong-Duarte  
Principal Investigator  
Merjent, Inc.  
[aaron.armstrong-duarte@merjent.com](mailto:aaron.armstrong-duarte@merjent.com)

RE: Lemon Hill Solar Project  
Olmsted County  
SHPO Number: 2024-1718

Dear Aaron Armstrong-Duarte:

Thank you for continuing consultation on the above referenced project. We understand that this project will require a Minnesota Public Utilities Commission site permit and will partially be located on public land. Therefore, the submitted information has been reviewed pursuant to the responsibilities given the State Historic Preservation Office by the Minnesota Historic Sites Act (M.S. 138.665-666) and the Minnesota Field Archaeology Act (M.S. 138.40)

According to your correspondence, Lemon Hill Solar, LLC is proposing to build a new 180-megawatt utility-scale solar facility on approximately 1900 acres of land in rural Olmsted County, east of the City of Rochester. We have reviewed the submitted report, *Phase I Archaeological Survey Report for the Lemon Hill Solar Project, Olmsted County, Minnesota* (January 2025) as prepared by Merjent, Inc. One archaeological site was identified as a result of the survey, site **21OL0077**. We agree that this site is **not eligible** for listing in the National Register of Historic Places.

Therefore, based on information that is available to us at this time, we have determined that no significant archaeological sites will be affected by this project and that there are **no properties** listed in the National or State Registers of Historic Places, or within the Historic Sites Network, that will be affected by this project.

If you have any questions regarding our review of this project, please contact Kelly Gragg-Johnson, Environmental Review Specialist, 651-201-3285 or [kelly.graggjohnson@state.mn.us](mailto:kelly.graggjohnson@state.mn.us).

Sincerely,

Amy Spong  
Deputy State Historic Preservation Officer



July 19, 2024

Aaron Armstrong-Duarte, Principal Investigator  
Merjent, Inc.  
[Aaron.armstrong-duarte@merjent.com](mailto:Aaron.armstrong-duarte@merjent.com)

RE: Lemon Hill Solar Project  
Olmsted County  
SHPO Number: 2024-1547

Dear Aaron Armstrong-Duarte:

Thank you for the opportunity to comment on the above referenced project. We understand that this project will require a Minnesota Public Utilities Commission site permit and will partially be located on public land. Therefore, the submitted information has been reviewed pursuant to the responsibilities given the State Historic Preservation Office by the Minnesota Historic Sites Act (M.S. 138.665-666) and the Minnesota Field Archaeology Act (M.S. 138.40)

According to your submittal, Lemon Hill Solar, LLC is proposing to build a solar farm that will have a generating capacity of up to 180 megawatts and will comprise 1900 acres in rural Olmsted County, east of the City of Rochester. We have reviewed the following documentation that was included with your submittal:

- Merjent Cover Letter (dated May 28, 2024)
- *Lemon Hill Solar Project Cultural Resource Survey Plan* (May 23, 2024, Merjent)
- *Phase Ia Literature Review for the Lemon Hill Solar Project, Olmsted County, Minnesota* (May 2024, Merjent)

Based on our review of this documentation, we agree that the proposed survey strategy appears to be appropriate for the proposed project.

We look forward to further consultation on this project. If you have any questions regarding our review of this project, please contact me at 651-201-3285 or [kelly.graggjohnson@state.mn.us](mailto:kelly.graggjohnson@state.mn.us).

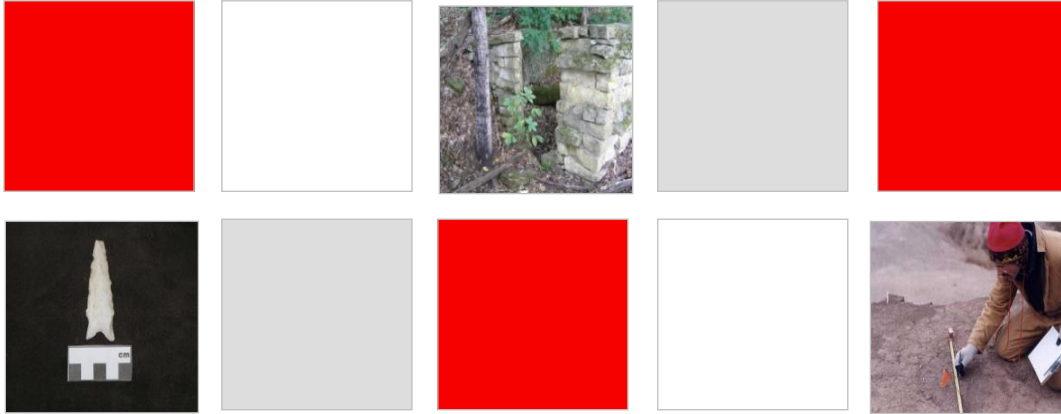
Sincerely,

*Kelly Gragg-Johnson*

Kelly Gragg-Johnson  
Environmental Review Program Specialist

**Appendix H-1**  
**Cultural Resources Literature Review**





## **Lemon Hill Solar, LLC**

### **Phase Ia Literature Review for the Lemon Hill Solar Project Olmsted County, Minnesota**

PREPARED BY

Merjent, Inc.  
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Kevin Mieras

**Aaron Armstrong-Duarte, PhD  
Principal Investigator**

May 2024

## **EXECUTIVE SUMMARY**

Lemon Hill Solar, LLC (Lemon Hill Solar) is proposing to build a solar farm that will have a generating capacity of up to 180 megawatts and will comprise 1,900 acres (see Figure 1). The Lemon Hill Solar Project (Project) is located in rural Olmsted County.

The Project is in the pre-permitting and field reconnaissance phase and will require a Site Permit and Certificate of Need from the Minnesota Public Utilities Commission pursuant to the Minnesota Power Plant Siting Act (Minnesota Statutes Chapter 216E) and Minnesota Administrative Rules Chapter 7850. Lemon Hill Solar intends to conduct Phase I archaeological survey of the Project footprint in the summer of 2024. In February and March 2024, Merjent conducted the literature review of all archaeological survey reports, recorded archaeological sites, and historic architectural sites within a 1-mile buffer of the 1,906-acre Project Area (Study Area) using data provided by the Minnesota State Historic Preservation Office and Office of the State Archaeologist, as well as reviewing nineteenth-century General Land Office maps, historical atlases, and historical aerial photography.

The Phase Ia literature review identified three previously conducted archaeological investigations and 14 historic architectural resources within the Study Area. No archaeological sites have been recorded within the Study Area. Based on the lack of previous survey within the Project Area and the presence of upland soils that may exhibit depth, there is potential to encounter unrecorded, intact archaeological sites. Phase I archaeological survey should comply with the *State Archaeologist's Manual for Archaeological Projects in Minnesota* (Anfinson 2011), the *Historic and Architectural Survey Manual* (Minnesota State Historic Preservation Office 2017), and the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (National Park Service 1983).

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**ACRONYMS AND ABBREVIATIONS**

|             |                                              |
|-------------|----------------------------------------------|
| BCE         | Before the Common Era                        |
| BLM         | Bureau of Land Management                    |
| CE          | Common Era                                   |
| CenterPoint | CenterPoint Energy                           |
| GLO         | General Land Office                          |
| Merjent     | Merjent, Inc.                                |
| MNDNR       | Minnesota Department of Natural Resources    |
| NRCS        | Natural Resources Conservation Service       |
| NRHP        | National Register of Historic Places         |
| OSA         | Office of the State Archaeologist            |
| Project     | Lemon Hill Solar Project                     |
| SHPO        | Minnesota State Historic Preservation Office |
| Study Area  | 1-mile buffer around the Project Area        |

## 1.0 PROJECT DESCRIPTION

Lemon Hill Solar, LLC (Lemon Hill Solar) is proposing to build a solar farm that will have a generating capacity of up to 180 megawatts referred to as the Lemon Hill Solar Project (Project). The Project Area will comprise 1,900 acres, located in rural Olmsted County (see Figure 1). Locational information is provided in Table 1.0-1.

| TABLE 1.0-1                           |          |       |                        |
|---------------------------------------|----------|-------|------------------------|
| Sections Included in the Project Area |          |       |                        |
| County                                | Township | Range | Sections               |
| Olmsted                               | 107N     | 12W   | 7, 17, 18, 19, 20, 29  |
| Olmsted                               | 107N     | 13W   | 11, 12, 13, 14, 23, 24 |

## 1.1 METHODS

The literature search included an analysis of protected datasets on file at the Minnesota State Historic Preservation Office site file information, the State Register of Historic Places, the Minnesota State Historic Site Network, information regarding National Register of Historic Places listed properties, Minnesota's Statewide Historic Inventory Portal (MNSHIP)(SHPO 2024), and National Historic Landmarks from databases maintained by the National Parks Service. Sections included in the Study Area are shown in Table 1.1-1. The Minnesota Office of the State Archaeologist (OSA) maintains a secure online dataset of known and suspected archaeological sites, which is regularly updated and referenced (OSA Portal). Mr. Kevin Mieras, Merjent archaeologist, reviewed the OSA Portal files and archived copies of site forms for all known sites within the Study Area.

| TABLE 1.1-1                         |          |       |                          |
|-------------------------------------|----------|-------|--------------------------|
| Sections Included in the Study Area |          |       |                          |
| County                              | Township | Range | Sections                 |
| Olmsted                             | 107N     | 12W   | 6-9, 16-21, 28-33        |
| Olmsted                             | 107N     | 13W   | 1-3, 10-12, 13-15, 22-27 |

Merjent also reviewed nineteenth-century General Land Office (GLO) maps and notes on file with the Bureau of Land Management (BLM 2024), historical atlases, and aerial photographs from 1940 to present (NETRonline 2024; OSA 2024).

Since geographic information system shapefiles of archaeological survey locations and archaeological site boundaries are not available from SHPO or OSA, Merjent digitized previous site locations based on digital files provided by SHPO and available on the OSA Portal. Given this review is related to precontact burial sites, historic architectural structures are not included in this document. The results of the literature review are presented in Section 3.0. Finally, Mr. Mieras reviewed background materials on file at Merjent and publicly available data sources available online for information about Hennepin County and the ecological setting of the Study Area.

## 2.0 ENVIRONMENTAL AND CULTURAL BACKGROUND

According to the Minnesota Department of Natural Resources' (MNDNR) Ecological Classification System, the Project is in the Rochester Plateau Subsection of the Paleozoic Plateau Section of

the Eastern Broadleaf Forest Province (MNDNR 2024a). This is bound to the north by at the northern extent of loess deposits and to the east by a transition from dissected landscapes and level to rolling plateau. The subsection comprises a series of Des Moines lobe end moraines (MNDNR 2024a).

## **2.1 TOPOGRAPHY**

Topography within the Rochester Plateau Subsection is level to gently rolling, which is controlled by the underlying glacial till in the east and bedrock controlled as loess deposits thin to the west. Karst topography and sinkholes are common in the southeast portion of the subsection (MNDNR 2024a). The Project is situated on a gently rolling upland landform that serves as the boundary between the Silver Creek and Whitewater River watersheds (see Figure 1 in Appendix A). The most dramatic topography within the Project Area is created by several unnamed intermittent drainages that lead to Silver Creek and the North Fork Whitewater River.

## **2.2 HYDROLOGY**

According to the MNDNR Watershed Index, the Project is within the Mississippi River – Winona and Zumbro surface watersheds (MNDNR 2024b). These watersheds flow roughly east into the Mississippi River. The drainage system is well developed and there are very few lakes in this region (MNDNR 2024a). The Project Area specifically is drained to the west by Silver Creek and to the north by the North Fork Whitewater River.

## **2.3 GEOLOGY**

Bedrock within the Rochester Plateau Subsection is Ordovician dolomite, limestone, and sandstone in steep ravines with Cambrian sandstone shale, and dolomite exposures in the Mississippi River Valley. Local exposures of Denovian dolomite and limestone are evident in the western edge of the subsection (MNDNR 2024a; Morey and Walton 1976). Bedrock depth varies from 100 to 200 feet in the west and 10 to 100 feet in the east (MNDNR 2024a; Olsen and Mossler 1982).

The parent material of the Project Area was deposited during the retreat of the last glacial maximum (Late Wisconsinan). This material can be characterized as sandy outwash sediments that formed in loamy alluvium and in the underlying sandy and gravelly outwash (Natural Resources Conservation Service [NRCS] 2024).

## **2.4 SOILS**

According to NRCS soils data, there are 41 different soil units anticipated within the Project Area (NRCS 2024a; see Table 2.4-1). Water comprises less than 0.1 percent (0.7 acre) of the Project Area. Alfisols (1,166 acres), Mollisols (646.9 acres), and Inceptisols (19.6 acres) exhibit depth and are well drained, which suggests potential for buried, intact archaeological deposits (Fanning and Fanning 1989; Jenny 1941). The remaining 774.1 acres of the Project Area comprises Entisols (71.5 acres) and Histosols (2.6 acres). Entisols show little to no pedogenic development and Histosols are typically saturated (NRCS 2024b), suggesting low potential for archaeological deposits. Although there is potential to encounter archaeological deposits within the Project Area, Holliday (2004) states that soil series mapped by the NRCS potentially provide clues but should be recognized as having considerable limitations in archaeological applications. Descriptions of the soil types expected to be encountered within the Project Area are provided below.

Phase Ia Literature Review for the Lemon Hill Solar Project  
Olmsted County, Minnesota

| TABLE 2.4-1                            |             |                                                                                                               |                       |                            |
|----------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------|
| Soil Types Present in the Project Area |             |                                                                                                               |                       |                            |
| Soil Type                              | Soil Order  | Landform                                                                                                      | Acres in Project Area | Percentage of Project Area |
| Mt. Carroll silt loam                  | Alfisols    | Ridgetops, side slopes, and stream benches                                                                    | 551.8                 | 28.90%                     |
| Waubeeek silt loam                     | Alfisols    | Summits and side slopes                                                                                       | 241.1                 | 12.6%                      |
| Port Byron Silt Loam                   | Mollisols   | High terraces                                                                                                 | 110.0                 | 5.8%                       |
| Otter silt loam                        | Mollisols   | Flood plains                                                                                                  | 74.8                  | 3.9%                       |
| Kasson Silt Loam                       | Alfisols    | Interfluves and side slopes                                                                                   | 72.4                  | 3.8%                       |
| Oronoco loam                           | Mollisols   | Summits of rolling or hilly uplands                                                                           | 71.3                  | 3.7%                       |
| Vasa silt loam                         | Alfisols    | Interfluves on dissected till plains                                                                          | 64.8                  | 3.4%                       |
| Chaseburg Silt Loam                    | Entisols    | Flood plains, hills, and alluvial fans                                                                        | 59.4                  | 3.1%                       |
| Floyd silt loam                        | Mollisols   | Foot slopes and upland drainageways                                                                           | 56.6                  | 3.0%                       |
| Garwin Silty Clay Loam                 | Mollisols   | Drainageways, till plains, and stream terraces                                                                | 49.8                  | 2.6%                       |
| Frankville silt loam                   | Alfisols    | Crests of interfluves, side slopes, and high structural benches                                               | 48.9                  | 2.6%                       |
| Joy Silt Loam                          | Mollisols   | Ridges and terraces                                                                                           | 47.4                  | 2.5%                       |
| Clyde silty clay loam                  | Mollisols   | Swales, interfluves, and till plains                                                                          | 42.9                  | 2.2%                       |
| Elbaville silt loam                    | Alfisols    | Upper back slopes, shoulders, and foot slopes in dissected uplands                                            | 41.9                  | 2.0%                       |
| Dorerton loam                          | Alfisols    | Shoulders and side slopes of dissected uplands                                                                | 39.2                  | 2.0%                       |
| Atkinson loam                          | Mollisols   | Ridges of narrow interfluves, crests and side slopes on uplands, high structural benches, and strath terraces | 29.4                  | 1.6%                       |
| Skyberg silt loam                      | Alfisols    | Dissected till plains                                                                                         | 28.9                  | 1.5%                       |
| Littleton silt loam                    | Mollisols   | Alluvial fans, toe slopes of uplands, and stream terraces                                                     | 28.6                  | 1.5%                       |
| Racine Loam                            | Alfisols    | Interfluves and side slopes on dissected till plains on the Iowan Erosion Surface                             | 26.9                  | 1.4%                       |
| Marlean silty clay loam                | Mollisols   | Ridges, interfluves, and side slopes on dissected uplands                                                     | 24.1                  | 1.3%                       |
| Racine Silt Loam                       | Alfisols    | Interfluves and side slopes on dissected till plains on the Iowan Erosion Surface                             | 20.6                  | 1.1%                       |
| Timula silt loam                       | Inceptisols | Hill slopes                                                                                                   | 19.6                  | 1.0%                       |
| Kenyon loam                            | Mollisols   | Interfluves and dissected till plains                                                                         | 19.3                  | 1.0%                       |
| Lindstrom silt loam                    | Mollisols   | Toe and foot slopes of steel hills, ridges, or valley walls                                                   | 18.6                  | 0.9%                       |
| Waucoma loam                           | Alfisols    | Summits and backslopes                                                                                        | 17.8                  | 0.9%                       |
| Kato silty clay loam, depressiona      | Mollisols   | Outwash plains, valley trains, and flood plains                                                               | 17.2                  | 0.9%                       |
| Ostrander Silt Loam                    | Mollisols   | Summits, side slopes, or shoulder slopes on dissected till plains                                             | 15.6                  | 0.8%                       |
| Brodale channery loam                  | Mollisols   | Valley sides and dissected uplands                                                                            | 13.1                  | 0.7%                       |
| Arenzville Silt Loam                   | Entisols    | Floodplains and upland drainageways                                                                           | 9.6                   | 0.5%                       |
| Channahon loam                         | Mollisols   | Level-bedded terraces                                                                                         | 6.7                   | 0.3%                       |
| Schullsburg Silt Loam                  | Mollisols   | Upland slopes                                                                                                 | 5.9                   | 0.3%                       |
| Nasset silt loam                       | Alfisols    | Interfluves, benches, and dissected uplands                                                                   | 5.1                   | 0.3%                       |
| Schapville Silty Clay Loam             | Mollisols   | Ridgetops, high structural benches, and saddles between hills on bedrock-controlled uplands                   | 4.5                   | 0.3%                       |
| Maxfield silt loam                     | Mollisols   | Interfluves and head slopes of broad, shallow drainageways on dissected till plains                           | 4.5                   | 0.2%                       |
| Rockton loam                           | Mollisols   | Uplands, high structural benches, strath terraces, and lake plains                                            | 3.7                   | 0.2%                       |

TABLE 2.4-1

**Soil Types Present in the Project Area**

| Soil Type                     | Soil Order | Landform                                                                        | Acres in Project Area | Percentage of Project Area |
|-------------------------------|------------|---------------------------------------------------------------------------------|-----------------------|----------------------------|
| Dorerton-Rock outcrop complex | Alfisols   | Shoulders and side slopes of dissected uplands                                  | 2.9                   | 0.1%                       |
| Palms muck                    | Histosols  | Closed depressions                                                              | 2.6                   | 0.1%                       |
| Root silt loam                | Entisols   | Flood plains                                                                    | 2.5                   | 0.1%                       |
| Brodale-Sogn complex          | Mollisols  | Valley sides, hillslopes, and dissected uplands                                 | 2.4                   | 0.1%                       |
| Massbach Silt Loam            | Alfisols   | Shale ridges and side slopes on uplands                                         | 1.9                   | 0.1%                       |
| Dowagiac sandy loam           | Alfisols   | Outwash plains, terraces, and valley trains                                     | 1.3                   | 0.1%                       |
| Water                         | N/A        | N/A                                                                             | 0.7                   | <0.1%                      |
| Frontenac loam                | Mollisols  | Slopes in dissected terrain                                                     | 0.5                   | <0.1%                      |
| Lilah Sandy Loam              | Alfisols   | outwash areas on dissected till plains and treads and risers on stream terraces | 0.3                   | <0.1%                      |

## 2.5 FLORA AND FAUNA

The most common types of pre-Euro-American settlement vegetation within the Rochester Plateau were tallgrass prairie and bur oak savanna. Few remnants of this vegetation remain with the majority of the subsection dedicated to farming (MNDNR 2024).

The pre-Euro-American settlement fauna were dominated by bison and occasional elk. White-tailed deer and small animals were abundant along river valleys. Wetlands and lakes within the outer coteau contain various species of waterfowl, aquatic mammals, and fish (MNDNR 2024; Gibbon et al. 2002).

## 2.6 CULTURAL AND HISTORICAL OVERVIEW

Culturally, the Project is within the Minnesota Archaeological subregion 3w (Southeast Riverine West). This subregion covers a portion of central Minnesota in all or part of Dakota, Dodge, Fillmore, Goodhue, Houston, Mower, Olmsted, Rice, Wabasha, Winona, Counties (Gibbon et al. 2002).

### 2.6.1 Precontact Period (10,900 BCE–1,650 CE)

The first inhabitants of Minnesota are known as Paleoindians (10,900 to 7,500 years Before the Common Era [BCE]). These people were highly nomadic hunter-gatherers, moving in small bands in search of food and other subsistence resources; however, in the Late Glacial and Early Holocene forests of Minnesota, Paleoindians likely relied more on gathering and the hunting of a variety of smaller animals. Paleoindian sites are small, relatively ephemeral, and commonly identified with the recovery of distinctive spear points that occur across much of North America (Gibbon et al. 2002).

The Paleoindian peoples were followed by Archaic Tradition hunter-gatherers. At the end of the Ice Age, around 10,000 years BCE, the climate became warmer and drier, which led to major changes in plant and animal communities. Spruce forests followed the retreating glacial ice northward and were replaced by a new landscape comprised of extensive lakes and rivers. Many large-game species became extinct. Archaic Tradition hunters-gatherers (7,500 to 500 BCE)



adapted to this new environment, shifting their focus to smaller game such as deer and elk, the abundant fish and shellfish in the numerous lakes and rivers, and wild plants such as nuts and berries (Gibbon et al. 2002).

The Archaic peoples appear to have been less nomadic than the Paleoindians and lived in smaller household groups. Archaic sites are identified by large notched and stemmed projectile points. Immense sedimentation during the early part of the Archaic, corresponding with the Early and Middle Holocene periods, resulted in many Archaic Tradition sites being deeply buried under river valley deposits; therefore, these sites are not usually evident in surficial contexts (Gibbon et al. 2002).

The Woodland Tradition followed the Archaic Tradition. In Minnesota, the Woodland culture is separated into two periods: the earlier Initial Woodland period (ca. 500 BCE to 500 years into the Common Era [CE]), and the later Terminal Woodland period (500 to 1650 CE) (Gibbon et al. 2002).

The frequent surficial expression of Woodland site locations, coupled with burial mounds that frequently mark their place, has resulted in more frequent documentation and excavation of Woodland sites. Due to this higher frequency of identification, many Woodland sites have also been grouped into specific regional archaeological cultures (Gibbon et al. 2002; Gibbon 2012).

The Initial Woodland period is primarily marked by the emergence of precontact ceramic traditions and burial mounds. Regional archaeological cultures of the Initial Woodland period include Howard Lake, Malmo, Elk Lake, and Laurel (Gibbon et al. 2002; Gibbon 2012).

The Terminal Woodland period has been defined throughout eastern and central Minnesota, the Red River Valley, and portions of the Dakotas (Gibbon 2012). During this period, populations began to increase, which in turn led to an increase in size and number of precontact sites. Burial mounds became more prevalent and the cultural material artifacts began shifting to smaller, unnotched triangular projectile points and thinner ceramic vessels that were more globular in shape. Agriculture and wild rice harvests also increased (Gibbon et al. 2002; Gibbon 2012).

In the northern portion of the state, ceramic types and burial practices indicate specific regional archaeological cultures, including Kathio, Blackduck, and Psinomani. In the southern portion of the state, primarily comprised of deciduous forests and prairie, some cultures adopted the cultivation of maize and the construction of effigy burial mounds (Gibbon et al. 2002; Gibbon 2012). By the end of the Initial Woodland, maize horticulture had spread to the northern portion of the state (Boyd and Surette 2010).

Around approximately 1000 CE, Mississippian populations from Cahokia, near St. Louis, Missouri, began to extend their influence northward into the Upper Mississippi River Valley and evidence suggests that there were attempts at colonization. Archaeologists tend to regard some southern Minnesota Terminal Woodland cultures as the northern expression of a "Mississippian" lifeway, distinguished by distinctive ceramic styles, larger and more diverse artifact assemblages, and evidence of maize production. In southern Minnesota, three Mississippian complexes have been identified: Silvernale, Oneota, and Plains Village (Gibbon et al. 2002). It was the Mississippian peoples in the south, and the Terminal Woodland peoples in the north, who had contact with the first Europeans to explore Minnesota in the mid-seventeenth century (Gibbon et al. 2002; Gibbon 2012).

## **2.6.2 Contact Period (1650–1837 CE)**

The Contact Period includes American Indian and Euro-American contexts. The OSA subdivides the American Indian context into “Indeterminate” or “Eastern Dakota,” and the Euro-American context into “Indeterminate,” “French,” “British,” and “Initial US” (Gibbon 2012). This section focusses on developing a cultural context and temporal framework for sites relevant to the Project.

Because the Project occurs on traditional Dakota lands, a brief description of the Dakota is warranted. DeMallie (2001) states that Dakota and Lakota (also known as Sioux) tribes share common language, history, social organization, and culture. They were first mentioned in 1640 (Thwaites 1898:18:231) and at that time occupied the area between Mille Lacs and the Missouri River and south into central Iowa. Three divisions were distinguished by the early nineteenth century, the Santee, Yankton and Yanktonai (Dakota), and Teton (Lakota), which mirrored geographical, linguistic, and cultural distinctions. Following government administrators, anthropologists grouped all three divisions under the designation “Dakota” (e.g., Dorsey 1897; Deloria 1944; Holder 1970). Researchers tend to minimize the use of the term “Sioux” for two reasons: 1) it had a foreign origin in an Ojibwa ethnonym, and 2) it was said to mean “snake” and therefore has pejorative connotations (DeMallie 2001).

Oral histories and various linguistic reconstructions are similar regarding the origins of the Tribe. Linguistic studies place the Proto-Dakota west of Lake Michigan in southern Wisconsin, southeastern Minnesota, northwestern Iowa, and northern Illinois (Munson 1975). Dakota traditions recorded by Nicollet in 1839 indicate an origin near the northern lakes east of the Mississippi prior to moving westward—initially by the Teton, then the Yankton and Yanktonai, and lastly the Santee (DeMallie 1976). A tradition of the Mdewakanton group of Santee states that their ancestors left the lakes around the headwaters of the upper Mississippi and moved to the region of the Minnesota River because bison were more plentiful (Commissioner of Indian Affairs 1849:1006). Oral traditions also state that the Assiniboiné split off from a band of Yanktonai (Riggs 1893).

