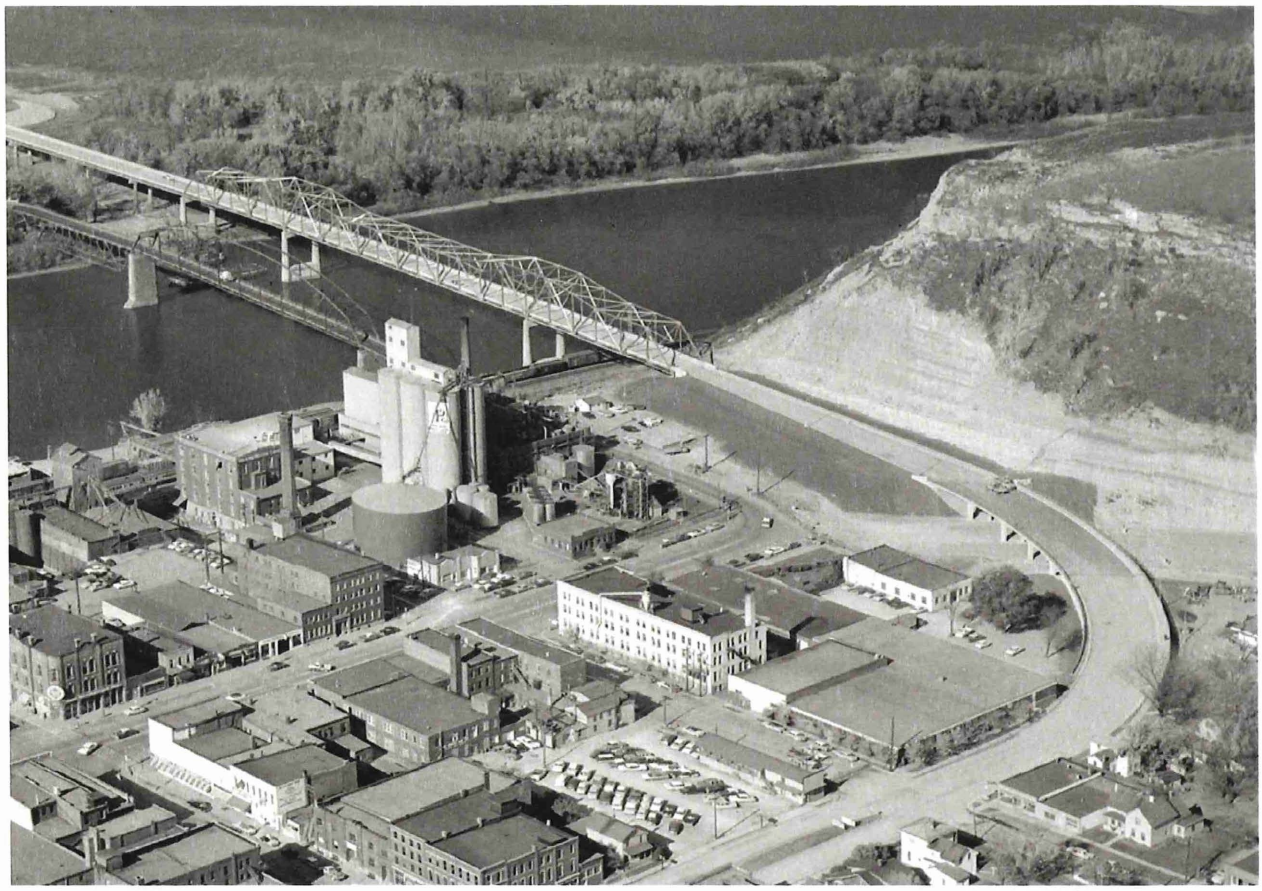
TH 63 RED WING BRIDGE PROJECT
GOODHUE COUNTY, MINNESOTA
AND PIERCE COUNTY, WISCONSIN



Phase I Archaeological Survey

Prepared by
Two Pines Resource Group, LLC

FINAL
January 2015

Cover Image
Aerial of Red Wing
Collections of the Minnesota Historical Society (Neg. No. 50849)

TH 63 RED WING BRIDGE PROJECT
GOODHUE COUNTY, MINNESOTA
AND PIERCE COUNTY, WISCONSIN

Phase I Archaeological Survey

MnDOT Contract No. 02318
State Project No. 2515-21
Two Pines Resource Group No. 12-06
OSA License No. 13-13 (Vermeer), 14-20 (Terrell)

Authorized and Sponsored by the
Minnesota Department of Transportation
and the Federal Highway Administration

Principal Investigator and
Primary Report Author:
Michelle M. Terrell, Ph.D., RPA

Co-Principal Investigator
Andrea C. (Vermeer) Pizza, Ph.D., RPA

Two Pines Resource Group, LLC
17711 260th Street
Shafer, MN 55074

FINAL
January 2015

MANAGEMENT SUMMARY

In 2014, Two Pines Resource Group, LLC (Two Pines) completed a Phase I archaeological survey in anticipation of the replacement of the Trunk Highway (TH) 63 bridge over the Mississippi River at Red Wing, Minnesota (TH 63 Bridge Project). Because the TH 63 Bridge Project will receive funding from the Federal Highway Administration (FHWA), it must comply with Section 106 of the National Historic Preservation Act of 1966, as amended. In 2011, the Minnesota Department of Transportation (MnDOT) Cultural Resources Unit (CRU) contracted with Two Pines to undertake a pre-evaluation study for archaeological potential within the bridge's area of potential effects (APE). The pre-evaluation study identified several areas with moderate to high archaeological potential within the project APE. Subsequently, in 2012, the MnDOT CRU contracted with Two Pines to conduct a Phase I archaeological investigation for the TH 63 Bridge Project, which is the subject of the current report.

The purpose of the Phase I archaeological investigations was to determine if the project's APE contains archaeological resources that may be eligible for listing on the National Register of Historic Places (NRHP). The Phase I archaeological investigations included the use of geomorphological coring and trenching in areas of deeply-buried soils and shovel testing in areas of shallow deposits. Additional archival research was conducted to aid in the assessment of the historical significance of potential archaeological resources.

For the Phase I survey, the boundary of the APE was reduced to reflect the refinement of project plans since the completion of the pre-evaluation study. The APE was selected by the MnDOT CRU project manager to encompass direct impacts as well as ancillary impacts, including pond locations and areas of construction staging. The APE includes portions of Sections 29 and 30 of Township 113N, Range 14W in Minnesota, and portions of Sections 10, 11, 14, and 15 of Township 24N Range 18W in Wisconsin. The project area is located within the Southeast Riverine East archaeological sub-region. Over the course of the project, both Michelle M. Terrell and Andrea C. (Vermeer) Pizza served as Principal Investigators.

During the Phase I archaeological survey for the TH 63 Bridge Project, five archaeological sites and one site lead were identified within the APE. The five archaeological sites (21GD291-21GD295) are associated with 19th-century residential properties within the East Red Wing neighborhood. The site lead, 21GDbj, is the location of a buried soil containing c. 1850-1870s deposits within the Red Wing Shoes parking lot. Through cores and flight augers, three additional areas (Harbor Bar Locality, YMCA Locality, and Area 25) were identified as having a high potential for containing intact archaeological resources, but the deposits could not be further characterized due to the constraints of the test areas. Also, several areas within the project APE with moderate to high potential for archaeological resources were not surveyed due to a lack of access.

When the construction limits for the preferred TH 63 Bridge Project alternative are determined, the archaeological APE will need to be reviewed. If any of the archaeological sites, the site lead, or the unsurveyed areas of moderate to high archaeological potential are located within the APE, they will require further assessment through Phase I or Phase II archaeological investigations.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1 . INTRODUCTION

In 2014, Two Pines Resource Group, LLC (Two Pines) completed a Phase I archaeological survey in anticipation of the replacement or rehabilitation of the Trunk Highway (TH) 63 bridge over the Mississippi River at Red Wing, Minnesota (TH 63 Bridge Project) (Figure 1). This work was performed under contract with the Minnesota Department of Transportation's (MnDOT) Cultural Resources Unit (CRU).

PROJECT DESCRIPTION

In cooperation with the Wisconsin Department of Transportation (WisDOT), the Federal Highway Administration (FHWA) and the City of Red Wing, MnDOT is undertaking the TH 63 Bridge Project, which encompasses not only the high bridge over the Mississippi River, but also the TH 63 bridge over TH 61, as well as highway connections to TH 61 and Minnesota Highway 58, and approach roadways in Wisconsin. In the wake of the I-35W Bridge collapse, the Minnesota legislature made funds available for the rehabilitation or replacement of certain types of bridges including the present TH 63 (Eisenhower) Bridge at Red Wing, which is "fracture critical" due to its truss design.

In 2014, MnDOT completed the evaluation of rehabilitation and replacement options for the river crossing and the TH 63 bridge over TH 61. The recommended project alternative is bridge replacement and the realignment of approach roadways in Minnesota and Wisconsin (Figure 2).

AREA OF POTENTIAL EFFECTS (APE)

The archaeological APE was selected by the MnDOT CRU project manager to encompass direct impacts as well as ancillary impacts, including pond locations and areas of construction staging (see Figure 1). The APE includes portions of Sections 29 and 30 of Township 113N, Range 14W in Minnesota, and portions of Sections 10, 11, 14, and 15 of Township 24N Range 18W in Wisconsin (Table 1). The UTM (NAD 83, Zone 15) coordinates of the extent of the project APE are as follows: northernmost point – 536327E 4936127N; southwest corner – 536771E 4934720N; and southeast corner – 537822E 4935066N. These coordinates were determined electronically using ACME Mapper 2.1.

TABLE 1. LEGAL LOCATIONS FOR THE TH 63 BRIDGE PROJECT APE

T	R	S	Quarter Sections
T24N	18W	10	SE ¼
T24N	18W	11	SW ¼ - SW ¼
T24N	18W	14	All
T24N	18W	15	E ½
113N	14W	29	NW ¼
113N	14W	30	SW ¼ – NE ¼, E ½ - NE ¼

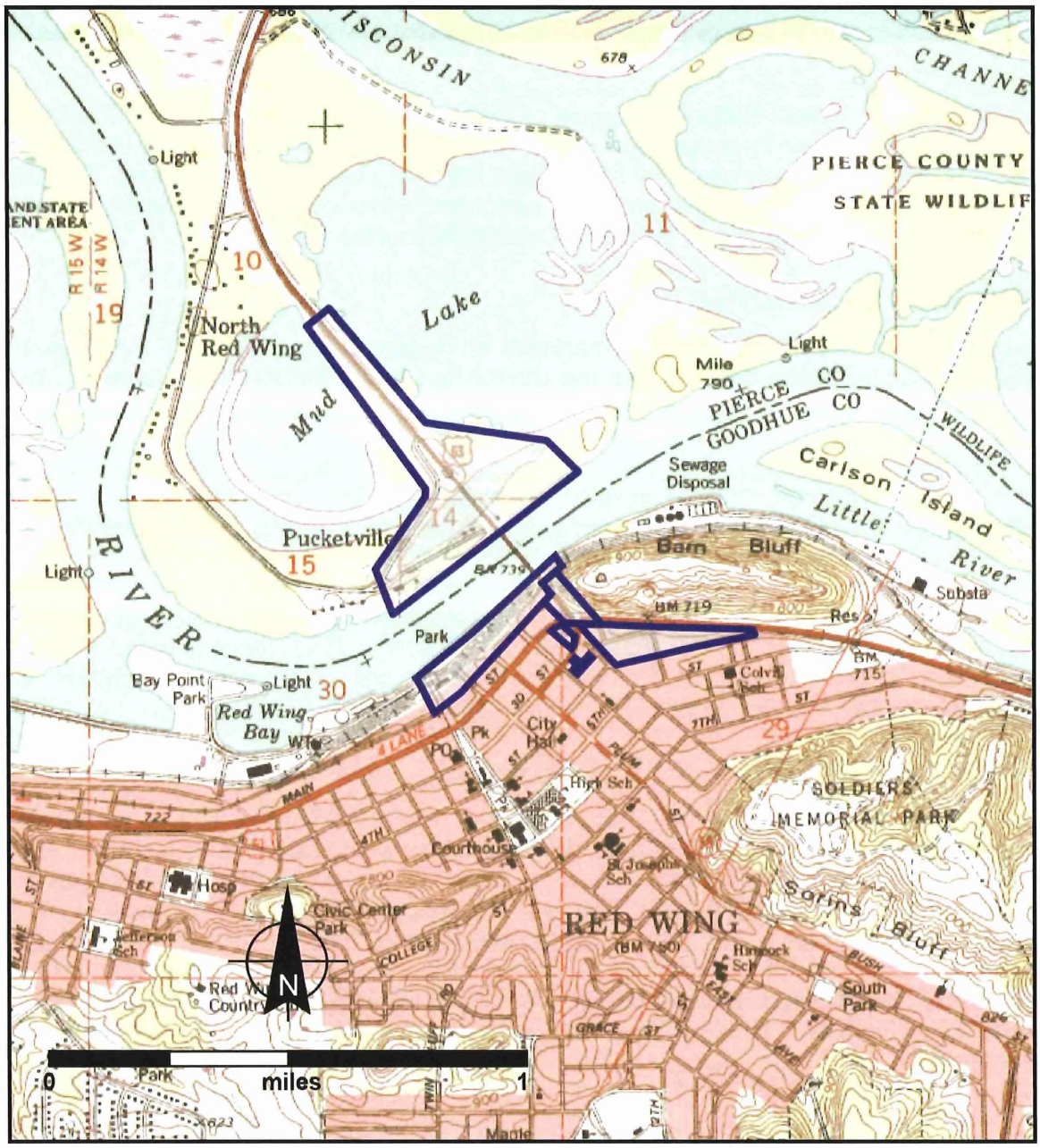


FIGURE 1. TH 63 BRIDGE PROJECT ARCHAEOLOGICAL APE

(RED WING, 1994, QUADRANGLE, USGS 7.5MINUTE SERIES)

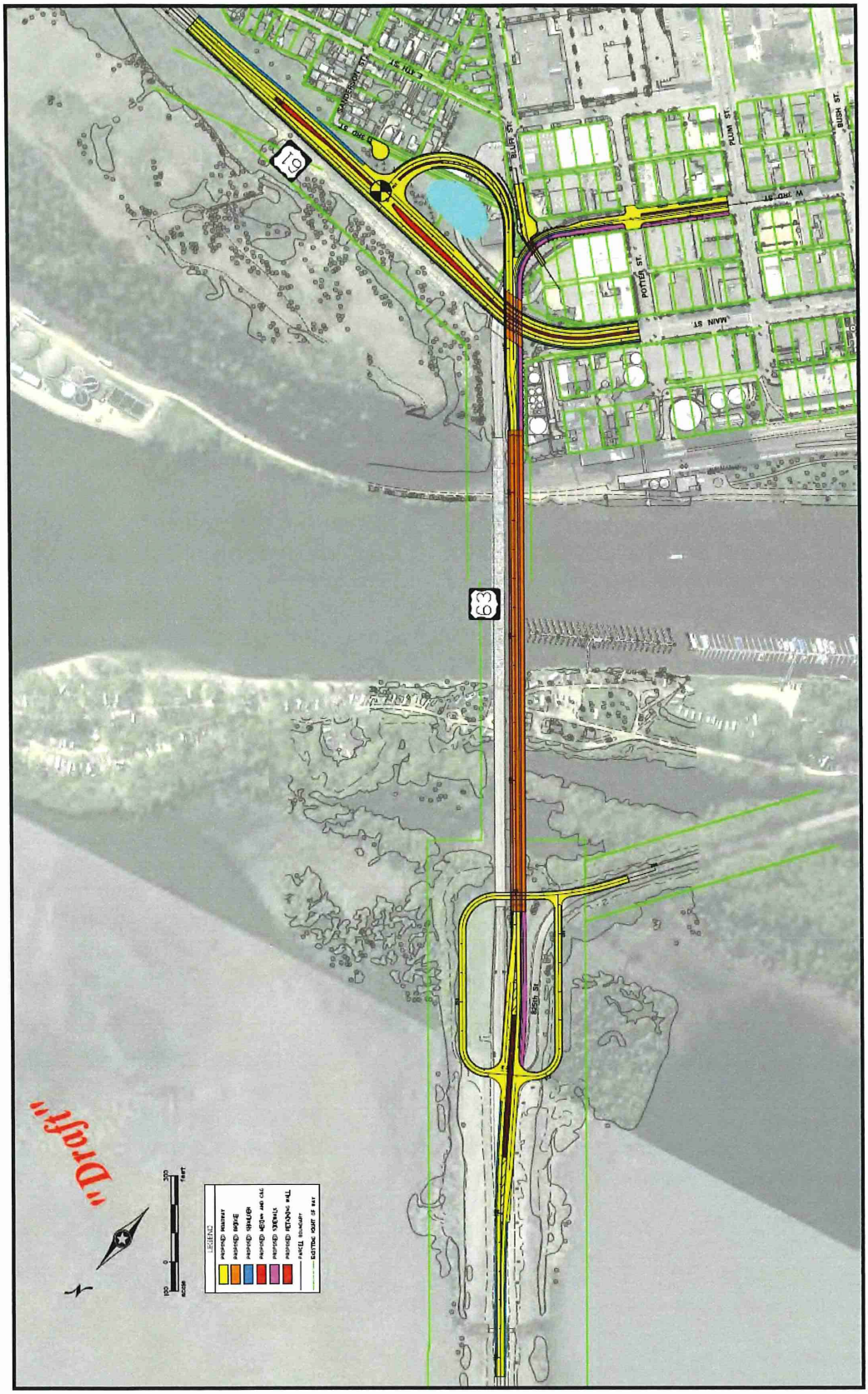


FIGURE 2. RECOMMENDED ALTERNATIVE ALIGNMENT (MNDOT 10-1-2014)

PREVIOUS STUDIES

Because the TH 63 Bridge Project will receive federal funding it must comply with Section 106 of the National Historic Preservation Act of 1966, as amended. As part of the compliance process, Two Pines was contracted by the MnDOT CRU in 2011 to conduct a pre-evaluation study to assess the archaeological potential of the area of potential effects (APE) associated with four bridge alternatives then under consideration.

The APE, based on its land-use history, was divided into five sub-areas (Figure 3).

- The North of the River sub-area is defined as the largely undeveloped portion of the APE located within Wisconsin and to the north of the Mississippi River.

- The Levee sub-area is defined as the portion of the APE that was historically oriented toward river and railroad transportation. It included the northern halves of Blocks 41 through 46, which historically housed industrial concerns, and extends north through the railroad corridor and levee area to the state line.

- The East Red Wing Residential sub-area is defined as the portion of the APE east of Bluff Street and south of TH 61/63, which was historically occupied primarily by residential housing.

- Downtown Commercial sub-area is defined as the part of Red Wing's historical commercial district located within the APE.

- The Barn Bluff sub-area is defined as the portion of the APE that encompasses the slope of the bluff.

The pre-evaluation study consisted of an intensive literature search to reconstruct the detailed land-use history of all five sub-areas and thereby which areas were most likely to contain intact archaeological sites, followed by targeted archaeological coring to assess whether intact deposits were, in fact, present prior to any kind of intensive testing program. The study identified several areas within the APE having moderate to high potential for containing intact archaeological sites, as well as three locations with confirmed archaeological features, which were assigned site lead numbers 21GDbi, 21GDbj, and 21GDbk.

After the pre-evaluation study was completed in 2012, the MnDOT CRU revised the APE based on the refinement of project plans and contracted Two Pines to conduct a Phase I archaeological investigation of the revised APE. The purpose of the Phase I survey was to determine if the project's APE contains archaeological resources that may be eligible for listing in the National Register of Historic Places.

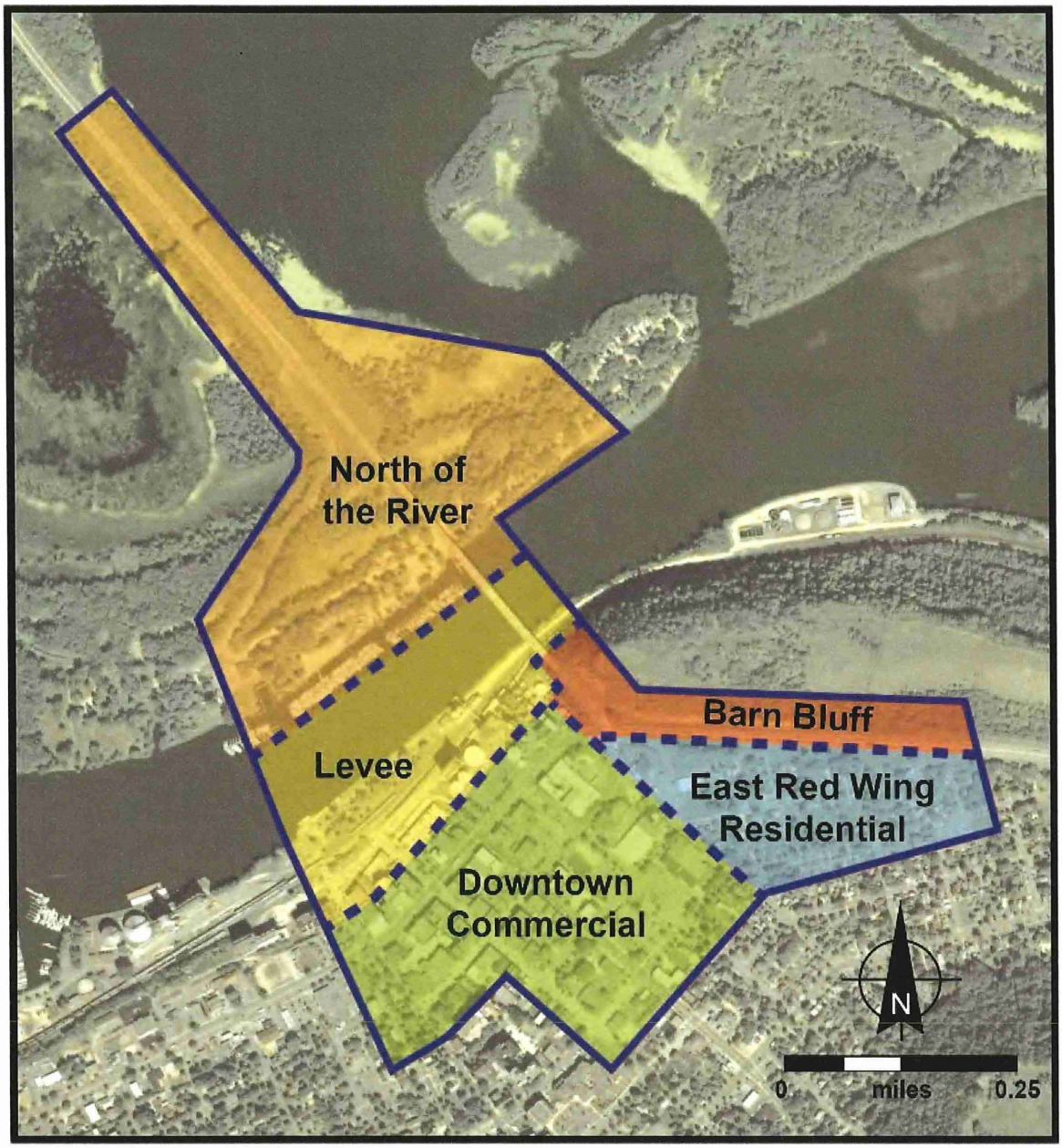


FIGURE 3. THE PRE-EVALUATION STUDY APE AND SUB-AREAS

REPORT FORMAT

This report presents the research design, environmental background, archaeological background, and historic contexts for the TH 63 Bridge Project's APE. Subsequently, the results of the fieldwork and cultural resource management recommendations are provided in five separate chapters, one devoted to each sub-area. These are followed by a chapter summarizing the study and its findings. Appendix A provides the Minnesota Annual Archaeological Reconnaissance Survey Licenses under which the fieldwork was conducted, while Appendix B contains the report on the geomorphological investigations (Kolb 2014).

CHAPTER 2 . RESEARCH DESIGN

All work was conducted in accordance with the *MnDOT's Cultural Resources Unit Project Requirements* (MnDOT 2011), the *SHPO Manual for Archaeological Projects in Minnesota* (Anfinson 2005), the *State Archaeologist's Manual for Archaeological Projects in Minnesota* (Anfinson 2011), the *Guidelines for Public Archeology in Wisconsin* (Kolb 1997), and *The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation* (National Park Service 2002).

OBJECTIVES

The purpose of the Phase I archaeological investigation was to identify any archaeological sites located in the TH 63 Bridge Project's APE with potential eligibility for listing in the NRHP. The NRHP criteria, summarized below, are used to assess the potential significance of documented cultural resources (National Park Service 1997). While all four criteria are considered, archaeological sites are typically eligible for listing in the National Register under Criterion A or D.

- Criterion A – association with events that have made a significant contribution in our past
- Criterion B – association with the lives of persons significant in our past
- Criterion C – embodiment of the distinctive characteristics of a type, period, or artistic values; or representation of the work of a master; possession of high artistic values; or representation of a significant and distinguishable entity whose components may lack individual distinction
- Criterion D – potential to yield information important to prehistory or history

LITERATURE SEARCH

During the pre-evaluation study, historical information specific to a given historical occupant of the APE was researched in a preliminary fashion and only for those occupants for which likely or confirmed intact historical deposits were identified during field testing. Such deposits were not identified in the majority of the current APE, due to the non-intensive nature of the sampling process. The primary goal of the Phase I literature search, therefore, was to augment our understanding of the histories of the occupants of the refined APE, to assist in assessing the potential significance of resources anticipated to be present and subsequently identified within the archaeology APE. This search consisted of a review of primary and secondary sources held at the Goodhue County Historical Society (GCHS), the Pierce County Register of Deeds office, the Pierce County Historical Association, and the Minnesota Historical Society. These sources, which are detailed below, included county historical society subject files and other holdings; property deeds; the Goodhue County auditor tax lists; federal census schedules; local and county histories; and secondary sources pertaining to the former city gas works.

COUNTY HISTORICAL SOCIETY RESOURCES

The GCHS maintains a number of subject files, a few of which were relevant to the historical land uses within the APE. Those examined for the Levee sub-area included the files for "Mills" and "Sawmills," which contain information on the historical mills that occupied the sub-area, as well as on the milling industry of Red Wing overall; the file for "Red Wing - Business and Industry – Iron Works," for information on the Red Wing Iron Works; and the file for "Steamboats," which turned out to be largely limited to the steamboats themselves and not on surrounding riverbank operations. The "Furniture" subject file was reviewed for information on the Red Wing Manufacturing Company, once located in the Downtown Commercial sub-area of the APE. Information on the city gas works and electric substation, formerly located in the East Red Wing Residential sub-area, was obtained from the "Public Utilities" subject file.

In addition to the subject files, holdings of the GCHS were reviewed including *Historic Contexts for the City of Red Wing* (Vogel 1994), *Survey of Red Wing City's Blocks* (Kosec 1972), *Early Red Wing Businesses Street by Street* (Nelson 2012), and historic resources inventory forms from a 1986 study of East Red Wing conducted by the Goodhue County Preservation Planner (Red Wing Historic Resources Inventory: East End Neighborhood, held at the GCHS). The latter three sources document the history of occupation for individual lots, based on historical research conducted by the authors.

Subject files at the Pierce County Historical Association were reviewed for information relevant to the North of the River sub-area, including the files for "Trenton Township," and "Hager City." Also useful was the Oluff Halls scrapbook, which contained information on Trenton Island, Halls being the Pierce County sheriff responsible for conducting a raid on the island in 1908.

PROPERTY DEEDS

Property deeds were examined at the Pierce County Register of Deeds office to obtain chain of ownership information for the North of the River sub-area, which is in Wisconsin. The Goodhue County Recorder office does not have historical property deeds indexed to allow for a search by legal location, or any other similarly efficient point of reference; therefore, county auditor tax lists and assessment rolls held at the MHS were used to determine chain of ownership information for the Minnesota portion of the APE.

GOODHUE COUNTY RECORDS AND CENSUS SCHEDULES

Goodhue County Auditor tax lists were reviewed at the MHS to obtain detailed chain of ownership information for the residential parcels in the East Red Wing Residential sub-area. The MHS holds tax lists from the years 1857 and 1871-1901 inclusive, as well as from 1910-1911, 1920-1921, 1930-1931, 1940-1941, 1950-1951, and 1960-1961. Ownership information was available for the years 1860, 1864, 1868, 1870 from the Goodhue County Assessor assessment rolls, also held at the MHS, and was used to supplement that obtained from the tax lists. Once owners were identified, they were cross-checked against available federal census schedules to determine whether the respective owner resided at his or her property and to obtain information on ethnic background, occupation, and other specific details that could inform on identified archaeological sites.

Sources Associated with the Gas Works and Electric Sub-Station

Due to levels of contamination caused by the gas works, field testing could not be conducted in the location it formerly occupied within the East Red Wing Residential sub-area. A search of secondary sources therefore was conducted for historic contextual information that could assist in identifying the types of associated archaeological resources that might be present and their potential significance. This search included a review of secondary sources pertaining to the history of the development of the Red Wing gas works specifically and of gas works overall in the United States, and to the technologies of these facilities. Most useful in this regard were the volume *Builders of Northern States Power Company* (Meyer 1972) and Historic American Engineering Record (HAER) forms for various gas works, as well as online resources describing coal gas operations.

FIELD SURVEY

A Phase I archaeological survey was conducted to identify any archaeological sites present within the APE. The survey consisted of the Principal Investigator observing the close-interval geomorphological coring and subsequent backhoe trenching conducted by Strata Morph Geoexploration, Inc. (Strata Morph) (Appendix B), as well as shovel testing conducted by Two Pines staff. The Phase I fieldwork was limited to those areas identified during the pre-evaluation study as having moderate to high archaeological potential and for which landowner permission to conduct the survey was granted. For ease of reference, the specific methods used in each sub-area are described within their respective results chapter.

All soils removed from excavated shovel tests and sampled from trenches were screened through a ¼-inch (in.) mesh. Shovel tests were excavated through all post-glacial soils and sediments to culturally sterile subsoil, bedrock, or to a maximum depth of one meter (m) (3 feet [ft.]) below the surface, depending on which condition was first encountered.

Data gathered during the survey were recorded on shovel test forms, auger test forms, and in the field notebook of the Principal Investigator. Items noted included: the location of survey areas; the location of individual shovel tests; the depth of each shovel test and its associated soil profile; the presence or absence of cultural materials within each test; and the excavated soil texture, inclusions, and Munsell® color designation.

GEOGRAPHIC INFORMATION SYSTEM DATA

A geographic information system (GIS) data layer was created during the course of the Phase I survey. The locations of individual shovel tests were recorded in the field using a Trimble GeoXT GPS Unit. GIS data for the geomorphological cores were provided to Two Pines by Strata Morph. All data were differentially corrected using a National Geodetic Survey (NGS) continuously operating reference station (CORS) data. Trimble Pathfinder Office 3.10 was used to correct the data and export them as ESRI shapefiles. ESRI ArcGIS was used to analyze and map the data.

LABORATORY ANALYSIS

All artifacts recovered through shovel testing and trenching were returned to the Two Pines laboratory for cleaning, cataloging, and analysis. Artifacts were processed in accordance with the standards and guidelines of the Minnesota Historical Society (MHS) Collections Department. Artifacts were cleaned and then sorted into categories used in standard professional practice, first by general material type, then by function and other attributes. Faunal analysis was performed by Alexis Thorpe. Materials were cataloged using Microsoft Excel 2002®. Each artifact from a particular provenience received a distinctive artifact number, beginning with the number "1." The artifacts from sites were curated at the MHS (Table 2).

TABLE 2. ACCESSION NUMBERS FOR TH 63 BRIDGE PROJECT ARTIFACT COLLECTIONS

Site #	Site Name	Accession #	# of Artifacts Curated
21GD291	141 E. 3rd Street	2014.36	255
21GD292	157 E. 3rd Street	2014.37	295
21GD293	124 E. 4th Street	2014.38	318
21GD295	318 Sanderson Street	2014.39	209

CHAPTER 3 . LITERATURE SEARCH

As previously described, the pre-evaluation study for archaeological potential performed for the TH 63 Bridge Project included an intensive literature search (Terrell and Vermeer 2012). Summarized in this chapter is only that archaeological and environmental background information relevant to the Phase I archaeological survey.

RECORDED ARCHAEOLOGICAL SITES

Background research conducted at MnSHPO and WiSHPO revealed that one previously identified archaeological site (21GD0015) partially overlaps with the TH 63 Bridge Project's APE and one archaeological site lead (21GDbj) is located within the APE.

- Site 21GD0015 (Barn Bluff Mounds) is a group of three Native American earthworks recorded atop Barn Bluff in 1885. The boundary of the site, as recorded at the MnSHPO, is drawn to encompass all of Barn Bluff, and hence overlaps partially with the project APE. However, during a study of Barn Bluff completed in 2014, Two Pines relocated each of the three mounds which are located atop the bluff and outside of the project APE (Terrell and Terrell 2014).

- Site lead 21GDbj was identified during the pre-evaluation study. Archaeological cores taken within Lots 4-7 of Block 40 encountered structural remains associated with the Red Wing Manufacturing Company and other historical-period resources recorded within the test area. Pending excavation to confirm the association of the features, the resources are considered a site lead and assigned an "alpha site number."

Twelve additional archaeological sites and five site leads have been recorded within a one-mile (1.6 km) radius of the project APE (Table 3; Figure 4). Of these resources, six sites and two site leads are mound groups or individual mounds. With the exception of 21GDa (Hancock Mounds I), all of the earthwork sites and site leads are located atop bluffs or distant from the APE. Site 21GDa, which was reported to Alfred J. Hill in 1867 by Joseph W. Hancock, is located proximate to the project area and on the same terrace occupied by downtown Red Wing. Of this mound group, Hancock, who settled in Red Wing in 1849, wrote, "a row of mounds extended along the southwestern border of the Indian corn fields, the ground now occupied by streets and buildings in this city. With my pencil I have endeavored to make dots on the plat you sent to show the locality of these mounds. Scarcely any of them are now visible" (Winchell 1911:169). The easternmost of the mounds in this group was mapped near the intersection of West Avenue and 5th Street W., approximately three and a half blocks from the nearest portion of the revised project APE.

The remaining six sites and three site leads within one mile of the APE include two precontact sites, three historical-period sites, three historical-period site leads, and one multi-component (precontact and historical) site. The precontact sites are artifact scatters located on the north side of the Wisconsin Channel of the Mississippi River, one (47PI0070) over a series of small knolls, and the other (47PI0095) along a low spur toward the base of a high Pleistocene terrace. The historical-period sites are the site of

TABLE 3. PREVIOUSLY RECORDED SITES WITHIN ONE MILE OF THE APE

Site No.	T	R	S	¼ Section	Description
21GD0012	113	14	30	NE-SW-SE, C-W-NW-SE-SE	Earthworks
21GD0013	113	14	30	C-SE-SW-SW	Earthworks
21GD0014	113	14	30	W-NW-SW-SW	Earthworks
	113	14	25	SE-SE, S-NW-SE, NE-SW-SE, W-SW-NE-SE	
21GD0015	113	14	29	C-NW-NW, NW-SW-NE-NW, SW-NW-NE-NW	Earthworks
21GD0089	113	15	25	N-NW-NE-SE, NE-NE-NW-SE, SE-SE-SW-NE	Red Wing Pottery Dump
21GD0171	113	14	30	C-NE-SE-SW	Earthwork
21GD0212	113	14	30	NE-SE	Original Hamline University Building (foundations and artifact scatter)
21GD0273	113	14	31	SE-SW-NW	Earthwork and cairn
21GD0297	113	14	29	NW-NE	G. A. Carlson Red Wing Pioneer Lime Works
21GDa	113	14	30	C-SW, S-N-SE	Earthworks
21GDj	113	15	25	C-S-S-SE-SE	Earthworks
	113	15	36	NE-NE-NE, NE-NW-NE-NE	
21GDq	113	14	29	N-N-NW, NW-NE	Find spot (1702-1714 gun barrel)
21GDbi	113	14	30	NE-NE-SE	Heising/Remmler Brewery (foundations)
21DGbj	113	14	29	NE-SE-NE	Red Wing Manufacturing Company (foundations)
	113	14	30	NW-SW-NW	
21GDbk	113	14	29	SW-SW-NW	Block 26, Lot 4 (feature)
47PI0012/	24	18	2	W-SW	Earthworks and habitation site
BPI-0097	24	18	3	N-SE, N-SE-SE	
47PI0070	24	18	2	NE-SW-SE, NW-SE-SE	Artifact scatter
47PI0095	24	18	3	S-SE-SE	Artifact scatter
BPI-0054	24	18	3	SE-NW-SE	Trenton Cemetery

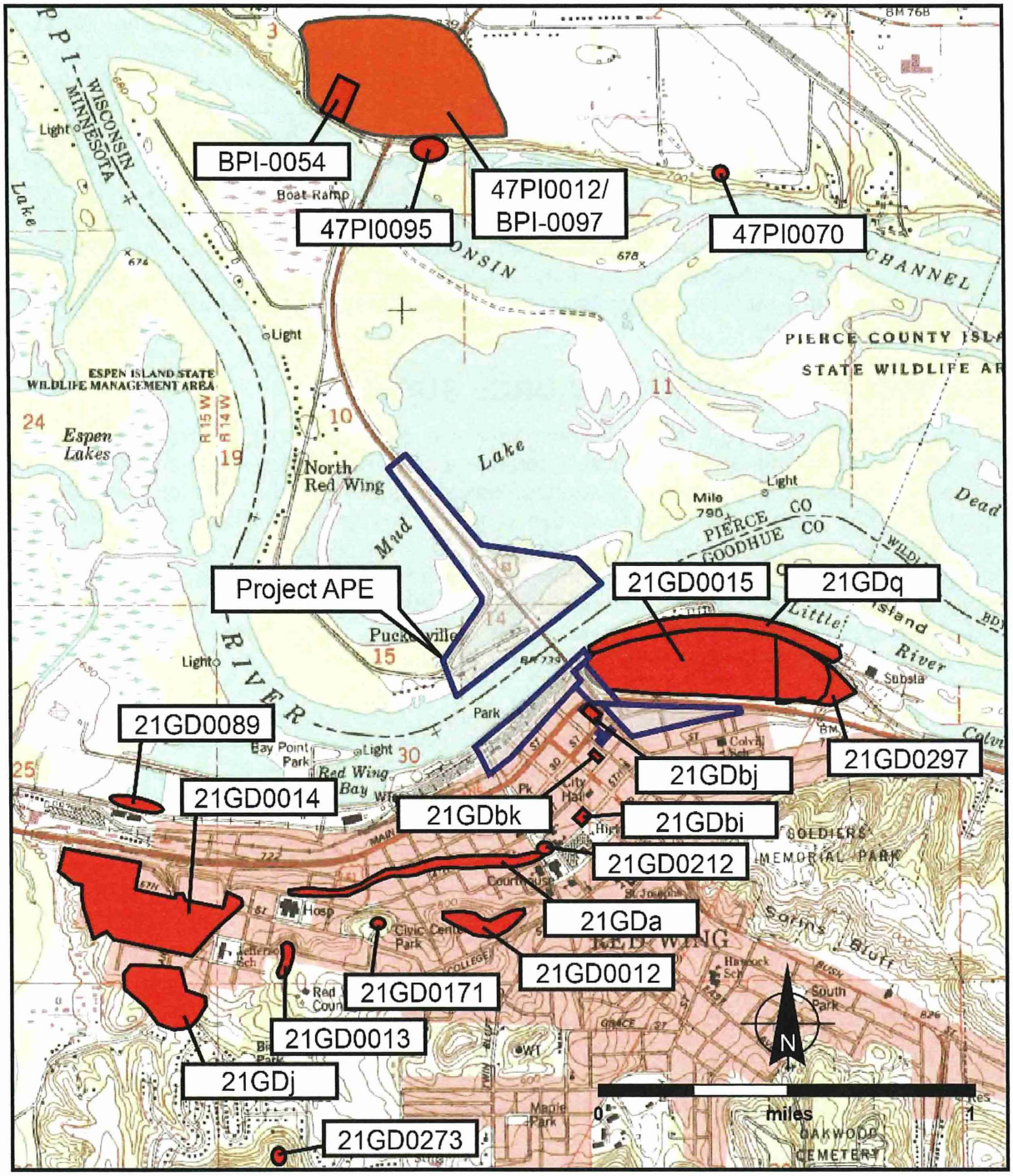


FIGURE 4. ARCHAEOLOGICAL SITES PROXIMATE TO THE TH 63 BRIDGE PROJECT'S APE

the Red Wing Pottery dump (21GD0089), the G. A. Carlson Pioneer Lime Works (21GD0297), and the Trenton Cemetery (BPI-0054), an active cemetery established in 1883. Site lead 21GDq, is the location of an early eighteenth-century gun barrel found by William Sweney of Red Wing in 1870. Site lead 21GDbi is the location of foundations of the Heising/Remmler Brewery, while site lead 21GDbk is the location of a feature within Lot 4 of Block 26. These two site leads were documented during the pre-evaluation study for the TH 63 Bridge Project. The multi-component site, 21GD0212, is the site of the original Hamline University building. Although primarily comprising the foundation of the building and an associated artifact scatter, the site also includes two Woodland-period ceramic sherds encountered during excavations. All of these sites and site leads are at a sufficient distance that associated resources would not be present within the project APE.

PREVIOUS CULTURAL RESOURCE SURVEYS

Portions of the project APE were encompassed by three previous archaeological surveys. In 1984 and 1985, the Institute for Minnesota Archaeology (IMA) conducted an intensive survey and inventory of archaeological sites within the City of Red Wing (Dobbs 1985). During the course of this project, information on previously identified archaeological resources was reviewed, reported sites were field-checked, and an additional 760 acres were surveyed that had not been previously examined. Twenty sites were documented during the course of this survey (Dobbs 1985:2). A map of the IMA's survey locations was not included in the report, but no sites were identified within the APE of the TH 63 Bridge Project during their study.

In 2002, Commonwealth Cultural Resources Group (CCRG) conducted a Phase I survey of TH 63 from the Wisconsin/Minnesota border to Wisconsin State Highway 35. The project area included that portion of the current APE approximately 175 ft. either side of the TH 63 centerline from the state border north. A walkover of this area concluded that the portion crossing Mud Lake was road fill with low potential for deeply buried archaeological deposits, and that cores could not be taken between the Mud Lake causeway and the main channel of the Mississippi due to the presence of "concrete rubble and other types of fill" (Egan-Bruhy et al. 2003:4-3). No archaeological sites were encountered within the current APE during the survey.

A Phase IA archaeology/Phase I architectural history survey was completed by The 106 Group in 2010 for a riverfront trail in Red Wing (Van Erem et al. 2010). The route of this trail passes through the project APE between the existing rail corridor and the river. Within the Red Wing Bridge Project APE, the archaeological survey was limited to surface reconnaissance, and no archaeological features were documented.

In addition to the above-mentioned archaeological surveys, in 1989, Landscape Research prepared an historic context for Minnesota's geographic features of historic and cultural significance (Zellie 1989a). This study created a statewide inventory of such geographic features and created guidelines for their evaluation and registration. Five of these geographic features were nominated to the National Register, including Barn Bluff/La Grange, which was listed on the National Register in 1990 as a natural feature of significance in the areas of exploration and tourism. In 2014, Two Pines completed a cultural landscape report (CLR) for the Barn Bluff Historic District (Terrell and Terrell 2014).

MOUNDS AND BURIALS

As described in the section on previously identified archaeological sites, nine burial mounds or groups of mounds are located within a one-mile radius of the project area. The files for mound groups proximate to the project APE (21GD15 and 21GDa) were reviewed at the Minnesota OSA. No additional locational information on burials beyond that recorded in the SHPO files was uncovered. However, the review of early explorers' records found an 1845 account by William Folsom that records a cemetery with scaffold burials located near the Dakota village at Red Wing (Folsom 1888:595-596).

ENVIRONMENTAL CONTEXT

The TH 63 Bridge Project is located in the Southeast Riverine East archaeological sub-region. The following environmental history of this sub-region is based largely on information contained in Borchert and Gustafson's (1980) *Atlas of Minnesota Resources and Settlement* and an overview entitled "Minnesota's Environment and Native American Culture History" by Gibbon et al. (2002).

The Southeast Riverine region covers most of southeastern Minnesota and continues into the adjacent corners of Wisconsin and Iowa. This region was not glaciated during the Late Wisconsin Ice Age and is characterized by a stream-dissected terrain. The Southeast Riverine East sub-region parallels the Mississippi River south from its junction with the St. Croix River and includes portions of Dakota, Goodhue, Wabasha, Winona, and Houston counties.

The soils in the eastern part of the region are fine-textured forest and prairie soils formed on loess deposits over Paleozoic bedrock. The climate within this region has an average annual precipitation range of 28 and 30 inches. January highs average 23 degrees Fahrenheit (F), while July highs average 85 degrees F. The frost-free season averages 160 days.

During the Late Holocene, forests of elm, ash, and cottonwood lined the river lowlands, while "Big Woods" forests of maple, elm, and basswood occupied the uplands near the Mississippi River. Within the current project area, mixed grassland and hardwood forest was present at the time of initial EuroAmerican contact.

Late Holocene subsistence resources in this region consisted of deer, elk, and occasional bison in the uplands. Mussels, fish, waterfowl, and edible aquatic plants were available in the bottomlands, particularly along the Mississippi River, while prairie turnips and acorns were present on the uplands and savannas of the region.

CHAPTER 4 . HISTORIC CONTEXTS

The Minnesota State Historic Preservation Office (MnSHPO) has developed a series of statewide historic contexts and themes for the interpretation and evaluation of cultural properties (Dobbs 1990a; Dobbs 1990b; SHPO 1993). These contexts cover three broad periods of Minnesota's history: precontact (12,000 years B.P. to Anno Domini [A.D.] 1700); contact (A.D. 1650-1837); and historical-period (1830s to the present). Those historic contexts relevant to the TH 63 Bridge Project are summarized below.

PRECONTACT PERIOD

The human occupation of Minnesota prior to EuroAmerican contact is divided into four principal cultural traditions:

- Paleoindian (c. 11,200 – c. 7500 B.C.)
- Archaic (c. 7500 – c. 500 B.C.)
- Woodland (1000 B. C. – A.D. 1750)
- Late Prehistoric (A. D. 900 – EuroAmerican contact)

These traditions are primarily defined by technological innovations that are visible in the archaeological record such as changes in forms and types of material culture (e.g., pottery decoration) and variations in subsistence patterns (e.g., hunting, gathering, and cultivation) that occurred in response to a transforming landscape.

It should be noted that the cultural traditions described hereafter provide only a general overview of Minnesota's 12,000 years of human occupation. The cultural history of Minnesota prior to approximately 2,000 years ago is especially undeveloped because few archaeological sites from these earlier periods have been identified. Cultural descriptions, therefore, of the earliest traditions are based in part on archaeological evidence recovered in Minnesota, but are also enriched by evidence from surrounding states.

PALEOINDIAN TRADITION (C. 11,200 - C. 7.500 B. C.)

The earliest people to enter Minnesota followed the retreat of the Wisconsin Glaciation some 12,000 years ago. Much of the area that they once inhabited has since been buried beneath thick deposits of Middle Holocene sediments. Archaeological evidence for the Paleoindian period, however, indicates that these people were highly mobile hunters and gatherers who pursued herds of large game, including mastodon, bison, and woodland caribou, as well as a variety of smaller animals that occupied the tundra and open pine and oak forests that populated that landscape behind the retreating glaciers. As they moved, probably in small bands, they obtained and carried, sometimes for hundreds of miles, choice raw materials for making their stone tools (Dobbs 1990a:56).

The nomadic life of Paleoindians did not result in artifact assemblages and deposits like those associated with long-term occupations; rather, throughout the United States, archaeological sites dating to this period generally are temporary campsites, faunal processing sites, short-term, stone-tool-manufacturing sites, and animal kill sites. The

Paleoindian tradition is characterized by finely crafted, large, lanceolate ("leaf shaped") projectile points used to arm spears and possibly as knives. These lanceolate points are divided into two types: fluted (Clovis and Folsom points) and non-fluted (Plano) points. Chipped-stone axes and adzes, large "turtleback" scraping tools, and trihedral blades used for a variety of tasks are also characteristic of the Paleoindian period.

In Minnesota, the Paleoindian period is commonly divided into Early and Late stages. Sites dating to the Early Paleoindian period, between approximately 13,200 and 12,500 years ago, are scarce and largely limited to fluted spear points typical of the period without any associated features or artifacts (Dobbs 1990a:56; Gibbon and Anfinson 2008). Early Paleoindian artifacts have been reported (but not field-verified) or recorded (and verified through fieldwork) in several counties, primarily in southern Minnesota, including Blue Earth, Brown, Cottonwood, Fillmore, Freeborn, Hennepin, Murray, Nobles, Olmsted, Rock, St. Louis, Sherburne, Stearns, Waseca, and Washington counties (Higginbottom 1996; Anfinson 1997; Vermeer 2005). Although these locations suggest that the occupation of Minnesota during this period was concentrated in the central and southern regions of the state, additional Early Paleoindian sites may have yet to be discovered in the northern half of Minnesota. Sites dating to the Late Paleoindian stage, between 12,500 and 9,500 years ago, are numerous in Minnesota, and have been found throughout the State, but these also have consisted largely of surface-collected spear points; therefore, little information is known regarding this time period in Minnesota (Dobbs 1990a; Gibbon and Anfinson 2008).

As the first humans entered Minnesota some 12,000 years ago following the retreat of the Wisconsin Glaciation, the landscape around Red Wing was still dramatically changing. It wasn't until about 11,000 years ago that the waters of the river slowed to the point that the formation of the gorge ceased (Wright et al. 1998:134, 135). However, the decrease in water volume within the valley allowed a delta to form at the mouth of the Chippewa River about seven miles south of Red Wing. The Chippewa River delta created Lake Pepin and backed up water within the valley perhaps as far upriver as St. Paul (Wright et al. 1998:134). Over the course of the next 9,000 years the head of Lake Pepin was pushed by the Mississippi delta back downstream reaching its modern position near Red Wing about A.D. $\pm$650 (Hudak 2011; Hudak et al. 2011). Given the changing landscape around Red Wing, perhaps it is not surprising that to date no archaeological evidence of a Paleoindian occupation has been recovered in the Red Wing area. Not only are sites associated with these traditions often deeply-buried and therefore not readily discoverable, but the often inundated and fluctuating environment within the valley at Red Wing may have led to few sites from these eras being preserved in the area. However, reported finds in other portions of the Southeast Riverine archaeological region, together the location of the project area near the northern boundary of the driftless zone, suggest the potential for resources from this period to be present (Dobbs 1985:15; Buhta et al. 2011:32).

ARCHAIC TRADITION (C. 7,500 - C. 500 B. C.)

Approximately 9,000 years ago, Minnesota experienced a "rapidly changing postglacial environment," (Gibbon et al. 2002:10) associated with warmer temperatures and a decrease in precipitation. New landscapes emerged from beneath the ice, and the state transitioned from a forested region to an expanse of prairie interspersed with large lakes and swiftly-flowing rivers fed by glacial runoff. These changes brought about the

extinction of the Pleistocene megafauna, which were replaced with new complexes of animals and plants.

Inhabitants of this region were forced to adapt to this transformed landscape, altering their means of subsistence and lifestyles. The Archaic tradition is marked by an increased diversity of tool types, raw materials, and local resources. In response to the increased abundance and variety of game, fish, shellfish, and plant resources, the large lanceolate projectile points of the Paleoindian tradition were replaced by smaller notched and stemmed chipped-stone points, and chipped-stone axes were replaced by groundstone adzes, axes, and other groundstone tools. Other implements introduced into the tool kit during this period include atlatl darts, bone tools, and copper tools. Copper implements, found primarily in northern regions of the state, appeared about 5,800 years ago and were manufactured and used until approximately 3,200 years ago (Gibbon and Anfinson 2008). Because of an increased ability to depend on regional resources within an increasingly stable environment, Archaic people became less nomadic and established longer-term seasonal camps with temporary structures and associated storage pits.

Because of the focus on the resources of particular regions, Archaic-tradition artifact assemblages demonstrate more regional cultural variations than do Paleoindian sites. Four distinct Archaic contexts have been identified in Minnesota including the Shield Archaic, Lake-Forest Archaic, Prairie Archaic, and Eastern Archaic. Archaic peoples who occupied the south-central/southeastern Minnesota deciduous forests are associated with the Eastern Archaic complex, which includes subsistence strategies heavily reliant on riverine animals and plants, as well as deer. Although much remains to be learned about this complex, eastern Archaic sites typically contain "a wide variety of projectile points that may be notched, stemmed, or have bifurcated bases [and] an extensive groundstone industry that includes fully and three-quarters-grooved axes, mauls, 'nutting stones,' adzes, gouges, and other implements" (Dobbs 1990a:97).

As with the Paleoindian period, the landscape of the Mississippi River valley at Red Wing was still changing during the Archaic period. Surface finds of Archaic materials have been reported in the greater Red Wing area and Archaic sites have been reported along the less turbulent Cannon River and Spring Creek (Dobbs 1985:16).

WOODLAND TRADITION (1,000 B.C. – A.D. 1750)

As the climate of the state continued to stabilize, the region's inhabitants began to use the resources available to them in an increasing variety of ways. Hunting and gathering, which had been the primary means of subsistence, were supplemented by the introduction of domesticated plants such as squash, gourds, and beans – particularly in central and southern Minnesota, where expansive prairies to the west and an oak savanna spanning the state from the northwest to the southeast were present. Agriculture resulted in a more reliable food source, leading to the adoption of an increasingly sedentary lifestyle as evidenced in the long-term or reoccurring seasonal occupation of village sites. Tied to this increased environmental stability and regional settlement patterns were the advent of ceramic technology and the construction of earthen mounds. These changes occurred in Minnesota between approximately 3,000 and 900 years ago. It should be noted that these innovations were not adopted in all areas of the state at the same time or necessarily together. Even so, the period in which

these innovations occurred has been designated as a single archaeological period, the Woodland Tradition.

Woodland sites are more frequently encountered in Minnesota because they are more widely distributed and not usually as deeply buried as Paleoindian and Archaic sites. The presence of ceramics and distinct tool types also allows Woodland sites to be more readily assigned to a particular tradition than non-diagnostic lithic scatters. Consequently, a relative abundance of Woodland-period artifacts has enabled archaeologists to develop a chronological framework consisting of an Early and Middle (Initial) (ca. 1000 B.C.–A.D. 500) and Late (Terminal) (ca. A.D. 500-1750) Woodland periods, and to assign Woodland sites to distinct traditions. Those traditions that relate to the Red Wing area include the Southeast Minnesota Early Woodland Complex (500 – 200 B.C.), the Havana-Related Complex of the Middle Woodland (200 B.C. – A.D. 200/300), and the Southeast Minnesota Late Woodland Complex (A.D. 500-1150) (Arzigian 2008).

Southeast Minnesota Early Woodland Complex (500 – 200 B.C.)

The diagnostic artifact type for the Southeast Minnesota Early Woodland Complex is La Moille Thick ceramics. The five sites in Minnesota that have produced this ware type are located within riverine settings in the southeastern and south-central portions of the state. Three of the sites are situated along the Mississippi River, and one of these sites is located in Goodhue County. Due to the dearth of identified sites associated with this complex and the lack of stratified deposits within those sites that can be assigned to the complex, very little can be said at this time about associated material culture and subsistence patterns (Arzigian 2008:30-34). It has been suggested that these sites "might reflect the gradual nature of the transition between Archaic and Woodland in this region" (Arzigian 2008:30).

Havana-Related Complex of the Middle Woodland (200 B.C. – A.D. 200/300)

The Havana-Related Complex dates to the Middle Woodland (ca. 200 B.C. – A.D. 200/300) in central and eastern Minnesota (Arzigian 2008). This period is marked by the presence of northern Havana Hopewell ceramic and burial mound traditions that originated from the Illinois River valley just south of Peoria (Dobbs 1990a:130). The exchange of cultural concepts between Minnesota's Havana-related cultures and the Havana Hopewell likely resulted from the development of an extensive trade network that focused on the transfer of raw materials from one region to another (Dobbs 1990a:130). As explained by Arzigian (2008:25), "The Havana-related complex fits within the more broadly defined Lake Forest Middle Woodland tradition," and it includes the Howard Lake, Malmo, and Sorg phases, which are defined by ceramic wares of the same names. Howard Lake ceramics and sites are concentrated in southern east-central Minnesota in the region of the Anoka Sand Plain and along Rice Creek, while Malmo wares are concentrated in central and eastern Minnesota from Mille Lacs Lake westward (Arzigian 2008:36). Sorg ceramics are found in northern southeast Minnesota, particularly from sites clustered near the junction of the Mississippi and St. Croix rivers, although Sorg ceramics have been recovered near Red Wing (Arzigian 2008:41). Sites that produce Sorg pottery are situated on beach ridges or terraces above the floodplain of the Mississippi River (Arzigian 2008:36).

Southeast Minnesota Late Woodland Complex (A.D. 500-1150)

The Southeast Minnesota Late Woodland Complex is defined as that period after Havana-related complexes have faded and before the rise of Oneota. This complex is associated with populations that continued to hunt, gather, and fish, but which also began growing crops towards the end of the period. Effigy and other mounds are typical of this period, as are cord-impressed ceramics and true triangular bow-and-arrow projectile points. Sites are found along terraces and bluffs associated with the Mississippi River and its tributaries, and west to the Blue Earth River valley (Arzigian 2008:93). Several sites associated with this complex are located in the region to the west of Red Wing where the Cannon River joins the Mississippi River.

Burial mounds and earthworks typical of the Woodland period have been documented both to the immediate west (21GDa – Hancock Mounds I) and east (21GD15 – Barn Bluff Mounds) of the project area, as well as in the greater region. Furthermore, Woodland-period artifacts were recovered by Dr. William Sweney and Jacob Brower in the Red Wing area during the early exploratory period, and a small Woodland site (21GD116) was documented near the Cannon River in west Red Wing (Winchell 1911:452; Dobbs 1985:17, 18).

LATE PREHISTORIC PERIOD (CA. A.D. 900 – EUROAMERICAN CONTACT)

In southern Minnesota, a new set of traditions began to develop around 1,000 years ago during an era marked by an intensification in agricultural practices, and the presence of larger and increasingly complex societies. Sites from this period are distinguished from those of the Woodland period by their greater artifact density, distinct ceramic styles, corn and vegetable storage pits, and large semi-permanent village complexes located on river valley terraces. The Late Prehistoric period in Minnesota is exemplified by three traditions: Plains Village, Mississippian, and Oneota. These traditions did not immediately displace Woodland populations, and some of the complexes that made up these traditions co-existed not only with Woodland groups, but with each other (Anfinson 1997:89).

During this period, the river valley at Red Wing begin to resemble its current configuration as the delta of the Mississippi River reached its present position. It was at this time that the area around Red Wing became a center of inter-regional interaction for a diverse group of populations (Fleming 2009:71-72). At the center of this area are the mouths of the Cannon and Trimbelle rivers, which enter the Mississippi from the west and east, respectively. The deltas of these rivers and the high blufftops that overlook them in northeast Goodhue County and extreme western Pierce County comprise what archaeologists refer to as the Red Wing Locality– a portion of the Mississippi River valley that was intensively occupied between A.D. 900 and 1300 during the Late Prehistoric period. The environment of this region offered a wide variety of subsistence resources, arable land for farming, and sources of lithic raw material (Dobbs 1985:7-8). These resources, together with the transportation, trade, and communication networks offered by the Mississippi and its tributary rivers made this an ideal setting. The sites of nine major villages and over 2,000 mounds are located within this approximately 155-square-mile area (Institute for Minnesota Archaeology 1999; Fleming 2009:6, 11, 15).

Sites within the Red Wing Locality contain evidence for Oneota (Blue Earth Oneota and Orr Phase Oneota), Mississippian (Silvernale), and to a lesser extent Plains Village (Cambria) connections. The relationship of the Oneota to the Plains Village and Mississippian peoples is unclear. Some have suggested that the Oneota may have originated from the south and replaced the Mississippians, while others have argued that they are their descendants. Still others have proposed that Oneota culture is a local response to the introduction of Mississippian lifeways. Certainly, evidence for 200 years of intense interaction between the Oneota and southern Middle Mississippian groups is present in and around Red Wing. Over time the influence of Middle Mississippian cultures waned, and Oneota culture became an increasingly regionalized expression that then spread west and south (Dobbs 1990a:183). At its height, the Red Wing locale demonstrated Mississippian-inspired pottery, and the presence of exotic materials including "marine shell, non-local lithic materials from as far away as Obsidian Cliffs in western Wyoming, Plains complex pottery, copper, galena, bison, bone" (Fleming 2009:71) and flat-topped pyramidal mounds.

