Appendix - I-2
Phase I Archaeological Reconnaissance Survey

A REPORT FOR PHASE I ARCHAEOLOGICAL SURVEY

Lake Wilson Solar Project

Murray County, Minnesota

NOVEMBER 22, 2022

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Phase I Archaeological Survey

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Project Number: R0012861.02
Date: November 22, 2022

Abstract

Lake Wilson Solar Energy LLC contracted Westwood Professional Services, Inc. (Westwood) of Minnetonka, Minnesota to conduct a Phase I Archeological Survey for the proposed Lake Wilson Solar Project (Project) in Murray County, Minnesota. The Project will be comprised of 150-megawatt (MW) solar energy generation facilities, a 95 MW battery energy storage system (BESS) facility, and related facilities. At this time, the Project is being conducted at a state-level review due to anticipated requirements of the Minnesota Public Utilities Commission as part of the Site Permit Application process as required under the Power Plant Siting Act (Minnesota Statutes Chapter 216E).

Design changes to where ground-disturbing Project facilities are proposed to be constructed and operated have resulted in multiple Preliminary Development Areas (PDA) and field surveys. The Previous PDA consisted of 1,577 acres and was surveyed in November 2021 (**Exhibit 1**). The Current PDA consists of approximately 1,526 acres, of which about 973 acres overlapped with the Previous PDA. The final 553 acres within the Current PDA were surveyed in November 2022 (**Exhibit 2**). A total of 2,130 acres was surveyed.

The Project is situated in Minnesota Archaeological Region 1 (Southwest Riverine) and Region 2s (Prairie Lake [South]). Fieldwork of the initial APE was carried out by Westwood Principal Investigator Rigden Glaab and Archaeological Technicians Brian Joby Hunt, Ryan Steeves, Lindsay Schwartzkopf, and Daniel Schneider between November 16 and November 19, 2021. Survey of changes to the APE was completed by Rigden Glaab and Sara Nelson on October 31 through November 2, 2022. Rigden Glaab of Westwood meets the Secretary of the Interior's Professional Standards for Archaeology, as stipulated in 36 CFR Part 61, and served as Principal Investigator for the Project. Ground surface visibility (GSV) across the entire Project APE was 50% - 95%+ at the times of survey, which provided optimal conditions for viewing terrain.

No cultural resources were identified within the Project APE by Westwood archaeologists during the Phase I Survey and no further work is recommended for the Project at this time. No National Register of Historic Places or State listed historic resources will be impacted by the Project. It is recommended the Project proceed as planned. Should there be additions or changes to the proposed construction plans, Westwood should be contacted to complete additional survey in areas not previously field surveyed.

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1.0 Introduction

Lake Wilson Solar Energy LLC subcontracted Westwood Professional Services, Inc. (Westwood) of Minnetonka, Minnesota, to perform a Phase I Archeological Survey for the proposed Lake Wilson Solar Project (Project) in Murray County, Minnesota (**Exhibit 1**). The Project will consist of 150-megawatt (MW) solar energy generation facilities, a 95 MW battery energy storage system (BESS) facility, and other related facilities. The Project requires approval from the Minnesota Public Utilities Commission (PUC or Commission) which will issue a Site Permit for the Project. A Site Permit Application (SPA) is being prepared for the Project as required under the Power Plant Siting Act (Minnesota Statutes Chapter 216E).

Design changes to where ground-disturbing Project facilities are proposed to be constructed and operated have resulted in multiple Preliminary Development Areas (PDA) and field surveys. The Previous PDA consisted of 1,577 acres and was surveyed in November 2021. The Current PDA consists of approximately 1,526 acres, of which about 973 acres overlapped with the Previous PDA (**Exhibit 1**; **Table 1**). The final 553 acres within the Current PDA were surveyed in November 2022 (**Exhibit 2**). A total of 2,130 acres was surveyed.

The Minnesota State Historic Preservation Office (SHPO) requires that archaeological investigations be conducted by a qualified archaeologist who meets the Secretary of the Interior's qualifications as outlined in 36 C.F.R. 61. The Minnesota SHPO also outlines standards and guidelines for conducting work in the state. Rigden Glaab of Westwood meets the Secretary of Interior's Professional Standards for Archaeology, as stipulated in 36 C.F.R. Part 61, and served as Principal Investigator for the archaeological survey. Fieldwork and review were supported by Westwood Cultural Resources Manager Ryan Grohnke, and archaeologists Brian Joby Hunt, Ryan Steeves, Lindsay Schwartzkopf, Daniel Schneider, and Sara Nelson. The Project is located south and southeast of the City of Lake Wilson in Murray County, Minnesota. The PLS locations of the Current and previous PDAs and their encompassing one-mile buffer are listed in **Table 1** below.

Table 1 – Sections Containing Preliminary Development Areas and/or One-Mile Buffer

Township	Range	Sections in Current Preliminary Development Area	Sections in Previous PDA and Literature Review Buffers
106	42	15, 16, 17, 20, 21, 22, 27	7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 26, 27, 28, 29, 30, 33, 34, 35
106	43		11, 12, 13, 14, 23, 24, 25

2.0 Scope of Work

A Phase I Archaeological Survey was conducted to determine whether any undocumented, significant archaeological resources are present within the proposed Project's APE and to define vertical and horizontal boundaries of identified sites. If new sites are identified, investigators assess proposed construction impacts and provide recommendations on avoidance or additional work. The APE for this Project is commensurate with the PDA and consists of any location where ground disturbance could occur. The Previous PDA consisted of 1,577 acres and was surveyed in November 2021. The Current PDA consists of approximately 1,526 acres, of which about 973 acres overlapped with the Previous PDA (**Exhibit 1**). The final 553 acres within the Current PDA were surveyed in November 2022 (**Exhibit 2**). A total of 2,130 acres was surveyed during the various design iterations.

3.0 Survey Methods

Project survey methods included background research, a literature review, and field investigations in the form of pedestrian survey. Environmental background and historic contexts were used to assess site probability and determine site types most likely to be encountered in the area.

The background research and literature review involved detailed file review in the online Portal maintained by the Office of the State Archaeologist (OSA) and a request for data and files from the Minnesota SHPO, specifically examining site maps, archaeological site forms, burial files, and survey reports. Other sources investigated included the Historic Andreas Atlas, Trygg Maps, and county histories and plat books. The background research and literature review identified previous cultural resource investigations and previously recorded archaeological sites, along with levels of disturbance and potential for sites within the Project APE / PDA.

Fieldwork consisted of pedestrian visual ground surface survey, completed in 15-meter interval transects throughout the proposed Project APE. Investigation of the initial Project APE was completed on November 16 to 19, 2021. Changes to Project design resulted in additional survey of new APE October 31 to November 2, 2022. Most effective visual inspection is conducted on ground surfaces, such as cultivated fields exhibiting exposed soils. Generally, pedestrian survey is utilized in areas where surface visibility is greater than 25%. Significant slopes, wetlands, and obviously heavily disturbed areas may be excluded from survey.

4.0 Results of Background Investigations

4.1 Environmental Background

The Project is located in a sparsely populated agricultural region in southwestern Minnesota in Murray County and is currently comprised almost entirely of agricultural land. At the time of the field investigation ground surface visibility (GSV) ranged from 50% to 95%.

4.1.1 Landscape

The Project is located in the Des Moines Lobe ecoregion of the Western Corn Belt Plains with Lake Wilson meeting at the convergence of the Des Moines Lobe and the Loess Prairies. This area also encompasses portions of the Prairie Lakes Region (PLR). The Western Corn Belt Plains

is noted to possess high agricultural productivity due to its fertile mesic soils, temperate climate, and adequate precipitation during the growing season. The Des Moines Lobe extends from southern Minnesota into north-central Iowa, and with this region being covered by the Des Moines Lobe of the Wisconsin glaciation. The northern two-thirds of the ecoregion is bisected by the Minnesota River, from northwest to southeast, and its floodplain that is trenched into the glacial till along much of its length before the river turns northeast at Mankato. Much of the eastern border is formed by moraines from both the Des Moines Lobe glaciation and earlier stages of glaciation. The largest part of the ecoregion is in till plain and ground moraine.

Murray County resides on a plateau called the Coteau des Prairies, a wedge-shaped bedrock upland between the Minnesota River lowland and the James River lowland in South Dakota (Berg 2002; CEC 2021). Murray County is mostly a near level to undulating glacial moraine that is dissected by two nearly parallel, northwest- to southeast-trending end moraines that formed rolling to steep topography. The Des Moines Lobe ecoregion is noted for intensive agriculture, with 92% of Murray County being dedicated to cropland and an additional 5% dedicated pastureland (Berg 2002; CEC 2021).

4.1.2 Flora

Prior to European settlement in the region, grasses would have dominated a Prairie Grassland Biome. Frequent fires would have kept woody vegetation in check, with fire-tolerant trees, such as cottonwoods (*Populus* spp), elms (*Ulmus* spp), ashes (*Fraxinus* spp), and willows (*Salix* spp). The modern landscape does not reflect that of pre-European peoples, as less than 1 percent of this prairie landscape remains, making it functionally extinct. Modern trees are planted as windbreaks around farmsteads and along fencerows to prevent soil erosion, with a mixture of native and non-native plants. Modern native plants may include, big bluestem (*Andropogon gerardii*), blazing star (*Liatris spicata*), purple prairie clover (*Dalea purpurea*), prairie dropseed (*Sporobolus heterolepis*), and leadplant (*Amorpha canescens*) (Wilken et al. 2011).

4.1.3 Fauna

The agricultural landscape of the Western Corn Belt limits the wildlife that may reside within the region. Modern native mammals may include White tail deer Odocoileus virginianus, pocket gopher (Family *Geomyidae*), American badger (*Taxidea taxus*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), and Virginia opossum (*Didelphis virginiana*). Birds may include Canada goose (*Branta canadensis*), red-tailed hawk (*Buteo jamaicensis*), barn owl (*Tyto alba*), wild turkey (*Meleagris gallopavo*), greater prairie chicken (*Tympanuchus cupido*), and upland sandpiper (*Bartramia longicauda*). Reptiles and amphibians may include great plains toad (*Anaxyrus cognatus*), American toad (*Anaxyrus americanus*), and snapping turtle (*Chelydra serpentina*). Waterways are predominantly channelized intermittent and perennial streams. Streams and some natural lakes provide habitat for a variety of species like walleye (*Sander vitreus*), bluegill (*Lepomis macrochirus*), northern pike (*Esox lucius*), sunfish (Family *Centrachidae*), and others (MNDNR, 2021; Wilken et al., 2011).

4.1.4 Soils

Soils of the Lake Wilson area of Murray County are indicative of Bemis Moraine lying adjacent to Meltwater Channel (Murray County Soil) atop glacial drift. Lying beneath the Glacial Drift is Sioux Quartzite Bedrock. Prairie soils are noted to possess a dark color and high nutrient content, which cover much of the southern and western part of the state. Soils tend to be gently sloping, with a black silty clay loam to black clay loam with ranging depths of 20–30 centimeters (cm) throughout the county. Underlying materials typically consist of yellowish-brown clay loam

to dark yellow-black clay loams reaching a depth of approximately 150 cm (CEC 2021; MNDNR 2021)

4.1.5 Geology

Cretaceous-age sediments and Sioux Quartzite make up the bedrock surface of the drift mantled Coteau des Prairies. Metamorphic and igneous crystalline Precambrian rocks underlie the Sioux Quartzite and Cretaceous rocks. Tongue River silica (TRS) is noted as culturally abundant in western portions of Iowa and Minnesota. Naturally occurring Tongue River cobbles are distributed generally in glacial graves throughout the region, often heat treated, they typically exhibit a red or maroon coloration in the archaeological record. However, natural color ranges from red ochre to yellowish brown, with a grey variation occurring in North Dakota. TRS is not found naturally in southwest Minnesota and would have been traded or carried into the region by indigenous peoples. TRS is derived from the Fort Union formation in the Dakotas, however, may be carried downstream into Iowa along the Missouri River (Anderson 1978; USDA 2017). Knife River flint (KRF) is also present in the region and was utilized by Native Americans. Its source is likely attributed to glacial cobbles or gravels. The Pipestone Quarry Site (21PP2) located 20 miles west of the Project was visited by the artist George Catlin in 1836. The pipestone quarries in southwestern Minnesota were extensively mined by Native American tribes for pipe manufacture. The raw material, catlinite, was eventually named after Catlin (Morrow 2016:34).