Conventional archaeological methods are unable to answer questions regarding Dakota origins at this time. Generally, sites identified with the precontact Dakota on the northeastern fringe of the plains are lumped into the Woodland Tradition in Minnesota as are early contact sites (Eggan 1952; Winchell 1911).

In the heavily forested regions within Dakota territory, deer were the principal game; however, the plains Dakota made their livelihood hunting bison (DeMallie 2001). In the mid-seventeenth century, the eastern Dakota groups hunted bison in the grassland-forest savannah east of the Mississippi River. War with other groups, notably the Illinois, Fox, and other Central Algonquian tribes, all of whom had access to guns and who hunted bison, likely caused the Dakota to hunt west of the Mississippi River. Also, by the mid-seventeenth century, the Ojibwe began to move west from Sault Sainte Marie to regions they inhabited at the time of Euro-American contact. Initially the Dakota and Ojibwe warred, but eventually came to peaceful terms (for the most part) and the Dakota allowed the Ojibwe to hunt in their territory and act as middlemen in trade with the French (DeMallie 2001).

By the early eighteenth century, traders had built several posts and forts within Dakota territory, including one at Duluth and Fort l’Huillier on the Blue Earth River, a tributary of the Minnesota River (DeMallie 2001). The fort on the Blue Earth River was seen as an unwelcome incursion into the territory of the Eastern Dakota and they retaliated by robbing two French traders and fired on the post. The western Dakota groups denied any responsibility, which demonstrates the

autonomy between villages. Fort l'Huillier was abandoned in 1702, and the Dakota lacked direct contact with the French for the next 20 years (DeMallie, 2001).

During this time, the Dakota depended on Fox and Ojibwe as intermediaries for trade. First in 1714 and again in 1721, the Fox made peace with the Dakota, not only for trade purposes, but also as an alliance against the Ojibwe who were expanding southwest from Lake Superior (Edmunds and Peyser 1993). The French negotiated a peace between the Ojibwe and Dakota with the result of undermining the alliance between the Dakota and Fox, although with the unintended result of also undermining the peace with the Ojibwe due to the opening of direct trade (Hickerson 1962).

In the 1730s, Pierra Gaultier de Varennes sieur de la Verendrye financed his search for the western sea by trading with the Native Americans and built posts west and north of Lake Superior. La Verendrye allied himself with the Ojibwe and Cree and, in 1734, his eldest son accompanied a Cree war party against the Dakota (DeMallie 2001). This action precipitated hostilities by the Dakota against the French. By 1736, several Frenchmen, including le Verendrye's youngest son, a Jesuit missionary, and 20 voyageurs were killed, scalped, and decapitated, with their heads placed on beaver skins (Thwaites 1906).

Also, by 1736, most of the Dakota lived west of the Mississippi River. That year the number of Dakota living east of the Mississippi was 300 compared with 2,000 Dakota on the prairies (Thwaites 1906). Although warfare with the Ojibwe had forced the Dakota to abandon their villages around Leech Lake and Mille Lacs, this did not result in an end in hostilities. While Ojibwe traditions recount many victories against the Dakota, most of the Dakota had already located to the Mississippi and Minnesota River valleys due to the availability of bison and the advantages of trade with the French (DeMallie 2001). A 1697 map, with additions in 1699 and 1702, depicts 22 Dakota villages in the upper Mississippi River region (DeMallie 2001).

The Dakota of the east lived in small, scattered villages, each of which was composed of five or six families (Radisson 1961). In addition to these small villages, there were larger ones that they returned to annually, which housed up to 7,000 people (Radisson 1961). Radisson (1961) describes some of the lodges as being covered with mats and some with skins and says lodges were rounded and constructed with long poles. Other accounts indicate that the Dakota of the west lived in tipis that they carried with them whenever they relocated (Neill 1890). There is no mention of Dakota utilization of dogs or horses during this period.

When the Dakota returned to their villages in the spring, they used cache pits to contain surplus wild rice. Radisson (1961) writes that they sowed corn, but that the harvest was small. The wild rice afforded them nourishment throughout the year. Conversely, the Jesuit Relations mention in 1642 that the Dakota harvested corn, but in 1670–1672 it was stated that they did not till land (Thwaites 1898:23:225, 1899:55:169). During the summer, the Dakota gathered for communal bison hunts, which were extremely important since these hunts provided surplus meat to be dried for winter use and hides (De Mallie 2001). Hennepin (1903) reported that sometimes 100 to 120 bison were killed in a single hunt. Because a single hunter or small group could frighten the bison herd away, hunts were strictly controlled by the chiefs for the communal good. Anyone who hunted before the bison were surrounded was liable for punishment by specially appointed police. Hennepin (1903) described these police as carrying clubs, overturning lodges of offenders, and confiscating their food.

Following the communal bison hunt, the Dakota of the east would return to their villages in the lake county for the wild rice harvest season, part of which, as noted above, was stored in

underground cache pits (Radisson 1961; Hennepin 1903). Corn and various other roots, fruits, and berries were gathered and eaten while fresh (Radisson 1961). Le Sueur provided additional detail in that the Dakota of the west hunted extensively, utilizing the prairies between the upper Mississippi and the Missouri Rivers where canoes were not needed. They practiced no horticulture, did not gather wild rice, and had no fixed villages. All their travel was by foot (Wedel 1974).

DeMallie (2001) writes that the Dakota placed their dead either on scaffolds or buried them in the ground. Oftentimes the bones from the scaffold burial were collected, re-buried in the ground, and surrounded by a ring of stones. DeMallie (2001) also reports that occasionally the bones of the dead were preserved, honored, and carried on war expeditions.

The first mention of the Dakota of the west was in 1679–1680. Hennepin (1903) was told by the Dakota of the east that 50 to 75 miles above present-day Minneapolis lived the Nations Tintonha (Inhabitants of the Meadows).

By the late seventeenth and eighteenth centuries, the image that develops from the literature regarding the Dakota is one of small village groups bonded by common language and customs (DeMallie 2001). Dakota villages were bands that traveled around independently of each other and the dispersion of the Dakota of the east into many small villages likely related to the need for each group to use the resources of the area most efficiently, particularly the wild rice.

Gates (1965) states that the Dakota had acquired numerous horses by 1774 and used them for both transportation and pack horses. The acquisition of the horse was an integral innovation that fit into the nomadic bison-hunting economy and intensified earlier subsistence patterns (Wissler 1914). Additionally, the Dakota developed cultural traits that ultimately became central to Plains culture, including the intertribal pipe adoption ceremony and the Sun Dance (Parks 1993).

Following the acquisition of the horse, the westward expansion of the Dakota continued in the early 1800s. The Teton, allied with the Cheyenne and Arapaho, pressed westward, driving the Kiowa and the Crow from the Black Hills area and claiming it as their own (DeMallie 1980). This was the period in which the classic western Dakota culture developed.

After the Louisiana Purchase in 1803 by the United States, the establishment of formal relations with the tribes became integral to the government's need to explore and exploit the new territory. During their trip up the Missouri River, Lewis and Clark met with the Yankton, Yanktonai, and Teton tribes and presented peace medals and U.S. flags to their chiefs, affirming their status and power (DeMallie 2001). In 1805, Lt. Zebulon M. Pike traveled up the Mississippi and signed the first treaty with the Dakota. Under the terms of the treaty, the Mdewakonton ceded to the United States two areas of land near the Mississippi River for the construction of military posts, one of which was at the confluence of the Minnesota and Mississippi Rivers where Fort Saint Anthony (later Fort Snelling) was built in 1819.

The Dakota were divided during the War of 1812 with the eastern Dakota siding with the British and the western Dakota siding with the United States. After the war concluded, in 1815, representatives of several tribes were invited to Portage des Sioux where they signed treaties of peace and friendship with the United States. These treaties were noteworthy in that they specified that the Native American signers acknowledged themselves and their tribes to be under the sole protection of the U.S. government—the first extension of federal authority over the Dakota (Kappler 1904–1941).

An 1825 military expedition led by General Henry Atkinson and Indian Agent Benjamin O'Fallon up the Missouri River signed four more treaties with the Yankton, Yanktonai, and Teton (Kappler 1904–1941). These treaties specified that the Dakota acknowledged living within the United States, recognized its supremacy, and claimed its protection. The treaties also gave the United States the right to regulate all trade and intercourse with the Dakota.

Other treaties had more focused purposes. The 1830 treaty jointly signed by the Santee, Yankton, Sauk, and Fox, Omaha, Iowa, Otoe, and Missouri tribes at Prairie du Chien (Kappler 1904–1941) ostensibly was to end intertribal warfare. In actuality, the Dakota, Sauk and Fox surrendered two 20-mile-wide strips of land separating their territories from each other. Also significant, this treaty was the first stating that the Dakota was to obtain annuities from the United States payable over a 10-year period in money or goods. Other similar treaties followed in 1836 and 1837, further eroding Santee and Yankton lands with the promise of annuities (Kappler 1904–1941). The non-deliverance of the annuities, resulting in the starvation of the Dakota confined to small reservations, led directly to the 1862 Dakota War.

### 3.0 LITERATURE REVIEW RESULTS

In February and March 2024, Merjent conducted a Phase Ia literature review for the Project Study Area. Merjent sought archaeological site forms and historical cemeteries from the OSA Portal, and historical architectural forms and cultural resource reports provided by SHPO. Additionally, nineteenth-century GLO maps and historical aerial photography were reviewed. The results of the Phase Ia Literature Review are provided below.

#### 3.1 PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

Review of SHPO files identified three previous archaeological investigations that have taken place within the Study Area (See Table 3.1-1 and Figures 1 and 2 in Appendix A). These investigations were conducted in support of a countywide survey project, a transmission line rebuild, and a trunk sewer extension project (OL-04-01).

| Table 3.1-1                                                          |                                                                                                                                                         |                   |      |
|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------|
| Previously Reported Cultural Resources Surveys within the Study Area |                                                                                                                                                         |                   |      |
| SHPO Number                                                          | Title                                                                                                                                                   | Author            | Year |
| OL-04-01                                                             | Cultural Resources Assessment for the Rochester Water Reclamation Plant Expansion – Trunk Sewer Extension Project, Rochester, Olmsted County, Minnesota | Section 106 Group | 2004 |
| 2021-0352                                                            | Field Survey Results for a Portion of the Dairyland Power Cooperative Q-3 Transmission Line Rebuild in Olmsted County, Minnesota, SHPO# 2021-0352       | Twinde-Javner     | 2021 |
| None                                                                 | 2010 Archaeological Reconnaissance Survey of Olmsted County, Minnesota                                                                                  | Arzigian and Kolb | 2010 |

#### 3.2 PREVIOUSLY RECORDED ARCHAEOLOGICAL SITES

No archaeological sites have been recorded within the Project Area. According to the MnModel (Phase 4) Survey Implementation Model (Minnesota Department of Transportation 2020), the Study Area is within an area of unknown site potential. The overall density of previously documented sites in the Study Area is low, which is potentially due to the lack of previous survey. Based on the presence of upland soils that may exhibit depth, there is potential to encounter intact archaeological deposits within the Project Area.

### 3.3 HISTORICAL CEMETERIES

According to the Historical Cemeteries layer provided on the OSA Portal, the potential location of the St. John's Lutheran Cemetery (OSA Cemetery 22686) is located in the NE 1/4, NE 1/4 of Section 12 in Township 107 North, Range 13 West (see Figure 1 in Appendix A). Review of modern aerial imagery shows the actual location of the cemetery in an approximately 0.6-acre plot in the northeast corner of the section mentioned above.

### 3.4 PREVIOUSLY RECORDED ARCHITECTURAL RESOURCES

Results of the SHPO data request and MNSHIP review identified 14 recorded historic architectural resources within the Study Area (see Table 3.4-1 and Figures 1 and 2 in Appendix A). These structures consist of bridges and culverts. All 13 structures are outside of the Project Area.

| TABLE 3.4-1                                                                |                                                    |               |              |
|----------------------------------------------------------------------------|----------------------------------------------------|---------------|--------------|
| Previously Reported Historic Architectural Resources within the Study Area |                                                    |               |              |
| Historic Inventory Number                                                  | Property Name                                      | Property Type | NRHP Status  |
| OL-HVH-00007                                                               | CR 119 over Silver Creek                           | Structure     | Not Eligible |
| OL-VIO-00017                                                               | Great River Ridge State Trail Bridge (MnDOT R0450) | Structure     | Unevaluated  |
| OL-VIO-00018                                                               | Great River Ridge State Trail Bridge (MnDOT R0449) | Structure     | Unevaluated  |
| OL-VIO-00019                                                               | Great River Ridge State Trail Bridge (MnDOT R0448) | Structure     | Unevaluated  |
| OL-VIO-00022                                                               | Great River Ridge State Trail Bridge (MnDOT R0445) | Structure     | Unevaluated  |
| OL-VIO-00023                                                               | Great River Ridge State Trail Bridge               | Structure     | Unevaluated  |
| OL-VIO-00024                                                               | Great River Ridge State Trail Bridge               | Structure     | Unevaluated  |
| OL-VIO-00025                                                               | Great River Ridge State Trail Bridge (MnDOT R0444) | Structure     | Unevaluated  |
| OL-VIO-00026                                                               | Great River Ridge State Trail Bridge (MnDOT R0444) | Structure     | Unevaluated  |
| OL-VIO-00034                                                               | Culvert 97463                                      | Structure     | Not Eligible |
| OL-VIO-00035                                                               | Culvert R0213                                      | Structure     | Unevaluated  |
| OL-VIO-00036                                                               | Culvert R0253                                      | Structure     | Not Eligible |
| OL-VIO-00039                                                               | Bridge 88737                                       | Structure     | Not Eligible |
| OK-VIO-00040                                                               | Bridge 55J16                                       | Structure     | Unevaluated  |

### 3.5 HISTORICAL MAP REVIEW

Merjent reviewed nineteenth-century GLO maps and notes on file with the BLM (2024), aerial photographs taken between 1940 to present (OSA 2024; NETRonline 2024; Google 2024), modern aerial imagery from Google Earth, and historical plat maps from 1874 to 1916 (Andreas 1874, Warner and Foote 1878, Geo A. Ogle 1896, Webb Publishing Company 1914, Anderson Publishing Company 1928, W.W. Hixson & Company 1916). The 1853 GLO maps depict no historic features within the Study Area (see Figure 3 in Appendix A). No improvements or cultural features are mentioned in the associated survey notes (BLM 2024).

Review of aerial photographs spanning from 1940 to present show the Study Area as primarily dedicated to agriculture (OSA 2024; NETRonline 2024, Google 2024). Other than a slight increase in structures over time, the Study Area has remained relatively unchanged between 1940 and present.

Review of historical atlases from 1874 through 1916 (Andreas 1874, Warner and Foote 1878, Geo A. Ogle 1896, Webb Publishing Company 1914, Anderson Publishing Company 1928, W.W.

Hixson & Company 1916) shows the area as entirely parceled out with several roads and structures, presumably farmsteads, within the Study Area.

#### **4.0 SUMMARY AND CONCLUSIONS**

The Phase Ia literature review identified three previous cultural resource investigations, no archaeological sites, and fourteen historic architectural resources within the Study Area. Based on the lack of previous survey and the presence of upland soils that may exhibit depth, there is potential to encounter unrecorded, intact archaeological sites. Phase I archaeological survey should comply with the *State Archaeologist's Manual for Archaeological Projects in Minnesota* (Anfinson 2011), the *Historic and Architectural Survey Manual* (Minnesota State Historic Preservation Office 2017), and the Secretary of the Interior's *Standards and Guidelines for Archaeology and Historic Preservation* (National Park Service 1983).

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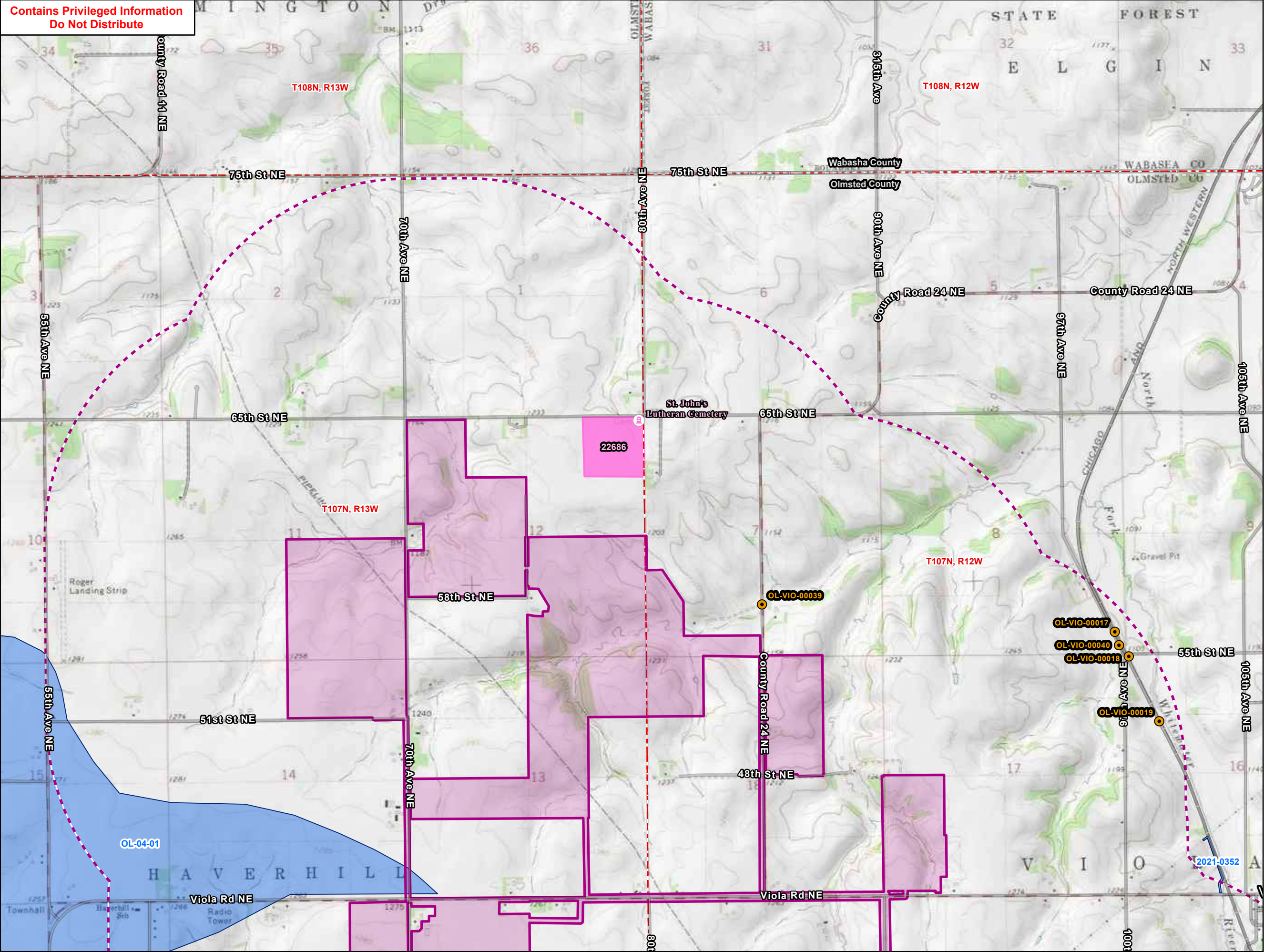
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## **APPENDIX A**

### **Project Figures**



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Page 1 of 2

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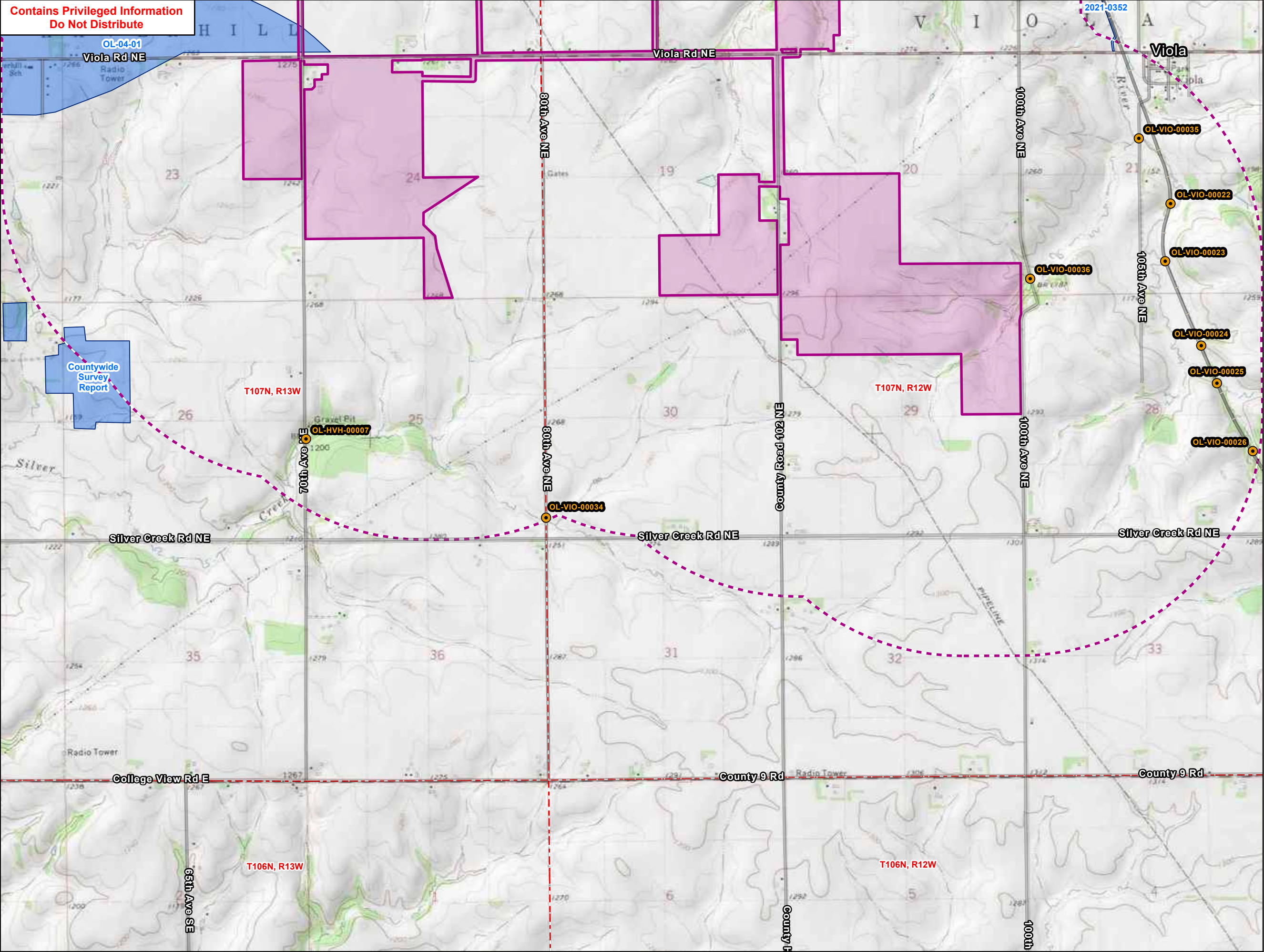


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- Literature Review Study Area
- County Boundary
- Township Boundary
- Unrecorded Historic Cemetery
- Previous Survey
- Historic Structure
- Historic Cemetery

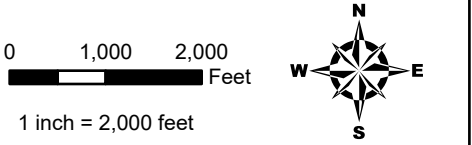
**Figure 1:**  
**Project Location**  
**and Previously Recorded**  
**Cultural Resources**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**







Page 2 of 2



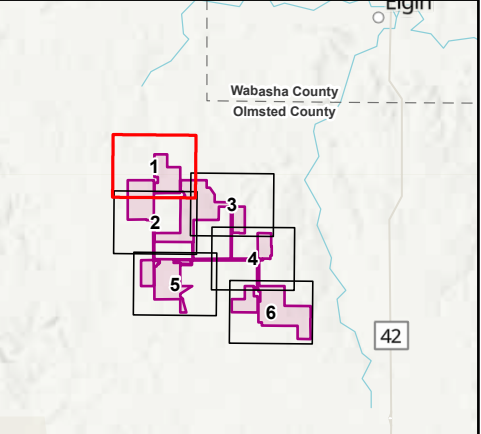
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- Township Boundary
- Unrecorded Historic Cemetery
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**Figure 1:**  
**Project Location**  
**and Previously Recorded**  
**Cultural Resources**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**

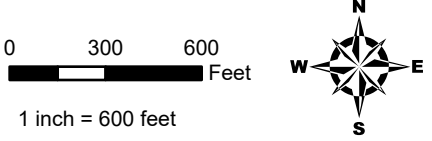




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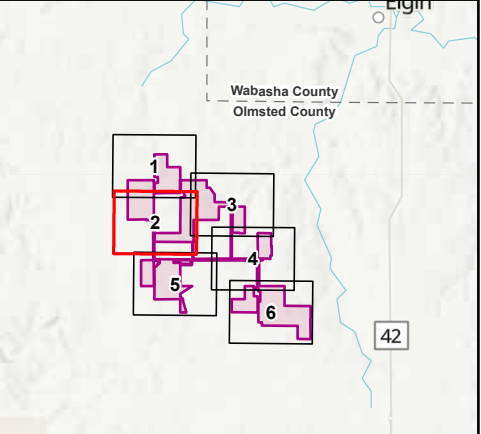
- Project Area
- Section Boundary
- Previous Survey
- Unrecorded Historic Cemetery

**Figure 2:**  
**Literature Review Results**  
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**Lemon Hill Solar**  
**Olmsted County, Minnesota**

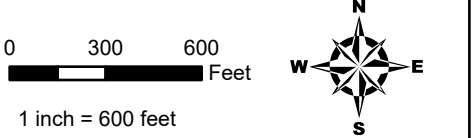




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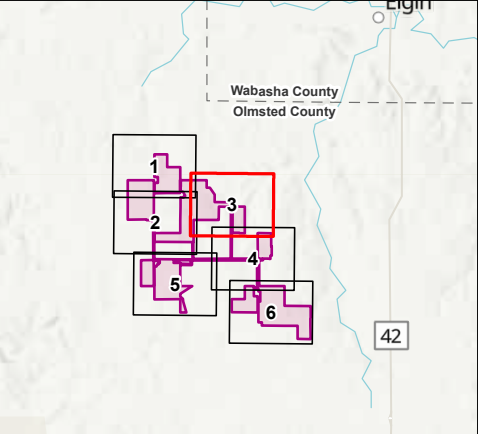
- Project Area
- Section Boundary
- Previous Survey
- Unrecorded Historic Cemetery