The TH 63 Bridge Project is located within the eastern portion of the Red Wing Locality. None of the major villages that have been archaeologically-documented are located within the immediate vicinity of downtown Red Wing, although the Adams site (47PL12), an apparent single-component Oneota site, is located opposite Red Wing on the Wisconsin side of the Mississippi River (Fleming 2009:47-48, 66). The 1903 Brower and Sweney map, however, indicates an "ancient village" near the site of present-day Red Wing (Figure 5). The map also records the presence of "pits" near this village site, as well as on the island in the river to the west of Mud Lake. Brower recorded the profile of these pits in 1902 (Brower 1903:65) (Figure 6). Of them he wrote (Brower 1903:65-66):

> At the site of Chief Red Wing's village on the terrace where the city of Red Wing is now situated there is a recent railroad grade cut through a bed of stratified gravel. Dr. Sweney pointed out a series of ash pits which were exposed to view by the excavation mentioned. Lieutenant Z. M. Pike visited this Indian village one hundred years ago, assuming friendly relations with Red Wing and his followers. While examining the exposed ash pits I gathered innumerable objects of village debris from the contents of various deposits which had been cast into the pits. I found specimens of serpentine and obliquely marked pieces of clay pots intermixed with ashes, corn cobs, bird, animal and fish bones, decayed birch bark, a mill stone, pieces of old fashioned blue dishes and a slight indication of decayed tinware. The debris recovered from those pits, intermixed in irregular masses, indicated plainly the merging of the customs of ancient stone age into the period of historic occurrences and habits, confirming the identification of clay vessels made and used by Dakota Indians.

Pit features are indicative of Mississippian-period occupations within the Red Wing Locality, and it was likely the presence of these pits that led to the identification of an "ancient village" at Red Wing. The sherds that Brower described as having serpentine and oblique markings could refer to Silvernale wares. It is likely that these features were initially excavated and used during that era; however, the presence of "old fashioned blue dishes" and "decayed tinware" indicates that these features were being used as refuse pits through the contact period.

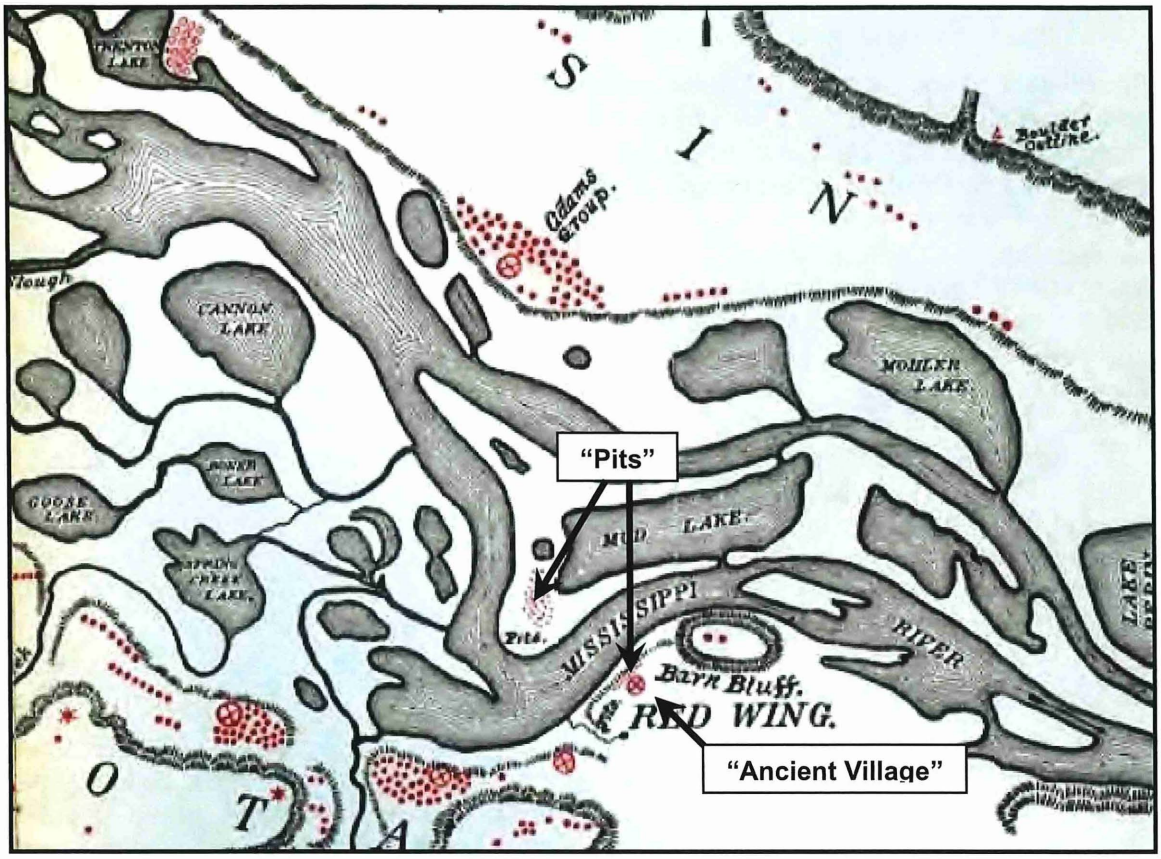
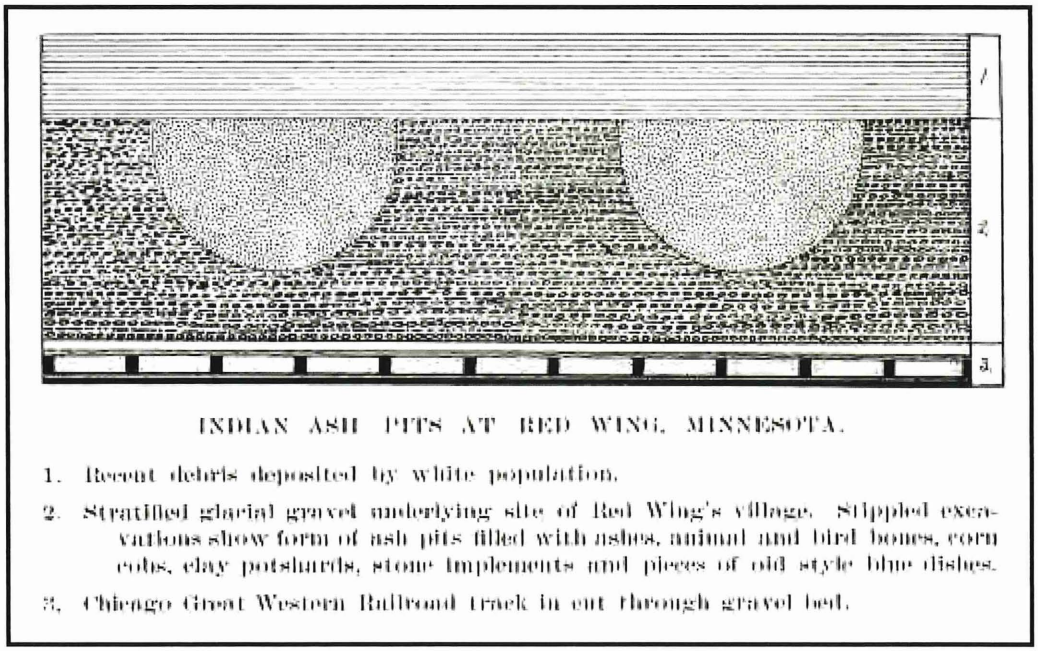


FIGURE 5. DETAIL OF BROWER AND SWENEY MAP SHOWING MOUNDS AND VILLAGES NEAR RED WING



INDIAN ASH PITS AT RED WING, MINNESOTA.

1. Recent debris deposited by white population.
2. Stratified glacial gravel underlying site of Red Wing's village. Stippled excavations show form of ash pits filled with ashes, animal and bird bones, corn cobs, clay potsherds, stone implements and pieces of old style blue dishes.
3. Chicago Great Western Railroad track in cut through gravel bed.

FIGURE 6. PROFILE OF PIT FEATURES AT RED WING AS RECORDED BY BROWER

CONTACT PERIOD

The contact-period historic contexts created by the MnSHPO encompass the era between 1650 and 1837, when initial contact and interactions occurred between Native Americans and EuroAmericans. The end date of 1837 corresponds to the date of major treaties with the eastern Dakota and southern Ojibwe, which opened up portions of present-day Minnesota to EuroAmerican settlement. In the case of Red Wing, however, it is appropriate to extend the end date for the period of EuroAmerican and American Indian contact given that the area was not open to EuroAmerican settlement until the 1851 treaties with the Dakota went into effect.

Within the contact-period contexts developed by the MnSHPO, two major study units are identified: Native American and EuroAmerican. The Native American unit is subdivided into historic contexts for each of the tribal groups occupying the state at the time of European contact. Likewise, the EuroAmerican unit is divided into contexts associated with the various European ethnic groups that settled within the state from the seventeenth through nineteenth centuries. The three developed contact-period historical contexts relevant to the APE of the TH 63 Bridge Project are the "Chiwere Siouan Language Group," "Eastern Dakota," and "Initial United States Presence."

CHIWERE SIOUAN LANGUAGE GROUP

The Chiwere Siouan language group includes the Ioway, Otoe, and Missouri groups. These three groups are closely related and share ties of language, belief, culture, and kinship, and according to Otoe tradition were once part of a single group (Dobbs 1990b:22). During the seventeenth century, the Ioway were living in southeastern Minnesota along the Mississippi, Root, and Upper Iowa rivers (Dobbs 1990b:22). The exact locations of Otoe and Missouri groups at this time is unclear, although the Otoe are associated with the Blue Earth River valley. It is said that the territory of the Ioway once extended north to the Minnesota River valley, but as the Mdewakanton Dakota moved south from the Mille Lacs area, they pushed the Ioway southward (Neill 1881:191; Pond 1872:114). When writing his ethnography of the Dakota, Samuel Pond (1986 [1908]:174) noted that the Dakota described "having expelled the Iowas from the country bordering on the Mississippi and Minnesota rivers [and] often spoke of having driven the Iowas from southern Minnesota. They did not speak of this as some ancient tradition, but as a well known event of comparatively recent occurrence, though it must have taken place more than two hundred years ago." Pond (1986 [1908]:175) also wrote, "The small mounds, which may be seen on the left bank of the Minnesota at Eden Prairie and Bloomington, and perhaps at other places, are, the Dakotas say, the ruins of dwelling houses built by the Iowas." Due to increased pressures, the Ioway and Otoe removed from Minnesota to Iowa during the 1680s or 1690s (Wedel 1986; Dobbs 1990b:25).

While the Ioway and Otoe did not remain long in Minnesota after initial EuroAmerican contact, their presence should not be overlooked. The ancestors of the Chiwere Siouan-speaking peoples lived in Minnesota for 700 years or more (Dobbs 1990b:25). Some Late Precontact archaeological sites in southeastern Minnesota have been connected to the Ioway, while some in the Blue Earth River valley have been tentatively connected to the Otoe. Ethnographic studies have linked Oneota people with Siouan-speaking tribes such as the Ioway, Oto, Missouri, Winnebago, Osage, and Kansa (Anfinson 1997:90).

In particular, Orr Phase ceramics of the Oneota period have been linked to the Ioway (Dobbs 1990a:187). According to Dobbs (1990b:25), "It is conceivably possible that the extensive Oneota materials around Red Wing may also represent ancestral Chiwere Siouan peoples."

EASTERN DAKOTA

At the time that EuroAmericans began to enter the region, the greater portion of what would become northern and central Minnesota was occupied by the Santee or Eastern Dakota. While the Santee Dakota were concentrated near Lake Mille Lacs during the 1700s, Dakota villages were also documented at Sandy, Red, Cass, Leech, and Winnibigoshish lakes; but as early as 1689, European explorers' accounts indicate that the Dakota were also living in and using the region as far south as the mouth of the Minnesota River (Lettermann 1969:13-14). Over the 200 years following initial EuroAmerican contact, numerous shifts occurred in the geographic arrangement of Native American groups within Minnesota due largely to the gradual movement of the Ojibwe into the region and the simultaneous gradual shift of Dakota lifeways from the woodlands of northern Minnesota to the prairies and plains of the southern and western portions of the state.

The Ojibwe presence was part of a continuing westward migration that had come up the Saint Lawrence River and around the Great Lakes. This movement was motivated in part by the fur trade with the French. After the beaver population had diminished in the La Pointe region of northern Wisconsin (a location the Ojibwe wrested from the Dakota and the Fox while moving westward along the southern shore of Lake Superior), the Ojibwe "radiated in bands inland, westward and southward towards the beautiful lakes and streams which form the tributaries of the Wisconsin, Chippeway, and St. Croix rivers, and along the south coast of the Great Lake to its utmost extremity, and from thence even inland unto the headwaters of the Mississippi" (Warren 1984 [1885]:126). Here their migration stopped in the region where they found the prophesied "food that grows on water" (wild rice). By the early 1800s, "the Mississippi Headwaters and most of the lake-forest region of Minnesota was occupied and controlled by [Ojibwe] people" (Dobbs 1990b:47), and "the Eastern Dakota were established at a series of villages along the Minnesota and Mississippi rivers" (Dobbs 1990b:34). The Santee Dakota are divided into four sub-divisions: Mdewakanton, Wahpeton, Wahpekute, and Sisseton. During the initial contact period, the Mdewakanton Dakota occupied the lower Minnesota and Mississippi river valleys, including the general vicinity of the APE.

THE DAKOTA VILLAGE AT RED WING AND EUROAMERICAN EXPLORATION

Among the Mdewakanton Dakota villages was a community that resided near the head of Lake Pepin. The hereditary leader of the band was called *Koo-poo-hoo-sha* [*Khupahu*, wing; *sha*, red] or *Hhoo-pa-hoo-doo-ta* (the Wing of Scarlet), from the swan's wing, dyed scarlet, which he carried, or *L'Aile Rouge* (Red Wing) in French (Curtiss-Wedge 1909:529; Upham 2001:212). At least four leaders bore this name, each being distinguished by another given name (e.g., *Tatanka-mani* [Walking Buffalo], *Wacouta* [Shooter]) (Long 1978[1823]:79fn2). While the exact location of the band's village changed over time, it is primarily associated with the plain occupied by modern-day Red Wing. This area of Red Wing is known to the Dakota as *Rhemnicha* or *Khemnichan* (hill-water-wood place or the "hill that appears as it were in the water"), a name that is

associated with Barn Bluff. The village's proximity to the bluff, which is known in French as *La Grange* (Barn), is frequently noted in early accounts (Hodge 1907 v1:678; Hodge 1907 v2:365; Nicollet 1976:255).

While French fur traders explored the Mississippi River and established posts at Prairie Island and in the Lake Pepin area (Dobbs 1990b:64), the earliest accounts of the Dakota village at Red Wing date to the period of EuroAmerican exploration of the river valley. Explorer Zebulon Pike provides one of the earliest accounts of the Dakota village at Red Wing, which he encountered on September 18, 1805, while traveling up the Mississippi River. He places the location of the village at the junction with the Canoe (Cannon) River. Here, he says, "was a small band of Sioux, under the command of Red Wing, the second war chief in the nation" (Pike 1902:376). On September 23, the leader of this band, Tatankamani (Le Boeuf-qui-Marche, Walking Buffalo) was present at the signing of Pike's 1805 Treaty with the Sioux (Pike 1902:380fn, 381). Returning downriver the following spring, Pike stopped on April 13th at "the band of the Aile Rouge" and remained there for a day before departing on the 15th (Pike 1902:412). While at the village on the 14th, he "ascended a high hill called the Barn, from which we had a view of Lake Pepin. The valley through which the Mississippi by numerous channels wound itself to the St Croix; the Cannon River and the lofty hills on each side" (Pike 1902:413).

Twelve years later, when explorer Stephen H. Long traveled the Mississippi River in July of 1817, he encountered two villages in the Red Wing area. The village of "Red Wing, the elder," was located approximately a half-mile upstream from present-day Barn Bluff, while the "large encampment" of "Red Wing, the younger," was located farther downriver at Sand Point near present-day Frontenac (Long 1978[1823]:63-64; 64fn30, 81). In his journal entry of July 18, Long provides the following description of the village at Red Wing and nearby Barn Bluff (Long 1978[1823]:78-79):

> We lay by a while at a Sioux Village 4 ½ miles above Lake Pepin in order to catch some fish, as we had nothing left of our Provisions but flour. Our whiskey also was all expended, & we had two hundred miles farther to go before we could obtain a fresh supply. Caught three very fine cat fish & killed a few pigeons.
>
> The village was kept in very nice order, exhibiting more signs of a well regulated police than any one I have met with on the voyage, with the exception of the Little Raven's before mentioned. The name of the chief of this village is Red Wing the elder. He and all his band were on a hunting tour at the time we were there.
>
> During our delay at this place, Mr. H[empstead] & myself ascended a hill about ½ mile far[ther] down the river called the Grange, or barn, of which it has some faint resemblance. Its length is ¾ mile & its height about 400 feet. Its acclivity on the river side is precipitous, that on the opposit very abrupt. It is completely insulated from the other hilands in the neighbourhood, which is also the case with many others within a moderate distance tho' not in quite so remarkable a manner; for this is not only surrounded by valleys, but is also nearly insulated by water, an arm or bay [Colvill Bay] of the river entering at the lower end of the hill & extending within 3 or 4 hundred yards of the river above.

> Immediately upon the highest part of the Grange is one of the numerous artificial mounds that are to be met with in almost every part of the western world. Its elevation above its base, however, is only about 5 feet...

On August 19, 1819, Colonel Leavenworth's expedition to establish Fort Snelling stopped at Red Wing's village, but no description of the village or its setting was given (Forsyth 1880:153). In a separate letter, though, Thomas Forsyth, who was on the expedition, notes, "I next halted at a place called the Ground Barn, at the village of Red Wing..." (Forsyth 1880:165). The next year, Stephen Kearny was part of a party that arrived at the Red Wing village on the evening of July 22. He describes the village as having been "established about 10 years since" (Porter 1908:23).

Not even two weeks later, Henry Schoolcraft's expedition stopped at Red Wing's village on August 3. Schoolcraft states that the village is "handsomely situated on the west banks of the river, six miles above Lake Pepin" and "consists of four large, and several small lodges, built of logs" (Schoolcraft 1821:323). He also observed "several fine corn fields near the village" and "several buffalo skins which were undergoing the Indian process of tanning," which consisted of the hides being "stretched out upon the ground and covered with a decoction of oak and other bark" (Schoolcraft 1821:323). Like Long, Schoolcraft also climbed Barn Bluff, which he places "half a mile east of Red wing's village" and describes as "an isolated mountain, standing upon the brink of the river, called the Grange, from the summit of which you enjoy the most charming prospect" (Schoolcraft 1821:324). He further states, "The altitude of this mountain cannot fall short of eight hundred feet above the bed of the river. It presents an abrupt mural precipice towards the Mississippi, but slopes off gradually towards the south, and is covered with grass, and a few scattering oaks" (Schoolcraft 1821:324-325).

In 1823, Stephen H. Long again came up the Mississippi River. On the evening of June 20, the expedition camped "about 100 yards above Red-Wing's village" (Long 1978 [1823]: 149; Colhoun 1978 [1823]:273). Before departing on July 1, members of Long's party were invited to the chief's lodge, which is described as "a large bark cabin" (Colhoun 1978 [1823]:274). William H. Keating, who was also part of the Long expedition, published his own account, in which he describes Barn Bluff as "a singular hill" located "immediately below the village" (Keating 1824:286). Party member James E. Colhoun's detailed description of the topography upon the departure of Long's group indicates that the village was located one mile to the east of present-day Hay Creek (Colhoun 1978 [1823]:278). The population of the Dakota village at Red Wing was estimated to be 200 in 1823, and 300 in 1852 (Beltrami 1828:206; *Minnesota Gazette*, February 21, 1857). During the 1840s, lodges in the village numbered approximately 22 (Williams 1920:262), and they were arranged, according to missionary Joseph W. Hancock, "along the river bank near what is now Main street, between Bush and Potter streets" (Curtiss-Wedge 1909:530). A cemetery with scaffold burials was observed nearby (Folsom 1888:595-596). In 1849, the Dakota community was "cultivating considerable ground" (Williams 1920:262). The wattle-fenced cornfields extended "some sixty rods east and west" of the spring-fed creek, later known as the Jordan, which flowed through a ravine down to the river, where its mouth provided a harbor for canoes (Curtiss-Wedge 1909:530). The Mdewakanton Dakota village remained at Red Wing until the fall of 1853, when in compliance with the Treaty with the Sioux of 1851 its

occupants were removed to a reservation in the Minnesota River valley (Westerman and White 2012:197).

EARLY EUROAMERICAN PRESENCE AT RED WING, 1836-1853

The land that encompasses Red Wing was not available for EuroAmerican settlement until the 1851 treaties with the Dakota went into effect, yet a small, permanent EuroAmerican presence was introduced at Red Wing in the decades preceding the treaty signings, as missionaries, government farmers, and traders established homes there.

MISSIONS AT RED WING

Among the first to arrive was the family of missionary Samuel Denton in 1836. From that year until 1846, he and fellow missionary Daniel Gavin and their families operated a mission under the auspices of the Committee of Missionaries of Lausanne, Switzerland (Folwell 1921:203). In the spring of 1837, the Reverend Alfred Brunson, while ascending the Mississippi River on the steamboat *Pittsburg*, found that Gavin had established a mission at the mouth of the Trempeleau River, while Denton was located at the Dakota village at Red Wing (Brunson 1879:70, 74) (Figure 7). Of Red Wing, Brunson wrote:

> "The mission house was at the foot of a hill running some three or four miles down the river, a singular formation of nature, being one continuous ridge, nearly perpendicular on both sides. At the west or upper end is a cliff of perpendicular rocks, which, from its shape and size, is called "the barn rock."

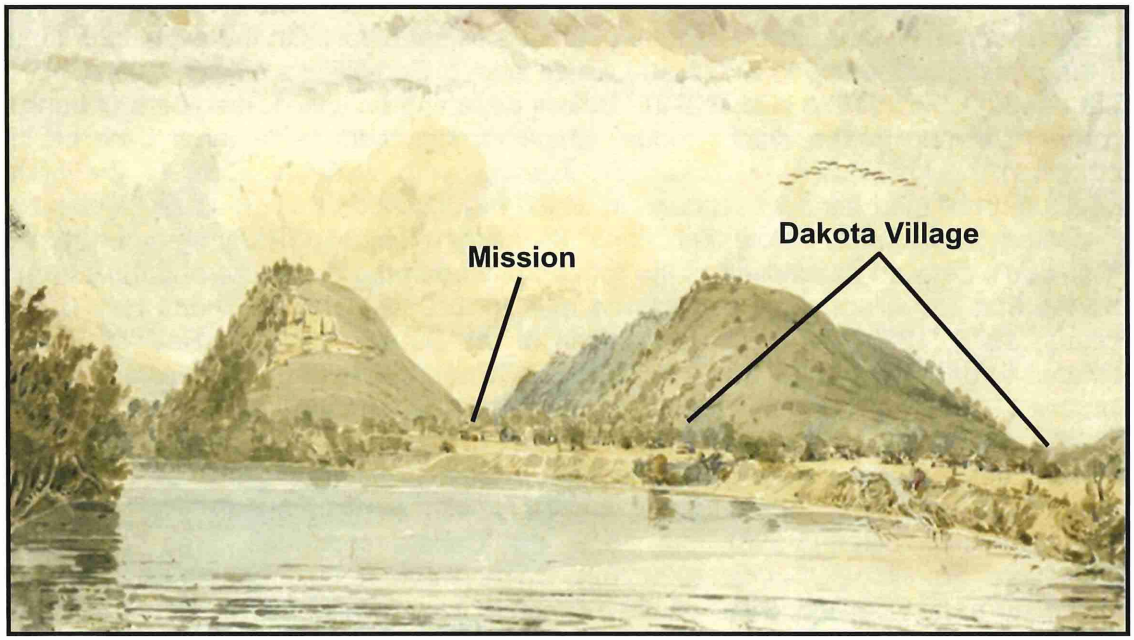


FIGURE 7. RED WING'S VILLAGE BY SETH EASTMAN, C. 1847 (MHS NEG. NO. 12957)

Before settling at Red Wing, Denton married Paris Skinner, who had been working at the mission school at Mackinaw, and, in 1839, Daniel Gavin married Lucy Cornelia Stevens, of the Lake Harriet mission (Riggs 1894:134). From 1839 until 1845, both families resided at the Red Wing mission in "two substantial log houses" that are reported to have stood "near what is now Bush street, about one-third of the distance from Third to Main street" (Curtiss-Wedge 1909:529) or "near the junction of Bush and Third streets" (Curtiss-Wedge 1909:530) (Figure B-3). Among the mission activities was a school for Indian children led by Mr. Gavin (Folsom 1888:595). In 1845, the poor health of Mrs. Gavin resulted in the departure of the Gavins from Red Wing (Riggs 1894:134; Folwell 1921:203). The Dentons remained through 1846, but also were soon forced to leave due to the failing health of Samuel Denton (Riggs 1894:134).

In 1848, a new mission was begun at Red Wing under the auspices of the American Board of Commissioners of Foreign Missions (Folwell 1921:204). The Reverends Joseph W. Hancock and John F. Aiton were assigned to the mission (Riggs 1894:154; Folwell 1921:204). Aiton arrived before Hancock, who came with his wife and child in 1849 (Hancock 1893:49). It is not known how long John Aiton remained at Red Wing, as he is not recorded in the 1850 census of what was then Wabasha County in the Minnesota Territory. The Hancock household in that year consisted of Joseph (34) and his wife Martha (30), their two-year-old daughter, and their one-year-old son. Mrs. Hancock died the following March (Hancock 1893:52).[1] In 1853, when the Dakota people who resided at Red Wing were forced to remove to the Lower Sioux Agency in compliance with the 1851 Treaty with the Sioux, Joseph Hancock remained at Red Wing, where he organized and led the First Presbyterian church (Riggs 1894:155).

GOVERNMENT FARMER AND TRADERS

According to the census of the Territory of Minnesota taken in 1849, 33 EuroAmericans (20 males and 13 females) were residing at Red Wing (Seymour 1850:280), near the approximately 22 Dakota lodges also present during this period (Williams 1920:262). Prior to the 1851 treaty, only those working amongst the tribes in an official capacity were permitted to be in the territory. Besides the aforesaid missionaries, the EuroAmerican population at Red Wing included John Bush, a government farmer assigned to the Dakota village, as well as traders. It is unclear when Bush's appointment began (Folsom 1888:595); however, he was at Red Wing by 1845 and continued in residence there through 1852, when his household consisted of his 27-year-old wife Charlotte, a 12-year-old by the name of Robert Baker, and a 27-year-old laborer named Louis Chavion (Hancock 1893:34).

The traders present at Red Wing included Joseph "Jack" Frazer, whose home was listed among the log buildings present at Red Wing in 1849 (Folsom 1888:595). Frazer was raised at the Mdewakanton Dakota village at Red Wing, being the son of a Scottish fur trader and a sister of Wacouta, leader of the Red Wing band (Gilman 2004:69). In July of 1846, Charles Lanman stayed at a trader's cabin near Red Wing's village, and although he does not give the name of the trader, it was likely Frazer (Lanman 1847:51). By 1850, Jack Frazer no longer resided at Red Wing, according to the census of that

[1] While Mrs. Hancock was initially buried near the mission house, her remains were later removed to Oakwood Cemetery (Hancock 1893:53, 54).

year; rather, John Snow was the licensed trader to the community (Hancock 1893:35). The Snow household in 1850 consisted of John (48), his wife, Dainthy (48), and his son, John G. (15), as well as Sarah A. Bennett (23) and her presumed two children, Hanah (2) and Mary (8 mos.). Snow built a "trading house of logs near the river, using the upper part for a residence, while in the lower part he kept his Indian goods for sale" (Curtiss-Wedge 1909:531). In 1851, Calvin Potter entered into partnership with Snow and took over the operation at Red Wing when Snow died of cholera on a trip to St. Paul (Curtiss-Wedge 1909:531; Hancock 1893:35, 41). With the removal of the Dakota upon the ratification of the 1851 Treaty, a trading post was no longer needed at Red Wing (Hancock 1893:35).

HISTORICAL-PERIOD HISTORIC CONTEXTS

A variety of historical-period historic contexts have been created for the period of EuroAmerican settlement that commenced after the signing of the 1837 treaties in Minnesota. These contexts are temporal, regional, and thematic. The two statewide historic contexts developed by the MnSHPO for the historical period relevant to the Red Wing Bridge Project APE are "Early Agriculture and River Settlement, 1840-1870" and "Railroads and Agricultural Development, 1870-1940" (MnSHPO 1993).

EARLY AGRICULTURE AND RIVER SETTLEMENT, 1840-1870

Early EuroAmerican settlement in Minnesota and Wisconsin was concentrated along the rivers, which were not only a source of transportation, but also provided a source of power for mills. Townsites were formed along the rivers by speculators, townsite companies, and various groups, the latter often with a common ethnic or social heritage. Many of these towns became centers for the processing of agricultural products from the surrounding countryside, as well as offered a market for those products and a shipping point to other markets via the river.

The land that encompasses Red Wing was not available for EuroAmerican settlement until the 1851 treaties with the Dakota went into effect, yet as discussed in the preceding chapter, a small, permanent EuroAmerican presence was introduced at Red Wing in the several years prior to the treaty signings, as missionaries, government farmers, and traders established homes there. Then, in 1852, the EuroAmerican community at Red Wing experienced a sudden influx of land speculators anticipating the treaties' ratification. Claims were made by individuals such as the recently arrived John Day and Benjamin Young, as well as by those already present, such as John Bush and Calvin Potter. They were soon joined by William Sweney, his brother-in-law, William Freeborn, James McGinnis (McGuinness), and E. C. Stevens (Curtiss-Wedge 1909:532-533). The river facilitated the residence of those with intentions of speculation and permanency alike, allowing for the easy receipt of consumables and building materials from other locations as people established land ownership and sufficient living quarters. Andrus Durand, for example, had lumber brought down river from Stillwater to build Red Wing's first hotel, the Red House, at Main and Bush by the spring of 1853, giving new arrivals a place beyond tiny log cabins to reside while their homes were constructed (Curtiss-Wedge 1909:532-533) (Figure 9).

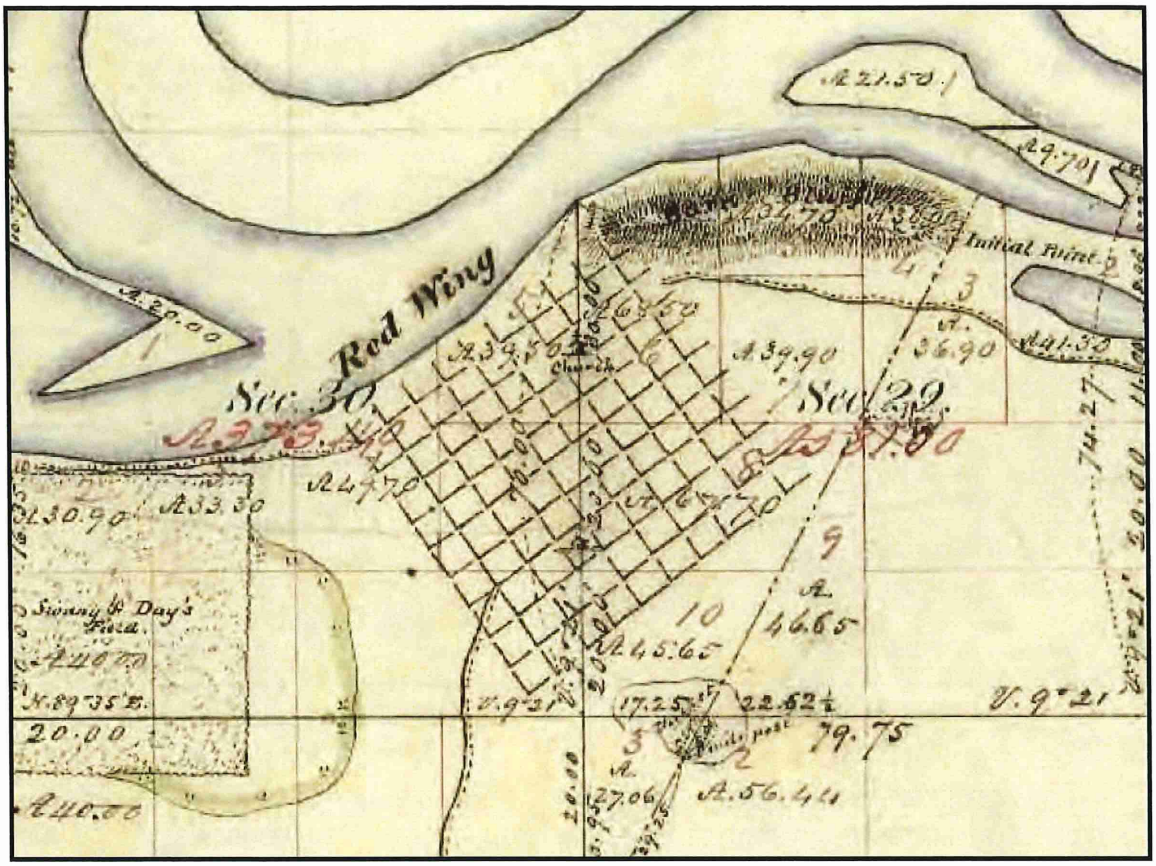


FIGURE 8. DETAIL OF RED WING FROM THE 1856 GENERAL LAND OFFICE SURVEY MAP

Among these new arrivals were a group of Scandinavians, the first EuroAmerican farmers without government ties in the county, who made their home in the adjacent township of Vasa beginning in August of 1853. Commercial farming was soon after begun within Red Wing proper and the surrounding rural areas (Curtiss-Wedge 1909: 534, 536), and the wheat grown in 1854 "was found to be of a most superior quality, and the marketing and shipping of this cereal gave Red Wing its first start as a business point" (Curtiss-Wedge 1909:537). According to Hancock (1893:187), by the late 1860s, Red Wing "was claimed to be the greatest primary wheat market in the world," a claim supported in 1874 by "disinterested authorities like the *Winona Daily Republican*, *St. Paul Press, St. Paul Pioneer* and various other journals" (*Red Wing Argus* February 12, 1874, quoted in Angell 1977:146). Whether or not this claim was valid on an international scale, as a river port in the years before the railroad, Red Wing was certainly positioned to be a large primary wheat market, as buyers had easy access to the town and could readily ship wheat once purchased. Beyond agriculture, Red Wing's natural resources and position on the river made it ideal for a number of other small-scale industries that readily took hold while the city grew in the mid-1850s and 1860s, including brick manufacturing, sawmilling, and flour milling early on, then pottery manufacture beginning in the mid-1860s (Curtiss-Wedge 1909:540-541; Red Wing Pottery 2012).

FIGURE 9. RED WING BY EDWIN WHITEFIELD, C. 1856-1859, (MHS NEG. NO. 53338)

As the City of Red Wing was taking form (Figure 10), Goodhue County was created from a portion of what had been part of Wabasha County, and Red Wing was made the county seat in 1853. Two years later, Red Wing also became the site of a federal land office, which began selling public lands to current and future residents of southern Minnesota in August of that year. In 1856, a wave of immigration stemming from states to the east and Europe reached Red Wing, setting off increases in the city's commercial, service, and institutional sectors as residents strove to fill the physical, practical, and cultural needs of themselves and others. While these increases were slowed by the Panic of 1857, Red Wing would rebound with the rest of the country (Curtiss-Wedge 1909:539-542). In the late summer of 1870, another wave of immigration brought over 1,000 new residents to the city, bringing its population to over 5,200 (Walker 1872:178; Angell 1977:149). This population by and large comprised Norwegian and Swedish immigrants, though strong German, British, and Canadian elements were also present (Angell 1977:150). With a sizeable population in place, and buildings containing everything from banks to billiard halls, churches to a courthouse, grocery stores to jewelry stores, and telegraph offices to newspaper offices (Curtiss-Wedge 1909:544-546), the urbanization of Red Wing was nearly complete by the end of the 1860s. However, what Red Wing needed to be truly viable, and freed from the limitations of the annually frozen river, was a railroad.

RAILROADS AND AGRICULTURAL DEVELOPMENT, 1870-1940

The City of Red Wing's earliest attempt at obtaining a railroad occurred during the 1863-64 fiscal year, when the city council "adopted a plan for surveying a railroad from Winona to St. Paul, the city offering to pay seven per cent interest to anyone who would advance money for the project," but there were no takers (Curtiss-Wedge 1909:552). Within a few years, however, the St. Paul and Chicago Railroad Company had been

incorporated to build a Mississippi River route from St. Paul to Winona, with construction beginning in St. Paul in 1869. This railroad connected Red Wing with Hastings in September of 1870, and was subsequently extended beyond Winona to La Crescent in 1872, just after the St. Paul and Chicago was purchased by the Milwaukee and St. Paul Railway Company, which became the Chicago, Milwaukee, and St. Paul (CM&StP) in 1874 (Prosser 1966:140, 158; Angell 1977:144). The riverside line was part of the CM&StP main line from Chicago, and by the early 1880s, it extended beyond Minneapolis to South Dakota (Prosser 1966:12), linking Red Wing not only to the urban centers of the Twin Cities and Chicago, but also to inland agricultural markets and wheat sources to the west.

While the spread of the railroad network across Minnesota and beyond resulted in the waning of Red Wing's status as a primary wheat market, it remained an important grain shipment center, and the introduction of the railroad to the city further spurred its economic development by allowing for a substantial expansion of milling and other industries, as well as connections to new markets. The railroad's route through Red Wing closely paralleled the Mississippi River. The proximity of the rail corridor and steamboat levee allowed industrial concerns located along the riverfront to take advantage of both methods of transportation. In 1873, Bluff Mill was constructed at the northwest foot of Barn Bluff. Between 1873 and 1877, several additional mills (Bluff, Diamond, Red Wing, and La Grange) were constructed along the city's rail line (Angell 1977:153-154; Hancock 1893:218). By 1880, large grain warehouses belonging to other concerns lined the railroad between the Red Wing and La Grange mills (Shober and Carqueville 1880). Other 1870s enterprises not located directly on the railroad were established nearby in the city's quickly growing downtown. These businesses included numerous retail stores that received their wares via the railroad, factories that obtained raw materials and shipped finished goods via rail, and hotels that enjoyed a substantial new clientele of rail passengers. Of note is the St. James Hotel, financed through a joint stock company by citizens of Red Wing and completed in 1875, after being deemed necessary to reflect the city's status as "one of the leading business centers of Minnesota and the Northwest" (Angell 1977:154).

Coinciding with the expansion of Red Wing's railroad network was an expansion in its manufacturing interests, which continued into the turn of the twentieth century, minus the approximately four-year period affected by the Panic of 1893. The period between 1880 and 1900 witnessed reflections of the economic strength of Red Wing's industrial sector, such as the formation of the Red Wing Manufacturing Company in 1882; a successful lime and stone industry, between the establishment of the Twin City Lime and Cement Company in 1890 and the expanded operations of Gustaf A. Carlson, who ran spur lines to the railroad from his two stone quarries and twelve lime kilns; the 1885 reconstruction of the La Grange Mills after an 1883 fire took its main competitor, the Red Wing Mills, leading to an expanded production rate of over 200,000 barrels per year in the 1890s; and the establishment of the advertising paraphernalia manufacturer Sultzer, Shedd & Livingston, predecessor to the Red Wing Advertising Company (1902), whose flood of business necessitated moving six times in ten years, until the company constructed a large, four-story building at the intersection of Potter and Main in 1905 (Hancock 1893:218, 220; Curtiss-Wedge 1909:633, 968; Angell 1977:172, 174-176, 202).

The period between 1880 and 1900 additionally saw the city's first creamery, built in 1885 and not a moment too soon, as a series of chinch bug invasions beginning in that year forced a transition by the area's farmers from a concentration on wheat to diversified farming. By the mid to late 1880s, dairy farming was a solid component of this diversification, which also included the cultivation of crops like oats, potatoes, and flax, crop rotation between grains and plants such as clover and timothy, and a substantial growth in the raising of livestock (Rasmussen 1933:129-130, 136, 149-150; Angell 1977:233). As Red Wing transitioned into the twentieth century, barley became a major focus of farming in the area, overtaking wheat for several years as the major crop in Goodhue County (Angell 1977:248). The raising of other crops in addition to wheat was such a success that three new, large grain processing plants joined La Grange Mills along the railroad in 1901, these belonging to the Red Wing Linseed Mills, the Red Wing (later Fleischmann) Malting Company, and the Simmons (later Red Wing) Milling Company (Curtiss-Wedge 1909:635; Rasmussen 1933:156). The addition of these plants likely played into the decision by the CM&StP to build a separate passenger depot and replace the former combination depot with a freight house in 1904.

Despite the success of diversified farming, its practice in the vicinity of Red Wing was largely abandoned during World War I due to the promotion of and higher prices realized by food crops, and the push for associated products was undoubtedly a boon to local milling interests. The shift back to these crops without appropriate rotation, however, had a deleterious effect on the soil quality in Goodhue County overall, and it therefore ended shortly after the war did (Angell 1977:273). At that time, steamboats largely were phased out, leaving the railroads to do the bulk of grain transportation and other types of shipments in and out of Red Wing.

During the time that diversified farming was on the rise before the turn of the century and into the war era, Red Wing's commercial sector underwent some fluctuation before settling into a pattern of general stability. Although the built environment of downtown Red Wing was largely filled in by the 1880s (Shober and Carqueville 1880), fire insurance maps dating to 1884 and 1891 show that sometime between those years, a relatively high number of its commercial buildings were vacated. On Block 39, for example, which was one of the worst cases, 10 of the 24 commercial addresses that had been occupied in 1884 were vacant in 1891, some of which were then demolished before 1895 (Sanborn Map Company [Sanborn] 1884, 1891, 1895). Shortly thereafter, though, the commercial area was revived, and it continued to thrive and provide diverse goods and services beyond the First World War and into the late 1920s (Sanborn 1902, 1910, 1917, 1927).

As the 1920s drew to a close, Red Wing, like the rest of the country, was staring into the Great Depression, although it did not have a strong effect there until the local population began to run out of its conserved finances in 1931 (Rasmussen 1933:203-204). Even then, the industrial sector remained viable; although work forces were reduced, none of the city's major industries were forced to shut down, though the Red Wing Advertising Company came close (Angell 1977:306, 309-310). Thanks to the continuation of the grain processing plants, the economy of Red Wing received a major boost with World War II, but it did not only assist agricultural interests. Other Red Wing industries were also called upon for increased wartime production, such as Meyer Machine and the S. B. Foot Tanning Company, and as the economy recovered during the 1940s, 26 new commercial or service enterprises made Red Wing their home (Angell 1977:340, 344).

GAS LIGHTING, GASIFICATION, AND THE RED WING GAS LIGHT COMPANY AND ITS SUCCESSORS, 1872-1950

In order to assess the historical significance of potential archaeological resources associated with a gas works and electrical plant located within the TH 63 Bridge Project's archaeological APE, the following additional historic contexts were developed.

Gas Lighting and Gasification Plants in the United States

In 1806, a home in Newport, Rhode Island, became the first in the United States to be lit by gas as a result of experiments conducted by its owner in that year (Mattausch 1998). This event represented a very early foray into a technology that would not take hold in this country until after its utility and safety were demonstrated through its use in Rembrandt Peale's museum in Baltimore, C. W. Peale's museum in Philadelphia, and gas streetlight experiments in New York City. Although Baltimore built the first gasworks in the United States in 1816, other cities were reticent to immediately follow suit, citing concerns about leaks, explosions, odors, and expense (Pratt and Nolte 1998:6, 8). Eventually continued experimentation and the successful use of gas lighting in Europe, combined with public demand to replace dim and smoky oil lamps, propelled the gas illumination industry. The New York Gas-Light Company and the Boston Gas Light Company were both chartered in 1823; the New York company constructed its works within the next two years, and the Boston company would follow in 1827-1828 (*Gas Lines* 1972; Burrows and Wallace 1999: 439). From this time forward, gas illumination, and therefore the building of gas works, gradually and then rapidly gained momentum in the United States, with Minnesota getting its first gas works, in St. Paul, in 1857 (Goodrich 1866). In the vast majority of cases, coal gas was the type of gas manufactured in these facilities, which would eventually supply gas for cooking and heating in addition to lighting.

Coal gas works, although varying in scale and appearance, were standard in their components. A retort house held the retorts, the apparatuses in which coal was heated as the first step in producing gas, within retort benches. The smoke generated in this step was routed to a condenser via a pipe partially filled with water, and, in the condenser, many of the volatile components formed a dark amber liquid that was subsequently drained into a tar pit. The remaining gas was sent to an ammonia washer to remove the ammonia content. The ammonia content was drained off into a pit, usually the tar pit, while the gas was sent to purifiers, metal boxes holding wood planks covered in peat with iron oxide, for removal of the sulphur dioxide content. Sometimes the purifiers were set up outside on the grounds of the gas works; other times, they were housed within a building. From the purifiers, gas was moved to a large tank(s) known as a gasholder, or early on, a gasometer, where it was stored and from which it was distributed to underground mains (Smith 2003). Gasholders could be constructed either entirely above ground or with subterranean bases, the latter particularly in areas where clay was present to serve as a seal for the base of the gasholder (Pratt and Nolte 1998:30). Gasholders, particularly early on, were typically within gasholder houses, structures that housed the tanks to protect them from the elements, prevented "freezing of the water in the holder pit that formed a seal to prevent loss of gas, while allowing the holder to rise and fall" (Waite 1969:3), while also promoting a sense of security among the general public, and constituting a pleasing visual element in an operation that was often considered a nuisance.

With the advent of electricity came significant competition and a drop in profitability for gas companies, which led in the late nineteenth and early twentieth century to mergers between gas companies or between gas and electrical power companies who sometimes then combined their facilities (Wellman 2011). Coal gas, however, remained an important energy source, with over 1,000 gas works still present nationwide in the 1930s (Smith 2013). Some coal gas works were converted to oil gas works during the late 1950s and early 1960s, but it was natural gas that would ultimately spell the demise of coal gas works. Although natural gas had been tapped into earlier, after World War II, the mass construction of pipelines became possible through metalworking techniques developed during the war. With the expanding distribution of these pipelines and the accompanying development of natural gas locations, nearly all of the coal gas works in the country closed by 1970 (Smith 2013; United States Department of Energy 2013).

The Red Wing Gas Light Company and Successors, 1872-1950

The Red Wing Gas Light Company was formed in May of 1872 by four of Red Wing's leading citizens, Lucius F. Hubbard, William W. Phelps, Joshua C. Pierce, and Theodore B. Sheldon, along with a Charles Nash of Milwaukee. Work commenced immediately on the construction of a plant, sited between 3rd and 4th streets east of Bluff Street, and on the laying of wooden gas mains:

> . . . from the plant on Bluff Street to Main, on Main to Broadway, up West Avenue to 5th Street and up 5th to Dakota, on 4th Street from West Avenue to Hill Street, on 3rd Street from West Avenue to Cedar, on Bush Street from Main to 5th and on Plum Street from Main to 4th Street [GCHS Vertical File – Public Utilities - "History of Red Wing Gas Manufacturing and Distribution," typed manuscript].

The plant featured a stone retort house and a repair shop, with an attached coal house on the east and two successively adjacent sheds on the south, along with a single gasholder in a detached wooden gas house. On February 11, 1873, the first gas streetlights in Red Wing went into use. Approximately four years later, cast iron mains replaced the original wooden ones (Meyer 1972:125).

Circa late 1888, following the national trend of merging utility companies, the Red Wing Gas Light Company purchased the Red Wing Electric Light and Power Company to form the Red Wing Gas and Electric Company. The Red Wing Electric Light and Power Company had previously formed in July of 1888 to purchase the Globe Electric Light and Power Company, which had been powering Red Wing's first electric streetlights since 1887. Under the new name, the Red Wing Gas and Electric Company removed the eastern shed building between 1891 and 1895, then subsequently removed the western shed building circa 1896 when a purifier house was placed in its location. The purifier house marked the north end of a new brick complex constructed in 1894 that also included, from north to south, a meter room; a new retort house, the earlier one having been converted to a pipe shop; a new boiler room; and a room of unidentified function (Figure 10). The latter room would house the company's electrical plant once it was moved from a location on Plum Street in 1901. Beyond this complex to the east and southeast were added an underground tar tank and two one-story buildings, as well as a 30,000-cubic foot gasholder in a wooden gashouse (Sanborn 1891, 1895, 1902; Meyer 1972:125) (Figure 11).

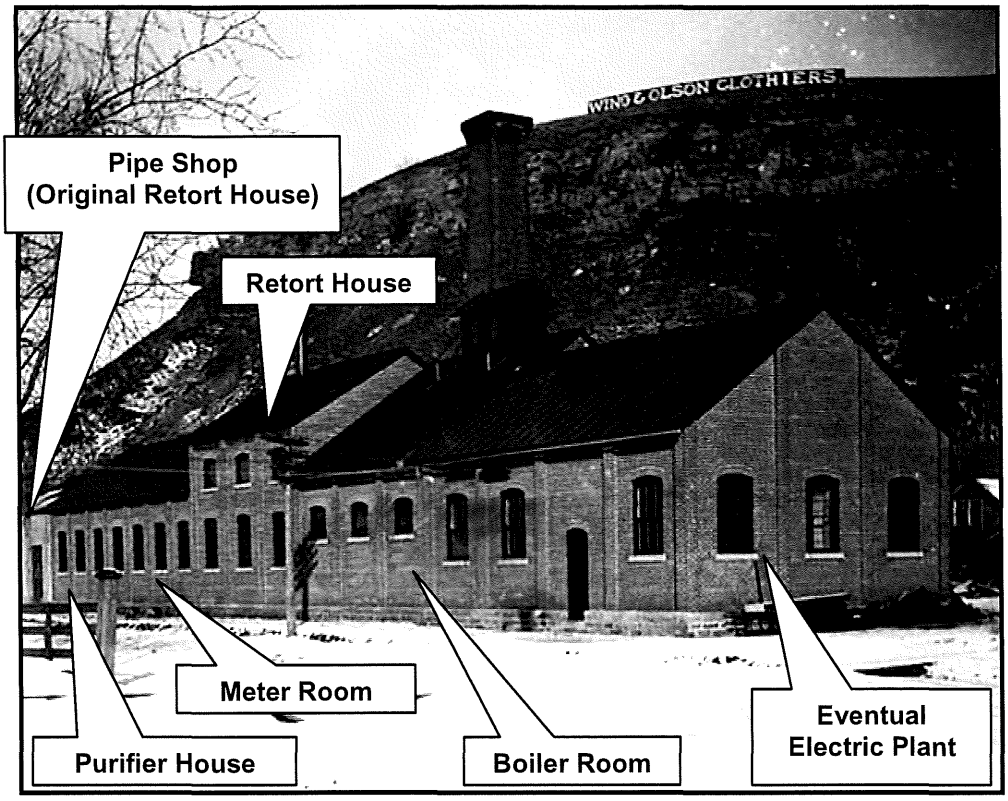


FIGURE 10. RED WING GAS AND ELECTRIC COMPANY PLANT, 1897 (MHS NEG. NO. 18815)

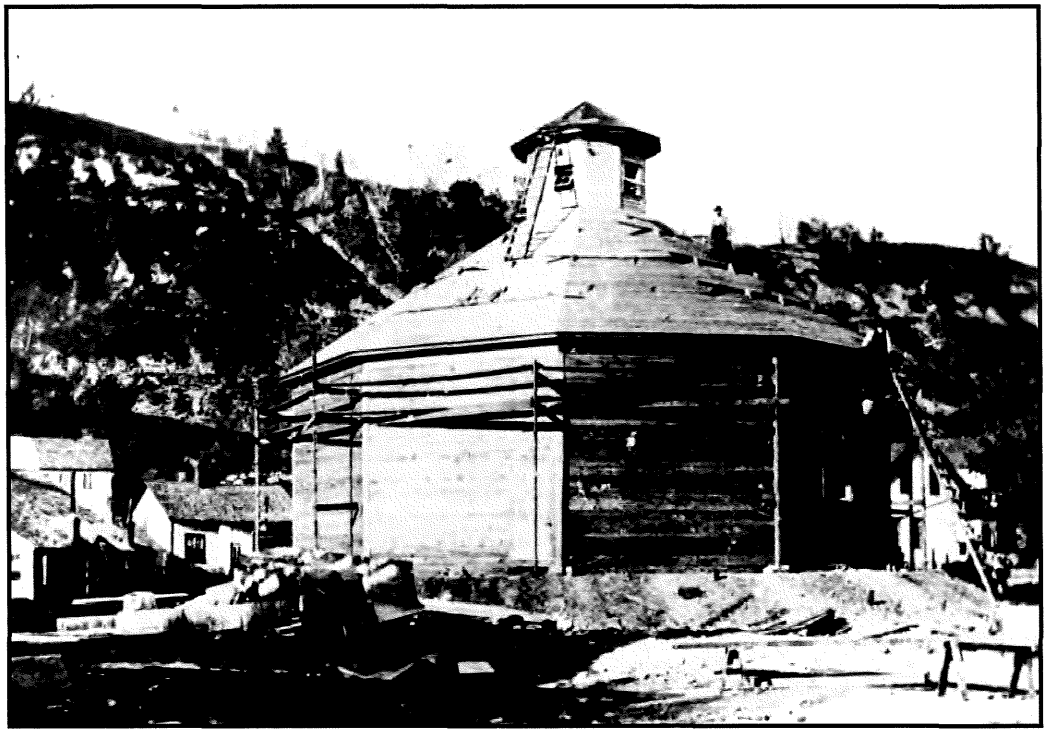


FIGURE 11. GAS HOLDER CONSTRUCTED IN 1894 AT BLUFF AND 3RD STREETS (GOODHUE COUNTY HISTORICAL SOCIETY IMAGE 1.2.4053)

In 1902 and 1906, additional retort benches were added, leading to the expansion of the retort house to the east and hence the removal of the tar tank and one-story buildings, while in 1904, a new 150,000-cubic foot gasholder sans gashouse was built just south of the 30,000 cubic-foot one (Sanborn 1910; Meyer 1972:125). Around the same time, an extension was made to the south end of the brick complex, to accommodate a transformer room. In the midst of this period of construction, The Red Wing Gas, Light and Power Company was incorporated in December of 1905 by individuals from Red Wing and Michigan, and this new company bought the Red Wing Gas and Electric Company and assumed its operations (Meyer 1972:125).

Into the period of ownership by the Red Wing Gas, Light and Power Company, the plant had been Red Wing's sole power source, but in 1909, a transmission line was brought into Red Wing from Menomonie, Wisconsin, by the Chippewa Valley Railway Light and Power Company. By way of purchase by another company, Chippewa Valley, along with the Red Wing Gas, Light and Power Company, were bought by the Wisconsin-Minnesota Light and Power Company, which had been formed by Michigan interests. Under this company, the original and long-abandoned gashouse constructed by the Red Wing Gas Light Company was used as a tar well, and the retort house was expanded yet again (Sanborn 1917; Meyer 1972:125-126). Finally, in 1923, Northern States Power Company (NSP) purchased the Wisconsin-Minnesota Light and Power Company and made substantial equipment upgrades to eliminate electrical service interruptions, while retaining largely the same physical layout of the plant (Sanborn 1927, 1943; Meyer 1972:126).

NSP discontinued the manufacture of coal gas in 1950 and the plant site:

> ...was converted to a service center. Propane gas then natural gas were supplied to customers instead, and in 1952 NSP built a new garage.
>
> The coal gasholders were demolished; parts of the metal structures were flattened and used along with construction debris to fill the holes. The coal tar tank, too was covered over and left about half full [Nerhaugen 1995].

CHAPTER 5 . NORTH OF THE RIVER SUB-AREA

The North of the River sub-area is that largely undeveloped portion of the TH 63 Bridge Project's archaeological APE that is located on the Wisconsin side of the Mississippi River (Figure 12). The boundaries of the North of the River sub-area were the same for the pre-evaluation study and the Phase I archaeological survey. The sub-area is currently occupied by a private campground east of the TH 63 bridge and by the Harbor Bar near the west end of the sub-area. Between the bar and the bridge are a cluster of seasonally occupied mobile homes and a house, all of which are just north of a levee that was partially created in the late 1960s when the bar owner had dredge disposal placed there. However, aerial photographs show that a substantial amount of filling to extend the riverbank to the south also occurred between 1938 and 1949. A causeway created for the 1960 bridge carries TH 63 across Mud Lake in the northern portion of the sub-area. The North of the River sub-area is otherwise wooded or inundated.

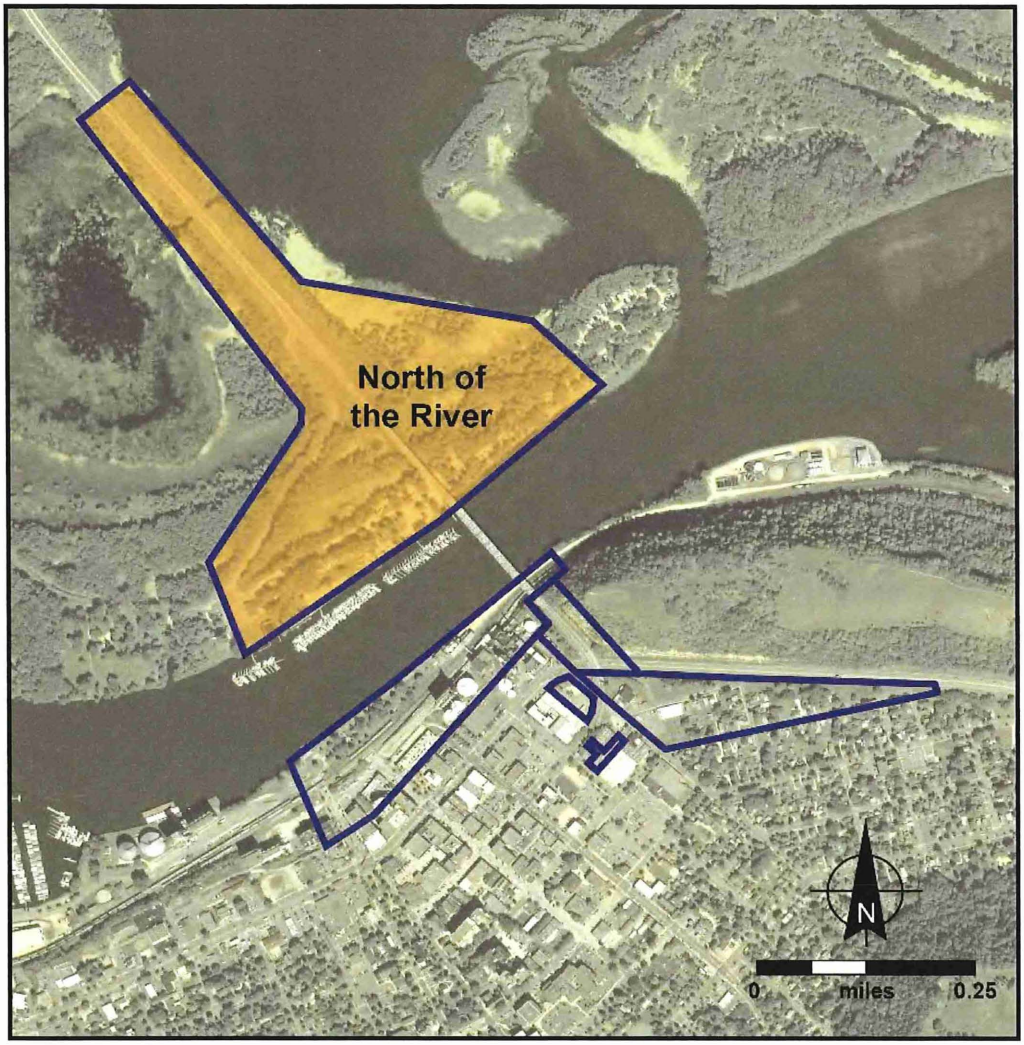


FIGURE 12. NORTH OF THE RIVER SUB-AREA OF THE ARCHAEOLOGICAL APE

HISTORICAL BACKGROUND

As the majority of the North of the River sub-area is either a constructed landform or inundated, areas of archaeological potential are limited to a narrow strip of land known as Trenton Island that forms the north shore of the river opposite Red Wing. Ferry connections provided passage across the river to the island from whence a wagon road and another ferry provided connections to Hager City and points beyond. Structures on the island are illustrated in an 1880 panoramic drawing and an 1890 map of the river (Shober and Carqueville 1880; Mississippi River Commission 1890)(Figure 13).