4.1.6 Geomorphology

Geomorphology of the Project Area is primarily comprised of a thick loess and glacial till cover over the Mesozoic and Paleozoic shale, sandstone, and limestone (Wilken et al. 2011). The greater ecoregion is bisected by the Minnesota River, from northwest to southeast, and its floodplain that is trenched into the glacial till along much of its length before the river turns northeast at Mankato. Much of the eastern border of the ecoregion formed by moraines from both the Des Moines Lobe glaciation and earlier stages of glaciation. The largest part of the ecoregion is in till plain and ground moraine. Most of Murray County has a poorly developed surface drainage pattern. The county is drained by four watersheds, the Des Moines, Redwood, and Cottonwood Rivers (Mississippi River drainage), as well as the Rock River (Missouri River drainage) (Berg 2002; White 2020).

4.2 Cultural History

4.2.1 Prehistoric

In general, there are five major archaeological traditions in Minnesota that consist of the Paleoindian, Archaic, Woodland, Plains Village, and the later Mississippian, comprised of Oneota and Psinomani periods (Anfinson 1997; Arzigian 2008; Dobbs 1990; Gibbon 2012). These traditions represent varying degrees of cultural adaptations to changing environmental conditions, endemic population growth, and the movement of Native American groups in the past. The following cultural context presents an interpretation of this history based on current archaeological research and broadly accepted models for precontact social lifeways.

The Project is situated in Minnesota Archaeological Region 1 (Southwest Riverine) and Region 2s (Prairie Lake [South]) (Gibbon et al. 2002). Gibbon et al. (2002) note that village sites of earlier prehistoric periods are typically located on islands, lake peninsulas, and major rivers. Archaeological sites can be expected during the early periods to be near glacial streams and rivers. In this context, winter villages occur in wooded areas of large river valleys, while

temporary campsites are identified along minor rivers and lakes. The Minnesota and Blue Earth rivers near the Project are a locus Late Prehistoric activity in the region with numerous village site examples documented atop significant terraces (Gibbon et al. 2002). Woodland period camps follow a similar pattern across the landscape but are limited to temporary or special use activities. Euro American settlements start along riverine areas and later expand to follow surveyed divisions in subsequent townships.

The cultural history presented below focuses on the archaeology of the Prairie Lake Region (PLR), specifically across southwest Minnesota. This encompasses Murray County where the Project is located. Archaeological phases will be discussed as they pertain to research on cultural changes influenced by environmental and social variables. Ceramic, lithic, and groundstone technologies are also included as material markers of these transitions.

4.2.1.1 Paleoindian Period (13,000 to 9000 Before Present [B.P.])

The Paleoindian Period represents the earliest evidence of human occupation in Minnesota, typically separated into the Early Paleoindian (13,000–12,500 B.P.) and Late Paleoindian (12,500–9000 B.P.) periods (Frison 1998). Spear technology is important during this timeframe, as opposed to an emphasis on atlatl and bow and arrow lithic technology seen during later periods. This reflects a subsistence strategy focused on large game hunting and high mobility. However, Gibbon (2012: 37) suggests foraging behavior may have been broader spectrum, as evidenced by the long temporal overlap of eastern Archaic and Paleoindian traditions in Minnesota. Paleoindian settlement and mobility patterns constitute a major discussion point in archaeological research.

Paleoindian archaeology in Minnesota mirrors the initial expansion of *Homo sapien sapiens* during the height of the Eurasian Upper Paleolithic periods into North America (Gilligan 2010: 16). The focal point of this migration is hypothesized to have occurred in a region termed Beringia, which extends from the Verkhoyansk Mountains in Siberian Russia to the edge of the now extinct Laurentide glacial ice sheet in western Canada (Hoffecker and Elias 2007). Traditionally, the shallow waters of the Bering Sea are argued to have served as the principal access point into the Americas when sea levels were reduced due to extensive glaciation that occurred during the Pleistocene Epoch (2.588 million to 12,000 B.P.).

The proposition that the Bering land bridge may have served as passageway for early human migrations was first suggested by the Spanish Missionary Fray Jose de Acosta in A.D. 1590 (Hoffecker and Elias 2007: 2). Although Spain had not yet explored these waters, de Acosta thought it was the only logical explanation for how indigenous populations would have come to the Americas. Eric Hultén (1937) later coined the term “Beringia” to describe the Quaternary ecology of this unique region. The designation Beringia is named for the famous Danish explorer Vitus Bering, who, by way of Russian contract, was the first European to sail the strait in 1728.

The area associated with the bridge is termed the Bering-Chukchi Platform, which extends 1600 km from the Arctic Ocean to the eastern Aleutians (Hoffecker and Elias 2007: 5). Although the majority of this region is flat, the topography is punctuated by a few small islands, such as St. Lawrence Island and Wrangle Island. The majority of the shelf lies beneath less than 100 meters of water and drops to 30 meters near the Chukotka Peninsula, Russia. Over the 2.6-million-year course of the Quaternary Period, 100 Marine Isotope Stages (MIS [Oxygen 16/18 ratios]) have been documented, which show the repeated exposure and inundation of the land bridge constituting 50

glacial/interglacial oscillations (Hoffecker and Elias 2007: 7–8). Initial human migrations into North America appear to be associated with the cold-snap brought on by the Younger Dryas (12,900–11,700 B.P.), which effectively lowered sea-levels by 50 meters, exposing the platform.

The archaeological record for humans expanding into North America is manifested at both interior and coastal sites. Wygal et al. (2022) recently reported on osseous technology dating to 13,600–13,300 cal B.P. from the Holzman Site along Shaw Creek in interior Alaska. These mammoth ivory rods are the oldest confirmed bone tools in the Americas. Early interior sites include that of Swan Point, Broken Mammoth, and Healy Lake, Alaska, which suggest population movements between the Laurentide and Cordilleran ice sheets between 13,000 and 11,000 B.P. (Holmes 2001; Cook 1996; Yesner 2001). Concurrently, a rapid coastal migration is also indicated at several South American localities, such as Monte Verde, which demonstrate potential evidence for groups moving by boat down the Pacific shoreline at approximately 15,000 B.P. (Dillehay 1989; Dixon 1999; Fladmark 1979).

Genetic work with mtDNA haplogroups in the Americas and Asia appears to confirm the archaeological evidence, showing simultaneous coastal/interior population movement occurring between 18,700 and 14,200 B.P. (O'Rourke 2009; Perego et al. 2009). Alternatively, although followed by much criticism, Bradley and Stanford (2004) suggest that the progenitors of Clovis, and perhaps other groups, were the product of Atlantic migrations associated with peoples of the Solutrean cultures in France. Current genetic evidence refutes this claim; however, the issue does highlight an important debate in Alaskan archaeology (O'Rourke 2009; Perego et al. 2009).

The Pleistocene history of Minnesota is long and complex with most of the state and surrounding regions being covered in glaciers between 18,000 B.P. and 11,000 B.P. (Manz 2019: 23). Glaciers did not fully recede until approximately 10,000 years ago, where only the southwestern and southeastern parts of the state remained unglaciated. A dominant feature following deglaciation was Glacial Lake Agassiz. This overlapped the northwest portion of the state and formed during the retreat of the Des Moines Lobe, which principally drained to the south via Glacial River Warren (Gibbon 2012: 38). As Lake Agassiz further retreated north, the modern Red River of the North began to form flowing towards the Hudson Bay. In terms of human occupation potential, the southern part of the state is likely the highest probability area to encounter archaeological sites, as it was unglaciated (Gibbon 2012: Map 2.1). Elk, mammoth, and extinct forms of bison (e.g., *Bison antiquus*) may have been hunted by Pleistocene Native Americans of this time frame in Minnesota; however, other resources were probably equally important.

Waguespack (2007: 69–70) highlights evidence for early migrations into North America that indicate hunters and gatherers may have been generalized foragers, as opposed to explicitly large game predators. Historically, the first evidence for the Paleoindian Period comes from New Mexico where archaeologists uncovered fluted projectile points in association with extinct megafauna at sites, such as Blackwater Draw (Cook 1927; Figgins 1927). These important early finds quickly placed the antiquity of humans on the mid-continent of North America at the end of the Late Pleistocene (Howard 1936). Much of the debate generated by these discoveries overly focused on the role megafauna placed in the subsistence economy of Paleoindian hunter and gatherers. This pattern is different than many of the interior localities dating prior to 11,000 B.P. (e.g., the Village Lake Site at Healy Lake in Alaska [Cook 1969]), which exhibit a broad-spectrum diet. Bison and

Wapiti appear to be the predominant large game that were hunted during this early period; however, birds and other small mammals were also exploited (Yesner 2001).

Analogous patterns have been observed outside of Minnesota, including eastern Great Basin sites, such as Bonneville Estates Rock Shelter, which demonstrate a broad-spectrum diet occurring between 13,100 and 12,000 B.P. (Goebel 2007; Graf 2007: 103). The archaeological record from this site suggests the prehistoric inhabitants were participating in a mixed foraging and hunting strategy. The identification of this trend in the Great Basin has led to the suggestion that this early phase be called the "Paleoarchaic" instead of "Paleoindian" in recognition of the markedly different subsistence strategies that were similar to later archaic groups (Graf and Schmitt 2007; Willig 1988; Willig and Aikens 1988). Realistically, the debate about whether early Paleoindians were generalized foragers or large game specialists likely rests "on the relationship between what could have been hunted and what was actually taken" (Waguespack 2007: 70; Waguespack and Surovell 2003).

In contrast to these views, Kelly and Todd (1988) take the position that early populations of hunter and gatherers entering into the North American continent were heavily dependent on terrestrial fauna, as opposed to plant resources, since this was a more reliable food source. They argue that the strategies employed by these foragers were starkly different than that of modern hunter and gatherers, in that groups were not operating in seasonally restricted spaces. An optimal foraging analysis for procuring large game has been conducted by Byers and Ugan (2005). Specifically, they identified variables that may have deterred Paleoindians from focusing exclusively on megafauna, including the large number of individuals needed for processing, difficulty in procuring game, and distribution of game within different environmental patches. The authors conclude that the phenomena of exclusive large mammal hunting likely only occurred in a "narrow range" of places where game was abundant and processing time was low, such as in the Great Plains (2005: 1625). Minnesota and surrounding areas may have encompassed by this narrower range, as suggested by Kelly and Todd (1988).

The issue of broad spectrum versus predominant large game hunting has been problematic to the ongoing debate of how and when humans entered into the North American continent. Guthrie (1990) has supported the notion that humans could have easily followed the wide trails of proboscideans across the land bridge. Haynes (2001) reasons that modern African elephants can serve as an analogy for understanding how Pleistocene hunters may have interpreted herd characteristics. Such behavioral patterns include 1) the speed, direction, and health of an elephant herd based on the distribution/content of dung, and 2) the relative size of the animals based on the track width. Elephants create a series of fixed and habitually used trails that would have allowed initial colonizers into interior Alaska as a means to systematically explore the landscape. Conversely, Yesner (2001: 317) sees the process of colonization into interior Alaska as involving a "push-pull" factor, presenting evidence for the existence of proboscideans in Siberia up to 9000 B.P. This suggests that hunters would have been encouraged to remain in western Beringia for a longer period of time to procure this higher ranked resource. Foragers may have only episodically crossed the land bridge as eastward movement began to develop as the principal subsistence cycle.

A theoretical trajectory of incipient occupation into novel landscapes has been proposed by Beaton (1993) to describe the initial colonization of Australia (also see Yesner 2001). His model breaks down human entry into two categories: transient explorers and estate settlers. Beaton suggests that the settlement pattern associated with transient explorers

would be lineal, conforming principally to significant geographic features, such as mountains and rivers. This type of occupation may be associated with the earliest sites in Minnesota, which could be situated along the margins of major river corridors (e.g., Glacial River Warren). High mobility and small populations are necessary with the transient model, since groups are entering into an unfamiliar landscape leading to potentially high extinction rates. In contrast, estate settlers inhabit new lands in a more radial fashion since there is a greater degree of familiarity with the resources present. Kelly and Todd (1988) argue that immigrant Paleoindians would have needed to switch territories frequently due to unfamiliar landscapes. This would have been an adaptive method to adjust to resource stress by either switching territories or adjusting the types of foods being consumed. In reality, the Early and Late Paleoindian Periods in Minnesota likely represented a combination of these alternating mobility strategies.