**Figure 2:**  
**Literature Review Results**  
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**Lemon Hill Solar**  
**Olmsted County, Minnesota**

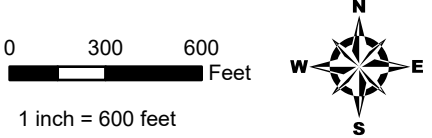




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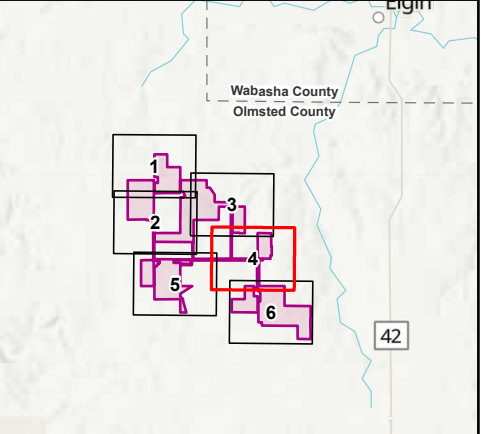
- Project Area
- Section Boundary
- Previous Survey
- Unrecorded Historic Cemetery
- Historic Structure

**Figure 2:**  
**Literature Review Results**  
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**Olmsted County, Minnesota**

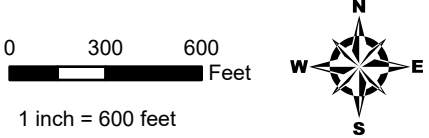




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- Project Area
- Section Boundary
- Previous Survey
- Unrecorded Historic Cemetery

**Figure 2:**  
**Literature Review Results**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**





Contains Privileged Information  
Do Not Distribute

OL-04-01

70th Ave NE

T107N, R13W, Sec. 14  
Co Rd 2 NE

T107N, R13W,  
Sec. 13

T107N, R12W,  
Sec. 18

T107N, R13W,  
Sec. 24

T107N, R13W,  
Sec. 23

T107N, R12W,  
Sec. 19

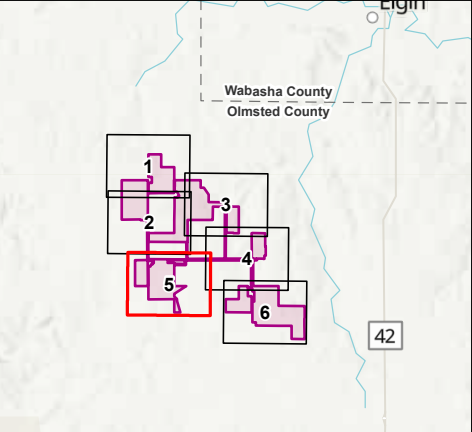
Co Rd 119

80th Ave NE

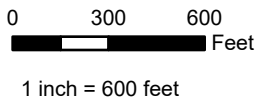
T107N, R13W,  
Sec. 26

T107N, R13W,  
Sec. 25

T107N, R12W,  
Sec. 30



Page 5 of 6



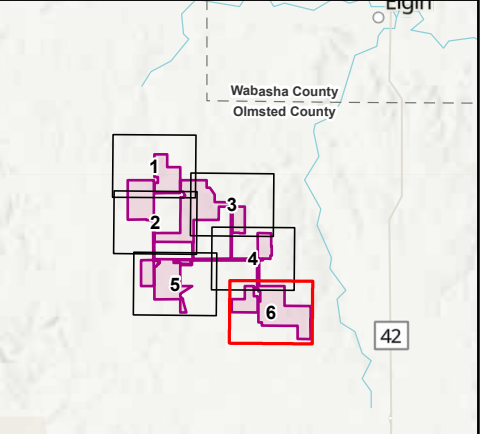
-  Project Area
-  Section Boundary
-  Previous Survey
-  Unrecorded Historic Cemetery

**Figure 2:**  
**Literature Review Results**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**

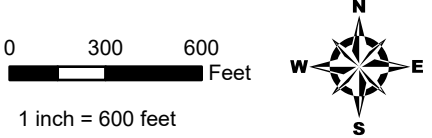




Contains Privileged Information  
Do Not Distribute



Page 6 of 6



-  Project Area
-  Section Boundary
-  Previous Survey
-  Unrecorded Historic Cemetery

**Figure 2:**  
**Literature Review Results**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**





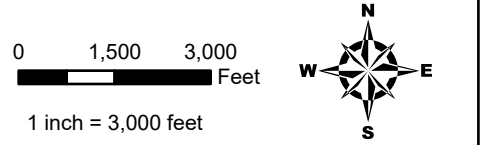
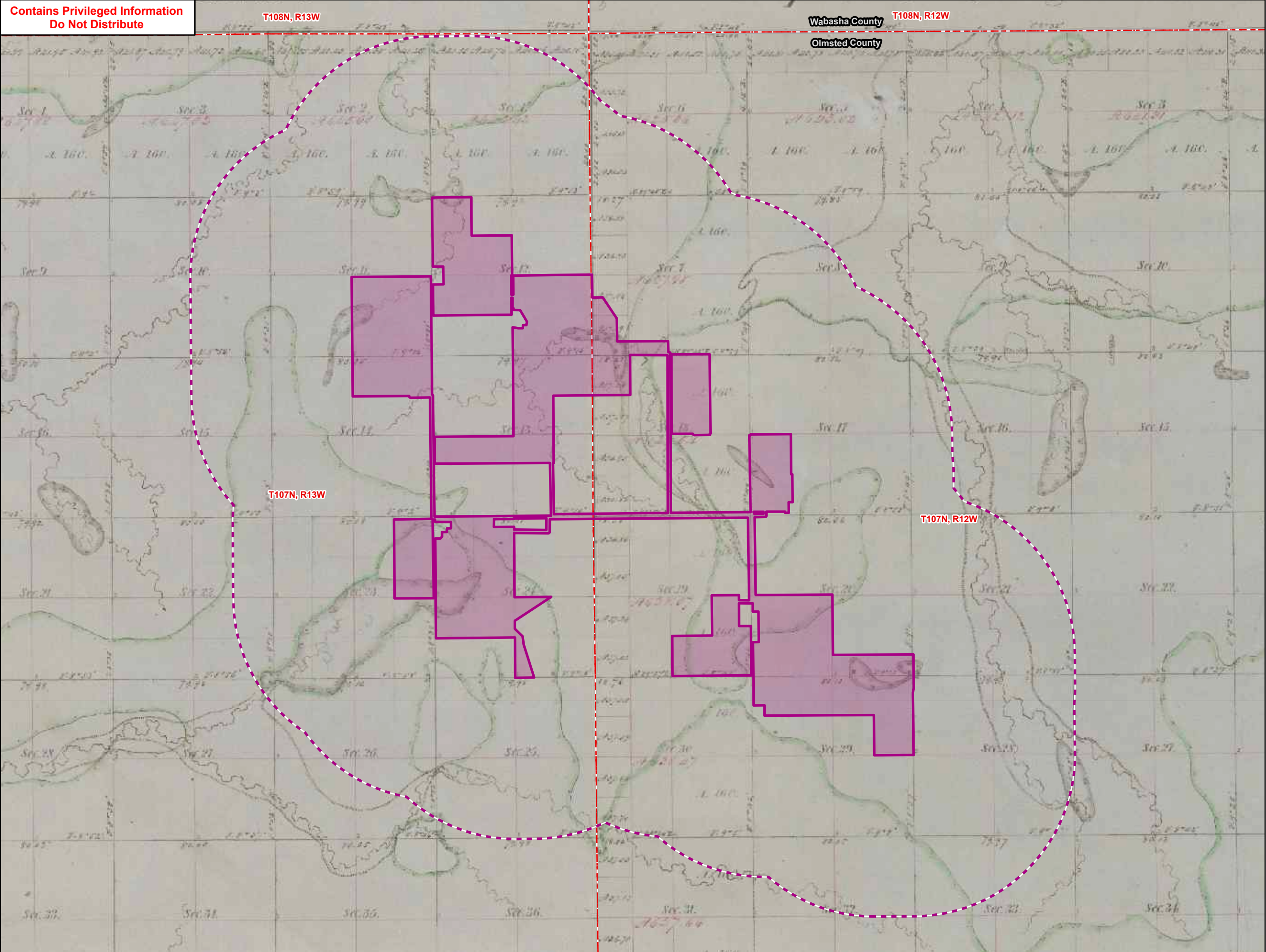
Contains Privileged Information  
Do Not Distribute

T108N, R13W

Wabasha County

T108N, R12W

Olmsted County



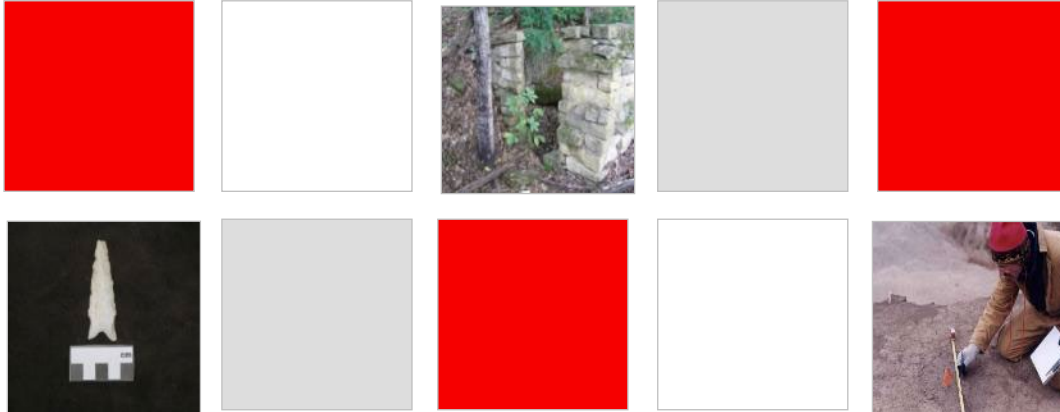
- Project Area
- County Boundary
- Township Boundary

**Figure 3:**  
**1853 GLO Map**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**





**Appendix H-2**  
**Phase 1 Archaeological Reconnaissance Survey Report**



## **Lemon Hill Solar, LLC**

### **Phase I Archaeological Survey Report for the Lemon Hill Solar Project Olmsted County, Minnesota**

PREPARED BY

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**SHPO Project Number 2024-1718  
OSA Phase I Survey License Number 24-237**

January 2025

## EXECUTIVE SUMMARY

Lemon Hill Solar, LLC (Lemon Hill Solar) is proposing to build a solar farm that will have a generating capacity of up to 180 megawatts and will comprise 1,906 acres. The Lemon Hill Solar Project (Project) is located in rural Olmsted County. The Project will require a Site Permit from the Minnesota Public Utilities Commission pursuant to the Minnesota Power Plant Siting Act (Minnesota Statutes Chapter 216E) and Minnesota Administrative Rules Chapter 7850. Project locational information can be found in the table below and Figure 1 in Appendix A.

| Sections Included in the Project Footprint |          |       |                        |
|--------------------------------------------|----------|-------|------------------------|
| County                                     | Township | Range | Sections               |
| Olmsted                                    | 107N     | 12W   | 7, 17, 18, 19, 20, 29  |
| Olmsted                                    | 107N     | 13W   | 11, 12, 13, 14, 23, 24 |

Lemon Hill Solar contracted with Merjent, Inc. (Merjent) to provide environmental services. In February and March 2024, Merjent conducted the literature review of cultural resources within a 1.0-mile buffer of the 1,906-acre Project footprint (Study Area). On May 28, 2024, Merjent, on behalf of Lemon Hill Solar, submitted a Phase Ia Cultural Resources Literature Review and Phase I Survey Plan and Methods to the Minnesota State Historic Preservation Office (SHPO) for review. In a letter dated July 19, 2024, SHPO concurred that the Phase Ia Literature Review and the methods described in the Phase I Survey Plan and Methods were appropriate for the undertaking. Between October 21 and November 2, 2024, a Phase I archaeological survey of 1,622 acres, which followed the methods described in the Survey Plan and Methods, was conducted.

One precontact archaeological site (21OL0077) consisting of a single chert tertiary flake was identified during the survey. Merjent recommends that the site is not eligible for listing in the National Register of Historic Places. Merjent recommends that no historic properties will be affected by the Project as proposed. No further archaeological work is recommended for the Project as planned.



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**TERMS AND ABBREVIATIONS**

|                  |                                                 |
|------------------|-------------------------------------------------|
| BCE              | Before the Common Era                           |
| BLM              | Bureau of Land Management                       |
| CE               | Common Era                                      |
| CFR              | Code of Federal Regulations                     |
| cm               | centimeters                                     |
| cmbs             | Centimeters below surface                       |
| GLO              | General Land Office                             |
| Lemon Hill Solar | Lemon Hill Solar, LLC                           |
| Merjent          | Merjent, Inc.                                   |
| MnDNR            | Minnesota Department of Natural Resources       |
| MnSHIP           | Minnesota's Statewide Historic Inventory Portal |
| NRCS             | Natural Resources Conservation Service          |
| NRHP             | National Register of Historic Places            |
| OSA              | Office of the State Archaeologist               |
| Project          | Lemon Hill Solar Project                        |
| ROW              | right-of-way                                    |
| SHPO             | Minnesota State Historic Preservation Office    |
| Study Area       | 1.0-mile buffer around the Project Area         |

## **1.0 PROJECT DESCRIPTION**

Lemon Hill Solar, LLC (Lemon Hill Solar) is proposing to build a solar farm that will have a generating capacity of up to 180 megawatts referred to as the Lemon Hill Solar Project (Project). The Project footprint will comprise 1,906 acres, located in rural Olmsted County (see Figure 1 in Appendix A). Locational information is provided below in Table 1.0-1.

| TABLE 1.0-1                                |          |       |                        |
|--------------------------------------------|----------|-------|------------------------|
| Sections Included in the Project Footprint |          |       |                        |
| County                                     | Township | Range | Sections               |
| Olmsted                                    | 107N     | 12W   | 7, 17, 18, 19, 20, 29  |
| Olmsted                                    | 107N     | 13W   | 11, 12, 13, 14, 23, 24 |

## **1.1 REGULATORY FRAMEWORK**

The Project will require a Site Permit from the Minnesota Public Utilities Commission pursuant to the Minnesota Power Plant Siting Act (Minnesota Statutes Chapter 216E) and Minnesota Administrative Rules Chapter 7850. Minnesota Public Utilities Commission permitting requires consideration of impacts to cultural resources by following relevant state historic preservation laws, notably the Field Archaeology Act (MS 138.31-42), Minnesota Historic Sites Act (MS 138.661-138.669), and the Private Cemeteries Act (MS 307.08).

The Project footprint includes road rights-of-way (ROWs) that are administered by the Minnesota Department of Transportation, Olmsted County, and local municipalities. Therefore, a Minnesota Office of the State Archaeologist (OSA) Phase I Survey License was obtained prior to the archaeological survey (OSA license number 24-237).

## **2.0 ENVIRONMENTAL AND CULTURAL BACKGROUND**

According to the Minnesota Department of Natural Resources' (MnDNR) Ecological Classification System, the Project is in the Rochester Plateau Subsection of the Paleozoic Plateau Section of the Eastern Broadleaf Forest Province (MnDNR 2024a). This is bound to the north by at the northern extent of loess deposits and to the east by a transition from dissected landscapes and level to rolling plateau. The subsection comprises a series of Des Moines lobe end moraines (MnDNR 2024a).

### **2.1 TOPOGRAPHY**

Topography within the Rochester Plateau Subsection is level to gently rolling, which is controlled by the underlying glacial till in the east and bedrock controlled as loess deposits thin to the west. Karst topography and sinkholes are common in the southeast portion of the subsection (MnDNR 2024a). The Project is situated on a gently rolling upland landform that serves as the boundary between the Silver Creek and Whitewater River watersheds (see Figure 1 in Appendix A). The most dramatic topography within the Project footprint is created by several unnamed intermittent drainages that lead to Silver Creek and the North Fork Whitewater River. Within the Project footprint these drainages manifest as steeply sided ravines and streams flanked by marshes and drainage slopes.

## **2.2 HYDROLOGY**

According to the MnDNR Watershed Index, the Project is within the Mississippi River – Winona and Zumbro surface watersheds (MnDNR 2024b). These watersheds flow roughly east into the Mississippi River. The drainage system is well developed and there are very few lakes in this region (MnDNR 2024a). The Project footprint is drained to the west by Silver Creek and to the north by the North Fork Whitewater River. Multiple unnamed streams within steeply sided ravines or streams flanked by marshes and hill slopes are located within the Project footprint.

### **2.2.1 Paleo-Hydrography**

A review of the Prehistoric Hydrography (MM4) model on the OSA Portal (2024) suggests that approximately one-fifth of the Project footprint was paleo-wetlands and floodplains; those paleo-wetlands and floodplains roughly match the locations of present-day National Wetlands Inventory (NWI)-defined wetlands (NWI 2024), marsh, drainages, and ravines observed during the survey. The model suggests that most of the Project footprint was uplands and has been incised by drainages and ravines. In addition, the Historic Lakes and Rivers (MM4) model on the OSA Portal (2024) indicates that the historic lakes and ponds are absent from the Project footprint, save for the North Fork Whitewater River that is located just west and south of the Town of Viola; this river is 0.5 mile east of the Project footprint. Based on review of the Prehistoric Hydrography and Historic Lakes and Rivers models, the Project footprint does not contain paleo-lake or historical shores.

## **2.3 GEOLOGY**

Bedrock within the Rochester Plateau Subsection is Ordovician dolomite, limestone, and sandstone in steep ravines with Cambrian sandstone shale, and dolomite exposures in the Mississippi River Valley. Local exposures of Devonian dolomite and limestone are evident in the western edge of the subsection (MnDNR 2024a; Morey and Walton 1976). Bedrock depth varies from 100 to 200 feet in the west and 10 to 100 feet in the east (MnDNR 2024a; Olsen and Mossler 1982).

The parent material of the Project footprint was deposited during the retreat of the last glacial maximum (Late Wisconsinan). This material can be characterized as sandy outwash sediments that formed in loamy alluvium and in the underlying sandy and gravelly outwash (Natural Resources Conservation Service [NRCS] 2024a).

## **2.4 SOILS**

According to NRCS soils data, there are 41 different soil units anticipated within the Project footprint (NRCS 2024a; see Table 2.4-1). Standing water comprises less than 0.1 percent (0.7 acre) of the Project footprint. Within the Project footprint are Alfisols (1,165 acres), which are soils developed in forest ecosystems; Mollisols (646.6 acres), which are soils developed under grassland ecosystems; and Inceptisols (19.6 acres), which are soils found on fairly steep slopes and young geomorphic surfaces. Soils in the Project footprint tend to exhibit depth and are well drained, which suggests potential for buried archaeological deposits (Fanning and Fanning 1989; Jenny 1941). The remaining 74.1 acres of the Project footprint are mapped by the NRCS as Entisols (71.5 acres) and Histosols (2.6 acres). Entisols show little to no pedogenic development and Histosols are typically saturated (NRCS 2024b), suggesting lower potential for archaeological deposits (Holliday 2004). Although there is potential to encounter archaeological deposits within the Project footprint, Holliday (2004) states that soil series mapped by the NRCS potentially

Phase I Archaeological Survey Report for the Lemon Hill Solar Project  
Olmsted County, Minnesota

provide clues but should be recognized as having considerable limitations in archaeological applications. Descriptions of the soil types expected to be encountered within the Project footprint are provided below.

| TABLE 2.4-1                                 |             |                                                                                                               |                            |                                 |
|---------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------------|
| Soil Types Present in the Project Footprint |             |                                                                                                               |                            |                                 |
| Soil Type                                   | Soil Order  | Landform                                                                                                      | Acres in Project Footprint | Percentage of Project Footprint |
| Mt. Carroll silt loam                       | Alfisols    | Ridgetops, side slopes, and stream benches                                                                    | 551.5                      | 28.90%                          |
| Waubeeek silt loam                          | Alfisols    | Summits and side slopes                                                                                       | 240.6                      | 12.6%                           |
| Port Byron Silt Loam                        | Mollisols   | High terraces                                                                                                 | 110.0                      | 5.8%                            |
| Otter silt loam                             | Mollisols   | Flood plains                                                                                                  | 74.5                       | 3.9%                            |
| Kasson Silt Loam                            | Alfisols    | Interfluves and side slopes                                                                                   | 72.4                       | 3.8%                            |
| Oronoco loam                                | Mollisols   | Summits of rolling or hilly uplands                                                                           | 71.3                       | 3.7%                            |
| Vasa silt loam                              | Alfisols    | Interfluves on dissected till plains                                                                          | 64.8                       | 3.4%                            |
| Chaseburg Silt Loam                         | Entisols    | Flood plains, hills, and alluvial fans                                                                        | 59.4                       | 3.1%                            |
| Floyd silt loam                             | Mollisols   | Foot slopes and upland drainageways                                                                           | 56.6                       | 3.0%                            |
| Garwin Silty Clay Loam                      | Mollisols   | Drainageways, till plains, and stream terraces                                                                | 49.8                       | 2.6%                            |
| Frankville silt loam                        | Alfisols    | Crests of interfluves, side slopes, and high structural benches                                               | 48.9                       | 2.6%                            |
| Joy Silt Loam                               | Mollisols   | Ridges and terraces                                                                                           | 47.4                       | 2.5%                            |
| Clyde silty clay loam                       | Mollisols   | Swales, interfluves, and till plains                                                                          | 42.9                       | 2.2%                            |
| Elbaville silt loam                         | Alfisols    | Upper back slopes, shoulders, and foot slopes in dissected uplands                                            | 41.9                       | 2.0%                            |
| Dorerton loam                               | Alfisols    | Shoulders and side slopes of dissected uplands                                                                | 39.2                       | 2.0%                            |
| Atkinson loam                               | Mollisols   | Ridges of narrow interfluves, crests and side slopes on uplands, high structural benches, and strath terraces | 29.4                       | 1.6%                            |
| Skyberg silt loam                           | Alfisols    | Dissected till plains                                                                                         | 28.9                       | 1.5%                            |
| Littleton silt loam                         | Mollisols   | Alluvial fans, toe slopes of uplands, and stream terraces                                                     | 28.6                       | 1.5%                            |
| Racine Loam                                 | Alfisols    | Interfluves and side slopes on dissected till plains on the Iowan Erosion Surface                             | 26.9                       | 1.4%                            |
| Marlean silty clay loam                     | Mollisols   | Ridges, interfluves, and side slopes on dissected uplands                                                     | 24.1                       | 1.3%                            |
| Racine Silt Loam                            | Alfisols    | Interfluves and side slopes on dissected till plains on the Iowan Erosion Surface                             | 20.6                       | 1.1%                            |
| Timula silt loam                            | Inceptisols | Hill slopes                                                                                                   | 19.6                       | 1.0%                            |
| Kenyon loam                                 | Mollisols   | Interfluves and dissected till plains                                                                         | 19.3                       | 1.0%                            |
| Lindstrom silt loam                         | Mollisols   | Toe and foot slopes of steel hills, ridges, or valley walls                                                   | 18.6                       | 0.9%                            |
| Waucoma loam                                | Alfisols    | Summits and backslopes                                                                                        | 17.8                       | 0.9%                            |
| Kato silty clay loam, depressional          | Mollisols   | Outwash plains, valley trains, and flood plains                                                               | 17.2                       | 0.9%                            |
| Ostrander Silt Loam                         | Mollisols   | Summits, side slopes, or shoulder slopes on dissected till plains                                             | 15.6                       | 0.8%                            |
| Brodale channery loam                       | Mollisols   | Valley sides and dissected uplands                                                                            | 13.1                       | 0.7%                            |
| Arenzville Silt Loam                        | Entisols    | Floodplains and upland drainageways                                                                           | 9.6                        | 0.5%                            |
| Channahon loam                              | Mollisols   | Level-bedded terraces                                                                                         | 6.7                        | 0.3%                            |
| Schullsburg Silt Loam                       | Mollisols   | Upland slopes                                                                                                 | 5.9                        | 0.3%                            |
| Nasset silt loam                            | Alfisols    | Interfluves, benches, and dissected uplands                                                                   | 5.1                        | 0.3%                            |



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TABLE 2.4-1

**Soil Types Present in the Project Footprint**

| Soil Type                     | Soil Order | Landform                                                                                    | Acres in Project Footprint | Percentage of Project Footprint |
|-------------------------------|------------|---------------------------------------------------------------------------------------------|----------------------------|---------------------------------|
| Schapville Silty Clay Loam    | Mollisols  | Ridgetops, high structural benches, and saddles between hills on bedrock-controlled uplands | 4.5                        | 0.3%                            |
| Maxfield silt loam            | Mollisols  | Interfluvial and head slopes of broad, shallow drainageways on dissected till plains        | 4.5                        | 0.2%                            |
| Rockton loam                  | Mollisols  | Uplands, high structural benches, strath terraces, and lake plains                          | 3.7                        | 0.2%                            |
| Dorerton-Rock outcrop complex | Alfisols   | Shoulders and side slopes of dissected uplands                                              | 2.9                        | 0.1%                            |
| Palms muck                    | Histosols  | Closed depressions                                                                          | 2.6                        | 0.1%                            |
| Root silt loam                | Entisols   | Flood plains                                                                                | 2.5                        | 0.1%                            |
| Brodale-Sogn complex          | Mollisols  | Valley sides, hill slopes, and dissected uplands                                            | 2.4                        | 0.1%                            |
| Massbach Silt Loam            | Alfisols   | Shale ridges and side slopes on uplands                                                     | 1.9                        | 0.1%                            |
| Dowagiac sandy loam           | Alfisols   | Outwash plains, terraces, and valley trains                                                 | 1.3                        | 0.1%                            |
| Water                         | N/A        | N/A                                                                                         | 0.7                        | <0.1%                           |
| Frontenac loam                | Mollisols  | Slopes in dissected terrain                                                                 | 0.5                        | <0.1%                           |
| Lilah Sandy Loam              | Alfisols   | outwash areas on dissected till plains and treads and risers on stream terraces             | 0.3                        | <0.1%                           |

## 2.5 FLORA AND FAUNA

The most common types of pre-Euro-American settlement vegetation within the Rochester Plateau were tallgrass prairie and bur oak savanna. Few remnants of this vegetation remain with the subsection as most of the land has been converted to plowed farmland and, to a lesser extent, pastureland (MnDNR 2024a).

The pre-Euro-American settlement fauna were dominated by bison and occasional elk. White-tailed deer and small animals were abundant along river valleys. Wetlands and lakes within the outer coteau contain various species of waterfowl, aquatic mammals, and fish (MnDNR 2024a; Gibbon et al. 2002).