Trenton Island had a notorious reputation in the late nineteenth and early twentieth centuries due to the presence of a brothel and a few saloons. Newspaper accounts report that the first incarnations of these establishments burned in the early 1880s, but not long after new ones were built. Then, in September of 1908, the brothel and two saloons then operated by Charles and May Cook on their four-acre property were raided by the Pierce County sheriff with the assistance of 14 other men. The Cooks, some of their employees, and perhaps also customers, were taken into custody. Shortly thereafter, the buildings associated with the operations were dismantled, and the acreage deeded to the City of Red Wing for the creation of a park (*Red Wing Republican Eagle* 1908, 1909, 1976). Despite these well-known events, which have been revisited repeatedly by local media and businesses (e.g., *Red Wing Republican Eagle* 1976; Island Camping and Marina 2012; Harborbar.net 2012), the history of Trenton Island was somewhat more multi-faceted. In 1868, for example, a house was set up there for attending to cholera patients (Hancock 1893:237). During the same period in which the brothels and saloons operated, neighboring households enumerated in the census included primarily families, with occupations such as farmer, ferryman, domestic servant,

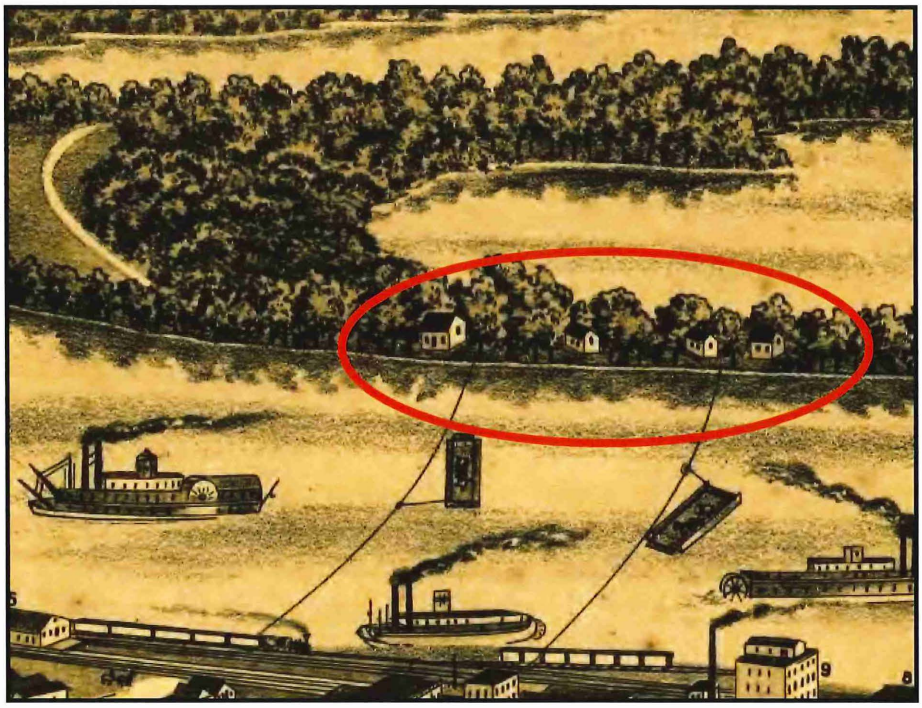


FIGURE 13. 1880 PANORAMIC MAP DETAIL SHOWING FERRY CROSSINGS AND TRENTON ISLAND STRUCTURES (CIRCLED)

dressmaker, laborer, ship carpenter, railroad worker, harness maker, barber, boat builder, mason, and carpenter present (U.S. Census 1880, 1900). In 1928, a "tourist camp was established on the island park" (Irvine 1941).

Today, the island is primarily a recreational site. Repeated flooding, particularly a disastrous flood in 1993, led to a government buyout from willing sellers and subsequent demolition of the majority of the residences on the island. Remaining uses within the archaeological APE include a campground, a bar and grill, an RV park, and a marina.

PRE-EVALUATION STUDY

During the pre-evaluation study, a single geologic core (11GD-01) to characterize this sub-area was taken within the Mud Lake causeway (Figure 14). Given its location the core largely documented road fill and provided no strong indicators of the potential for archaeological deposits. While the possibility for precontact or historical-period

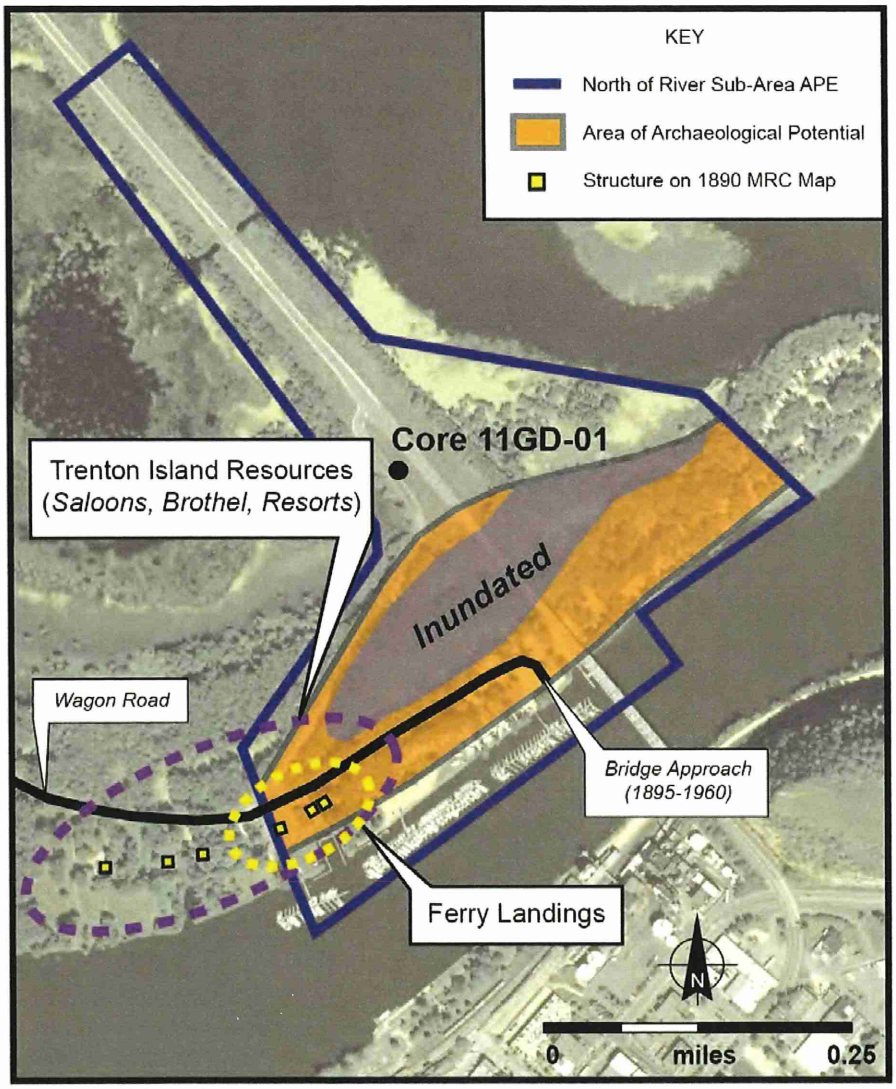


FIGURE 14. NORTH OF THE RIVER SUB-AREA PRE-EVALUATION STUDY RESULTS

materials to be present in the 1-2 m (3-7 ft.) of deposits below the road fill was noted, it was also suggested that these deposits "may be dredged materials placed here to help lower sags in the island landscape, or channel deposits" (Hudak 2011:15). Based on the overall characteristics of the floodplain landform sediment assemblage, the pre-evaluation geomorphological study concluded that the "near surface for the remaining majority of the floodplain landform sediment assemblage (away from the road fills) may contain either late prehistoric or historic materials" (Hudak 2011).

METHODS

Due to the depth of alluvial and dredge deposits on the island, shovel testing was not a feasible method for archaeological survey. In order to determine where archaeological deposits may be present within the North of the River sub-area, geomorphological coring was conducted by Strata Morph and observed by Two Pines' Principal Investigator, Andrea (Vermeer) Pizza, on December 18 and 19, 2012, April 15-18, 2013, and November 18, 2013. Field testing was conducted in areas of moderate to high potential for containing intact archaeological resources, as identified through the pre-evaluation study (see Figure 14). Due to landowner denial of access, field testing could not be conducted in the portion of the sub-area proximate to either side of the bridge approach. In addition, no testing was conducted near the piers of the existing bridge due to the presence of contaminated soils.

Although the original intent was for geomorphological cores to be advanced at regular intervals throughout the remainder of the sub-area, given the presence of structures and buried utility lines, only within the parking lot of the Harbor Bar could a regular grid be established. For comparative purposes and with the permission of the landowner, one core was advanced outside the west boundary of the archaeological APE on a topographically higher landform that seemed more likely to approximate the east edge of the documented historical-period occupations. Based on the results of the coring, in which buried soils were identified, trenching was conducted within the Gardas Locality per the MnDOT Deep Test Protocol (Commonwealth Cultural Resources Group 2006).

RESULTS

Within the area of archaeological potential within the North of the River sub-area, the parcels available for testing were those of the Harbor Bar and the neighboring Gardas property (Figure 15).

Harbor Bar Locality

Eighteen cores were extracted within the Harbor Bar parcel, which consists of a bar, parking lot, harbor, and marina. During coring historical-period and non-diagnostic artifacts were encountered in eight cores (Cores 1, 11, 9, 13, 20, 21, 24, and 30) within the Harbor Bar's parking lot and its vicinity (see Figure 15). Although the artifacts came from various depths and strata, some occurred within a silt loam stratum that was fairly consistent throughout the parking lot. This stratum as encountered during coring at depths ranging from 60 to 75 centimeters below the surface (cmbs) (24 to 30 in.) and it measured 5 cm (2 in.) or less in thickness. Artifacts in this stratum, which also often contained cinders, included one brown-glazed stoneware sherd dating to the nineteenth century and a few colorless glass fragments, as well as clinkers. Fill layers within the parking lot contained non-diagnostic artifacts, including fragments of

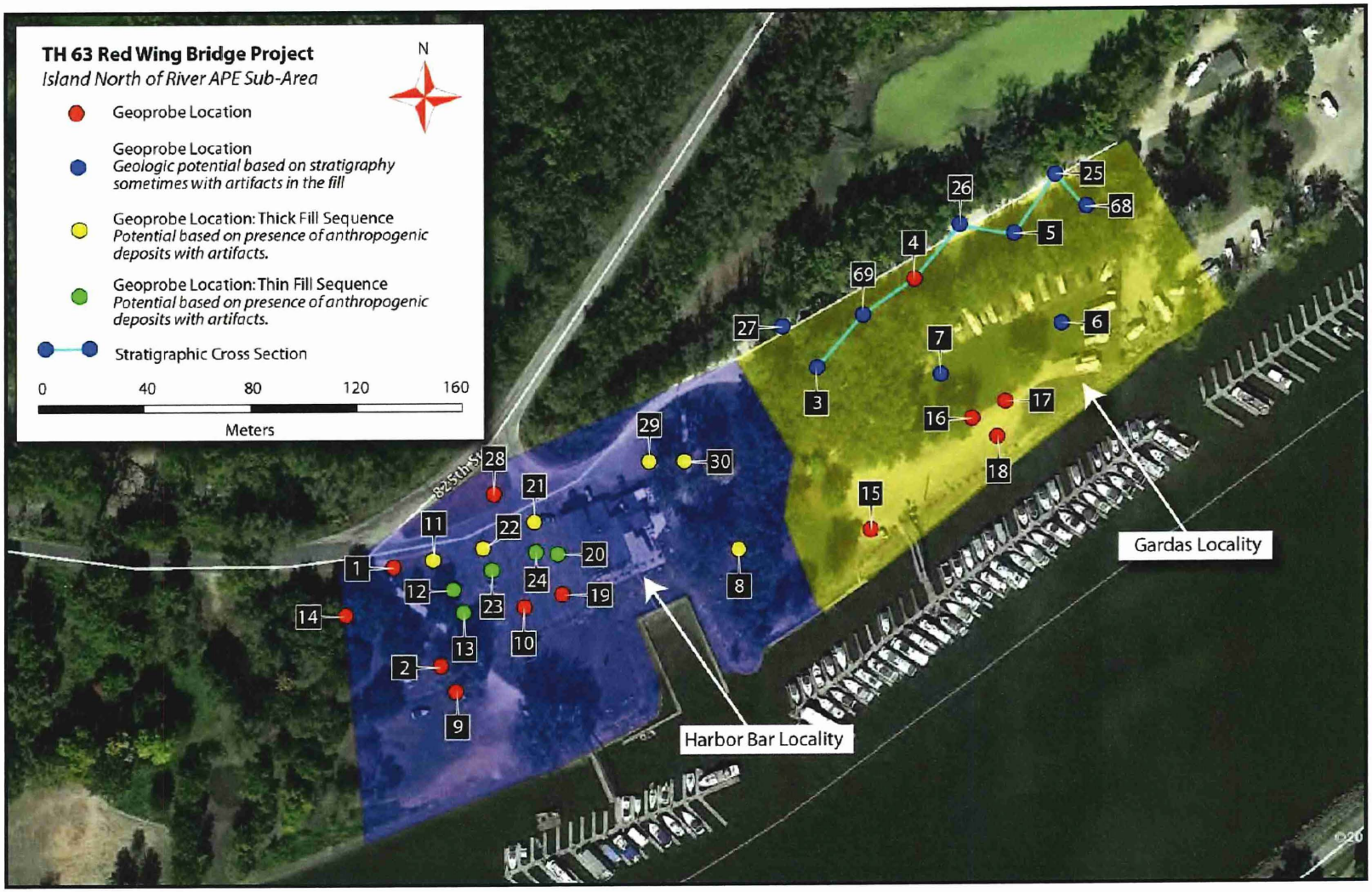


FIGURE 15. PLAN OF GEOPROBE CORES WITHIN THE NORTH OF THE RIVER SUB-AREA (KOLB 2014:6)

brick, metal, colorless glass, and whiteware. Outside of the parking lot, Core 29, located just northeast of the bar yielded similar materials from within a layered sand and darker sandy loam extending from 1.22 to 1.41 cmbs. The historical-period material and associated strata encountered within the Harbor Bar parcel is likely related to the structures documented in the vicinity on the 1890 MRC map around the bar (see Figure 14).

Cultural materials recovered from the other three cores outside of the parking lot were of a relatively recent nature. These occurred in a location that the bar owner had used to burn trash (Core 8), where brick fragments were found in association with a pull tab, and near the riverfront, where a conglomeration of rubber bands that may be a golf ball core (Core 15) and a clinker (Core 16) were encountered.

A single core (Core 14) placed just outside the west edge of the APE, encountered a layer of cinders with brick fragments, extending from 1.44 to 1.46 meters (4.7 to 4.8 ft.) below the surface over approximately 9 cm (3.5 in.) of limestone fragments. This location would be more likely than the APE to contain sites related to the documented historical-period buildings as it is slightly higher topographically and just behind the original shoreline. Furthermore, LiDAR imaging indicates rectangular house mounds in the vicinity.

Given that historical-period structures are documented within the Harbor Bar Locality and that cores within the area produced artifacts from within historical-period strata, upon conclusion of the coring additional sub-surface archaeological testing was recommended within this portion of the North of the River sub-area, however landowner permission for trenching in the Harbor Bar property was not granted. If the Harbor Bar Locality is within the APE of the TH 63 Bridge Project's preferred alternative, additional archaeological investigations will be needed.

Gardas Locality

Fourteen cores were taken within the Gardas property, which is occupied by a campground and marina. While cores along the riverfront (Cores 15-18) revealed modern historic fill placed along the river channel, a line of cores along a ridge summit and backslope near the campground access road revealed weakly developed soils ranging in depth from 78-132 cmbs (Kolb 2014:9) (see Figure 15).

As buried soils with archaeological potential were documented within the Gardas Locality, additional sub-surface archaeological testing was recommended within this portion of the North of the River sub-area. On August 6, 2014, staff from Strata Morph and Two Pines, including Principal Investigator Michelle M. Terrell, oversaw trenching with a backhoe within the Gardas Locality. The trenching was undertaken in order to better characterize the buried soils documented along the ridge summit and to expose them for archaeological testing. Four backhoe trenches were excavated to depths between 1.35 and 1.50 m proximate to the borings that had produced evidence of buried soils. Soils within the trenches were sampled and artifacts noted (Figure 16).

Within Trench 1, located proximate to Core 68, a shallow historic-period buried soil was documented at 50-60 cmbs (1.6-1.9 ft.). A light scatter of bone, iron alloy spikes, glass, brick fragments, and shell were present within the buried soil.

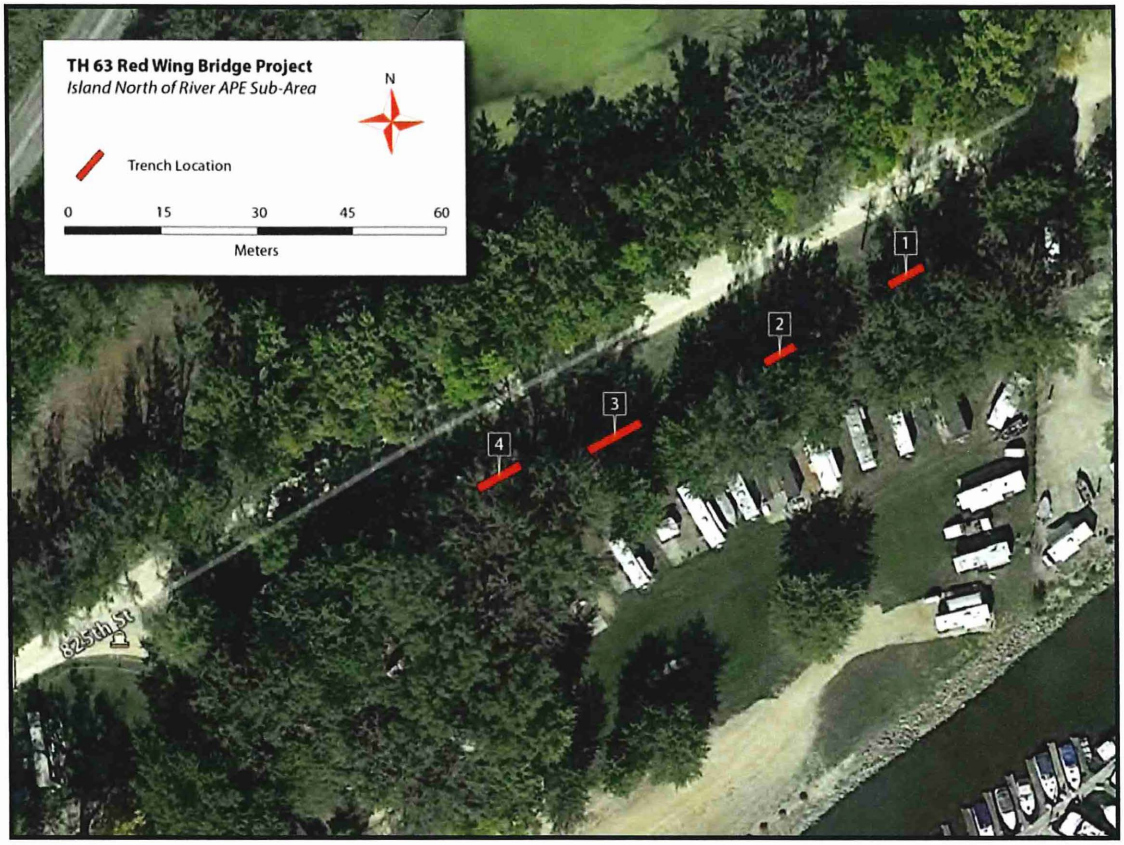


FIGURE 16. PLAN OF TRENCHES WITHIN THE NORTH OF THE RIVER SUB-AREA (KOLB 2014:11)

FIGURE 17. CUT LIMESTONE BLOCK WITHIN TRENCH 2, VIEW TO SOUTH

Trench 2 was located proximate to Core 5, and 15 meters west of Trench 1. A 4-ft. square limestone block was encountered along the west edge of the trench at 15-20 cmbs (0.5-0.6 ft.) (Figure 17). Excavation continued in the eastern portion of the trench where demolition layer was identified between 20-35 cmbs (0.6-1.1 ft.). Brick, ceramic, glass, and artifacts were encountered within the layer.

Trench 3 was located 20 meters west of Trench 2 and proximate Core 4. Four limestone slabs were encountered within the trench (Figure 18). The slabs were positioned at different angles consistent with deposition during demolition. The easternmost slab was encountered at 33 cmbs (1 ft.), with the two middle slabs at 40 cmbs (1.3 ft.). The presence of these slabs resulted in the expansion of the trench to the west where the fourth westernmost limestone slab was encountered at 42 cmbs (1.3 ft.). A historic layer was encountered at 60-70 cmbs (1.9-2.2 ft.). Like the comparable horizon in Trench 1 it contained a light scatter of ceramics, glass, brick, and metal.

Trench 4 was located 15 meters west of Trench 3 (before the west expansion), and between Cores 4 and 69. A 2.1 ft. by 2.3 ft. limestone pier was encountered at 40 cmbs (1.3 ft.) in the west end of the trench. A demolition layer was encountered at 25-35 cmbs (0.8-1.1 ft.), with a stratum associated bridge material underneath at 35-45 cmbs (1.1-1.4 ft.).

FIGURE 18. THREE OF THE LIMESTONE BLOCKS WITHIN TRENCH 3 (38 CMBS), VIEW TO SOUTHWEST

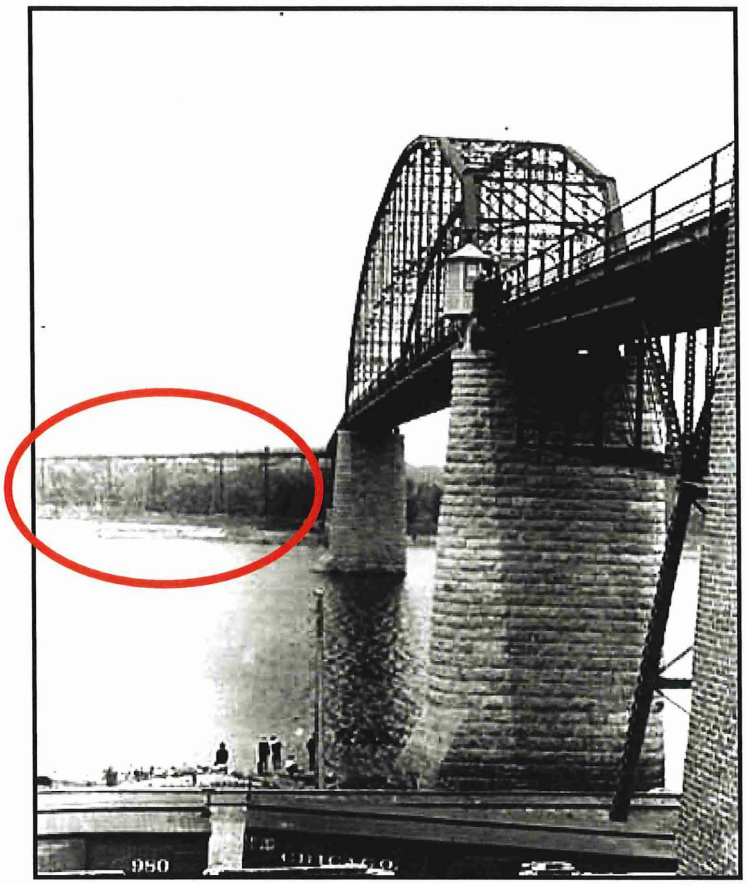


FIGURE 19. THE 1895 WAGON BRIDGE WITH TRENTON ISLAND BRIDGE APPROACH (CIRCLED), VIEW TO NORTHWEST

The limestone blocks encountered within Trenches 2, 3, and 4 are remnants of the limestone foundations of the piers that supported the elevated approach to the 1895 wagon bridge (Figure 19). The bridge was removed after the TH 63 Eisenhower Bridge was opened in 1960. The positioning of the blocks and the inclusion of fragments of bridge ironwork and other debris in the associated horizons indicates that these materials are no longer *in situ*, but were graded and used as fill when the bridge was removed. Artifacts encountered within the trenches were consistent with a light artifact scatter that would accumulate proximate to a roadway. No intact structural remains or dense artifact deposits were encountered within the trenches excavated within the Gardas Locality.

No further archaeological investigations are recommended within the Gardas Locality prior to or during the construction of the TH 63 Bridge.

RECOMMENDATIONS

The majority of the North of the Bridge sub-area has low potential for archaeological resources as it is either inundated or a constructed modern landform (Figure 20). Only a narrow point bar that forms the shoreline opposite Red Wing has the potential to contain intact archaeological deposits. However, more than half of this area could not be tested

during the Phase I survey due to a lack of landowner permission. Likewise, while cores within the Harbor Bar parking lot indicated the presence of an intact historical-period stratum and artifacts associated with the 19th-century occupation of Trenton Island, permission to excavate trenches was not received. Therefore, these portions of the North of the River sub-area retain moderate to high potential for significant archaeological resources. If these locations are within the construction limits of the TH 63 Bridge Project, they will require further assessment through Phase I or Phase II archaeological investigations.

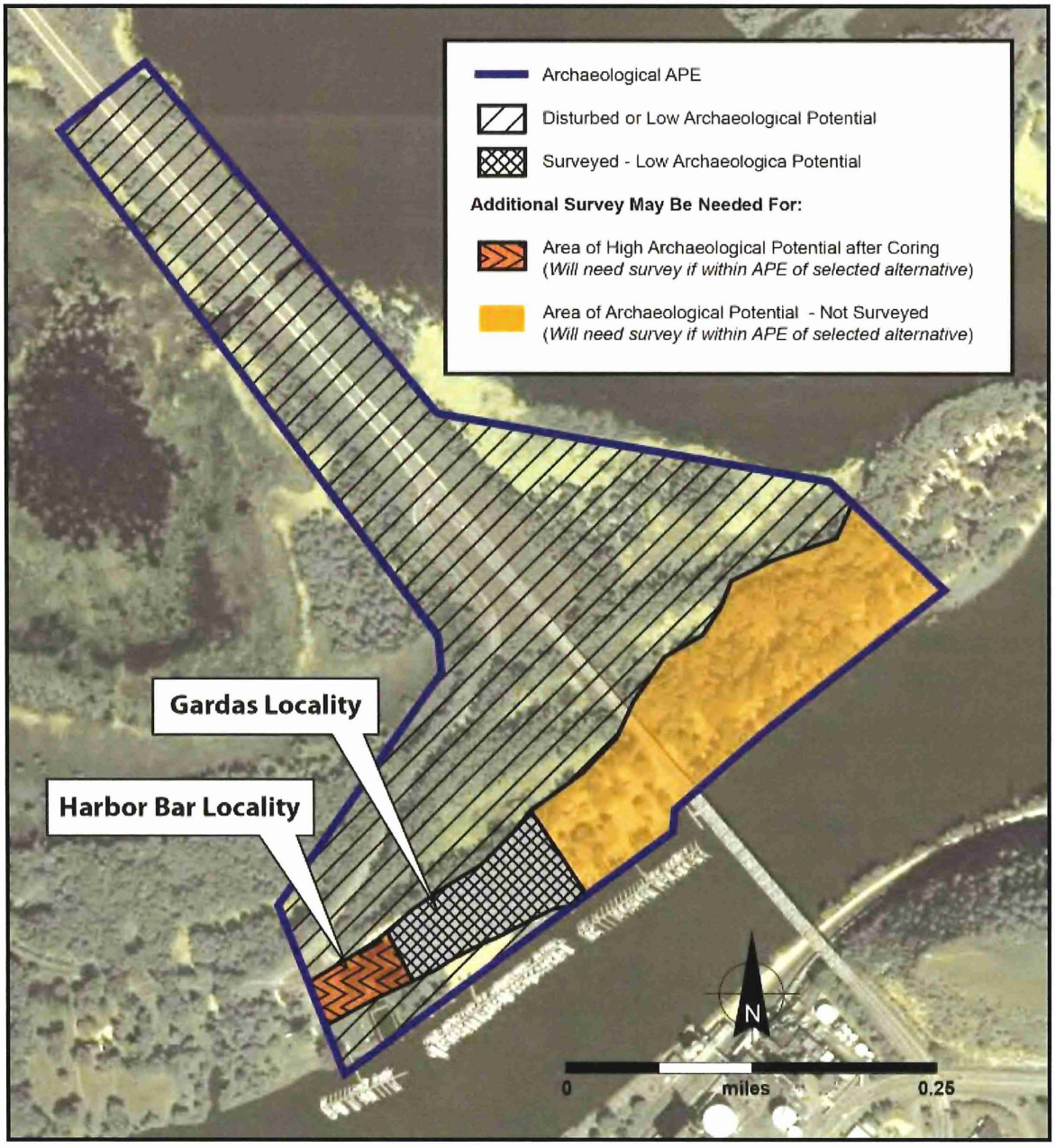


FIGURE 20. NORTH OF THE RIVER SUB-AREA SURVEY RESULTS

CHAPTER 6 . LEVEE SUB-AREA

The Levee sub-area is that portion of the archaeological APE that was historically oriented towards the riverfront and railroad corridor. The boundaries of the Levee sub-area remained the same for the pre-evaluation study and the Phase I archaeological survey. It includes the north halves of Blocks 41-44 and a portion of Block 46 and extends north through the railroad corridor and levee area to the river (Figure 21). This sub-area is currently occupied by Levee Park, the Canadian Pacific rail corridor, portions of the facilities of Archer Daniels Midland, the former Chicago Milwaukee and St. Paul Railway Company (CM&StP) depot and pumphouse, parking ramps and lots, the Red Wing Iron Works building, the YMCA building, and the former Red Wing Malting Company/Fleischmann Malting Company building.

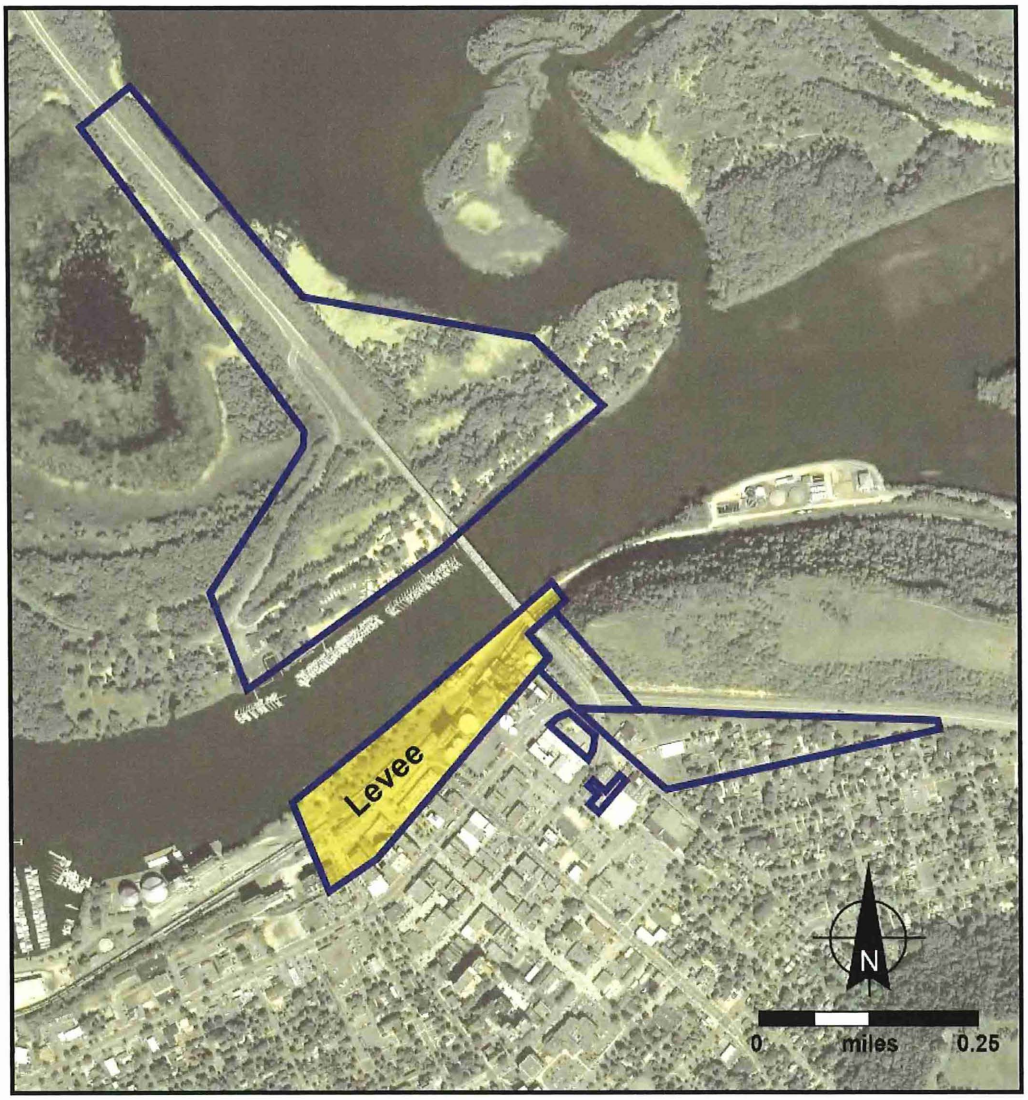


FIGURE 21. LEVEE SUB-AREA OF THE ARCHAEOLOGICAL APE

HISTORICAL BACKGROUND

Although no precontact or contact era archaeological sites have been identified within the Levee sub-area, the southern portion of this sub-area includes part of the original Mississippi River terrace, which is known to have been the site of a 19th-century Mdewakanton Dakota village. The village near Red Wing was recorded as early as 1805 and continued to be occupied until 1853 when its occupants removed to a reservation in the Minnesota River valley in compliance with the Treaty with the Sioux of 1851. It is likely that the terrace was also used during the precontact period as pit features examined by Brower in 1902 along the terrace edge just to the west of the APE contained pottery sherds indicative of a Late Prehistoric (Silvernale) occupation (Brower 1903:65).

After the removal of the Dakota and the opening of the Red Wing area to EuroAmerican settlement, the levee became a hub of river transportation, marked by hotels, forwarding and commission offices, and buildings and structures associated with sawmilling, grain milling, and other industries that were the early foundation of Red Wing's development (Curtiss-Wedge 1909:616; Kosec 1972) (Figure 22). These industries included the Red Wing Saw Mill (1865), Joshua Ashton's fanning mill (1860), and the fanning mill's replacement, the Red Wing Iron Works (1866) (Sanborn 1884; GCHS Vertical File – Red Wing – Business and Industry, Iron Works). The city's ferry landing was also located along this portion of the riverfront.

In 1872, the St. Paul and Chicago Railroad Company (later the CM&StP) built the first line into Red Wing through the Levee sub-area, bolstering the city's shipping capabilities, and facilitating commercial flour milling in the Levee sub-area. In order to accommodate the construction of the railroad, the Red Wing riverfront was expanded beyond the natural level through the introduction of fill (Terrell and Vermeer 2012:45)(Figures 23 and 24). The levee was further expanded into the Mississippi River when Levee Park was constructed in 1904-1905 (Angell 1977:239).

The first commercial flour mills built along the levee were the Bluff Mill in 1873 and the Diamond and La Grange mills in 1877, and between the latter two was an entire block of adjacent grain storage facilities (ADM Milling Company – Red Wing Mill, manuscript on file at the GCHS; Sanborn 1884). In 1901, the Simmons Milling Company's flour mill and the Red Wing Linseed Mills took up the former locations of the Bluff and Diamond Mills, which had been destroyed by fire in 1883, while the construction of the Red Wing Malting Company (later taken over by the Fleischmann Malting Company) malt mill and elevator began at the west end of the sub-area, replacing a substantial ice house operation previously located there. The addition of these plants likely played into the decision by the CM&StP to build a separate passenger depot and replace the former combination depot with a freight house in the Levee sub-area in 1904. The milling industry and the railroad continued to dominate the sub-area through the remainder of the historical period.

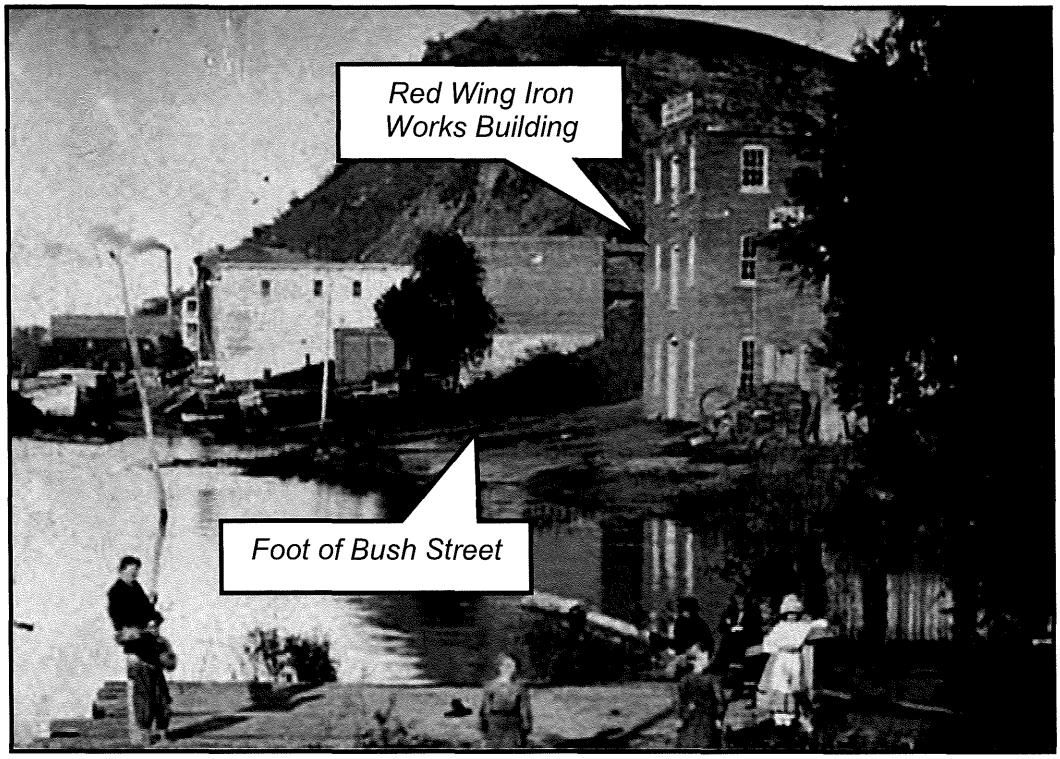


FIGURE 22. THE LEVEE SUB-AREA PORTION OF THE RED WING RIVERFRONT, 1860S (MHS NEG. NO. 64113)

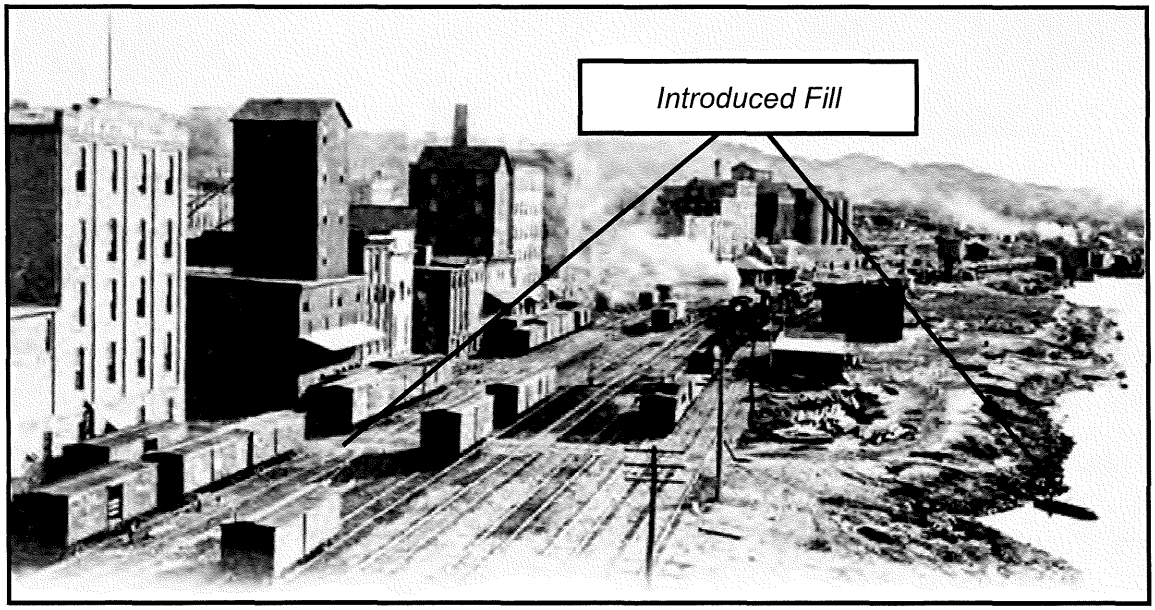


FIGURE 23. MILLS ON THE RED WING RIVERFRONT, C. 1900

(MHS LOCATION NO. FERRELL III.201)

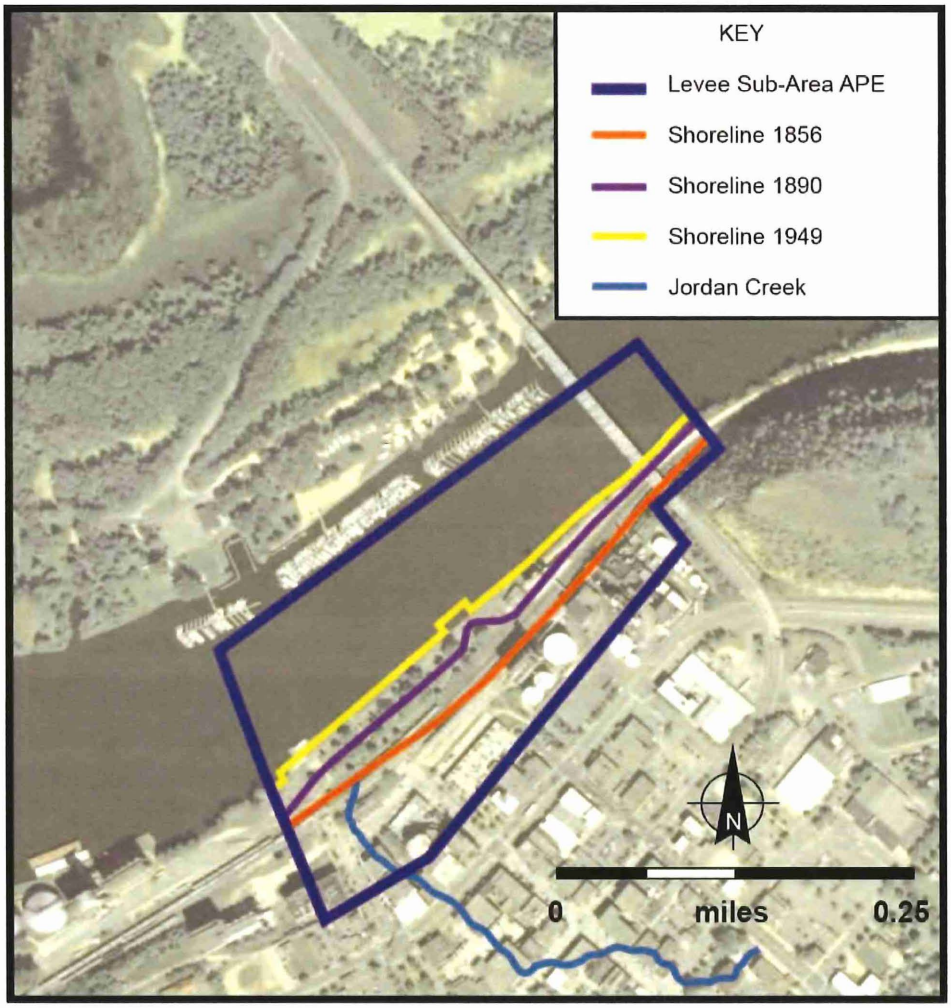


FIGURE 24. CHANGES IN RED WING'S RIVERFRONT (TERRELL AND VERMEER 2012)

PRE-EVALUATION STUDY

During the pre-evaluation study, two cores were extracted within the Levee sub-area (Terrell and Vermeer 2012:48, 52) (Figure 25). A geologic core (11GD-02) taken to characterize this sub-area was located north of the railroad right-of-way (ROW) and within Levee Park. This core was located within the entirely artificial portion of the levee and documented the presence of artificial fill layers over sub-aquatic depositional layers (Hudak 2011:17-18). No potential cultural horizons were identified.

Archaeological Core 2A was taken in a parking lot that was the site of a former railroad spur line near Levee Street (see Figure 25). This core contained a succession of historical-period deposits beginning at 50 cmbs, including a cinder-laden, railroad-associated fill, a structure-related layer of limestone and mortar, a potentially organic soil, and over 1 m (3.3 ft.) of fill that was apparently used to raise the elevation of the landscape. The structural remains encountered in this core may be related to a platform for a trackside derrick documented near this location on the 1895 Sanborn map. Beneath the historical-period fill were stream channel deposits. This core was proximate to the historic location of Jordan Creek, which has been undergrounded through the city.

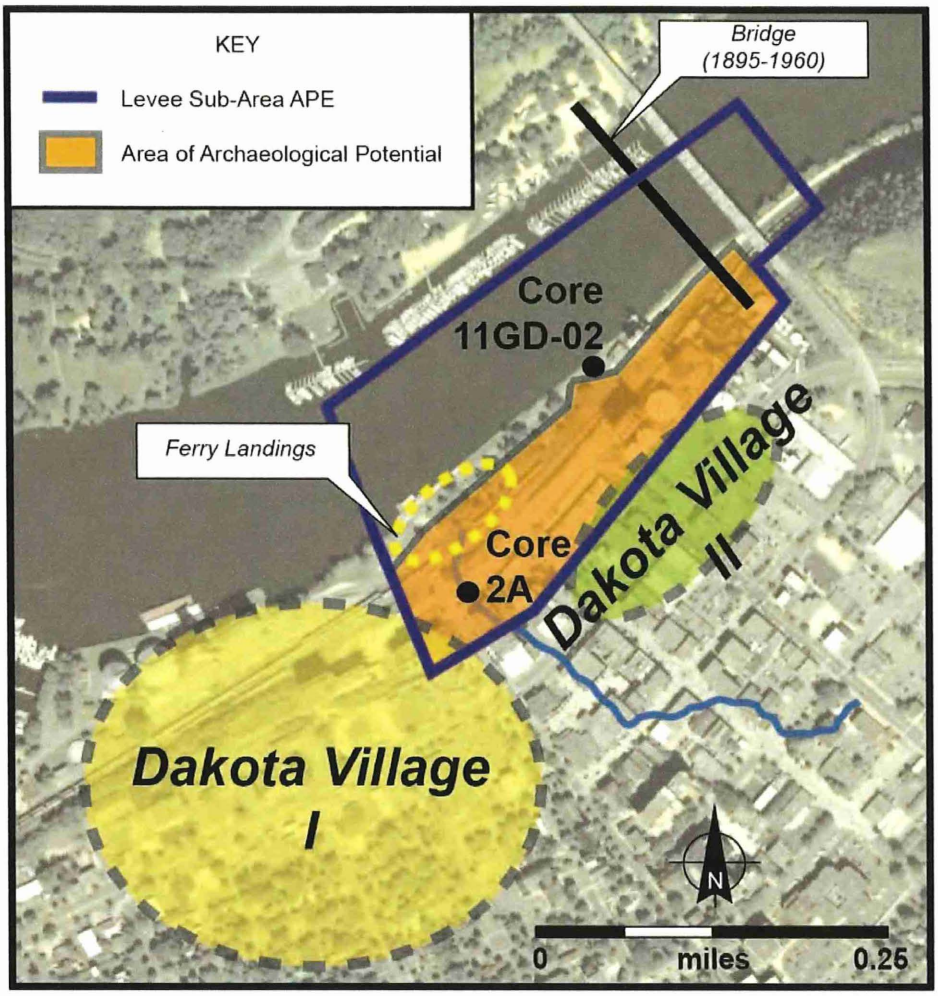


FIGURE 25. LEVEE SUB-AREA PRE-EVALUATION STUDY RESULTS

METHODS

Due to the depth of fill within the Levee sub-area, shovel testing was not a feasible method for archaeological survey. Geomorphological coring in the Levee sub-area was conducted by Strata Morph and observed by Two Pines' Principal Investigator, Andrea (Vermeer) Pizza, on April 24-26, and May 7-8, 2013. Field testing was conducted in areas of moderate to high potential for containing archaeological resources as identified through the pre-evaluation study (see Figure 25), and where extant buildings are not present. Due to landowner denial of access, field testing could not be conducted on the property of Archer Daniels Midland, which constitutes approximately the entire east half of the Levee sub-area (Blocks 41 and 42). By request of the City, no testing was conducted in the municipal parking ramp, which occupies much of the north half of Block 43. Additionally, no testing was conducted in the St. James Hotel parking ramp, which occupies part of the east half of Block 44, because overhead clearance for the Geoprobe® was not sufficient. Furthermore, work did not take place within active railroad corridors or roadways. Based on the results of the coring, in which buried soils were identified, trenching was conducted in the City Ramp Locality in keeping with the MnDOT Deep Test Protocol (Commonwealth Cultural Resources Group 2006).

RESULTS

During the Phase I archaeological survey, four separate portions of the Levee sub-area were tested (Figure 26).

Levee Park Locality

Two transects containing a total of 12 cores were placed in that portion of Levee Park north of the former CM&StP tracks and south of the Mississippi River shoreline as it existed in 1890 (see Figure 26). This portion of the APE was determined during the pre-evaluation study to have moderate to high potential for containing historical-period archaeological resources. Cores at the south end of the two transects were established to follow a grid based on 15-meter (49-foot) intervals where feasible, but numerous buried utility lines interrupted the grid. Cores within the north portion of the test area were more widely spaced, due not only to the presence of utility lines, but also because the patterning of deposits at the south end of the test area indicated that archaeological deposits from any period were unlikely to be present.

The 12 cores advanced in the Levee Park portion of the Levee sub-area indicated that this portion of the APE contains substantial amounts of fill/dredge spoil over historical-period deposits that overlie former shoreline gravels. The presence of the shoreline gravels indicates, as did the literature search, that this location was generally inundated during the precontact and contact periods, and therefore is unlikely to contain archaeological deposits dating to those eras. The historical-period deposits occur as a layer containing cinders and occasionally ash, likely associated with the rail yard that occupied this area (see Figure 23). With the exception of one small metal fragment, no artifacts were retrieved in the cores. Based on the geomorphology, which shows the historical-period deposits to have formed in a lag resulting from fluctuating water levels, any artifacts that might be present are not likely to be *in situ* (Kolb 2014:19). Given these findings and the history of the area, it is unlikely therefore, that any significant archaeological deposits are present within Levee Park.

No further archaeological investigations are recommended within the Levee Park Locality prior to or during the construction of the TH 63 Bridge.

Railroad Depot Locality

A single core (Core 55) was taken in a small green space to the east of the former CM&StP passenger depot. The upper 1.31 m of the core consisted of a horizon of fill over cinders (61-72 cmbs), bedrock fill, and a horizon of burned/weathered mortar (80 and 110 cmbs). At 1.31 m the core abruptly transitioned to bedrock fill over glacial source sand. These horizons are likely related to the modification of the riverfront in the late 19th-century and its subsequent use as a rail yard (see Figures 22 and 23). No artifacts were noted within the core. Based on these findings and the results of the literature search, this location is unlikely to contain significant historical archaeological deposits. Further, no soil horizons indicative of the potential for contact or precontact occupation were present.

No further archaeological investigations are recommended within the Railroad Depot Locality prior to or during the construction of the TH 63 Bridge.

FIGURE 26. PLAN OF GEOPROBE CORES WITHIN THE LEVEE SUB-AREA (KOLB 2014:17)

YMCA Locality

Three cores (Cores 56-58) were advanced in Lot 10 of Block 44 within the parking lot of the YMCA building (see Figure 26). These cores were proximate to Core 2A of the pre-evaluation study. Recovery within Cores 56 and 57, which were in the portion of the lot to the north of the building, was poor due to the presence of loose, coarse fill, and rubble, but both cores documented a buried soil at a depths of 2.15/2.41 below the surface (Kolb 2014:21, 23). The presence of wood and coal or cinders within this soil indicates the stratum is a historic surface. Within Core 58, which was placed slightly upslope and within a short alley between buildings, a layer of fill was documented between 0.54 and 2.3 meters below the surface that contained wood and brick fragments and numerous artifacts (Kolb 2014:23). Beneath the fill, Core 58 encountered a silt loam that continued to a depth of 3.0 meters. This buried soil also contained brick and wood fragments. This sequence suggests an historic landscape capped by the remnants of a demolished/burned structure. Historical Sanborn maps indicate that these cores are within the rear lots of a series of 19th century buildings (including a hotel) that fronted on Broad Street.

Based on these findings, the YMCA Locality has a high potential to contain intact archaeological resources, however, the active parking lot and the presence of numerous utilities prevented additional sub-surface archaeological testing during the current study. If the YMCA Locality is within the APE of the TH 63 Bridge Project's preferred alternative, additional archaeological investigations will be needed.

City Ramp Locality

Five cores were placed within the City Ramp Locality. One core each was taken adjacent to the west (Core 59) and east (Core 67) ends of the city parking ramp (see Figure 26). Three additional cores (Cores 64-66) were advanced on a grassy slope extending along the north portion of Block 43, north of the parking ramp and south of a gravel access road adjacent to a spur track (see Figure 26). Initially, two cores were attempted in the access road, but both of these met with refusal in concrete, hence the shift to the slope.

Both cores (Cores 59 and 67) adjacent to the city parking ramp contained heavily disturbed fill directly over bedrock, and therefore these locations hold no potential for containing intact archaeological resources from any period.

The first core in the grassy slope, Core 64, was located near the west end of the slope, and it contained fill over a layer of peat, which gave way to bedrock. The fill contained some cinders in the upper 40 cm and is presumably associated with the railroad. The peat continued to a depth of 2.20 m (Kolb 2014:19). Core 65 was taken at the east end of the slope to determine whether the profile was consistent throughout. Although generally the same, the peat was replaced by a black buried soil formed in alluvium that was documented between 0.90 to 1.65 meters (Kolb 2014:21). A third core (Core 66) was therefore taken in between the first two. The third core was originally attempted 20 meters (66 ft.) west of Core 65, but met with refusal in concrete at a shallow depth and was therefore shifted beyond this location another 10 meters (33 ft.) to the west. Core 66 contained fill over alternating layers of peat overlying a buried soil at a depth of 2.47 meters (Kolb 2014:19).

Based on the presence of a buried soil associated within the City Ram Locality cores, staff from Strata Morph and Two Pines, including Principal Investigator Michelle M. Terrell, oversaw trenching with a backhoe at the foot of the grassy slope adjacent to Cores 64, 65 and 66. The trenching, which took place on May 28, 2014, was undertaken in order to better characterize the buried soils and to expose them for archaeological testing. Three backhoe trenches were excavated proximate to the borings that had produced evidence of buried soils (Figure 27). Soils within the trenches were sampled and encountered artifacts noted.

Within Trench 1, located proximate to Core 64, a 24 cm (10 in.) thick concrete slab was encountered at a depth of 45 cmbs. The west edge of this slab was located approximately 80 ft. east of the alignment of Bush Street. A light historic scatter was present in the horizon (40-65 cmbs) associated with the slab. Fill was present to 1.30 m below the surface, at which depth a very dark brown (10YR 2/2) horizon of organic material containing occasional historic-period artifacts, milled wood, logs, and ash was encountered. At 1.70 m below the surface, this horizon gave way to peat that overlay mucky loam weathered bedrock.

Trench 2 was located adjacent to Core 66, and 20 m east of Trench 1. A similar profile to Trench 1 was documented. A single buried soil was present at 70-100 cmbs (2.3-3.2 ft.) containing a light scatter of historic artifacts and brick and mortar fragments.

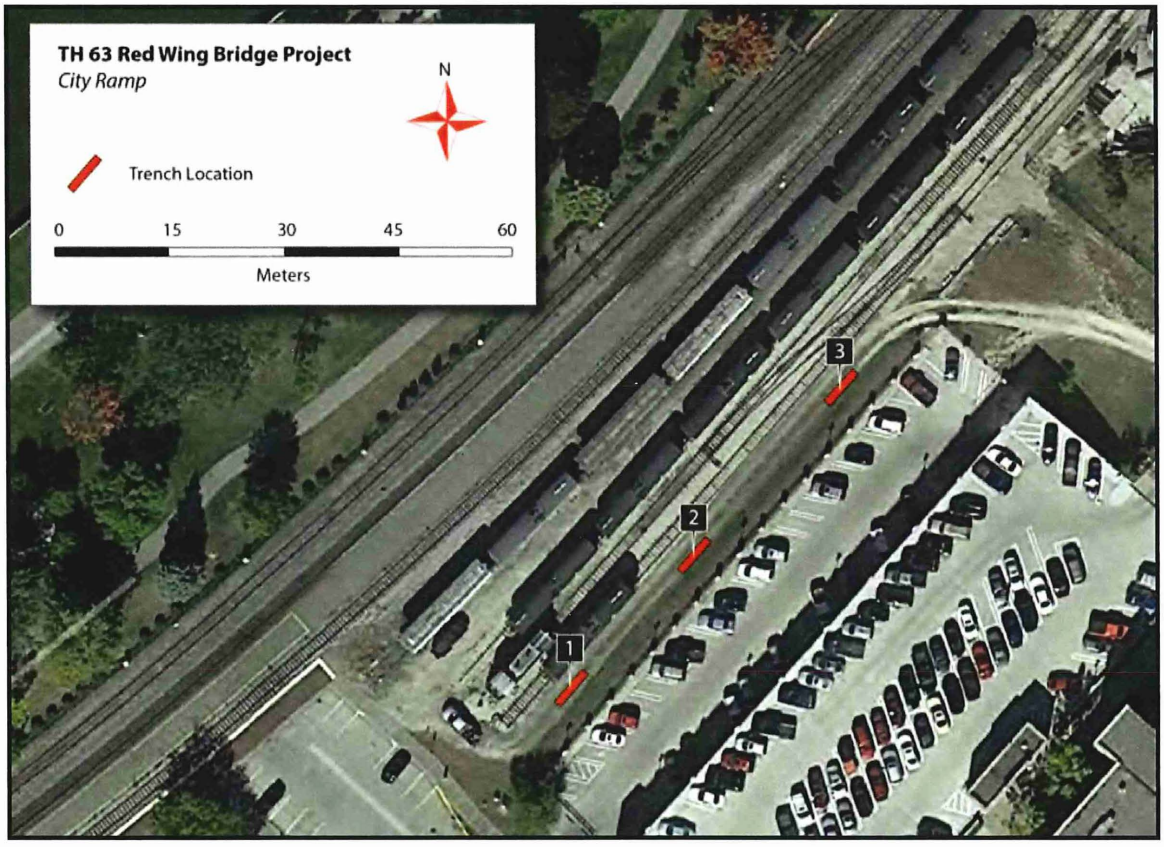


FIGURE 27. TRENCH LOCATIONS WITHIN THE CITY RAMP LOCALITY OF THE LEVEE SUB-AREA (KOLB 2014:22)

Trench 3 was located proximate to Core 65. No buried soil was identified within the trench. Rather the fill gave way directly to the peat at a depth of 90 cmbs. A 2 ft. (61 cm) wide limestone foundation was documented within the trench at a depth of 40 cmbs (1.3 ft.). This foundation was located approximately 40 ft. west of the west edge of Plum Street.

Cores and trenches within the City Ramp Locality documented the same sequence of a wet fluctuating natural shoreline that was raised with fill to create a dry levee for the railroad mainline and industrial sidings during the late 19th-century (see Figures 22 and 23). Sanborn maps indicate that the concrete slab and limestone foundation encountered during the trenching are related to the trackside structures of the La Grange Flour Mills (Figure 28). While the 1877 mill was a significant industry in the history of Red Wing, the mill complex has been removed and replaced with the municipal parking ramp. Those remnants of the building which fronted on the rail line do not retain sufficient information potential to be considered eligible for listing on the National Register of Historic Places.

No further archaeological investigations are recommended within the City Ramp Locality prior to or during the construction of the TH 63 Bridge.

RECOMMENDATIONS

Based on the results of the coring and trenching, the majority of the Levee sub-area has low potential for archaeological resources as it is largely a constructed landform (Figure 29). Only the undeveloped portions of Blocks 41-44 within the sub-area have the potential to contain intact archeological deposits. However, portions of the Levee sub-

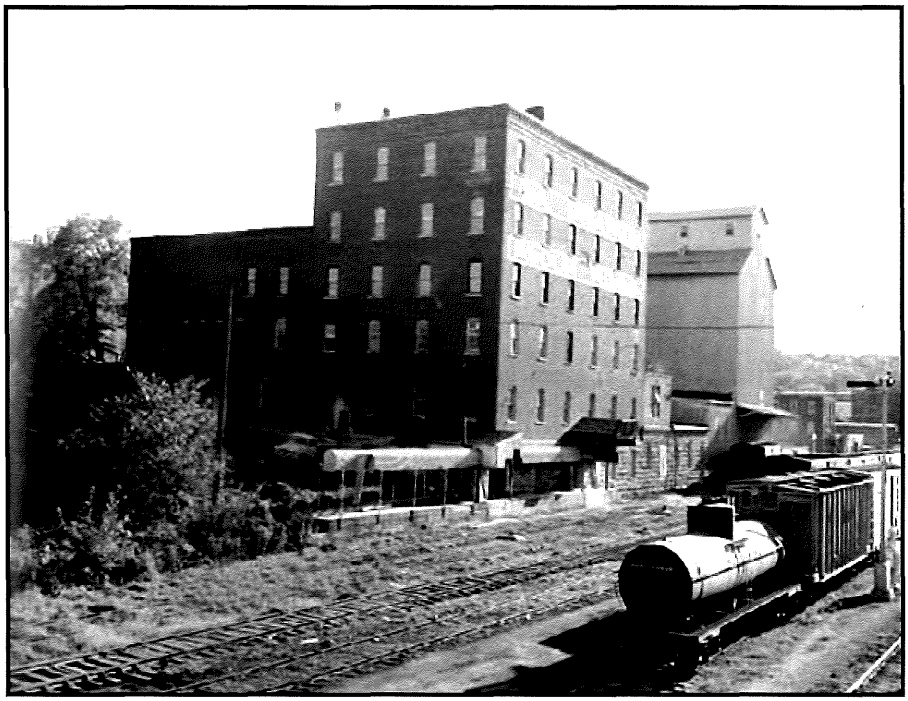


FIGURE 28. LA GRANGE FLOUR MILLS, 1960, VIEW TO SOUTHWEST (MHS MG6.9 RW3.1 R44)

area could not be tested during the Phase I survey due to a lack of landowner permission or the presence of active roadways. Likewise, while cores within the YMCA parking lot indicated the presence of an intact historical-period stratum and artifacts associated with 19th-century structures that fronted on Broad Street, trenching was not feasible given the active nature of the parking lot and the presence of numerous utilities. Therefore, these portions of the Levee sub-area retain moderate to high potential for significant archaeological resources. If these locations are within the construction limits of the TH 63 Bridge Project, they will require further assessment through Phase I or Phase II archaeological investigations.