4.2.1.2 Minnesota's Early Archaeological Record

Clovis culture is commonly regarded as the first evidence of human occupation in Minnesota during the Early Paleoindian period. Its signature implement, the Clovis projectile point, is made from high quality lithic materials and has a central channel flake that extends part way up the proximal shaft of the tool (Frison 1998). Folsom is another Early Paleoindian technology that temporally follows Clovis during the Early Paleoindian Period. The Folsom point and type site are named after the city of Folsom, New Mexico, where a Folsom projectile point was recovered with the ribcage of the now extinct species of bison, *Bison antiquus* (Dobbs 1990). Its projectile point is typically made from high quality materials as well, with the central channel flake extending the entire length of the implement to the distal tip (Hofman 1995).

Clovis and Folsom projectile points were used to hunt now-extinct forms of game, including *Bison antiquus* and mammoths. Evidence for Early Paleoindian occupation in Minnesota is limited to isolated finds of projectile points. Clovis isolated finds (N=30) have been found in central and southeastern Minnesota, while Folsom isolated finds (N=20) are documented in the western and southern parts of the state (OSA 2019).

Anfinson (1997: 34) suggests the reason southwest Minnesota has produced limited Clovis evidence could be attributed to Pleistocene reactivation episodes of Glacial River Warren in the Minnesota River trench. Riverine site encampments were favored among early foragers, but these locations are quickly destroyed during flooding or other channelization events. The archaeological record has simply not survived for this period or is buried beyond conventional excavation methods.

Morrow (2016: 125 [Fig. 5.9]) identifies that Clovis technology is present in Murray County albeit in the form of isolated projectile points. An example from the Harris Darling Collection presents a heavily curated Clovis point made from an unidentified chert or chalcedony. The material, to this reader, appears slightly oxidized, which may be from heat treatment or naturally occurring fire. The morphology of Clovis projectile points in Minnesota may represent a lithic adaptation from similar types in Wisconsin (e.g., Gainey). Two additional Clovis points of Cedar Valley Chert are shown from the Gregg Nelson Collection, in Blue Earth County, approximately 70 miles to the east of the Project.

The Late Paleoindian Period in Minnesota is characterized by an unfluted variety of projectile points similar to earlier lanceolate forms associated with the Plano Cluster (Dobbs 1990). Alberta, Agate Basin, Eden, Hell Gap, and Scottsbluff are varieties of

projectile points found during this time, which are often associated with bison kill sites. Late Paleoindian sites are significantly more common in Minnesota, with over 200 being recorded. Browns Valley Site in western Minnesota and the Bradbury Brook Site in east-central Minnesota are important Late Paleoindian localities in the state (Morrow 2016; OSA 2019).

The discussion will focus on the Browns Valley Site (21TR5) due to its proximity to the Project, and for the quality of Late Paleoindian data. The site is located next to the town of Browns Valley, Minnesota, and is 120 miles north of the Project in Traverse County. Browns Valley contains a possible Late Paleoindian burial dating to approximately 9000 B.P. (Morrow 2016:125). Anfinson (1997: 32) previously discusses two radiocarbon assays from bone samples (9160 +-110 B.P. and 9049 +-82 B.P.) that demonstrate its antiquity as one of the oldest burials in North America. The site also contains a significant Plains Village component with circular fortifications (See Plains Village discussion below).

The grave consists of a male aged between 35 and 39 years old in a U-shaped, red-ochre stained depression that was found with a possible lithic cache of six projectile points (Anfinson 1997: 30–32; Gibbon 2012: 56; Morrow 2016: 157). Commonly called Browns Valley projectile points, this implement is lanceolate-shaped with convex margins and a ground concave base that can include basal thinning flakes onto the medial-proximal biface surface. The points found at the type site were made from KRF whose primary source area is western North Dakota. Smaller KRF cobbles can be found in regional glacial lag.

Browns Valley points are a unique Late Paleoindian tool type found in the PLR of southwest Minnesota and Murray County. The distribution of these points broadly follows the western Mississippi River Valley from Minnesota to Mississippi (Morrow 2016: 157). Locally, Browns Valley points have been found in Murray County surface collections, and other examples are present, though limited, from Aitkin and Pine counties in east-central Minnesota. The type site itself in Traverse County contains the most biface examples from a single collection (N=6).

Dalton Tradition (10,500–9500 B.P.) implements are more common to the Central Mississippi Valley and represent a transitional lithic type (e.g., Dalton, Hi-Lo, and Quad points) from other Late Paleoindian tool forms (Buhta et al. 2017: 77; Morrow 2016: 140). Dalton projectile points are a medium- to large-sized spear or dart that has a lanceolate/auriculate body, sometimes serrated, and often is proximally ground along its concave base. Many examples show evidence for beveling or resharpening on the margins of the projectile point. Flake tools, end scrapers, side scrapers, and gravers comprise implements found in Dalton assemblages.

Southern Dalton assemblages contain unique tools that include stone drills/awls, adzes, shaft abraders, and edge-abraded cobbles (CALS 2020). The proliferation of adzes in the archaeological record show that woodworking became an important activity (e.g., canoe production, structures). Cemeteries also start to occur as can be seen south of the Project at the Sloan Site in Green County, Arkansas (Morrow 2020). Approximately 28 to 30 people were buried with some including large ceremonial items called “Sloan Bifaces,” which mirror the form of Dalton points (Morse 1997). Overall, these trends in site patterning signal an increase in social complexity.

Expanding diet breadth in Dalton assemblages suggests that deer, waterfowl, fish, turkey, nuts, berries, and other small mammals (rabbits, squirrels, and raccoon) were likely targeted. Morrow (2016: 140) note that from "one to six points have been found in Aitkin, Anoka, Brown, Clearwater, Freeborn, Fillmore, Goodhue, Hennepin, Houston, Itasca, Koochiching, Lac qui Parle, Meeker, Morrison, Ramsey, Rice, Roseau, and Wabasha Counties" in Minnesota. The Dalton Tradition is principally defined from excavations at The Twin Dalton Sites (23SL591 and 23SL766), Big Eddy Site (23CE426), and Graham Cave (23MT2) in Missouri (Chandler 2001; Martens 2010; O'Brien and Wood 1998). Evidence for Dalton in Murray County is limited to isolated finds. Dalton points in Minnesota are often made from Burlington Chert, a material sourced farther south.

4.2.1.3 Archaic Period (9,000 to between 3000 and 2500 B.P.)

Approximately 9000 B.P., a new mode of subsistence strategy began to emerge in the archaeological record across North America (Emerson et al. 2011). The general pattern of this change is the replacement of lanceolate spear-points used during the Paleoindian period, and the adoption of atlatl technology with the presence of groundstone implements. Dalton lithic technologies may represent a technological transition (Buhta et al. 2017: 77). This represents a fundamental difference from earlier forager behavior with a diversification of economy that incorporated more plants into the diets of Native Americans. The Archaic Period in Minnesota began substantially later than other regions starting around 9000 B.P., principally in the southeastern part of the state (Anfinson 1997; Gibbon 2012). Important Archaic innovations include the use of grooved mauls and axes, canine domestication, copper tools, and incipient horticulture. The Archaic Period in Minnesota is poorly known; however, it comprises its longest temporal frame of human occupation.

Xeric environmental conditions began around 9000 B.P. with the spread of prairie grassland across most of southern and western Minnesota (Anfinson 1997). Many of the lakes created as a product of Pleistocene glaciation started to dry during this time, leading to a reduction in game (e.g., bison, fish, birds, etc.) dependent on these resources. These environmental transformations promoted a diversification in hunting strategies, which differed dramatically from the Paleoindian period.

Minnesota experienced a wide variety in changing environmental conditions based on its different ecotones across the state during this time. Consequently, the traditional models of Early, Middle, and Late Archaic found elsewhere in North American do not directly apply. These different environmental regimes necessitated a variety of adaptive strategies to successfully subsist. Archaeologists have defined these internal periods within the state as follows: Lake Forest Archaic, Shield Archaic, Riverine Archaic, and Prairie Archaic (OSA 2022).

The temporal period known as the Lake Forest Archaic accompanies archaeological sites from about 7950 B.P. in much of central and northern Minnesota (Anfinson 1997; Gibbon 2012). Prior to this period, most sites in this region would have mirrored those found in grasslands, whose economy focused on bison hunting. As a result, the Prairie Archaic pattern would have been prevalent during the earliest periods based on the similar environment. The expansion of woodlands during the mesic environments of the post-glacial thermal maximum led to a greater diversification of both plant and animal species. The Mississippi River corridor also served as a conduit for archaic groups from other regions, which ultimately influenced the potential spread of technologies and new

lifeways into Minnesota. The site of Petaga Point in Kathio State Park is one of the best examples of the Lake Forest Archaic Period and contains evidence of Old Copper culture.

The Shield Archaic Period characterizes sites from far northeastern Minnesota, whose assemblages are the product of Native American adaptations found farther north in Canada (i.e., Canadian Shield). An important characteristic of Shield Archaic sites is the lack of ground stone tools and copper artifacts that are often associated with archaic groups elsewhere in Minnesota (Anfinson 1997; Gibbon 2012). Shield Archaic sites in Canada are typically found near lakes and rivers where caribou and other migratory game may have crossed. Similar to other northern adapted populations, these groups may have utilized specialized technologies, such canoes, snowshoes, toboggans, bark and skin-covered shelters, bark containers, and efficient winter clothing. The Fowl Lake Site is an important Minnesota site near the Canadian border that exemplifies the archaeological record of this period.

The Riverine Archaic period is found at sites located along the lower Mississippi River and other drainages in southeastern Minnesota (Anfinson 1997; Gibbon 2012). The river valley bottomlands provided a rich and varied source of animals and plants that were exploited by Native American populations. Common riverine resources included aquatic tubers, fish, waterfowl, mussels, deer, elk, and bison may have been taken in the uplands. The fertile floodplains also provided suitable locations for horticulture where plants, such as squash and various early cultigens, were grown. The King Coulee Site in Wabasha County is one of the most complete archaic sites from this region and dates to between 3450–2450 B.P. A slate gorget, mussel shells, squash seeds, and stemmed projectile points were recovered during the excavations (OSA 2019).

4.2.1.4 Prairie Archaic in Murray County (7,000 to between 3000 and 2500 B.P.)

The Prairie Archaic Period is found across the western parts of Minnesota, representing an adaption to grassland environments. Key game hunted were bison; however, subsistence strategies became diversified resulting in a range of new technologies to process plant and hunt/trap varied animals. An important locality defining this time is the Itasca Bison Site (21CE1) in Clearwater County, Minnesota. The site dates between 8520 and 7790 B.P. and was possibly occupied over two separate stages (Widga 2014). Itasca yielded the remains of bison (N=16), but also contained another pattern for expanding diet breadth in separate species counts of mammals (N=17), birds (N=9), fish (N=7), and turtle (Buhta et al. 2017: 19). These counts have recently been questioned in terms of the degree of faunal diversity, currently suggesting a more limited number (cf. Widga 2014). The most common artifact forms were side-notched projectile points, knives, scrapers, choppers, grinding stones, hammerstones, and perforators. Other important localities from the Prairie Archaic Period include the Granite Falls Site, the Cherokee Sewer Site, and Canning Site. A later regional variation of the Prairie Archaic are the presence of copper tools in the northwestern part of the state, but few examples are in the southwestern areas (Anfinson 1997).

Buhta et al. (2017: 16) identify three Archaic sites in Minnesota's Archaeological Region 1 (Southwest Riverine) and 182 Archaic sites in Region 2s (Prairie Lake [South]) (see Gibbon et al. 2002). Buhta et al. (2017: Figure 7) present a map with the plotted location of approximately seven Archaic sites in Murray County. The majority of the Archaic data specific to Murray County is mainly limited to isolated projectile, so any inference must be drawn from regional examples.

This period represents a climax in pedestrian bison hunting across the PLR. Numerous variations of side-notched projectile technology exist in the Early Archaic including forms such as Graham Cave, Simonsen, Raddatz, Godar, Reigh, Osceola, Matanzas, and Oxbow forms. Morrow (2016: 121) note that many points from the Archaic have variations similar to "two or three different types." The fundamental characteristic — side-notching — is understood here to represent a broad lithic adaptation encompassing many Native American groups practicing similar subsistence strategies. From a global perspective, the human capacity for variation in projectile point style as an ethnic marker is one not just contained in flaking or metal work, but also in its associated accoutrement.