## 2.6 CULTURAL AND HISTORICAL OVERVIEW

Culturally, the Project is within the Minnesota Archaeological subregion 3w (Southeast Riverine West). This subregion covers a portion of central Minnesota in all or part of Dakota, Dodge, Fillmore, Goodhue, Houston, Mower, Olmsted, Rice, Wabasha, Winona, Counties (Gibbon et al. 2002).

### 2.6.1 Precontact Period (10,900 BCE–1,650 CE)

The first inhabitants of Minnesota are known as Paleoindians (10,900 to 7,500 years Before the Common Era [BCE]). These people were highly nomadic hunter-gatherers, moving in small bands in search of food and other subsistence resources; however, in the Late Glacial and Early Holocene forests of Minnesota, Paleoindians likely relied more on gathering and the hunting of a variety of smaller animals. Paleoindian sites are small, relatively ephemeral, and commonly identified with the recovery of distinctive spear points that occur across much of North America (Gibbon et al. 2002).

The Paleoindian peoples were followed by Archaic Tradition hunter-gatherers. At the end of the Ice Age, around 10,000 years BCE, the climate became warmer and drier, which led to major changes in plant and animal communities. Spruce forests followed the retreating glacial ice northward and were replaced by a new landscape comprised of extensive lakes and rivers. Many large-game species became extinct. Archaic Tradition hunters-gatherers (7,500 to 500 BCE) adapted to this new environment, shifting their focus to smaller game such as deer and elk, the abundant fish and shellfish in the numerous lakes and rivers, and wild plants such as nuts and berries (Gibbon et al. 2002).

The Archaic peoples appear to have been less nomadic than the Paleoindians and lived in smaller household groups. Archaic sites are identified by large notched and stemmed projectile points. Immense sedimentation during the early part of the Archaic, corresponding with the early and middle Holocene periods, resulted in many Archaic Tradition sites being deeply buried under river valley deposits; therefore, these sites are not usually evident in surficial contexts (Gibbon et al. 2002).

The Woodland Tradition followed the Archaic Tradition. In Minnesota, the Woodland culture is separated into two periods: the earlier Initial Woodland period (ca. 500 BCE to 500 years into the Common Era [CE]), and the later Terminal Woodland period (500 to 1650 CE) (Gibbon et al. 2002).

The frequent surficial expression of Woodland site locations, coupled with burial mounds that frequently mark their place, has resulted in more frequent documentation and excavation of Woodland sites. Due to this higher frequency of identification, many Woodland sites have also been grouped into specific regional archaeological cultures (Gibbon et al. 2002; Gibbon 2012).

The Initial Woodland period is primarily marked by the emergence of precontact ceramic traditions and burial mounds. Regional archaeological cultures of the Initial Woodland period include Howard Lake, Malmo, Elk Lake, and Laurel (Gibbon et al. 2002; Gibbon 2012).

The Terminal Woodland period has been defined throughout eastern and central Minnesota, the Red River Valley, and portions of the Dakotas (Gibbon 2012). During this period, populations began to increase, which in turn led to an increase in size and number of precontact sites. Burial mounds became more prevalent and the cultural material artifacts began shifting to smaller, unnotched triangular projectile points and thinner ceramic vessels that were more globular in shape. Agriculture and wild rice harvests also increased (Gibbon et al. 2002; Gibbon 2012).

In the northern portion of the state, ceramic types and burial practices indicate specific regional archaeological cultures, including Kathio, Blackduck, and Psinomani. In the southern portion of the state, primarily comprised of deciduous forests and prairie, some cultures adopted the cultivation of maize and the construction of effigy burial mounds (Gibbon et al. 2002; Gibbon 2012). By the end of the Initial Woodland, maize horticulture had spread to the northern portion of the state (Boyd and Surette 2010).

Around approximately 1000 CE, Mississippian populations from Cahokia, near St. Louis, Missouri, began to extend their influence northward into the Upper Mississippi River Valley and evidence suggests that there were attempts at colonization. Archaeologists tend to regard some southern Minnesota Terminal Woodland cultures as the northern expression of a "Mississippian" lifeway, distinguished by distinctive ceramic styles, larger and more diverse artifact assemblages, and evidence of maize production. In southern Minnesota, three Mississippian complexes have been identified: Silvernale, Oneota, and Plains Village (Gibbon et al. 2002). It was the Mississippian

peoples in the south, and the Terminal Woodland peoples in the north, who had contact with the first Europeans to explore Minnesota in the mid-seventeenth century (Gibbon et al. 2002; Gibbon 2012).

## **2.6.2 Contact Period (1650–1837 CE)**

The Contact Period includes American Indian and Euro-American contexts. The OSA subdivides the American Indian context into “Indeterminate” or “Eastern Dakota,” and the Euro-American context into “Indeterminate,” “French,” “British,” and “Initial US” (Gibbon 2012). This section focusses on developing a cultural context and temporal framework for sites relevant to the Project.

Because the Project occurs on traditional Dakota lands, a brief description of the Dakota is warranted. DeMallie (2001) states that Dakota and Lakota (also known as Sioux) tribes share common language, history, social organization, and culture. They were first mentioned in 1640 (Thwaites 1898) and at that time occupied the area between Mille Lacs and the Missouri River and south into central Iowa. Three divisions were distinguished by the early nineteenth century, the Santee, Yankton and Yanktonai (Dakota), and Teton (Lakota), which mirrored geographical, linguistic, and cultural distinctions. Following government administrators, anthropologists grouped all three divisions under the designation “Dakota” (e.g., Dorsey 1897; Deloria 1944; Holder 1970). Researchers tend to minimize the use of the term “Sioux” for two reasons: 1) it had a foreign origin in an Ojibwa ethnonym, and 2) it was said to mean “snake” and therefore has pejorative connotations (DeMallie 2001).

Oral histories and various linguistic reconstructions are similar regarding the origins of the Dakota. Linguistic studies place the Proto-Dakota west of Lake Michigan in southern Wisconsin, southeastern Minnesota, northwestern Iowa, and northern Illinois (Munson 1975). Dakota traditions recorded by Nicollet in 1839 indicate an origin near the northern lakes east of the Mississippi prior to moving westward—initially by the Teton, then the Yankton and Yanktonai, and lastly the Santee (DeMallie 1976). A tradition of the Mdewakanton group of Santee states that their ancestors left the lakes around the headwaters of the upper Mississippi and moved to the region of the Minnesota River because bison were more plentiful (Commissioner of Indian Affairs 1849). Oral traditions also state that the Assiniboine split off from a band of Yanktonai (Riggs 1893).

Conventional archaeological methods are unable to answer questions regarding Dakota origins at this time. Generally, sites identified with the precontact Dakota on the northeastern fringe of the plains are lumped into the Woodland Tradition in Minnesota as are early contact sites (Eggan 1952; Winchell 1911).

In the heavily forested regions within Dakota territory, deer were an important resource; however, the plains Dakota made their livelihood hunting bison (DeMallie 2001). In the mid-seventeenth century, the eastern Dakota groups hunted bison in the grassland-forest savannah east of the Mississippi River. War with other groups, notably the Illinois, Fox, and other Central Algonquian tribes, all of whom had access to guns and who hunted bison, likely caused the Dakota to hunt west of the Mississippi River. Also, by the mid-seventeenth century, the Ojibwe began to move west from Sault Sainte Marie to regions they inhabited at the time of Euro-American contact. Initially the Dakota and Ojibwe warred, but eventually came to a largely peaceful relationship and the Dakota allowed the Ojibwe to hunt in their territory and act as middlemen in trade with the French (DeMallie 2001).

By the early eighteenth century, traders had built several posts and forts within Dakota territory, including one at Duluth and Fort l'Huillier on the Blue Earth River, a tributary of the Minnesota River (DeMallie 2001). The fort on the Blue Earth River was seen as an unwelcome incursion into the territory of the Eastern Dakota and they retaliated by robbing two French traders and fired on the post. The western Dakota groups denied any responsibility, which demonstrates the autonomy between villages. Fort l'Huillier was abandoned in 1702, and the Dakota lacked direct contact with the French for the next 20 years (DeMallie 2001).

During this time, the Dakota depended on Fox and Ojibwe as intermediaries for trade. First in 1714 and again in 1721, the Fox made peace with the Dakota, not only for trade purposes, but also as an alliance against the Ojibwe who were expanding southwest from Lake Superior (Edmunds and Peyser 1993). The French negotiated a peace between the Ojibwe and Dakota with the result of undermining the alliance between the Dakota and Fox, although with the unintended result of ultimately undermining the peace between the Ojibwe and Dakota due to the opening of direct trade (Hickerson 1962).

In the 1730s, Pierra Gaultier de Varennes sieur de la Verendrye financed his search for the western sea by trading with the Native Americans and built posts west and north of Lake Superior. La Verendrye allied himself with the Ojibwe and Cree and, in 1734, his eldest son accompanied a Cree war party against the Dakota (DeMallie 2001). This action precipitated hostilities by the Dakota against the French. By 1736, several Frenchmen, including le Verendrye's youngest son, a Jesuit missionary, and 20 voyageurs were killed, scalped, and decapitated, with their heads placed on beaver skins (Thwaites 1906).

Also, by 1736, most of the Dakota lived west of the Mississippi River. That year the number of Dakota living east of the Mississippi was 300 compared with 2,000 Dakota on the prairies (Thwaites 1906). Although warfare with the Ojibwe had forced the Dakota to abandon their villages around Leech Lake and Mille Lacs, this did not result in an end in hostilities. While Ojibwe traditions recount many victories against the Dakota, most of the Dakota had already located to the Mississippi and Minnesota River valleys due to the availability of bison and the advantages of trade with the French (DeMallie 2001). A 1697 map, with additions in 1699 and 1702, depicts 22 Dakota villages in the upper Mississippi River region (DeMallie 2001).

The Dakota of the east lived in small, scattered villages, each of which was composed of five or six families (Radisson 1961). In addition to these small villages, there were larger ones that they returned to annually, which housed up to 7,000 people (Radisson 1961). Radisson (1961) describes some of the lodges as being covered with mats and some with skins and says lodges were rounded and constructed with long poles. Other accounts indicate that the Dakota of the west lived in tipis that they carried with them whenever they relocated (Neill 1890). There is no mention of Dakota utilization of dogs or horses during this period.

When the Dakota returned to their villages in the spring, they used cache pits to contain surplus wild rice. Radisson (1961) writes that they sowed corn, but that the harvest was small. The wild rice afforded them nourishment throughout the year. Conversely, the Jesuit Relations mention that in 1642, the Dakota harvested corn, but in 1670 to 1672 it was stated that they did not till land (Thwaites 1898, 1899). During the summer, the Dakota gathered for communal bison hunts, which were extremely important since these hunts provided surplus meat to be dried for winter use and hides (De Mallie 2001). Hennepin (1903) reported that sometimes 100 to 120 bison were killed in a single hunt. Because a single hunter or small group could frighten the bison herd away, hunts were strictly controlled by the chiefs for the communal good. Anyone who hunted before the bison were surrounded was liable for punishment by specially appointed police. Hennepin



(1903) described these police as carrying clubs, overturning lodges of offenders, and confiscating their food.

Following the communal bison hunt, the Dakota of the east would return to their villages in the lake county for the wild rice harvest season, part of which, as noted above, was stored in underground cache pits (Radisson 1961; Hennepin 1903). Corn and various other roots, fruits, and berries were gathered and eaten while fresh (Radisson 1961). Le Sueur provided additional detail in that the Dakota of the west hunted extensively, utilizing the prairies between the upper Mississippi and the Missouri Rivers where canoes were not needed. They practiced no horticulture, did not gather wild rice, and had no fixed villages. All their travel was by foot (Wedel 1974).

DeMallie (2001) writes that the Dakota placed their dead either on scaffolds or buried them in the ground. Oftentimes the bones from the scaffold burial were collected, re-buried in the ground, and surrounded by a ring of stones. DeMallie (2001) also reports that occasionally the bones of the dead were preserved, honored, and carried on war expeditions.

The first mention of the Dakota of the west was in 1679 to 1680. Hennepin (1903) was told by the Dakota of the east that 50 to 75 miles above present-day Minneapolis lived the Nations Tintonha (Inhabitants of the Meadows).

By the late seventeenth and eighteenth centuries, the image that develops from the literature regarding the Dakota is one of small village groups bonded by common language and customs (DeMallie 2001). Dakota villages were bands that traveled around independently of each other and the dispersion of the Dakota of the east into many small villages likely related to the need for each group to use the resources of the area most efficiently, particularly the wild rice.

Gates (1965) states that the Dakota had acquired numerous horses by 1774 and used them for both transportation and pack horses. The acquisition of the horse was an integral innovation that fit into the nomadic bison-hunting economy and intensified earlier subsistence patterns (Wissler 1914). Additionally, the Dakota developed cultural traits that ultimately became central to Plains culture, including the intertribal pipe adoption ceremony and the Sun Dance (Parks 1993).

Following the acquisition of the horse, the westward expansion of the Dakota continued in the early 1800s. The Teton, allied with the Cheyenne and Arapaho, pressed westward, driving the Kiowa and the Crow from the Black Hills area and claiming it as their own (DeMallie 1980). This was the period in which the classic western Dakota culture developed.

After the Louisiana Purchase in 1803 by the United States, the establishment of formal relations with the tribes became integral to the government's need to explore and exploit the new territory. During their trip up the Missouri River, Lewis and Clark met with the Yankton, Yanktonai, and Teton tribes and presented peace medals and U.S. flags to their chiefs, affirming their status and power (DeMallie 2001). In 1805, Lt. Zebulon M. Pike traveled up the Mississippi and signed the first treaty with the Dakota. Under the terms of the treaty, the Mdewakonton ceded to the United States two areas of land near the Mississippi River for the construction of military posts, one of which was at the confluence of the Minnesota and Mississippi Rivers where Fort Saint Anthony (later Fort Snelling) was built in 1819.

The Dakota were divided during the War of 1812 with the eastern Dakota siding with the British and the western Dakota siding with the United States. After the war concluded, in 1815, representatives of several tribes were invited to Portage des Sioux where they signed treaties of

peace and friendship with the United States. These treaties were noteworthy in that they specified that the Native American signers acknowledged themselves and their tribes to be under the sole protection of the U.S. government—the first extension of federal authority over the Dakota (Kappler 1904–1941).

An 1825 military expedition led by General Henry Atkinson and Indian Agent Benjamin O’Fallon up the Missouri River signed four more treaties with the Yankton, Yanktonai, and Teton (Kappler 1904–1941). These treaties specified that the Dakota acknowledged living within the United States, recognized its supremacy, and claimed its protection. The treaties also gave the United States the right to regulate all trade and intercourse with the Dakota.

Other treaties had more focused purposes. The 1830 treaty jointly signed by the Santee, Yankton, Sauk, Fox, Omaha, Iowa, Otoe, and Missouri tribes at Prairie du Chien (Kappler 1904–1941) ostensibly was to end intertribal warfare. In actuality, the Dakota, Sauk, and Fox surrendered two 20-mile-wide strips of land separating their territories from each other. Also significant, this treaty was the first stating that the Dakota were to obtain annuities from the United States payable over a 10-year period in money or goods. Other similar treaties followed in 1836 and 1837, further eroding Santee and Yankton lands with the promise of annuities (Kappler 1904–1941). The non-deliverance of the annuities, resulting in the starvation of the Dakota who were largely confined to small reservations, led directly to the 1862 Dakota War.

### **3.0 Literature Review Results**

In February and March 2024, Merjent conducted a literature review of archaeological survey reports, recorded archaeological sites, and historic architectural sites within a 1.0-mile buffer of the Project footprint (Study Area) using data provided by the Minnesota State Historic Preservation Office (SHPO) and OSA. Merjent also reviewed nineteenth-century General Land Office (GLO) maps (Bureau of Land Management [BLM] 2024), historical atlases, and historical aerial photography from 1940 to present (NETRonline 2024; OSA 2024). On May 28, 2024, Merjent, on behalf of Lemon Hill Solar, submitted the Phase Ia Cultural Resources Literature Review to SHPO for review. In a letter dated July 19, 2024, SHPO confirmed that the Phase Ia Literature Review was appropriate for the Project.

The literature review included an analysis of protected datasets on file at the SHPO, the State Register of Historic Places, the Minnesota State Historic Site Network, information regarding National Register of Historic Places listed properties, Minnesota’s Statewide Historic Inventory Portal (MnSHIP), and National Historic Landmarks from databases maintained by the National Parks Service. The OSA maintains a secure online dataset of known and suspected archaeological sites, which is regularly updated and referenced (OSA Portal). Mr. Kevin Mieras, Merjent archaeologist, reviewed the OSA Portal files and archived copies of site forms for all known sites within the Study Area. Since geographic information system shapefiles of archaeological survey locations and archaeological site boundaries are not available from SHPO or OSA, Merjent digitized previous site locations based on digital files provided by SHPO and available on the OSA Portal.

### **3.1 PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS**

Review of SHPO files identified three previous archaeological investigations that have taken place within the Study Area (see Table 3.1-1 below and Figure 2 in Appendix A). These investigations were conducted in support of a countywide survey project, a transmission line rebuild, and a trunk sewer extension project (OL-04-01). A small portion of OL-04-01 intersects the Project footprint

just north of the intersection of Viola Road NE and 70th Avenue NE (see Figure 1 in Appendix A). This survey did not inventory any cultural resources within the Project Study Area.

| Table 3.1-1                                                          |                                                                                                                                                         |                   |      |
|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------|
| Previously Reported Cultural Resources Surveys Within the Study Area |                                                                                                                                                         |                   |      |
| SHPO Number                                                          | Title                                                                                                                                                   | Author            | Year |
| OL-04-01                                                             | Cultural Resources Assessment for the Rochester Water Reclamation Plant Expansion – Trunk Sewer Extension Project, Rochester, Olmsted County, Minnesota | Section 106 Group | 2004 |
| 2021-0352                                                            | Field Survey Results for a Portion of the Dairyland Power Cooperative Q-3 Transmission Line Rebuild in Olmsted County, Minnesota, SHPO# 2021-0352       | Twinde-Javner     | 2021 |
| None                                                                 | 2010 Archaeological Reconnaissance Survey of Olmsted County, Minnesota                                                                                  | Arzigian and Kolb | 2010 |

### 3.2 PREVIOUSLY RECORDED ARCHAEOLOGICAL SITES

No archaeological sites have been recorded within the Study Area. According to the MnModel (Phase 4) Survey Implementation Model (Minnesota Department of Transportation 2020), the Study Area is within an area of unknown site potential. The overall density of previously documented sites in the Study Area is low, which is potentially due to the lack of previous survey. Based on the presence of upland soils that may exhibit depth, there is potential to encounter intact archaeological deposits within the Project footprint.

### 3.3 HISTORICAL CEMETERIES

According to the Historical Cemeteries layer provided on the OSA Portal, the potential location of the St. John's Lutheran Cemetery (OSA Cemetery 22686) is located in the NE 1/4, NE 1/4 of Section 12 in Township 107 North, Range 13 West (see Figure 2 in Appendix A). Review of modern aerial imagery shows the actual location of the cemetery in an approximately 0.6-acre plot in the northeast corner of the section mentioned above. The cemetery does not intersect the Project footprint.

### 3.4 PREVIOUSLY RECORDED ARCHITECTURAL RESOURCES

Results of the SHPO data request and MnSHIP review identified 14 recorded historic architectural resources within the Study Area (see Table 3.4-1 below and Figure 2 in Appendix A). These structures consist of bridges and culverts. All 14 structures are outside of the Project footprint.

| TABLE 3.4-1                                                                |                                                    |               |                          |
|----------------------------------------------------------------------------|----------------------------------------------------|---------------|--------------------------|
| Previously Reported Historic Architectural Resources within the Study Area |                                                    |               |                          |
| Historic Inventory Number                                                  | Property Name                                      | Property Type | NRHP <sup>a</sup> Status |
| OL-HVH-00007                                                               | CR 119 over Silver Creek                           | Structure     | Not Eligible             |
| OL-VIO-00017                                                               | Great River Ridge State Trail Bridge (MnDOT R0450) | Structure     | Unevaluated              |
| OL-VIO-00018                                                               | Great River Ridge State Trail Bridge (MnDOT R0449) | Structure     | Unevaluated              |
| OL-VIO-00019                                                               | Great River Ridge State Trail Bridge (MnDOT R0448) | Structure     | Unevaluated              |
| OL-VIO-00022                                                               | Great River Ridge State Trail Bridge (MnDOT R0445) | Structure     | Unevaluated              |
| OL-VIO-00023                                                               | Great River Ridge State Trail Bridge               | Structure     | Unevaluated              |
| OL-VIO-00024                                                               | Great River Ridge State Trail Bridge               | Structure     | Unevaluated              |
| OL-VIO-00025                                                               | Great River Ridge State Trail Bridge (MnDOT R0444) | Structure     | Unevaluated              |
| OL-VIO-00026                                                               | Great River Ridge State Trail Bridge (MnDOT R0444) | Structure     | Unevaluated              |

TABLE 3.4-1

**Previously Reported Historic Architectural Resources within the Study Area**

| Historic Inventory Number | Property Name | Property Type | NRHP <sup>a</sup> Status |
|---------------------------|---------------|---------------|--------------------------|
| OL-VIO-00034              | Culvert 97463 | Structure     | Not Eligible             |
| OL-VIO-00035              | Culvert R0213 | Structure     | Unevaluated              |
| OL-VIO-00036              | Culvert R0253 | Structure     | Not Eligible             |
| OL-VIO-00039              | Bridge 88737  | Structure     | Not Eligible             |
| OK-VIO-00040              | Bridge 55J16  | Structure     | Unevaluated              |

<sup>a</sup> NRHP = National Register of Historic Places

### 3.5 HISTORICAL MAP REVIEW

Merjent reviewed nineteenth-century GLO maps and notes on file with the BLM (2024), aerial photographs taken between 1940 to present (OSA 2024; NETRonline 2024; Google 2024), modern aerial imagery from Google Earth, and historical plat maps from 1874 to 1916 (Andreas 1874, Warner and Foote 1878, Geo A. Ogle 1896, Webb Publishing Company 1914, Anderson Publishing Company 1928, W.W. Hixson & Company 1916). The 1853 GLO maps depict no historic features within the Study Area (see Figure 3 in Appendix A). No improvements or cultural features are mentioned in the associated survey notes (BLM 2024).

Review of aerial photographs from 1940 to present show the Study Area as primarily dedicated to agriculture (OSA 2024; NETRonline 2024, Google 2024). Other than a slight increase in structures—presumably farmsteads—over time, the Study Area is agricultural and rural and has remained relatively unchanged between 1940 and present.

Review of historical atlases from 1874 through 1916 (Andreas 1874, Warner and Foote 1878, Geo A. Ogle 1896, Webb Publishing Company 1914, Anderson Publishing Company 1928, W.W. Hixson & Company 1916) shows the area as entirely parceled out with several roads and structures, presumably farmsteads, within the Study Area.

### 3.6 IMPLICATIONS FOR SITE POTENTIAL

The environmental setting and modern land use patterns suggest that archaeological resources may be present in the Project footprint. However, the lack of documented archaeological sites and the paucity of large water bodies and rivers suggests that the Project footprint may have only modest potential to contain precontact archaeological sites. Further, the likelihood of encountering intact cultural resources within the Project footprint is somewhat diminished due to modern disturbance of surface soils from mechanical alteration related to agricultural plowing. Regarding the prevalence of Alfisols in the Project footprint, Alfisols typically have a thin A horizon rich in organic matter and nutrients, a clay-enriched subsoil, and are fertile as they are usually only moderately leached (Soil Survey Staff 1999). Archaeological deposits within Alfisols are often near the ground surface and not deeply buried given their temporal and geospatial formation histories (Holliday 1993); sustained agricultural plowing would both incorporate exposed artifacts within the A horizon and disrupt the geospatial integrity of archaeological deposits. Historic-period artifact scatters are possible in the Project footprint due to the presence of the farmsteads within the Study Area since the end of the nineteenth century. Conversely, remnants of historical occupation have likely been affected by the same ground-disturbing activities discussed previously, likely hindering the integrity of potential sites.

#### **4.0 OBJECTIVES AND METHODS**

The objective of the Phase I archaeological survey was to identify conventional archaeological sites within the Project footprint that are at least 45 years of age. Archaeological resource types considered for this investigation included precontact, contact, and postcontact archaeological sites and earthworks that could provide information about past human occupation. Such sites could be evident in artifacts or features on or below the current ground surface. The focus of this field survey was to identify potentially affected cultural resources within the Project footprint.

Throughout all stages of this investigation Merjent applied industry best practices and adhered to the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (48 Federal Register 44716), the SHPO Manual for Archaeological Projects in Minnesota (Anfinson 2005), and the State Archaeologist's Manual for Archaeological Projects in Minnesota (Anfinson 2011). The Project footprint was based on files provided by Lemon Hill Solar in March 2024.

On May 28, 2024, Merjent, on behalf of Lemon Hill Solar, submitted the Project's Phase I Survey Plan and Methods to the SHPO for review. In a letter dated July 19, 2024, SHPO concurred that the Phase I Survey Plan and Methods were appropriate for the undertaking. The Phase I Survey Plan and Methods defined portions of the Project footprint as areas of high, medium, or low probability of containing archaeological resources and proposed to survey 100 percent of the high and medium probability areas, and 5 percent of the low probability areas. See the Project's Phase I Survey Plan and Methods in Appendix B for a detailed description of the methodology underpinning the survey model.

The pedestrian survey visually inspected for surface features, foundations, densities of surface artifacts, and other surface indications of archaeological sites while considering the safety of the field team. Pedestrian survey was conducted to the exclusion of systematic shovel testing in plowed areas where ground surface visibility (GSV) was greater than 25 percent. Pedestrian survey transects were spaced between 5 and 15 meters based on GSV. An average survey rate of 40 acres per person, per day was expected. Shovel testing was conducted in areas that have not been plowed or that had potential to contain buried cultural material regardless of GSV. Additional shovel tests were excavated regardless of GSV to capture soil profiles within a landform and to determine the depth of the plow zone and assess the potential for deeply buried A horizon soils. Areas determined unsafe to shovel test (i.e., in areas featuring buried utilities) were photographed and documented.

Shovel tests were excavated per SHPO and OSA guidelines; that is, each shovel test measured 30 to 40 centimeters (cm) in diameter and extended no less than 35 cm deep and at least 10 cm into sterile subsoil. For all shovel tests, subsoils were encountered before 50 cm below surface (cmbs); therefore, deeper testing was not needed. Shovel tests were excavated in 10-cm levels. Soils from each stratum were screened separately through 0.25-inch wire mesh onto a tarp. Data from all shovel tests were recorded on standardized forms and located by GPS. Soil profiles were recorded using the Munsell color system and standard texture classifications as well as additional notes and comments (e.g., "disturbed matrix," "heavily compacted," "inundated at 20 cm below the surface," etc.). Once completed, each shovel test was immediately backfilled.