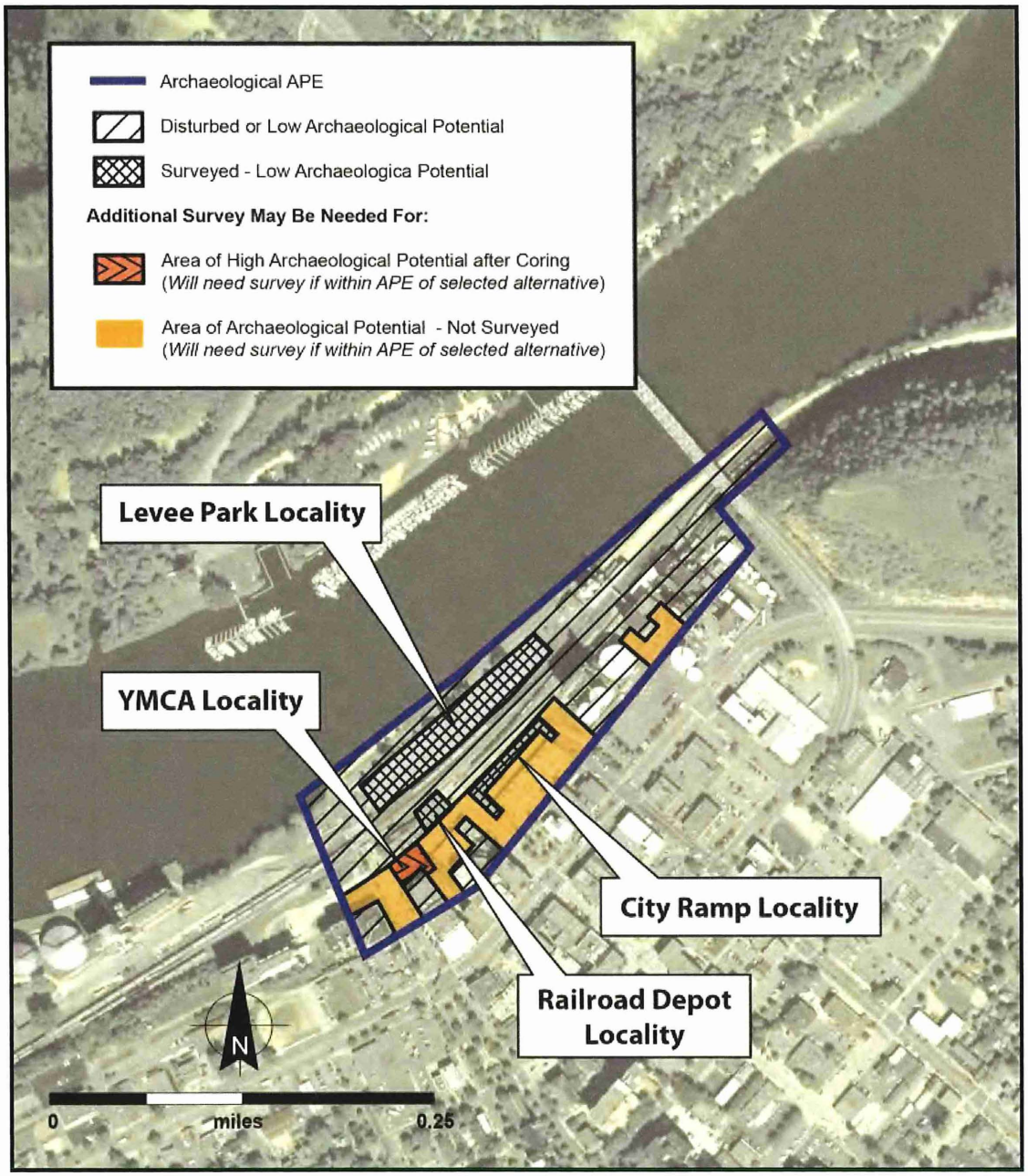


FIGURE 29. LEVEE SUB-AREA SURVEY RESULTS

CHAPTER 7 . DOWNTOWN COMMERCIAL SUB-AREA

The Downtown Commercial sub-area is defined as that part of Red Wing's historic commercial district located within the TH 63 Bridge Project's APE. For the Phase I archaeological survey the Downtown Commercial sub-area was reduced to two test areas (Areas 10 and 25) proximate to the bridge touchdown that were identified during the pre-evaluation study as having archaeological potential (Figure 30). Area 10 (Red Wing Shoes Locality) encompasses the east portion of Block 40 including most of Lots 4 through 7; while Area 25 (Viking Coca Cola Locality) consists of limited portions of Lots 6 through 10 in the north half of Block 25. Area 10 is currently the employee parking lot of the Red Wing Shoe Company, while Area 25 is a parking lot, open space, and loading dock.

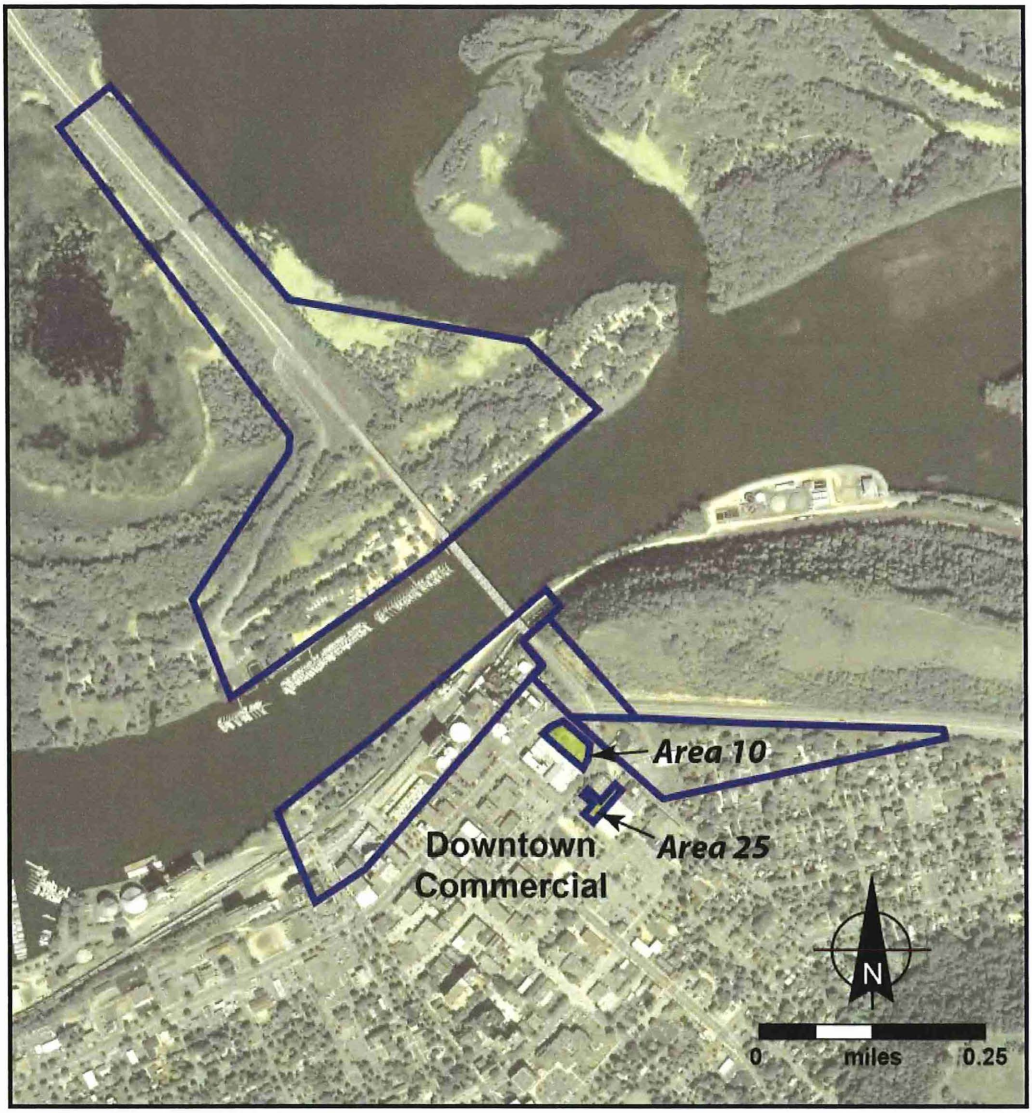


FIGURE 30. DOWNTOWN COMMERCIAL SUB-AREA OF THE ARCHAEOLOGICAL APE

HISTORICAL BACKGROUND

Although no precontact or contact-era archaeological sites have been identified within the Downtown Commercial sub-area to date, this area encompasses part of the original Mississippi River terrace, which is known to have been the site of a 19th-century Mdewakanton Dakota village (Figure 31). The village near Red Wing was recorded as early as 1805 and continued to be occupied until 1853 when its occupants removed to a reservation in the Minnesota River valley in compliance with the Treaty with the Sioux of 1851. It is likely that the area was also used during the precontact period as pit features examined by Brower in 1902 along the terrace edge just to the west of the TH 63 Bridge Project's APE contained pottery sherds indicative of a Late Prehistoric (Silvernale) occupation (Brower 1903:65).

AREA 10 – RED WING SHOES LOCALITY

Area 10 was developed between 1853 and 1868 with residences to the south of the alley and Daniel C. Hill's sash and door factory to the north at the corner of Bluff and Main streets (Ruger 1868; Curtiss-Wedge 1909:638). Begun in 1862, Hill's operation was incorporated in 1882 as the Red Wing Manufacturing Company. By 1884, the buildings of the plant had expanded to cover the entire north half of Area 10, while the south half remained residential (Figure 32). The character of both parts of Area 10 remained fairly consistent for approximately the next four decades; then, sometime between 1917 and 1927, the Red Wing Manufacturing Company moved, and an automobile repair shop

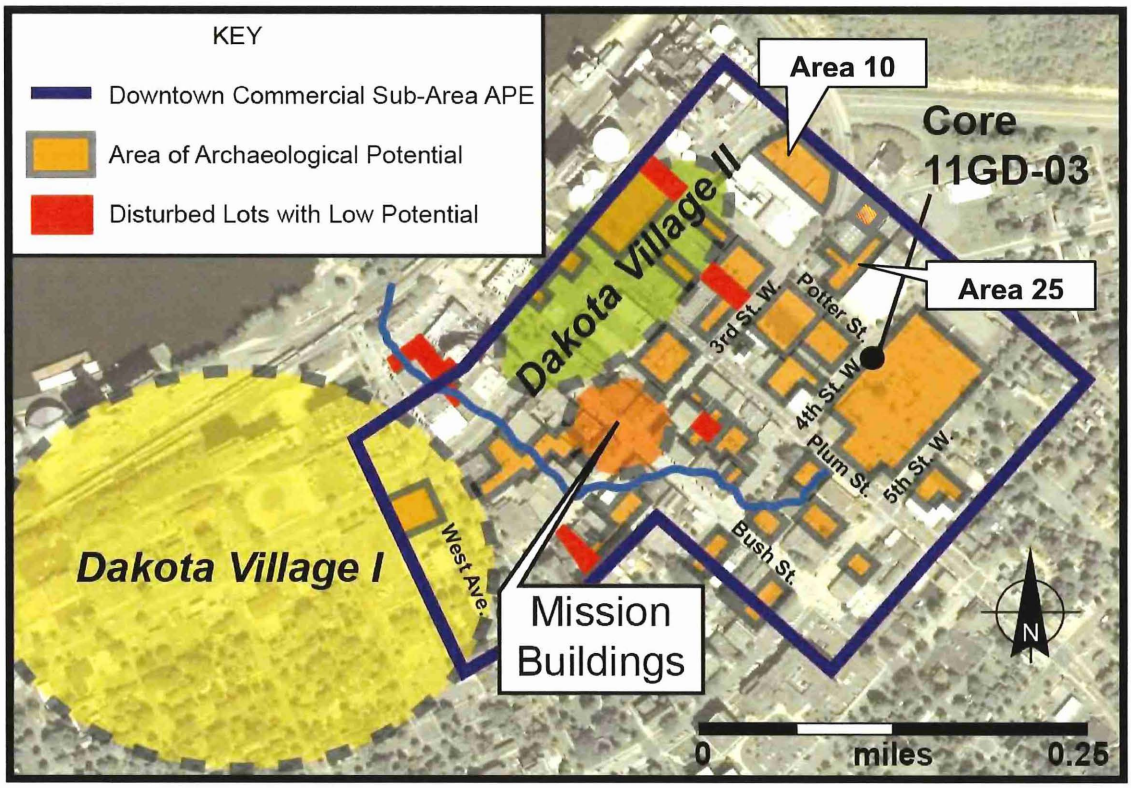


FIGURE 31. DOWNTOWN COMMERCIAL SUB-AREA PRE-EVALUATION STUDY RESULTS

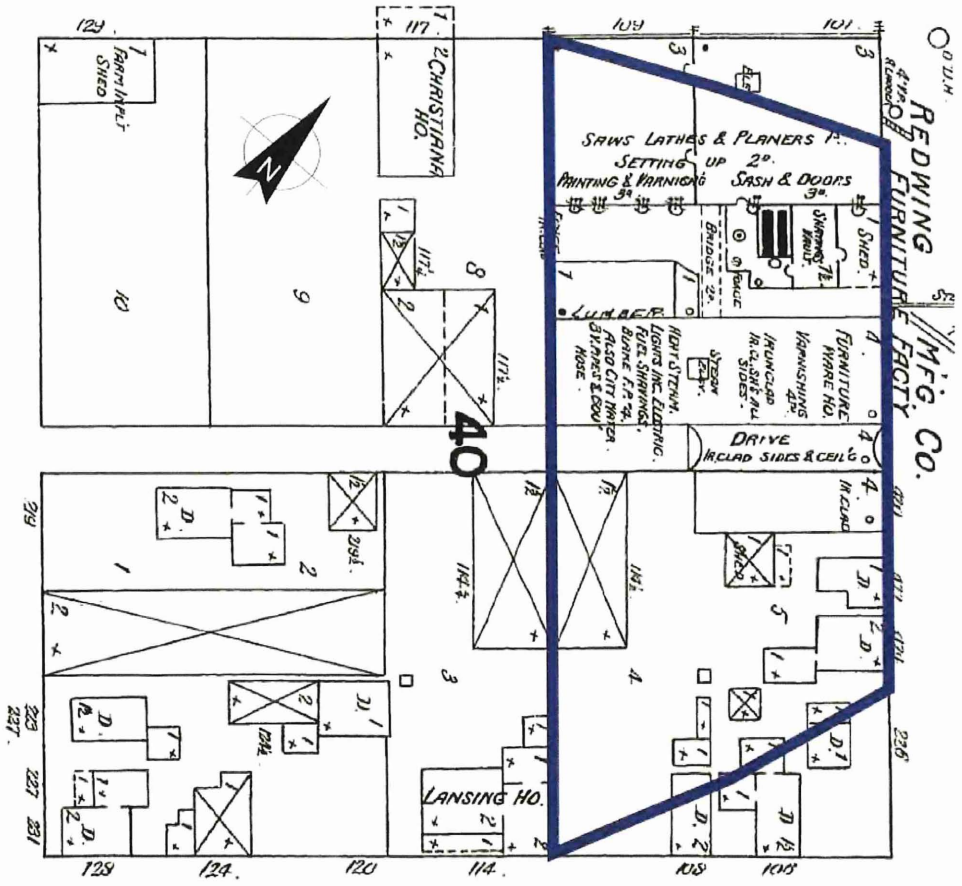


FIGURE 32. AREA 10 (RED WING SHOES LOCALITY) OUTLINED ON THE 1891 SANBORN MAP OF BLOCK 40

took up part of the factory, later expanding into more of the building, along with a feed warehouse business (Sanborn 1917, 1927, 1943). In 1905, the Red Wing Shoe Company was founded on the northwest corner of Block 40 and since has expanded at this location to occupy the west three-fifths of the block. Area 10 is the parking lot for the building.

AREA 25 – VIKING COCA COLA LOCALITY

By 1868, Area 25 had developed into a residential area. Circa 1880, a small cigar factory was constructed along the north edge of the block. It was converted to a grocery store between 1884 and 1891 (Figure 33). In 1902, this building was identified as a grocery and purveyor of patent medicines (Sanborn 1902). Between 1910 and 1917, the grocery building was removed and all of Area 25 was residential (Sanborn 1910, 1917). Between 1927 and 1943 an auto repair garage was constructed immediately to the north of the alley on the east side of the block (Sanborn 1927, 1943). This building is still extant. Since 1943 all of the residences on Block 25 have been removed and a bottling works constructed in the south half of the block prior to 1902 has expanded to take over the entire south half of the block and much of the north as well (Sanborn 1902, 1943).

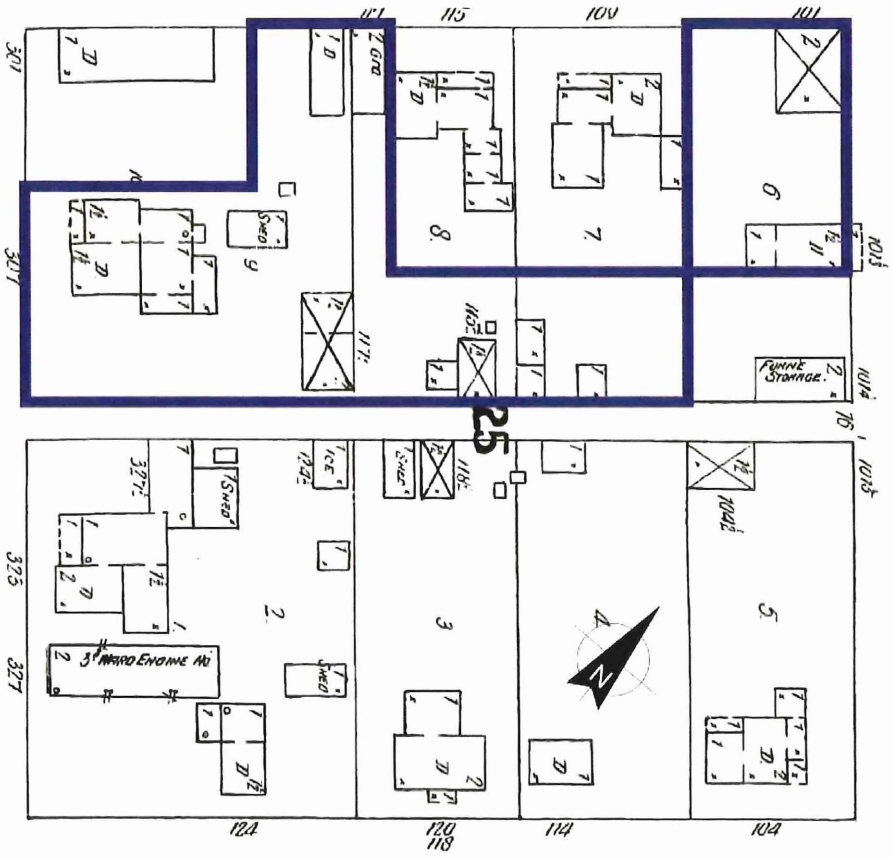


FIGURE 33. AREA 25 OUTLINED ON THE 1891 SANBORN MAP OF BLOCK 25

PRE-EVALUATION STUDY

AREA 10 – RED WING SHOES LOCALITY

During the pre-evaluation study, seven archaeological cores were advanced within Area 10 (Figure 34). Two cores (10-A and 10-G) were placed within the footprint of the Red Wing Manufacturing Company complex. Both cores demonstrated the presence of structural remnants of buildings associated with the complex. Core 10-A was placed within company's boiler room in Lot 6. Beneath recent fill, the core encountered brick, mortar, cinders, and limestone between 1.0 and 4.5 ft. (30 and 137 cm) below the ground surface. These materials are consistent with the structural remains of the boiler room. The historical-period deposits capped an apparently natural soil profile that continued to 8 ft. (244 cm), at which depth weathered bedrock was encountered. Core 10-G was placed on what was historically the south side of the alley at the north wall of a warehouse building. Assorted fills and textures were recorded in the upper portion of the core. At a depth of 5.2 ft. (158 cm), limestone and mortar likely associated with the foundation of the warehouse was encountered. A peat-like horizon of wood, possibly associated with the manufacturing company's operations, was encountered at a depth of approximately 6 ft. (183 cm). Beneath this horizon was a natural soil profile at 8 ft. (244 cm) that gave way to clays and weathered siltstones at approximately 10 ft. (304 cm). Given the presence of these intact structural features the area was designated as an archaeological site lead, 21GDbj.

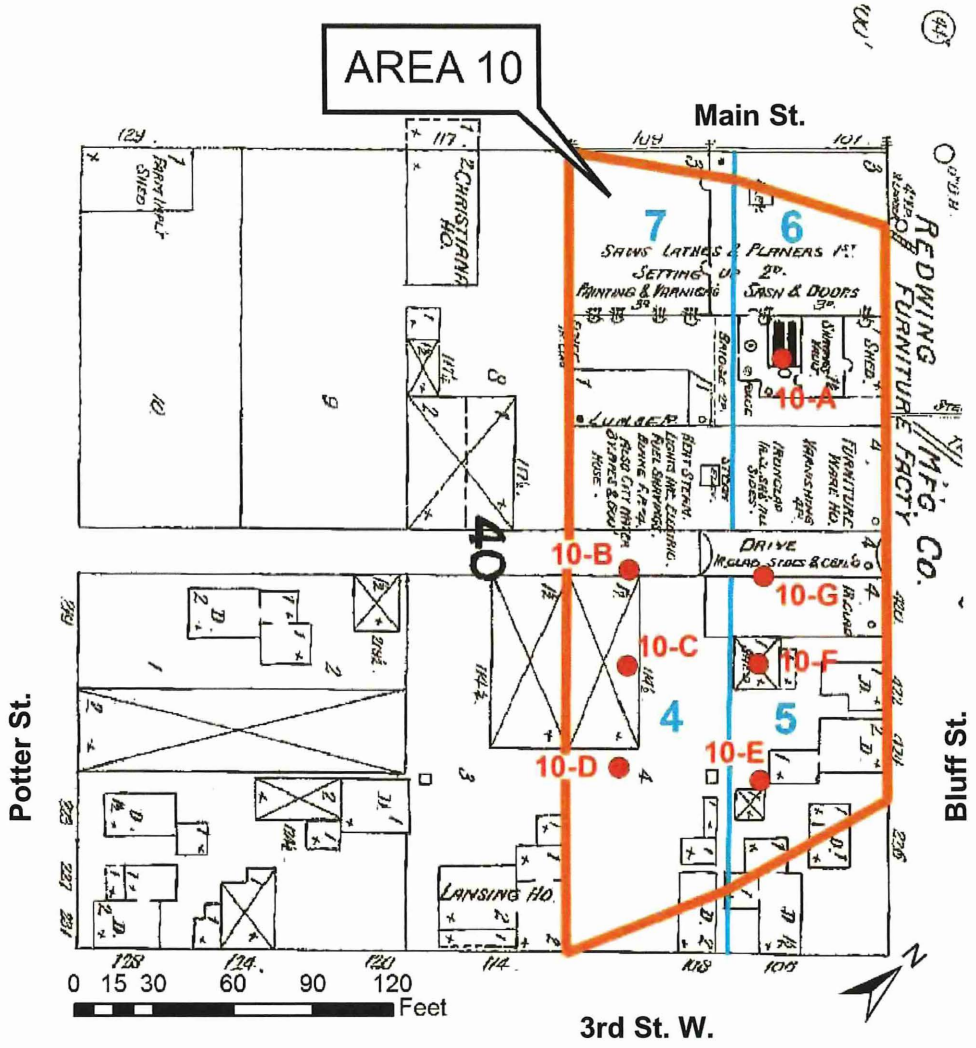


FIGURE 34. ARCHAEOLOGICAL CORES WITHIN AREA 10 ON 1891 SANBORN MAP

Within several of the other cores (10-B-F), a horizon of peaty wood was present at about 6 ft. below the surface and a natural soil overlying bedrock was documented at a depth of about 8 ft. Core 10-C documented a shallow horizon of brick and crushed limestone in the upper 1.5 ft. of the core most likely related to the stable that formerly was present in the northwest portion of Lot 4.

AREA 25 – VIKING COCA COLA LOCALITY

During the pre-evaluation study, no coring took place within Area 25 as permission was not granted by the property owners. However, because the literature search indicated that the parcel had the potential to contain historical-period (and earlier) archaeological deposits, a Phase I archaeological survey of the area was recommended should Area 25 be subject to project-related impacts.

METHODS

Through the pre-evaluation study, Areas 10 and 25 were both identified as having a high potential for containing intact archaeological resources. Due to the presence of paved and compacted surfaces, as well as the depth to buried soils documented in the cores, shovel testing was not a feasible method for archaeological survey. Geomorphological coring within Areas 10 and 25 was conducted by Strata Morph and observed by Two Pines' Principal Investigator, Andrea (Vermeer) Pizza, on May 7 and November 19, 2013.

Within the south half of Area 10, geomorphological cores were advanced in locations that would fill in between the six cores taken there during the pre-evaluation study, as a means of closer-interval testing to assess the presence or absence of archaeological deposits within the rear and side yards of residences historically present in Lots 4 and 5 of Block 40. Within the north half of Area 10, cores were taken in 10- and 15-meter (33- and 49-foot) intervals around previously identified structural features associated with the Red Wing Manufacturing Company's furniture-making operation in Lots 6 and 7, to obtain further information on the characteristics of those features. Cores were also used to assess the presence or absence of soils that may contain contact-period and precontact archaeological resources. It is noted that the property contact for Area 10 informed Strata Morph and Two Pines that since the pre-evaluation study, a sewer line had been installed through the northern portion of Lots 6 and 7, during which a footing had been encountered (and at least partially impacted). Based on the results of the coring, in which buried soils were identified, trenching was conducted in Area 10 in keeping with the Deep Test Protocol (Commonwealth Cultural Resources Group 2006).

Landowner permission was only granted for testing within a limited portion of Area 25. A single geomorphological core was taken in Lot 7 and in Lot 8 to assess whether the area had archaeological potential. Based on the results of the coring, in which buried soils coming between fill and bedrock were identified, sub-surface testing was recommended. However, as the area is an active loading dock, trenching was not feasible. Rather, a cluster of three 6-in. diameter flight augers to sample the soils. All soils were screened through ¼-in. mesh.

RESULTS

AREA 10 – RED WING SHOE LOCALITY

Nine cores were taken within Area 10 (Red Wing Shoe Locality) (Figure 35). Core 52, which was located proximate to the bridge approach, contained only disturbed fill over bedrock. The remaining cores generally exhibited the same stratigraphic profile of fill and/or historical period deposits over a buried soil formed in muck over alluvium or alluvium that gave way to bedrock (Kolb 2014:24). The muck or mucky silt loam was present in Cores 50 and 51 near the south end of the test area. These soils suggest that the buried landscape was wet (Kolb 2014:24). Within the north half of Area 10, Cores 60, 62, and 63 encountered structural remains associated with the Red Wing Manufacturing Company factory (designated as 21GDbj), consisting of a brick layer from 40 to 45 cmbs; a limestone layer at approximately 30 cmbs; and a brick and mortar layer from 15 to 45 cmbs, respectively.

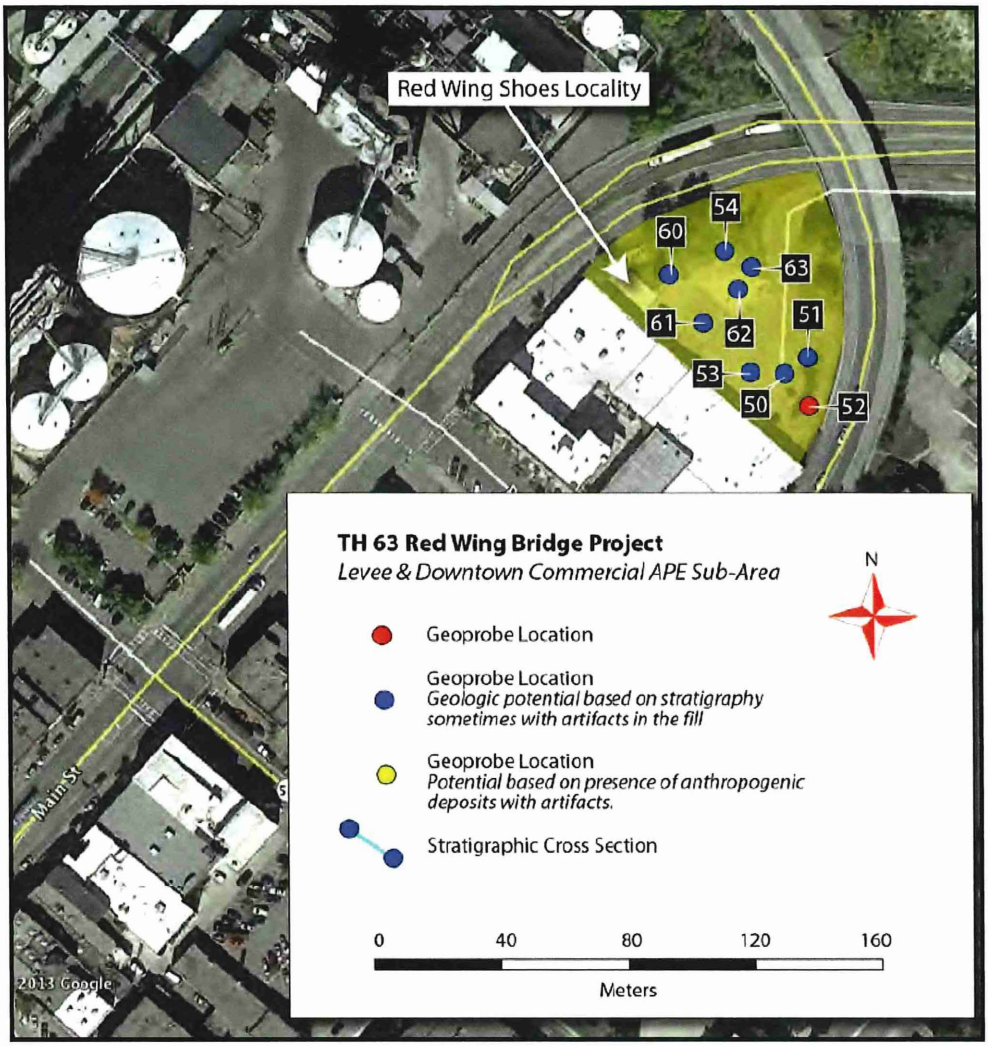


FIGURE 35. PLAN OF GEOPROBE CORES WITHIN AREA 10 (KOLB 2014:17)

Based on the presence of buried soils within Area 10 (Red Wing Shoe Locality) cores, on May 29, 2014, staff from Strata Morph and Two Pines, including Principal Investigator Michelle M. Terrell, oversaw trenching with a backhoe within this portion of the Downtown Commercial sub-area of the APE (Figure 36). The trenching was undertaken in order to better characterize the buried soils and to expose them for archaeological testing. Five backhoe trenches were excavated proximate to the borings that had produced evidence of buried soils (Figure 37). Given the presence of utility disturbance and the former Red Wing Manufacturing Company building in the north half of Area 10, trenching was concentrated in the south half of the test area. Soils within the trenches were sampled and associated artifacts documented.

Within Trench 1, a buried soil was documented at 95-160 cmbs (3.1-5.2 ft.). Charcoal, brick and limestone fragments, flat glass, and metal were encountered within the upper 35 cm of the buried soil, with wood fragments and other organic material documented in the lower 40 cm. The trench gave way to degraded bedrock at a depth of 1.7 meters.

FIGURE 36. AREA 10 OVERVIEW, TRENCHES 2 AND 3, VIEW TO WEST

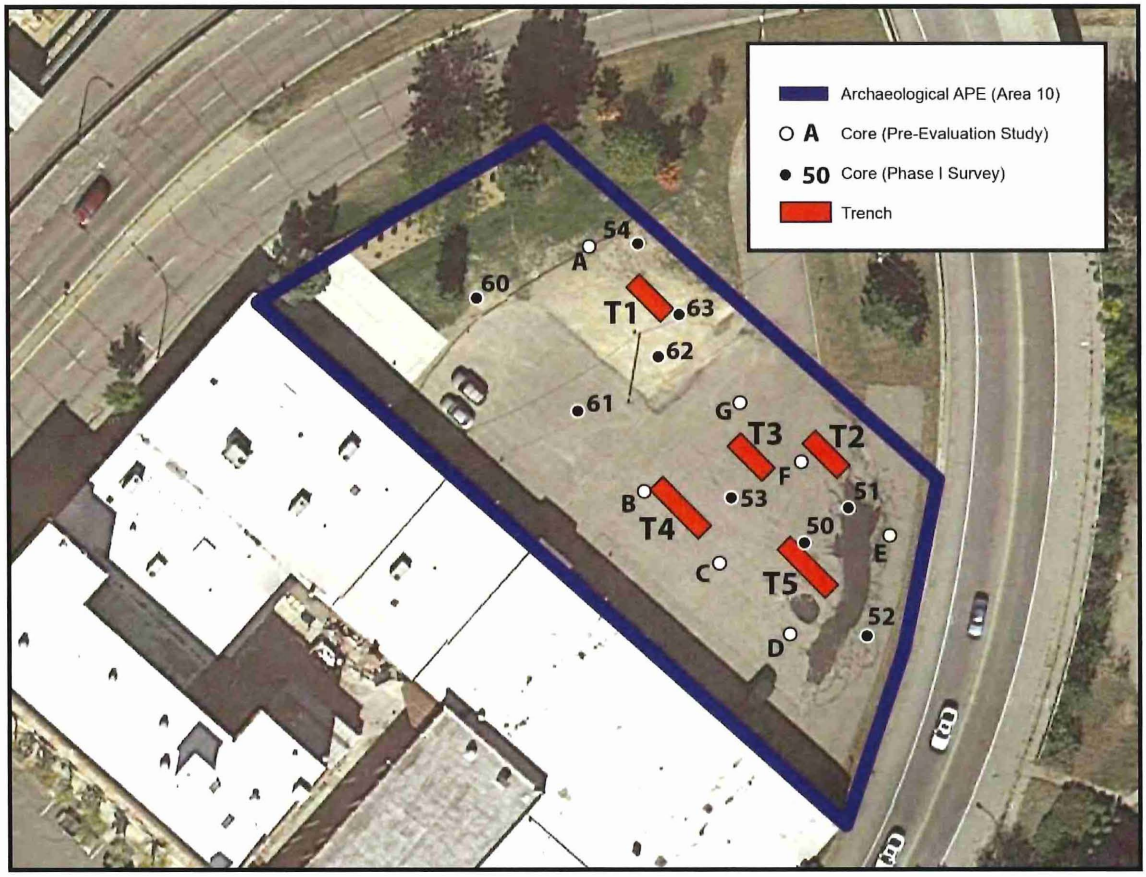


FIGURE 37. CORE AND TRENCH LOCATIONS WITHIN AREA 10 (RED WING SHOES LOCALITY)

Trench 2 was located 25 meters to the south of Trench 1 and 5 meters to the east of Trench 3 with its north edge in line with the south edge of Trench 3. A limestone foundation was encountered in the south end of Trench 2 at a depth of 50 cm below the surface of the lot. This foundation is likely the north wall of a pre-1884 dwelling that fronted on Bluff Street and which stood through the late 1950s when it was removed to construct the approach to the TH 63 (Eisenhower) Bridge (Sanborn 1884, 1943; State of Minnesota Department of Highways n.d.). The stratigraphic profile of Trench 1 consisted of gravels, fill and clean sand in the upper 60 cm that gave way to a demolition layer (60-75 cmbs) over additional clean sand (75-115 cmbs). At a depth of 115-125 cm a very dark grayish brown (10YR 3/2) loam with mottles and banding was encountered. This apparent buried soil/occupation layer contained stoneware fragments. This horizon overlay a distinctive stratum of stone rubble that continued to a depth of 1.8 meters. At that depth a black (10YR 2/1) native soil was encountered that continued to a depth of 2.5 meters. The water table was present at 2.4 meters. The buried soil documented at 180-250 cmbs (5.9-8.2 ft.) contained historical-period artifacts including a clay pipe stem (undecorated) (1), sherds of an aqua double-eagle quart flask with an applied lip marked "PITTSBURGH PA" (Figure 38) (4), bone (bird, mammal, fish) (7), ceramic (1), and shoe fragments (4).

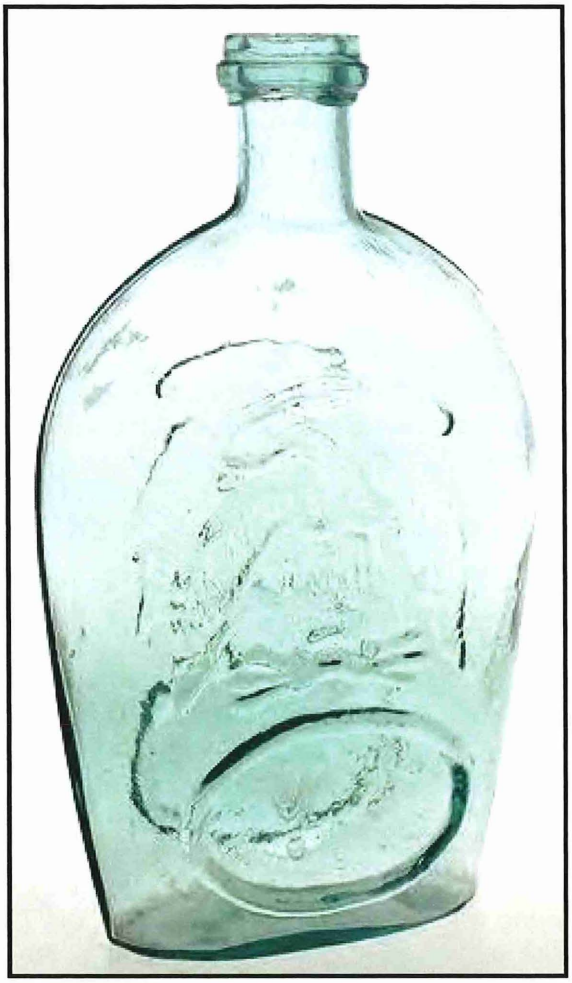


FIGURE 38. INTACT EXAMPLE OF DOUBLE EAGLE QUART FLASK OF WHICH FOUR FRAGMENTS WERE FOUND WITHIN AREA 10 (TRENCH 2)

Trench 3 was excavated 5 meters to the west and slightly to the north of Trench 2. A limestone foundation was encountered at

the north end of the trench at a depth of 40 cmbs. This foundation is associated with a four-story, iron clad structure that was part of the Red Wing Manufacturing Company complex (Sanborn 1891). The stratigraphic profile of Trench 3 was similar to that encountered in Trench 2. The upper historical-period occupation layer was documented at 100-140 cmbs and the buried soil beneath the rubble layer was present at a depth of 200-220 cmbs (6.5-7.2 ft.). Milled lumber, flat glass (2), a machine cut nail (1), and a fragment of bone (mammal) (1) were present in the deeper soil.

Trench 4 was located 10 meters to the west of Trench 3. The buried soil beneath the rubble was documented at a depth of 180-215 cmbs (5.9-7.0 ft.). It contained milled wood fragments, ceramics (5), flat glass (2), a machine cut nail (1), bone (mammal, including a pig mandible fragment) (3) and shell (1).

Trench 5 was located 12 meters to the west of Trench 2, with its north edge was aligned with the south edge of Trench 2. The buried soil was documented at 164-210 cmbs (5.3-6.8 ft.), with an artifact layer from 180-200 cmbs (5.9-6.5 ft.) that contained milled wood, flat glass (2), and bone (mammal) (1) as well as other organic material.

Based on the results of the coring and trenching, Area 10 (Red Wing Shoe Locality) has a high potential to contain intact 19th-century and earlier archaeological resources. Not only did cores and trenches encounter intact foundations indicating that the area has not been intensively graded, but trenches also revealed a deeply-buried native soil capped by a 19th-century fill episode. This soil is generally present between 180-250 cmbs (6-8.2 ft.). Milled wood is present within the uppermost portion of the soil and just beneath the rubble fill that caps this horizon. This lumber is presumably by-products of the Daniel C. Hill's sash and door factory founded in 1862 on the northeast corner of the block. Based on the artifacts present within the buried soil including shell-edge earthenware (ca. 1840-1860s) and fragments of a double eagle quart flask (ca. 1860s-1870s) it is associated with an occupation dating to the third quarter of the 19th century. It is unclear when the rubble fill was introduced, but based on the cultural material present beneath and atop it, as well as historical maps and image, the area was filled c. 1870. Capped beneath the rubble fill are deposits associated with the initial development of Red Wing and possibly earlier periods. Given the depth and inundated nature of this stratum and its presence within a corporate parking lot, it was not possible to fully explore the extent of these deposits. If Area 10 is within the APE of the TH 63 Bridge Project's preferred alternative, additional archaeological investigations will be needed.

AREA 25 – VIKING COCA COLA LOCALITY

In Area 25, geomorphological Cores 77 and 78 identified buried soils underneath fill beginning at approximately 35 cmbs and 30 cmbs, respectively. The buried soil consisted of a black silt loam, 10 centimeters thick, overlying a gray silt loam 10 to 20 centimeters thick. The latter gave way to a weathered rock surface that transitioned to bedrock. No artifacts were observed in either core.

On May 27, 2014, staff from Strata Morph and Two Pines, including Principal Investigator Michelle M. Terrell, conducted augering within the southern portion of Lots 7 and 8 of Block 25, which is a paved loading dock approach (Figure 39). Augering was

FIGURE 39. OVERVIEW OF AREA 25, VIEW TO NORTHEAST

undertaken in order to better characterize the archaeological content of the buried soils. Two transects of four auger tests spaced at 10-m intervals were laid out across the available test area (Figure 40). An additional bracketing auger test (A-9) was placed 5 meters to the south of test A-7, while auger test A-10 was placed within a depression apparent on the surface of the lot. A cluster of three 6-in. flight augers was extracted at each location and all soils were screened through ¼-in. mesh.

A layer of fill, followed by natural A and B horizons over bedrock characterized each test. Nine of the 10 auger tests contained historical-period material within the A horizon. The exception was test A-8 which met refusal in concrete at the surface. The artifacts encountered were typical of a light surface scatter and included brick, flat glass, nails, ceramics, bone, coal, slag, and cinders. Test A-4 was notable for producing 15 bone fragments amongst the 23 artifacts it contained. Most were unidentifiable mammal bone, but two fragments were identified as being the metacarpal and ulna of a pig (*Sus scrofa*). This test was to the rear of the grocery and abundant faunal remains are typical of 19th-century grocery store deposits. A single test (A-7) produced three pieces of lithic shatter. The lithic material recovered within test A-7 was associated with a distinct dark brown (7.5YR 3/2-3/3), clay loam over gravels. However, the lithics could not be definitively determined to be of cultural origin given their small size and the fact that the chert is of a type that naturally occurs as nodules within the local bedrock. Further, this horizon may be related to a fill event associated with a concrete foundation or footing encountered within the test at 40 cmbs. The matrix with the lithics was not present within any of the other tests including the bracketing auger test (A-9) placed 5 m to the south of A-7.

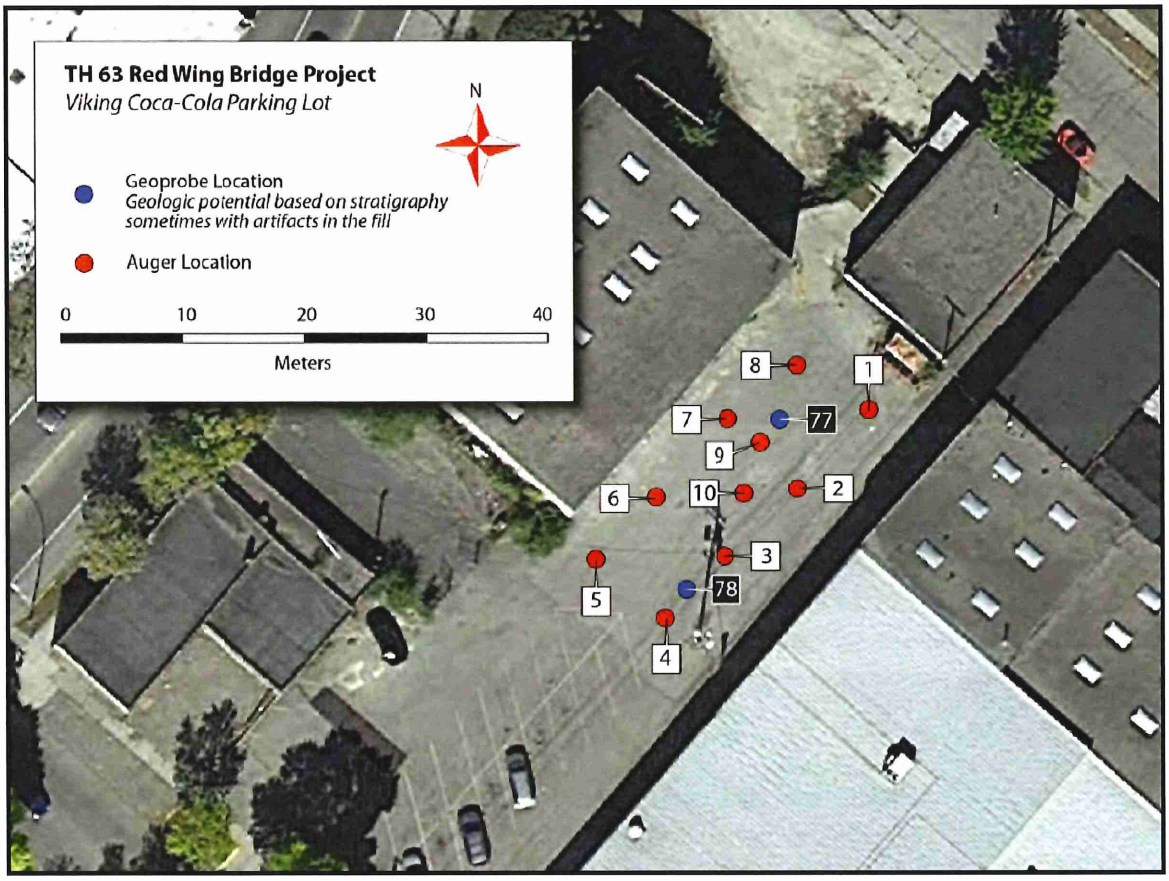


FIGURE 40. PLAN OF GEOPROBE CORES WITHIN AREA 25 (KOLB 2014:27)

Auger tests within Area 25 (Viking Coca Cola Locality) exhibited intact soils, artifact patterning, and the possibility of a precontact period occupation. Based on these findings, Area 25 has a high potential to contain intact archaeological resources, however, the active loading dock and a lack of landowner permission for the remainder of the test area prevented additional sub-surface archaeological testing during the current study. If Area 25 is within the APE of the TH 63 Bridge Project's preferred alternative, additional archaeological investigations will be needed.

RECOMMENDATIONS

For the Phase I study, the Downtown Commercial Sub-Area was reduced to two test areas (Areas 10 and 25) proximate to the bridge approach (Figure 41).

AREA 10 – RED WING SHOE LOCALITY

During the pre-evaluation study, the structural remains of the Red Wing Manufacturing Company encountered within Area 10 were documented as site lead 21GDbj. During the Phase I coring and trenching within Area 10, additional foundations and debris related to the company's complex were identified within the north half of Area 10 and along the north edge of Trench 3. However, while the Daniel C. Hill sash and door factory and subsequent Red Wing Manufacturing Company was an important industry within early Red Wing, modifications to the structure, including its conversion to an auto

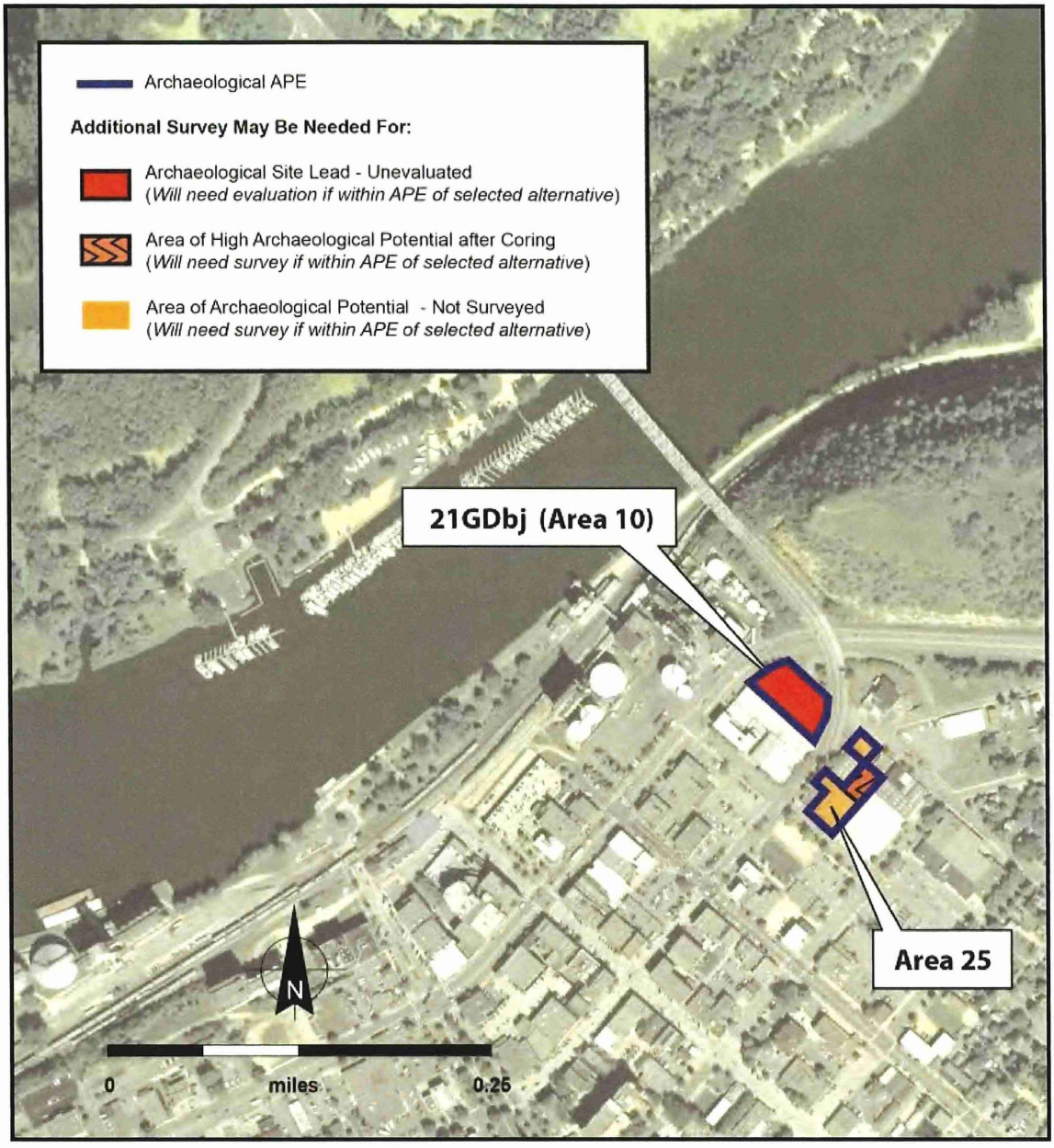


FIGURE 41. DOWNTOWN COMMERCIAL SUB-AREA SURVEY RESULTS

repair shop between 1917 and 1927 and its subsequent demolition mean that it is unlikely to retain technological components that would further our understanding of this industry. Further, no indication of related artifact-bearing horizons was found within the cores or trenches. Based on these findings, the structural remains alone of the Red Wing Manufacturing Company are unlikely to provide important historical information that would not meet NRHP Criterion D. However, coring and trenching within the south half of Area 10 documented intact foundations and a deeply-buried native soil capped by a 19th-century fill episode. This soil is generally present between 180-250 cmbs. Milled wood is present within the uppermost portion of the soil and just beneath the rubble fill that caps this horizon. This lumber is presumably by-products of the Daniel C. Hill's

sash and door factory founded in 1862 on the northeast corner of the block. Based on the artifacts present within the buried soil including shell-edge earthenware (ca. 1840-1860s) and fragments of a double eagle quart flask (ca. 1860s-1870s) it is associated with an occupation dating to the third quarter of the 19th century. It is unclear when the rubble fill was introduced, but based on the cultural material present beneath and atop it, as well as historical maps and image, the area was filled c. 1870. Given the depth and inundated nature of this stratum and its presence within a corporate parking lot, it was not possible to fully explore the extent of these deposits. However, the buried soil contains deposits associated with the initial development of Red Wing and possibly earlier periods, that may have significant information potential (NRHP Criterion D). The boundary of site lead 21GDbj has been expanded to encompass all of Area 10. If Area 10 is within the APE of the TH 63 Bridge Project's preferred alternative, additional archaeological investigations will be needed.

AREA 25 – VIKING COCA COLA LOCALITY

Auger tests within Area 25 (Viking Coca Cola Locality) exhibited intact soils, artifact patterning, and the possibility of a precontact period occupation. Based on these findings, Area 25 has a high potential to contain intact archaeological resources, however, the active loading dock and a lack of landowner permission for the remainder of the test area prevented additional sub-surface archaeological testing during the current study. If Area 25 is within the APE of the TH 63 Bridge Project's preferred alternative, additional archaeological investigations will be needed.

CHAPTER 8 . EAST RED WING RESIDENTIAL SUB-AREA

The East Red Wing Residential sub-area was defined as the portion of the APE east of Bluff Street and south of TH 61/63, which was historically occupied primarily by residential housing and the city gas works. For the Phase I archaeological survey the sub-area was reduced to that portion of the APE north of the alignment of East 4th Street (Figure 42). This sub-area is currently occupied primarily by residential development. Also present are the public works/PBF (People Behind the Flower Baskets) building, with associated parking lot and greenspace, and a light industrial building.

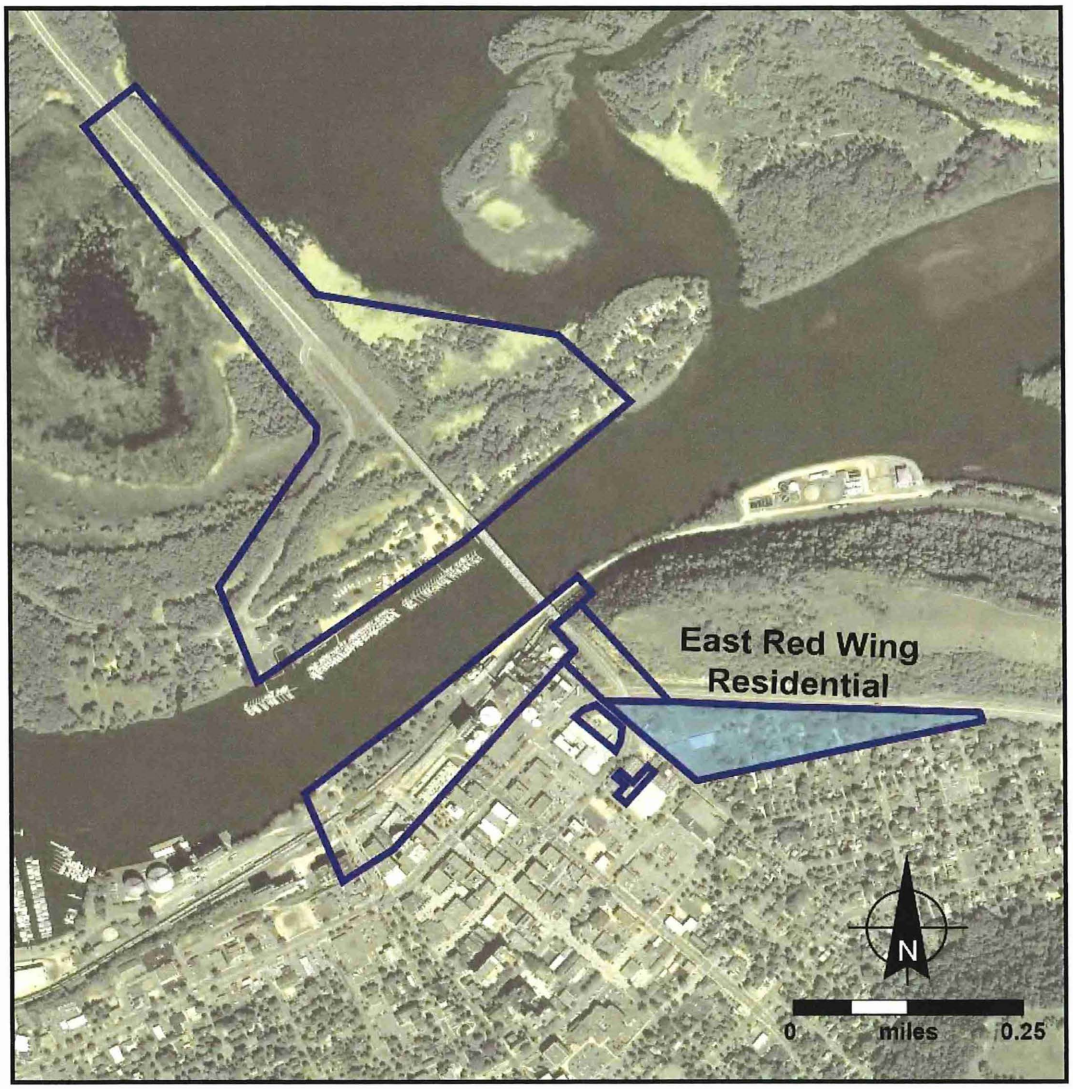


FIGURE 42. EAST RED WING RESIDENTIAL SUB-AREA OF THE ARCHAEOLOGICAL APE

HISTORICAL BACKGROUND

Although no precontact archaeological sites have been identified within the East Red Wing Residential sub-area, this sub-area incorporates portions of river terraces in the vicinity of the site of a Mdewakanton Dakota village, which suggests the likelihood that it was used during the precontact period. The village near Red Wing was recorded as early as 1805 and continued to be occupied until 1853 when its occupants removed to a reservation in the Minnesota River valley in compliance with the Treaty with the Sioux of 1851.

The East Red Wing Residential sub-area has been occupied primarily by single-family houses since the mid-19th century, when its residents were predominantly of first-generation Scandinavian heritage and working class, trends that continued through the turn of the twentieth century. Historically, the main exceptions within the APE to its residential character were a cooperage and associated barrel warehouse present by 1884, and the facilities of the Red Wing Gas Light Company, built in 1872 and subsequently expanded under the aegis of the various corporations that successively acquired the original company. These facilities were located on the east side of Bluff Street between 3rd Street E. and 4th Street E. The cooperage and warehouse were removed sometime between 1884 and 1891, while the gas light works were expanded and reconfigured for other power supply uses before being removed during the second half of the 20th century (Sanborn 1884-1943; Hancock 1893:215). In addition, the location of the light industrial building (constructed in 1947) was formerly the site of two dwellings along East 3rd Street and a store with an attached beer warehouse that fronted on Bluff Street.

PRE-EVALUATION STUDY

During the pre-evaluation study, two geologic cores were taken, 11GD-04 and 11GD-05, within the East Red Wing Residential sub-area near the intersections of Arkin Street with 4th Street E. and 5th Street E., respectively (Figure 43). These cores identified a bedrock valley at depths of five feet (11GD-05) and eight feet (11GD-04) with overlying colluvial deposits that have relatively strong potential to contain precontact archaeological deposits. The potential of specific locations varies based on the severity of more recent impacts (Hudak 2011:19-20). Because bedrock is fairly shallow in this sub-area, it is less likely that intact precontact resources survive in areas that have undergone development, including the construction of roads, houses, outbuildings, the former gasification plant, and the public works/PBF (People Behind the Flower Baskets) building.

Shovel testing was also attempted within public right of way between East 3rd Street and TH 61/63. Several dwellings were formerly present in this area. Shovel testing therefore commenced in this area after archaeological coring for the project had been completed. The shovel test (Shovel Test 1), however, encountered extremely compact fill and concrete fragments that prevented hand digging beyond 38 cmbs.