For example, Wiessner (1983) documented a broad range of projectile point characteristics among the !Kung, G/wi, !Xo, and Nharo of the Kalahari San in Botswana, Africa. Projectiles points for these foragers are unifying cultural symbols expressing individualism, language groups, poison delivery methods, folklore (eland mythology), and were exchange items connecting larger populations. In Minnesota, projectile point morphology should be cautiously used to identify specific cultural groups during a period with significant population movement and an unknown ethnographic context.

The Jeffers Petroglyph Site (21CO3) located 40 miles east of the Project contains various images of atlatls and projectile points pecked into an expansive red quartzite ridge in Cottonwood County (Buhta et al. 2017: 34). Images of atlatls, stemmed points, and tanged points indicate that some of the representations could be from the Archaic period (Anfinson 1997: 44). Lothson (1976) suggests the petroglyphs are associated with the practice of hunting magic, performance of sacred ceremonies, and documenting important events. Over 5,000 individual glyphs have been documented at Jeffers, which Lothson subdivided into five major classes including human, tool/weapon, Thunderbird, animal, and geometric forms. There is an absence of images depicting contact-period items, such as horses or guns, suggesting all of the petroglyphs pre-date A.D. 1750.

A key regional example of the Archaic transition close to southwestern Minnesota can be found 90 miles southeast of the Project near Cherokee, Iowa, along the Little Sioux River. Horizon II of the Cherokee Sewer Site (13CK405) contains a bison bone bed layer with an estimated 15 to 30 individuals, suggesting a late winter kill site (Anfinson 1997: 38; Gibbon 2012: 75). The assemblage is also important for the diversity of other animal remains present including skunk and rabbit. Lithic artifacts were predominantly made from TRS consisting of projectile points, end scrapers, choppers, and burins. Bone tools were identified. This type site highlights the diversification of subsistence strategies being practiced during the Early Archaic.

The Granite Falls Bison Site (21YM47) is located approximately 60 to 70 miles north of the Project. It is a well-dated Early Archaic bison processing encampment (6390+-110 and 6840+-120 B.P.) with immature specimens suggesting late fall or early winter site occupation (Anfison 1997: 36). TRS is an important lithic material with artifacts including debitage, side-notched projectile points, and a large ovate biface. This site signals hunting complexity where it is hypothesized bison (*Bison occidentalis*) were driven into bedrock basins and trapped against the bedrock walls before being dispatched. Granite Falls Bison Site demonstrates some of the earliest regional evidence for emerging foraging economies in the Archaic.

A similar assemblage has been excavated at the Goodrich Site (21FA36) in Faribault County, Minnesota, approximately 84 miles east-southeast from the Project (Anfinson

1997: 36–37). Artifacts consisted of stone axes, mauls, scrapers, and bison bone indicative of a seasonal kill site. Parallels have been noted between these artifacts and those excavated at the Cherokee Sewer Site (13CK405).

There is evidence for mortuary practices during the Prairie Archaic near the PLR. The Turin Site (31MN2) is located 136 miles south of the Project in western Iowa. This inhumation was identified in a gravel pit with four individuals buried flexed position including one covered in red ochre. Grave goods were comprised of an *Anculusa* shell bead necklace and side-notched projectile points (Anfinson 1997: 39).

4.2.1.5 Woodland Tradition (3000 B.P. to 950 B.P.)

Substantial cultural changes began to occur in southwestern Minnesota approximately 3000 to 2500 years ago, with Native American adaptations mirroring broader trends across the southern and eastern United States (Arzigian 2008). This timeframe, known as the Woodland Period, is marked by the presence of burial mounds, pottery, bow and arrow technology (ca. 1450 B.P.), and intensive plant cultivation. Archaeological settlement patterns show Native American groups beginning to aggregate into larger populations along lakes, rivers, and associated drainages. Woodland archaeological sites are often broken into one of a classic tripartite temporal division of Early (3000–2150 B.P.), Middle (2150–1450 B.P.), and Late Woodland (1450–950 B.P.) Periods (Emerson et al. 2008).

Traditionally, variations in the Woodland Period across time and space are argued to derive from broader influences that shaped significant trends in cultural practices. These interaction spheres include the Adena (Early Woodland Period), Hopewell (Middle Woodland Period), and Mississippian (Late Woodland Period) Cultures (Anfinson 1997; Gibbon 2012). While these divisions work well for other regions of North America, they do not neatly apply to archaeological sites in southwestern Minnesota (Arzigian 2008).

Major Woodland complexes in the various regions of the state include Laurel, Brainerd, and Blackduck (northern Minnesota); Malmo, St. Croix, Onamia, and Kathio (central Minnesota); Fox Lake and Lake Benton (southwestern Minnesota); and La Moille, Howard Lake, Sorg, and Effigy Mound (southeastern Minnesota) (Arzigian 2008). Pottery is an important distinguishing characteristic of these complexes, which are commonly named for the associated type site where they were first discovered. Ceramic vessels range in form from globular to conoidal with shell or sand grit as temper, and designs across the body (e.g., net impressions, patterned incisions). Lithics during this timeframe shows a preference for smaller projectile points utilized principally in bow and arrow technology.

A hallmark characteristic of the Woodland Period in Minnesota is presence of burial mounds, of which 12,000 have been recorded in the state (OSA 2019). The areas surrounding Red Wing, Lake Minnetonka, and Mille Lacs Lake have the highest concentrations of burial mounds. Many of these structures have been destroyed due to historic and modern development.

The subsistence strategies of Woodland groups in Minnesota varied widely based on the type of resources available. Wild rice was central to groups living in the northeast quarter of the state, which was husked in excavated pits and parched in ceramic vessels (Arzigian 2008). Other resources hunted or gathered included deer, fish, and various plants, such as maple sap for sugar. Farther west, around the Red River Valley and southern

Minnesota, bison continued to be important as they were in the Archaic Period (OSA 2019). The "Three Sisters" of squash, beans, and corn were grown in small garden plots, which were further supplemented with other resources (e.g., fish and aquatic mammals).

4.2.1.6 Archaic Transition and Woodland Period in Murray County

In the Project Area, the environment became cooler and moister around 4000 to 5000 years ago leading to an expansion of woody vegetation and the movement of bison herds farther west (Buhta et. 2017: 14). Referred to as the Mountain Lake Phase (5000–2200 B.P), this long period of time represents the terminus overlap of the Archaic and subsequent Woodland. Subsistence strategies formed a "lake-oriented habitation pattern" where archaeological sites are found commonly on lacustrine islands and peninsulas (Anfinson 1990, 1997: 42–47). Foragers procured a blend of upland and aquatic resources but were more tethered to the landscape than previous periods. Lanceolate projectile points exist during this time frame with some similarities to Plano stemmed varieties. These are often of poorer quality in production made from local materials. There is little evidence of horticulture tools (e.g., ground stone) or ceramic use across the PLR during the Mountain Lake Phase. Some copper technology becomes evident, often restricted farther east.

The Mountain Lake Site (21CO1) is a type locality for this period located approximately 50 miles east of the Project in Cottonwood County, Minnesota (Anfinson 1997: 42–47; Holley and Michlovic 2013: 51). Located on an island in Mountain Lake, this site produced bison, muskrat, small mammals, fish, turtle, and waterfowl remains suggesting a diverse diet breadth (Anfinson 1997: 45). Other Mountain Lake Phase sites surrounding the Project include Pedersen (21LN2), Fox Lake (21MR2), Big Slough (21MU1), and Arthur (13DK27). The Hilde Site (39LK7) in the PLR of South Dakota has seven to 10 graves that consisted of 17 to 18 individuals in primary and secondary burials dating to the Mountain Lake Phase.

The first appearance of ceramics in southwestern Minnesota coincides with the Fox Lake Phase (2220–1250 B.P.), which continues with the trend of occupation occurring on or near lakes (Arzigian 2008: 63). Arzigian (2008: 63) identified 52 Fox Lake sites in the PLR as a general density estimate for the region. There is an absence of mounds in the PLR of the Fox Lake Phase, while mounds are common elsewhere throughout Minnesota. Conoidal and semi-conoidal ceramics with grit and shell temper were excavated at the Fox Lake Site (21MR2) near Sherburn, Minnesota, along with a possible fire pit, scrapers, knives, projectile points, mano and two celts (Anfinson 1997: 47). Ceramics from this phase resemble other Early Woodland types defined in southeastern Minnesota, such as LaMoille Thick and those with Havana influences. Trailing and cordmarking in addition to bosses and wrapped stick impression are common design elements. Anfinson (1997: 56) notes that sand temper seems more common at Early Woodland sites and crushed rock is preferred during later periods. Fox Lake projectile points consist of stemmed, side-notched, corner-notched, and triangular unnotched commonly made from TRS (Anfinson 1997: 66). It is possible that smaller varieties of projectile points represent the incipient adoption of the bow and arrow in the region. Scrapers, knives, drills, flake tools, and choppers are also present.

Components of the Big Slough Site (21MU1) in Murray County are an important regional example of the Fox Lake Phase. This site produced bison, muskrat, dog/wolf, turtle, bullhead, deer, beaver, badger, raccoon, skunk, gopher, duck, goose, crane, owl, northern pike, and mussels (Arzigian 2008: 69). Bone artifacts consisted of an awl, bone beads,

worked mammal long bones, bison metapodial flesher, and a polished hawk humerus. Local chert, chalcedony, and silicified sediment common, but KRF and some obsidian are present. The Pedersen Site (21LN2) and Arthur Site (13DK27) are two other sites important for understanding the Fox Lake Phase in the PLR. The Alton Anderson Site (21WW4) 60 miles east of the Project is a possible Fox Lake burial site in Watonwan County, Minnesota. Thirty individuals were excavated in two discreet areas, a single burial event, comprised of young adults and children in flexed burials positions. Ochre and bone-stone tools were present including elk teeth.

After the Fox Lake Phase, Anfinson identifies the beginning of the Lake Benton Phase (1250–750 B.P.) as representing the decline of Hopewell influence, a continuation of intensive pedestrian bison hunting, new ceramic forms, and the presence of bow and arrow technologies. This corresponds to the Late Woodland elsewhere in Minnesota. Sites from the Lake Benton Phase are commonly located islands, peninsulas or isthmuses, which may have served as protection from fires (Arzigian 2008: 75). The Pedersen Site (21LN2) is located on a peninsula 25 miles northwest of the Project in Lake Benton. This is a type site for the Lake Benton Phase in the region (Holley and Michlovic 2013: 47–49). Pedersen has produced samples with radiocarbon dates ranging from 705+-80 B.P. to 1135 +-90 B.P (Anfinson 1997: 85).

Burial mounds become more common in the PLR during the Lake Benton Phase consisting of circular and linear forms. Lithic technology is similar to Fox Lake with a continuation of smaller side-notched, unnotched triangular, and corner-notched projectile points made from local materials (Anfinson 1997: 80). Crushed rock is used as a temper in ceramics. Vessel forms are often sub-conoidal with flaring rims, vertical cordmarking, dentate impressions, and punctuate decorations. Anfinson (1997: 77) identifies that Lake Benton ceramics share similarities with those found in the St. Croix-Onamia area of Minnesota. Vessels tend to have thinner walls than in other periods.

4.2.1.7 Mississippian, Oneota, Plains Village, and Psinomani Traditions (750–950 B.P. to European Contact)

The Woodland Period ends throughout most of Minnesota around 950 B.P., with the exception of the northern portions of the state (Arzigian 2008; Gibbon 2012). The dominant regional influence was the site of Cahokia in the American Bottom near the modern city of St. Louis, Missouri on the Mississippi River (Pauketat 2009). This influence is most clearly seen in archaeological sites near Red Wing, Minnesota, that contain Cahokian-style ceramics, large palisaded villages, and evidence of corn horticulture. The presence of square earthen mounds may reflect Cahokian socio-religious belief systems. In Minnesota, the manifestation of this interaction is called the Silvernale Phase (Gibbon 2012).

A widespread cultural complex called Oneota in Minnesota is concurrent with the regional influences of Cahokia, lasting from approximately 950 B.P. until the time of French contact (Gibbon 2012). These mobile groups shared Middle Mississippian traits that included corn horticulture and shell-tempered ceramics (e.g., globular vessels with high rims), but lacked permanent structures, such as burial mounds. Oneota is manifested in different types called Orr (southeastern Minnesota), Blue Earth (south-central Minnesota), and Ogechie (central Minnesota). Siouan languages were spoken at the time of French contact (OSA 2019).