If an artifact or artifacts were found on the ground surface, a formal surface collection commenced. Surface collection included all historic, potentially historic, non-diagnostic, and precontact artifacts per SHPO and OSA guidelines. When an artifact or artifacts were encountered on the surface or



in a shovel test, additional shovel testing was conducted in the four cardinal directions, spaced at 5-meter intervals, to delineate the site boundary.

The location of all shovel tests, surface artifacts, and features were mapped and recorded with a Trimble R1 Integrated Global Navigation Satellite System receiver and Esri Field Maps at sub-meter accuracy. Digital photography was used to record surface conditions of all Project footprint, select excavation profiles, cultural features, and identified archaeological sites. Overview photographs were taken of the areas surveyed and landforms. Additional photographs were taken to document specific disturbances, archaeological sites, artifacts, land use patterns, landforms, and anything else that would contribute to describing the survey and Project footprint.

#### **4.1 NRHP SITE EVALUATION CRITERIA**

Merjent evaluates sites and their significance, as defined by criteria set forth in Title 36 Code of Federal Regulations (CFR) 60.4 (National Park Service 1991), which state:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- A. that are associated with events that have made a significant contribution to the broad patterns of our history;
- B. that are associated with the lives of persons significant in our past;
- C. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D. that have yielded, or may be likely to yield, information important in prehistory or history.

Sites that are not eligible are unlikely to contribute further data significant to our knowledge of prehistory or history and/or may no longer possess integrity.

##### **4.1.1 Precontact Archaeological Sites**

Precontact lithic scatters/open camps (sites without any structures or association with known significant events or persons) usually do not merit discussion of Criteria A, B, and C. Rather, for NRHP recommendation purposes, these property types are discussed for their potential to yield information significant to the precontact period or the archaeological record under NRHP Criterion D. Special cases generally relate to Criterion A, where a precontact site type (such as a stone circle site) may not be recommended eligible for the NRHP from an archaeological perspective but may be considered important to cultures of Native American Tribes (Parker and King 1998).

Evaluation of the significance of archaeological sites under Criterion D involves considering general characteristics such as the nature, size, and diversity of the site assemblage; the potential presence or absence of intact subsurface cultural deposits; the depth that the deposits are buried; the nature of any features within the site (construction techniques, building materials, structural integrity); and the age range reflected by the site assemblage. Sites considered to be significant

usually contain an assemblage of cultural artifacts and/or features that indicate sufficient diversity to permit identification of activities and allow confirmation of the period of site use. The integrity of archaeological sites is addressed using the guidelines presented in National Register Bulletin 15 (National Park Service 1991), which defines the seven elements of integrity as location, design, setting, materials, workmanship, feeling, and association and occasionally evaluated using the guidelines presented in Little et al. (2000). Sites with the most potential to address research questions about human lifeways contain associated features, structures, and/or relatively intact and dateable artifacts.

## **5.0 SURVEY RESULTS**

The Phase I archaeological survey of 1,622 acres (this acreage is composed of 100 percent of the high and medium probability areas and at least 5 percent of the low probability areas) was conducted between October 21 and November 2, 2024, by Merjent archaeologists Aaron Armstrong-Duarte (October 29 to November 1), Jacob Seaton (October 21 to 26), Paige Englert (October 24 to November 2), Sabin Wright (October 21 to November 2), Courtney Laine (October 21 to 26), Kristina Budde (October 21 to 26), Mathias Thiesen (October 21 to 26), and Eric Bangs (October 29 to November 1). Dr. Armstrong-Duarte served as the principal investigator and meets the Secretary of the Interior's Professional Qualification Standards for Archaeology as published in 36 CFR 61.

The Project is set in a rural area of Olmsted County (see Figure 1 in Appendix A). The 1,906-acre Project footprint is composed largely of plowed agricultural fields; a pasture; road ROWs; steep-sided ravines, drainages, marshes, and hill slopes; and NWI-defined wetlands (see Figure 4 in Appendix A). There were 779 acres of high, 674 acres of medium, and 453 acres of land defined as having low probability of containing archaeological sites (see the Phase I Survey Plan and Methods in Appendix B for a description of the probability model). Within the high, medium, and low probability areas there were 166 acres of ravines, drainages, marshes, and hill slopes, and 108 acres of NWI-defined wetlands. As the Project footprint is sprawled across a wide landscape, the survey results are organized and summarized below by Township, Range, and Section in results matrices.

The 498 shovel tests excavated throughout the Project footprint indicated that the A horizon was relatively shallow and did not extend deeper than 30 cmbs. All shovel tests were excavated to at least 10 cm into subsoil; the average shovel test depth was 44 cmbs; multiple shovel tests were excavated to at least 60 cmbs. There was no evidence of deep or buried A horizons. Therefore, within the plowed agricultural fields, the A horizon has been habitually turned and pedestrian survey is an effective method of sampling the landscape for archaeological deposits.

**5.1 SECTION 7 OF TOWNSHIP 107 NORTH AND RANGE 12 WEST**

The section was composed of harvested corn and soybean fields and a field of standing corn (see Photos 5.1-1 and 5.1-2 and Table 5.1-1 below and Figures 4.5 and 4.7 in Appendix A). There were three drainages flanked by NWI-defined wetlands and marshes (see Photo 5.1-3 below and Figures 4.5 and 4.7 in Appendix A), as well as a steeply sloped ravine (see Photo 5.1-4 below and Figures 4.5 and 4.7 in Appendix A), and steeply sloped and wooded terrace (see Photo 5.1-5 below and Figures 4.5 and 4.7 in Appendix A).

| TABLE 5.1-1                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                              |                                      |                           |                                                                     |                  |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------|--------------------------------------|---------------------------|---------------------------------------------------------------------|------------------|
| Survey Results Section 7, Township 107 North, Range 12 West |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                              |                                      |                           |                                                                     |                  |
|                                                             | Acres Within<br>the Project<br>Footprint                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Acres<br>Surveyed | Percent<br>Acres<br>Surveyed | GSV in<br>Agricultural<br>field(s)   | Shovel Tests<br>Excavated | Positive<br>Shovel<br>Tests/<br>Cultural<br>Resources<br>Identified | Surface<br>Finds |
| Total Project<br>Footprint in<br>Section                    | 48                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 48                | 100%                         | 25–50%<br>(see Photo<br>5.1-6 below) | 4                         | 0                                                                   | 0                |
| High<br>Probability                                         | 42                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 42                | 100%                         | -                                    | -                         | -                                                                   | -                |
| Medium<br>Probability                                       | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 7                 | 100%                         | -                                    | -                         | -                                                                   | -                |
| Low<br>Probability                                          | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                 | 0%                           | -                                    | -                         | -                                                                   | -                |
| Ravines/<br>Drainages/<br>Marshes/<br>Hillslopes            | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | -                 | -                            | -                                    | -                         | -                                                                   | -                |
| NWI-Defined<br>Wetlands                                     | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -                 | -                            | -                                    | -                         | -                                                                   | -                |
| Shovel Test<br>Profile(s):                                  | <p>1 shovel test: Ap horizon of silty loam (10YR 3/2) to 22 cmbs with an abrupt transition to a C horizon of silty loam (10YR 4/4) to 42 cmbs</p> <p>1 shovel test: Ap horizon of silty clay loam (10YR 3/2) to 25 cmbs with an abrupt transition to a B horizon of silty clay loam (10YR 4/4) to 45 cmbs</p> <p>2 shovel tests: Ap horizon of silty loam (10YR 5/1) to 20.5<sup>±1.5</sup> cmbs with a smooth transition to an A horizon of silty loam (10YR 4/1) to 33<sup>±3</sup> cmbs to an abrupt transition to a B horizon of sandy loam (10YR 4/3) to 48.5<sup>±2.5</sup> cmbs (see Photo 5.1-7 below)</p> |                   |                              |                                      |                           |                                                                     |                  |

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**Photo 5.1-1. Overview of harvested corn field sloped toward NWI-defined wetland, facing southeast.**



**Photo 5.1-2. Overview of harvested soybean field, facing east.**



**Photo 5.1-3. Example of sloped drainage, facing northeast.**



**Photo 5.1-4. Example of steeply sloped ravine (in distance), facing southeast.**



**Photo 5.1-5. Example of a wooded terrace slope, facing west.**



**Photo 5.1-6. Example of GSV in harvested soybean field, facing ground.**





Photo 5.1-7. Example of shovel test profile, facing ground.

## 5.2 SECTION 17 OF TOWNSHIP 107 NORTH AND RANGE 12 WEST

The section was composed of harvested soybean fields (see Photos 5.2-1 and 5.2-2 and Table 5.2-1 below and Figures 4.7 and 4.8 in Appendix A). There was a large drainage flanked by NWI-defined wetlands and marshes (see Photo 5.2-3 below and Figures 4.7 and 4.8 in Appendix A). The drainage was set within a steeply sloped ravine (see Photo 5.2-4 below and Figures 4.7 and 4.8 in Appendix A). The section also included road ROW featuring a borrow and buried utilities (see Photo 5.2-5 below and Figures 4.7 and 4.8 in Appendix A).

| TABLE 5.2-1                                                  |                                             |                   |                              |                                                         |                              |                                                                     |                  |
|--------------------------------------------------------------|---------------------------------------------|-------------------|------------------------------|---------------------------------------------------------|------------------------------|---------------------------------------------------------------------|------------------|
| Survey Results Section 17, Township 107 North, Range 12 West |                                             |                   |                              |                                                         |                              |                                                                     |                  |
|                                                              | Acres<br>Within the<br>Project<br>Footprint | Acres<br>Surveyed | Percent<br>Acres<br>Surveyed | GSV in Agricultural<br>field(s)                         | Shovel<br>Tests<br>Excavated | Positive<br>Shovel<br>Tests/<br>Cultural<br>Resources<br>Identified | Surface<br>Finds |
| Total Project<br>Footprint in<br>Section                     | 77                                          | 77                | 100%                         | 25–75%<br>(see Photo 5.2-2, 5.2-<br>6, and 5.2-7 below) | 4                            | 0                                                                   | 0                |
| High<br>Probability                                          | 48                                          | 48                | 100%                         | -                                                       | -                            | -                                                                   | -                |
| Medium<br>Probability                                        | 27                                          | 27                | 100%                         | -                                                       | -                            | -                                                                   | -                |
| Low<br>Probability                                           | 3                                           | 3                 | 100%                         | -                                                       | -                            | -                                                                   | -                |
| Ravines/<br>Drainages/<br>Marshes/<br>Hillslopes             | 30                                          | -                 | -                            | -                                                       | -                            | -                                                                   | -                |
| NWI-<br>Defined<br>Wetlands                                  | 5                                           | -                 | -                            | -                                                       | -                            | -                                                                   | -                |



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| TABLE 5.2-1                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Survey Results Section 17, Township 107 North, Range 12 West |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Shovel Test Profile(s):                                      | <p>2 shovel tests: Ap horizon of silty loam (10YR 3/1 to 10YR 3/2) to 24<sup>±2</sup> cmbs with an abrupt transition to a C horizon of silty clay loam (10YR 4/3) to 43.5<sup>±1.5</sup> cmbs</p> <p>2 shovel tests: Ap horizon of silty loam (10YR 5/1) to 24.5<sup>±2.5</sup> cmbs with a smooth transition to an A horizon of silty loam (10YR 4/1) to 31.5<sup>±1.5</sup> cmbs to an abrupt transition to a B horizon of sandy loam (10YR 4/3) to 50<sup>±1</sup> cmbs (see Photo 5.2-8 below)</p> |



**Photo 5.2-1. Overview of harvested soybean field (ravine in distance), facing north.**



**Photo 5.2-2. Overview of harvested soybean field and 50 percent GSV, facing south.**



**Photo 5.2-3. Steeply sloped drainage, facing southeast.**



**Photo 5.2-4. Overview of portion of the ravine, facing northeast.**



**Photo 5.2-5. Road ROW and borrow, facing west.**



**Photo 5.2-6. Overview example of 25 percent GSV in harvested soybean field, facing west.**



**Photo 5.2-7. Example of 75 percent GSV, facing ground.**



**Photo 5.2-8. Example of shovel test profile, facing ground.**

### **5.3 SECTION 18 OF TOWNSHIP 107 NORTH AND RANGE 12 WEST**

The section was composed of harvested soybean fields, standing corn fields, and a fallow field set on hill slope (see Photos 5.3-1, 5.3-2, and 5.3-3 and Table 5.3-1 below and Figures 4.5 to 4.8 in Appendix A). There was also a drainage flanked by slope and marshes (see Photo 5.3-4 below and Figures 4.5 to 4.8 in Appendix A), NWI-defined wetlands (see Photo 5.3-5 below and Figures 4.5 to 4.8 in Appendix A), and road ROWs featuring borrows and buried utilities (see Photo 5.3-6 below and Figures 4.5 to 4.8 in Appendix A).



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| TABLE 5.3-1                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                   |                              |                                                    |                           |                                                                     |                  |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------|----------------------------------------------------|---------------------------|---------------------------------------------------------------------|------------------|
| Survey Results Section 18, Township 107 North, Range 12 West |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                   |                              |                                                    |                           |                                                                     |                  |
|                                                              | Acres Within<br>the Project<br>Footprint                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Acres<br>Surveyed | Percent<br>Acres<br>Surveyed | GSV in<br>Agricultural<br>field(s)                 | Shovel Tests<br>Excavated | Positive<br>Shovel<br>Tests/<br>Cultural<br>Resources<br>Identified | Surface<br>Finds |
| Total Project<br>Footprint in<br>Section                     | 136                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 129               | 95%                          | 25–75%<br>(see Photos<br>5.3-7 and<br>5.3-8 below) | 14                        | 0                                                                   | 1                |
| High<br>Probability                                          | 46                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 46                | 100%                         | -                                                  | -                         | -                                                                   | -                |
| Medium<br>Probability                                        | 66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 66                | 100%                         | -                                                  | -                         | -                                                                   | -                |
| Low<br>Probability                                           | 24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 17                | 70%                          | -                                                  | -                         | -                                                                   | -                |
| Ravines/<br>Drainages/<br>Marshes/<br>Hillslopes             | 22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -                 | -                            | -                                                  | -                         | -                                                                   | -                |
| NWI-Defined<br>Wetlands                                      | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -                 | -                            | -                                                  | -                         | -                                                                   | -                |
| Shovel Test<br>Profile(s):                                   | <p>1 shovel test: Ap horizon of silty loam (10YR 5/3) to 18 cmbs with a smooth transition to an AB horizon of silty loam (10YR 5/3 to 10YR 5/6) to 23 cmbs with a smooth transition to a B horizon of silty clay loam (10YR 5/1) to 40 cmbs (see Photo 5.3-9 below)</p> <p>2 shovel tests: Ap horizon of silty loam (10YR 3/1 to 10YR 3/2) to 22<sup>±2</sup> cmbs with an abrupt transition to a B horizon of silty clay loam (10YR 5/1) to 39.5<sup>±1.5</sup> cmbs</p> <p>3 shovel tests: Ap horizon of silty loam (10YR 2/2) to 26.5<sup>±5.5</sup> cmbs with an abrupt transition to a C horizon of silty clay loam (10YR 4/3) to 45.5<sup>±3.5</sup> cmbs</p> <p>8 shovel tests: Ap horizon of silty loam (10YR 4/1) to 16.25<sup>±6.75</sup> cmbs with a smooth transition to an A horizon of silty loam (10YR 4/1) to 24.5<sup>±3.5</sup> cmbs to an abrupt transition to a B horizon of sandy loam (10YR 4/3) to 37.5<sup>±7.5</sup> cmbs (see Photo 5.3-10 below)</p> |                   |                              |                                                    |                           |                                                                     |                  |



**Photo 5.3-1. Overview of harvested soybean field, facing west.**



**Photo 5.3-2. Overview standing corn field, facing north.**





**Photo 5.3-3. Overview of fallow field on hill side slope, facing north.**



**Photo 5.3-4. Overview of drainage flanked by slope and marshes, facing north.**



**Photo 5.3-5. Overview of NWI-defined wetland, facing northwest.**



**Photo 5.3-6. Road ROW and borrow, facing west.**



**Photo 5.3-7. Example of 25 percent GSV in corn field, facing ground.**



**Photo 5.3-8. Example of 50 percent GSV in soybean field, facing ground.**





Photo 5.3-9. Example of shovel test profile, facing ground.



Photo 5.3-10. Example of shovel test profile, facing ground.

#### 5.4 SECTION 19 OF TOWNSHIP 107 NORTH AND RANGE 12 WEST

The section was composed of a harvested and plowed corn field (see Photo 5.4-1 and Table 5.4-1 below and Figures 4.6, 4.8, and 4.9 in Appendix A); a drainage set within a steeply sloped ravine (see Photo 5.4-2 below and Figures 4.6, 4.8, and 4.9 in Appendix A); a forested space set on a ravine slope (see Photo 5.4-3 below and Figures 4.6, 4.8, and 4.9 in Appendix A); a work and farm equipment storage space (see Photo 5.4-4 below and Figures 4.6, 4.8, and 4.9 in Appendix A); and road ROWs featuring borrows (see Photo 5.4-5 below and Figures 4.6, 4.8, and 4.9 in Appendix A).

| TABLE 5.4-1                                                  |                                          |                   |                              |                                    |                           |                                                                     |                  |
|--------------------------------------------------------------|------------------------------------------|-------------------|------------------------------|------------------------------------|---------------------------|---------------------------------------------------------------------|------------------|
| Survey Results Section 19, Township 107 North, Range 12 West |                                          |                   |                              |                                    |                           |                                                                     |                  |
|                                                              | Acres Within<br>the Project<br>Footprint | Acres<br>Surveyed | Percent<br>Acres<br>Surveyed | GSV in<br>Agricultural<br>field(s) | Shovel Tests<br>Excavated | Positive<br>Shovel<br>Tests/<br>Cultural<br>Resources<br>Identified | Surface<br>Finds |
| Total Project<br>Footprint in<br>Section                     | 128                                      | 121               | 100%                         | 50–75%<br>(see Photo<br>5.4-6)     | 6                         | 0                                                                   | 0                |
| High<br>Probability                                          | 39                                       | 39                | 100%                         | -                                  | -                         | -                                                                   | -                |
| Medium<br>Probability                                        | 66                                       | 66                | 100%                         | -                                  | -                         | -                                                                   | -                |
| Low<br>Probability                                           | 22                                       | 15                | 68%                          | -                                  | -                         | -                                                                   | -                |
| Ravines/<br>Drainages/<br>Marshes/<br>Hillslopes             | 2                                        | -                 | -                            | -                                  | -                         | -                                                                   | -                |
| NWI-Defined<br>Wetlands                                      | 0                                        | -                 | -                            | -                                  | -                         | -                                                                   | -                |



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| TABLE 5.4-1                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |                              |                                    |                           |                                                                     |                  |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------|------------------------------------|---------------------------|---------------------------------------------------------------------|------------------|
| Survey Results Section 19, Township 107 North, Range 12 West |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |                              |                                    |                           |                                                                     |                  |
|                                                              | Acres Within<br>the Project<br>Footprint                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Acres<br>Surveyed | Percent<br>Acres<br>Surveyed | GSV in<br>Agricultural<br>field(s) | Shovel Tests<br>Excavated | Positive<br>Shovel<br>Tests/<br>Cultural<br>Resources<br>Identified | Surface<br>Finds |
| Shovel Test<br>Profile(s):                                   | <p>3 shovel tests: Ap horizon of silty loam (10YR 2/2 to 10YR 3/1) to 25<sup>±4</sup> cmbs with a gradual transition to a B horizon of silty clay loam (10YR 4/1) to 44.5<sup>±4.5</sup> cmbs (see Photo 5.4-7 below)</p> <p>3 shovel tests: Ap horizon of silty loam (10YR 5/4) to 19.5<sup>±3.5</sup> cmbs with a smooth transition to an A horizon of silty loam (10YR 4/1) to 23.5<sup>±1.5</sup> cmbs to an abrupt transition to a B horizon of clay loam (10YR 2/2) to 43.5<sup>±2.5</sup> cmbs (see Photo 5.4-8 below)</p> |                   |                              |                                    |                           |                                                                     |                  |



**Photo 5.4-1. Overview of harvested and plowed corn field, facing south.**



**Photo 5.4-2. Drainage set within steeply sloped ravine, facing west.**



**Photo 5.4-3. Forested space set on ravine slope, facing northwest.**



**Photo 5.4-4. Work and farm equipment storage space, facing west.**





Photo 5.4-5. Overview of road and ROW, facing south.



Photo 5.4-6. Example of 75 percent GSV, facing ground.



Photo 5.4-7. Example of shovel test profile, facing ground.



Photo 5.4-8. Example of shovel test profile, facing ground.

## 5.5 SECTION 20 OF TOWNSHIP 107 NORTH AND RANGE 12 WEST

The section was composed of harvested and plowed corn fields and harvested corn fields (see Photos 5.5-1 and 5.5-2 and Table 5.5-1 below and Figures 4.1, 4.8, and 4.9 in Appendix A); forested and steep ravine slope (see Photo 5.5-3 below and Figures 4.1, 4.8, and 4.9 in Appendix A); and road ROWs featuring borrows (see Photo 5.5-4 below and Figures 4.1, 4.8, and 4.9 in Appendix A).

| TABLE 5.5-1                                                  |                |                        |                              |                        |                                                      |               |
|--------------------------------------------------------------|----------------|------------------------|------------------------------|------------------------|------------------------------------------------------|---------------|
| Survey Results Section 20, Township 107 North, Range 12 West |                |                        |                              |                        |                                                      |               |
| Acres Within the Project Footprint                           | Acres Surveyed | Percent Acres Surveyed | GSV in Agricultural field(s) | Shovel Tests Excavated | Positive Shovel Tests/ Cultural Resources Identified | Surface Finds |

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| TABLE 5.5-1                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |      |                                        |   |   |   |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|----------------------------------------|---|---|---|
| Survey Results Section 20, Township 107 North, Range 12 West |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |      |                                        |   |   |   |
| Total Project Footprint in Section                           | 204                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 204 | 100% | 25–75%<br>(see Photos 5.5-5 and 5.5-6) | 7 | 0 | 0 |
| High Probability                                             | 104                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 104 | 100% | -                                      | - | - | - |
| Medium Probability                                           | 89                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 89  | 100% | -                                      | - | - | - |
| Low Probability                                              | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 12  | 100% | -                                      | - | - | - |
| Ravines/<br>Drainages/<br>Marshes/<br>Hillslopes             | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -   | -    | -                                      | - | - | - |
| NWI-Defined Wetlands                                         | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -   | -    | -                                      | - | - | - |
| Shovel Test Profile(s):                                      | <p>1 shovel test: Ap horizon of silty loam (10YR 3/2) to 22 cmbs with an abrupt transition to a C horizon of silty loam (10YR 4/4) to 42 cmbs</p> <p>1 shovel test: Ap horizon of silty sandy loam (10YR 2/2) to 18 cmbs with a gradual transition to an AB horizon of sandy loam (10YR 2/2 and 10YR 4/1) to 26 cmbs to a B horizon of sandy clay loam (10YR 4/3) to 39 cmbs</p> <p>2 shovel tests: Ap horizon of silty loam (10YR 2/2 to 10YR 3/1) to 21<sup>±4.5</sup> cmbs with a gradual transition to a B horizon of silty clay loam (10YR 4/1) to 40.5<sup>±2.5</sup> cmbs (see Photo 5.5-7 below)</p> <p>3 shovel tests: Ap horizon of silty loam (10YR 4/2 to 10YR 4/4) to 23.5<sup>±3.5</sup> cmbs with a smooth transition to an A horizon of silty loam (10YR 5/4) to 27.5<sup>±1.5</sup> cmbs to an abrupt transition to a B horizon of clay loam (10YR 5/6) to 44.5<sup>±2.5</sup> cmbs (see Photo 5.5-8 below)</p> |     |      |                                        |   |   |   |



**Photo 5.5-1. Overview of harvested and plowed corn field, facing north.**



**Photo 5.5-2. Overview of harvested corn field, facing south.**





**Photo 5.5-3. Forested and steep ravine slope, facing northwest.**



**Photo 5.4-4. Overview of road ROW and borrow, facing south**



**Photo 5.5-5. Example of 25 percent GSV in harvested corn field, facing ground.**



**Photo 5.5-6. Example of 75 percent GSV in harvested and plowed corn field, facing north.**



**Photo 5.5-7. Example of shovel test profile, facing ground.**



**Photo 5.5-8. Example of shovel test profile, facing ground.**



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## 5.6 SECTION 29 OF TOWNSHIP 107 NORTH AND RANGE 12 WEST

The section was composed of harvested and plowed corn fields, harvested corn fields, and a harvested soybean field (see Photos 5.6-1, 5.6-2, and 5.6-3 and Table 5.6-1 below and Figures 4.1 and 4.9 in Appendix A). There were also two drainages and NWI-defined wetlands set within steeply sided ravines (see Photos 5.6-4 and 5.6-5 below and Figures 4.1 and 4.9 in Appendix A).

| TABLE 5.6-1                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |                              |                                                   |                              |                                                                     |                  |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------|---------------------------------------------------|------------------------------|---------------------------------------------------------------------|------------------|
| Survey Results Section 29, Township 107 North, Range 12 West |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |                              |                                                   |                              |                                                                     |                  |
|                                                              | Acres<br>Within the<br>Project<br>Footprint                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Acres<br>Surveyed | Percent<br>Acres<br>Surveyed | GSV in Agricultural<br>field(s)                   | Shovel<br>Tests<br>Excavated | Positive<br>Shovel<br>Tests/<br>Cultural<br>Resources<br>Identified | Surface<br>Finds |
| Total Project<br>Footprint in<br>Section                     | 191                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 182               | 95%                          | 25–75%<br>(see Photos 5.6-1,<br>5.6-6, and 5.6-7) | 6                            | 0                                                                   | 0                |
| High<br>Probability                                          | 113                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 113               | 100%                         | -                                                 | -                            | -                                                                   | -                |
| Medium<br>Probability                                        | 56                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 56                | 100%                         | -                                                 | -                            | -                                                                   | -                |
| Low<br>Probability                                           | 22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 13                | 58%                          | -                                                 | -                            | -                                                                   | -                |
| Ravines/<br>Drainages/<br>Marshes/<br>Hillslopes             | 18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -                 | -                            | -                                                 | -                            | -                                                                   | -                |
| NWI-<br>Defined<br>Wetlands                                  | 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -                 | -                            | -                                                 | -                            | -                                                                   | -                |
| Shovel Test<br>Profile(s):                                   | <p>1 shovel test: Ap horizon of silty loam (10YR 3/2) to 27 cmbs with an abrupt transition to a B horizon of silty clay loam (10YR 4/4) to 44 cmbs</p> <p>1 shovel test: Ap horizon of silty sandy loam (10YR 2/2) to 14 cmbs with a gradual transition to an AB/E horizon of sandy loam (10YR 2/2 and 10YR 4/1) to 24 cmbs to a B horizon of sandy clay loam (10YR 4/3) to 40 cmbs</p> <p>1 shovel test: Ap horizon of silty loam (10YR 3/1) to 21 cmbs with a gradual transition to a B horizon of silty clay loam (10YR 4/1) to 40 cmbs</p> <p>3 shovel tests: Ap horizon of silty loam (10YR 4/1) to 22<sup>±2</sup> cmbs with a smooth transition to a B horizon of silty loam (10YR 5/4) to 38.5<sup>±5.5</sup> cmbs (see Photo 5.6-8 below)</p> |                   |                              |                                                   |                              |                                                                     |                  |

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**Photo 5.6-1. Overview of harvested and plowed corn field, facing north.**



**Photo 5.6-2. Overview of harvested corn field, facing west.**



**Photo 5.6-3. Overview of harvested soybean field, facing north.**



**Photo 5.6-4. Drainage and NWI-defined wetland set within a ravine, facing south**



**Photo 5.6-5. Steeply sided ravine slope and drainage, facing southwest.**



**Photo 5.6-6. Example of 25 percent GSV in harvested corn field, facing ground.**





Photo 5.6-7. Example of 50 percent GSV in harvested soybean field, facing ground.