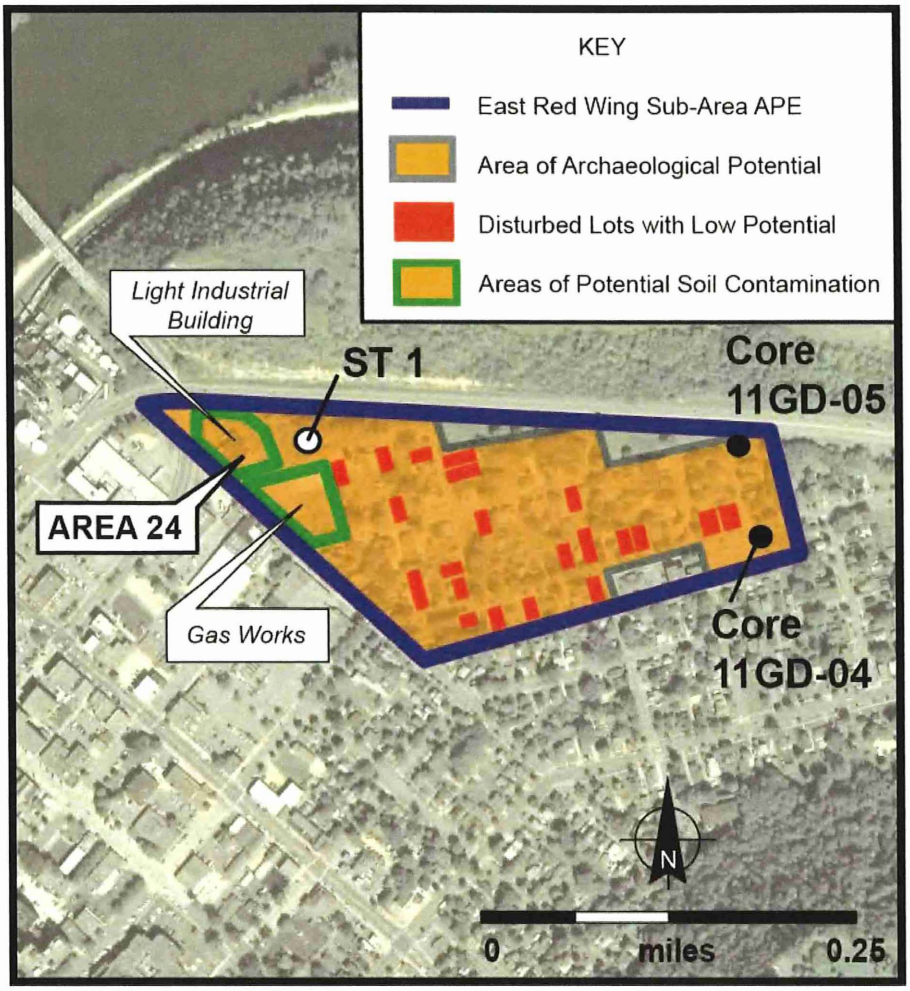


FIGURE 43. EAST RED WING RESIDENTIAL SUB-AREA PRE-EVALUATION STUDY RESULTS

METHODS

The revised East Red Wing Residential sub-area encompasses areas of potential soil contamination, public right of way, and private residential lots. As areas of potential soil contamination could not be field tested, additional historical information was gathered that could assist in identifying the specific types of archaeological resources associated with these locations, their likely integrity, and their potential historical significance. This information was augmented by soil data from the environmental boring logs conducted by URS in 2014. The environmental borings were not observed by an archaeologist.

Geomorphological coring was carried out within public right of way located between the alignments of East 3rd Street, the TH 61/63 highway corridor, and the frontage road/access to the Red Wing Shoes Company lot. Attempts to shovel test this area during the pre-evaluation study encountered highly compacted soils. Coring within the East 3rd Street Locality was conducted by Strata Morph and observed by Two Pines' Principal Investigator, Andrea (Vermeer) Pizza, on May 6, 2013. Based on the presence of buried soils within this location, trenching was conducted per the MnDOT Deep Test Protocol (Commonwealth Cultural Resources Group 2006).

Shovel testing was conducted in the East Red Wing Residential sub-area by Two Pines staff under the direction of Two Pines' Principal Investigator, Andrea (Vermeer) Pizza, on September 4-6 and 12, 2013. Shovel testing took place within residential lots with moderate to high archaeological potential for which landowner permission had been received. Shovel testing intervals varied based on each lot's available open pace.

AREAS OF POTENTIAL SOIL CONTAMINATION

Two locations with moderate to high archaeological potential within the East Red Wing Residential sub-area could not be field tested due to the presence of, or likely presence of, contaminated soils. For ease of reference, these are designated as the Gas Works Locality and the Light Industrial Locality (Figures 44 and 45). Twenty environmental soil borings were placed within these two localities (Figure 46).

GAS WORKS LOCALITY (231 BLUFF STREET)

The Gas Works Locality encompasses the site of the former gas works of the Red Wing Gas Light Company and a later associated electrical plant. It also includes the locations of four former pre-1884 dwellings along East 3rd Street that were removed in the course of the plant's expansion. This locality also extends to the first tier of extant residential properties to the east including the property at 135 East 3rd Street, which was determined during the pre-evaluation study to have low potential for containing intact archaeological resources from any period, and the property at 120 East 4th Street, which were determined to have moderate to high potential for archaeological deposits.

Red Wing Gas Light Company

Although the Red Wing coal gas works and electrical plant may have held historical significance as an early and important part of the city's infrastructure, the core facilities of these operations were located largely above-ground and have been demolished. Any archaeological remnants, therefore, would not retain the integrity to convey any potential significance under NRHP Criterion A. During the literature review, no evidence was found that suggests the gas works and electrical plant would be significant under either Criterion B or C. While the gas works was established by leading citizens of Red Wing, their historical importance was unrelated to the gas works. The plant was standard in its components, it was not an early or innovative example of a coal gasification or electrical plant, and none of the architectural elements are extant; therefore, the site would not have design or engineering significance as needed to satisfy Criterion C. The only subsurface components of the plant were a tar tank, the bases of the gasholders, and the gas mains. None of these components would provide important information about the history of the Red Wing plant or the technology of coal gas works or electrical stations overall. Any archaeological deposits or features would therefore not meet Criterion D.

135 East 3rd Street

The Gas Works Locality also encompasses the property that was historically occupied by a residence at 135 E. 3rd Street, which was determined during the pre-evaluation study to have low potential for containing intact archaeological resources from any period due to extensive alterations to the structure on the lot including expansion into the rear yard.

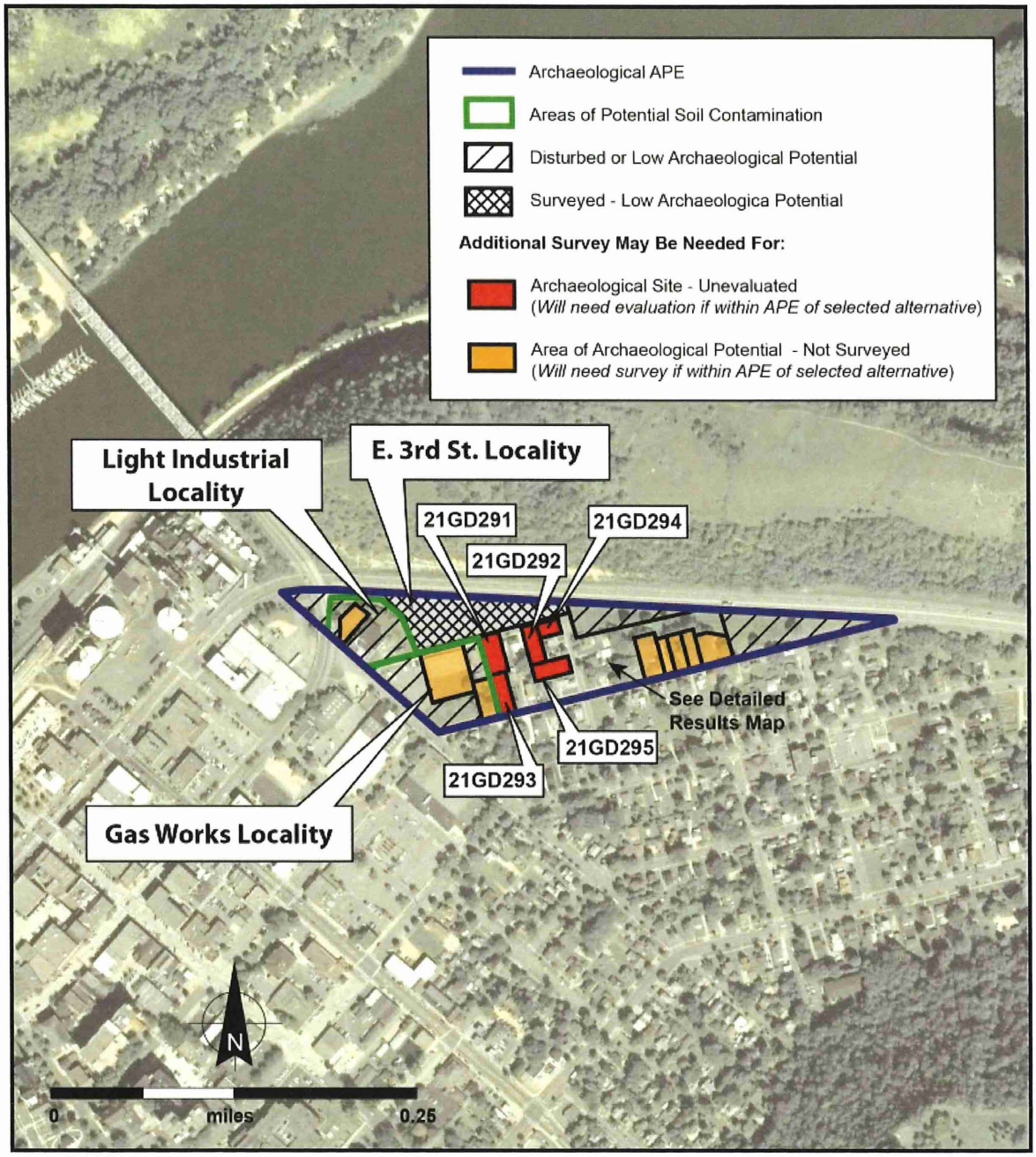


FIGURE 44. EAST RED WING SUB-AREA SURVEY RESULTS OVERVIEW

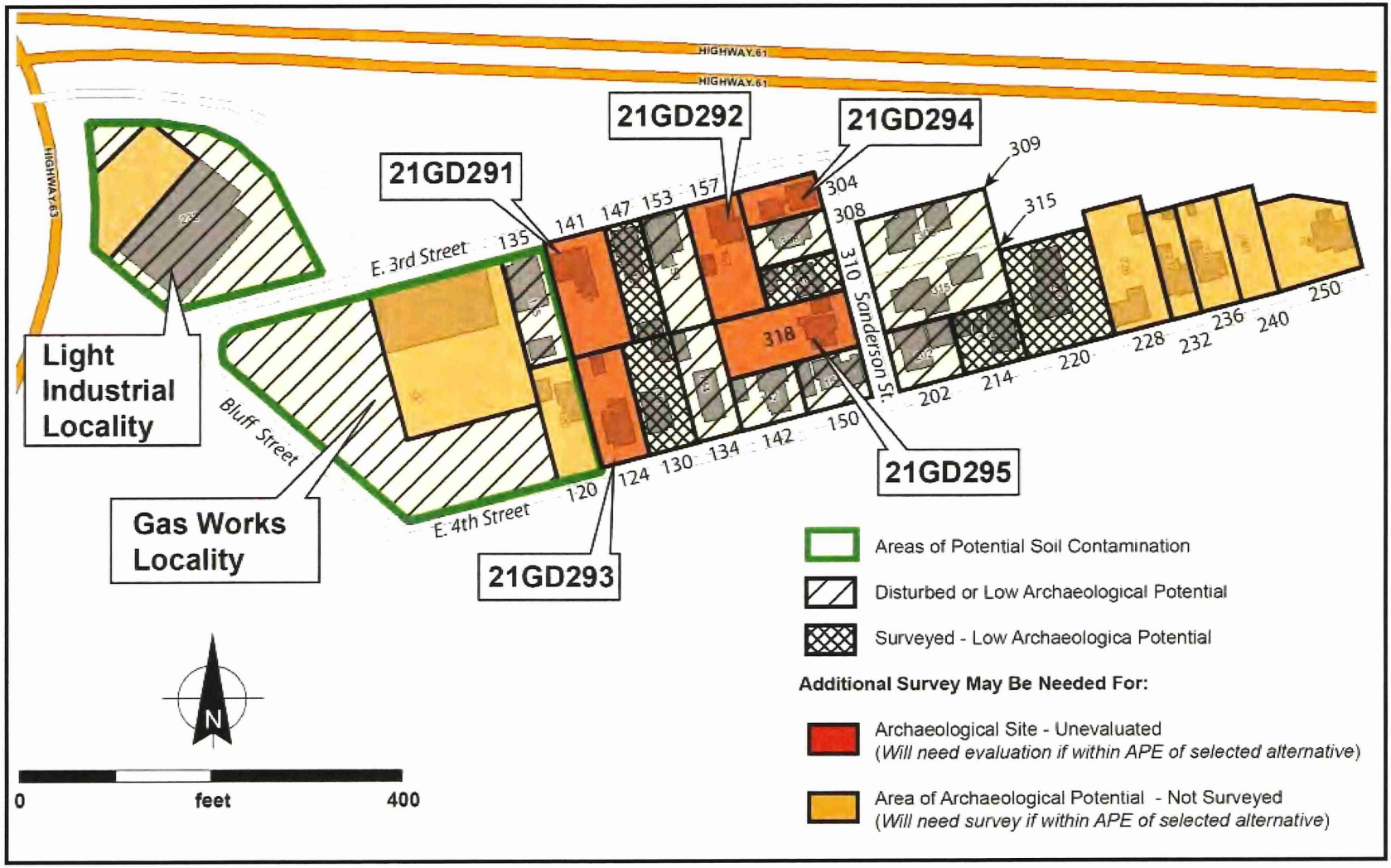


FIGURE 45. EAST RED WING SUB-AREA – DETAILED RESULTS MAP

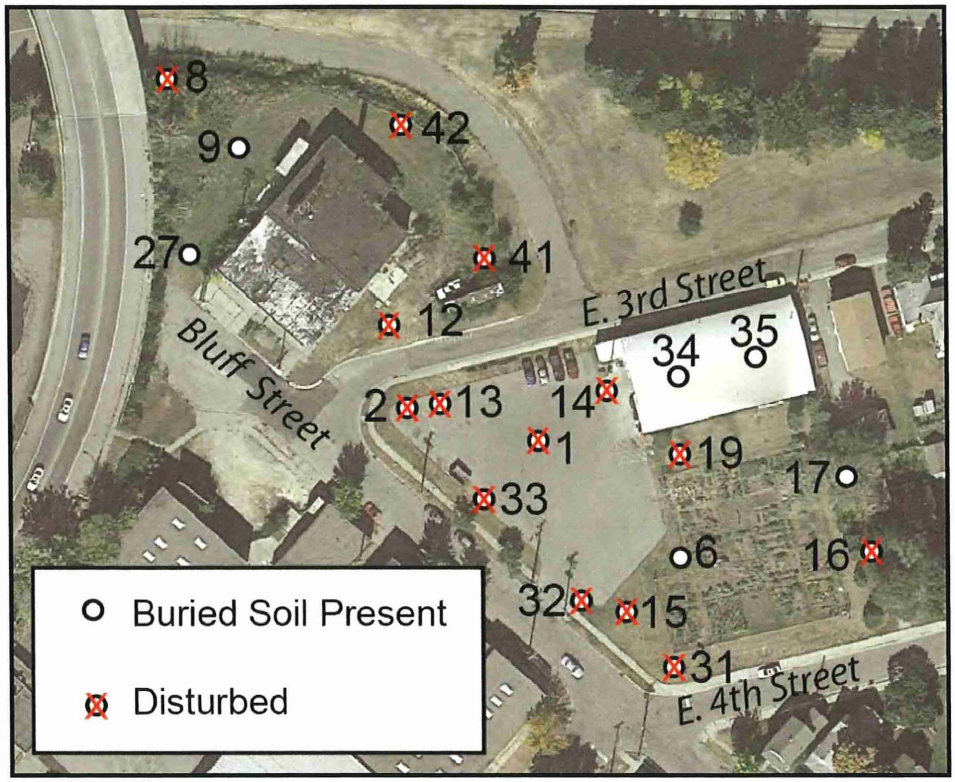


FIGURE 46. RESULTS OF ENVIRONMENTAL SOIL BORINGS WITHIN THE GAS WORKS AND LIGHT INDUSTRIAL LOCALITIES

120 East 4th Street

The Gas Works Locality also encompasses the property at 120 East 4th Street, which was formerly the site of two dwellings the one being located where the garage is now. The structure to the west was identified initially as 118 ½ and the one to the east as 118, and later as 118 and 120 East 4th Street, respectively. It is not known when specifically the residences at 118 and 120 E. 4th Street were built, although they predate 1884 when they both appear on the Sanborn map of that year (Sanborn 1884). Between 1927 and 1943, the one-story dwelling on the west half of the block was either replaced by, or converted to, a garage.

In 1857, the property on which these residences were located was listed under the ownership of Ives and Sexton. Ives was the sole owner listed in 1864, while Jared Sexton was the sole owner listed in 1866. Ives was most likely John Ives, a millwright, while Jared Sexton ran a grocery store at Plum and Third streets in 1866, though he had previously been an agent for a steamboat line and ran a meat market thereafter (Franklin-Wedge 1909:713). It is likely that the residences were constructed prior to 1860 and were occupied by Ives and Sexton, as they and their families were enumerated consecutively in the census of 1860, and in proximity to Charles Merrill, who owned and likely resided at the property at 220 E. 4th Street. In 1868, Charles Graves, who lived at 135 E. 3rd Street, took ownership of the lot and probably rented out the house at 118 E. 4th Street, as did subsequent owners until the turn of the century (Table 1).

Goodhue County auditor tax lists indicate that in 1883, Andrew Gunderson, a police officer (Curtiss-Wedge 1909:566), took ownership of Lot 11. Gunderson's occupancy of 120 E. 4th Street, along with up to two boarders, is identified in a city directory dating to 1894. Although the potential boarders, Marcus Avins and Charles Peterson, are listed at 120 E. 4th Street in the 1894 city directory, a Marcus Evans with the same occupation listed for Marcus Avins is listed at 118 E. 4th Street, suggesting that he and perhaps Peterson as well boarded at the house next door to Gunderson's. Gunderson passed away sometime between 1894 and 1899, as his widow is listed at 120 E. 4th Street in a city directory of the latter year (Red Wing Historic Resources Inventory Form, 120 E. 4th Street, held at the GCHS). Because, however, his residency falls between federal census schedules, Andrew Gunderson's place of birth and any other occupations could not be readily identified.

Based on the results of shovel testing conducted at the neighboring property (124 E. 4th Street), it is entirely likely that historical-period archaeological resources associated with the residences at 118 and 120 E. 4th Street are present and intact. Given the results of shovel testing in the neighborhood in general, archaeological resources dating to the contact or precontact periods, although less likely, are also a possibility. If this lot is located within the within the APE of the TH 63 Bridge Project's preferred alternative, and soil contamination levels allow, additional archaeological investigations will be needed.

Environmental Soil Borings

During environmental testing conducted by URS, 14 soil borings were placed within the Gas Works Locality. Ten of the borings documented disturbance and a lack of intact soils (see Figure 46). However, two borings (6 and 17) within the east-central portion of the locality documented a very dark grayish brown to black, clayey silt or silty clay at a depth of 5-8.5 ft. (1.5-2.6 m). The description and depth of this soil is consistent with the artifact-bearing soil encountered to the northwest of the locality in Area 10 (21GDbj). The presence of this soil suggests a moderate to high potential for archaeological resources. Furthermore, two borings (34 and 35), which were taken within the public works building, documented an intact dark brown to black soil beneath the concrete floor of the building at depths of 0.5-6.0 ft. (0.15-1.8 m). Boring 34 also encountered brick at a depth of a 1.5 ft. (0.45 m). Based on these borings, intact soils are present within the east half of the Gas Works Locality. Given the results of investigations in the greater area, these soils have the potential to contain archaeological deposits.

Recommendation

Based on the results of this study, portions of the east half of the Gas Works Locality, including the lot associated with 120 East 4th Street have the potential to contain intact archaeological resources. If this area is located within the within the APE of the TH 63 Bridge Project's preferred alternative, and soil contamination levels allow, additional archaeological investigations will be needed.

LIGHT INDUSTRIAL LOCALITY (233 BLUFF STREET)

The Light Industrial Locality encompasses an area bound to the south by East 3rd Street, to the west by the alignment of Bluff Street, and to the north and east by an access road to the Red Wing Shoe Company (see Figure 45). The parcel currently encompasses an extant building constructed in 1947.

History

Sanborn maps indicate that this parcel has through the years has hosted lumber sheds; a pre-1884 dwelling at 116 ⅓ East 3rd Street that was removed for the 1947 industrial building; a post-1927 store/beer warehouse/garage fronting on Bluff Street that was removed in the late 1950s; and a house constructed after 1943 and removed in the late 1950s (Sanborn 1884-1947). Of these resources, the pre-1884 house at 116 ⅓ East 3rd Street has the greatest potential for associated historical-period archaeological deposits, however, the location of the structure and its associated lot has been impacted by the construction of the 1947 industrial building and the creation of the access road and the TH 61/63 corridor.

Environmental Soil Borings

During environmental testing conducted by URS, six soil borings (8, 9, 12, 27, 41, and 42) were completed within the Light Industrial Locality. Four of the six borings exhibited disturbance and a lack of intact soils (see Figure 46). However, two borings (9 and 27) to the north of the industrial building documented a dark brown to strong brown, silty clay at depths of 4-7.5 ft. (1.22-2.29 m). The description and depth of this soil is consistent with the artifact-bearing soil encountered to the immediate west in Area 10 (21GDbj). The presence of this soil suggests a moderate to high potential for archaeological resources.

Recommendation

Based on the results of the historical review and environmental coring, the only portion of the Light Industrial Locality with the potential to contain intact archaeological resources is located to the north of the structure. If this portion of the lot is located within the within the APE of the TH 63 Bridge Project's preferred alternative, and soil contamination levels allow, additional archaeological investigations will be needed.

EAST 3RD STREET LOCALITY

Seven single-family homes that formerly stood along this stretch of the north side of East 3rd Street were removed in the late 1950s during the construction of the TH 61/63 corridor. During the Phase I archaeological survey, seven geomorphological cores were advanced in this open area, which was designated the East 3rd Street Locality (see Figure 44). The first (Core 43) was roughly centered between the east and west ends of the test area, and the second (Core 44), approximately 30 meters (66 ft.) to the west (Figure 47). The subsequent four cores were taken in obvious small depressions within the open area, which resulted in fairly regular spacing at 10- to 15-meter (33- to 49-ft.) intervals. The final core, Core 49, was approximately 40 meters (131 ft.) east of Core 43, where a break in the trees allowed for a core to be taken. Fill and disturbance was evident throughout the area and only fill was documented in Cores 44 and 45. Beneath the fill, which was generally 1.0-1.5 meters in depth a relatively intact soil was present in cores 46 and 48 and a truncated soil in Core 43 (Kolb 2014:28). Cores 47 and 49 indicated the presence of a buried soil formed in sand, sandy loam, and colluvium.

Based on the presence of buried soils within the East 3rd Street Locality, on May 28, 2014, staff from Strata Morph and Two Pines, including Principal Investigator Michelle M. Terrell, oversaw trenching with a backhoe within this portion of the East Red Wing Residential sub-area of the APE (Figure 48). The trenching was undertaken in order to

FIGURE 47. PLAN OF CORES WITHIN THE EAST RED WING SUB-AREA (KOLB 2014:29)

FIGURE 48. PLAN OF TRENCHES WITHIN THE EAST RED WING SUB-AREA (KOLB 2014:31)

better characterize the buried soils and to expose them for archaeological testing. Five backhoe trenches were excavated proximate to the borings that had produced evidence of buried soils. Soils within the trenches were sampled and associated artifacts documented.

Within Trench 1, located between Cores 46 and 47, one buried soil was documented at a depth of 130-170 cmbs (4.2-5.6 ft.) and underlying a demolition layer at 115-130 cmbs (3.8-4.2 ft.). The buried soil at 130-170 cmbs produced scattered historic artifacts, with the demolition stratum above containing largely structural material (e.g. brick, charcoal, and mortar). The trench went to bedrock at 2.20 meters.

Trench 2, which was located proximate to Core 44 and approximately 10 m to the east of Trench 1, exhibited the same profile as Trench 1, but the remnant buried soil at 140-160 cmbs (2.8-3.6 ft.) was disturbed. Fewer artifacts were observed within Trench 2. The trench went to weathered bedrock at 2.30 meters.

Trench 3 was located proximate to Core 48 and 10 m east of Trench 2. A demolition layer was documented at 90-162 cmbs (2.9-5.3 ft.). The backhoe met refusal at 1.73 meters due to a slab and rubble in the east half of the trench.

Trench 4 was located proximate Core 43 and approximately 10 m to the east of Trench 3. A horizon of brown (10YR 4/3-4/4) sandy loam with an occasional historical-period artifact was documented at a depth of 171-201 cmbs.

Trench 5 was located 10 m to the east of Trench 4. A buried soil containing an occasional historical-period artifacts was identified at 80-115 cmbs (2.6-3.8 ft.).

While occasional historical-period artifacts were encountered within the trenches excavated within the East 3rd Street Locality, they were consistent with a light artifact scatter that would collect in a residential neighborhood. No dense artifact deposits or artifact-bearing features were encountered within the trenches. Rather, several cores and trenches provided evidence of disturbance from the removal of the buildings prior to the construction of the TH 61/63 corridor. Given these findings, together with the removal of the rear lots (where archaeological features are most prevalent) during highway construction, this area has a low potential to contain intact, historically-significant, archaeological resources. No further archaeological investigations are recommended within the East 3rd Street Locality prior to or during the construction of the TH 63 Bridge.

RESIDENTIAL PARCELS

Of the 23 residential parcels within the East Red Wing Residential sub-area that are located beyond the areas of potential soil contamination, eight were considered after the pre-evaluation study and subsequent investigation to have a low potential for containing intact archaeological resources given the developmental history of the property and thus were eliminated from testing. Five parcels identified as having moderate to high potential to contain archaeological resources could not be shovel tested during the Phase I survey because landowner permission was not received. The remaining 10 parcels underwent a Phase I survey using shovel testing. For each of the surveyed

parcels, the associated residential history is also provided, as reconstructed through Goodhue County tax auditor lists, United States census schedules, and city directories.

21GD291 (141 AND 143 EAST 3RD STREET)

The parcel associated within 141 E. 3rd Street is comprised of Lot 12 and the westerly portion of Lot 14 of Block 1 of the Auditor's Subdivision to East Red Wing. An extant house is present at 141 E. 3rd Street, while location of a former house that stood on the west half of Lot 14 at 143 E. 3rd Street is also encompassed by the parcel (Figures 45 and 49). To the rear of these structures were a variety of associated outbuildings including large 1/5 and 2-story stables/carriage houses. Additions were made to the rear of the house at 141 E. 3rd Street between 1910 and 1917, and the outbuilding was converted for use as an automobile garage between 1917 and 1927. The house at 143 E. 3rd was rebuilt or substantially modified between 1910 and 1917, and it was removed sometime between 1927 and 1943 (Sanborn 1884-1943).

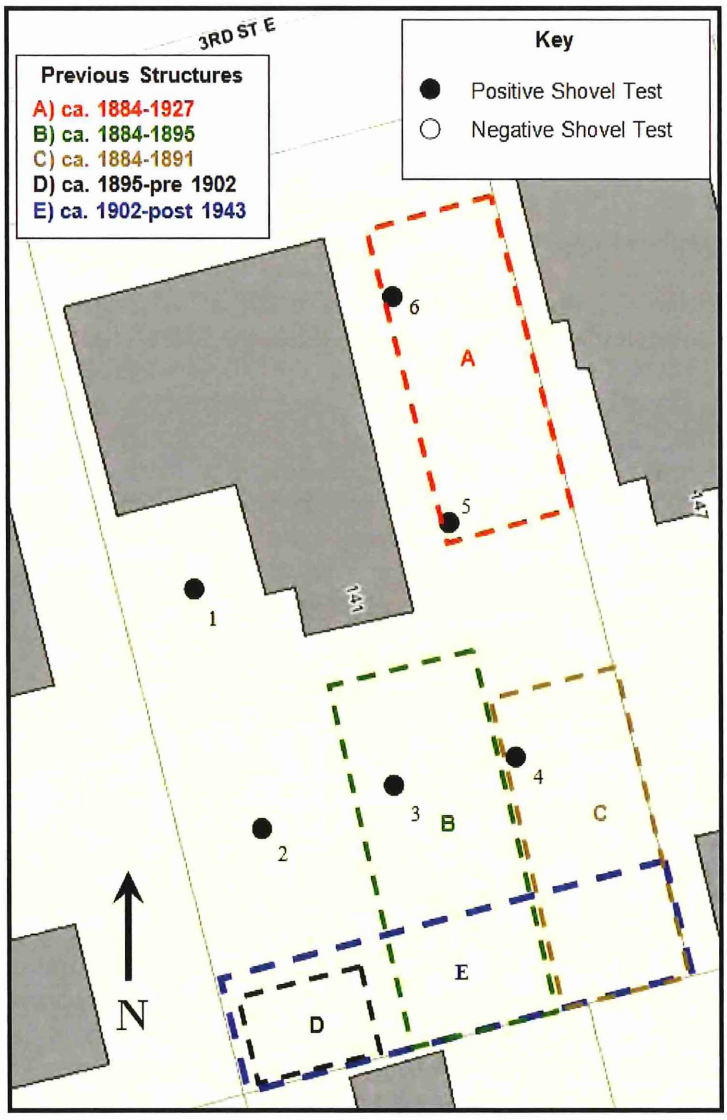


FIGURE 49. PLAN OF 21GD291 (141 AND 143 EAST 3RD STREET)

History

The residence at 141 E. 3rd Street was occupied by a Norwegian immigrant, Ole Nordlie, and his wife and son beginning in 1875. Although it is possible that the house was present on the property in the early 1870s, when the property was owned by Ellen Hanson, no record of Ms. Hanson could be located in the 1870 census. Circa 1882, ownership of the property was transferred to F. W. Hoyt. It is not known whether Hoyt resided at the property at any point, or exactly when it was purchased by the next resident, Bernard A. Olson; although the auditors records indicate that Hoyt owned the property through 1896 and that it was taken over by Olson in 1897, the 1894 city directory places Olson at 141 E. 3rd Street and notes Hoyt's widow at a different address. Bernard and his wife, Anna, were Swedish immigrants, and Bernard was the proprietor of a paint shop. His children were involved in the operations of the shop in various capacities during its history. Members of the Olson family continued to occupy the house through at least 1941.

The first confirmed residents of 143 E. 3rd Street were the family of Ole Ingebretson, another Norwegian immigrant, who worked in a flour mill. Although it is possible that the house was present on the property by as early as 1870, no record of the owner during that year, Nels Anderson, could be located in the 1870 census, and the subsequent owner, Gulbrand Islakson, fell between census schedules. The Ingebretson family lived in the house from 1879 until 1889, after which it was purchased by Bernard A. Olson, who probably rented it out until it was removed sometime between 1927 and 1930.

Fieldwork Results

Six shovel tests were established at 10-meter (33-foot) intervals along a single transect that wrapped around the side and rear yard of the house (see Figure 49). Despite the additions that had been made to the back of the house at 141 E. 3rd Street, the remaining large rear part of the lot remains mostly unaltered since the historical period.

All shovel tests contained a dark grayish brown (10YR 4/2) silt loam topsoil, 10 to 20 centimeters in thickness. In ST 2, the topsoil capped a concrete pad that was encountered at 15 cmbs. The edge of this pad was found in ST 3, and therefore it does not correspond to the footprint of the garage. Otherwise, in ST 3 and the remaining four shovel tests, the topsoil covered artifact-bearing, gravel-laden sandy silts or silt loams. Although occasionally modern artifacts were encountered in the upper horizons, a transition to historical-period artifacts occurred with depth. These included domestic items, such as ceramic sherds, curved glass fragments likely from bottles or jars, buttons, and a buckle. A high density of faunal remains was recovered from ST 4 and ST 5. A variety of specimens were represented including pig, fish, chicken and other bird, and indeterminate medium and large mammals. In addition to the domestic items, demolition debris was also encountered, including machine-cut and wire nails, a screw, a washer, mortar fragments, a structural tile fragment, brick fragments, and window glass fragments. Beneath the artifact-bearing layers, a very dark gray (10YR 3/1) silt loam containing no gravel and very few artifacts is present.

The identified site was designated 21GD0291.

Artifact Analysis

A total of 470 artifacts were recovered from 141 and 143 E 3rd Street. These included 151 faunal remains, 15 ceramic sherds, 62 pieces of glass, and 142 metal pieces and fragments. Also, recovered were three buttons, two plant seed fragments, one piece of lithic shatter, one fiberglass fragment, 20 slag fragments, 11 brick fragments, five coal fragments, five mortar fragments, two textile fragments, one hollow tile fragment, and one asphalt fragment, as well as one tin foil fragment, one yarn fragment, 10 wood fragments, and 35 modern plastic fragments.

Faunal Remains. Shovel tests within 21GD0291 yielded a total of 151 (32.1% of site assemblage) faunal specimens. Shovel Test 5, located on the east side of the house, had the highest concentration with 48.3 % (73) of the faunal remains. The remainder of the animal bone was produced mainly by ST 6 and ST 4, also in the east half of the yard, with 24.5% (37) and 22% (33) respectively. Shovel Test 3 (5) and ST 1 (3) cumulatively contained just eight specimens (5.3%), and ST 2 was devoid of any animal material. The preservation of the faunal remains was excellent throughout the site with no specimens showing signs of extensive wear and weathering and only two with animal gnaw marks; however, due to their fragmentary nature most were not able to be identified beyond class. Of those could be assigned to a class there were bivalve (73; 48.3%), mammal (28; 18.5%), fish (12; 7.9%), and bird (12; 7.9%) present. The remaining 26 specimens (17.2%) were not able to be assigned to a class. Some of those assigned to a class were able to be further classified. All of the bivalve specimens (73) were identified as freshwater mussel shell fragments. Of the identified mammal bone, there was pig (*Sus scrofa*) (4), rodent (1), and likely rodent (2); furthermore, the majority of the mammal remains were from medium to large species. Although most of the fish could not be identified, one specimen was likely from the pike genus (*Esox*), and the size and morphology of the other specimens were consistent with freshwater species native to the local region. Of the birds, there were four specimens assigned to the Galliformes family, all of which were likely chicken (*Gallus gallus*). Some of the remains (13) exhibited evidence of butchery and cooking. There were nine specimens with cut marks and four specimens with sawn edges located in ST 4 and 5. Also, some bone fragments showed signs of being burned (7) or calcined (12) with the majority concentrated in ST 5 (8) and ST 6 (6).

Ceramics. At 21GD0291, there was a total of 15 (3.2% of site assemblage) ceramic artifacts collected. The 15 ceramic artifacts collected included five ironstone sherds including one identified as a plate, two whiteware sherds, six earthenware sherds, one stoneware sherd, and a porcelain sherd. Of the ceramic artifacts recovered, a single ironstone sherd possessed a fragmentary black transfer-printed maker's mark. These artifacts were concentrated largely in ST 4 (5), ST 5 (6), and ST 6 (3), which are all along the north-south transect. Shovel Test 3 did not produce any ceramic sherds.

Glass. At 21GD0291, there was a total of 62 (13.2% of site assemblage) glass artifacts collected. Among the 62 glass artifacts collected there were oil lamp sherds (6), a jar sherd (1), a glass marble, and a red taillight sherd. There were also indeterminate curved glass sherds likely from bottles or jars including colorless glass (18), aqua glass (5), green glass (1), olive glass (1), and a milk glass (1) varieties. In addition to these artifacts, 27 pieces of both colorless and aqua flat glass were recovered. Glass artifacts were spread throughout ST 3 (10), 4 (10), ST 5 (22), and ST 6 (14).

Metal. At 21GD0291, there was a total of 142 (30.2% of site assemblage) metal artifacts collected. These artifacts included a buckle (1), a brass tag for "Starket's Chocolate" (2), straps (2), washers (2), a spring (1), a lapel pin (1), a clamp (1), an eyelet (1), tacks (2), staples (2), a screw (1), machine cut nails (13), and wire nails (33). In addition to these artifacts, a total of 80 unidentified metal fragments were also recovered. These artifacts were found in all six shovel tests with a higher density in ST 4-6.

Miscellaneous Artifacts. In addition to the above artifacts, material collected at 21GD291 included a fabric covered button (1; ST 3), a Prosser and a shell button (2; ST 5), plant seed fragments (2; ST 4-5), lithic shatter (1; ST 1), a fiberglass fragment (1; ST 6), slag fragments (21; ST 1, 3, and 5), brick fragments (11; ST 3-5), coal fragments (5; ST 3 and 5), mortar fragments (5; ST 1, 3, and 5), textile fragments (2; ST 5), a hollow tile fragment (1; ST 3), and an asphalt fragment (1; ST 1), as well as a tin foil fragment (1; ST 5), a yarn fragment (1; ST 4), wood fragments (10; ST 4), and modern plastic fragments (35; ST 1, 3-6). The single piece of lithic shatter was from a small nodule and could not be definitively determined to be of cultural origin given its size and the fact that the chert is of a type that naturally occurs locally.

Synthesis

The artifacts collected within 21GD0291 are associated with the domestic occupation of the site during the late 19th and early 20th century. Though modern artifacts were present at shallow depths, an intact historical layer was encountered at roughly 20 cmbs. The majority (348; 74%) of the artifacts were recovered on the east half of the lot which was formerly occupied by 143 East 4th Street. Based on the high number of animal bone present, especially those with cut and saw marks, mixed with household ceramic and glass sherds as well as architectural debris, the preferred household trash disposal areas may have been between the two houses in addition to the southeast corner of the backyard. Furthermore, the faunal material indicates that while the inhabitants' meat consumption was largely dependent on domesticated animals including pig and chicken, it was supplemented with wild aquatic animals such as fish and freshwater mussels. Also, the presence of cranial and foot elements suggest that some animals were being butchered on site.

Recommendation

Based on the presence of intact historical-period deposits, a high density of domestic artifacts including faunal remains, and their association with 19th-century working class life in East Red Wing, a Phase II archaeological evaluation of 21GD0291 (141 East 3rd Street) is recommended to determine it is eligibility for listing on the NRHP should this site be within the final APE of the TH 63 Bridge Project.

147 EAST 3RD STREET

The parcel associated with 147 East 3rd Street is the eastern portion of Lot 14 of Block 1 of the Auditor's Subdivision to East Red Wing (see Figure 45). The property includes an extant house and garage, and the locations of former outbuildings. The house was constructed between 1867 and 1884. All previous outbuildings were removed between 1910 and 1917, and a garage was constructed at the rear of the lot.

History

An 1894 city directory indicates that 147 E. 3rd Street was occupied by a Nels Anderson, although the auditor tax lists indicate that the owner of the property from 1877 through 1899 was Erland Olson, therefore perhaps Mr. Anderson occupied the house as a renter at that time. Nels Anderson, however, was listed as the owner from 1870 to 1876, and subsequently, in 1900 and 1910. The census and city directory information indicate a renter residing with the Anderson family at the property in 1900. Sometime during 1910 or 1911, Nels passed away, and his family left the property before 1920, after which it was occupied by a series of renters.

Fieldwork Results

Four shovel tests were established in the backyard of the property, with two shovel tests at 10-meter intervals located on two north-south transects spaced five meters (16 ft.) apart. As at 141 E. 3rd Street, each shovel test began with a dark grayish brown, silt loam topsoil, which was extremely compact at this location, and it contained just a few artifacts, some modern. Overall, beneath the topsoil, the deposits appeared mixed and disturbed. Inconsistent soils containing gravel or cobbles were present, these containing a minor amount of historical-period cultural material that tapered with depth. In ST 1 and ST 2, which were farther from the house, the inconsistent soils were underlain by a compact, black (10YR 2/1), sterile clayey silt loam encountered at 77 cmbs. In ST 3 and ST 4, which were closer to the house, they were underlain by a mottled dark brown to dark yellowish brown (10YR 3/3 to 3/6) silt loam without gravels. In ST 3, this silt loam yielded a single precontact sherd from a depth of 80-100 cmbs. This grit-tempered sherd has a thickness of 3.3 mm and a cordmarked-smoothed exterior. However, no additional precontact materials were documented within the parcel.

Recommendation

Based on the disturbed nature of this location, combined with an extremely low density of artifacts, the cultural deposits were not designated as an archaeological site, and no further archaeological work is recommended in association with 147 E. 3rd Street prior to or during construction for the TH 63 Project.

21GD292 (157 EAST 3RD STREET)

The west half of Lot 18 of Block 1 of the Auditor's Subdivision to East Red Wing includes an extant house and garage located at 157 E. 3rd Street, as well as the locations of former associated outbuildings (Figure 50). The lot remained largely unchanged until the 1910s, when a one-story addition was made on the east side of the house, a second stable or carriage house was added to the east of the first, and two small outbuildings were constructed to the north of the new stable/carriage house. Between 1920 and 1927, the two small outbuildings and the original stable/carriage house were removed. The newer one was either converted to or replaced by a garage during this period. Between 1943 and the present, the garage was removed, and a new one constructed at the center of the west edge of the lot.

History

The house was built circa 1870 under the ownership of the property by Philander Gates, who resided at 308 Sanderson Street. City directories indicate that members of the Sundell family resided at the house for at least 18 years between 1876 and 1894, in the latter year with other renters, before Philander Gates' son, George, occupied the property with his wife and a boarder circa 1899. By 1910, the Gates were gone, and Warren Roberts moved in with his family. The 1900 census schedule indicates that he was an owner, while the 1910 census schedule indicates that he was a renter, but in any case, other renters continued to be identified in historical documents as living at the property with the Roberts family through 1920. Based upon subsequent census schedules, it appears that the property remained a rental property with a fair amount of turnover through at least 1940.

Fieldwork Results

Five shovel tests were established in the backyard of the property at 10-meter (33-foot) intervals along two north-south transects spaced 10 meters apart, with two shovel tests in the west transect and three in the east (see Figure 50). The two southernmost shovel tests, ST 3 and ST 4, were proximate to the footprints of former stables/carriage houses.

In all shovel tests, the dark grayish brown, silt loam topsoil extended to between 20 and 30 cmbs. Profiles beneath the topsoil were variable between the shovel tests. In ST 1, which was nearest to the house, the topsoil overlay a Class-5-like compact gravel layer present from 20 to 30 cmbs, which rested upon a brown (10YR 4/3) silt loam without gravels. This silt loam gradually transitioned to a dark brown (10YR 3/3) silt loam after 52 cmbs.

In ST 2, an ash lens was present from 20 to 25 cmbs, under which three horizons overlay the dark brown silt loam, encountered at 61 cmbs. These consisted of a dark yellowish brown (10YR 4/4) silt loam to 35 cmbs, a yellowish brown (10YR 5/4) silt loam to 42 cmbs, and a dark brown silty sand banded with light gray to very pale brown (10YR 7/2 to 7/4) sand, reminiscent of water action.

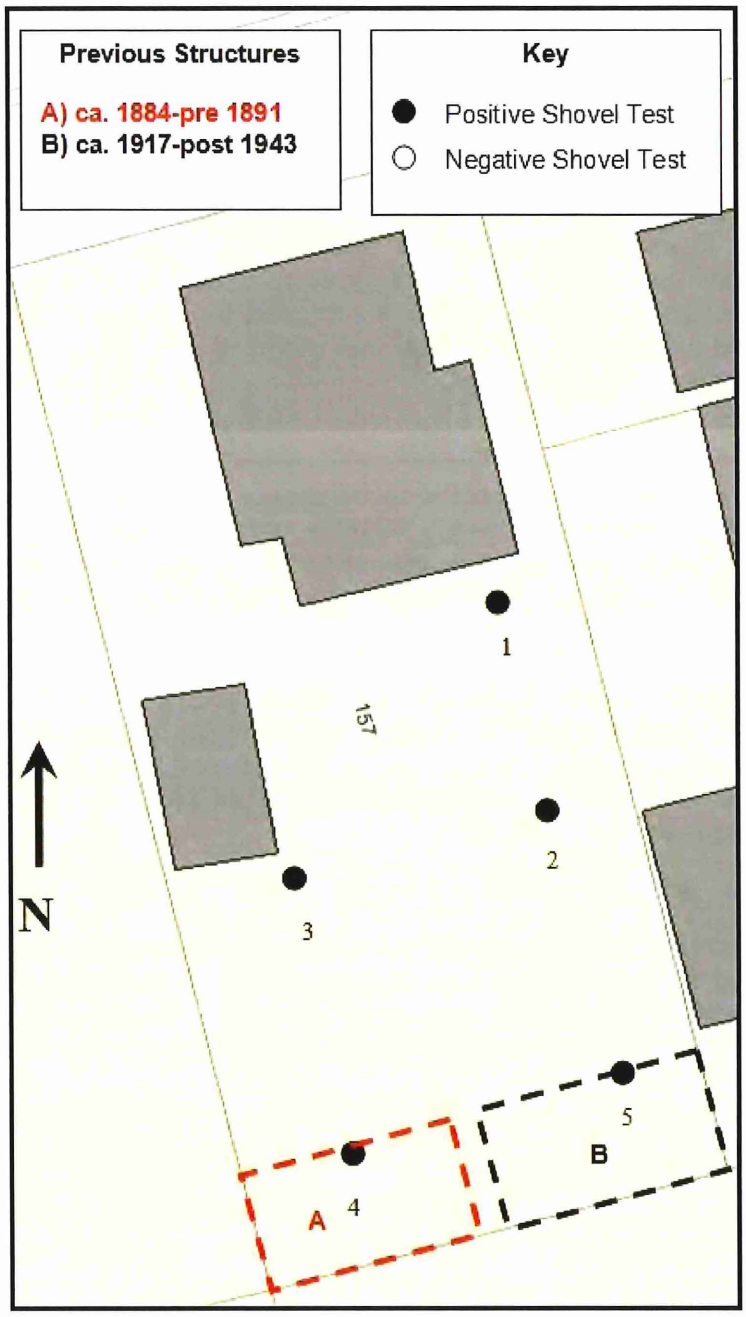


FIGURE 50. PLAN OF 21GD292 (157 EAST 3RD STREET)

ST 3 was in the location of a former garage, and the concrete pad for the garage was encountered in the north side of the test at 5 cmbs and extending down to 47 cmbs. A break was present for 4 cm before what was presumed to be an extension of the concrete or rock across the test prevented further excavation. The dark grayish brown silt loam extended down around the concrete until refusal occurred at 51 cmbs.

ST 4 contained a yellowish brown silty sand from 30 to 41 cmbs, which rested upon a yellowish brown (10YR 5/6) banded silty sand containing gravels that increased with

depth. At 60 cmbs, another silty sand, brown (10YR 4/3) in color, was encountered, and this stratum extended until the dark brown silt loam was reached at 72 cmbs.

In ST 5, a 4-cm-thick, black, coarse cindery layer was present at 29 cmbs, and it overlay a grayish brown (10YR 5/2) silt loam, 7 centimeters thick. Underneath the silt loam was a yellow (10YR 7/6) sand to 73 cmbs, at which depth the dark brown silt loam was present.

Together, the shovel tests documented dense artifact deposits indicative of a late 19th- to early 20th-century occupation. Although some artifacts were encountered in the upper horizons, artifact density increased with depth, particularly in ST 1, where a noticeable transition occurred between the compact gravel layer to an underlying brown silt loam. Artifacts tapered off upon reaching the dark brown silt loam, although they continued to be present down to at least 100 cmbs. Exceptions to this pattern were in ST 4, in which artifacts were primarily within the upper horizons to a depth of 41 cmbs, and in ST 3, which was interrupted by the concrete pad. Some architectural debris, including several machine-cut and wire nails, window glass fragments, and a few brick and mortar fragments, were present throughout the property, but most artifacts were domestic items.

The identified site was designated 21GD0292.

Artifact Analysis

A total of 643 artifacts were collected from Shovel Tests 1-5 at 157 3rd street. These included 59 faunal remains, 99 ceramic sherds, 209 glass sherds, 206 metal pieces and fragments, a shell button, a Prosser button, two Bakelite comb fragments, one pipe stem fragment, one mortar fragment, one plastic fragment, 34 clinker fragments, five brick fragments, two coal fragments, eight slag fragments, and one charcoal fragment, as well as three rubber fragments, and 10 modern plastic fragments.

Faunal Remains. A total of 59 (9.2% of site assemblage) faunal specimens were collected at 21GD0292. Shovel Test 1, located directly behind the house, produced the most faunal remains (24; 40.7%) at depths from 30 to 100 cmbs. The other specimens were fairly evenly distributed amongst ST 2 (12), ST 3 (8), and ST 5 (14). Also, ST 4 contained a single specimen. The preservation of the faunal remains was generally good throughout the site with 12 specimens (20.3%) showing signs of wear and weathering and only one with rodent gnaw marks; however, due to their fragmentary nature most were not able to be identified beyond class. Of those that could be assigned to a class there were mammal (28; 47.5%), bird (6; 10.2%), bivalve (6; 10.2%), and fish (3; 5.1%) remains present. The remaining 16 specimens (27.1%) were not able to be identified to class. There were some animal remains that could be categorized further. Of the identified mammal bone, all were from medium to large species including three cow (*Bos taurus*) specimens. Among the identified bird specimens, there was a single specimen from the water fowl family (Anseriformes), most likely a small duck and one that was likely a sparrow hawk (*Falco* sparverius). None of the fish remains could be identified; however, unlike the two other fish bones, there was a single specimen that appeared to be from a non-native very large fish species. All of the bivalve specimens (6) were identified as mussel shell fragments. Some of the remains exhibited evidence of butchery and cooking. The majority of the animal remains with butchery marks, mainly

found in ST 1, ST 2, and ST 5, had sawn edges (19) and just one of those did have cut marks as well as saw marks. Also, some remains (11.9%) showed signs of being burned (1) or calcined (6) and were distributed amongst ST 1, ST 2, and ST 3.

Ceramics. At 21GD0292, there was a total of 99 (15.4% of site assemblage) ceramic artifacts collected. Of the 99 ceramic artifacts collected, there were a total of 59 ironstone sherds, two whiteware sherds, 22 earthenware sherds, one yellowware sherd, 14 stoneware sherds, and a porcelain sherd. The recovered ceramic included four ironstone sherds with molded decoration, five ironstone sherds with gilded decoration, one ironstone sherd with a floral transfer-printed design, a single ironstone sherd with a partial lion and unicorn crest maker's mark, one whiteware fragment decorated with blue diamonds, and a piece of earthenware with molded raised dots. The ceramic artifacts were concentrated largely in ST 1 (39) and ST 2 (27) with less sherds present within ST 3 (10), ST 4 (9) and ST 5 (14).

Glass. At 21GD0292, there was a total of 209 (32% of site assemblage) glass artifacts collected. Of the 209 glass artifacts collected there were two prescription bottle finishes (3), a pale green applied oil bottle finish (2), three milk glass jar liner sherds, two lamp shade sherds, five bottle glass sherds, three rim sherds, and five pressed glass sherds. There were also indeterminate curved glass sherds likely from bottles or jars that were also collected including colorless (100), aqua (8), amber (5), yellow amber (1), green (1), pale green (8), milk glass (3), and sun-colored amethyst (3). In addition to these artifacts, 57 pieces of both colorless and aqua flat glass were recovered. These artifacts were spread throughout the site in ST 1 (48), 2 (43), 3 (31), 4 (58), and ST 5 (29).

Metal. At 21GD0292, there were a total of 206 (32% of site assemblage) metal artifacts collected. These artifacts included a battery fragment (1), a screwdriver handle (1), an unidentified zinc alloy ring (1), a crown bottle cap (1), an eyelet (1), wire fragments (3), nuts (2), a bolt (1), can fragments (18), machine cut nails (23), and wire nails and wire nail fragments (34), wood fragments with nails with embedded nails (2), nail with attached nut and washer (1); indeterminate nail (1). In addition to these artifacts, a total of 116 indeterminate iron alloy fragments were also recovered. These artifacts were concentrated on the east side of the site in ST 1 (63), 2 (40), and 5 (58) while the west side had much less in ST 3 (19) and ST 4 (26).

Miscellaneous Artifacts. The remaining recovered artifacts at the site were Bakelite comb fragments (2; ST 1), a Prosser button (1; ST 5); a shell button (1; ST 1), brick fragments (5; ST 1 and ST 2), a charcoal fragment (1; ST 2); clinkers (34; ST 2-4), coal (2; ST 2 and ST 5), mortar (1; ST 1), a clay smoking pipe stem (1; ST 1), a modern plastic power outlet (1; ST 1), other modern plastic fragments (10; ST 1, 2, 4, and 5), rubber gasket fragments (2; ST 4), a modern rubber fragment (1; ST 5), and slag fragments (8; ST 2, 3, and 5).

Synthesis

The artifacts collected within 21GD0292 are associated with the domestic occupation of the site during the late 19th and early 20th century. Artifacts were largely concentrated on the east side of the lot in ST 1, ST 2, and ST 5. A lack of cranial and foot elements among the faunal remains suggests the inhabitants purchased much of their meat already butchered. Although there is a preponderance of domesticated mammal bone

with cow (*Bos taurus*) as the only identified species, some of the dwellers' diets were supplemented with local wild aquatic resources including fish and freshwater mussels as well as duck (Anseriformes), which could be either wild or domestic.

Recommendation

Based on the presence of intact historical-period deposits, a high density of domestic artifacts including faunal remains, and their association with 19th-century working class life in East Red Wing, a Phase II archaeological evaluation of 21GD0292 (157 East 3rd Street) is recommended to determine it is eligibility for listing on the NRHP should this site be within the final APE of the TH 63 Bridge Project.

21GD293 (124 East 4th Street)

Lot 13 of Block 1 of the Auditor's Subdivision to East Red Wing encompasses an extant house and garage at 124 E. 4th Street, as well as the locations of former associated outbuildings. Based on Sanborn maps, the house was not built until after 1884, although a small outbuilding associated with the neighboring lot at 120 E. 4th Street was present in the northwest corner of the lot by that year. This outbuilding was removed around the turn of the 20th century, and a new one-story outbuilding was constructed to the north of the house. The new outbuilding, in turn, was removed sometime after 1943, and a new garage was built in the northwest corner of the lot.

History

The house was most likely built by the Wilson family, who purchased the property circa 1886 after it was owned by a known local real estate agent, T. K. Simmons. The first of the Wilsons to own the property was Susanna Wilson, but her relationship to the subsequent owner, Magnus Wilson, is unknown, because her residency falls between census schedules, and she is not present in the household of Magnus Wilson in the 1895 Minnesota census. Magnus Wilson owned the property through 1898, after which it was purchased by John and Annie Mann, who resided at the property as of the 1900 census. Each of the subsequent federal census schedules through 1940 lists a new owner/resident at the property.

Fieldwork Results

Five shovel tests were established at 10-meter (33-foot) intervals along two north-south transects spaced 5 meters (16 ft.) apart, with two shovel tests along the west transect and three along the east (Figure 51). The southernmost shovel test in the east transect extended to the east side yard, while the west transect was entirely within the backyard of the property. In this yard, the topsoil occurred as a dark grayish brown sandy silt with yellow mottling in the backyard and with brown (7.5YR 4/3) mottling in the side yard.

In ST 1 and ST 2 in the north part of the backyard, which was near a large garden, a thin layer of pea gravel was present under the topsoil, which had been put down over plastic. Underneath the plastic, a dark brown (10 YR 3/3) silt loam was encountered at 19 (ST 1) and 29 (ST 2) cmbs. This silt loam overlay a very dark grayish brown (10YR 3/2) to dark brown sandy silt containing gravels and rusty conglomerations, interrupted by a 5-centimeter thick lens of charcoal at 45 cmbs in ST 1 and a lens of ash at 40 cmbs in ST

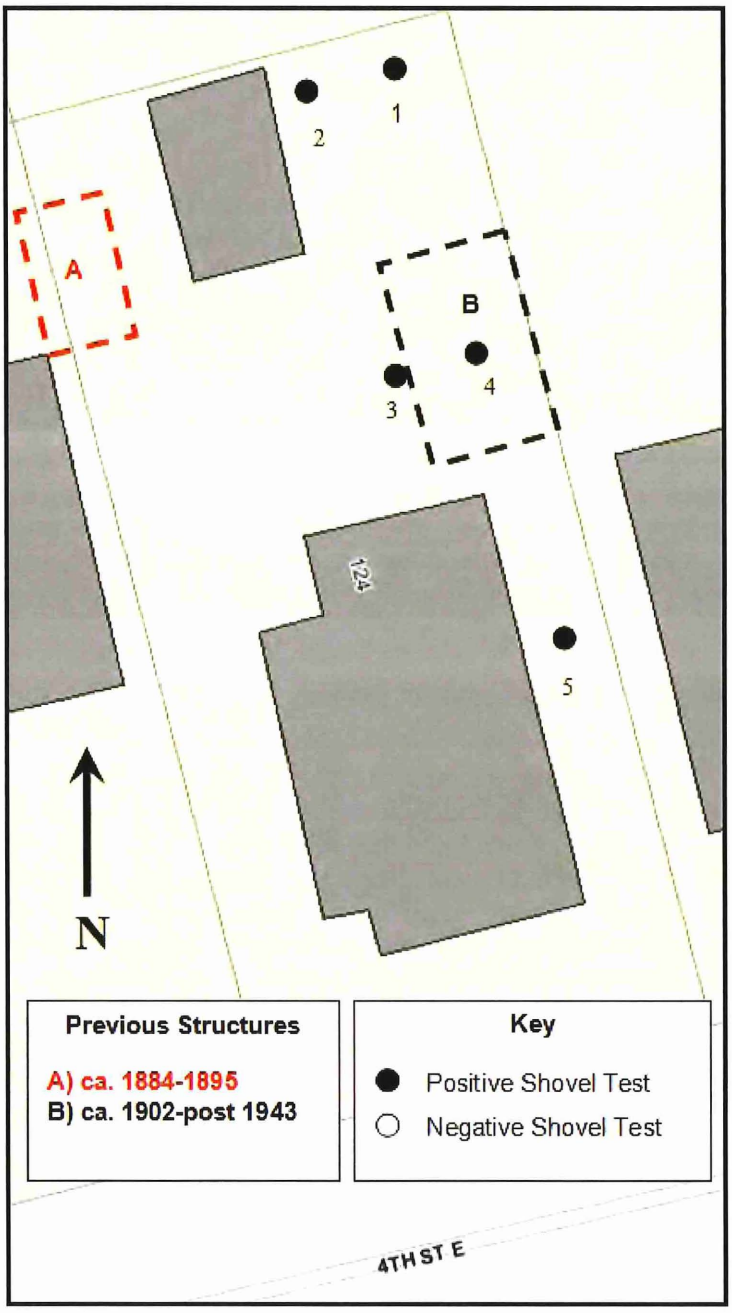


FIGURE 51. PLAN OF 21GD293 (124 EAST 4TH STREET)

2. In ST 1, the sandy silt extended to 70 cmbs, at which depth a light yellowish brown (2.5Y 6/4) sand that extended to at least one meter below the surface was encountered.

In ST 2, the sandy silt extended to 62 cmbs, at which depth a mottled very dark grayish brown and yellowish brown (10YR 5/4) silt loam was present. This silt loam extended another seven centimeters, at which point bedrock was reached.

In the two shovel tests in the south part of the backyard, ST 3 and ST 4, the profiles varied. Shovel Test 3 contained a brown (10YR 5/3) silt loam with slag from 20 to 40 cmbs, which rested upon a mottled dark yellowish brown and yellowish brown (10YR 4/4 and 10YR 5/6) silty sand with rust inclusions. This silty sand extended to 60 cmbs, at which point a dark brown (10YR 3/3) silty sand was encountered. This horizon was 20 centimeters thick and situated over bedrock. Shovel Test 4 was located within the footprint of a former one-story outbuilding, and it held what was more like the usual topsoil under the mottled topsoil, at 16 cmbs, but it contained fragments of cement and brick, and large pieces of limestone. At 38 cmbs, this stratum gave way to the dark brown silty sand, although it was interrupted at 52 cmbs by a four-centimeter-thick lens of brownish yellow (10YR 6/6) sandy silt with rust inclusions. Underneath the silty sand, at 68 cmbs, bedrock was present.

In ST 5, located in the side yard, the mottled topsoil rested over an olive brown (2.5Y 4/3) silt loam with coarse sand inclusions and gravels, encountered at 34 cmbs and situated above a three-centimeter-thick layer of a white (10YR 8/1), greasy substance, possibly quicklime. Underneath this layer was a mottled light greenish gray (Gley 1 8/5GY) and pale yellow (2.5Y 8/2) silt loam to 80 cmbs, at which point a layer of strong brown (7.5YR 4/6) coarse sand with gravels and weathered bedrock was reached.

Together, the shovel tests documented dense artifact deposits indicative of a late 19th- to early 20th-century occupation particularly within intact strata in ST 1, ST 2, and ST 3. Artifact density was substantially less in ST 4, which was in the location of a former outbuilding, and ST 5, which was in the side yard.

The identified site was designated 21GD0293.