Plains Village groups from the region of the Missouri River in the Dakotas began to interact with the Oneota in western Minnesota after 950 B.P. (Anfinson 1997; Ahler and Kay 2007). These groups hunted bison, practiced corn horticulture, and lived within earth-lodges protected within palisaded forts (e.g., Double Ditch Site in North Dakota). Globular shaped ceramic jars with crushed rock temper are a hallmark technology of this period.

Psinomani groups are believed to be the ancestors of the modern Dakota people, who lived in east central Minnesota (Gibbon 2012). The principal ceramic type associated with this group is Sandy Lake, whose form is more similar to a bowl rather than the globular jars of Oneota varieties. There is evidence of blended ceramic styles with Oneota Native Americans.

4.2.1.8 Late Precontact in Murray County

Anfinson (1997: 90–112) utilizes Great Oasis, Cambria, Big Stone, and Blue Earth phases to characterize the likely palimpsest of cultural activity occurring in the PLR during the late precontact. (See also Holley and Michlovic 2013.) The Great Oasis Site (21MU2) is a type locality in Murray County near the Project. Ceramics from here often have trailed lines with numerous motif types including diamonds and triangles. Projectile points are small triangular notched and unnotched varieties. Other tools include end scrapers, end hoes, knives, drills, and choppers. Lithic items are commonly made from local materials, but KRF is present to some extent. Artifact use is diverse including awls, chisels, quill flatteners, shaft wrenches, antler-tine flaking tools, bison scapula hoes, pendants, shell beads, and dippers. Animals exploited were bison, dog/wolf, beaver, lynx, striped skunk, muskrat, raccoon, pocket gopher, red fox, mink, badger, white-tailed deer, fish, and birds. Great Oasis produced radiocarbon assays dating from 975 +-65 B.P. and 1050 +-60 B.P. Houses are not identified in the PLR, nor are there any fortifications. A key feature of many Great Oasis Phase sites is the presence of maize kernels, sunflowers and/or squash, general indicators of a horticultural system.

The Cambria Site (21BE2), type site for the Cambria Phase, is located northwest of Mankato (Anfinson 1997: 96) It has been previously suggested to be part of a Cahokia-based trade network operated through Red Wing, Minnesota (Johnson 1986). This exchange system included the movement of bison meat, hide, clothing, exotics, and horticultural products. It yielded radiocarbon dates from 815+-125 B.P. and 775 +-130 B.P. Ceramics are often globular in form and grit-tempered with constricted necks, pronounced shoulders, and smooth surfaces. The diversity of artifact and faunal remains in similar to Great Oasis sites. Grinding technology is varied also consisting of grooved stone mauls, celts, hammer-stones, grinding stones, and slab abraders. Characteristics of Cambria settlement patters include: 1) large villages on the Minnesota River; 2) small sites on lakes and interior rivers; 3) small villages near large villages; and 4) burial sites.

Small, fortified villages become more common in the PLR of the Big Stone Phase (Anfinson 1997: 104). These include examples like the Hartford Beach Site (39RO5), Shady Dell Site (21TR6), or the village component of the Browns Valley Site (21TR5), which contain artificial ditches and bastions. Hartford Beach is also protected by steep slopes and produced dates ranging from 830+-70 B.P. and 650 +-70. Most of the fortified sites close to the Project can be found near the borders of South Dakota, North Dakota, and Minnesota. KRF becomes more common as a lithic material type suggesting regional influences from the west specifically in North Dakota. The variety of artifacts identified in Big Stone Phase sites can include corner-notched/triangular points, end

side scrapers, drills, utilized flakes, grooved mauls, sandstone hoes, choppers, nutting stones; bone bison scapula hoes, metapodial flesher, and bone awls. Bison seems to be more important than horticultural production.

Overlapping the PLR, the Blue Earth Phase includes areas along the Little Sioux River in northwestern Iowa, the Blue Earth River in southcentral Minnesota, and the St. Croix-Mississippi rivers in southeast Minnesota and southwestern Wisconsin (Anfinson 1997: 112–114). Ceramics are typically shell-tempered and smooth-surfaced. Sites in Faribault County to the northeast from the Project are important for understanding this time period in the region. The Humphrey Site (21FA1) and Vosburg Site (21FA2) along Center Creek serve as key examples. Previously discussed sites such as Great Oasis (21MU2), Big Slough (21MU1), Pedersen (21LN2), and Mountain Lake (21CO1) all contain Blue Earth components.

Complete vessels found at these sites consist of round bottomed, globular jars with handles that may also be grit tempered. Vessel rim interiors are often decorated with tool impressions or trailed lines that may be present on the shoulders. Chevron designs, vertical lines, and circular nodes are other design elements seen in ceramics. Lithics and ground stone technologies consist of unnotched projectile points, end scrapers, manos, abraders, and celts (Anfinson 1997: 112–117). Toolstone is made from fine gray chert, oolitic chert, white chert, and quartzite with less KRF use. Bone tools are scapula hoes, antler picks, awls, split beaver incisors, barbed harpoons, and bone tubes. Bison appear to be less prevalent, but other animal species are represented (e.g., beaver, elk). Horticulture is common with maize, beans, and sunflower forming cultigens. Anfinson (1997: 119) notes that many of the radiocarbon dates for this period fall between 950 B.P. and 440 B.P. The is little for European trade goods or burials in the Cambria Phase.

4.2.2 Contact Period and Post-Contact (A.D. 1650 to Present)

Located in the west-central portion of Murray County, most of the Project is located in Leeds Township, while the westernmost ½ mile, south of Lake Wilson, is located in Chanarambie Township.

4.2.2.1 White Settlement of Minnesota Territory

In present Murray County, prehistoric and initial European settlement was concentrated in the northwestern corner of the county approximately eight miles north of the Project. A “small woodland area surrounded by a complex of lakes” had been a prehistoric settlement that was abandoned sometime before 1200 C.E. The excavation site and the people that occupied the area were called Great Oasis. The grouping of lakes that surrounded 300 acres of timber was also called Bear Lakes, which included four distinct lakes, which have been called various names: Bear, Crooked, Hawk or Rush, and Tibbetts or Great Oasis. The area continually served as an important meeting place and trading hub throughout history. Nearby Bear Creek is the headwaters of the Des Moines River, which served as a link in the waterway transportation route, along with the Watonwan, Blue Earth, and Minnesota Rivers, that connected to Fort Snelling at Mendota.

The first records of European explorers in present western Murray County date from 1688 when French hydrographer J. B. Franquelin “charted and mapped the Des Moines River as it is now known.” Fifteen years later, French cartographer Guillaume DeLisle “charted and mapped the river to its source.” It is presumed that they “must have passed through Leeds and other townships” to arrive at the river’s “true source” at Beaver Creek.

Pierre-Charles Le Sueur, a French fur trader and explorer also traversed and hunted buffalo in the area in 1703 (Forrest 1947: 5). There "was a lapse" in the county's history until 1831 when records show voyageur and trader Philander Prescott "traded with the Indians in this section" (Forrest 1947: 96). Upon his arrival, Prescott identified Bear Lakes at the Great Oasis as a potential trading post and settlement location. By 1833, the American Fur Company established a trading post near the Great Oasis overlooking Tibbetts Lake near "the old Indian trail." The company abandoned the post because of "war among the Indian tribes and an epidemic of smallpox" in "the fall of 1837 and it was burned by Indians in 1838" (Forrest 1933: 84-85; Forrest 1947: 38). At the time, the county was "a sea of prairie dotted with lakes, many of them beautiful and picturesque, others shallow and marshy and not at all beautiful but quite the contrary" (Forrest 1947: 15).

In the first half of the nineteenth century, Ojibwe and Dakota Indian tribes in what would become Minnesota were coerced into signing several treaties that ceded vast swaths of their lands to the U.S. government, including 100,000 acres of land at the confluence of the Mississippi and Minnesota rivers in 1805 and eventually "all their land east of the Mississippi" in 1837. Following these cessions, the territory was traversed and mapped by multiple expeditions for eventual settlement (MNHS n.d.).

In 1836, French geographer Joseph Nicolas Nicollet (1786–1843) explored the Mississippi River to its source at Lake Itasca. With the "backing of the U.S. Army Corps of Topographical Engineers" he led expeditions in 1838 and 1839 "to explore the triangle of land bordered by Canada and the Mississippi and Missouri Rivers." His endeavors were also supported by the American Fur Company and private stakeholders. He produced topographical and hydrographical maps of the Upper Mississippi River Basin, as well as documented botanical and geological specimens throughout the region" (Smithsonian 2022). Nicollet's maps were published in 1842; "he gave names to many lakes and physical features or adopted those which were current," and area in which is now called Murray County was labeled 'Sisseton Country' on his map (Nicollet and Fremont 1842).

The "whole of southwestern Minnesota" remained Indian territory and unsettled until the mid-1850s, but for many years before that, trappers operated in the area. The Minnesota Territory was created in 1849. The Treaty of Traverse des Sioux in 1851 resulted in the cession of 21 million acres of Sisseton and Wahpeton Dakota bands land to the U.S. government. It included all of the land in southern and western Minnesota Territory and smaller portions in Iowa and South Dakota. Following this and the 1851 Treaty of Mendota between the United States and the Sioux tribes of Minnesota (Mdewakanton and Wahpekute), an influx of white settler-colonists to the Minnesota Territory forced Indians from their ancestral lands and confined to reservations.

The first wave of settlement to southwestern Minnesota began in 1856 and consisted mostly of "New England Yankees," American-born White people moving from eastern states, but nearly ceased within a year due to the financial Panic of 1857 (LOC 2021). Additionally, the "winter of 1856–7 was almost the longest and hardest ever experienced in the Northwest" as the "snow and cold started early in November" and "spring did not come until the last of April" (Hughes 1908: 270). In March 1857 a Wahpekute band of Santee Sioux carried out the Spirit Lake Massacre in Iowa at Spirit Lake, Lake Okoboji, and along the Des Moines River. Indian tribes were "already ill disposed toward the whites because of the appropriation of their lands" and following the "cold and hunger suffered [...] in such a winter," they sought retribution for a series of provocations and

failed promises by the U.S. government and local White settlers (Hughes 1908: 269). The massacre resulted in the deaths of more than 30 White people and would be the final act of hostility in Iowa. The threat proved to be a short-lived deterrent for White people from settling in the region. As more areas were ceded from Indian control, tribes were forcibly removed from the lands. All of southwestern Minnesota Territory had originally been organized as part Dakota County. After several years and a series of divisions, Murray County was created in 1857 out of Brown County. A month after Minnesota gained statehood in 1858, "a group of Dakota traveled to Washington, D.C. to discuss their reservation," but were ultimately "pressured to cede the lands on the north side of the Minnesota River." During the U.S.-Dakota War of 1862, "the settlement at Lake Shetek was entirely wiped out," leaving at least 15 White settlers dead (MHRSP 1941: 8–9). Following the U.S.-Dakota War of 1862, "the Dakota were forced to give up all their remaining land in Minnesota, and the U.S. government canceled all treaties made with them" and they were eventually forcefully exiled from the land onto reservations (MNHS n.d.).

4.2.2.2 Establishment and Development of Murray County

Murray County was "established in 1857 and formally organized in 1872. At the time, the county contained five townships, but a total of 20 would be organized over the next decade. Although Currie was the original county seat, the City of Slayton won a contentious battle for that title in 1890. Agricultural production has been (and continues to be in the twenty-first century) the county's primary industry." The county was named after William Porter "Pitt" Murray, a member of the Territorial House of Representatives.

The population of Murray County grew from 29 residents in 1860 to 209 in 1870, and to 3,604 by 1880. In 1866, the nearest post office and trading post was more than 90 miles east in New Ulm (Forrest 1947: 16). Although the region of southwestern Minnesota was open to white settlement following the U.S.-Dakota War of 1862, "for some time following [the Lake Shetek] Indian outbreak, southwestern Minnesota was almost deserted" and "the farmers west and south of New Ulm were afraid to return to their homes." The "restoration of confidence was slow, and it was not until the middle of the 1860s that people again began to settle in Murray County" (MHRSP 1941: 9-10). As indicated in the 1870 census records, nearly all the early settlers to the region were American born. Most people were born in eastern states such as Pennsylvania, New York, Vermont, and Massachusetts, while many others were born in states bordering the Great Lakes such as Ohio, Michigan, and Wisconsin. Fewer than 20 foreign-born residents were recorded in 1870; one family had emigrated from each Canada, Norway, and Scotland, while individuals also came from England, Ireland, and Sweden. At the time there were 15 farms in the county (Forrest 1947: 19).