Photo 5.6-8. Example of shovel test profile, facing ground.

## 5.7 SECTION 11 OF TOWNSHIP 107 NORTH AND RANGE 13 WEST

The section was composed of a harvested corn field and pasture (see Photos 5.7-1 and 5.7-2 and Table 5.7-1 below and Figures 4.1 and 4.2 in Appendix A); two drainages set within NWI-defined wetlands (see Photos 5.7-3 and 5.7-4 below and Figures 4.1 and 4.2 in Appendix A); steep hill slope adjacent to the drainages (see Photo 5.7-5 below and Figures 4.1 and 4.2 in Appendix A); a buried natural gas pipeline (see Photo 5.7-6 below and Figures 4.1 and 4.2 in Appendix A); and an occupied contemporary house.

| TABLE 5.7-1                                                  |                                          |                   |                              |                                    |                           |                                                                     |                  |
|--------------------------------------------------------------|------------------------------------------|-------------------|------------------------------|------------------------------------|---------------------------|---------------------------------------------------------------------|------------------|
| Survey Results Section 11, Township 107 North, Range 13 West |                                          |                   |                              |                                    |                           |                                                                     |                  |
|                                                              | Acres Within<br>the Project<br>Footprint | Acres<br>Surveyed | Percent<br>Acres<br>Surveyed | GSV in<br>Agricultural<br>field(s) | Shovel Tests<br>Excavated | Positive<br>Shovel<br>Tests/<br>Cultural<br>Resources<br>Identified | Surface<br>Finds |
| Total Project<br>Footprint in<br>Section                     | 156                                      | 94                | 60%                          | 0–25%<br>(see Photo<br>5.7-7)      | 409                       | 0                                                                   | 0                |
| High<br>Probability                                          | 51                                       | 51                | 100%                         | -                                  | -                         | -                                                                   | -                |
| Medium<br>Probability                                        | 40                                       | 40                | 100%                         | -                                  | -                         | -                                                                   | -                |
| Low<br>Probability                                           | 65                                       | 3                 | 5%                           | -                                  | -                         | -                                                                   | -                |
| Ravines/<br>Drainages/<br>Marshes/<br>Hillslopes             | 30                                       | -                 | -                            | -                                  | -                         | -                                                                   | -                |
| NWI-Defined<br>Wetlands                                      | 18                                       | -                 | -                            | -                                  | -                         | -                                                                   | -                |

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| TABLE 5.7-1                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Survey Results Section 11, Township 107 North, Range 13 West |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Shovel Test Profile(s):                                      | <p>3 shovel tests: Ap horizon of silty loam (10YR 3/2) to 27.5<sup>±2.5</sup> cmbs with an abrupt transition to a B horizon of silty clay loam (10YR 4/4) to 42.5<sup>±1.5</sup> cmbs</p> <p>3 shovel tests: Ap horizon of silty sandy loam (10YR 2/2) to 19.5<sup>±4.5</sup> cmbs with a gradual transition to an AB horizon of sandy loam (10YR 2/2 and 10YR 4/1) to 27.5<sup>±2.5</sup> cmbs to a B horizon of sandy clay loam (10YR 4/3) to 43.5<sup>±4.5</sup> cmbs</p> <p>3 shovel tests: Ap horizon of silty loam (10YR 2/2) to 26<sup>±3.5</sup> cmbs with a gradual transition to a B horizon of silty clay loam (10YR 4/1) to 42<sup>±4</sup> cmbs</p> <p>9 shovel tests: A/O horizon of loam and organics (10YR 2/1) to 22.5<sup>±3.5</sup> cmbs with a gradual transition to an A horizon of silty loam (10YR 3/1) to 31.5<sup>±4.5</sup> cmbs with an abrupt transition to a B horizon of clay loam (10YR 4/1 to 10YR 4/3) to 46.25<sup>±5.75</sup> cmbs</p> <p>11 shovel tests: Ap horizon of silty loam (7.5YR 6/4) to 24.25<sup>±4.75</sup> cmbs with an abrupt transition to a B horizon of silty clay loam (7.5YR 5/8) to 45.5<sup>±3.5</sup> cmbs (see Photo 5.7-8 below)</p> <p>35 shovel tests: Ap horizon of silty loam (10YR 5/1 to 10YR 5/3) to 21.25<sup>±7.75</sup> cmbs with a gradual transition to a B horizon of silty loam (10YR 5/6 to 10YR 5/8) to 48.25<sup>±10.75</sup> cmbs (see Photo 5.7-9 below)</p> <p>88 shovel tests: Ap horizon of silty loam (10YR 5/1 to 10YR 5/3) to 17.5<sup>±6.5</sup> cmbs with a gradual transition to an AB horizon of silty loam (10YR 5/1 to 10YR 5/3 and 10YR 4/3 to 10YR 4/6) to 26.25<sup>±5.25</sup> cmbs with a gradual transition to a B horizon of silty clay loam (10YR 4/3 to 10YR 4/6) to 46.5<sup>±11.5</sup> (see Photo 5.7-10 below)</p> <p>257 shovel tests: Ap horizon of silty loam (7.5YR 5/3 to 7.5YR 5/8) to 17.25<sup>±6.75</sup> cmbs with a smooth transition to a B horizon of silty loam (10YR 4/3 to 10YR 4/6) to 45.5<sup>±10.5</sup> cmbs (see Photo 5.7-11 below)</p> |



**Photo 5.7-1. Overview of harvested corn field, facing south.**



**Photo 5.7-2. Overview of pasture, facing east.**





**Photo 5.7-3. Overview of drainage and NWI-defined wetland, facing east.**



**Photo 5.7-4. Overview of drainage and NWI-defined wetland, facing south**



**Photo 5.7-5. Example of steep slope adjacent drainage, facing west.**



**Photo 5.7-6. Buried pipeline marker, facing northwest.**



**Photo 5.7-7. Example of 25 percent GSV in harvested corn field, facing ground.**



**Photo 5.7-8. Example of shovel test profile, facing ground.**





**Photo 5.7-9. Example of shovel test profile, facing ground.**



**Photo 5.7-10. Example of shovel test profile, facing ground.**



**Photo 5.7-11. Example of shovel test profile, facing ground.**

## **5.8 SECTION 12 OF TOWNSHIP 107 NORTH AND RANGE 13 WEST**

The section was composed of harvested soybean and corn fields (see Photos 5.8-1 and 5.8-2 and Table 5.8-1 below and Figures 4.1, 4.2, and 4.5 in Appendix A). There were also four drainages flanked by NWI-defined wetlands and marshes, three of which were set within steep-sided ravines (see Photos 5.8-3, 5.8-4, and 5.8-5 below and Figures 4.1, 4.2, and 4.5 in Appendix A); forested and steep hill slopes adjacent to portions of the drainages (see Photo 5.8-6 below and Figures 4.1, 4.2, and 4.5 in Appendix A); and steep-sided terraces within harvested agricultural fields (see Photo 5.8-7 below and Figures 4.1, 4.2, and 4.5 in Appendix A).

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| TABLE 5.8-1                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                              |                                                    |                           |                                                                     |                  |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------|----------------------------------------------------|---------------------------|---------------------------------------------------------------------|------------------|
| Survey Results Section 12, Township 107 North, Range 13 West |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                              |                                                    |                           |                                                                     |                  |
|                                                              | Acres Within<br>the Project<br>Footprint                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Acres<br>Surveyed | Percent<br>Acres<br>Surveyed | GSV in<br>Agricultural<br>field(s)                 | Shovel Tests<br>Excavated | Positive<br>Shovel<br>Tests/<br>Cultural<br>Resources<br>Identified | Surface<br>Finds |
| Total Project<br>Footprint in<br>Section                     | 336                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 297               | 88%                          | 25–50%<br>(see Photos<br>5.8-8 and<br>5.8-9 below) | 14                        | 0                                                                   | 0                |
| High<br>Probability                                          | 143                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 143               | 100%                         | -                                                  | -                         | -                                                                   | -                |
| Medium<br>Probability                                        | 111                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 11                | 100%                         | -                                                  | -                         | -                                                                   | -                |
| Low<br>Probability                                           | 82                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 44                | 54%                          | -                                                  | -                         | -                                                                   | -                |
| Ravines/<br>Drainages/<br>Marshes/<br>Hillslopes             | 42                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -                 | -                            | -                                                  | -                         | -                                                                   | -                |
| NWI-Defined<br>Wetlands                                      | 33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -                 | -                            | -                                                  | -                         | -                                                                   | -                |
| Shovel Test<br>Profile(s):                                   | 1 shovel test: Ap horizon of silty sandy loam (10YR 4/4) to 24 cmbs with an abrupt transition to a B horizon of mottled silty sandy clay loam (10YR 4/4 and 10YR 5/1) to 45 cmbs.<br>1 shovel tests: Ap horizon of silty loam (10YR 2/1) to 24 cmbs with an abrupt transition to a B horizon of silty loam (10YR 5/6) to 48 cmbs.<br>5 shovel tests: Ap horizon of silty loam (10YR 4/1 to 10YR 4/2) to 19.5 <sup>±5.5</sup> cmbs with a gradual transition to a B horizon of silty loam (10YR 3/1 to 10YR 3/2) to 42.5 <sup>±4.5</sup> cmbs (see Photo 5.8-10 below).<br>7 shovel tests: Ap horizon of silty loam (7.5YR 5/3 to 7.5YR 5/4) to 22.5 <sup>±4.5</sup> cmbs with a gradual transition to a B horizon of silty loam (10YR 4/3 to 10YR 4/4) to 44.5 <sup>±4.5</sup> cmbs (see Photo 5.8-11 below). |                   |                              |                                                    |                           |                                                                     |                  |



**Photo 5.8-1. Overview of harvested corn field, facing south.**



**Photo 5.8-2. Overview of harvested corn field, facing east.**





**Photo 5.8-3. Overview of drainage and NWI-defined wetland set within a ravine, facing east.**



**Photo 5.8-4. Overview of drainage and NWI-defined wetland set within a ravine, facing northwest**



**Photo 5.8-5. Overview of drainage and NWI-defined wetland, facing east.**



**Photo 5.8-6. Forested and steep hill slope adjacent to drainage, facing northwest.**



**Photo 5.8-7. Steep-sided terrace within a harvested corn field, facing east.**



**Photo 5.8-8. Example of 25 percent GSV in harvested corn field, facing ground.**





**Photo 5.8-9. Example of 50 percent GSV in harvested soybean field, facing ground.**



**Photo 5.8-10. Example of shovel test profile, facing ground.**



**Photo 5.8-11. Example of shovel test profile, facing ground.**

## **5.9 SECTION 13 OF TOWNSHIP 107 NORTH AND RANGE 13 WEST**

The section was composed of harvested and plowed corn fields and harvested soybean fields (see Photos 5.9-1 and 5.9-2 and Table 5.9-1 below and Figures 4.2, 4.3, 4.5, and 4.6 in Appendix A). There were also three drainages flanked by NWI-defined wetlands and marshes, two of which were set in ravines (see Photos 5.9-3, 5.9-4, and 5.9-5 below and Figures 4.2, 4.3, 4.5, and 4.6 in Appendix A); forested, steep ravine slopes adjacent to portions of the drainages (see Photo 5.9-6 below and Figures 4.2, 4.3, 4.5, and 4.6 in Appendix A); and road ROWs and borrows (see Photo 5.9-7 below and Figures 4.2, 4.3, 4.5, and 4.6 in Appendix A).

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| TABLE 5.9-1                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |                              |                                                    |                           |                                                                     |                  |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------|----------------------------------------------------|---------------------------|---------------------------------------------------------------------|------------------|
| Survey Results Section 13, Township 107 North, Range 13 West |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |                              |                                                    |                           |                                                                     |                  |
|                                                              | Acres Within<br>the Project<br>Footprint                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Acres<br>Surveyed | Percent<br>Acres<br>Surveyed | GSV in<br>Agricultural<br>field(s)                 | Shovel Tests<br>Excavated | Positive<br>Shovel<br>Tests/<br>Cultural<br>Resources<br>Identified | Surface<br>Finds |
| Total Project<br>Footprint in<br>Section                     | 204                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 201               | 98%                          | 25–75%<br>(see Photos<br>5.9-8 and<br>5.9-9 below) | 10                        | 0                                                                   | 0                |
| High<br>Probability                                          | 104                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 104               | 100%                         | -                                                  | -                         | -                                                                   | -                |
| Medium<br>Probability                                        | 78                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 78                | 100%                         | -                                                  | -                         | -                                                                   | -                |
| Low<br>Probability                                           | 22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 19                | 86%                          | -                                                  | -                         | -                                                                   | -                |
| Ravines/<br>Drainages/<br>Marshes/<br>Hillslopes             | 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | -                 | -                            | -                                                  | -                         | -                                                                   | -                |
| NWI-Defined<br>Wetlands                                      | 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | -                 | -                            | -                                                  | -                         | -                                                                   | -                |
| Shovel Test<br>Profile(s):                                   | <p>2 shovel tests: Ap horizon of silty loam (10YR 4/1) to 25<sup>±2</sup> cmbs with an abrupt transition to a B horizon of silty clay loam (10YR 4/4) to 45<sup>±0</sup> cmbs</p> <p>2 shovel tests: Ap horizon of silty loam (10YR 2/1) to 23.5<sup>±2.5</sup> cmbs with an abrupt transition to a B horizon of silty loam (10YR 5/1) to 46<sup>±1</sup> cmbs</p> <p>6 shovel tests: Ap horizon of silty loam (10YR 4/3 to 10YR 4/4) to 22.5<sup>±4.5</sup> cmbs with a gradual transition to a B horizon of silty loam (10YR 5/4 to 10YR 5/6) to 45.5<sup>±3.5</sup> cmbs (see Photo 5.9-10 below)</p> |                   |                              |                                                    |                           |                                                                     |                  |



**Photo 5.9-1. Overview of harvested and plowed corn field, facing north.**



**Photo 5.9-2. Overview of harvested soybean field, facing east.**





**Photo 5.9-3. Overview of drainage and NWI-defined wetland set within a ravine, facing north.**



**Photo 5.9-4. Overview of drainage and NWI-defined wetland set within a ravine, facing southwest**



**Photo 5.9-5. Overview of drainage and ravine slope, facing northwest.**



**Photo 5.9-6. Forested and steep hill slope adjacent to drainage, facing west.**



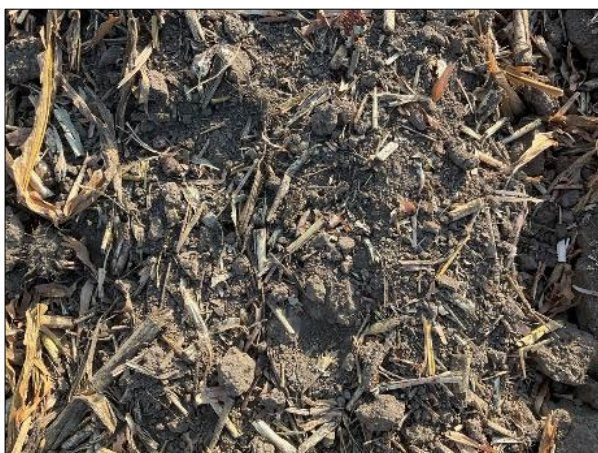
**Photo 5.9-7. Overview of road ROW and borrow, facing west.**



**Photo 5.9-8. Example of 50 percent GSV in harvested soybean field, facing ground.**



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**Photo 5.9-9. Example of 75 percent GSV in harvested and plowed corn field, facing ground.**



**Photo 5.9-10. Example of shovel test profile, facing ground.**

### 5.10 SECTION 14 OF TOWNSHIP 107 NORTH AND RANGE 13 WEST

The section was composed of harvested corn fields (see Photos 5.10-1 and 5.10-2 and Table 5.10-1 below and Figures 4.2 and 4.3 in Appendix A); road ROWs and borrows (see Photo 5.10-3 below and Figures 4.2 and 4.3 in Appendix A); and an occupied farmstead.

| TABLE 5.10-1                                                 |                                                                                                                                                                                                                                                                                                                                                                                   |                   |                              |                                       |                           |                                                                     |                  |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------|---------------------------------------|---------------------------|---------------------------------------------------------------------|------------------|
| Survey Results Section 14, Township 107 North, Range 13 West |                                                                                                                                                                                                                                                                                                                                                                                   |                   |                              |                                       |                           |                                                                     |                  |
|                                                              | Acres Within<br>the Project<br>Footprint                                                                                                                                                                                                                                                                                                                                          | Acres<br>Surveyed | Percent<br>Acres<br>Surveyed | GSV in<br>Agricultural<br>field(s)    | Shovel Tests<br>Excavated | Positive<br>Shovel<br>Tests/<br>Cultural<br>Resources<br>Identified | Surface<br>Finds |
| Total Project<br>Footprint in<br>Section                     | 87                                                                                                                                                                                                                                                                                                                                                                                | 57                | 66%                          | 25%<br>(see Photo<br>5.10-4<br>below) | 5                         | 0                                                                   | 0                |
| High<br>Probability                                          | 15                                                                                                                                                                                                                                                                                                                                                                                | 15                | 100%                         | -                                     | -                         | -                                                                   | -                |
| Medium<br>Probability                                        | 30                                                                                                                                                                                                                                                                                                                                                                                | 30                | 100%                         | -                                     | -                         | -                                                                   | -                |
| Low<br>Probability                                           | 42                                                                                                                                                                                                                                                                                                                                                                                | 12                | 28%                          | -                                     | -                         | -                                                                   | -                |
| Ravines/<br>Drainages/<br>Marshes/<br>Hillslopes             | 0                                                                                                                                                                                                                                                                                                                                                                                 | -                 | -                            | -                                     | -                         | -                                                                   | -                |
| NWI-Defined<br>Wetlands                                      | 0                                                                                                                                                                                                                                                                                                                                                                                 | -                 | -                            | -                                     | -                         | -                                                                   | -                |
| Shovel Test<br>Profile(s):                                   | <p>1 shovel tests: Ap horizon of silty clay loam (10YR 3/1) to 8 cmbs with an abrupt transition to a B horizon of silty clay loam (10YR 4/4) to 39 cmbs</p> <p>4 shovel tests: Ap horizon of silty loam (10YR 3/1) to 21.5<sup>±2.5</sup> cmbs with an abrupt transition to a B horizon of silty loam (10YR 4/1 to 10YR 4/3) to 42<sup>±3</sup> cmbs (see Photo 5.10-5 below)</p> |                   |                              |                                       |                           |                                                                     |                  |



**Photo 5.10-1. Overview of harvested corn field, facing north.**



**Photo 5.10-2. Overview of harvested corn field, facing east.**



**Photo 5.10-3. Overview of road ROW and borrow, facing north.**



**Photo 5.10-4. Overview of 25 percent GSV, facing ground**



**Photo 5.10-5. Example of shovel test profile, facing ground.**



**5.11 SECTION 23 OF TOWNSHIP 107 NORTH AND RANGE 13 WEST**

The section was composed of a plowed and harvested corn field (see Photo 5.11-1 and Table 5.11-1 below and Figures 4.3 and 4.4 in Appendix A).

| TABLE 5.11-1                                                 |                                                                                                                                                                                                      |                   |                              |                                    |                           |                                                                     |                  |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------|------------------------------------|---------------------------|---------------------------------------------------------------------|------------------|
| Survey Results Section 23, Township 107 North, Range 13 West |                                                                                                                                                                                                      |                   |                              |                                    |                           |                                                                     |                  |
|                                                              | Acres Within<br>the Project<br>Footprint                                                                                                                                                             | Acres<br>Surveyed | Percent<br>Acres<br>Surveyed | GSV in<br>Agricultural<br>field(s) | Shovel Tests<br>Excavated | Positive<br>Shovel<br>Tests/<br>Cultural<br>Resources<br>Identified | Surface<br>Finds |
| Total Project<br>Footprint in<br>Section                     | 76                                                                                                                                                                                                   | 54                | 71%                          | 50–75%<br>(see Photo<br>5.11-2)    | 2                         | 0                                                                   | 0                |
| High<br>Probability                                          | 16                                                                                                                                                                                                   | 16                | 100%                         | -                                  | -                         | -                                                                   | -                |
| Medium<br>Probability                                        | 32                                                                                                                                                                                                   | 32                | 100%                         | -                                  | -                         | -                                                                   | -                |
| Low<br>Probability                                           | 28                                                                                                                                                                                                   | 6                 | 23%                          | -                                  | -                         | -                                                                   | -                |
| Ravines/<br>Drainages/<br>Marshes/<br>Hillslopes             | 0                                                                                                                                                                                                    | -                 | -                            | -                                  | -                         | -                                                                   | -                |
| NWI-Defined<br>Wetlands                                      | 0                                                                                                                                                                                                    | -                 | -                            | -                                  | -                         | -                                                                   | -                |
| Shovel Test<br>Profile(s):                                   | 2 shovel tests: Ap horizon of silty loam (10YR 3/1) to 23.5 <sup>±1.5</sup> cmbs with an abrupt transition to a B horizon of silty loam (10YR 4/1) to 43 <sup>±3</sup> cmbs (see Photo 5.11-3 below) |                   |                              |                                    |                           |                                                                     |                  |



**Photo 5.11-1. Overview of plowed and harvested corn field, facing north.**



**Photo 5.11-2. Example of 50 percent GSV, facing ground.**





Photo 5.11-3. Example of a shovel test profile, facing ground.

## 5.12 SECTION 24 OF TOWNSHIP 107 NORTH AND RANGE 13 WEST

The section was composed of harvested and plowed corn fields (see Photo 5.12-1 and Table 5.12-1 below and Figures 4.3, 4.4, and 4.6 in Appendix A). There was a small area of fallow field for an access road; this area was shovel-tested (see Photo 5.12-2 and Table 5.12-1 below and Figures 4.3, 4.4, and 4.6 in Appendix A). The section also included road ROWs and borrows (see Photo 5.12-3 below and Figures 4.3, 4.4, and 4.6 in Appendix A).

| TABLE 5.12-1                                                 |                                          |                   |                              |                                         |                           |                                                                     |                  |
|--------------------------------------------------------------|------------------------------------------|-------------------|------------------------------|-----------------------------------------|---------------------------|---------------------------------------------------------------------|------------------|
| Survey Results Section 24, Township 107 North, Range 13 West |                                          |                   |                              |                                         |                           |                                                                     |                  |
|                                                              | Acres Within<br>the Project<br>Footprint | Acres<br>Surveyed | Percent<br>Acres<br>Surveyed | GSV in<br>Agricultural<br>field(s)      | Shovel Tests<br>Excavated | Positive<br>Shovel<br>Tests/<br>Cultural<br>Resources<br>Identified | Surface<br>Finds |
| Total Project<br>Footprint in<br>Section                     | 262                                      | 159               | 60%                          | 0–75%<br>(see Photo<br>5.12-4<br>below) |                           | 17                                                                  | 0                |
| High<br>Probability                                          | 60                                       | 60                | 100%                         | -                                       | -                         | -                                                                   | -                |
| Medium<br>Probability                                        | 71                                       | 71                | 100%                         | -                                       | -                         | -                                                                   | -                |
| Low<br>Probability                                           | 131                                      | 28                | 21%                          | -                                       | -                         | -                                                                   | -                |
| Ravines/<br>Drainages/<br>Marshes/<br>Hillslopes             | 2                                        | -                 | -                            | -                                       | -                         | -                                                                   | -                |
| NWI-Defined<br>Wetlands                                      | 16                                       | -                 | -                            | -                                       | -                         | -                                                                   | -                |

Phase I Archaeological Survey Report for the Lemon Hill Solar Project  
Olmsted County, Minnesota

| TABLE 5.12-1                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Survey Results Section 24, Township 107 North, Range 13 West |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Shovel Test Profile(s):                                      | <p>1 shovel tests: Ap horizon of silty clay loam (10YR 3/1) to 17 cmbs with an abrupt transition to a B horizon of silty clay loam (10YR 4/3) to 40 cmbs</p> <p>3 shovel tests: Ap horizon of silty loam (10YR 3/1) to 18.5<sup>±1.5</sup> cmbs with an abrupt transition to a B horizon of silty clay loam (10YR 4/4) to 43<sup>±2</sup> cmbs</p> <p>3 shovel tests: Ap horizon of silty loam (10YR 2/2) to 17.5<sup>±2.5</sup> cmbs with an abrupt transition to a B horizon of silty loam (10YR 4/2) to 39.5<sup>±3.5</sup> cmbs</p> <p>5 shovel tests: Ap horizon of silty loam (10YR 2/1) to 25.5<sup>±3.5</sup> cmbs with an abrupt transition to a B horizon of silty loam (10YR 3/4) to 47<sup>±2</sup> cmbs (see Photo 5.12-5 below)</p> <p>5 shovel tests: Ap horizon of silty loam (10YR 4/1) to 23.5<sup>±4.5</sup> cmbs with an abrupt transition to a B horizon of silty loam (10YR 5/3 to 10YR 5/6) to 42<sup>±3</sup> cmbs (see Photo 5.12-6 below)</p> |



**Photo 5.12-1. Overview of harvested and plowed corn field, facing east.**



**Photo 5.12-2. Overview of fallow field for small access road, facing east.**



**Photo 5.12-3. Overview of road ROW and borrow, facing east.**



**Photo 5.12-4. Example of 50 percent GSV, facing north**





Photo 5.12-5. Example of shovel test profile, facing ground.