Artifact Analysis

A total of 497 artifacts were collected from during shovel testing at 124 4th Street. These included 126 faunal remains, 40 ceramic sherds, 135 glass sherds, 162 metal pieces and fragments, two blackboard slate fragments, one battery fragment, one seed fragment, as well as three pieces of lithic shatter, two clinker fragments, two brick fragments, five coal fragments, four slag fragments, four charcoal fragment, and two mortar fragments, and eight modern plastic fragments

Faunal Remains. The animal remains recovered at 21GD0293 totaled 126 specimens (25.4% of the total assemblage). The majority (65.2%) of the animal bone was concentrated in the northeastern section of the site in ST 1 (32) and ST 2 (47). Shovel Test 3, to the south of ST 1 and 2 and adjacent to a no longer existing structure, also produced substantial remains with 36 specimens (29.7%) while ST 4 (6) and ST 5 (1) contained considerably less. The faunal remains were very well-preserved with none exhibiting signs of animal gnawing and only two with signs of weathering. Still most could only be assigned to class categories due to their fragmentary nature. Those identified to a class included mammal (55; 43.7%), fish (10; 7.9%), bird (6; 4.8%), and mollusk (1; < 1%). There were also 54 specimens (42.9%) that were not able to be identified. Some of the specimens were able to be assigned to more specific categories. Among the mammal bone, there were specimens identified as cow (*Bos taurus*) (4), pig (*Sus scrofa*), and medium to large artiodactyl (4); furthermore, all of the bone identified as mammal was from medium to large species. A single bird specimen was assigned

was likely chicken (*Gallus gallus*), and one fish specimen that was likely from the pike (*Esox*) genus. Also, all of the fish bone recovered was consistent with native fishes in both size and morphology. The single mollusk specimen was a land snail and was likely intrusive to the site. There was some animal bone at the site that exhibited signs of butchery and cooking. The majority of the animal remains with butchery marks were concentrated in ST 2 (17), which contained over half, and had sawn edges (24) while just five had cut marks. Also, some remains (33.7%) showed signs of being burned (17) or calcined (23) and were concentrated in ST 1 (22) and ST 2 (12).

Ceramics. At 21GD0293, there was a total of 40 (8% of site assemblage) ceramic artifacts collected. Of the 40 ceramic artifacts collected, there were a total of 28 ironstone sherds, one (1) earthenware sherd, 10 stoneware sherds, and a hand-painted porcelain sherd. These artifacts were concentrated largely in ST 1 (12), and 3 (24), with smaller amounts in ST 2 (3) and 4 (1).

Glass. At 21GD0293, there was a total of 135 (27% of site assemblage) glass artifacts collected. Of the 135 glass artifacts collected there were two drinking glass sherds, nine lamp shade sherds, one milk glass sherd, three scalloped rim sherds possibly from a dish, three canning jar sherds, 26 bottle glass sherds, and a nearly complete ketchup bottle with "Curtice Brothers Co." embossed on the side (ST 2; 1887-1920). There were also indeterminate curved glass sherds likely from bottles or jars were also collected including colorless glass (29), aqua glass (12), amber glass (4), pale green glass (3), olive green glass (2), dark olive glass (1), frosted glass (1), milk glass (2), and a sun-colored amethyst glass sherd (1). In addition to these artifacts 33 pieces of both colorless and aqua flat glass were recovered. These artifacts were concentrated in ST 1 (28), 2 (63), 3 (33), with smaller amounts in ST 4 (4), and 5 (7).

Metal. At 21GD0293, there were a total of 162 (32.6% of site assemblage) metal artifacts collected. These artifacts included a spoon (1), a turnbuckle (1), a fragment of brass mesh (1), a zinc eyelet (1), a barrel band (1), an indeterminate strap (1), a nut (1), a screw (1), a tack (1), a roofing nail (1), an indeterminate hardware component (1), iron alloy can fragments (4), machine cut nails (35), wire nails (31), an indeterminate nail (1), an aluminum register chain (1), and an aluminum can pull tab (1). In addition to these artifacts, a total of 78 indeterminate iron alloy fragments were also recovered. These artifacts were spread relatively evenly throughout ST 1 (24), 2 (60), 3 (39), and 4 (25) with less in ST 5 (14).

Miscellaneous Artifacts. Also collected from the site was a battery fragment (1; ST 1), a burned seed fragment (1; ST 1), blackboard slate fragments incised with scribe lines (2; ST 1), lithic shatter (3; ST 1, 2, and 5), red brick samples (2, ST 3 and 4), charcoal fragments (4; ST 2), clinker fragments (2; ST 3), coal fragments (5; ST 2 and 3), mortar samples (2; ST 3), plastic fragments (7; ST 1-4), and slag fragments (4, ST 1 and 2). The pieces of lithic shatter were all from small nodules and could not be definitively determined to be of cultural origin given its size and the fact that the chert is of a type that is locally available.

Synthesis

The artifacts collected within the lot associated with 124 4th Street are associated with the domestic occupation of the site during the late 19th and early 20th century. Most of the recovered artifacts (433; 87.1%) were located in ST 1-3 in the northeast corner of the lot. A lack of cranial and foot elements among the faunal remains suggests the inhabitants purchased much of their meat already butchered. While most of the animal remains are domesticated, such as cow (*Bos taurus*), pig (*Sus scrofa*), and chicken (*Galliformes*), there are still some remains of locally caught fish including a specimen likely belonging to a pike (*Esox*), showing that the inhabitants' diets were being supplemented with wild game.

Recommendation

Based on the presence of intact historical-period deposits, a high density and wide variety of domestic artifacts including faunal remains, and their association with 19th-century working class life in East Red Wing, a Phase II archaeological evaluation of 21GD0293 (124 East 4th Street) is recommended to determine it is eligibility for listing on the NRHP should this site be within the final APE of the TH 63 Bridge Project.

130 [128] East 4th Street

Lot 13 of Block 1 of the Auditor's Subdivision to East Red Wing encompasses an extant house and garage at 130 E. 4th Street, formerly 128 E. 4th Street. This lot was vacant until the house was built sometime between April of 1910, when the census was taken, and September of 1910, when the Sanborn map was prepared. The garage was built between 1917 and 1927.

History

The first known residents of the house were Carl and Alice Peterson, both of whom were born in Minnesota. Carl was a loose nailer at a shoe factory. Sometime between 1920 and 1930, ownership of the house had transferred to Pennsylvania-born Victor Johnson, who lived there with his wife Rose and their four children. Between 1930 and 1940, the house number shifted from 128 to 130, and Arvid and Anna Lundberg became the new owner-occupants.

Fieldwork Results

Two shovel tests spaced 5 meters (16 ft.) apart along a single north-south transect were excavated in the backyard of the property. These shovel tests were highly inconsistent in profile. Although structural debris and a few 19th-century artifacts were present, the house was not built until the first decade of the 20th century. It may be that these represent the edge of deposits from an adjacent address, but without confirmation, any potential archaeological site would lack historical association.

Recommendation

Based on the disturbed nature of this location, combined with a low density of artifacts, the cultural deposits were not designated as an archaeological site, and no further archaeological work is recommended in association with 128 E. 3rd Street prior to or during construction for the TH 63 Project.

214 EAST 4TH STREET

The parcel associated with 214 East 4th Street occupies the east half of Lot 25 of Block 1 of the Auditor's Subdivision to East Red Wing. The majority of this parcel is occupied by a home and a garage. Historical records indicate that the parcel was developed between 1894 and 1899.

Fieldwork Results

Due to the presence of structures, driveways, walkways and utilities, there was only room for a single shovel test within this lot to the rear of the garage. The shovel test revealed disturbed fill to a depth of 30 cmbs at which depth it met with refusal in limestone.

Recommendation

Based on the disturbed nature of the shovel test and the amount of this property that has been disturbed by structures, combined with a low density of artifacts, no further archaeological work is recommended in association with 214 E. 4th Street prior to or during construction for the TH 63 Project.

220 EAST 4TH STREET

Lot 27 of Block 1 of the Auditor's Subdivision to East Red Wing is a large lot that contains an extant house in the western two-thirds and is vacant in the eastern one-third. The house has been significantly altered.

History

Based on proximity in census schedule enumeration to other known owners of nearby properties in 1860, the house was likely built by this time and resided in by Charles Merrill (Merrell), a laborer, and his family. Ownership was transferred to Samuel Hasler, a carpenter, and his family in 1871. Samuel and his wife, Sarah, resided at the house with their children until Samuel passed away in 1881, after which the rest of the family remained until 1894. From 1895 until 1910, Swedish immigrants, Peter and Emma Lamberg raised their children at 220 East 4th Street. Peter worked as a tailor. At the time of the 1920 census, Frank and Irene Gorney resided on the lot. Frank was an edge trimmer at a shoe factory. From 1921 through the 1940 census, Oscar and Gustie Swanson, their children and other family members resided at 220 East 4th Street.

Fieldwork Results

Initially, three shovel tests were established at 10-meter (33-foot) intervals along a single north-south transect located in the east side yard of the property. The two northern tests in this transect appeared heavily disturbed, as they contained extremely mixed soils containing large fragments of displaced limestone and artifacts representing both the modern and historical periods. Artifacts were not present beyond these mixed soils, and in the northern shovel test, ST 1, a yellowish brown (10YR 5/4), silty clay loam subsoil was encountered at 28 cmbs. These shovel tests, which were near the house, indicate that the landscape surrounding the house was modified when additions were added to the house. In the southern shovel test, however, a dark brown (10YR 3/3) sandy silt was encountered beneath the mixed horizon, at 36 cmbs, which overlay a brown (10YR 4/3) silty clay loam at 47 cmbs. Because the sandy silt layer appeared intact and contained

additional artifacts, a second transect was established five meters (16 ft.) to the east of the first.

Shovel tests in the second transect appeared to contain more intact deposits, likely because they were at a greater distance from the house. All three contained the dark grayish brown (10YR 4/2), silt loam topsoil that was generally encountered in the rest of the sub-area, although in the northern shovel test (ST 4), it was shallow and rested directly over the subsoil, encountered at 17 cmbs. In the southern two shovel tests, the topsoil overlay a dark yellowish brown (10YR 3/6) sandy silt at approximately 55 cmbs. In ST 5, it extended to 93 cmbs, where the subsoil was reached. In ST 6, the sandy silt contained some slag, and it extended to at least 113 cmbs. Although some artifacts were recovered from the intact horizons, the density of artifacts present was low, and very few diagnostic artifacts were encountered.

Recommendations

Based on the low density of artifacts present and their lack of diagnostic characteristics, the cultural deposits were not designated as an archaeological site, and no further archaeological work is recommended in relation to 220 E. 4th Street prior to or during construction of the TH 63 bridge.

21GD294 (304 SANDERSON STREET)

The northern one-third of the east half of Lot 18 of Block 1 of the Auditor's Subdivision to East Red Wing encompasses an extant nineteenth-century house and a post-1943 garage. Sanborn map coverage does not extend to this address until 1917, by which time the house was already present.

History

In 1868, the entirety of Lot 18 was purchased by Philander Gates, who resided at 308 Sanderson Street. The property at 304 Sanderson Street was occupied as a rental from the time it was constructed until it was purchased by Thomas Howe sometime between 1930 and 1940. The first known resident of 304 Sanderson Street was Peter Gurnell, a stone mason, who is listed at that address in the 1894 city directory, although the house was likely constructed earlier. Census records document renters in subsequent decades with the head of household employed as an employee of Standard Oil, a hack driver, and a teamster.

Fieldwork Results

The available yard space at this property allowed for two shovel tests spaced 5 meters (16 ft.) apart along a single north-south transect in the backyard (Figure 52). The soil profile in both tests began with the dark grayish brown (10YR 4/2) silt loam topsoil typically encountered in the neighborhood, which extended to 27 (ST 1) and 36 (ST 2) cmbs.

In ST 1, the topsoil was underlain by a mottled dark grayish brown and yellowish brown (10YR 5/6) silt loam, 26 centimeters thick, containing a large piece of limestone and mortar fragments. The mottled silt loam then transitioned to a consistently yellowish brown silt loam, which extended for another 20 centimeters before bedrock was reached.

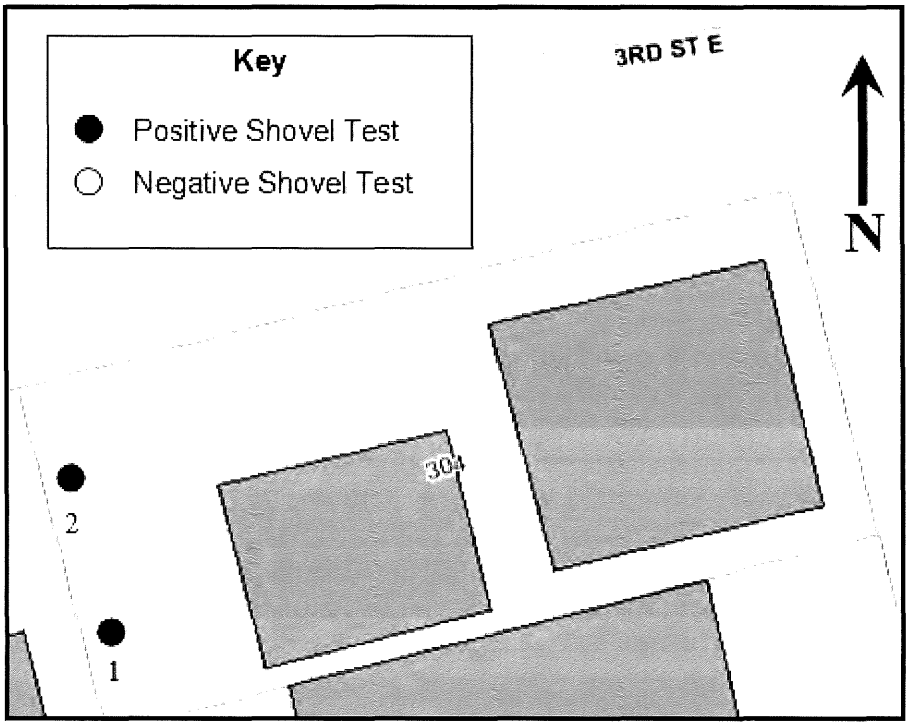


FIGURE 52. PLAN OF 21GD294 (304 SANDERSON STREET)

In ST 2, the topsoil capped dark grayish brown silt loam similar to the topsoil but containing substantial gravel and larger fragmented rock. This 20-centimeter-thick horizon was situated over a light yellowish brown (10YR 6/4) sand, underneath of which a highly compact, very dark brown (10YR 2/2) clay was present.

Both shovel tests documented intact strata containing a moderate number of artifacts associated with a late 19th- to early 20th-century domestic occupation. The identified site was designated 21GD0294.

Artifact Analysis

A total of 95 artifacts were collected from the two shovel tests excavated at 304 Sanderson Street. These included 13 ceramic sherds, 47 glass sherds, 22 iron alloy pieces and fragments, four brick fragments, seven coal fragments, and two modern plastic fragments.

Ceramics. A total of 13 (13.7% of total artifact assemblage) ceramic artifacts were recovered at 21GD0294. While the majority were ironstone (8), there was also whiteware (4) and stoneware (1) sherds present. Most of the ceramic sherds were concentrated in ST 2 (11), which also contained all of the sherds with decoration. These included a single whiteware sherd with a transfer-printed leafy design, three whiteware sherds that refit to form a single gilded rim sherd with a leafy motif, and an ironstone sherd with a brown transfer-printed design.

Glass. There were 47 (49.5% of total artifact assemblage) glass sherds collected at the site. Of these there were aqua bottle sherds (4), a colorless bottle sherd (1), a sun-

colored amethyst shoulder sherd (1), an amber body sherd (1), aqua body sherds (3), a milk glass body sherd (1), and a sun-colored amethyst body sherd (1). There were also indeterminate colorless (23) and aqua (4) curved glass sherds and aqua (5) and pale green (3) flat glass sherds. The majority were concentrated in ST 2 (33) while ST 1 only contained 14 glass artifacts.

Metal. At the site, there were 22 (23.2%) excavated metal artifacts Most were architectural materials and included iron alloy cut nails (3), iron alloy wire nails (4), and a galvanized wire tack (1). The remaining pieces were unidentified iron alloy fragments (14). Although most were located in ST 2 (15), there were seven in ST 1.

Miscellaneous Artifacts. Also collected from site 21GD0294 were red brick fragments (4), coal fragments (7), a plastic bag fragment (1), and unidentified plastic fragments (2).

Synthesis

The artifacts collected within 304 Sanderson Street are associated with the late-19th through early-20th-century occupation of the property. Though modern artifacts were present within the upper horizons, intact historical layers were encountered with depth.

Recommendation

Based on the presence of intact historical-period deposits, a moderate density of domestic artifacts, and their association with 19th-century working class life in East Red Wing, a Phase II archaeological evaluation of 21GD0294 (304 Sanderson Street) is recommended to determine it is eligibility for listing on the NRHP should this site be within the final APE of the TH 63 Bridge Project.

310 SANDERSON STREET

The southern one-third of the east half of Lot 18 of Block 1 of the Auditor's Subdivision to East Red Wing encompasses an extant circa-1900 house and a post-1943 garage, as well as the locations of a former addition or attached outbuilding off the back of the house and a stable/carriage house later converted to a garage to the north of the house. Sanborn map coverage does not extend to this address until 1917, by which time the house, addition, and stable were already present; they continued to be present through at least 1943. Based, however, on the absence of on the 1894 plat and no listing for the address in the 1899 city directory, as well as a change in ownership of the property between 1901 and 1910, all historical elements were probably built circa 1905.

History

In 1868, the entirety of Lot 18 was purchased by Philander Gates, who resided at 308 Sanderson Street. Gates retained the property until at least 1901. Between 1901 and 1910, it was purchased by Axel Erickson, a Swedish immigrant laborer, who lived at 310 Sanderson Street with his family. Members of the Erickson family continued to occupy the house through at least 1940.

Fieldwork Results

The available yard space at this property allowed for two shovel tests spaced 6 meters (20 ft.) apart along a single east-west transect. These were located in the backyard of

the house and next to the extant garage, and within the footprint of the former stable/carriage house/garage.

In ST 1, the typical silt loam topsoil extended to 42 cmbs and rested upon a layer of what appeared to be demolition-related fill. This layer, 37 centimeters in thickness, contained mixed soils, displaced brick, mortar pockets, large limestone fragments, and wood fragments. The demolition debris may be related to the stable/carriage house/garage that was removed after 1943 (Sanborn 1917, 1927, 1943). Beneath the demolition debris were 10 centimeters of light olive brown (2.5Y 5/4) silt loam with some banding evident, underneath of which a very dark grayish brown (10YR 3/2) clay loam occurred.

In ST 2, the topsoil was highly compact and contained gravels. At 50 cmbs, it gave way to what likely represents the same demolition layer as in ST 1, except that the matrix was more consistent, being a dark yellowish brown (10YR 4/4) silt loam. It similarly contained limestone fragments and mortar. At 93 cmbs, the demolition layer was underlain by a yellowish brown (10YR 5/6) silty sand with small gravels. In both shovel tests, a few domestic artifacts were present within the demolition layer, but these occurred in a low density and were generally non-diagnostic in nature.

Recommendations

Based on the low density of artifacts present and their lack of diagnostic characteristics, the cultural deposits were not designated as an archaeological site, and no further archaeological work is recommended in relation to 310 Sanderson Street prior to or during construction of the TH 63 bridge.

21GD295 (318 SANDERSON STREET)

Lot 19 of Block 1 of the Auditor's Subdivision to East Red Wing encompasses an extant house and garage at 318 Sanderson Street, as well as the locations of a former western extension of the house and a former garage, which was located in the southeast corner of the lot.

History

Lot 19 was purchased circa 1867 by George W. Gates, most likely the brother of Philander Gates, as the census schedule of 1870 shows they were close in age, and both born in New York. It is not known whether he lived on the premises, but the subsequent owner, a day laborer named William Toms, lived there with his family from 1870 to 1878. Subsequently the property was owned by Byron Allen, who may or may not have resided at 318 Sanderson Street, as he is enumerated in the census with his family on Fourth Street, to which 318 Sanderson is proximate. By 1889, Norwegian immigrant Halvor Olson owned the house and occupied it with his family, as did the subsequent resident, Andrew Schultz, who replaced Olson sometime between 1911 and 1920 and continued to reside in the house with his wife Elsie and their children through at least 1940.

Fieldwork Results

Two east-west transects were established five meters (16 ft.) apart in the backyard of this property, each containing three shovel tests spaced at 10-meter (33-foot) intervals (Figure 53). In general, the backyard was level, but a slightly mounded area was

FIGURE 53. PLAN OF 21GD295 (318 SANDERSON STREET)

present in the northwest corner of the yard. In all shovel tests, the standard dark grayish brown (10YR 4/2) silt loam found throughout the sub-area was present to an average depth of 20 cmbs.

In all shovel tests, except ST 3, which was located in the slightly mounded area in the northwest corner of the yard, varying soils occurred over a sterile, very dark brown (10YR 2/2) silt loam. In ST 1, the silt loam was directly underneath the topsoil at a depth of 17 cmbs and extended to 72 cmbs, at which point a very dark brown clayey silt loam with cobbles was encountered, this clayey silt loam overlying bedrock at approximately 90 cmbs. In ST 2, the very dark brown silt loam also underlay the topsoil, at 26 cmbs, but it contained large cobbles and rocks throughout its extension to 70 cmbs, where bedrock occurred. Shovel Test 4 contained a consistent, dark brown (10YR 3/3) silt loam from 19 to 39 cmbs, at which point brownish yellow (10YR 6/6) coarse sand inclusions became evident, these being present until the very dark brown silt loam was reached at 47 cmbs. Another sterile layer, of dark brown silt loam, occurred beneath it beginning at 64 cmbs and extending to at least one meter below the surface. In ST 5, a soil similar to the topsoil but containing gravels was present above the very dark brown silt loam from 19 to 48 cmbs, and the very dark brown silt loam was situated directly over bedrock, occurring at approximately 70 cmbs. Shovel Test 6 followed the same patterning as ST 5, with the topsoil-like, gravel-laden layer extending from 18 to 33 cmbs and resting directly on the very dark brown silt loam. In this case, however, the latter soil became very compact at 65 cmbs, and bedrock had not been reached by a depth of one meter. In all five shovel tests, artifacts, which were generally domestic in nature, occurred at a low density. In some instances, temporal associations were mixed.

In ST 3, however, a dense deposit of late 19^{th-} through early 20th-century domestic artifacts were encountered within a pale yellow (2.5Y 7/3) ashy layer present from 21 to 43 cmbs. The ashy layer overlay a dark brown silt loam that extended to at least one

meter below the surface, in which historical-period artifacts, including a clay pipe stem fragment, continued to be present but at a lower density.

The identified site was designated 21GD0295.

Artifact Analysis

A total of 274 artifacts were collected from within the six shovel tests excavated at 318 Sanderson Street. These included 133 faunal remains, 18 ceramic sherds, 17 glass sherds, 69 iron alloy pieces and fragments, one pipe stem fragment, one clay marble, and one peach or nectarine seed fragment, as well as two copper alloy pennies, 11 slag fragments, five mortar fragments, three clinker fragments, and 13 modern plastic fragments.

Faunal Remains. There was a total of 133 (48.5% of total artifact assemblage) faunal specimens excavated at 21GD0295. The faunal remains were overwhelmingly concentrated in ST 3 (87.2% [116]) in the northwest corner of the back of the lot. The other remains were evenly dispersed across the other shovel tests. The preservation of the recovered animal bone was good with none exhibiting signs of animal gnawing and only seven with signs of wear. Due to their fragmentary nature, most of the remains could only be assigned to a class. Of those that could be classified there were mammal (95; 71.4%), fish (4; 3%), bird (1; < 1%), and bivalve (1; < 1%) present. The remaining 31 specimens (23.3%) could not be identified. There was a small number of specimens that could be further described. Of the mammal bone, three were identified as sheep/goat (Caprinae) family and one as a pig (*Sus scrofa*). Both of the bivalve specimens were identified as freshwater mussel shell. Although none of the fish bone could be identified to species, the size and morphology of the remains indicate that they are native to the region. The animal bone that showed signs of butchery and cooking included 10 specimens with sawn edges and two with cut marks, excavated mainly from ST 3 (7). Notably, most (86.5%) of the recovered faunal material was burned (9) or calcined (106), and these remains were mainly found in ST 3.

Ceramics. There were 16 (5.8% of total artifact assemblage) ceramic sherds excavated at 21GD0295. Most of these were ironstone (13); however, there were also stoneware (2), and yellowware (1) sherds present. These artifacts were evenly dispersed across ST 1-4 and ST 6 while ST 5 was devoid of any ceramic. Some of the pieces of ceramic were decorated including a yellowware sherd with a Rockingham glaze and three ironstone sherds that refit to form a single scalloped, gilded rim sherd with a molded floral design. While a single ironstone sherd bore a partial lion and unicorn crest maker's mark, it was too partial to discern.

Glass. A total of 17 (6.2% of total artifact assemblage) glass artifacts were recovered at the site. The excavated glass artifacts included aqua bottle sherds (2), a milk glass jar liner (1), a colorless lamp shade sherd (1), and a colorless mug base sherd (1). There were also indeterminate colorless (6) and olive green (1) curved glass sherds. In addition, seven flat glass sherds, both colorless and aqua, were recovered. These artifacts were evenly dispersed amongst ST 2-3 and 5-6 while ST 1 and ST 4 only contained a single glass sherd in each. Noteworthy was the recovery in ST 2 of glass key mold bottle base (c.1860-early1880s).

Metal. At 21GD0295, there was a total of 69 (25.2% of site assemblage) metal artifacts collected. These artifacts included architectural materials including machine cut nails and fragments (28), wire nails and fragments (14), an iron alloy staple (1), and iron alloy tacks (3). There was also a likely iron alloy tool handle (1), a metal disk (1), an iron alloy strap (1), iron alloy wire fragments (7), and unidentified metal fragments (13). The metal artifacts were concentrated in ST 2 with 25 (36.2%), including 15 architectural artifacts; the remaining metal pieces were dispersed across ST 1 and ST 2-6.

Miscellaneous Artifacts. In addition to the above mentioned artifacts, there were 38 miscellaneous artifacts collected. These included a hand-painted bisque doll leg (1) in ST 3, a burned Prosser button (1) in ST 3, a clay smoking pipe stem (1) in ST 3, a marble game piece (1) in ST 6, a peach or nectarine pit (1) in ST 5, mortar fragments (5) in ST 3, clinkers and slag (14) in ST 3, 4, and 6, . There were also some modern artifacts encountered including a 1975 U.S. penny (1) in ST 4, a 1987 U.S. penny (1) in ST 6, a plastic screw (1) in ST 5, plastic bag fragments (2) in ST 3 and 4, indeterminate plastic fragments (9) in ST 4-5.

Synthesis

The artifacts collected within 318 Sanderson Street are associated with the late-19th through early-20th-century occupation of the property. These artifacts were concentrated within ST 3 (144; 52.6%) in the northwest corner of the yard, indicating the likelihood that the associated mounded area may be an intact feature, possibly a place for trash disposal and incineration. Diagnostic artifacts have a discernable date range from the 1860s through the present. Though modern artifacts were present within the upper horizons in some shovel tests, intact historical layers were encountered with depth.

Recommendation

Based on the presence of intact historical-period deposits, a high density and wide variety of domestic artifacts including faunal remains, and their association with 19th-century working class life in East Red Wing, a Phase II archaeological evaluation of 21GD0295 (318 Sanderson Street) is recommended to determine it is eligibility for listing on the NRHP should this site be within the final APE of the TH 63 Bridge Project.

RECOMMENDATIONS

Of the 23 residential parcels within the East Red Wing Residential sub-area that are located beyond the areas of potential soil contamination, eight were considered after the pre-evaluation study and subsequent investigation to have a low potential for containing intact archaeological resources given the developmental history of the property and thus were eliminated from testing (Table 4). No further archaeological work is recommended within these parcels prior to or during construction of the TH 63 bridge.

Five parcels within the East Red Wing Residential sub-area that were identified as having moderate to high potential to contain archaeological resources could not be shovel tested during the Phase I survey because landowner permission was not received. If these locations are within the construction limits of the TH 63 Bridge Project, they will require further assessment through Phase I or Phase II archaeological investigations.

The remaining 10 parcels within the East Red Wing Residential sub-area underwent a Phase I survey using shovel testing. Of those parcels, five exhibited evidence of disturbance and/or contained only a light scatter of historical-period material. No further archaeological work is recommended within these parcels prior to or during construction of the TH 63 bridge. Within the other five parcels, intact archaeological deposits associated with the 19th-century occupation of the East Red Wing neighborhood were documented. If any of these five archaeological sites (21GD291-21GD295) are within the construction APE of the TH 63 Bridge, a Phase II archaeological evaluation of the site(s) is recommended to determine the eligibility of the resource(s) for listing on the NRHP.

TABLE 4. PARCELS WITHIN THE EAST RED WING RESIDENTIAL SUB-AREA

Property Address	Results	Recommendation
141 E. 3rd Street & 143 E. 3rd Street	**Phase I survey; 21GD291**	**Phase II Evaluation**
147 E. 3rd Street	Phase I survey; Disturbed	No further work
153 E. 3rd Street	Low potential	No further work
157 E. 3rd Street	**Phase I survey; 21GD292**	**Phase II Evaluation**
124 E. 4th Street	**Phase I survey; 21GD293**	**Phase II Evaluation**
130 E. 4th Street	Phase I survey; Disturbed	No further work
134 E. 4th Street	Low potential	No further work
142 E. 4th Street	Low potential	No further work
150 E. 4th Street	Low potential	No further work
202 E. 4th Street	Low potential	No further work
214 E. 4th Street	Phase I survey; Disturbed	No further work
220 E. 4th Street	Phase I survey; Low-density deposits	No further work
228 E. 4th Street	Permission for survey not granted	Phase I survey
232 E. 4th Street	Permission for survey not granted	Phase I survey
236 E. 4th Street	Permission for survey not granted	Phase I survey
240 E. 4th Street	Permission for survey not granted	Phase I survey
250 E. 4th Street	Permission for survey not granted	Phase I survey
304 Sanderson St.	**Phase I survey; 21GD294**	**Phase II Evaluation**
308 Sanderson St.	Low potential	No further work
309 Sanderson St.	Low potential	No further work
310 Sanderson St.	Phase I survey; Low-density deposits	No further work
315 Sanderson St.	Low potential	No further work
318 Sanderson St.	**Phase I survey; 21GD295**	**Phase II Evaluation**

CHAPTER 9 . BARN BLUFF SUB-AREA

The Barn Bluff sub-area was defined as the portion of the APE that encompasses the slopes of the bluff. For the Phase I archaeological survey, the Barn Bluff sub-area was reduced to the west end of the bluff proximate that portion of the TH 63 alignment between Highway 61 and the TH 63 bridge over the Mississippi River (Figure 54). This sub-area is currently occupied by the grassy backslope of TH 63.

HISTORICAL BACKGROUND

Historically, the Barn Bluff sub-area of the APE was part of the bluff's natural, steep side slope (Figure 55). When Red Wing was platted, Main Street terminated at the base of this slope. In 1889 a path was created up this face of the bluff, which was dubbed, "Webster's Way" in honor of the city's postmaster, Charles C. Webster, who led the efforts to form the trail (Zellie 1989b; Allers 1991) (Figure 56). In 1929, the path was

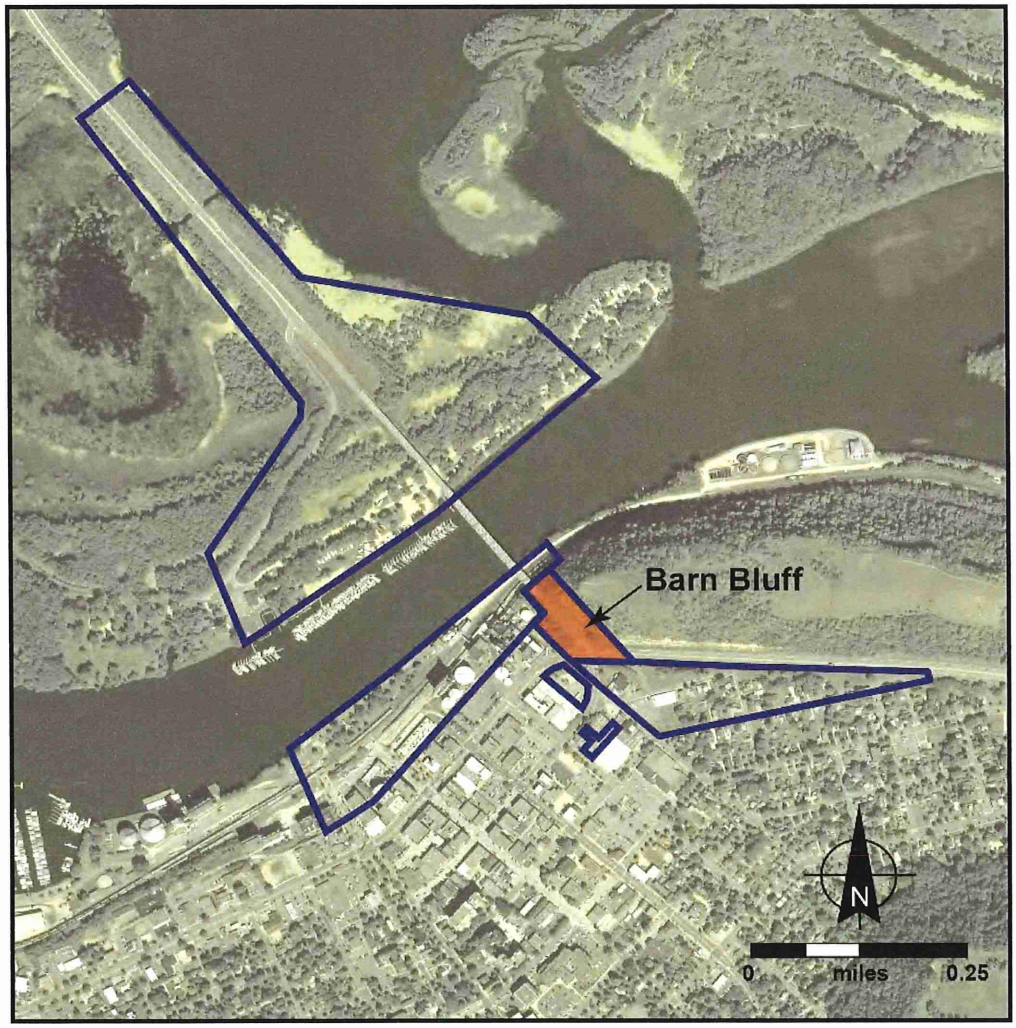


FIGURE 54. BARN BLUFF SUB-AREA OF THE ARCHAEOLOGICAL APE

FIGURE 55. WEST END OF BARN BLUFF, VIEW TO SOUTHEAST, 1900 (MHS)

FIGURE 56. WORKING ON WEBSTER'S WAY (GOODHUE CO. HIST. SOC.)

replaced by the ambitious Citizen's Memorial Stairway (Figure 57). Under the direction of the local Kiwanis Club, funds were raised through events and the sponsorship of steps into which the donors name were cast. Following the general alignment of Webster's Way, the elevated concrete stairway began at the east end of Main Street and from that point snaked its way up the west face of Barn Bluff. In the end, it took 472 steps, eight large platforms, and 12 small platforms to reach the summit of the bluff (Zellie 1989b; *Republican Eagle*, May 25, 1983; Allers 1991).

For approximately 30 years, the Citizens Memorial Stairway offered visitors to Red Wing and its citizens a convenient means to reach the summit of Barn Bluff. However, in the late 1950s, the replacement of the wagon bridge over the Mississippi River with a new high bridge completed in 1960 necessitated the removal of the stairway. In order to create a touchdown for the new bridge, which was built between the alignment of the wagon bridge and Barn Bluff, a portion of the west end of the bluff was blasted away (Figure 58). Only the uppermost two landings, the overlook, and 120 steps of the Citizens Memorial Stairway were left in place. The blasting also resulted in the loss of the "Indian Head" rock formation, which was one of the features of the bluff highlighted by the stairway (*The Winona Daily News* 1959; Allers 1991). At the same time, to provide for highway connections to the bridge, portions of the south side of the bluff were also removed as well as 87 homes in Red Wing's East End (Johnson 2008:41)(Figure 59).

Despite this disturbance to the bluff's west slope, the upper portion of the bluff, including the three Native American earthworks recorded in 1885, remained intact (Terrell and Terrell 2014).

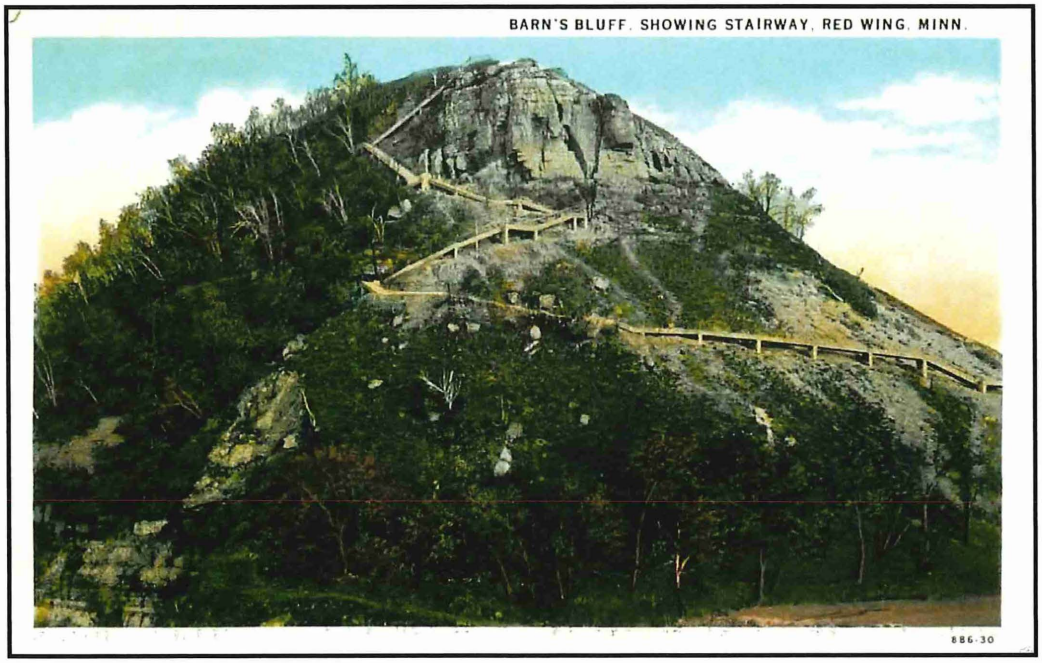


FIGURE 57. POSTCARD OF THE CITIZEN'S MEMORIAL STAIRWAY

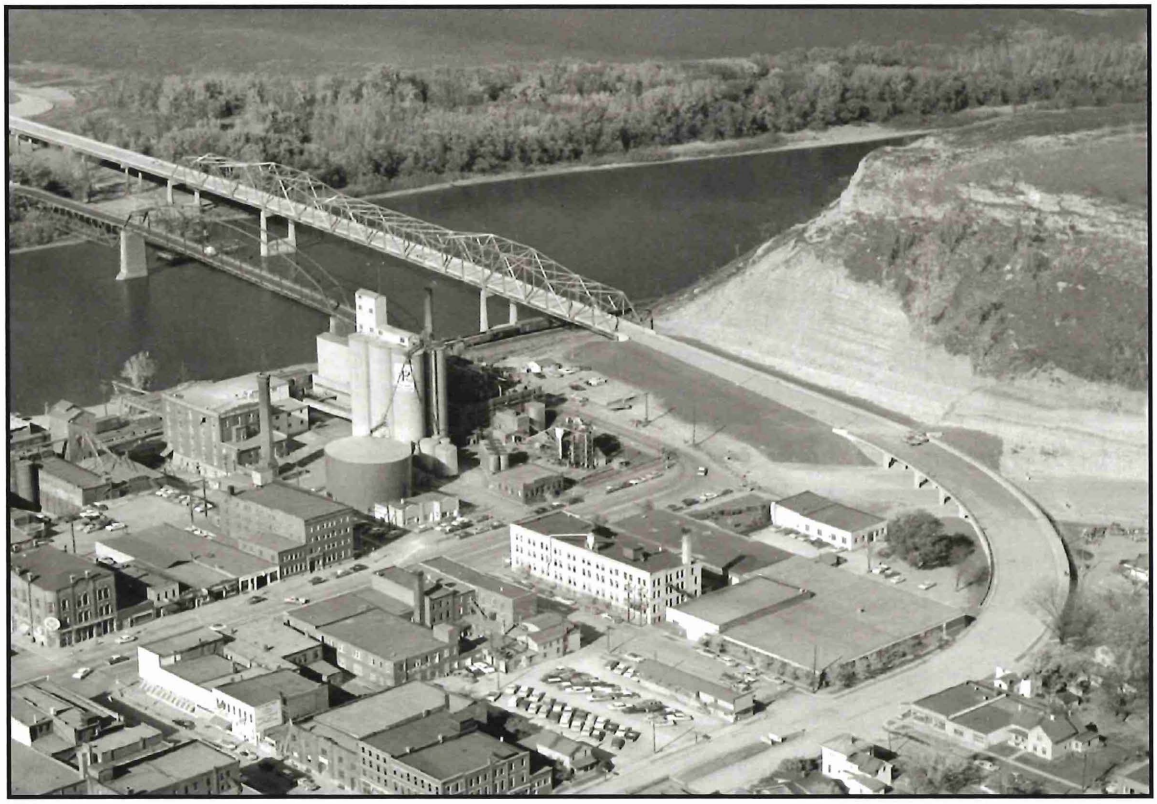


FIGURE 58. AERIAL VIEW OF BARN BLUFF AFTER BLASTING FOR NEW BRIDGE, 1960 (MHS)

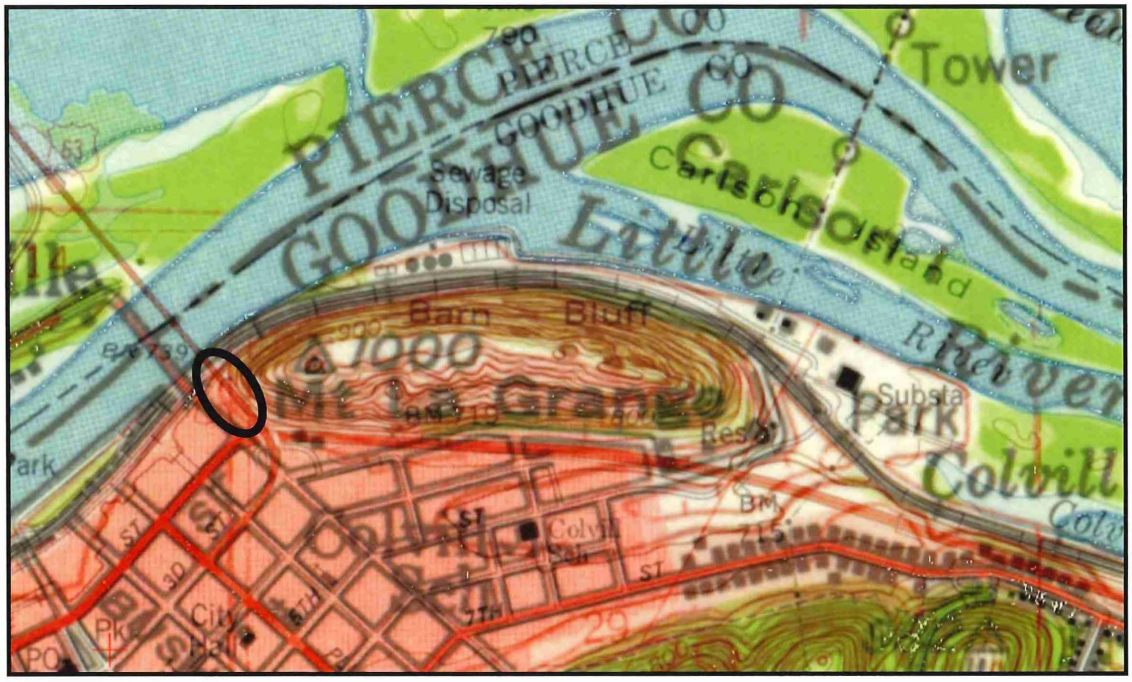


FIGURE 59. OVERLAY OF 1952 AND 1974 USGS TOPOGRAPHIC MAPS SHOWING NEW HIGHWAY ALIGNMENTS (BARN BLUFF SUB-AREA CIRCLED)

PRE-EVALUATION STUDY

No fieldwork took place within this portion of the Barn Bluff sub-area during the pre-evaluation study.

METHODS

Geomorphological coring in the Barn Bluff sub-area was conducted by Strata Morph and observed by Two Pines' Principal Investigator, Andrea (Vermeer) Pizza, on November 19, 2013. Field testing was conducted in the only location that could be accessed by the truck-mounted the Geoprobe®. The backslope of TH 63 allowed for a single transect of seven cores (Nos. 70-76) placed parallel to the road (Figure 60). Cores were spaced on average 10 m apart.

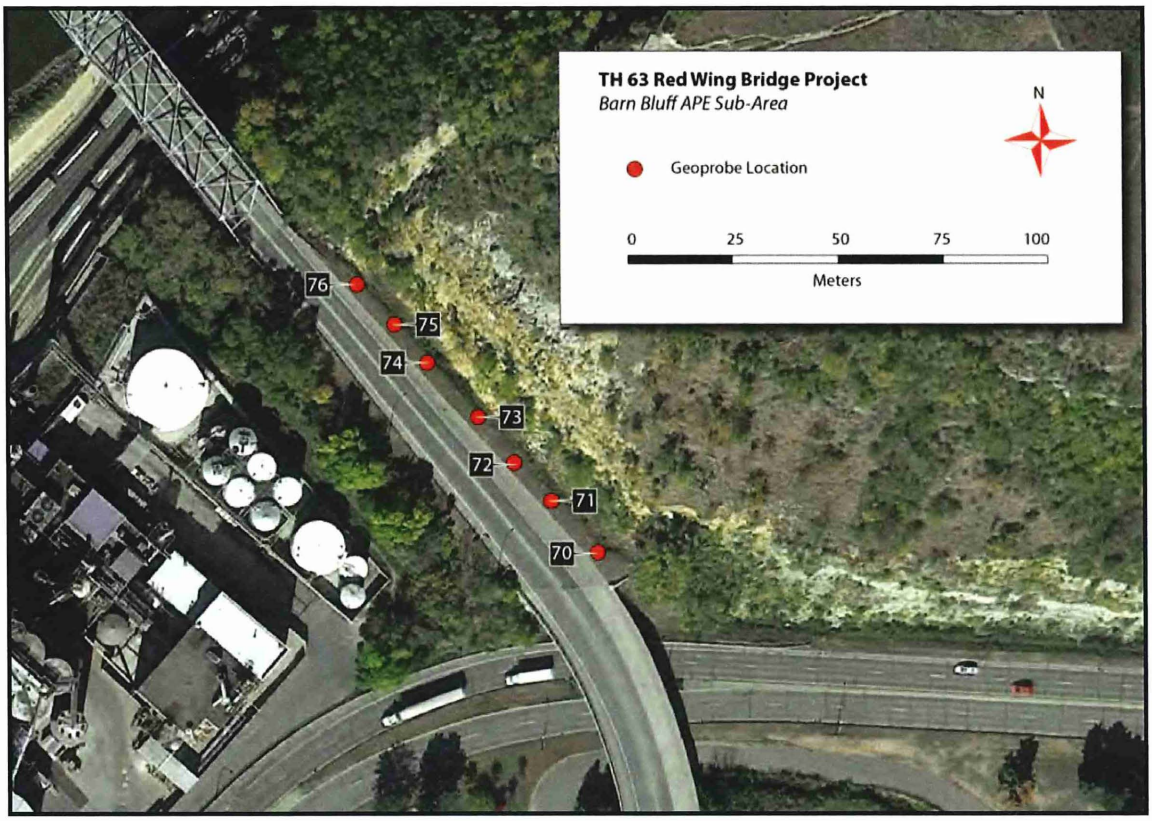


FIGURE 60. PLAN OF GEOPROBE CORES WITHIN THE BARN BLUFF SUB-AREA (KOLB 2014:33)

RESULTS

The Barn Bluff sub-area is a bench cut into the bedrock of the bluff to accommodate the present bridge approach (see Figure 58). The seven cores (Nos. 70-76) extracted within the Barn Bluff sub-area exhibited a consistent pattern of a thin (< 20 cm), modern, silty topsoil over fill, which is mostly crushed bedrock derived from the bluff and interspersed with occasional pebbles and sand (Kolb 2014:32). Fill gave way to bedrock or colluvium overlying bedrock. Depth to bedrock was 0.6 to 1.0 m (2 to 3.3 ft.). No buried soils or evidence of re-deposited soils were encountered within the cores. No cultural material was observed in the cores.

RECOMMENDATION

Based on the history of the Barn Bluff sub-area and the results of the geomorphological investigations, no additional archaeological investigations are recommended within this portion of the TH 63 Project Area prior to or during construction (Figure 61).

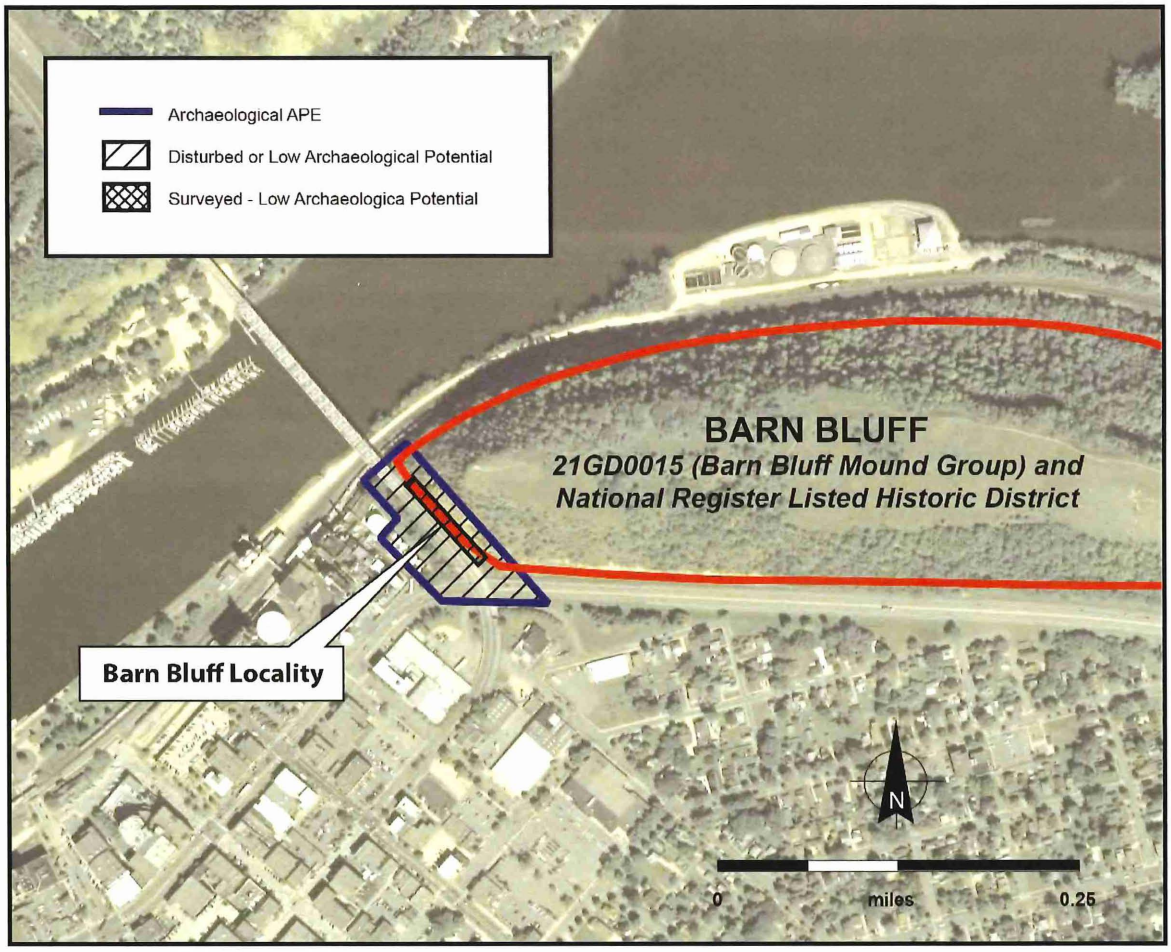


FIGURE 61. BARN BLUFF SUB-AREA SURVEY RESULTS

CHAPTER 10 . SUMMARY AND RECOMMENDATIONS

In 2014, Two Pines Resource Group, LLC (Two Pines) completed a Phase I archaeological survey for the TH 63 Bridge Project in Goodhue County, Minnesota, and Pierce County, Wisconsin. The purpose of the Phase I investigations was to determine if the project APE contains archaeological resources that may be eligible for listing on the National Register of Historic Places (NRHP). The APE was selected by MnDOT to encompass direct impacts from the construction of any of the bridge alternatives, as well as ancillary impacts, including pond locations and areas of construction staging. For the purposes of the study, the APE was divided into five project sub-areas based on its land-use history: North of the River, Levee, Downtown Commercial, East Red Wing Residential, and Barn Bluff.

RESULTS BY SUB-AREA

NORTH OF THE RIVER SUB-AREA

The majority of the North of the Bridge sub-area has low potential for archaeological resources as it is either inundated or a constructed modern landform. Only a narrow point bar that forms the shoreline opposite Red Wing has the potential to contain intact archaeological deposits. However, more than half of this area could not be tested during the Phase I survey due to a lack of landowner permission. Likewise, while cores within the Harbor Bar parking lot indicated the presence of an intact historical-period stratum and artifacts associated with the 19th-century occupation of Trenton Island, permission to excavate trenches was not received. Therefore, these portions of the North of the River sub-area retain moderate to high potential for significant archaeological resources. If these locations are within the construction limits of the TH 63 Bridge Project, they will require further assessment through Phase I or Phase II archaeological investigations.

LEVEE SUB-AREA

The majority of the Levee sub-area has low potential for archaeological resources as it is largely a constructed landform. Only the undeveloped portions of Blocks 41-44 within the sub-area have the potential to contain intact archeological deposits. However, portions of the Levee sub-area could not be tested during the Phase I survey due to a lack of landowner permission or the presence of active roadways. Likewise, while cores within the YMCA parking lot indicated the presence of an intact historical-period stratum and artifacts associated with 19th-century structures that fronted on Broad Street, trenching was not feasible given the active nature of the parking lot and the presence of numerous utilities. Therefore, these portions of the Levee sub-area retain moderate to high potential for significant archaeological resources. If these locations are within the construction limits of the TH 63 Bridge Project, they will require further assessment through Phase I or Phase II archaeological investigations.

DOWNTOWN COMMERCIAL SUB-AREA

For the Phase I study, the Downtown Commercial Sub-Area was reduced to two test areas (Areas 10 and 25) proximate to the bridge approach. Both areas revealed the presence of intact soils with the potential to contain historically-significant archaeological deposits. In particular, coring and trenching within the south half of Area 10 documented

intact foundations and a deeply-buried native soil capped by a 19th-century fill episode. This soil is generally present between 180-250 cmbs. Based on the artifacts present within the buried soil, it is associated with an occupation dating to the third quarter of the 19th century. These deposits are encompassed by site lead 21GDbj. If Area 10 is within the APE of the TH 63 Bridge Project's preferred alternative, additional archaeological investigations will be needed.

Likewise, Area 25 exhibited intact soils, artifact patterning, and the possibility of a precontact period occupation. Based on these findings, Area 25 has a high potential to contain intact archaeological resources, however, the active loading dock and a lack of landowner permission for the remainder of the test area prevented additional sub-surface archaeological testing during the current study. If Area 25 is within the APE of the TH 63 Bridge Project's preferred alternative, additional archaeological investigations will be needed. Furthermore, if the untested portions of Area 25 are within the construction limits of the TH 63 Bridge Project, they will require further assessment through Phase I or Phase II archaeological investigations.

EAST RED WING RESIDENTIAL SUB-AREA

Two locations (Light Industrial and Gas Works) within the East Red Wing Residential sub-area could not be field tested due to the presence of, or likely presence of, contaminated soils. Based on a review of the history of these areas and soil boring logs from the environmental testing, portions of both locations (including the lot associated with 120 E. 4th Street) have the potential to contain intact archaeological resources. If these areas are located within the APE of the TH 63 Bridge Project's preferred alternative, and soil contamination levels allow, these parcels will require further assessment through Phase I or Phase II archaeological investigations.

Of the 23 residential parcels within the East Red Wing Residential sub-area that are located beyond the areas of potential soil contamination, eight were considered after the pre-evaluation study and subsequent investigation to have a low potential for containing intact archaeological resources given the developmental history of the property and thus were eliminated from testing and further investigation.

Five parcels within the East Red Wing Residential sub-area that were identified as having moderate to high potential to contain archaeological resources could not be shovel tested during the Phase I survey because landowner permission was not received. If these locations are within the construction limits of the TH 63 Bridge Project, they will require further assessment through Phase I or Phase II archaeological investigations.

The remaining 10 parcels within the East Red Wing Residential sub-area underwent a Phase I survey using shovel testing. Of those parcels, five exhibited evidence of disturbance and/or contained only a light scatter of historical-period material. No further archaeological work is recommended within these parcels prior to or during construction of the TH 63 bridge. Within the other five parcels, intact archaeological deposits associated with the 19th-century occupation of the East Red Wing neighborhood were documented. If any of these five archaeological sites (21GD291-21GD295) are within the construction APE of the TH 63 Bridge, a Phase II archaeological evaluation of the

site(s) is recommended to determine the eligibility of the resource(s) for listing on the NRHP.

BARN BLUFF SUB-AREA

The Barn Bluff sub-area is a bench cut into the bedrock of the bluff to accommodate the present bridge approach. The seven geomorphological cores extracted within the sub-area exhibited a thin horizon of modern topsoil over fill, which is mostly crushed bedrock derived from the bluff and interspersed with occasional pebbles and sand. Fill gave way to bedrock or colluvium overlying bedrock. Depth to bedrock was 0.6 to 1.0 m (2 to 3.3 ft.). No buried soils or evidence of re-deposited soils were encountered within the cores. No cultural material was observed in the cores. Based on the history of the Barn Bluff sub-area and the results of the geomorphological investigations, no additional archaeological investigations are recommended within this portion of the TH 63 Project Area prior to or during construction.

Potential effects to the National Register-listed Barn Bluff Historic District were evaluated under a separate study prepared by Gemini Research.

SUMMARY OF RESULTS

During the Phase I archaeological survey for the TH 63 Bridge Project, five archaeological sites and one site lead were identified within the APE (Figure 62). The five archaeological sites (21GD291-21GD295) are associated with 19th- through early 20th-century residential properties within the East Red Wing neighborhood. The site lead, 21GDbj, is the location of a buried soil containing c. 1850-1870s deposits within the Red Wing Shoes parking lot. Through cores and flight augers, three additional areas (Harbor Bar Locality, YMCA Locality, and Area 25) were identified as having a high potential for containing intact archaeological resources, but the deposits could not be further characterized due to the constraints of the test areas. Also, several areas within the project APE with moderate to high potential for archaeological resources were not surveyed due to a lack of access.

When the construction limits for the preferred TH 63 Bridge Project alternative are determined, the archaeological APE will need to be reviewed. If any of the archaeological sites, the site lead or the unsurveyed areas of moderate to high archaeological potential are located within the APE, they will require further assessment through Phase I or Phase II archaeological investigations.

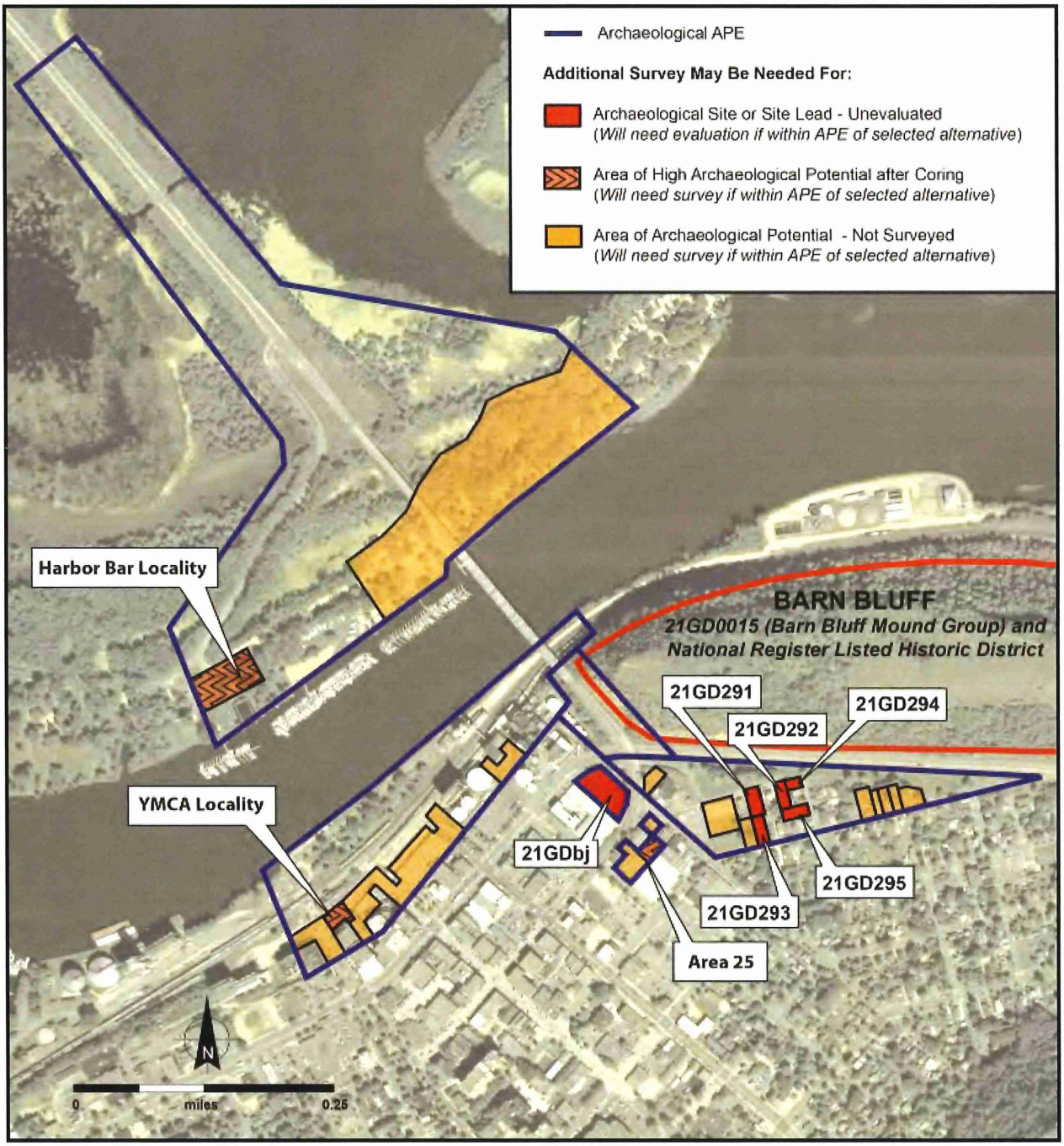


FIGURE 62. AREAS OF SENSITIVITY FOR ARCHAEOLOGICAL RESOURCES

REFERENCES CITED

Anfinson, Scott
2011 State Archaeologist's Manual for Archaeological Projects in Minnesota. Office of the State Archaeologist, St. Paul.