Leeds Township was "settled by nine Scandinavian families" (Forrest 1947: preface). Its first census in 1875 recorded 69 residents, 39 of whom were born in Norway. A family of five had come from Sweden, while 22 were born in Minnesota, and three in Iowa. There were ten houses in Leeds township in 1880 (Forrest 1947: 22–24, 48).

The introduction of two railroad lines into Murray County in 1879 spurred new waves of immigration to the region. Its population nearly doubled over each of the next two decades. There were 3,604 residents in 1880, 6,692 in 1890, and 11,911 in 1900. While most of the new arrivals continued to be New England Yankees, "there were also Scandinavians, Germans, and Canadians of French or Scotch ancestry." Two Catholic

colonies founded in 1878 and 1881 helped attract people "primarily of German and Irish origin" (Gaul 2017). In 1890, "there were 4,305 native-born in the county and 2,387 foreign-born" (MHRSP 1941: 25). Many of the towns in Murray County "originated as depots" between the 1880s and early 1900s along the newly formed railroad lines (Gaul 2017). Currie, one of the county's first towns, was the original county seat, but this authority was transferred to Slayton in 1890.

To the north of Leeds in Lowville Township, settlement in the area known as the Great Oasis around the Bear Lakes was especially prohibited by the large areas covered by water. Efforts to drain the area's wetlands began before the turn of the century but intensified after landowners petitioned the county to fund the expansion of ditches in 1904 and 1909. The 1898, a Murray County map notes that the lakes concentrated around the Great Oasis were "dry" or "nearly dry" and "turned to hayland" and meadows (Peterson and Wangersheim). The 1908 atlas indicates a major ditch running south had been established (Ogle & Co.). By 1915 "6,000 acres of wetland in Lowville Township" had been drained; "the 'big ditch' was put in and what was the Bear Lake was no more" (Murray County n.d.). Over a twenty-year period "of intense ditch digging," "nearly 40,000 acres of wetlands" were drained (Gaul 2017). The 1926 atlas indicates the area had been completely dried, and only outlines of the former lakes were indicated (Anderson Publishing).

In the first half of the twentieth century, the pace of Murray County's population growth slowed greatly. The number of residents actually decreased slightly in 1910 to 11,755 residents but grew to 13,361 in 1920. Murray County reached its peak population of 15,060 people in 1940 and has seen varying rates of decline in each subsequent decade. The decline of the rural population began several decades earlier than the county's overall population decrease. From 1910 to 1940 Lake Wilson grew from 219 to 421, Hadley from 136 to 162, Currie from 329 to 524, and Slayton from 850 to 1,587 residents. Meanwhile, the "rural population decreased from 10,888 in 1910 to 10,203 in 1940" (MHRSP 1941: 29). There were fewer than 10,000 people in 1990 and 8,179 residents in 2020 (US Census).

In the 1940s, the onset of World War II increased the number of manufacturing jobs and other employment opportunities in larger cities, and many people began abandoning their farmsteads and small towns for opportunities in urban areas. Suburban developments in the second half of the twentieth century increased affordable, modern housing opportunities near urban centers.

Architecture

The first homes of settlers were primitive. The first dwellings were "dugouts in the side of a steep hill in a ravine," including along the banks of Beaver Creek. Within a year of arriving, many of them built sod shanties. These structures were typically 12 feet by 16 feet and "built of three-foot strips of tough sod taken from a nearby slough. The sods were laid alternately so the walls were three feet thick. Saplings were cut from the stunted timber along the Beaver Creek for rafters and the rafters were covered with willow brush. The brush was covered with coarse slough hay. Well packed yellow clay covered the hay and provided a roof which was almost rain and snow proof" (Forrest 1947: 25). Root cellars were a necessity and built in the same manner as the sod houses. Water was abundant, and most wells reached a supply at a depth of 12 to 16 feet. Rudimentary small barns that housed an oxen or cows were "made by piling straw over a skeleton of saplings and logs. The better ones were covered or thatched by a covering of the wiry slough hay" (Forrest 1947).

A year or so after their establishment, settlers typically constructed a new frame house. The sod structures were not readily adaptable to alterations to meet evolving needs, nor were they easily upgraded with plumbing and electrical systems. It soon became more practical to replace buildings than to maintain and repair the aging structures (WHS n.d.[a, b]). Modern advancements in methods and production of materials made it faster and more affordable to construct a house than ever before. Most houses constructed between 1860 and 1920 were built using the balloon frame technique. This method was developed in the mid-nineteenth century following the introduction of manufactured "uniform, dimensional lumber" in the 1850s. During this time, lumber and other mass-produced building materials became readily available and affordable. Nearly all houses constructed into the 1920s had balloon frame structures, and they were typically clad in wood lap siding or stucco. The balloon frame technique of construction fell out of favor in the 1920s when a "safer, faster, and cheaper" technique called platform framing was developed; it remains the standard wood framing method (WHS n.d.[a,b]).

There were several contributing factors to the post-war building boom in America beyond providing housing for returning G.I.'s. Modern materials and technology that had been developed by the military was introduced to the public market. Wartime production plants and resources were redirected to create an ample variety of affordable, mass-produced building materials. Buildings that had been neglected due to financial instability and limited supply of building materials during the Great Depression and War could be repaired and updated. Original wood and stucco walls were obscured with a variety of modern cladding materials like aluminum, vinyl, asbestos, and manufactured wood. Wood sash windows were similarly replaced with modern frames; popular types were sash, casement, and sliding.

Technological advancements included the introduction of affordable, electrified appliances to the mass market. It became more advantageous to build a modern house than to retrofit an old house for modern appliances. Similarly, it was more advantageous to build new, larger farm structures to fit evolving needs. While their styles and building techniques vary, most of the late nineteenth and early twentieth century barns were constructed to shelter cattle and dairy cows or other varieties of livestock, and store feed in an overhead loft. Thanks to modern building materials and techniques, barns increased in scale, with larger footprints and tall roofs for expansive loft space. In the 1910s, barns were routinely built on concrete foundations, and in the by the 1920s, concrete blocks were used to construct basements and base walls (Noble, Hubert, and Wilhelm 2018). Apart from the barn, agricultural buildings are typically utilitarian in form and style, and devoid of ornamentation. The auxiliary structures serve various purposes in their support of farming activities. Pole barns are primitive in their construction and typically smaller in size and scale than barns. The rectangular-plan structure was built by hanging walls from timber posts that had been driven into the ground. They typically had dirt floors, with shed, saltbox, or gable roofs, and one exposed side elevation. They served a variety of purposes, including sheltering livestock, storing feed or hay, or storing machinery and implements. After it was introduced in the mid-nineteenth century, lumber began to be used in their construction.

During the building boom after World War II, new building materials were introduced to the public. Thin metal sheeting (aluminum, galvanized steel, and corrugated sheet metal) was frequently employed to re-clad pole barns and other farm buildings that had been neglected since before the Great Depression. The cladding provided some structural support to aging structures but obscured or replaced original elements like timber poles

and weatherboard cladding. Alternatively, many pole barns were demolished and replaced with modern structures. Today, modern pole barn construction is implemented for a variety of uses beyond the farmstead, including for commercial and residential purposes. Because of its method of construction, many machine sheds meet the definition of a pole barn. Generally taller and larger than pole barns, machine sheds have generally functioned as garages and storage buildings since they were developed. Plows, implements, tractors, and other machinery used for raising livestock and cultivating crops have continually evolved since the late-nineteenth century. In reaction to growing variety and physical size of modern machinery, machine sheds progressively increased in size and scale. They are typically rectangular-plan and have a gable roof. Vehicular entry bays typically have sliding doors may be set in the gable-end wall, sidewall, or both. The building form was standardized in the post-war building boom. Its pole or plank frame structure was built with dimensional lumber, and the walls and roofs were faced with modern metal cladding.

Farming and Trade

Settlers did not find much initial success in raising crops to trade, not the least of which was because the trade network was limited without rail service. According to John Low, who first visited the area in 1863 and settled in 1866, "We raised mostly wheat and oats and what little surplus we had was mostly taken up by the new settlers as they came in. In the winter we usually did some trapping which helped us out with what cash we needed for supplies." Farming operations were "rather crude" and what few pieces of machinery they had was typically handmade (Forrest 1947: 16-17). Wheat was the most grown crop, followed by flax, potatoes, oats, and barley. The grain was cut, bound, and threshed by hand. When there was enough for sale, the product would be "hauled to New Ulm" (Forrest 1947: 37). Small garden plots were cultivated for vegetables. Through the 1880s, bounties of "game of all kinds was to be had at any time of year," including "deer, elk, and antelope, "lynx, badger, raccoon, mink, skunk, weasels, muskrats, and occasionally an otter. There were plenty of jack rabbits and cotton tails." Feathered game also abounded, including cranes, "geese, brants, ducks and plenty of snipes and plovers" (Forrest 1947: 46).

In order to make money, many of the early settlers continued the tradition of fur trapping in the area. Soon after the American Fur Company closed its post in 1837, one group of "adventurous young white men" spent the entire winter trapping "beaver, coon, mink and taking fifty thousand muskrats." In subsequent years, "there were men living here who took out nearly twenty thousand in a winter. While the fur supply had dwindled in the 1870s, there was enough left so the prairie settlers found in fur the main source to keep them alive. Fur was not always cheap as muskrats brought as high as twenty cents sometimes, and that was real money in the early days" (Forrest 1947: 38).

The sod barns housed a small number of animals kept for husbandry. The animals provided physical power in transportation and crop production, food for subsistence, and materials for fabrics. Most of the settlers arrived by wagon, pulled by a yoke of oxen or team of horses. Upon their arrival in Murray County, "These men and women, when they reached their claim, took the plow from the wagon, hitched the oxen to it and started breaking up the virgin sod." Cattle were not plentiful, nor were mules. It was "no unusual sight to see an ox, a horse and a mule hitched to the plow or other implement" (Forrest 1947: 43, 45). The "old milk cow, when it was giving milk, was the foundation of the filled stomach. From her they got milk, cream, butter, cheese, and when a critter broke its leg, there was beef to eat. Many of the settlers had only one cow when they came, and when that cow was not giving milk, conditions were really serious" (Forrest

1947: 29). Sheep "were a necessity. They supplied wool for the clothing after it was carded, spun, and knitted. The pelts of the sheep were the only blankets many a family had during the winter months" (Forrest 1947: 41).

Severe weather and hailstorms, prairie fires, and insect infestations were among the challenges the settlers faced in the 1870s. Between 1873 and 1877 the region suffered a series of grasshopper infestations that caused farmers to lose their entire crop. By 1877, most farmers in Murray County, and the county itself, were bankrupt. The improved agricultural conditions coincided with the arrival of the railroads, which increased the population in the region. While there were "fifteen farms totaling 2,407 acres" in the county in 1870, by 1900 "there were 1,713 farms totaling 385,061 acres." Wheat, oats, and barley continued to be the primary crop grown into the twentieth century but "corn replaced small grains as the county's primary crop in the 1920s." Soybeans, which first appear as a Murray County crop in the 1930 U.S. Agricultural Census, were the county's second major crop by the mid-1960s (Gaul 2017).

Much like building materials after the Civil War, modern farming implements and machinery had begun to be mass produced, increasing their affordability and availability. The large modern equipment required larger buildings to store them. In some cases, an old barn would be converted into a garage, but it was often just as practical to build a modern gabled machine shed with metal cladding and large sliding doors.

Along with the population, the number of farms in the county peaked at 2,100 in 1940. In subsequent decades, the number of farms decreased while their average size increased. Modern machinery and farming methods allowed for more efficient operations that required fewer people and animals to complete. In addition to "mechanization and technological advances, improved livestock breeding, as well as the development of hybrid seeds, crop genetics, fertilizers and pesticides resulted in increased agricultural production" (Gaul 2017). Larger farms became more economically advantageous than family-run operations, and in time much of the land was owned and cultivated by commercial farming businesses. Agriculture remains the primary industry in the county.