Photo 5.12-6. Example of shovel test profile, facing ground.

## 6.0 EVALUATION OF SITE 21OL0077

Merjent documented one precontact artifact found on the ground surface in Section [REDACTED] of Township [REDACTED] and Range [REDACTED] OSA has designated the find as site number 21OL0077 (see site form in Appendix C). The artifact is a single chert tertiary flake. The artifact discovery locale was surveyed in 5-meter-spaced transects, and eight shovel tests spaced at 5- and 10-meter intervals were excavated in the cardinal directions centered on the discovery locale. There were no additional artifacts discovered in the pedestrian survey or shovel tests. The new discovery locale was assessed for physical integrity, associative value, and archaeological merit using the NRHP Evaluation Criteria (National Park Service 1991).

### 6.1 NRHP RECOMMENDATIONS – SIGNIFICANCE AND ASSESSMENT OF INTEGRITY

The integrity of site 21OL0077 is somewhat diminished by decades mechanical alteration of the soil related to agricultural activity. The eight shovel tests excavated in the vicinity of the new artifact locale demonstrate that the upper  $24.5^{+3.5}$  cmbs of soil displays evidence of agricultural disturbance; the deepest shovel test was excavated to 45 cmbs. In addition, there is little integrity of design or workmanship present in the tertiary flake; the artifact does not exhibit exceptional artistry nor is it clearly indicative of a temporal phase or sequence. The site consists of only one surface-recovered artifact, the integrity of which has been reduced due to plowing, which undoubtably affected the in-situ spatial integrity of the artifact. Further, the artifact material type, likely Swan River Chert, is commonplace for precontact archaeological sites in Minnesota. In terms of setting, the site is situated in an upland and is not near a lake or river or another precontact archaeological site. Site field number 21OL0077 does not meet criteria established in Title 36 CFR 60.4 (National Park Service 1991).

Due to the factors listed above, the archaeological resource site 21OL0077, does not retain sufficient integrity or importance to be recommended eligible for the NRHP. Merjent recommends that site 21OL0077 is not eligible for inclusion on the NRHP. If the SHPO concurs with this recommendation, then no avoidance of site 21OL0077 is necessary.



## **7.0 SUMMARY AND CONCLUSIONS**

Between October 21 and November 2, 2024, Merjent conducted a Phase I archaeological survey of the Project footprint, which followed the Project's SHPO-approved Phase I Survey Plan and Methods. The Project's Phase Ia literature search was reviewed by SHPO prior to fieldwork and was deemed appropriate for the undertaking. There are no determined eligible or NRHP-listed cultural resources within the Project footprint. One precontact artifact was discovered during the archaeological field surveys, site 21OL0077. Merjent recommends that 21OL0077 is not eligible for listing on the NRHP. Merjent recommends that no historic properties will be affected by the proposed Project. No further archaeological work is recommended for the Project as planned.

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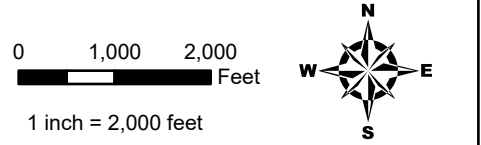
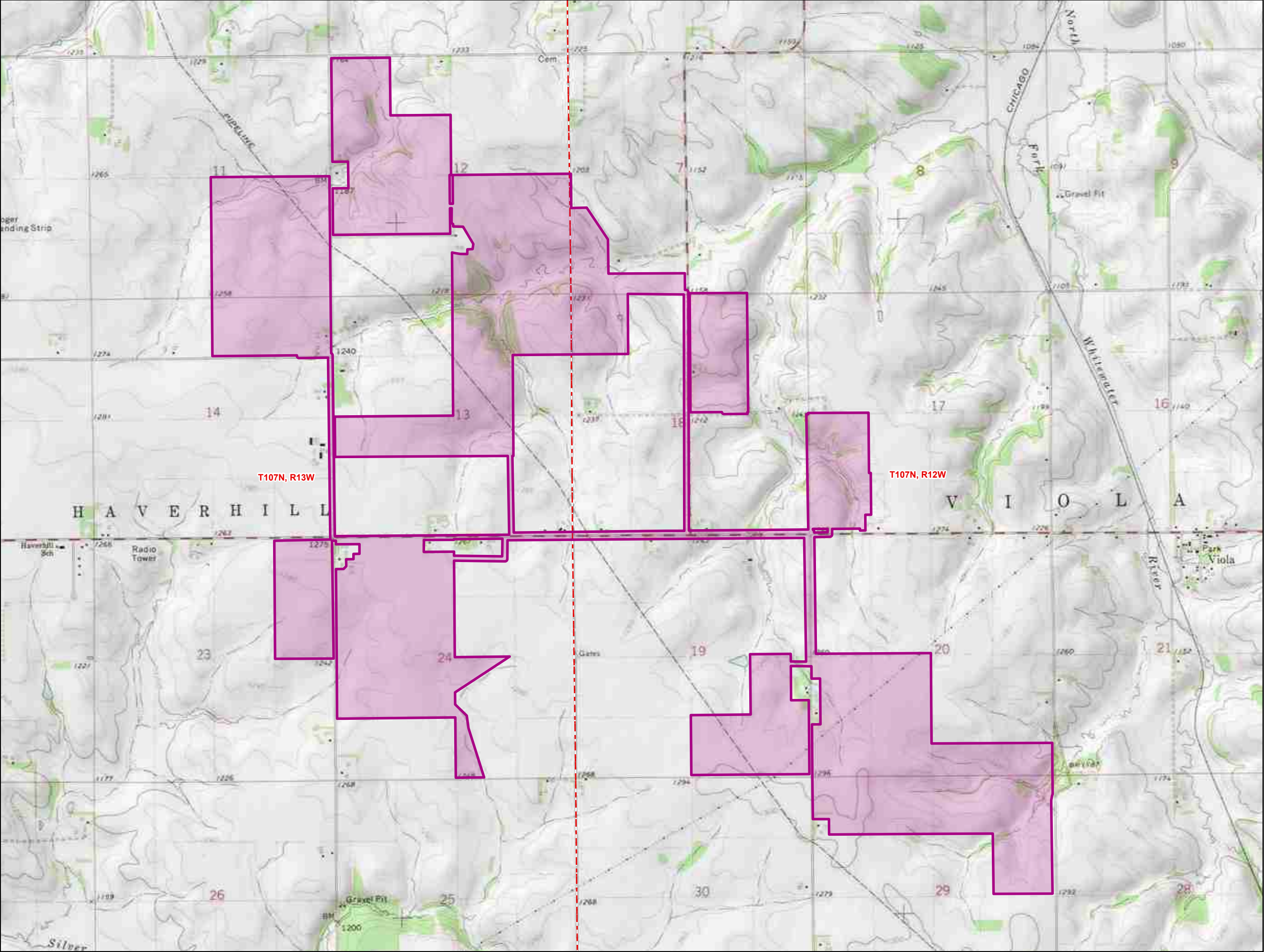
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## **APPENDIX A**

### **Project Figures**

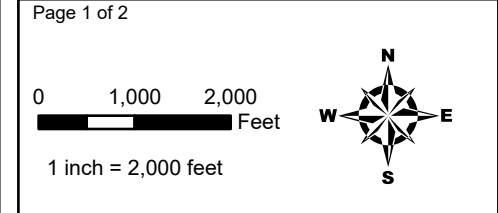


- Project Footprint
- Township Boundary

**Figure 1:**  
**Project Location**  
Lemon Hill Solar, LLC  
Lemon Hill Solar Project  
Olmsted County, Minnesota

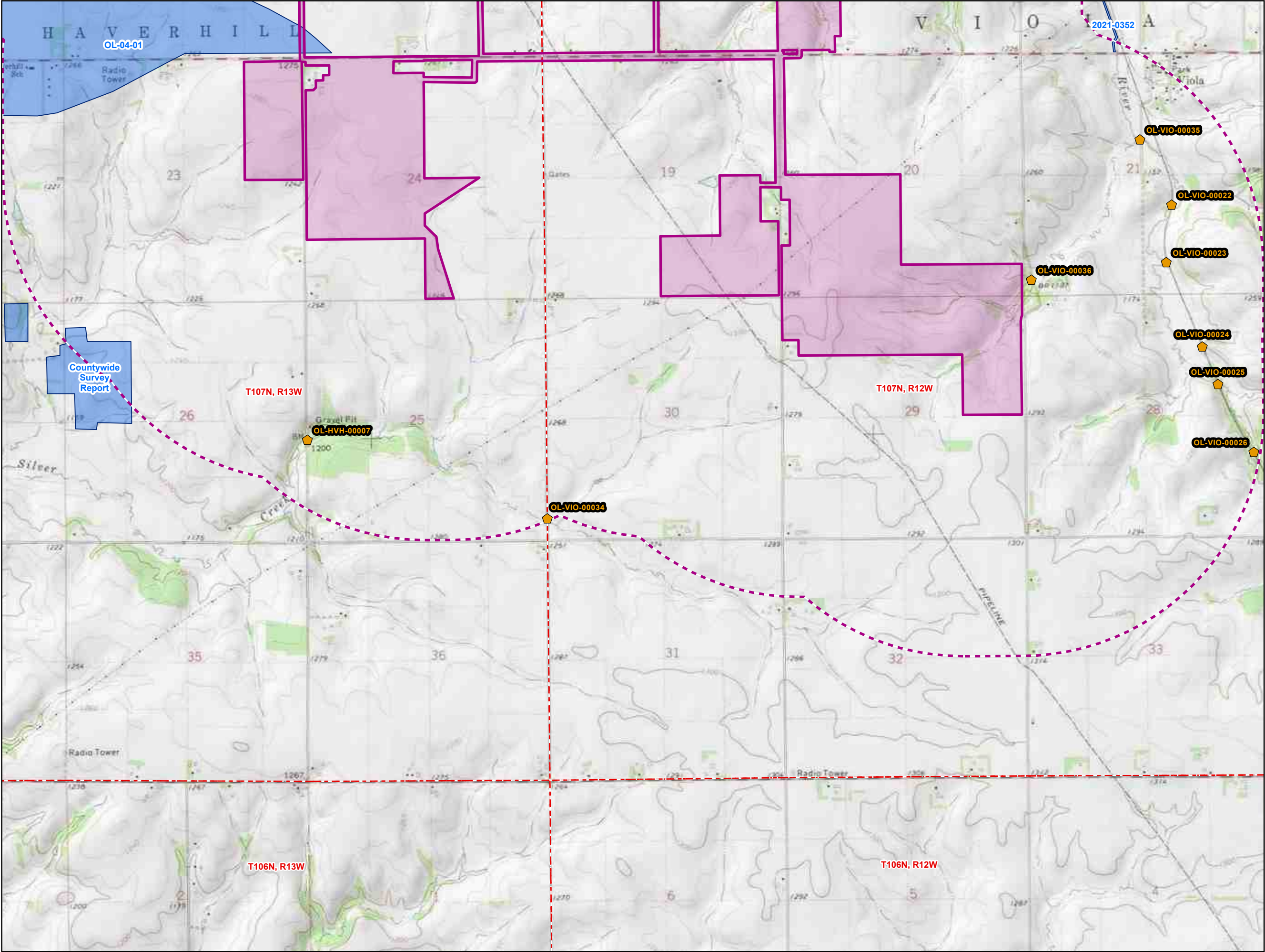




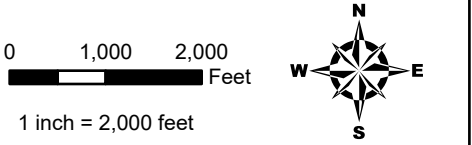


- Figure 2:  
Project Location and  
Previous Cultural  
Resources  
Lemon Hill Solar, LLC  
Lemon Hill Solar  
Olmsted County, Minnesota**
- merjent®
- For Environmental Review Purposes Only





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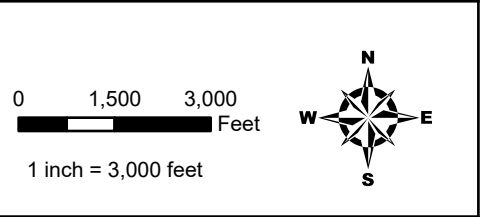
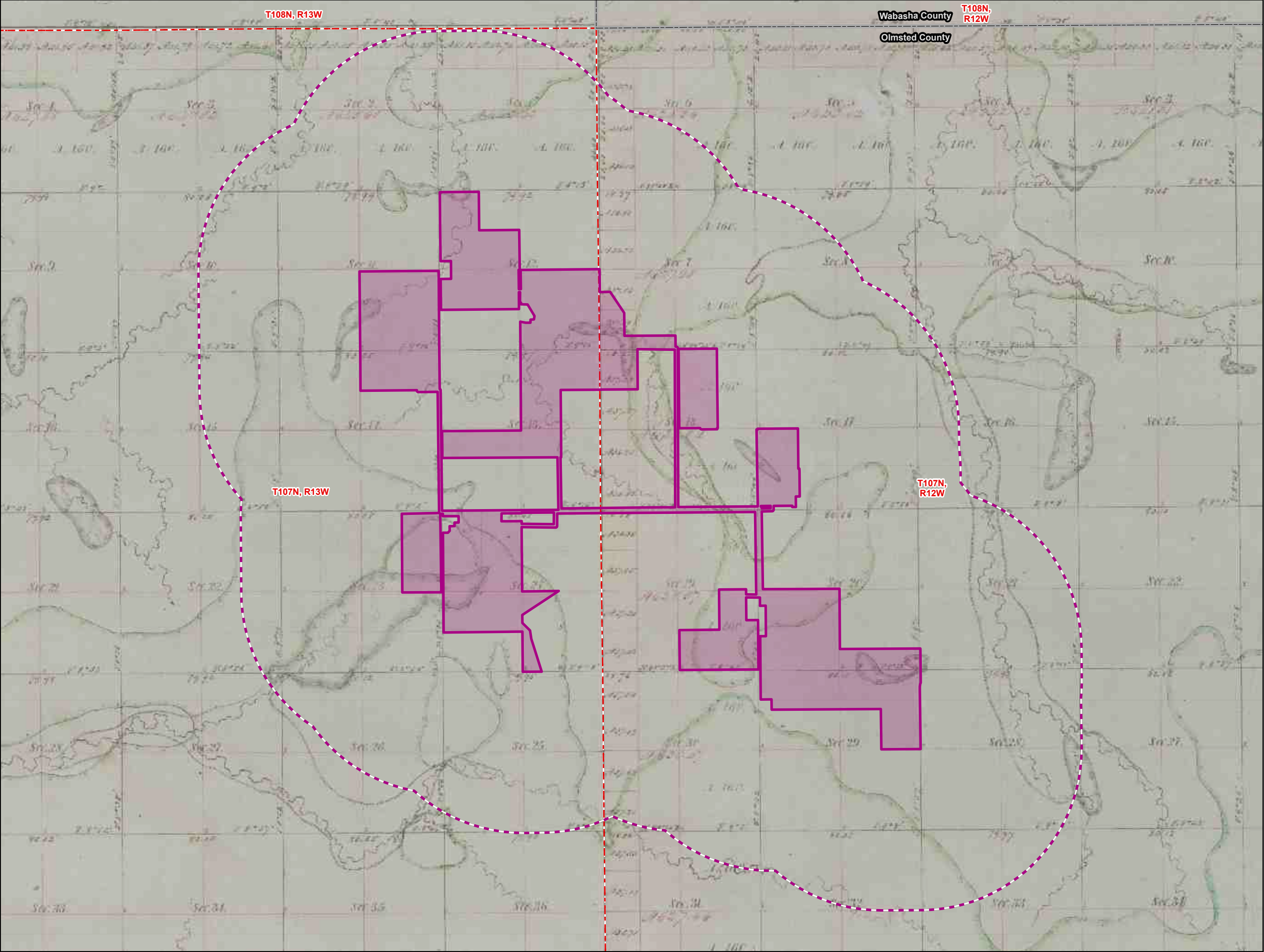


- Project Footprint
- Literature Review Study Area
- County Boundary
- Township Boundary
- Unrecorded Historic Cemetery
- Previous Survey
- Historic Structure
- Historic Cemetery

**Figure 2:**  
**Project Location and**  
**Previous Cultural**  
**Resources**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**





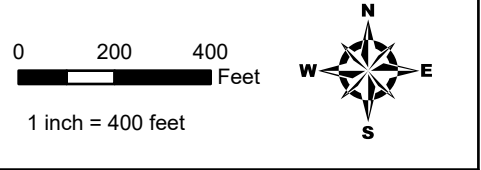
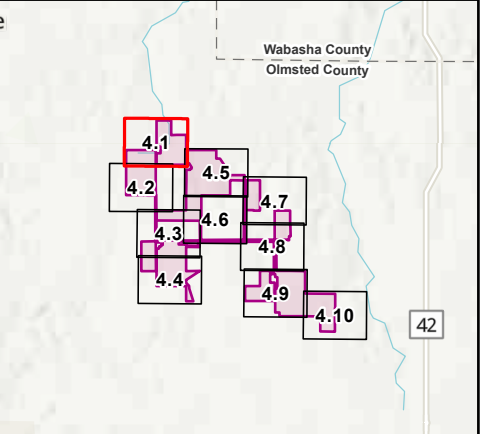


- Project Footprint
- Literature Review Study Area
- County Boundary
- Township Boundary

**Figure 3:**  
**1853 GLO Map**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**





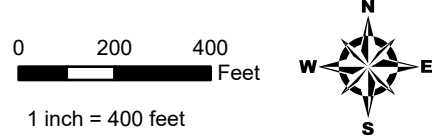
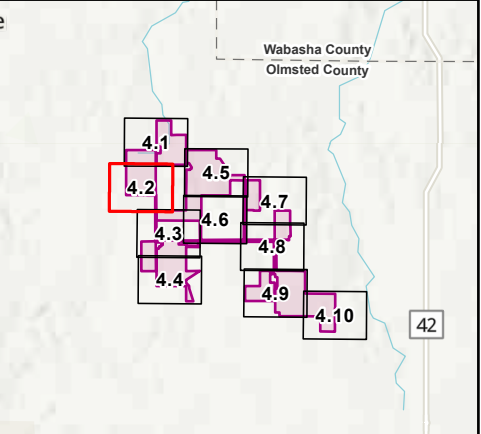


- Project Footprint
- High Probability Survey Area
- Medium Probability Survey Area
- Low Probability Survey Area
- Section Boundary
- Negative Shovel Test
- NWI Wetland
- Ravines/Drainages/Marshes/Hill Slopes

**Figure 4.1:**  
**Survey Results**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**





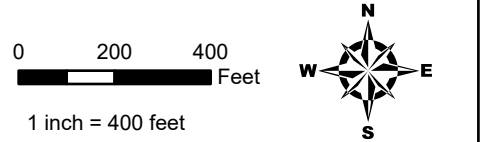
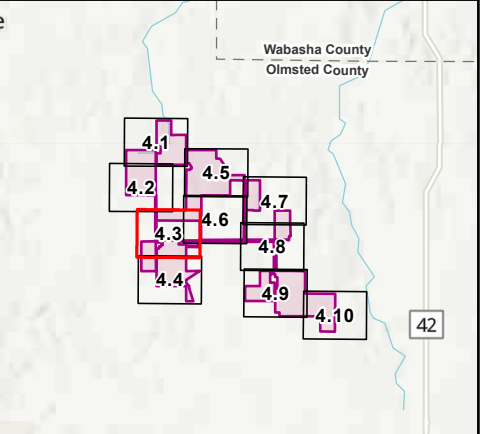


- Project Footprint
- High Probability Survey Area
- Medium Probability Survey Area
- Low Probability Survey Area
- Section Boundary
- Negative Shovel Test
- NWI Wetland
- Ravines/Drainages/Marshes/Hill Slopes

**Figure 4.2:**  
**Survey Results**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**





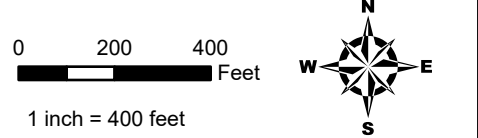
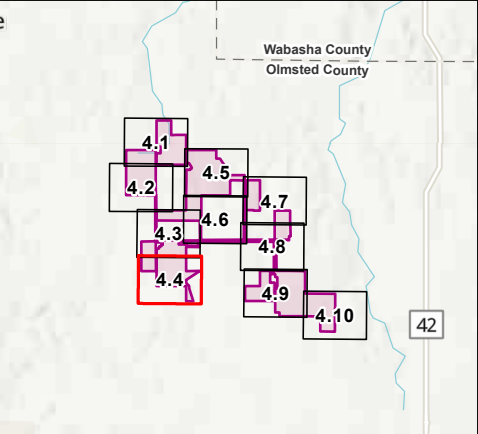


- Project Footprint
- High Probability Survey Area
- Medium Probability Survey Area
- Low Probability Survey Area
- Section Boundary
- Previous Survey
- Negative Shovel Test
- NWI Wetland

**Figure 4.3:**  
**Survey Results**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**





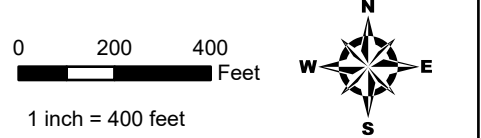
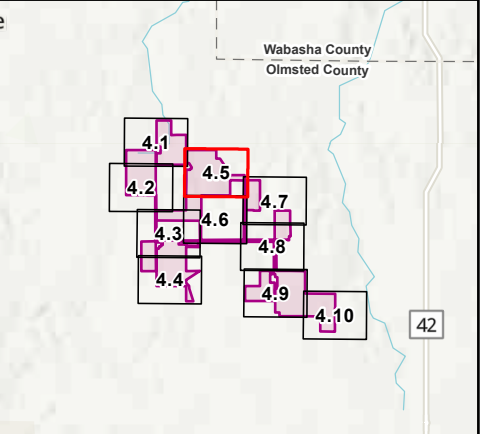


- Project Footprint
- High Probability Survey Area
- Medium Probability Survey Area
- Low Probability Survey Area
- Section Boundary
- Negative Shovel Test
- NWI Wetland
- Ravines/Drainages/Marshes/Hill Slopes

**Figure 4.4:**  
**Survey Results**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**





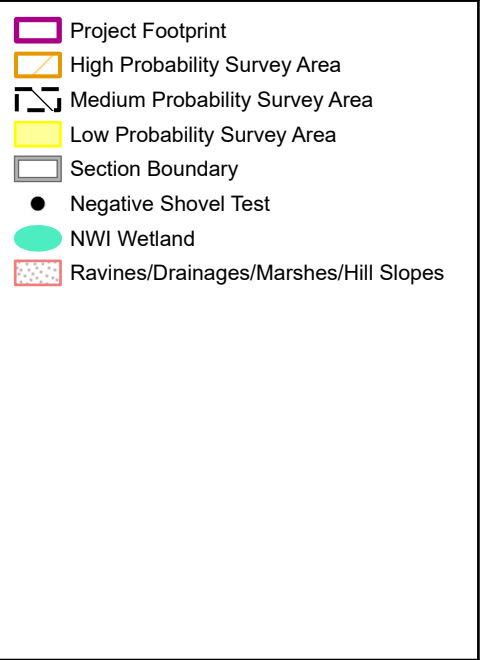
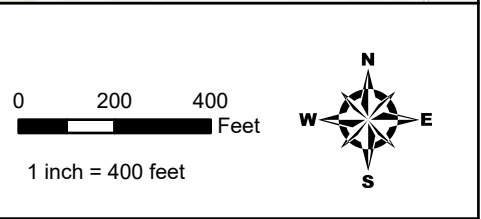
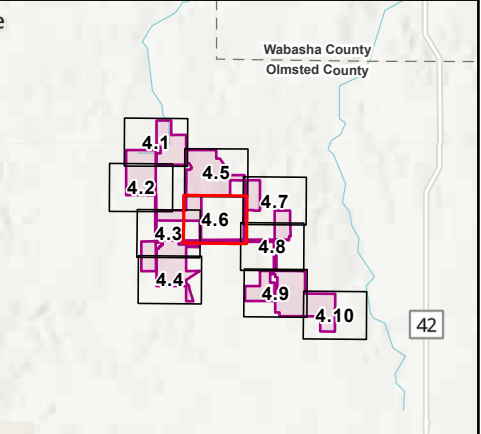


- Project Footprint
- High Probability Survey Area
- Medium Probability Survey Area
- Low Probability Survey Area
- Section Boundary
- MNSHIP Historic Structure
- Negative Shovel Test
- NWI Wetland
- Ravines/Drainages/Marshes/Hill Slopes

**Figure 4.5:**  
**Survey Results**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**





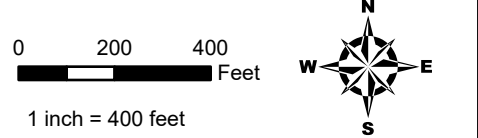
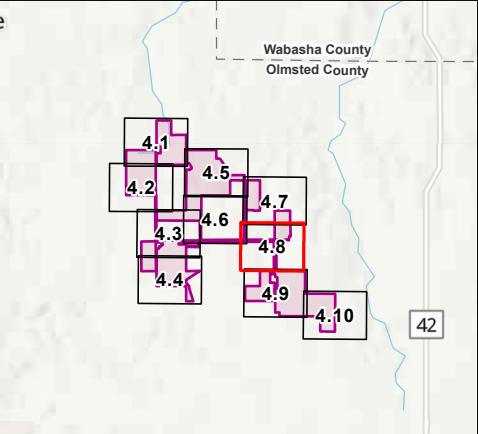


**Figure 4.6:**  
**Survey Results**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**







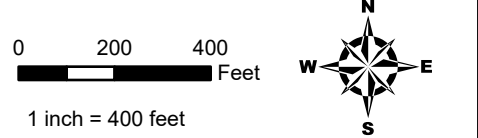
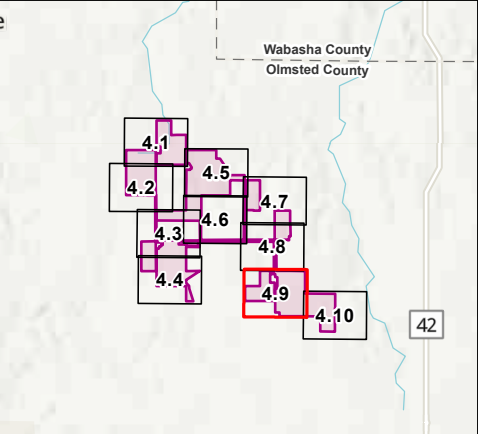


- Project Footprint
- High Probability Survey Area
- Medium Probability Survey Area
- Low Probability Survey Area
- Section Boundary
- Negative Shovel Test
- NWI Wetland
- Ravines/Drainages/Marshes/Hill Slopes

**Figure 4.8:**  
**Survey Results**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**





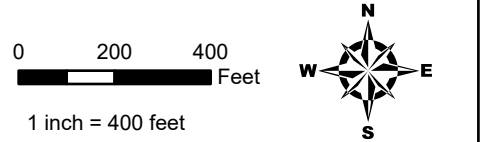
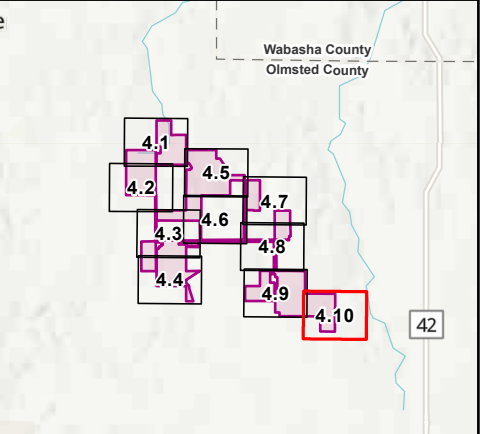


- Project Footprint
- High Probability Survey Area
- Medium Probability Survey Area
- Low Probability Survey Area
- Section Boundary
- Negative Shovel Test
- NWI Wetland
- Ravines/Drainages/Marshes/Hill Slopes

**Figure 4.9:**  
**Survey Results**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**







- Project Footprint
- High Probability Survey Area
- Medium Probability Survey Area
- Low Probability Survey Area
- Section Boundary
- MNSHIP Historic Structure
- Negative Shovel Test
- NWI Wetland
- Ravines/Drainages/Marshes/Hill Slopes

**Figure 4.10:**  
**Survey Results**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar**  
**Olmsted County, Minnesota**





## **APPENDIX B**

### **Project Phase I Survey Plan and Methods**



May 23, 2024

Environmental Review Program Manager  
 State Historic Preservation Office  
 Administration Building Suite 203  
 50 Sherburne Ave  
 St. Paul, MN 55155

Re: Lemon Hill Solar, LLC  
 Lemon Hill Solar Project, Olmsted County, MN  
 Cultural Resource Survey Plan

Dear Environmental Review Program Manager:

Lemon Hill Solar, LLC (Lemon Hill Solar) is planning to build a new utility-scale solar facility known as the Lemon Hill Solar Project (Project). The proposed Project site is located east of the City of Rochester in Olmsted County, Minnesota. Lemon Hill Solar will have a generating capacity of up to 180 megawatts (MW) on a site up to approximately 1,900 acres in size (Figure 1). This letter presents the Cultural Resource Survey Plan for a Phase I archaeological field inventory of the Project footprint. Locational information is provided in Table 1.

| TABLE 1                                    |          |       |                        |
|--------------------------------------------|----------|-------|------------------------|
| Sections Included in the Project Footprint |          |       |                        |
| County                                     | Township | Range | Sections               |
| Olmsted                                    | 107N     | 12W   | 7, 17, 18, 19, 20, 29  |
| Olmsted                                    | 107N     | 13W   | 11, 12, 13, 14, 23, 24 |

The Project is in the pre-permitting and field reconnaissance phase. The Project will require a Site Permit from the Minnesota Public Utilities Commission pursuant to the Minnesota Power Plant Siting Act (Minnesota Statutes Chapter 216E) and Minnesota Administrative Rules Chapter 7850. Lemon Hill Solar intends to conduct Phase I archaeological field inventory of the Project footprint in the summer of 2024 to fulfill these permitting requirements.