2005 *SHPO Manual for Archaeological Projects in Minnesota*. July 2005. State Historic Preservation Office, St. Paul.

1997 *Southwestern Minnesota Archaeology*. Minnesota Historical Society Press, St. Paul.

Allers, Beverly Voldseth
1991 Barn Bluff in Red Wing on National Register. *Goodhue County Tribune*, January 30.

Angell, Madeline
1977 *Red Wing, Minnesota: Saga of a River Town*. Dillon Press, Minneapolis.

Arzigian, Constance
2008 Minnesota Statewide Multiple Property Documentation Form for the Woodland Tradition. Prepared by the Mississippi Valley Archaeology Center, University of Wisconsin, La Crosse.

Beltrami, Giacomo C.
1828 *Pilgrimage in Europe and America Leading to the Discovery of the Sources of the Mississippi River and Bloody River; with a Description of the Whole Course of the Former, and of the Ohio*. Volume II. Hunt and Clarke, London.

Borchert, John R. and Neil C. Gustafson
1980 *Atlas of Minnesota Resources and Settlement*. Third Edition. University of Minnesota Center for Urban and Regional Affairs and the Minnesota State Planning Agency, Minneapolis.

Brower, Jacob V.
1903 *Minnesota: Discovery of Its Area: 1540-1665*. H. L. Collins, St. Paul.

Brunson, Alfred.
1879 A Western Pioneer: or, Incidents of the Life and Times of Rev. Alfred Brunson, A.M., D.D.. Volume II. Hitchcock & Walden, Cincinnati.

Buhta, A. A., J. L. Hofman, E. C. Grimm, R. D. Mandel, and L. A. Hannus
2011 Investigating the Earliest Human Occupation of Minnesota: A Multidisciplinary Approach to Modeling Landform Suitability & Site Distribution Probability for the State's Early Paleoindian Resources. Prepared by Archaeology Laboratory Augustana College, Sioux Falls, South Dakota.

Burrows, Edwin G. and Mike Wallace
1999 *Gotham: A History of New York City to 1898*. Oxford University Press, Oxford.

Colhoun, James E.
1978 [1823] The Journal of James E. Colhoun, 1823. In *The Northern Expeditions of Stephen H. Long: The Journals of 1817 and 1823 and Related Documents*, pp 271-327. L. M. Kane, J. D. Holmquist, and C. Gilman, eds. St. Paul: Minnesota Historical Society Press.

Commonwealth Cultural Resources Group
2006 *Minnesota Deep Test Protocol Project*. Commonwealth Cultural Resources Group. Submitted to Minnesota Department of Transportation.

Curtiss-Wedge, Franklyn (editor)
1909 *History of Goodhue County, Minnesota*. H. C. Cooper, Jr. & Co., Chicago.

Dobbs, Clark A.
1985 An Archaeological Survey of the City of Red Wing, Minnesota. Reports of Investigations Number 2. The Institute for Minnesota Archaeology, Minneapolis.

1990a. Outline of Historic Contexts for the Prehistoric Period (ca. 12,000-A.D. 1700). In *Minnesota History in Sites and Structures: A Comprehensive Planning Series*. Institute for Minnesota Archaeology Reports of Investigations, Number 37. On file at the State Historic Preservation Office, St. Paul, Minnesota.

1990b. Historic Context Outlines: The Contact Period Contexts (ca. 1630 A.D.-1820 A.D.). In *Minnesota History in Sites and Structures: A Comprehensive Planning Series*. Institute for Minnesota Archaeology Reports of Investigations, Number 39. On file at the State Historic Preservation Office, St. Paul, Minnesota.

Egan-Bruhy, Kathryn C., James A. Robertson, Michael LaRonge, Michael J. Hambacher, Stephen R. Kuehn, and Michael F. Kolb
2003 *Archaeological Investigations of US 63, Minnesota Border to Wis 35, Pierce County, Wisconsin*. Commonwealth Cultural Resources Group. Submitted to Short Elliott Hendrickson, Madison.

Fleming, Edward P.
2009 Community and Aggregation in the Upper Mississippi River Valley: The Red Wing Locality. Unpublished dissertation. University of Minnesota, Minneapolis.

Folsom, William H. C.
1888 *Fifty Years in the Northwest*. Pioneer Press Company, St. Paul.

Folwell, William W.
1921 *A History of Minnesota*. Volume I. Minnesota Historical Society, St. Paul.

Forsyth, Thomas
1880 Fort Snelling: Col. Leavenworth's Expedition to Establish it, in 1819. *Collections of the Minnesota Historical Society* 3:139-167.

Gas Lines
1972 Looking Back 150 Years. Available online at http://simson.net/ref/1995/Boston_Gas_History. pdf

Gibbon, Guy and Scott F. Anfinson
2008 Minnesota Archaeology: The First 13,000 Years. *Publications in Anthropology No. 6*. University of Minnesota, Minneapolis.

Gibbon, Guy E., Craig M. Johnson, and Elizabeth Hobbs
2002 Minnesota's Environment and Native American Culture History. In *A Predictive Model of Precontact Archaeological Site Location of the State of Minnesota*, edited by G. J. Hudak, E. Hobbs, A. Brooks, C. A. Sersland, and C. Phillips. Minnesota Department of Transportation, St. Paul. Available online at http://www.mnmodel.dot.state.mn.us/ chapters/ chapter3.htm.

Gilman, Rhoda R.
2004 *Henry Hastings Sibley: Divided Heart*. Minnesota Historical Society Press.

Goodrich, Earle S.
1866 A Sketch of the Affairs of the Saint Paul Gas Light Company from its organization to January 1st, 1866. Pamphlet. Minnesota Historical Society Pamphlet Collection, Pamphlets relating to gas companies in Minnesota, 1866-.

Hancock, Joseph W.
1893 *Goodhue County, Minnesota, Past and Present by an Old Settler*. Red Wing Printing Company, Red Wing.

Harborbar.net
2012 Harbor Bar and the Island History. Available online at http://www.harborbar. net/Harbor_Bar_website/History.html.

Higginbottom, Daniel K.
1996 Projectile Points of Minnesota: A Brief Introduction. Available online at http://www.tcinternet.net/users/cbailey/lithic1.html.

Hodge, Frederick W.
1907 *Handbook of American Indians North of Mexico*. Two volumes. Government Printing Office, Washington, D.C.

Hudak, Curtis M.
2011 Geomorphic Investigation of the State Trunk Highway 63 Bridge over the Mississippi River, Red Wing, Minnesota. Prepared for the Minnesota Department of Transportation and Federal Highway Administration. Foth Infrastructure and Environment, LLC, Lake Elmo, MN.

Hudak, Curtis M., Hajic Edwin R., and Walsh, Jeffery J.
2011 Interpreting the Origins of Landform Sediment Assemblages within the Upper Mississippi River Valley and Tributaries in the Twin Cities Area of Minnesota. In *Archaen to Anthropocene: Field Guide to The Geology of the Mid-Continent of North America*. J. D. Miller, G. J. Hudak, C. Wittkop, and P. I. MacLaughlin, editors. *Geological Society of America Field Guide* 24: 525-544.

Institute for Minnesota Archaeology
1999 Red Wing Locality. From Site to Story: the Upper Mississippi's Buried Past. http://www.fromsitetostory.org/rwl/rwlintro.asp#top. Accessed March 2011.

Irvine, Samuel Thomas
1941 A History of Red Wing, Minnesota. Unpublished manuscript, held at the Minnesota Historical Society.

Island Camping and Marina
2012 Island History. Available online at http://islandcampingandmarina.com/ History.html.

Johnson, Frederick L.
2008 *Red Wing: A Portable History*. City of Red Wing Historic Preservation Commission, Red Wing.

Keating, William H.
1824 *Narrative of an Expedition to the Source of St. Peter's River, Lake Winnepeek, Lake of the Woods, & c. &c.* Volume I. H. C. Carey & I. Lea, Philadelphia.

Kolb, Jennifer L.
1997 *Guidelines for Public Archeology in Wisconsin*. Available online at http://www4.uwm.edu/Org/was/WASurvey/WAS_Guidlines_files/WAS_Guidelines_DOC.pdf.

Kolb, Michael F.
2014 Geomorphological Investigations in Conjunction with Phase I Archaeological Survey for the Reconstruction of the Minnesota Trunk Highway 63 Bridge over the Mississippi River at Red Wing Minnesota. Prepared for the Minnesota Department of Transportation and Federal Highway Administration. Strata Morph Geoexploration, Sun Prairie, Wisconsin.

Kosec, R. J.
1972 Survey of Red Wing City's Blocks. Manuscript on file at the Goodhue County Historical Society, Red Wing, MN

Lanman, Charles
1847 A *Summer in the Wilderness Embracing a Canoe Voyage Up the Mississippi and Around Lake Superior*. D. Appleton and Company, Philadelphia.

Lettermann, E. J.
1969 *From Whole Log to No Log: A History of the Indians Where the Mississippi and Minnesota Rivers Meet*. Minneapolis: Dillon Press, Inc.

Long, Stephen H.
1978 [1823] The Northern Expeditions of Stephen H. Long: The Journals of 1817 and 1823 and Related Documents. L. M. Kane, J. D. Holmquist, and C. Gilman, eds. St. Paul: Minnesota Historical Society Press.

Mattausch, Daniel W.
1998 David Melville and the First American Gas Light Patents. *The Rushlight* 64:3422-3429.

Meyer, Herbert W.
1972 *Builders of Northern States Power Company*. Northern States Power Co., St. Paul.

Minnesota Department of Transportation (MnDOT)
2011 *MnDOT's Cultural Resources Unit Project Requirements*. Cultural Resources Unit, Office of Environmental Services, Minnesota Department of Transportation, St. Paul.

Minnesota State Historic Preservation Office (MnSHPO)
1993 Tier II: Post Contact Period Contexts (1837-1945). *Preserving Minnesota: A Comprehensive Planning Process.* St. Paul, Minnesota: On file at the Minnesota State Historic Preservation Office, St. Paul, Minnesota.

Mississippi River Commission (MRC)
1895 *Survey of the Mississippi River*. Chart Number 185. Mississippi River Commission, United States Army Corps of Engineers, Washington, D.C.

National Park Service
2002 *The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation*. National Park Service, U. S. Department of the Interior, Washington, D.C.

1997 How to Apply the National Register Criteria for Evaluation. *National Register Bulletin No. 15*. Revised edition for the internet. National Park Service, U. S. Department of the Interior, Washington, D.C.

Neill, E. D.
1881 *History of Dakota County and the City of Hastings, Including the Explorers and Pioneers of Minnesota*. North Star Publishing Company, Minneapolis.

Nelson, Sharon M.
2012 *Early Red Wing Businesses: Street by Street*. Held at the Goodhue County Historical Society.

Nerhaugen, Ruth
1995 Coal Gas Lit Up Red Wing. *Republican Eagle Weekend*. 4-5 November.

Nicollet, Joseph N.
1976 *Joseph N. Nicollet on the Plains and Prairies: the expeditions of 1838-1839 with journals, letters, and notes on the Dakota Indians*. Edmund C. Bray and Martha C. Bray, trans. and eds. St. Paul: Minnesota Historical Society Press.

Pike, Zebulon M.
1902 Pike's Explorations in Minnesota, 1805-1806. *Collections of the Minnesota Historical Society* 1: 368-416.

Pond, G.
1872 Ancient Mounds and Monuments. C*ollections of the Minnesota Historical Society* 1:113-120.

Pond, S. W.
1986[1908] *The Dakota or Sioux in Minnesota As They Were in 1834*. Minnesota Historical Society Press, St. Paul.

Porter, Valentine M.
1908 *Journal of Stephen Watts Kearny*. S.N.: St. Louis, Missouri.

Pratt, Daniel R. and Kelly Nolte
1998 Historic American Engineering Record: Saratoga Gas Light Company, Gasholder No. 2. HAER No. NY-313. Available online at http://memory.loc. gov.

Prosser, Richard S.
1966 *Rails to the North Star*. Dillon Press, Minneapolis.

Rasmussen, Christian A.
1933 *A History of the City of Red Wing, Minnesota*. Red Wing Advertising Co., Red Wing.

Red Wing Pottery
2012 History of the Red Wing Potteries. Available online at http://www. redwingpottery.com/history.htm.

Red Wing Republican Eagle
1908 Island Resort Raided by Pierce County Sheriff and Deputies. September 27.

1909 Buildings on Island Being Torn Down By Owners of Property. March 20.

1976 Island raid part of Pierce County's history. March 26.

Riggs, Stephen R.
1894 Protestant Missions in the Northwest. Minnesota Historical Collections, Volume 6:117-188.

Ruger, A.
1868 *Bird's eye view of the city of Redwing, Goodhue Co., Minnesota*. Robert Teufel & Co., Chicago.

Sanborn Map Publishing Company (Sanborn-Perris Map Company, Sanborn Map Company)
1884-1943 Insurance maps of Red Wing Minnesota. Sanborn Map Publishing Company, New York.

Schoolcraft, Henry R.
1821 *Narrative Journal of Travels from Detroit Northwest through the Great Chain of American Lakes to the Sources of the Mississippi River in the Year 1820.* E. & F. Hosford, Albany, New York.

Seymour, E. Sandford
1850 Sketches of Minnesota, the New England of the West. New York: Harper & Brothers Publishers.

Shober and Carqueville
1880 *Panoramic View of the City of Red Wing, Goddhue [sic] County, Minnesota, 1880.* Shober & Carqueville, Chicago.

Smith, Mike
2003 Gas Works, Coke and Smokeless Fuels. Available online at http://www.igg.org.uk/gansg/12-linind/gasworks.htm.

State of Minnesota Department of Highways
n.d. Jct. T.H. 58, T.H. 61 & T.H. 63, in Red Wing. Map File No. 30-6. State of Minnesota Department of Highways, St. Paul.

Terrell, Michelle M. and Andrea C. Vermeer
2012 Pre-Evaluation Study for Archaeological Potential for the Trunk Highway 63 Red Wing Bridge Project, Goodhue County, Minnesota, and Pierce County, Wisconsin. Prepared for the Minnesota Department of Transportation and the Federal Highway Administration. Two Pines Resource Group, Shafer.

Terrell, Michelle M. and Eva B. Terrell
2014 Barn Bluff National Register Historic District, Goodhue County, Minnesota: Cultural Landscape Report. Prepared for the City of Red Wing Planning Department. Two Pines Resource Group, LLC, Shafer, Minnesota.

United States Department of Commerce, Bureau of the Census (U.S. Census)
1900 *Twelfth Census of the United States, 1900* National Archives and Records Administration, Washington, D.C.

1880 *Tenth Census of the United States, 1880* National Archives and Records Administration, Washington, D.C.

1870 *Ninth Census of the United States, 1870*. National Archives and Records Administration, Washington, D.C.

United States Department of Energy
2013 The History of Natural Gas. Available online at http://www.fossil.energy.gov/education/energylessons/gas/gas_history.html.

Upham, Warren
2001 *Minnesota Place Names: A Geographical Encyclopedia.* Third Edition. Minnesota Historical Society, St. Paul.

Van Erem, Saleh, Mark Doperalski, and Miranda Van Fleet
2010 *Phase IA Archaeology and Phase I Architectural History Survey for the Red Wing Riverfront Trail Project, Red Wing, Goodhue County, Minnesota*. Prepared for the City of Red Wing. The 106 Group Ltd., St. Paul.

Vermeer, Andrea C.
2005 *Phase I Archaeological Survey for the Silver Creek Sanitary Sewer Sub-Trunkline Project, Rochester, Olmsted County, Minnesota*. Prepared for the City of Rochester. The 106 Group Ltd., St. Paul.

Vogel, Robert
1994 *Historic Contexts for the City of Red Wing*. Bear Creek Archaeology. Prepared for the Heritage Preservation Commission, City of Red Wing.

Waite, Diana S.
1969 Historic American Engineering Record: Troy Gas Light Company, Gasholder House. HAER No. NY-2. Available online at http://memory.loc.gov.

Walker, Francis A.
1872 *Ninth Census, Volume I: The Statistics of the Population of the United States, Embracing the Tables of Race, Nationality, Sex, Selected Ages, and Occupations.* Government Printing Office, Washington, DC.

Warren, W. W.
1984 [1885] *History of the Ojibway People*. St. Paul: Minnesota Historical Society Press.

Wedel, Mildred Mott
1986 Peering at the Ioway Indians Through the Mist of Time: 1630 – circa 1700. *Journal of the Iowa Archaeological Society* 33:1-74.

Wellman, Diana
2011 Historic American Engineering Record: Cleveland Gas Light & Coke Company. HAER No. OH-131. Available online at http://memory.loc.gov.

Westerman, Gwen and Bruce White
2012 *Mni Sota Makoce: The Land of the Dakota*. Minnesota Historical Society Press, St. Paul.

Williams, William
1920 Major William Williams' Journal of a Trip to Iowa in 1849. *Annals of Iowa*, Vol. XII (4):241-310.

Winchell, Newton H.
1911 *The Aborigines of Minnesota*. Minnesota Historical Society, St. Paul.

The Winona Daily News
1959 Red Wing May Remove Rest of Bluff Indian. May 22.

Wright, Herbert E. Jr., K. Lease and S. Johnson
1998 Glacial River Warren, Lake Pepin, and the Environmental History of Southeastern Minnesota, in Contributions to Quaternary Studies in Minnesota, Carrie J. Patterson and Herbert E. Wright, editors. *Minnesota Geological Survey Reports of Investigations,* 49:131-140.

Zellie, Carole
1989a From Palisade Head to Sugar Loaf: An Inventory of Minnesota's Geographic Features of Historic and Cultural Significance. Landscape Research, St. Paul.

1989b National Register Nomination Form: Barn Bluff. On file at the Minnesota State Historic Preservation Office, St. Paul.

APPENDIX A

MINNESOTA ANNUAL ARCHAEOLOGICAL LICENSES

APPLICATION FOR MINNESOTA
ANNUAL ARCHAEOLOGICAL RECONNAISSANCE SURVEY LICENSE

This license only applies to reconnaissance (Phase I) surveys conducted under Minnesota Statutes 138.31-.42 during calendar year **2013**. Separate licenses must be obtained for site evaluation (Phase II) surveys, for major site investigations (Phase III), for burial site authentications under Minnesota statutes 307.08, and for survey work that will continue into another calendar year. Only the below listed individual is licensed as a Principal Investigator, not the institution/agency/company or others who work for that entity. The licensed individual is required to comply with all the conditions attached to this license form. Permission to enter land for the purposes of archaeological investigation must be obtained from the landowner or land manager.

Name: **Andrea C. Vermeer**

Institution/Agency/Company Affiliation: **Two Pines Resource Group, LLC**

Title/Position: **Senior Archaeologist and Historian**

Address: **17711 260th Street, Shafer, MN 55074**

Work Phone: **651-257-4766** E-Mail: **avermeer@twopinesresource.com**

Name of Advanced Degree Institution: **The University of Arizona** Year: **2006**

Name of Department: **Anthropology** Degree: __MA __MS **X** PhD

Purpose: (check all that may apply)
CRM **X** Academic Research ___ Institutional Field School ___

Type of Land: (check all that may apply)
State Owned **X** County Owned **X** Township/City Owned **X**
Other non-federal public ___ List: _____

MHS Repository Agreement # **594** Other Approved Curation Facility: _____

Previous License: Year **2012** Type **Annual** Number **12-19**

Signed (applicant): _____ Date: **January 23, 2013**

Required Attachments: *Curriculum Vita* ___ and Documentation of Appropriate Experience ___ for previously unlicensed individuals.

Submit one copy of this form and attachments to:
Office of the State Archaeologist, Ft. Snelling History Center, St. Paul, MN 55111
612-725-2411 612-725-2729 FAX 612-725-2427 email: mnosa@state.mn.us

Minnesota Historical Society Approval: _____ Date: 2/4/13
State Archaeologist Approval: _____ Date: 1/22/13

License Number: 13-013

Form Date: 2/15/11

APPLICATION FOR MINNESOTA
ANNUAL ARCHAEOLOGICAL RECONNAISSANCE SURVEY LICENSE

This license only applies to reconnaissance (Phase I) surveys conducted under Minnesota Statutes 138.31-.42 during calendar year **2014**. Separate licenses must be obtained for site evaluation (Phase II) surveys, for major site investigations (Phase III), for burial site authentications under Minnesota statutes 307.08, and for survey work that will continue into another calendar year. Only the below listed individual is licensed as a Principal Investigator, not the institution/agency/company or others who work for that entity. The licensed individual is required to comply with all the conditions attached to this license form. Permission to enter land for the purposes of archaeological investigation must be obtained from the landowner or land manager.

Name: Michelle M. Terrell, Ph.D.

Institution/Agency/Company Affiliation: Two Pines Resource Group, LLC

Title/Position: Principal Archaeologist and Historian

Address: 17711 260th Street, Shafer, MN 55074

Work Phone: 651-257-4766 E-Mail: mterrell@twopinesresource.com

Name of Advanced Degree Institution: Boston University Year: 2000

Name of Department: Archaeology Department Degree: __MA __MS _X_PhD

Purpose: (check all that may apply)
CRM _X_ Academic Research ___ Institutional Field School ___

Type of Land: (check all that may apply)
State Owned _X_ County Owned _X_ Township/City Owned _X_
Other ___ List: _____

MHS Repository Agreement # 632 Other Approved Curation Facility: _____

Previous License: Year 2013 Type Annual Number 13-033

Signed (applicant): Michelle M Terrell Date: 1-15-14

Required Attachments: *Curriculum Vita* ___ and Documentation of Appropriate Experience ___ for previously unlicensed individuals.

Submit one copy of this form and attachments to:
Office of the State Archaeologist, Ft. Snelling History Center, St. Paul, MN 55111
612-725-2411 612-725-2729 FAX 612-725-2427 email: mnosa@state.mn.us

Minnesota Historical Society Approval: Patricia Emerson Date: 1-31-14
State Archaeologist Approval: _____ Date: 1/29/14

License Number: 14-020

Form Date: 2/15/11

APPENDIX B

GEOMORPHOLOGICAL INVESTIGATIONS REPORT

GEOMORPHOLOGICAL INVESTIGATIONS IN CONJUNCTION WITH PHASE I ARCHAEOLOGICAL SURVEY FOR THE RECONSTRUCTION OF THE MINNESOTA TRUNK HIGHWAY 63 BRIDGE OVER THE MISSISSIPPI RIVER AT RED WING, MINNESOTA

Mn/DOT Contract No. 02319

State Project No. 2515-21

Strata Morph Geoexploration Report of Investigation No. 247

Authorized and sponsored by the Minnesota Department of Transportation
and the Federal Highway Administration

Prepared by:

Michael F. Kolb, Ph.D., Geomorphologist
Strata Morph Geoexploration, Inc.
1648 Calico Court Sun Prairie, WI 53590

October 2014

INTRODUCTION

Geomorphological investigations consisting of coring and trenching were undertaken in five APE Sub-Areas in Red Wing, Minnesota and across the Mississippi River on Trenton Island in Wisconsin (Figure 1). The five sub-areas were defined during a pre-evaluation study designed to locate areas where intact archaeological resources may be located as a guide to future work on the TH 63 bridge approaches (Terrell and Vermeer 2012). This study included archaeological, architectural, and geomorphological investigations.

Coring was undertaken in the five subareas to determine the geologic potential for deeply buried historic and pre-contact archaeological resources. Based on the coring results areas with geologic potential were defined. Trenching or large diameter auguring was undertaken in areas determined to have potential for deeply buried archaeological deposits to gather additional soil-stratigraphic data and to obtain samples of archaeological material if present. A total of 78 cores were extracted in the five APE sub-areas, 14 trenches were excavated in four of the five APE sub-areas, and 10 auger clusters were sampled in one of the five APE sub-areas.

PREVIOUS RESEARCH

The geomorphic setting and subsurface geology is very different south of the Mississippi River in the City of Red Wing and north of the River on the Lake Pepin delta. Bedrock is near the modern surface in much of the project area south of the river. The most prominent bedrock feature is an outlier called Barn Bluff. It is capped by the Oneota Dolomite that is underlain by the Jordon sandstone and then the Francona Formation glauconitic sandstone and shale (Runkel 1998). Bedrock beneath the city in the project area is sandstone of the Jordon Formation, interbedded sandstone, siltstone and shale of the Eau Claire Formation, and sandstone of the Mt Simon Formation (Runkel 1998). Surficial deposits mapped in the project area in the city of Red Wing are Holocene alluvium and Wisconsinan age sand and gravel of the Grey Cloud and Langdon terraces (Hobbs and Setterholm 1998).

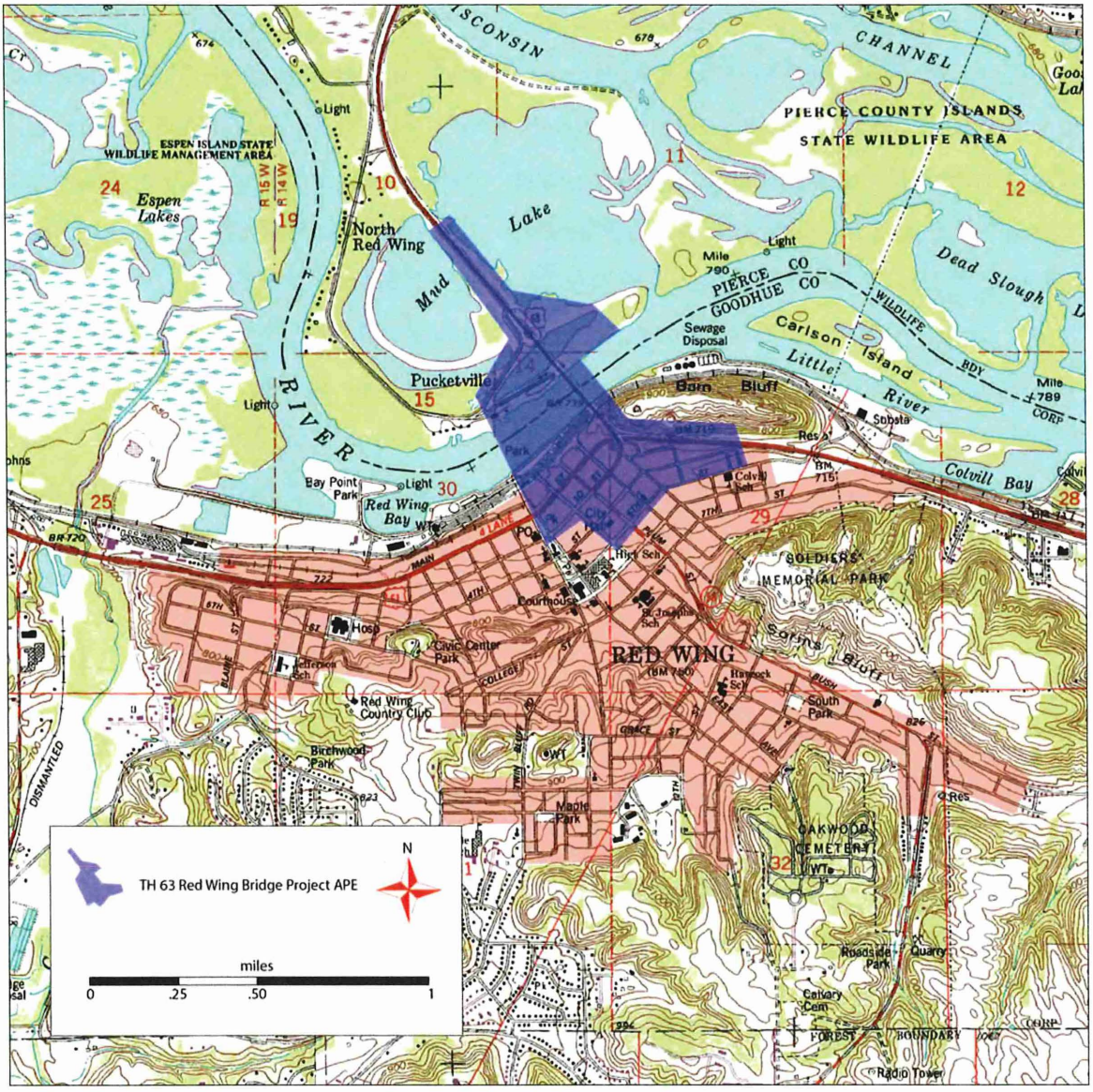


Figure 1. Location of project area on a 1:24,000 scale topographic map

The landscape and subsurface stratigraphy in the project area north of the Mississippi River channel is the result of the following events: At the onset of the Holocene (10,000-12,000 years ago) the Mississippi River valley was deeply incised. The fluvial fan at the mouth of the Chippewa River 40.8 kilometers (25 miles) downstream of Red Wing dammed the Mississippi River and created Lake Pepin which likely stretched up to St. Paul when it initially formed (Wright et al. 1998). The delta of the Mississippi River advanced into Lake Pepin, initially in the St. Paul area, and prograded downstream to its modern position near Red Wing, Minnesota. It reached the Red Wing area just prior to 760-650 CE (1330±30 ^{14}C years BP) (Hudak 2011, Hudak et al. 2011)

Hudak (2011) also conducted a geomorphological investigation for the TH63 bridge that included five deep soil borings, and an additional number of shallow borings associated with the initial archaeological assessment (Terrell and Vermeer 2012). The results of portions of this investigation are also discussed in a later publication (Hudak et al. 2011). Each of the borings will be discussed in the results section when we discuss the cores extracted for this investigation.

METHODS

Cores were used to collect subsurface data and construct a stratigraphic framework. This framework was used to determine where in the project area there is potential for buried archaeological sites. Methods followed a protocol developed specifically for deep testing (Monaghan et al. 2006) in Minnesota. Cores measuring 5 cm (2 inches) in diameter were extracted with a Geoprobe® mounted on a pick-up truck. Cores were described in the field using standard systems from soils (Schoeneberger et al. 1998, Soil Survey Staff 1975) and geology (Collinson 1982, Folk 1974), photographed and returned to the borehole. Standard core log descriptions are in Appendix A.

Based on the results of the investigation during the coring phase some of the localities were recommended for deep archaeological sampling. Sampling was accomplished by excavating trenches or, in one case, using flight augers mounted on the Geoprobe. Trenches are excavated to an OSHA safe depth of 1.25 m by skimming off soil in ± 5 cm levels with a smooth edged backhoe bucket. At this depth portions of the profiles are cleaned, examined for artifacts and/or anthropogenic features, and described

using the same standard systems used for the cores. In cases where the stratigraphy in the trench was identical to the stratigraphy identified in cores no formal description was completed instead variations or details not seen in the cores were noted on the core logs. Profiles are also photographed and sampled, if necessary. Excavation continues in the same manner until a "basal" deposit is reached or until the excavation depth is below the base of vertical APE. Because safe trench entry is not possible below 1.25 m soil is described after being removed from the trench below this depth. Formal profile descriptions are provided in Appendix A.

Flight augers (13-cm/5-in diameter) mounted on the Geoprobe were used to sample intact soils below a parking lot at the Viking Coca Cola Locality. For each auger location (1) the auger is advanced through the asphalt and subcourse to the top of the target stratum; (2) the hole is cleaned out; (3) the auger is advanced into the target deposit; and (4) the target deposit is brought to the surface and screened through 1/4-in mesh hardware cloth. To increase sample volume, a cluster of three auger holes is excavated at each sample location.

RESULTS

North of the River (Trenton Island) APE Subarea

The North of the River Subarea is in Wisconsin north of the Mississippi River channel (Figure 2). It consists of a long narrow island that parallels the channel on both the northeast and southwest sides of the existing TH 63 Bridge. The island is actually a point bar that is built on the delta formed by the Mississippi River as it enters Lake Pepin. Subsurface investigations were conducted at the Harbor Bar Locality and the Gardas Locality located southwest of the existing bridge (Figure 3). The Island Campground and Marina beneath the bridge and to the northeast of the bridge were not investigated because access was denied.

Gardas Locality Coring

The Gardas property consists of a campground and marina. The marina is at the modern river shoreline and the campground is on a low levee ridge just north of the marina. A shallow swale is to the north of the campground. Cores 15 and 18 are closest to the modern shoreline and have similar stratigraphy. It consists of 0.38 to 0.65 m of

Figure 2. Location of project area APE Subareas

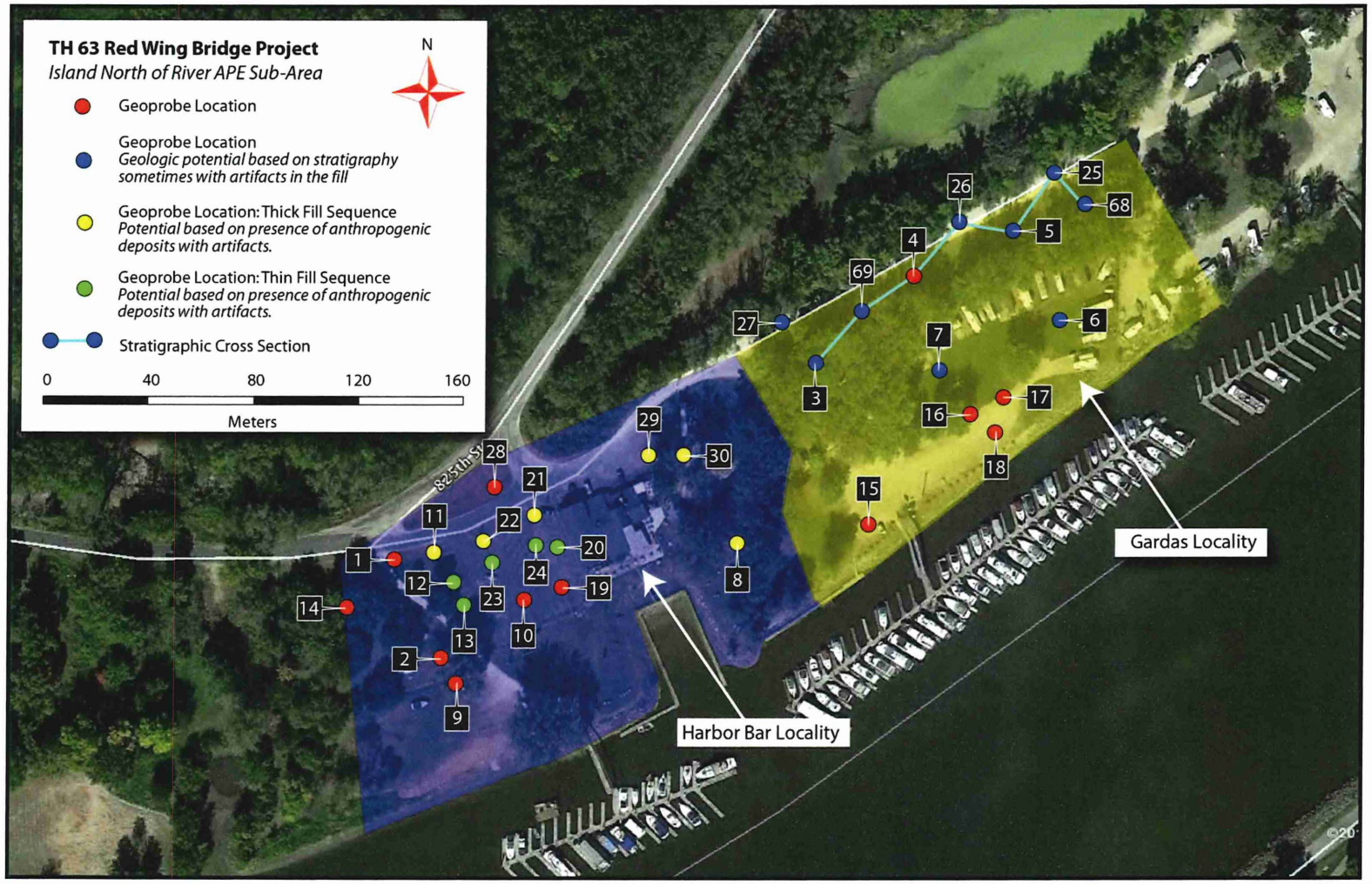


Figure 3. North of the River Subarea core locations & geologic potential

crushed gravel fill over laminated and thin bedded silt loam and very fine sandy loam dredge spoil or alluvium to a depths of 2.38 and 2.56 meters respectively (Appendix A). This sequence overlies a buried soil formed in silt loam that contains wood and saw dust. Beneath the silty Ab horizon in Core 18 the deposits consists of very fine sand, very fine sandy loam, and silt loam alluvium to a depth of 3.69 m. In Core 15 below the ABb horizon is a very fine sandy loam strata over a laminated silt loam strata that contain saw dust and a few historic artifacts to a depth of 4.07 m. Below 4.07 m is laminated fine and very fine sand alluvium.

Cores 16 and 17 are 10-12 m away from the modern shoreline (Figure 3). Stratigraphy consists of 0.17-0.20 m of crushed gravel over laminated very fine sand, sandy loam, and silt loam dredge spoil or alluvium with occasional clinkers to a depth of 2.20 m (Appendix A). In Core 17 the base of this unit is an erosional contact marked by very coarse sand and granules. Below 2.20 m in both cores is laminated alluvium that is predominately very fine sandy loam to silt loam in Core 17 and more silt loam with some sandier beds in Core 16.

Cores 6 and 7 are on the modern ridge top (Figure 3). Stratigraphy in Core 6 consists of 1.3 m of fill over laminated silty and sandy alluvium to a depth of 3.96 m (Appendix A). No soil is developed in the alluvium underlying the fill. Stratigraphy in Core 7 consists of 0.78 m of fill over an Ab horizon formed in sandy loam with rounded gravel and some cinder over an ACb horizon formed in very fine sandy loam alluvium to a depth of 1.38 m. Below 1.38 m is a sequence of bedded and laminated silt loam, very fine sandy loam and loam alluvium to a depth of 4.86 m.

A line of cores was placed on the slough side of the ridge parallel to the ridge (Figure 3). Stratigraphy consists of a Lower Sand Facies of very fine and fine sand with a few laminae containing fine plant fragments (Figure 4). A Silty to Sandy Facies overlies the Sand Facies at the WSW end of the cross-section. It consists of interbedded laminated silt loam and fine sand with common organic-rich laminae. A radiocarbon date on plant material in Core 3 from 3.5 m below the surface indicates the Silt to Sand Facies began accumulating around 1435 CE (460±30 ^{14}C years BP, Appendix B). Above the silty to sandy facies across the entire cross-section is the Silty-Clayey Facies. It consists

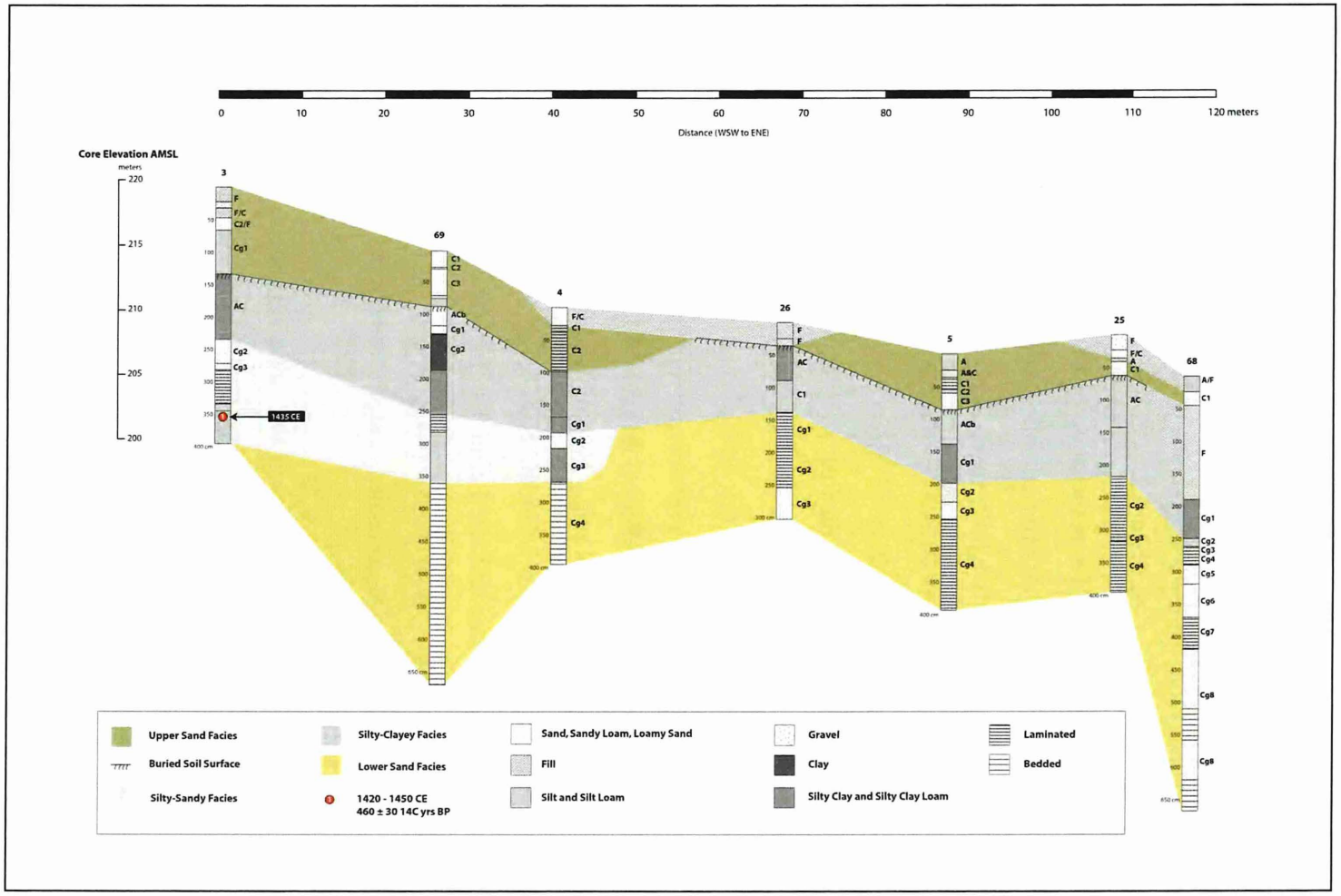


Figure 4. Stratigraphic cross-section at Gardas Locality

of silt loam, silty clay loam, and silty clay vertical accretion alluvial deposits. They are stratified in Core 69 but massive in the other cores. A weakly developed soil is formed in the Silty-Clayey Facies except in Cores 4 and 68 where it is eroded or has been removed by anthropogenic activity. The Silty-Clayey Facies and the soil are buried by the Upper Sand facies or by fill. The Upper Sand Facies consist of bedded and laminated very fine sand and very fine sandy silt alluvium (Figure 4).

Core 27 is located north of Core 3 at the edge of the modern slough (Figure 3). Stratigraphy consist of 1.51 m of fill over a buried soil formed in the Silty-Clayey Facies over laminated very fine and fine loamy sand Lower Sand Facies to a depth of 2.96 m. Stratigraphy is very similar to the sequence in Core 26 illustrated in the cross-section.

Soil boring 11GD1, located between 825th Street and TH 63 north and east of the Gardas property, documents the Holocene history of the landform at Gardas (Hudak 2011). Stratigraphy consists of road fill (0-3.0 m), over alluvial and fluvial deposits (3.0-12.0 m), over lacustrine deposits (12.0-28.6 m), over fluvial deposits to 33.53 m. The stratigraphy documents the change from a meltwater stream environment (lower fluvial deposits) to a lacustrine environment (Lake Pepin) around 10,070 ^{14}C years BP and then the progradation of the Mississippi River delta into the lake reaching Red Wing just before 1330±30 ^{14}C years BP (±668 CE) (Hudak 2011). By ±1435 CE the aggrading delta surface was at or near the surface of Lake Pepin forming the sand ridge between the slough and the main channel soon after 1435 CE. Vertical accretion deposits then accumulated in the slough during floods and soil began forming when the slough surface became perennially or seasonally subaerial.

Weakly developed buried soils in cores on the ridge summit and backslope are likely historic in age. Depth of burial ranges from 78-132 cm below surface. Fill, and in some cases, thin alluvial sequences overlie an historic age landscape. This area has geological potential for buried archaeological deposits. The Mississippi River channel margin on the south side of the locality is historic fill emplaced in the shallow waters along the channel margin and has no potential for buried archaeological deposits.

Gardas Locality Trenching

Stratigraphy delineated during coring phase of the investigation indicated that there was potential for deeply buried sites ranging in age from about 1400 CE into the early historic Euro-American period. Four trenches were excavated to determine if archaeological deposits were present (Figure 5). Trenches were excavated to depths between 1.35 and 1.50 m through the fill and the Upper Sand Facies just into the Silty-Clayey Facies. Stratigraphy and deposits are similar to those described for the cores (see Appendix A). Footing stones from the original bridge were located in Trench 3 about 40 cm below the modern surface. A layer of charcoal and rocks in a silt loam matrix was located at a depth of 0.71-0.78 meters in Trench 2. It is overlain and underlain by laminated very fine sand. This feature likely is the result of a recent campfire. No artifacts except for the rock manuports were present.

Harbor Bar Locality

The Harbor Bar locality is the property southwest of the Gardas Locality (Figure 3). Today it consists of a bar, a small harbor, and a marina. Stratigraphy consists of fill or dredge spoil over alluvium. The fill consists of historic debris from demolition of buildings and natural source material used to engineer the land surface (leveling and filling low areas). Asphalt and sub-course gravel is present in all the cores in the paved parking lot. The alluvium is predominately laminated and thin bedded silt and very fine sand texture over most of the area except in the northwest corner (Cores 29 and 30) where the deposits beneath the fill are silt loam to silty clay loam. The pedogenic soil is missing in most of the cores.

The cores around the periphery of the parking lot consist of natural source fill or dredge spoil over alluvium. Cores 1 and 2 have thin fill over alluvium (Table 1, Appendix A). Core 9 is on the channel side of a stone wall that marks the former channel margin and ferry landing. Stratigraphy consists of 1.31 m of dredge spoil over alluvium with sawdust at the base of the sequence. Dredge spoil is massive fine to medium sand with large clamshell fragments. The alluvium contains plant fragment and a few white ware sheds above the sawdust layer. Core 14 is west of the parking lot in the footprint of the former former residence of the Harbor Bar owner (Figure 3). Stratigraphy consists of natural source fill from off the island including outwash source gravel and limestone

Figure 5. Trench locations at the Gardas Locality

Table 1. Core data from the Harbor Bar Locality (blue core numbers are categorized as thin fill and red core numbers are categorized as thick fill)

Core #	Core Base (m)	Historic Fill or Deposits (m)	Fill Matrix	Artifacts
1	3.96	0.28	sand, rounded gravel	small piece of metal
2	3.96	0.26	silt loam	none
8	3.96	1.32	sandy	brick fragments, pull tab, dry wall fragments
9	3.04	1.31	dredge spoil silt, fine & medium sand with clam shell fragments over dredge spoil or alluvium	white ware fragments 1.6 mbs; saw dust 2.34-2.27 mbs
10	3.96	0.39	sand, gravel, dolostone gravel	none
11	3.96	1.45	laminated sand alluvium; soil inclusions	clinkers, cinders, burned soil, rounded fine pebbles mostly at between 1.36-1.45 m depth
12	3.04	0.76	silt loam and medium to very fine sandy loam, granules and very fine pebbles	burned residue
13	3.04	0.64	silt loam, fine – medium sandy loam	burned residue, cinder, brick fragments
14	3.04	1.60	medium to coarse sand, rounded gravel	sandstone, limestone
19	3.96	0.25	asphalt and sub-course only	none
20	3.04	1.00	fine to medium sand over silt loam	dolostone pebbles, slag, glass, flower pot fragments
21	3.04	1.36	medium to very coarse sandy loam with rounded gravel; soil inclusions, over silt loam	glass, stone ware; wood, charcoal, ash. Note: refusal near surface 2 m to the east
22	3.96	1.43	silt loam to sandy loam with rounded gravel over very coarse sand and granules; soil inclusions	fine anthropogenic inclusions
23	3.96	1.00	sandy loam to silt loam	fine anthropogenic inclusions and charcoal
24	2.13	0.62	medium to very coarse sand over silt loam, rounded pebbles	glass
28	3.96	0.64	medium to coarse sand and sandy loam, rounded pebbles road fill	dolostone in road fill
29	3.96	1.41	sand, loam, and sandy loam, rounded pebbles, over silt loam	fine artifact inclusion below 0.55 m
30	3.96	2.13	silt loam to loam over silt loam	sandstone clasts to 0.43 m, brick, glass, mortar and dolostone gravel below 0.43 m

building material in a medium to very coarse sand matrix. This fill in the basement or excavation created when demolishing the building.

Cores 10 and 19 are at the southern edge of the parking lot (Figure 3). Stratigraphy in these cores consists of the asphalt-subcourse sequence over alluvium (Appendix A). No artifacts are present.

Core 28 is across the road north of the Harbor Bar parking lot (Figure 3). Stratigraphy consists of natural source fill to 0.64 m over a thin layer of dolostone gravel over alluvium (Table 1, Appendix A). Fine-grained alluvium (silt and clay) beds are more common and thicker due to proximity to a swale than to the south around the bar.

The rest of the cores (yellow and green circles on Figure 3) have some potential for buried archaeological deposits. The cores are divided into two groups based on the thickness of the anthropogenic deposits and fill. Cores with relatively thin anthropogenic and/or natural source fill (0.62 – 1.00 m) are 12, 13, 20, 23 and 24 (Table 1). And those with thick anthropogenic and/or fill deposits (1.36 – 2.13 m) are 8, 11, 21, 22, 29 and 30 (Table 1).

Cores with Thin Anthropogenic Fill and Artifacts

The fill sequence in Cores 12 and 13 consists of compacted silt loam over a weakly developed AC horizon also formed in silt loam over strata of burned material and fine pebbles in a fine-medium sand matrix to a depth of 0.76 m and 0.69 m respectively. Two events are represented. The alluvial sequence is truncated as evidence by the lack of an A horizon and thin fill strata, containing anthropogenic material, was emplaced possibly the result of grading. Topsoil was added to cover the fill and the surface of the topsoil became the landscape surface for a period of time. A second layer of compacted artifact-free silt loam fill was then added to create the modern surface.

Fill in Cores 20, 23 and 24 consists natural source sandy loam with minor gravel from outwash sources, silt loam and some bedrock source fill mixed with small artifact fragments and identifiable artifacts such as glass, a flower pot fragment, and slag (Table 1). The A horizon at the top of the alluvial sequence is missing removed perhaps in a shallow excavation during construction or demolition of a structure. Fill mixed with small artifact was then emplaced.

Cores with Thick Anthropogenic Fill and Artifacts

Core 8 is in the southeast part of the locality (Figure 3). Stratigraphy consists of artifacts mixed with sandy and silty natural source fill to a depth of 1.32 m over alluvium (Table 1, Appendix A). Some brick fragments and dry wall are concentrated at the base of the fill. A dark colored silt loam and very fine sand stratum directly below the fill may indicate this was a wet area, possibly a shoreline, prior to filling.

In Core 11 the fill consists of interstratified laminated silt and very fine sand alluvium without artifacts and silty strata with artifacts. The artifact bearing strata are at intervals between 0.57 m -0.63 m and 1.36 - 1.45 m. The upper interval contains cinder and clinkers and the lower interval contains burned residue and ash. The soil below the fill is truncated and then the excavation is filled with alluvium during flooding or, less likely during an intense rain storm. The artifactual material may also have been deposited by fluvial activity.

Fill in Cores 21 and 22 consists of upper fill of silt loam to sandy loam deposits with gravel and a few soil inclusions and very few artifacts to depth of about 0.75 m. In Core 21 the upper fill is over silt loam with many artifacts including charcoal and ash and in Core 22 over sandy loam with fine anthropogenic inclusions. This is fill mixed with artifacts used to fill and excavation.

Core 29 and 30 are northeast of the bar near the dumpsters (Figure 3). These cores also have upper and lower fill units. The upper fill is sandy loam, loam and silt loam with minor gravel, including some local bedrock source gravel, to depth of 0.43 and 0.40 m. The lower fill top is marked by a compact silt loam A horizon with fine artifact fragments, slag, brick fragments and glass to a depth of about 1.00 m. Below this depth on Core 29 is layered sand and darker sandy loam with artifacts throughout to a depth of 1.41 m. In Core 30 the interval between 1.00 m and 2.13 m is a gap of very low recovery due to very soft loose fill. It is assumed the fill is anthropogenic. The lower fill is in a relatively deep excavation that is from 1.00 m to possibly 1.70 m deep from the top of the buried A horizon. The A horizon is formed in silty vertical accretion deposits that accumulated after the lower fill was emplaced indicating a period of relative stability before the upper fill was emplaced. The upper fill was used to level off the surface.

Anthropogenic deposits below the parking lot are likely associated with the destruction and demolition of buildings. Thickness of the deposits and the absence of the upper solum indicate fill is in (1) excavations done for footings or slabs, or (2) holes dug to dispose of the burned and/or demolished building material. Core refusal just below the subcourse gravel between Core 21 and the northwest corner of the bar indicated the likely presence of a footing. Around the edge of and outside of the parking lot there is either asphalt over sub-course gravel, to a depth of ±30 cm, over laminated sand or just sand with or without an A horizon. Geologic potential is low under the anthropogenic deposits and on the rest of the Harbor Bar property where anthropogenic deposits associated with demolished structures are not present. The anthropogenic deposits encountered in the coring appear to be in secondary cultural contexts except for the possible footing.

The Mississippi River shoreline at the Gardas and Harbor Bar Localities is artificially constructed using fill, dredge spoil, and alluvium sometimes captured by wing dams (Figure 6). The fill was laid down in shallow water at the channel margin and in areas that were seasonally inundated. It contains historic artifacts and saw dust and ranges from 1.30 to 4.06 m thick with the thickest fill closet to the modern channel margin.

Levee APE Subarea

Levee Park Locality

The Levee Park Locality is along the bank of the Mississippi River in the City of Red Wing (Figure 7). The river bank/shoreface was covered and built up with 2.24-5.11 m of fill to create the park. The fill consists of sand, some likely emplaced with a hydraulic dredge, local bedrock source material, sand and gravel, and minor amounts of cinder and other historic artifacts (Appendix A). Beneath the fill is bedrock or an erosional surface cut into gravelly sand occasionally with a silty cap (ACb horizons, Figure 8). This surface is the former waterfront. Often the surface is buried by 10-15 cm of either poorly sorted loamy sediment or stratified fine sand. These deposits can contain shell, cinder, metal, rounded gravel, plant fragments, and wood. The erosional surface was created by fluctuating water levels along the river shoreline/waterfront. The waterfront was also heavily utilized for commercial and recreational activity (boats landed for loading and unloading). These activities also modified the shoreline by direct manipulation or indirectly by disturbing vegetation and building structures and docks.

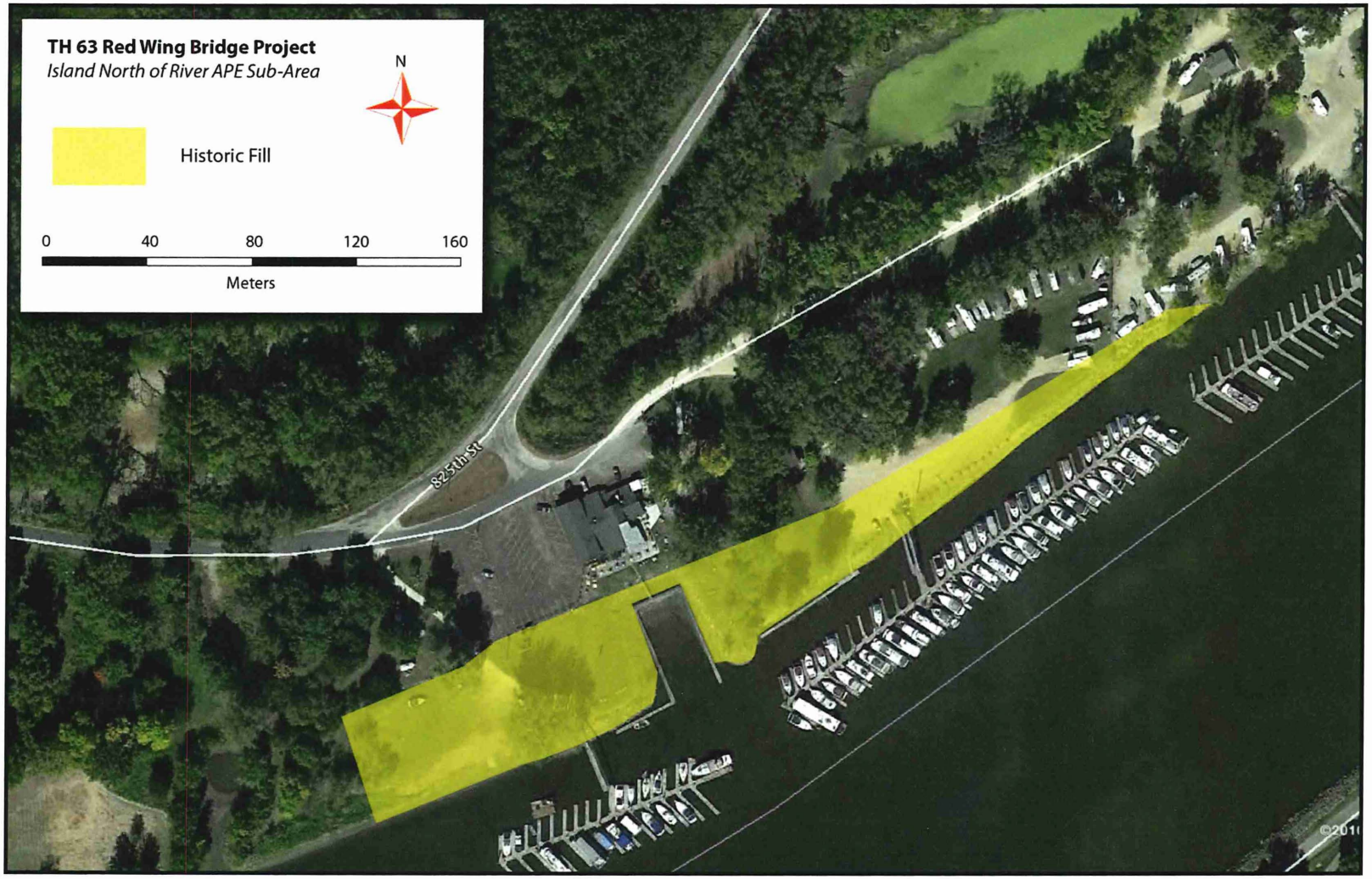


Figure 6. Location of historic fill areas at Gardas and Harbor Bar localities.