Transportation

Indians established and utilized trails and waterways throughout the area long before the arrival of the White settlers. New trade posts were frequently established along these early transportation networks. Upon the American Fur Company's establishment of the southwestern-most trading post in Minnesota in 1833, "trade goods and furs were transported between [the Bear Lakes post] and Mendota over land and by canoes. Traders used a tiny stream, not shown on maps published by the Minnesota Geological Survey, and dry during dry seasons, which connected Tibbetts Lake at the Great Oasis with the headwaters of the Des Moines River" (Forrest 1933: 85). Travel to Mendota continued via the Des Moines, Watonwan, Blue Earth, and Minnesota Rivers. Grains were hauled by oxen- or horse-led wagon to New Ulm for trade.

Many trailways used by explorers and then settlers had been long-ago established by Indians. The routes were continually improved in the late nineteenth century, and the major trails that connected trade hubs and cities were among the first routes to become highways in the first half of the twentieth century. The American Fur Company built their post and a surrounding stockade "between the sandy beach of [Lake Tibbetts] and the old Indian trail." By 1933 it was noted that trail was "today marked by a public highway" (Forrest 1933: 85). In other cases, government roads were established to

provide direct routes between territorial forts and burgeoning cities. In 1861 "a more direct road from the Minnesota River to Lake Shetek was opened up when a government road was laid out between New Ulm and Sioux Falls" beyond the state border (MHRSP 1941: 20).

Lacking a prominent trade hub along a major river route, and before the arrival of trains, growth in western Murray County was slow. Between 1854 and 1858, "twenty-seven railroads were incorporated in Minnesota Territory," but "most of them [were] speculative ventures that never laid track" (MIAC n.d.). Settlement in southwestern Minnesota was greatly assisted by the introduction of railroads in the 1870s, but the first lines in Murray County weren't laid until 1879. The Chicago & North Western Railway (C & NW) ran westward out of New Ulm towards Pipestone near the Minnesota-South Dakota border and onto Sioux Falls. Towns established on the C & NW rail line include Slayton (platted in 1882), Hadley (established 1880), and Lake Wilson (platted 1883). By 1908, this rail line was operated by the Chicago, St. Paul, Minneapolis & Omaha Railroad (C STP M&O). The "Milwaukee Road" line of the Chicago, Milwaukee & St. Paul Railway (C M STP) ran westward through the southern portion of the county. Towns established on this line include Fulda (founded 1881), Iona (platted 1878), and Chandler (established ca 1886).

The Progressive Era, "defined by the period between the 1880s and the end of World War I," led to "greater government involvement in providing essential community services, including transportation and utilities, and increased funding of public works. Their efforts coincided with the development of the automobile and the telephone, both of which dramatically improved communication within and between communities" (Ganzel 2009: 8:1). Development and improvements of rural county routes and the popularization of the automobile helped create wider trade networks and facilitated ease of travel between them. *Leeds Township in 1946* was described in A History of Western Murray County (Forrest 1947: 50):

> *This is one of the most progressive townships in Murray County. Every farmer in the township has access to a gravel road. There are thirty-five miles of township graveled roads and this season twenty miles were re-graveled. Every mile of graded road is graveled. 25 years ago, the township was in debt $12,000.00, all of the debt being incurred about thirty years ago building bridges during the ditching era. Today, November 1946, the township owes nothing. To the members of the township board goes a lot of praise for their business-like administration. They have performed a real service. The present members of the board are Wm. Stofferan who has served 30 years, G. M. Skouge 9 years, G. Conradi 2 years, and Fred Gass who has served 20 years. Hadley is part of the township of Leeds. While the village votes as a village on municipal affairs, it votes at all township, county, state and national elections with the township.*

No major interstates run through Murray County. State Highway 30 runs north of the Project; the east-west corridor spans between Rushford in southeastern Minnesota to the South Dakota state line, west of Pipestone. Similar to earlier modes of transportation, via waterways and rail, the lack of significant highway thoroughfares discouraged people or new industry in the county when there were more desirable opportunities in cities and trade hubs. Murray County has remained rural, with a focus on agriculture as the primary industry. After reaching its peak population of 15,060 in 1940, it fell in each

subsequent decade. There were fewer than 10,000 residents in 1990, and a population of 8,179 in 2020 (US Census 2022).

5.0 Literature Review

5.1 Previously Recorded Cultural Resources

A cultural resource literature review was undertaken prior to Westwood's Phase 1 pedestrian survey to identify known archaeological sites documented in or within the Study Area, consisting of a one-mile buffer around the Previous and Current Project Area boundaries. On September 15 and 16, 2021, Westwood Cultural Resources Manager Ryan Grohnke examined files maintained by the OSA and the Minnesota SHPO. Due to changes to the Project design, an update to this literature review was conducted in October 2022.

Review of information from these offices included an examination of site maps, archaeological site forms, burial files, historic structure inventories, and survey reports. The purpose of this review was to create an inventory of previously recorded cultural resources, including archaeological sites and historic architectural resources in the Study Area. The background research and literature review would identify previous cultural resource investigations along with levels of disturbance and potential for sites within the Project Area or buffer. The review also included examining the National Register of Historic Places (NRHP) dataset, aerial photography, and historic mapping. The Project Area including design changes and a one-mile buffer was examined (**Exhibit 1**).

The literature review completed by Mr. Grohnke did not identify any previously recorded archaeological sites or historic/architectural resources in the Project APE. In addition, no previous cultural resource investigations have been conducted across in the Project. Two sites have been identified within the one-mile buffer. Site 21MU0049 is an earthwork and artifact scatter located more than 0.70 miles from the Project boundary. Site 21MUaa is an alpha site that consists of an artifact scatter which is located approximately 0.40 miles from the original Project boundary. Alpha sites have been identified through historic documentation or landowner/collector's reports but have not been verified by a professional archaeologist. Alpha Site 21MUaa is also identified within the one-mile Project Area buffer, although its documentation states that this location is a natural geographic feature mistakenly identified as a site.

Twenty-three historic/architectural resources have been identified within the literature review Study Area, all of which are unevaluated for listing in the NRHP (**Exhibit 1**; **Table 2**). No previously recorded historic/architectural resources are within the Project Area, while five resources stand within one mile of the Current PDA. The north-south Trunk Highway 91 corridor runs one mile to the west, while the east-west Trunk Highway 30 corridor and Bridge No. 51503 are just north of the Project. Additionally, a town hall is located 0.5 miles east and a house is located 0.99 miles northeast.

Table 2: Previously Recorded Historic/Architectural Resources

Inventory No.	Name	Address	NRHP Eligibility	Proximity to Project
XX-ROD-027	Trunk Hwy 30	NA	Unevaluated	Current PDA Buffer
XX-ROD-169	Trunk Hwy 91	NA	Unevaluated	Current PDA Buffer
MU-CHR-002	Bridge L1548	NA	Unevaluated	Previous PDA Buffer
MU-LED-002	Bridge 51503	NA	Unevaluated	Current PDA Buffer
MU-LWC-001	School	xxx St. Paul Ave.	Unevaluated	Previous PDA Buffer
MU-LWC-002	Water Tower	NA	Unevaluated	Previous PDA Buffer
MU-LWC-003	Dance Hall	Broadway Ave. & Minnesota Ave.	Unevaluated	Previous PDA Buffer
MU-LWC-004	Lake Wilson City Hall	xxx Carrie Ave.	Unevaluated	Previous PDA Buffer
MU-LWC-005	United Methodist Church	xxx Lincoln Ave.	Unevaluated	Previous PDA Buffer
MU-LWC-006	Depot	xxx Broadway Ave.	Unevaluated	Previous PDA Buffer
MU-LWC-007	Apartment Building	SW corner Carrie Ave. & Broadway Ave.	Unevaluated	Previous PDA Buffer
MU-LWC-008	Lake Wilson Co-Op Elevator & Lumber Company	NW corner Carrie Ave. & Broadway Ave.	Unevaluated	Previous PDA Buffer
MU-LWC-009	Commercial Building	xxx Broadway Ave.	Unevaluated	Previous PDA Buffer
MU-LWC-010	Commercial Building	NA	Unevaluated	Previous PDA Buffer
MU-LWC-011	Barber Shop	NA	Unevaluated	Previous PDA Buffer
MU-LWC-012	First National Bank	NA	Unevaluated	Previous PDA Buffer
MU-LWC-013	State Bank of Lake Wilson	NA	Unevaluated	Previous PDA Buffer
MU-LWC-014	House	NA	Unevaluated	Previous PDA Buffer
MU-LWC-015	House	NA	Unevaluated	Previous PDA Buffer
MU-LWC-016	House	NA	Unevaluated	Previous PDA Buffer
MU-LWC-017	House	NA	Unevaluated	Previous PDA Buffer
MU-HDC-004	House	NA	Unevaluated	Current PDA Buffer
MU-LED-001	Leeds Township Hall	off Co. Hwy. 29	Unevaluated	Current PDA Buffer

5.2 Other Sources

Historical maps and atlases of Leeds and Chanarambie Townships in Murray County were reviewed to identify potentially unrecorded cultural resources in the vicinity of the Project. They include the following:

- 1874 *An Illustrated Historical Atlas of the State of Minnesota* (A.T. Andreas)
- 1898 *Map of Murray County, Minnesota: compiled and drawn from a special survey and official records*. (E.F. Peterson)
- 1908 *Standard Atlas of Murray County, Minnesota* (G.A. Ogle & Co.)
- 1926 *Atlas of Murray County, Minnesota* (Anderson Publishing Co.)
- 1961 *Atlas of Murray County, Minnesota* (T.O. Nelson)

All years of coverage show creeks and wetlands in throughout the Study Area and Lake Wilson in its northwest corner, there was very little settlement in southwestern Minnesota in 1874, as evidenced in the *Illustrated Historical Atlas of the State of Minnesota* (Andreas 1874), which provided minimal details in its "Counties of Cottonwood, Murray, Pipestone, Jackson, Nobles and Rock" map. Lake Wilson and several creeks were indicated but not labeled, nor were any of the townships in southwest Murray County. By 1898 the city of Lake Wilson had been established 2.5 miles west of the Project on the northwest shore of Lake Wilson (noted to be a "dry meadow") and Hadley had been established on the northeast shore of Summit Lake, 0.6 miles to the northeast of the Project. Both cities had been platted along the westerly corridor of the Chicago, St. Paul, Minneapolis and Omaha Railway (Omaha Road). At the time, nearly all of the sections in the Study Area had been subdivided, claimed, and homesteaded. There were at least two schoolhouses in the vicinity of the Project. The St. Paul & Sioux City Railroad Co. owned several large parcels in Leeds Township in 1898, but by 1908 no rail line had been built and most of their land had been sold off and homesteaded. No significant changes were evident between 1908 and 1926; no parcels were owned by the railroad, and at least one commercial stock farm operated in the Study Area. Although the corridors have historically been present, the two trunk highways north and west of the Project were formally indicated as highways in the 1962 Official Road Map of the state (MDH 1962). Leeds Town Hall, east of the Project, was also indicated that year. A review of historic aerial photographs indicate the Project Area has historically been primarily developed for agricultural cropland. Other than historic farmsteads, no potentially significant cultural resources within the Project were observed in any of the historical coverage.

6.0 Field Investigations

6.1 Archaeology

Fieldwork for the initial APE was carried out from November 16 to 19, 2021. Field investigators utilized pedestrian survey to examine the APE. The APE is the initial PDA of the Project, which consisted of locations of proposed ground disturbance for construction and operation of the Project. A total of 1,577 acres was surveyed as part of the initial PDA. Rigden Glaab of Westwood meets the Secretary of the Interior's Professional Standards for Archaeology, as stipulated in 36 CFR Part 61, and served as Principal Investigator for the Project. Fieldwork was performed by Principal Investigator Rigden Glaab, and Archaeological Technicians Brian Joby Hunt, Ryan Steeves, Lindsay Schwartzkopf, and Daniel Schneider. GSV was conducive to pedestrian survey in all locations. Pedestrian survey was performed at approximate 15-meter intervals, which conforms to archaeological standards outlined by the OSA (OSA 2021).

Transect spacing varied in lower site probability areas where a landscape-based approach was more appropriate (e.g., wetlands). In these locations, the archaeologists focused their inventory on any notable rises, ridges, or other elevated landforms. Transect spacing was maintained using layers in ArcGIS Collector showing a grid of north-south and east-west lines spaced at 15 meters. This allowed archaeologists to leave their line to inspect adjacent terrain while maintaining orientation and relative spacing in survey. Conditions were generally cold (25 °F–45 °F) with winds prevailing from the northwest. There was no snow in the Project Area.