Merjent, Inc. (Merjent), on behalf of Lemon Hill Solar, requests your review and comment of the proposed Cultural Resource Survey Plan in relation to the Phase I archaeological field inventory needed for the Project. The plan diverges from procedures described in *State Archaeologist's Manual for Archaeological Projects in Minnesota* (Anfinson 2011) and the *SHPO Manual for Archaeological Projects in Minnesota* (Anfinson 2005) as a landform sampling strategy and probabilistic survey model is proposed as opposed to a survey of the entire Project footprint.

## REGULATORY AUTHORITY

Minnesota Public Utilities Commission permitting requires consideration of impacts to cultural resources by following relevant state historic preservation laws, notably the Field Archaeology Act

(MS 138.31-42), Minnesota Historic Sites Act (MS 138.661-138.669), and the Private Cemeteries Act (MS 307.08). Therefore, Lemon Hill Solar intends to conduct a Phase I archeology field inventory to fulfill this requirement.

## LITERATURE REVIEW AND BACKGROUND RESEARCH

In April 2024, Merjent completed a Phase Ia literature review and environmental background research report concerning previously documented cultural resources within the proposed Project footprint and within a 1.0-mile buffer around the footprint. This report has been submitted as a supporting document to the Cultural Resource Survey Plan. The Phase Ia report included a review of archaeological sites, historic architectural structures, cemeteries, and previously conducted cultural surveys. The report also included a review of historical maps and atlases, and a review of the landscape, ecological setting, and soils. Identified within the 1.0-mile buffer around the Project footprint were no archaeological sites, 14 historic architectural structures, one cemetery, and two previous cultural surveys. There are no archaeological sites, historic architectural structures, or cemeteries located within the Project footprint; one previous survey intersects a small portion of the Project footprint.

## CULTURAL RESOURCE SURVEY PLAN

### Survey Methodology

The general objective of a Phase I archaeological field inventory is to identify historic properties within a survey area that are at least 45 years of age. Archaeological resource types considered for this investigation include both precontact, contact period, and historic period archaeological sites and earthworks that could provide information about past human occupation of the area. Such sites could be evident in artifacts or features on or below the current ground surfaces. The Phase Ia literature review—which include Minnesota State Historic Preservation Office (SHPO) site file information, the State Register of Historic Places, the Minnesota State Historic Site Network, information regarding National Register of Historic Places listed properties, and National Historic Landmarks from databases maintained by the National Parks Service—was used to inform this Cultural Resource Survey Plan and will be used to guide the Phase I archeological field inventory. The focus of the inventory is to understand if any unknown resources can be positively identified in the Project footprint. Merjent will prepare a Phase I archaeological field inventory report that summarizes the results of the Phase Ia literature review and background report along with the results of the field inventory.

Throughout all stages of this investigation, Merjent will apply industry (cultural resource management) best practices and adhere to the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 CFR 44716). Survey methodology will be in accordance with Phase I archaeological field inventory practices described in the *State Archaeologist's Manual for Archaeological Projects in Minnesota* (Anfinson 2011) and the *SHPO Manual for Archaeological Projects in Minnesota* (Anfinson 2005). The one exception is that a landform sampling strategy and probabilistic survey model is proposed as opposed to a survey of the entire Project footprint.

Based on the Phase Ia literature review, a 100 percent intensive field inventory of areas assessed as having *high probability* to contain significant archaeological sites will be conducted (see Figure 2). This landform sampling strategy and probabilistic survey model is derived from the Minnesota Department of Transportation statewide Survey Implementation Model, MM4 (MnDOT 2024), and



from Thomas' (1986) *Refiguring Anthropology: First Principles of Probability and Statistics*. The *high probability* areas include:

- within 500 ft. (150 m) of an existing or former water source of 40 acres (19 hectares) or greater in extent, or within 500 ft. (150 m) of a former or existing perennial stream;
- located on topographically prominent landscape features;
- located within 300 ft. (100 m) of a previously reported archaeological site; or
- located within 300 ft. (100 m) of a former or existing historic structure or feature (such as a building foundation or cellar depression).

A total of 100 percent of the *medium probability* areas will be intensively inventoried (see Figure 2). *Medium probability* areas include:

- between 500 and 1,000 ft. (150-305 m) of an existing or former water source of 40 acres (19 hectares) or greater in extent, or between 500 and 600 ft. (150–183 m) of a former or existing perennial stream;
- located between 300 and 800 ft. (100–244 m) of a previously reported archaeological site; or
- located between 300 and 800 ft. (100–244 m) of a former or existing historic structure or feature (such as a building foundation or cellar depression).

As a control, 5 percent of the areas outside of the high and medium probability areas that have been assessed as having a relatively *low potential* for containing archaeological resources (such as inundated areas, former or existing wetland areas, poorly drained areas, and areas with a 20 percent or greater slope) will undergo intensive field survey (see Figure 2). Other low potential areas and areas in which Holocene (less than 10,000 years old) deposits have been significantly disturbed (such as road right-of-way ditches) will be excluded from intensive field survey (Thomas 1986).

### Survey Methods

Conventional archaeological survey methods will be conducted to meet standards outlined in the *State Archaeologist's Manual for Archaeological Projects in Minnesota* (Anfinson 2011) and the *SHPO Manual for Archaeological Projects in Minnesota* (Anfinson 2005). An archaeological field inventory in Minnesota is referred to as Phase I. A Phase I includes a literature review and environmental background research, pedestrian field survey, systematic surface collection, and systematic shovel testing.

### Pedestrian Survey

Survey will occur within 100 percent of the high and medium areas, and 5 percent of the low probability areas (as defined above). The pedestrian survey will visually inspect for surface features, foundations, densities of surface artifacts, or other surface indications of archaeological sites while considering the safety of the field team. Pedestrian survey may be conducted to the exclusion of systematic shovel testing in plowed areas where ground surface visibility is greater

than 25 percent and with low potential for buried cultural material. Pedestrian survey transect spacing will not exceed 15 meters (50 feet). An average survey rate of 40 acres per person, per day is expected.

### **Shovel Testing**

Shovel testing will be conducted in areas that have not been plowed and/or that have potential to contain buried cultural material regardless of ground surface visibility. Areas determined unsafe (i.e., in areas featuring buried utilities) will be photographed and documented. If seasonal conditions prevent access, those conditions will be recorded and reported to determine scheduling for future investigations as necessary.

Shovel tests (ST), when required, will be excavated per SHPO and Office of the State Archaeologist (OSA) guidelines, i.e., each ST will measure 30 to 40 centimeters (12 to 15 inches) in diameter and will extend no less than 35 centimeters (10 inches) deep and at least 10 centimeters (4 inches) into sterile subsoil. Given the geological depositional environment and soils history of the Project footprint, it is anticipated that ST depths will not exceed 70 centimeters. If subsoils are not encountered before 70 centimeters below surface, and/or if soil deposits are encountered that have the potential for deeply buried cultural material, the Principal Investigator will evaluate each location to determine if deeper testing is needed. It is anticipated that archaeological deposits will be near the surface and reachable by conventional STs and hand augering may not be needed. However, if subsoil is not reached before 70 cm below the surface, STs will be hand augered until subsoil is reached. STs will be excavated in either natural stratigraphy or arbitrary 10 cm levels. Soils from each stratum will be screened separately through one-quarter-inch wire mesh onto a tarp. Data from all STs, including any pre-plotted STs not excavated (if applicable), will be recorded on standardized forms. Soil profiles will be recorded using the Munsell color system and standard texture classifications as well as additional notes and comments (e.g., “disturbed matrix,” “heavily compacted,” “inundated at 20 cm below the surface”). Once completed, each ST will be immediately backfilled.

### **Artifact Discovery**

If a scatter of artifacts or a single artifact is found on the surface, a formal surface collection will commence. Surface collection will include all historic, potentially historic, non-diagnostic, and precontact artifacts per SHPO and OSA guidelines. If artifacts are encountered on the surface or in a ST, additional STs will be conducted in the four cardinal directions, spaced at 5-meter intervals to delineate the site boundary. If multiple sites are identified within proximity to one another, the space between sites will be surveyed to determine if the individual sites are contiguous. If the space between sites affords ground surface visibility below 25 percent, shovel tests will be conducted at a maximum of 15-meter intervals.

Artifacts will be collected and retained for analysis and documentation before being returned to the landowner. If the landowner would like the artifacts to be curated, they will be deposited at the Minnesota Historical Society under Merjent’s curation agreement with the institution (#1082).

### **Additional Data Collection**

The location of all STs, surface artifacts, and features will be mapped and recorded with a Trimble R1 Integrated Global Navigation Satellite System receiver and ESRI Field Maps at sub-meter accuracy. Digital photography will be used to record surface conditions of all tracts, select excavation profiles, cultural features, and identified archaeological sites. Overview photographs

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will be taken of the high, medium, and low probability areas. Additional photographs will be taken at the discretion of the Principal Investigator to document specific disturbances, archaeological sites, artifacts, and anything else that would contribute to describing the Project footprint.

### **Archaeological Licenses**

An OSA Phase I Archaeological Survey License will be required as the Project footprint intersects Minnesota Department of Transportation road rights-of-way. The license will be secured prior to the Phase I archaeological field inventory.

The Phase I archaeological field inventory is anticipated for summer 2024. This letter presents the Cultural Resource Survey Plan for a Phase I archaeological field inventory for the Project. Lemon Hill Solar respectfully requests your review and comment on this Cultural Resource Survey Plan. If you require additional information, please do not hesitate to contact me at [aaron.armstrong-duarte@merjent.com](mailto:aaron.armstrong-duarte@merjent.com).

Sincerely,  
Merjent, Inc.



Aaron Armstrong-Duarte  
Principal Investigator

CC: Zane Jones, Lemon Hill Solar: [zane@rangerpower.com](mailto:zane@rangerpower.com)  
Dan Flo, Merjent: [dan.flo@merjent.com](mailto:dan.flo@merjent.com)

Attachments: References Cited  
Figure 1  
Figure 2



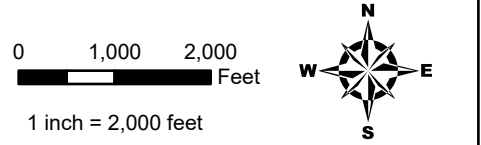
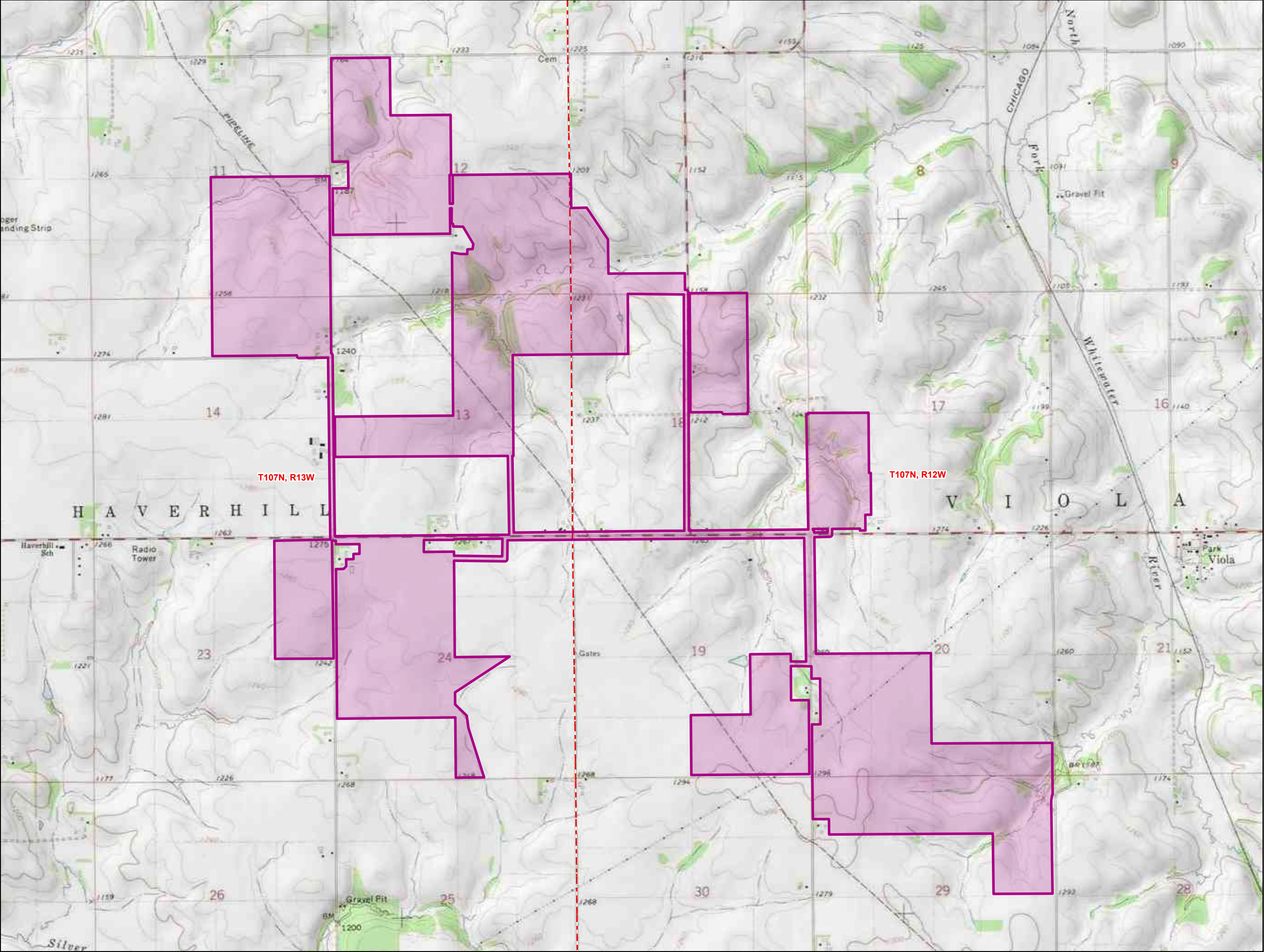
References Cited

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Anfinson, Scott F. 2005. *SHPO Manual for Archaeological Projects in Minnesota*. Minnesota Historical Society. St. Paul.

Minnesota Department of Transportation. 2024. Minnesota Statewide Archaeological Predictive Model MM4 (MnModel). Available online at <http://www.dot.state.mn.us/mnmodel/>. Accessed March 2024.

Thomas, David H. 1986. *Refiguring Anthropology: First Principles of Probability and Statistics*. Waveland Press, Inc. Prospect Heights.

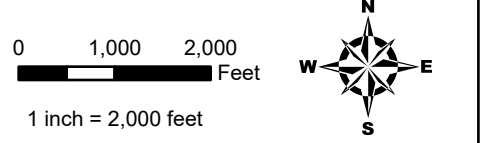
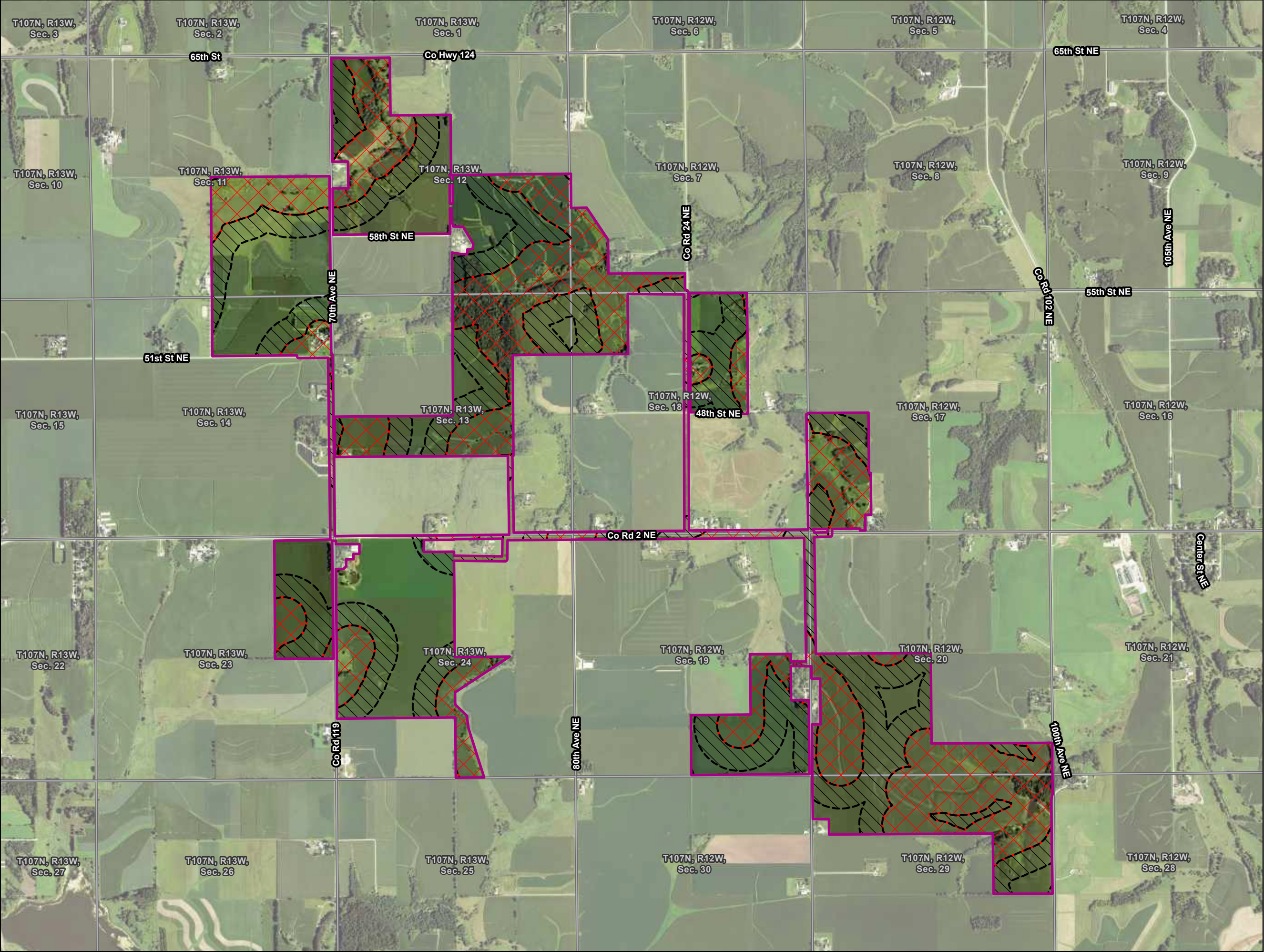


-  Survey Area
-  Township Boundary

**Figure 1:**  
**Project Overview**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar Project**  
**Olmsted County, Minnesota**







- Survey Area
- Section Boundary
- High Probability Survey Area
- Medium Probability Survey Area

**Figure 2:**  
**Survey Model**  
**Lemon Hill Solar, LLC**  
**Lemon Hill Solar Project**  
**Olmsted County, Minnesota**





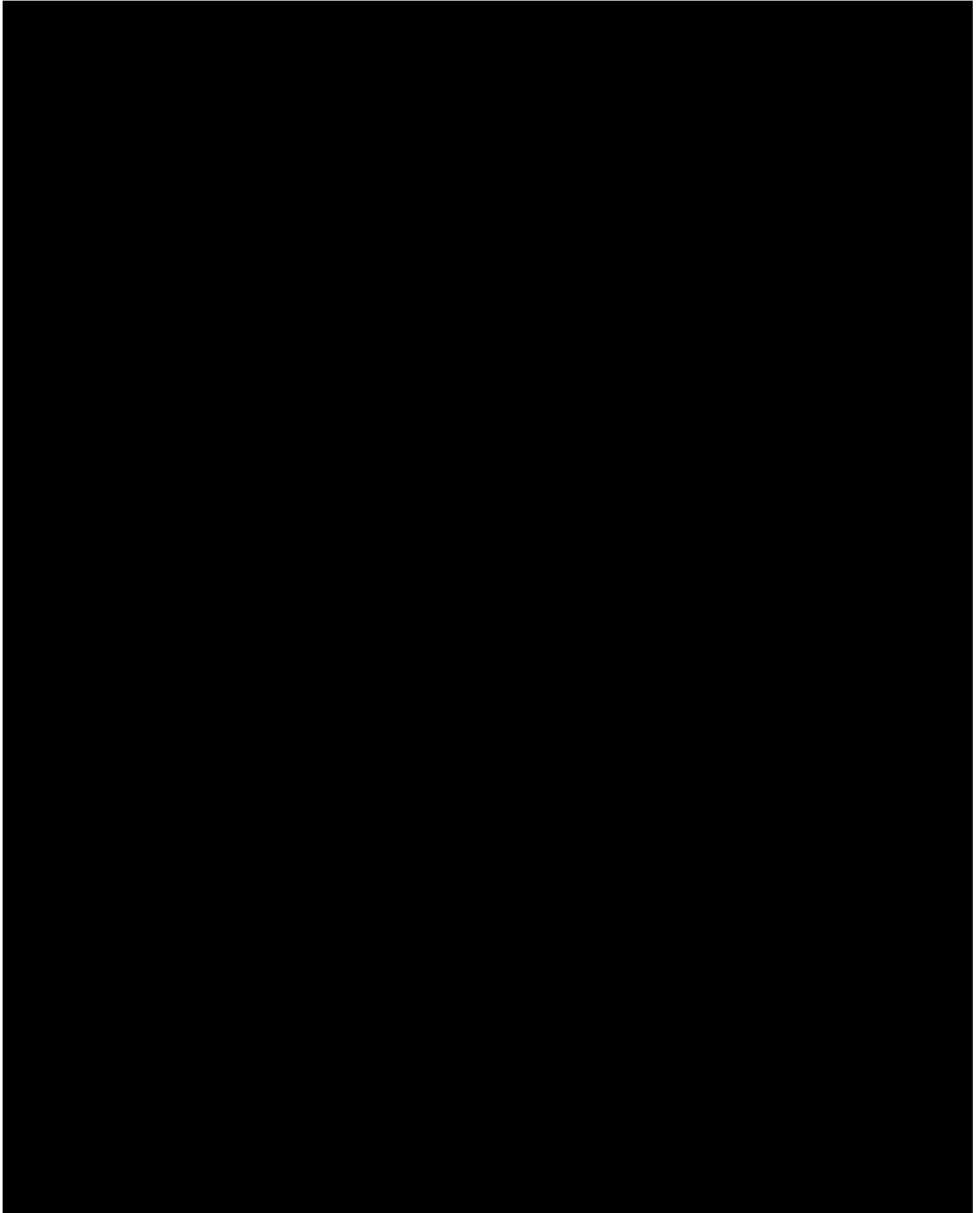
## **APPENDIX C**

### **Site Form for Site 21OL0077**

Rev.: 7/1/09

# **MINNESOTA ARCHAEOLOGICAL SITE FORM**

**OFFICE OF THE STATE ARCHAEOLOGIST**  
Fort Snelling History Center, St. Paul, MN 55111 (612) 725-2729

A large black rectangular redaction box covers the entire body of the form, obscuring all content below the header information. The box extends from the top of the form area to the bottom and across the full width of the page.