Moon Lake, Lake Wilson, and Beaver Creek are major water sources near the Project. The Project topography flows towards these features creating an undulating landscape with low ridges, coulees, and wetlands. The Project Area is principally used for agriculture with soy and corn being the main crops. All fields were harvested at the time creating a GSV of 95%+. The excellent visual coverage provided ideal survey conditions for the initial 1,574-acre Project APE. Representative photographs of the Project Area can be viewed in **Appendix A**.

Due to changes in Project design, an additional 533 acres were added to the revised PDA. Fieldwork of the additional APE in support of the current PDA was completed October 31 through November 2 by Rigden Glaab and Sara Nelson utilizing the previous field methods.

No cultural resources were identified during Westwood's Phase 1 archaeological pedestrian survey.

7.0 Summary and Recommendations

No new or previously recorded archaeological, architectural, or historic sites were identified/reviewed during the course of the survey. No further field investigations are recommended on behalf of Lake Wilson Solar Energy LLC associated with the Project APE at this time. Westwood stresses that if construction plans are altered to include areas not previously surveyed, those locations must be examined for cultural resources.

Although an archaeological survey was completed, the possibility of unidentified resources remains. If unrecorded archaeological sites are discovered during construction, all ground-disturbing activities in the area should stop and archaeologists at Westwood should be contacted. Further, if human remains are encountered during construction activities, all ground disturbing activity must cease, and local law enforcement must be notified. *Minnesota Statute 307.08, the Private Cemeteries Act, prohibits the intentional disturbance of human burials.*

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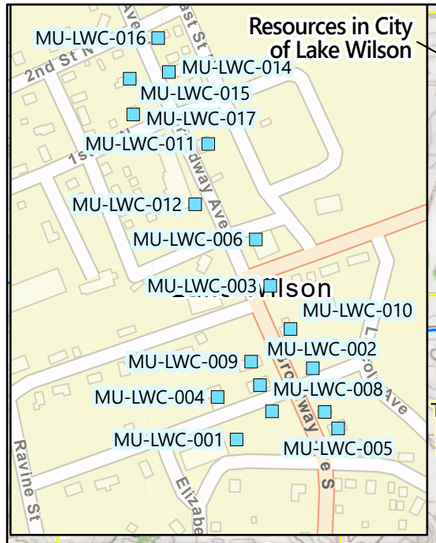
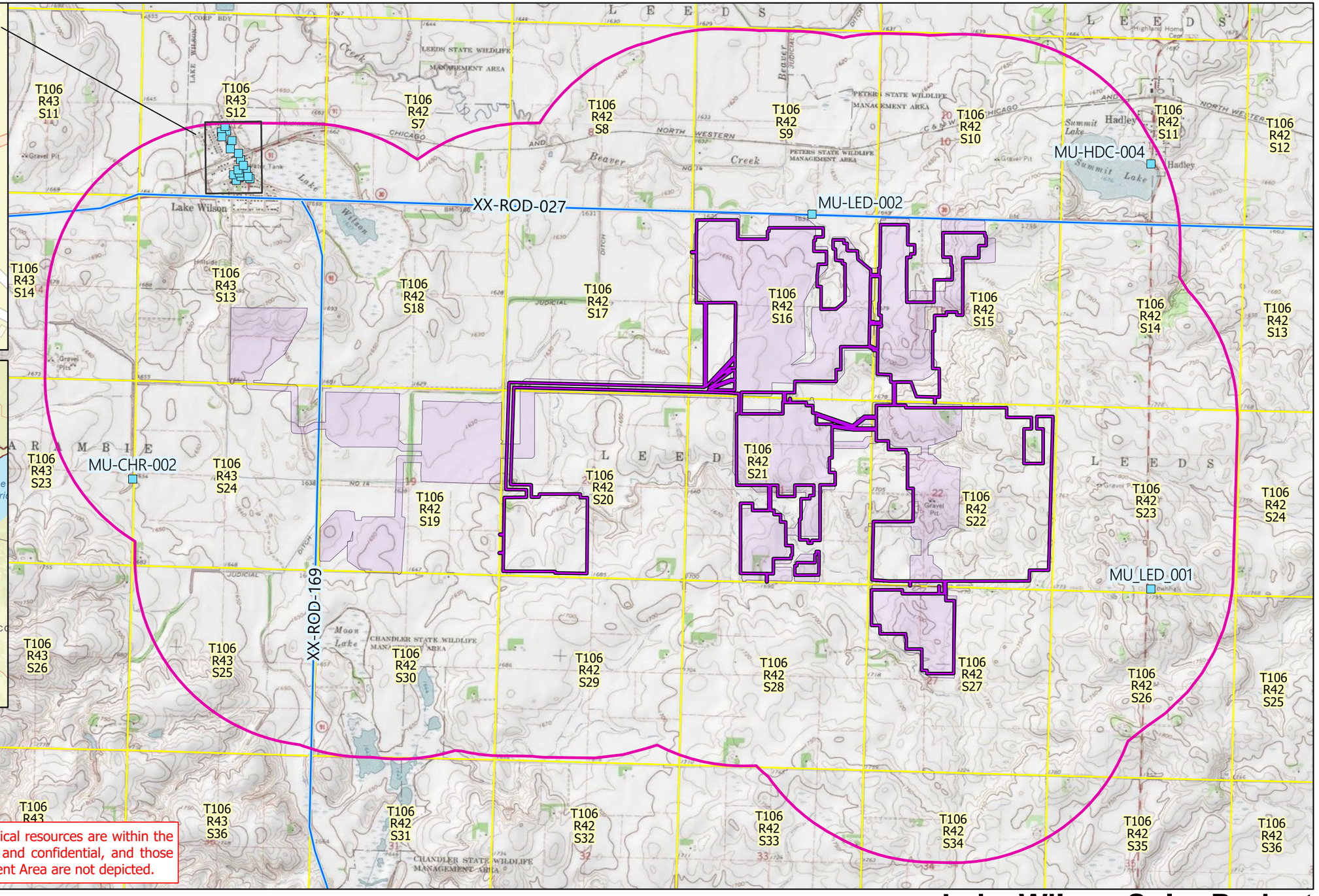
Exhibit 1

Project Location and Cultural Resources Literature Review Study Area map





NOTE: No previously recorded archaeological resources are within the Project Area. Site locations are sensitive and confidential, and those located outside the Preliminary Development Area are not depicted.

Scale: 1:34,000

Data Source(s): Westwood (2022); ESRI Street Map and Aerial Imagery (2020). Accessed September 2021.

Current Preliminary Development Area (11/2022)
Previously Surveyed PDA (12/2021)
Section Boundary
Literature Review Study Area (1-Mile PDA Buffer)
Architectural History Resource
Linear Historic Resource

N
0
Miles
1

Lake Wilson Solar Project

Murray County, Minnesota

Project Location and Cultural Resources Literature Review Study Area

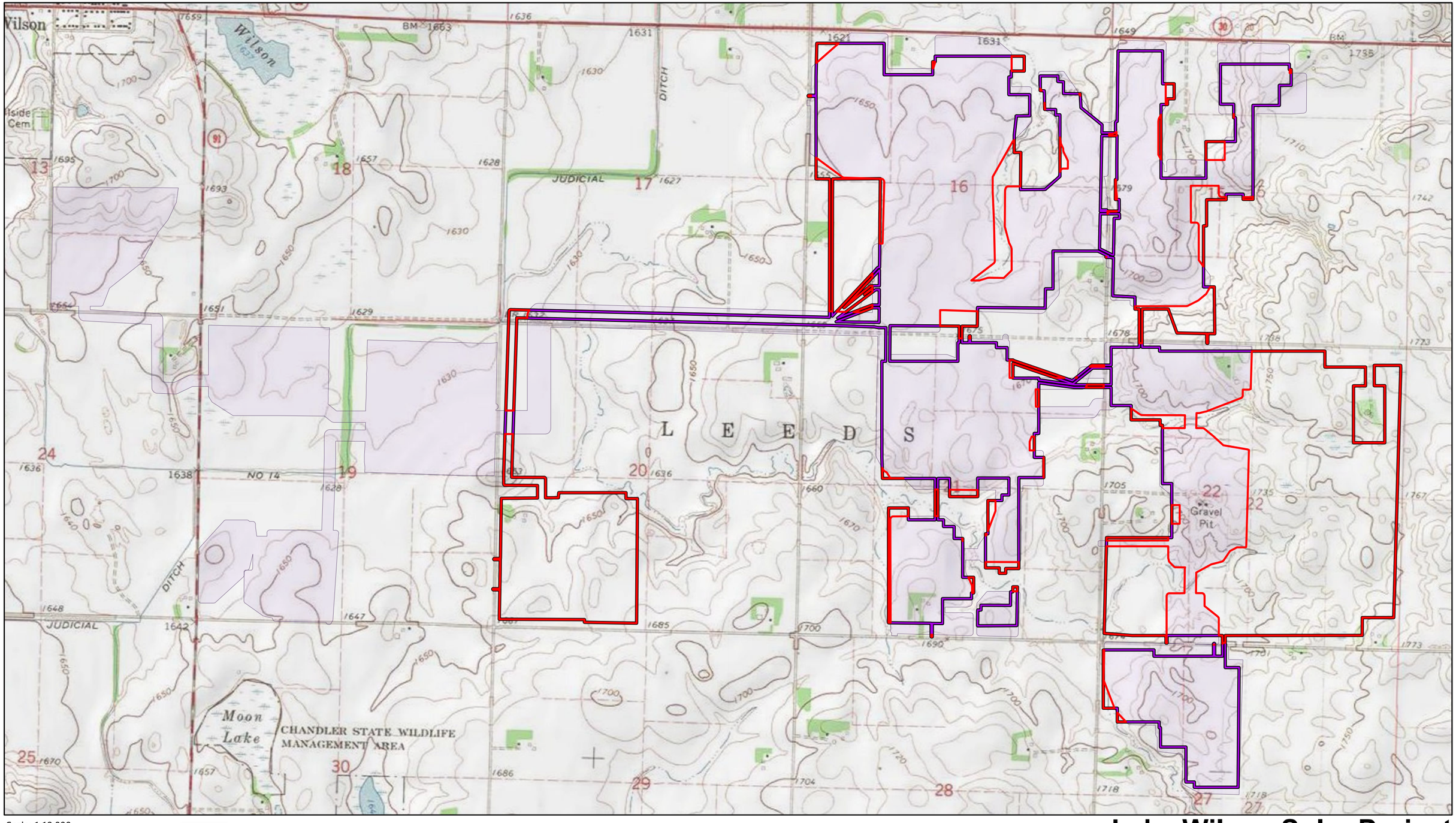
EXHIBIT 1

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

Map Document: \\westwoodps.local\Global Projects\0012861.01\GIS\Analysis\220928_SJN_CRM\LW_CRM_Updates_220928LW_CRM_Updates_221121_ARCPRO3.aprx 11/21/2022 1:08 PM SJNelson

Exhibit 2

Previous and Current Preliminary Development Areas map



Scale: 1:19,000

Data Source(s): Westwood (2022); ESRI Street Map and Aerial Imagery (2020). Accessed September 2021.

Current Preliminary Development Area (11/2022)

Area of Archaeological Survey in Current PDA (11/2022)

Previously Surveyed PDA (12/2021)

N

0 Miles 1

Lake Wilson Solar Project

Murray County, Minnesota

Previous and Current Preliminary Development Areas

EXHIBIT 2

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

Map Document: \\westwoodps.local\Global Projects\0012861.01\GIS\Analysis\220928_SJN_CRM\LW_CRM_Updates_220928\LW_CRM_Updates_221121_ARCPRO3.aprx 11/21/2022 1:13 PM SJNelson

Appendix A

Representative Photographs of Project Area

Photo 1. Facing northeast across APE in SWC of Section 20

Photo 2. Facing north in APE (collection line) in NW quadrant of Section 20

Photo 3. Facing north across APE in SE quadrant of Section 21

Photo 4. Facing west across APE in SE quadrant of Section 22

Photo 5. Facing south across APE in NE quadrant of Section 22

Photo 6. Facing north in APE (collection line) in SW quadrant of Section 15

Photo 7. Facing west across APE near midpoint of south boundary of Section 16

Photo 8. Facing west across APE in the NE-SW quadrant of Section 15. Note disturbances, trash piles at hillside