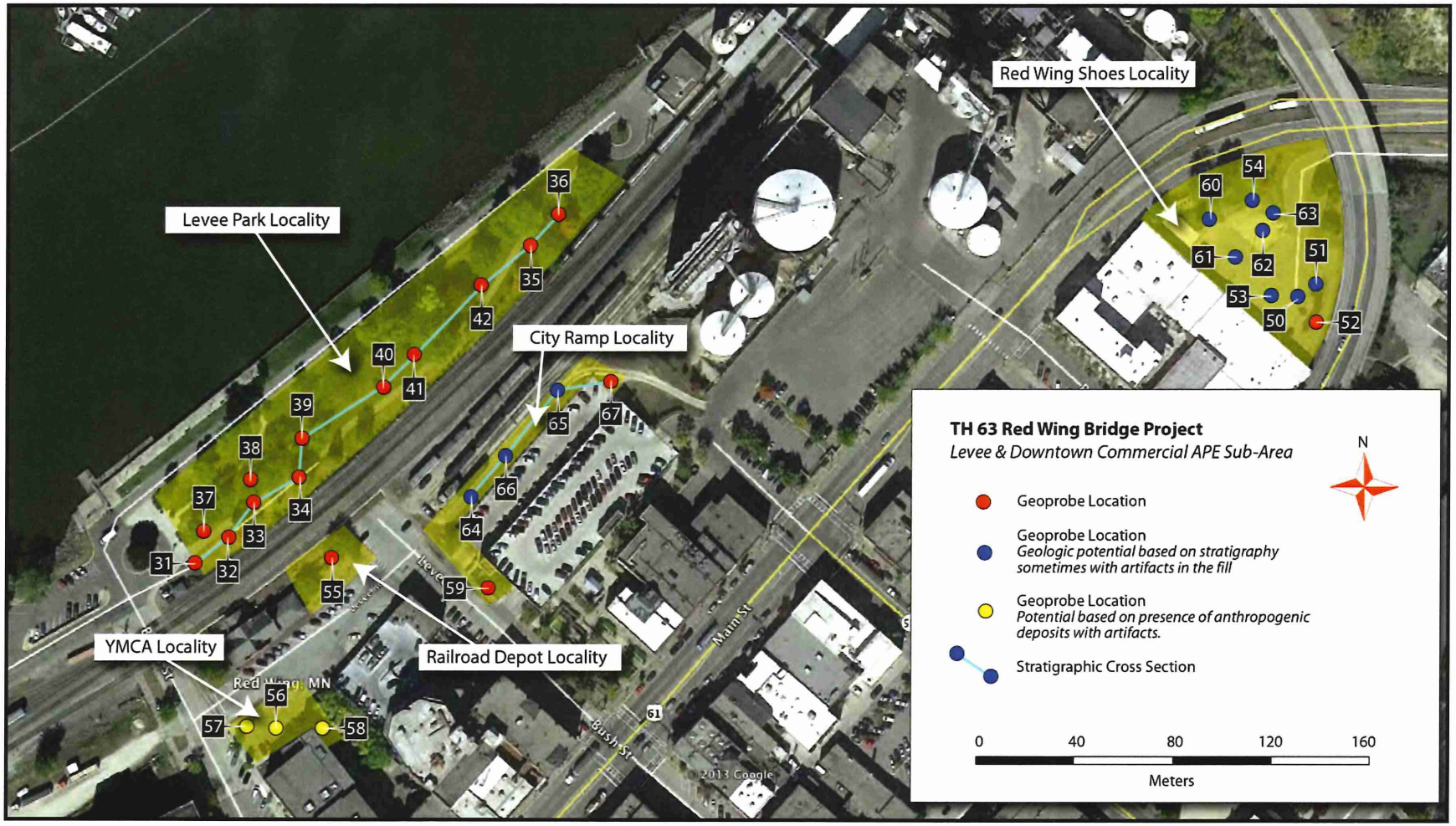


Figure 7. Core locations & geologic potential in the Levee & Downtown Commercial Subareas

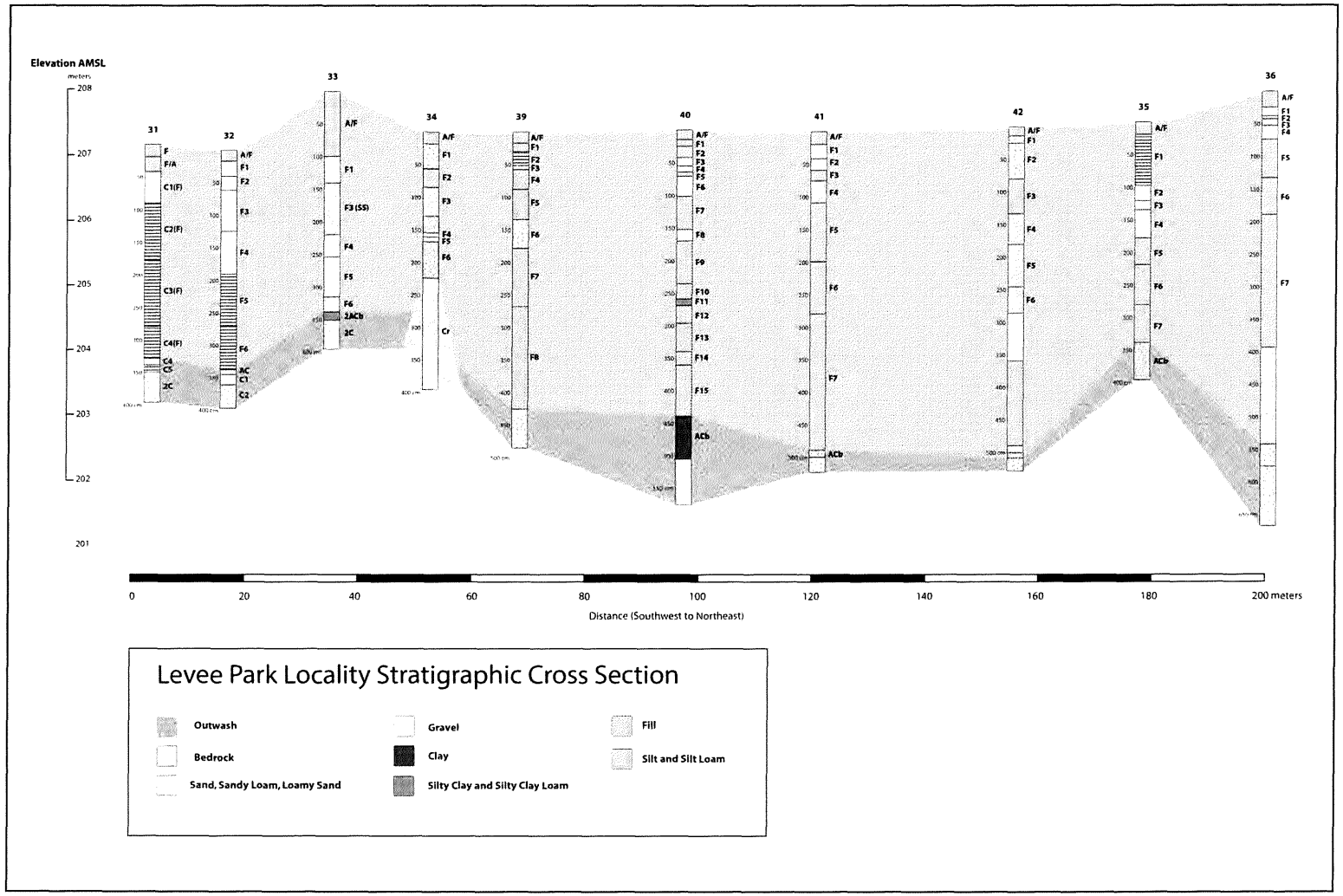


Figure 8. Levee Park Locality stratigraphic cross-section

Weathered bedrock in Core 34 may be emplace, as bedrock is as close to the surface 50 m to the southeast at the city garage, or this could be a large piece of bedrock source fill.

Soil boring 11GD2 is located at the northeast end of the park (Hudak 2011). Stratigraphy consists of natural levee deposits to a depth of 2.6 m, over wood chips to a to a depth of 5.15 m over interbedded fluvial, lacustrine and wetland deposits to a depth of 11.8 m, over bedrock. Two dates near the base of the interbedded sequences are 7490 ^{14}C years BP and 10,310 ^{14}C years BP. The sandy surface unit and the wood chips correlate with the fills we encountered in the park. The lag representing the historic shoreline under the fill is cut into gravelly sands that correlates with the coarse fluvial deposits identified by Hudak just below 5.15 m. Bedrock is another 6.5 m below the top of the fluvial sand in Hudak's core.

Geologic potential for *in situ* non-structural archaeological deposits is low beneath the fill on the erosional surface. Geomorphic process such as water level fluctuation, waves, and flooding that created the erosional surface, in combination with human activity, mitigates against any *in situ* artifacts. Structural elements or excavations that penetrated below the erosional surface may be partially preserved.

City Ramp Locality

Five cores were extracted at the City Ramp Locality (Figure 7). Core 59 is in the grass along the southwest end of the ramp on the slope that ascends to the center of the city. Stratigraphy consists of 1.0 m of fill over weathered bedrock. No unconsolidated sediment is present nor is the pedogenic soil present. This area has been stripped and filled during the process of urbanization.

Cores 64 – 67 form a cross-section at the base of the slope along the northwest boundary of the ramp (Figure 9). Core 67 is upslope of the other cores and has stratigraphy similar to Core 59. It consists of 0.51 m of fill over sandstone bedrock. Cores 64 -66 are lower on the landscape. Stratigraphy consists of fill ranging from 1.0-1.45 m thick over a buried soil formed in either organic sediments or mucky silt loam alluvium. The organic sediment occurs in Cores 64 and 66. It consists of peat and mucky peat to a depth of 2.20 m in Core 64 and interbedded peat, sandy peat, and peaty sand to a depth of 2.47 m in Core 66. The organic sequence overlies a buried soil formed in loamy and silty alluvium in Core 66 and mucky loam weathered bedrock in Core 64. In Core 65 the

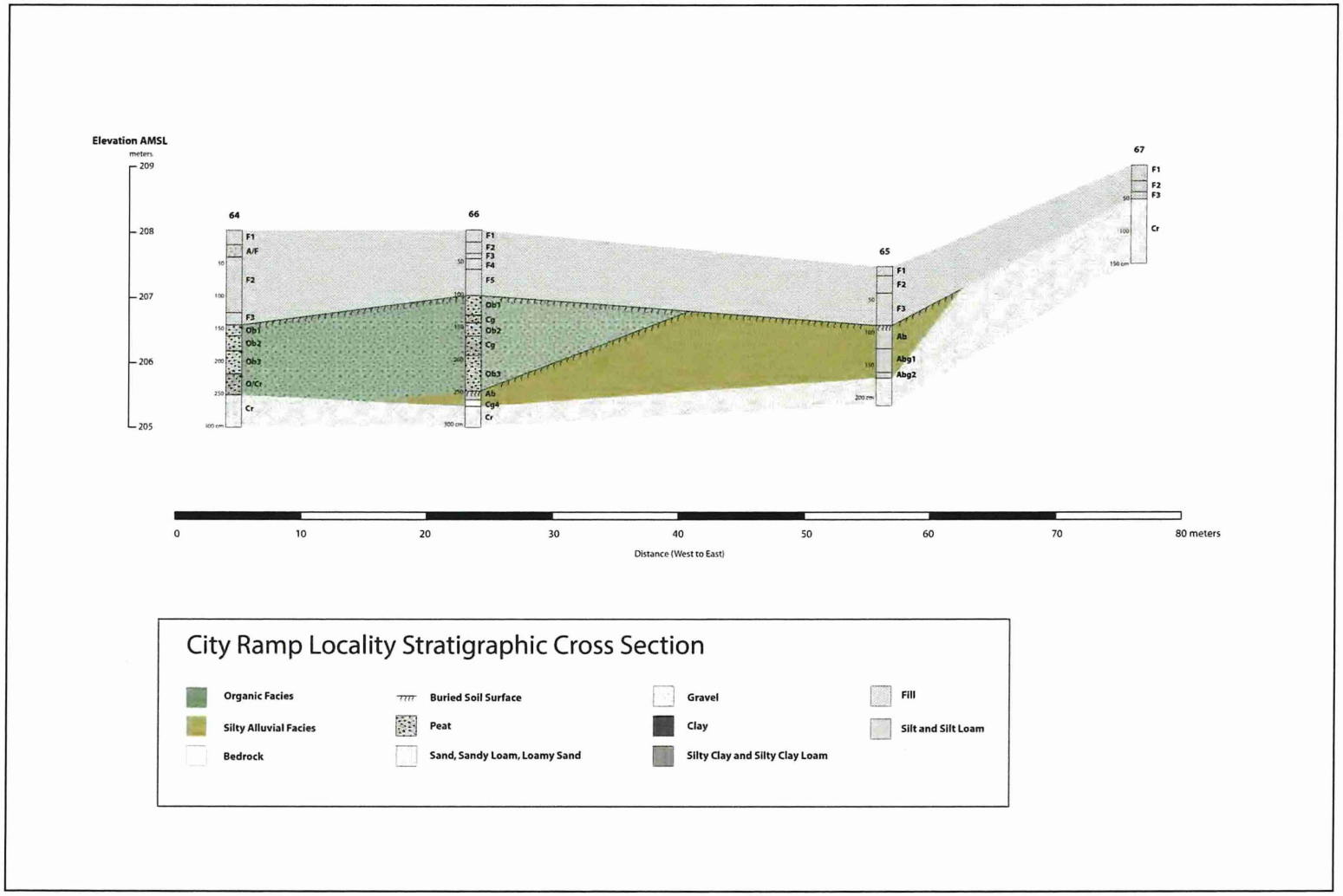


Figure 9. City Ramp Locality stratigraphic cross-section

organic sequence is not present. The fill directly overlies a hydric buried soil formed in alluvium to a depth of 1.65 m. The alluvium is interbedded with thin beds of organic sediment. Below the alluvium is sandstone bedrock. These soils have geologic potential because they mark a landscape surface at the top of a Holocene depositional sequence. Archaeological sampling is recommended using trenches to sample the buried soils.

City Ramp Locality Trenching

Three trenches were excavated along the base of the slope northwest of the city ramp in the same location as the core cross-section (Figure 10) to determine the presence of absence of archaeological deposits. Trenches were excavated through the fill into the Organic Facies and the Silty Alluvial Facies. Stratigraphy in the trenches was very similar to the stratigraphy in the cores. No archaeological deposits were located.

Railroad Depot Locality

One core (#55) was placed northeast of the railroad depot (Figure 7). Stratigraphy consists of fill from both bedrock and non-bedrock sources with occasional historic artifacts to a depth of 1.31 m. The lower boundary is very abrupt and may be the historic river bank/shoreface. From 1.31 m to 3.96 m is clean sand and gravel except for the presence of shell at 2.60 m. The presence of shell in a sand and gravel outwash sequence in inconsistent with the outwash depositional environment indicating the sediment is re-deposited. It is either dredge spoil, possibly pumped to this location, or it was re-deposited from upslope or up river possibly out of the mouth of the nearby tributary stream now covered by the City of Red Wing.

YMCA Locality

Three cores were extracted at the YMCA property (Figure 7). Two cores (56 and 57) are north of the building closest to the river and the third core (#58) is upslope in the short alley between buildings. In all cores loose, coarse fill, and rubble resulted in poor recovery. Stratigraphy in Core 56 consists of gravelly sandy loam and sand fill to refusal at a depth of 3.15 m. In the lower meter some clay loam and loam sediments with wood fragments were recovered.

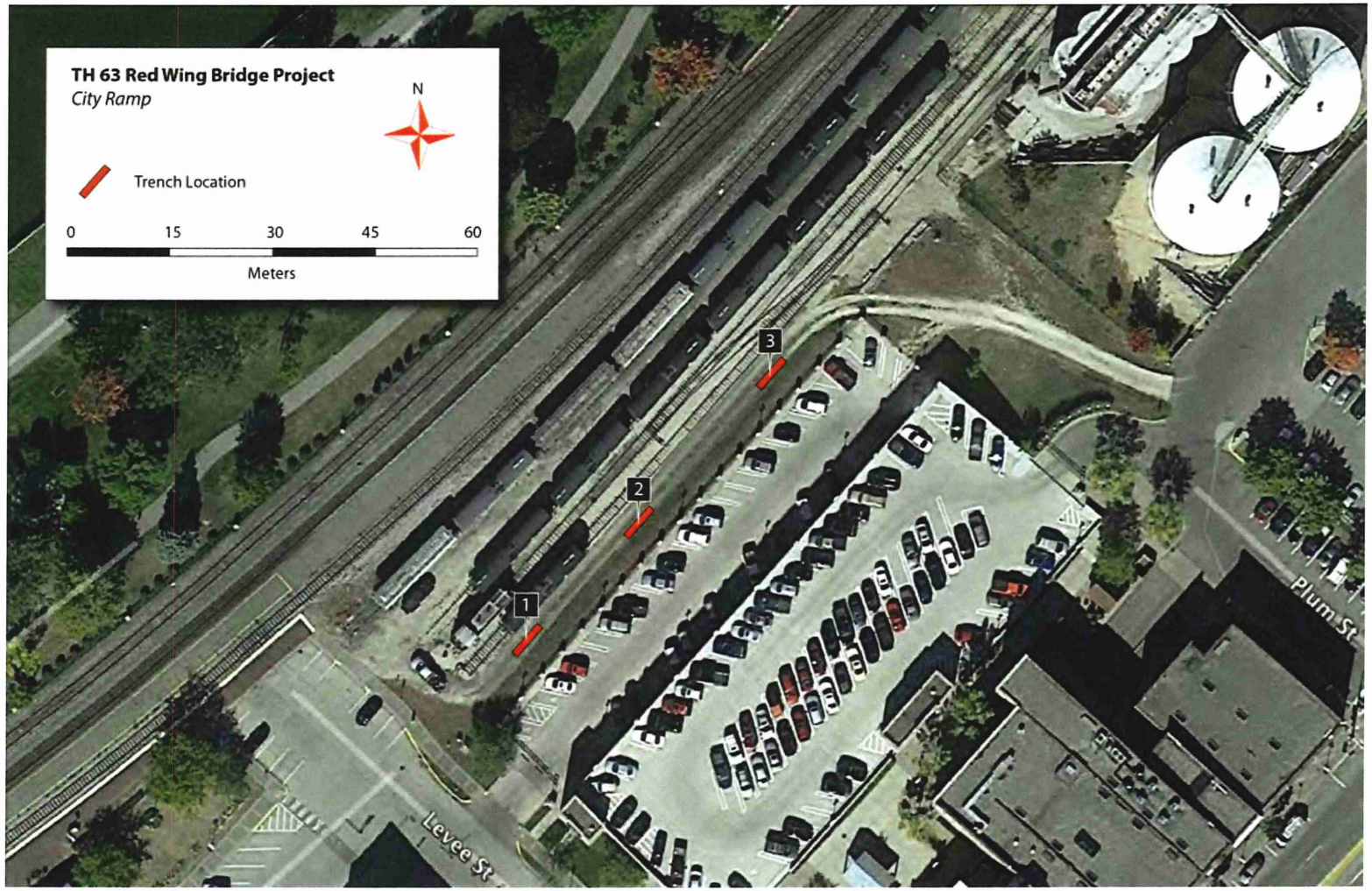


Figure 10. City Ramp Locality trench locations

Stratigraphy in Core 57 consists of asphalt and subcourse gravel over layers silt loam and gravelly sandy loam to a depth of 0.54 m, over bedrock source fill to a depth of 1.27 m, over mixed sand and gravel with a few bedrock clasts and black clay loam inclusions to a depth of 2.0 m. Below 2 m is an ACb horizon consisting of a black silt loam with a small percentage of gravel to a depth of 2.41 m, over black to very dark gray clay loam to a depth of ±3.5 m. The core was extended through sand and gravel to its base at 4.87 m. The ACb horizon may mark an historic landscape surface where the soil is mixed with coal or dust of very fine-grained cinders and over-thickened by other anthropogenic activity.

Core 58 is upslope of the other 2 cores. Stratigraphy consists of asphalt over a gravel subcourse and then a second bedrock source fill that may be second subcourse to a depth of 0.54 m. From 0.54 m to 2.30 m is sandy loam fill with rounded gravel, fresh dolostone gravel, wood and brick fragments and many artifacts. From 2.30 m to about 3.00 m is very fine sandy loam to silt loam with a few brick and wood fragments. Below 3.00 m to the base of the core at 3.96 m is fine sand weathered bedrock. The presence of numerous artifacts in fill may indicate the presence of a structure or remains of a demolished/burned structure therefore potential for *in situ* historic archaeological deposits is high.

Geologic potential exists at the base of the fill upslope in Core 58 and possibly in Cores 56 and 57, although the nature of the deposits beneath the fill in these cores is not clear .Subsurface conditions in this area will make trenching impossible without shoring and de-watering equipment. A rainbow of utility marks were present on the surface when the cores were extracted and coring revealed loose coarse fill with abundant groundwater. None of this is conducive to open trench stability or safety. Even under the best of conditions an excavation to the base of the fill could not be entered without steeping and sloping resulting in a very large hole or by using shoring. Artifacts could be recovered with the backhoe without shoring as long as the trench stayed open but dealing with *in situ* structural features would be problematic.

Downtown Commercial APE Subarea

Red Wing Shoes Locality Coring

The Red Wing Shoe locality is the parking lot and lawn to the northeast of the downtown Red Wing Shoe facility (Figure 7). Nine (9) cores were extracted from this area. Four types of deposits are present: (1) fill/historic archaeological deposits, (2) paludal deposits, (3) alluvium, and (4) weathered bedrock. The fill/historic archaeological deposit consist of transported fill with cinder and a few other types of artifacts and deposits that are the result of in situ building demolition. In place structural elements of building foundations are also present (see archaeology report). Paludal deposits consist of well-decomposed organic sediment (muck). The alluvium is silt loam, silty clay loam, and silty clay textured vertical accretion deposits that likely includes some loess. The weathered bedrock is friable sandstone. Stratigraphy, with a few exceptions, consists of fill/historic archaeological deposits (0.54-1.71 m thick) over a buried soil with an Ob-Ab or Ab-Cg horizon sequence formed in muck over alluvium or alluvium, over weathered bedrock (Appendix A). The Ab horizons are generally neutral black and cumulic and the C horizons are strongly gleyed. These characteristics plus the presence of patchy paludal deposits (wetland environment) indicate this was, prior to filling, a wet poorly drained landscape.

Stratigraphy in Core 52 consists of fill directly over weathered bedrock. The prehistoric Holocene deposits are missing due to truncation during urbanization.

The muck (Ob horizons) or mucky silt loam (Ab horizons) are in Cores 50 and 51 at the southeast end of the parking lot. Buried A horizons to the north are hydric but do not have O horizons or mucky Ab horizons indicating the water table dropped below the soil surface likely on a year cycle. On the buried landscape around Cores 50 and 51 the water table was at the surface or there was standing water all year except during very dry periods.

Although the buried soils formed in wet environments they are relatively intact beneath the historic fill in all of the cores except Core 52 where the solum is missing. Potential exists for buried archaeological deposits of both historic and pre-contact age over the entire parking lot except along the bridge ramp at the east end of the lot.

Red Wing Shoe Locality Trenching

Five (5) trenches were excavated in the Red Wing Shoe facility parking lot (Figure 11). Stratigraphy was very similar to the stratigraphy in the cores. The thicker fill was confined to the east end of the parking lot in Trenches 2-5 (Cores 50, 51 and 53). Two fill stages were identified by stratigraphic position and artifact content in some of these trenches. The later fill stage may preserve historic features in the earlier fill stages. No Native American artifacts were located in the buried soils.

Viking Coca Cola Locality

The area investigated at Viking Coca Cola is a paved parking lot (Figure 12). Two cores were extracted to determine the condition of the soil beneath the pavement. Stratigraphy in Core 77 consists of asphalt and crushed gravel subcourse to a depth of 0.35 m, over a soil with an AC-A-AB horizon sequence formed in silt loam to a depth of 0.72 m, over weathered bedrock to refusal at solid bedrock at a depth of 2.4 m. The AC horizon is anthropogenic in origin. It contains rounded pebbles and cinder and abruptly overlies the A horizon. The A horizon is anthropogenically modified but mostly intact.

Stratigraphy in Core 78 consists of asphalt and crushed gravel subcourse to a depth of 0.28 m, over a soil with an AC-A-AB horizon sequence to a depth of 0.57 m, over weathered bedrock to refusal at solid bedrock at a depth of 1.82 m. The AC horizon is anthropogenic and only 5 cm thick. The A and AB horizons are similar to those in core 77.

Soil boring 11GD3 is located in the downtown commercial subarea near the intersection of 4th Street and Potter Street. The boring also encountered bedrock less than 1 m below the surface (Hudak 2011).

An anthropogenic strata and the natural soil sequence is preserved beneath the asphalt and subcourse gravels indicating there is potential for intact archaeological deposits. Sampling the soil beneath the parking lot using trenching was not feasible because of trucks leaving and entering the Viking Coca Cola garage. For this reason and because the intact soil are shallow a continuous flight auger mounted on the Geoprobe was used for the sampling.

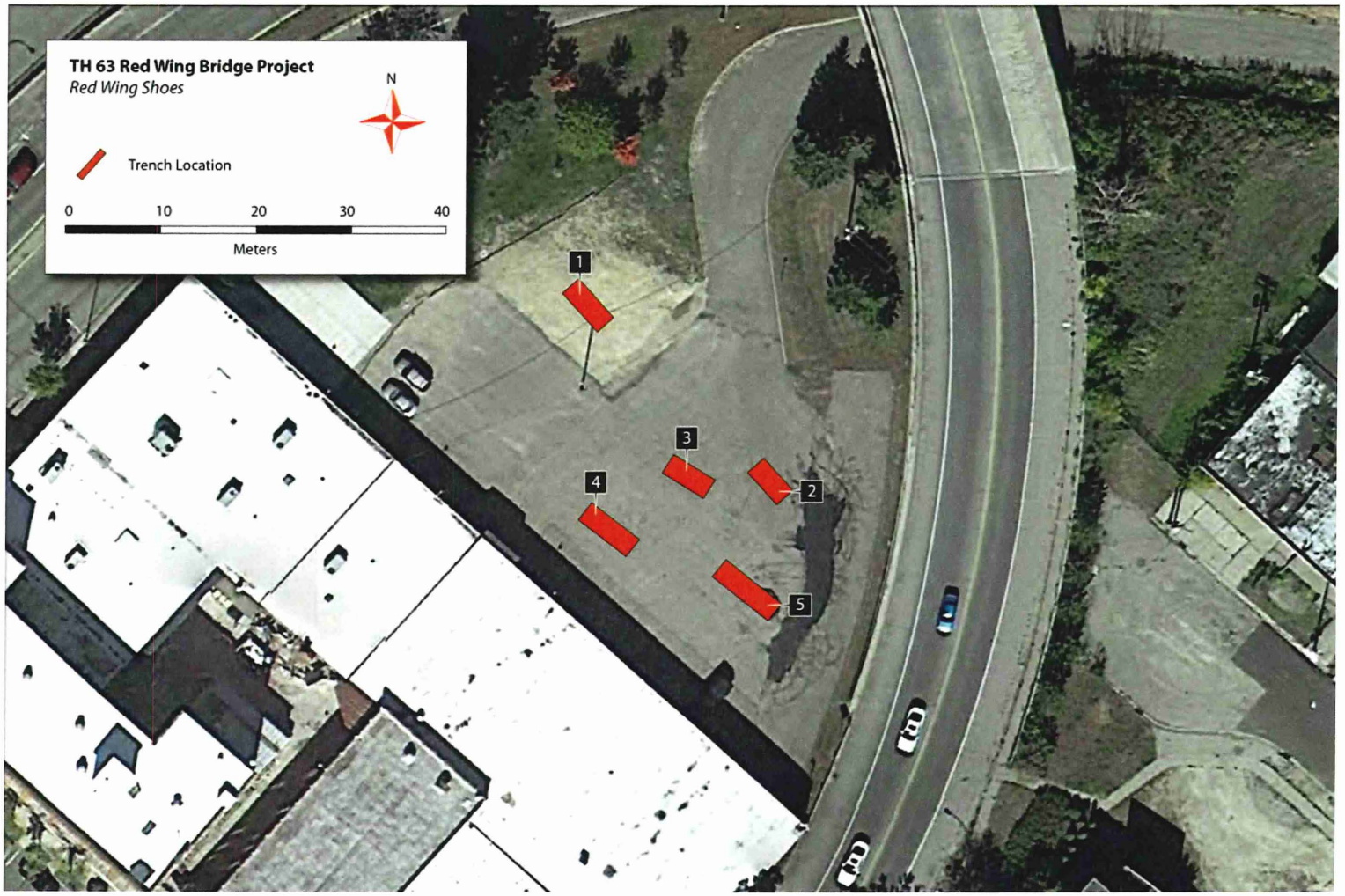


Figure 11. Red Wing Shoes Locality trench locations

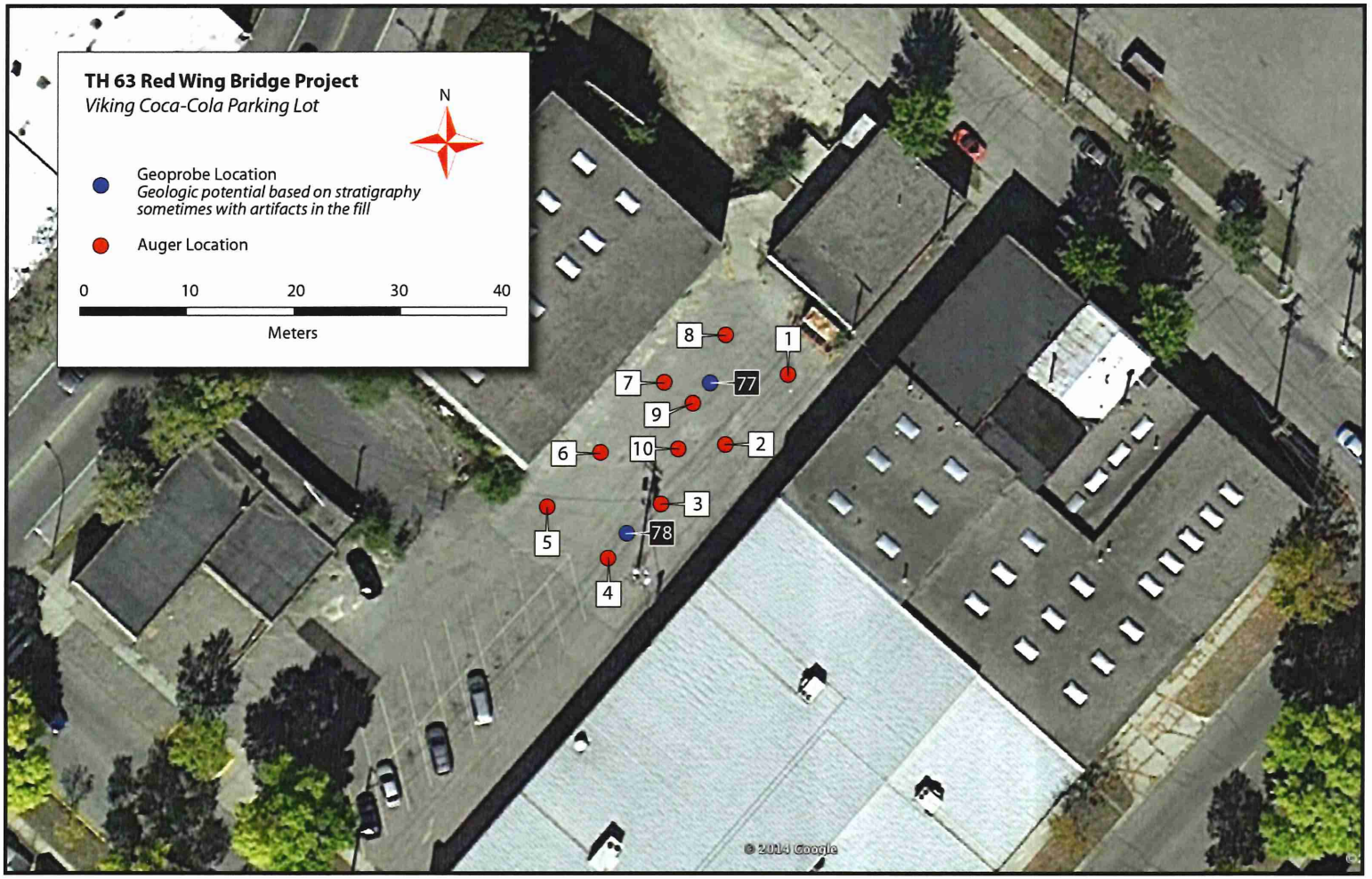


Figure 12. Viking Coca-Cola Locality core and auger locations

East Red Wing Residential APE Subarea

Cores 43 through 49 were extracted north of 3rd Street in a former residential neighborhood that is now grass and pine trees (Figure 13). Stratigraphy in all of the cores except Core 45 is illustrated in a cross-section (Figure 14). Fill is at the modern surface in the western half of the cross-section. It ranges in thickness from 1.0 to 1.5 m. A relatively intact soil is present in Cores 46 and 48 and a truncated soil is present in Core 43. Core 44 only penetrated to 1.2 m due to bedrock fill or building material. The soil buried beneath the fill and the surface soil in Cores 47 and 49 has an A or Ab-AB or ABb-Bw or Bwb horizon sequence formed in sand, sandy loam and loam colluvium. The sand fraction is fine and very fine textured. Weathered bedrock is present in all of the cores, except Cores 44 and 43, at depths ranging form 1.46 to 3.21 m.

Core 45 is to the north of the cross-section at the tree line (Figure 13). Stratigraphy consists of fill to a depth of 2.13 m. The fill consists of sandy loam and silt loam natural source material that contains dolostone gravel, glass, rounded pebbles, and a machine cut nail. The fill is in an excavation dug to bury the debris or dug as a basement and latter filled with debris.

The presence of intact buried soils in some of the cores indicates there is potential for buried archaeological deposits. Archaeological sampling of the buried soils is recommended.

Soil borings 11GD4 and 11GD5 are located at the intersection of 5th Street and Atkin Street and 4th and Aikin Street respectively (Hudak 2011) 4 blocks east of the East Red Residential cores. Boring 4 consists of a series thin buried soils formed in alluvium to a depth of 2.26 m over bedrock. An age of 2530 ^{14}C years BP was obtained on the buried soil at the base of the unconsolidated sediment 1.95-2.26 m below the surface. Boring 5 encountered bedrock within 1 m of the surface.

East Red Wing Residential Trenching

Five (5) trenches were excavated at the East Red Wing Residential Subarea (Figure 15). Stratigraphy in the trenches was very similar to the cores. No *in situ* archaeological material was encountered.

Figure 13. East Red Wing Residential core locations & geologic potential

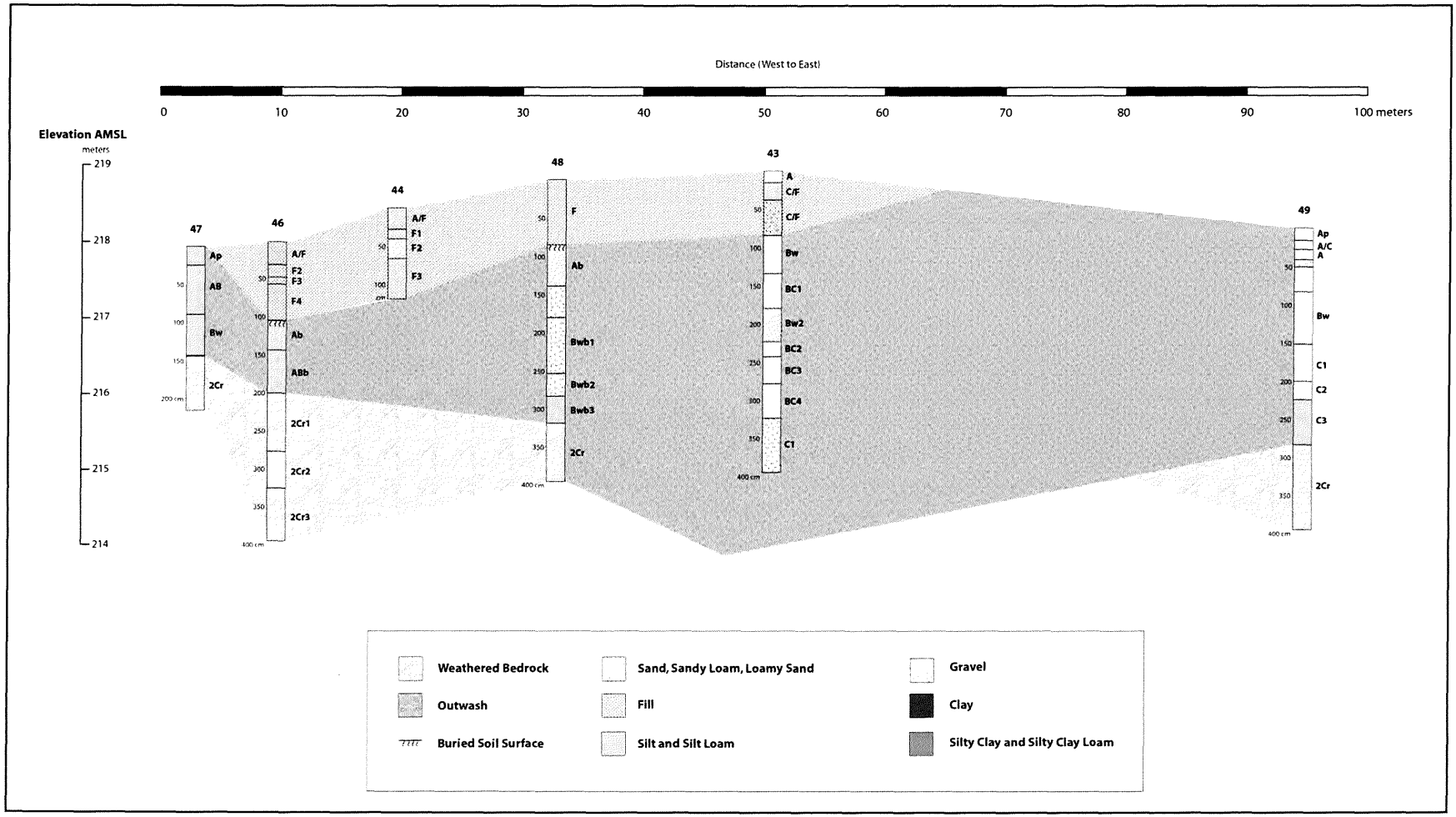


Figure 14. East Red Wing Residential stratigraphic cross-section

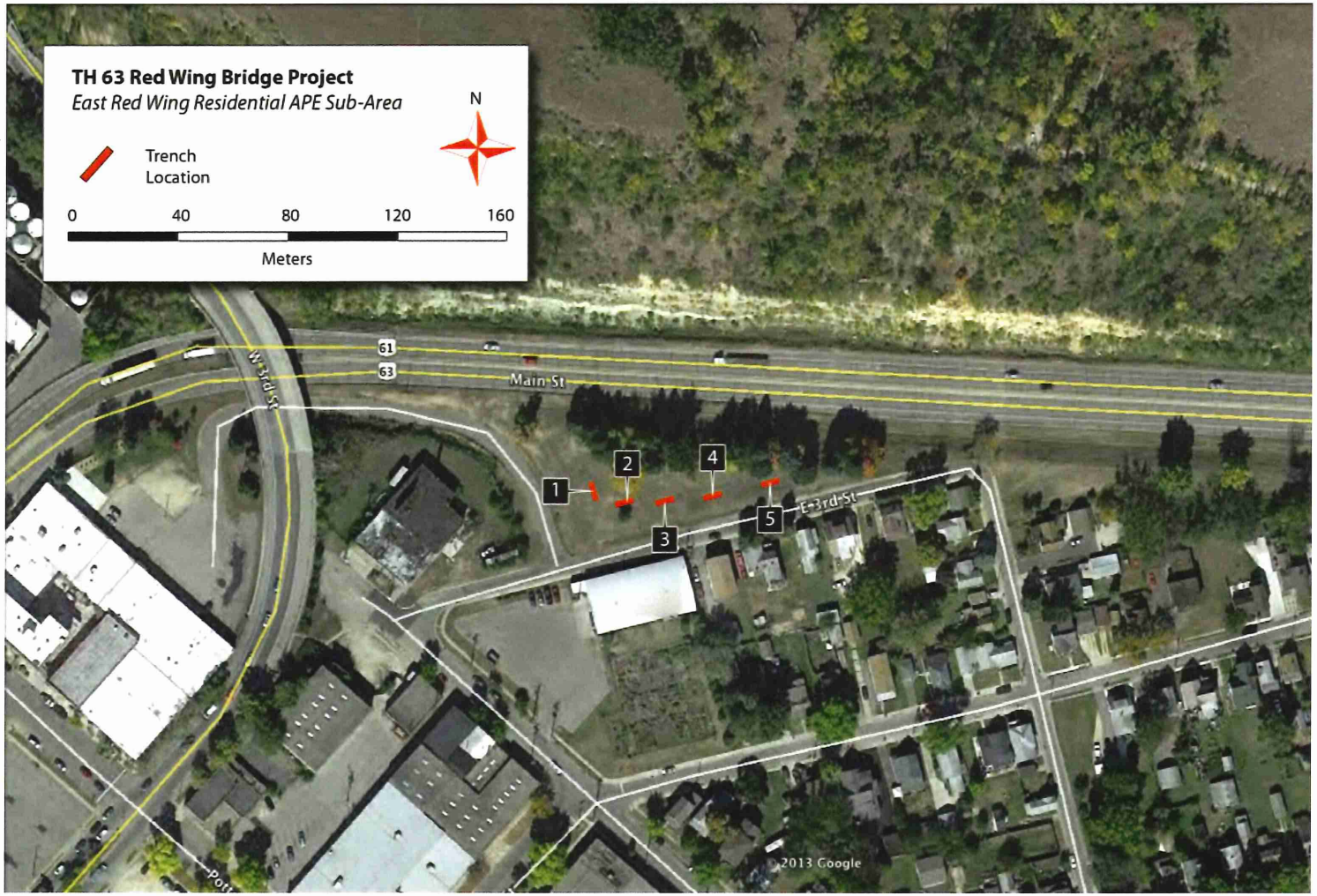


Figure 15. East Red Wing Residential trench locations

Barn Bluff Subarea

The Barn Bluff Subarea is located along the southern edge of Barn Bluff on either side of Highway 61 at the western edge of the bluff along the TH 63 approach to the Mississippi River Bridge (Figure 2). Cores 70-76 were extracted on the shoulder of the road between the bluff base and the highway (Figure 16). Stratigraphy consists of fill over bedrock or fill over colluvium over bedrock (Appendix A). Depth to bedrock ranges from 0.6 to 1.0 m below the surface. Colluvium only occurs in Cores 70 and 71 at the south end of the core transect. It consists of sand or sandstone that has moved downslope from the cliff face immediately east of the cores. Fill is mostly derived from the Barn Bluff bedrock with occasional pebbles and sand from the local outwash. It is capped with a surface fill of thin (<0.2 m) silty topsoil.

The road on the approach to the bridge is on a bench cut into the bedrock. Therefore the bedrock surface is historic in age and has no potential for buried archaeological sites. The colluvium in Cores 70 and 71 does not cover a buried soil and the surface soil exhibits no pedogenic modification indicating it is young. It was likely deposited during of just after construction of the road.

Discussion and Recommendations

Gardas and Harbor Bar Localities

The Gardas and Harbor Bar Localities are on an alluvial ridge with the Mississippi River channel on the south side and a shallow swale on the north side. Stratigraphy indicates the ridge formed as the Mississippi River delta prograded into Lake Pepin. At the Gardas Locality up until sometime after 1435 CE, the ridge was being constructed in a subaqueous alluvial/deltaic environment. Weakly developed buried soils on the ridge summit and backslope indicate a subaerial environment was present for a period of time before the historic fill was emplaced. The Gardas Locality has geological potential for buried archaeological deposits although the landscape was likely only available for habitation for a few hundred years. No *in situ* artifacts were located in the fill or the buried soils during the trench sampling.

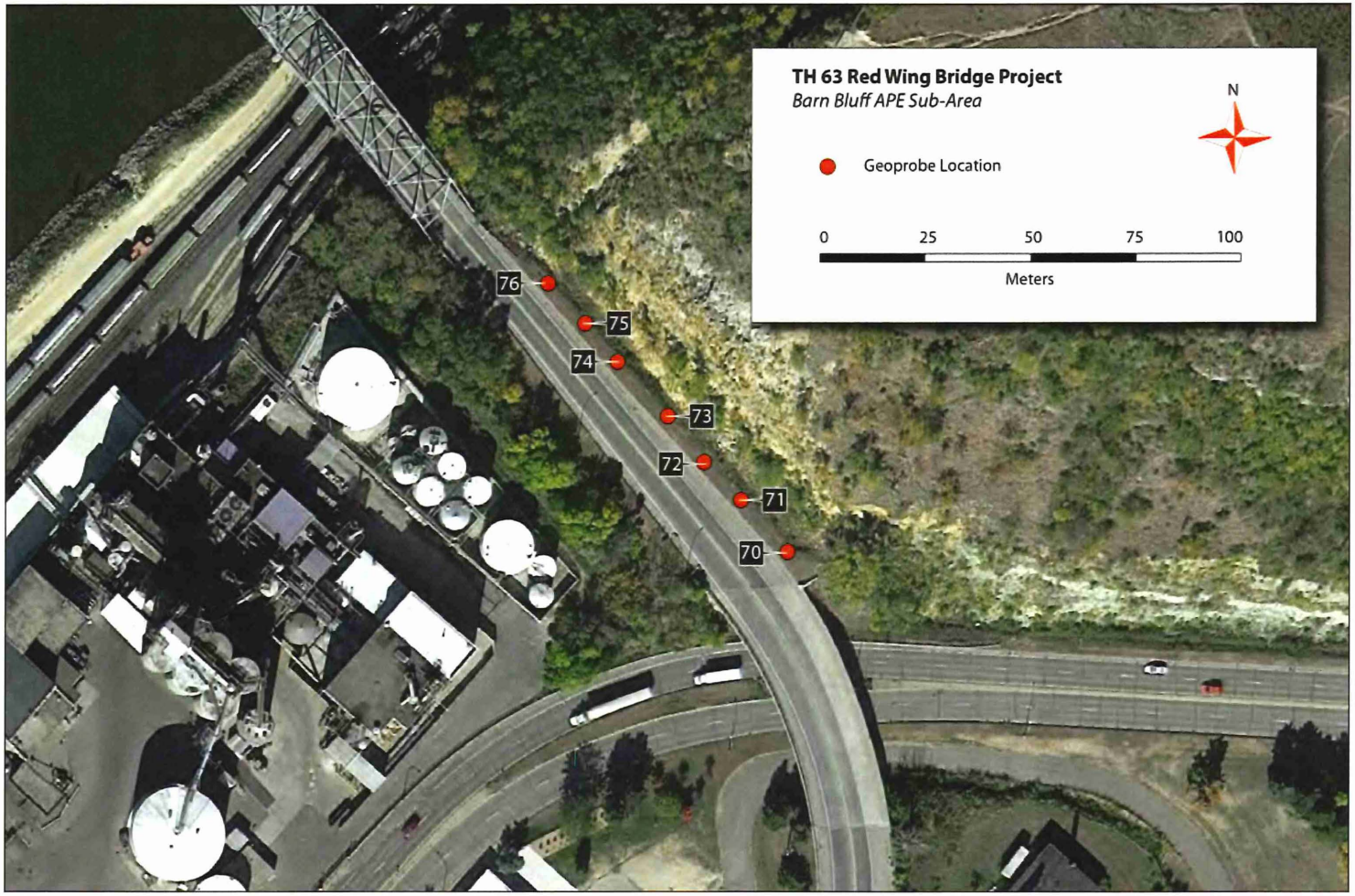


Figure 16. Barn Bluff Subarea core locations

The Harbor Bar Locality is in the same geomorphic setting as the Gardas Locality and except for beneath the bar parking lot has similar stratigraphy: relatively thin historic fill over stratified sandy alluvium. Anthropogenic deposits and fill below the parking lot are likely associated with the destruction and demolition of buildings. Thickness of the deposits and the absence of the upper solum suggest that fill is in (1) excavations done for footings or slabs, or (2) holes dug to dispose of the burned and/or demolished building material. Core refusal just below the subcourse gravel between Core 21 and the northwest corner of the bar indicated the likely presence of a footing or slab. Geologic potential is low under the anthropogenic deposits and on the rest of the Harbor Bar property where anthropogenic deposits associated with demolished structures are not present. The anthropogenic deposits encountered in the coring appear to be in secondary cultural contexts except for the possible footing/slab. Trenching is recommended to determine the nature of the anthropogenic deposits. Early in the process of getting permissions and doing the coring a possible second phase of trenching was suggested to the landowner and he stated that would not be possible in the parking lot. If the Harbor Bar Locality will be impacted by bridge construction the anthropogenic deposits should be further investigated.

Levee Park Locality

The Levee Park Locality is a reclaimed portion of the Mississippi River shoreline. Stratigraphy consists of thick fill over an erosion surface cut in outwash. A thin strata of alluvium is sometimes present above the erosional contact that is often a lag mixed with fine-grained alluvium. Geologic potential for in situ non-structural archaeological deposits is low beneath the fill on the erosional surface. Geomorphic process such as water level fluctuation, waves, and flooding that created the erosional surface, in combination with human activity, mitigates against any *in situ* artifacts. Structural elements or excavations for structural elements that penetrated below the erosional surface may be partially preserved.

City Ramp Locality

The City Ramp Locality is at the edge of the bedrock valley. It consists of an anthropogenically modified slope cut into bedrock that descends to the footslope where

organic deposits and alluvium over lie the bedrock. Soils formed in the alluvium and organic deposits The soils formed in alluvium and are hydric with the wet environment being maintained by spring flow at the base of the slope. They have geologic potential because they mark a landscape surface at the top of a Holocene depositional sequence. Archaeological sampling is recommended using trenches to sample the buried soils. Trenches excavated along the footslope through the organic deposits and alluvium did not locate any archaeological deposits.

Railroad Depot Locality

The Railroad Depot Locality is a reclaimed portion of the Mississippi River shoreline. Stratigraphy consists of fill to a depth of at least 1.31 m and likely to 3.96 m. The presence of shell in a sand and gravel sequence in inconsistent with the outwash depositional environment indicating the sediment is re-deposited. It is either dredge spoil, possibly pumped to this location, or it was re-deposited from upslope or up river possibly out of the mouth of the nearby tributary stream now covered by the City of Red Wing. Potential for deeply buried archaeological deposits is low.

YMCA Locality

Artifacts are abundant in the 3 m of fill over weathered bedrock in all three cores. Geologic potential exists at the base of the fill upslope in Core 58 and possibly in Cores 56 and 57 although the nature of the deposits beneath the fill in these cores is not clear. Subsurface conditions in this area will make trenching impossible without shoring and de-watering equipment. A rainbow of utility marks were present on the surface when the cores were extracted and coring revealed loose coarse fill with abundant groundwater. None of this is conducive to open trench stability or safety. Even under the best of conditions an excavation to the base of the fill could not be entered without steeping and sloping resulting in a very large hole or by using shoring. Artifacts could be recovered with the backhoe without shoring as long as the trench stayed open but dealing with *in situ* structural features would be problematic. If the area around Core 58 were to be impacted by the bridge construction further investigation would be necessary.

Red Wing Shoe Locality

Buried soils formed in alluvium/loess or organic deposits are present beneath historic fill in the Red Wing Shoe parking at depth ranging from 0.5-1.65 m below the modern surface. Historic structure foundation and associated deposits are also present. These buried soils have geologic potential as they mark a historic to pre-contact surface. Although the buried soils formed in wet environments they are relatively intact except Core 52 where the solum is missing. Potential exists for buried archaeological deposits of both historic and pre-contact age over the entire parking lot except along the bridge ramp at the east end of the lot. Trenching yielded no pre-contact artifact but did identify areas with potential for historic archaeological deposits (see archaeology report).

Viking Coca-Cola Locality

An anthropogenic strata and the natural soil sequence is preserved beneath the asphalt and subcourse gravels indicating there is potential for intact archaeological deposits. Sampling the soil beneath the parking lot using trenching was not feasible because of trucks leaving and entering the Viking Coca Cola garage. For this reason and because the intact soil are shallow a continuous flight auger mounted on the Geoprobe was used for the sampling. No pre-contact artifacts or significant historic material was located.

East Red Wing Residential Subarea

The 3rd Street Locality in the East Red Wing Residential Subarea is located across Hwy 61 from Barn Bluff. Coring indicate intact soils are present beneath the historic fill. These soils are formed in sandy outwash deposits. The presence of intact buried soils in some of the cores indicates there is potential for buried archaeological deposits. Sampling the buried soils for archaeological deposits using trenches yielded no pre-contact artifacts and no significant historic artifacts or features.

Barn Bluff Subarea

The road on the approach to the bridge is on a bench cut into the bedrock. Therefore the bedrock surface is historic in age and has no potential for buried archaeological sites. The colluvium in Cores 70 and 71 does not cover a buried soil and

the surface soil exhibits no pedogenic modification indicating it is young. It was likely deposited during of just after construction of the road.

References Cited

Collinson, J. D., and Thompson, D. B.
1982 *Sedimentary Structures*. George Allen & Unwin, London.

Folk, Robert. F
1974 *Petrology of Sedimentary Rocks*. Hemphill Publishing Company, Austin.

Hobbs, H. C. and D. R. Setterholm
1998 Plate 3-Surficial Geology and Thickness of the Quaternary Deposits. In *C-12 Geologic Atlas of Goodhue County, Minnesota [Part A]*, edited by D. R. Setterholm. Minnesota Geological Survey.

Hudak, Curtis M.
2011 Geomorphic Investigation of the State Trunk Highway 63 Bridge over the Mississippi River, Red Wing, Minnesota. *MnDOT Contracts No. 98210 and State Project No. 2515-21*.

Hudak, Curtis, M., Edwin R. Hajic and Jeffery J. Walsh
2011 Interpreting the Origins of Landform Sediment Assemblages Within the Upper Mississippi River Valley and Tributaries in the Twin Cities Area of Minnesota. In *Archaen to Anthropocene: Field Guide to The Geology of the Mid-Continent of North America*, edited by J. D. Miller, Hudak, G. J., Wittkop, C. and MacLaughlin, P. I. , pp. 525-544. Geological Society of America Field Guide 24.

Monaghan, G. William, K.C. Egan-Bruhy, M.J. Hambacher, D.R. Hayes, M.F. Kolb, S. Peterson, J.A. Robertson and N.R. Shaffer
2006 The Minnesota Deep Test Protocol Project
(http://www.mnmodel.dot.state.mn.us/pages/DeepTestProtocol.html)

Runkel, Anthony C.
1998 Plate 2-Bedrock Geology. In *C-12 Geologic Atlas of Goodhue County, Minnesota [Part A]*, edited by D. R. Setterholm. Minnesota Geological Survey.

Schoeneberger, P. J., D. A. Wysocki, E. C. Benham and W. D. Broderson
1998 Field Book for Describing and Sampling Soils Version 1.1. National Soil Survey Center, Natural Resource Conservation Service, USDA, Lincoln, Nebraska.

Soil Survey Staff
1975 Soil Taxonomy. United States Department of Agriculture Handbook 436.

Terrell, M. M. and Andrea C. Vermeer
2012 Pre-Evaluation Study for Archaeological Potential for the Trunk Highway 63 Red Wing Bridge Project, Goodhue County, Minnesota, and Pierce County, Wisconsin. *MnDOT Contract No. 98207 and State Project No. 2515-21, Two Pines Resource Group No. 11.01.*

Wright, Herbert E. Jr. , K. Lease and S. Johnson
1998 Glacial River Warren, Lake Pepin, and the Environmental History of Southeastern Minnesota, in Contributions to Quaternary Studies in Minnesota, Carrie J. Patterson and Herbert E. Wright, editors. *Minnesota Geologcial Survey Reports of Investigations* 49:131-140.

APPENDIX A
CORE AND TRENCH DESCRIPTIONS

Core 1: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-5	A	*Fill* Top Soil.
5-14	C1	GRAVEL & SAND.
14-28	A	*Alluvium* Very dark grayish brown (10YR 3/2) SILT LOAM; weak platy structure from compaction; very abrupt boundary.
28-100	C2	Laminated very fine SAND & SILT LOAM; faint redox features; metal.
100-250	C3	Dark grayish brown (10YR 4/2) light LOAM; laminated; faint redox features.
250-359	C4	Laminated and thin bedded LOAM and SILT LOAM.
359-396	C5	Dark gray (2.5Y 4/1) SILT LOAM – very fine SANDY LOAM.

Core 2: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-11	F	*Fill* Crushed GRAVEL; very abrupt boundary.
11-26	A	Very dark gray – very dark grayish brown (10YR 3/1 – 3/2) silt loam topsoil; clear gradational boundary.
26-41	AC	*Alluvium* Very dark grayish brown (10YR 3/2) heavy SILT LOAM.
41-50	C1	Dark grayish brown (10YR 4/2) SILT LOAM; few sand laminae; abrupt gradational boundary.
50-246	C2	Pale brown and brown (10YR 6/3 & 5/3) very fine SAND and light very fine SANDY LOAM.
246-396	Cg1	Dark greenish gray (5GY 4/1 grading to 10GY) very fine SANDY LOAM.

Core 3: Gardas Locality

Depth (cm)	Horizon	Description
0-22	F	*Fill* sand
22-31	F	GRAVEL.
31-48	F/C1	Laminated very dark grayish brown – very dark brown (10YR 3/2 – 2/2); coal at base.
48-66	C2/F	Dark grayish brown (10YR 4/2) very fine SANDY LOAM & fine SAND; black laminae with coal; very abrupt boundary.
66-132	Cg1	*Alluvium* Black – very dark gray (10YR 2/1 – N3/) SILT LOAM over laminated very fine SAND (10Y 4/1); very abrupt gradational boundary.
132-233	ACb	Dark greenish gray (10GY 4/1) SILTY CLAY LOAM.
233-271	Cg2	Dark grayish brown – grayish brown (2.5Y 4/2 – 5/2) very fine – fine SAND; redox features; massive; abrupt gradational boundary.
271-281	Cg3	Dark gray (5Y 4/1) laminated very fine SAND with few silt loam laminae.
281-333	Cg4	Dark greenish gray (5GY 4/3) thin bedded and laminated.
333-344	Cg5	Dark greenish gray (5GY 4/3) laminated heavy SILT LOAM; very abrupt boundary.
344-396	Cg6	Laminated very fine SAND and SILT LOAM; very fine shell fragments.

Core 4: Gardas Locality

Depth (cm)	Horizon	Description
0-29	F/C	*Fill* Dark grayish brown (10YR 4/2) very fine – fine SAND; coal at 19cm; very abrupt boundary.
29-37	C1	*Alluvium* Laminated SILT LOAM with very fine sand mode; coal; fine shell fragments; common distinct redox features; abrupt gradational boundary.
37-100	C2	Brown and dark gray (10YR 5/3 & 4/1) laminated SILT LOAM and very fine SAND; pebble at 47cm.
100-171	C2	Dark grayish brown – grayish brown (10YR 5/1) SILTY CLAY LOAM; unleached; few weakly cemented CaCO3 nodules; common faint redox features; very abrupt gradational boundary.
171-194	Cg1	Dark gray (2.5Y 4/1) SILTY CLAY; few soft white nodules; common faint redox features; very abrupt gradational boundary.
194-228	Cg2	Dark grayish brown – dark gray (2.5Y 4/2 – 4/1) very fine SANDY LOAM; unleached; abrupt gradational boundary.
228-271	Cg3	Dark greenish gray (10GY 4/4) laminated SILTY CLAY LOAM with few very fine sand laminae (more common in lower half); unleached.
271-396	Cg4	Dark greenish gray (10GY ¾) laminated and very thin bedded very fine SANDY LOAM and heavy SILT LOAM; roots; float at 343 & 328cm.

Core 5: Gardas Locality

Depth (cm)	Horizon	Description
0-27	A	*Alluvium* Very dark gray (10YR 3/1) SILT LOAM; abrupt boundary.
27-37	A&C	Mix of above and below; common faint redox features.
37-53	C1	Thin and very thin laminated very fine SAND; common redox on bed planes; very abrupt boundary.
53-57	C2	Dark grayish brown (10YR 4/2) SILT LOAM; very thin laminated; very abrupt boundary.
57-83	C3	Pale brown and gray (10YR 6/3 & 5/1) very fine SAND and SILT LOAM; very abrupt boundary.
83-141	ACb	Very dark grayish brown (10YR 3/2) SILT LOAM – SILTY CLAY; common faint redox features; 1-2% very fine sand.
141-200	Cg1	Dark grayish brown (10YR 4/2) SILTY CLAY; soft weak CaCO3 nodules; slightly grayer with depth; unleached.
200-230	Cg2	Dark gray (2.5Y 4/1) LOAM; sand is very fine textured; unleached; abrupt gradational boundary.
230-254	Cg3	Grayish brown – dark grayish brown (2.5Y 5/2 – 4/2) very fine SAND; abrupt gradational boundary.
254-396	Cg4	(10GY 4/1 & 5/1) laminated and very thin bedded very fine SAND & very fine SANDY LOAM; few organic-rich laminae; sand is slightly coarser with depth.

Core 6: Gardas Locality

Depth (cm)	Horizon	Description
0-130	F	*Fill*
130-144	C1	*Alluvium* Laminated brown SAND and very dark grayish brown (10YR 4/3 & 3/2) SILT LOAM; pale brown (10YR 6/3) very fine SAND; very abrupt boundary.
144-190	C2	Very dark grayish brown (10YR 3/2) SILT LOAM; platy parting; unleached.
190-244	C3	Laminated brown and pale brown very fine SAND & very fine SANDY LOAM; grades to dark yellowish brown (10YR 4/2) SILT LOAM and very fine SANDY LOAM at 135cm; soft CaCO3 nodules; abrupt gradational boundary.
244-396	Cg1	Dark grayish brown – dark gray (5Y 4/2 – 4/1) LOAM with few very fine sandy loam laminae & thin beds; common distinct redox features;

Core 7: Gardas Locality

Depth (cm)	Horizon	Description
0-78	F	*Fill* Bedrock and alluvial source FILL.
78-110	Ab	*Alluvium* Very dark gray – very dark grayish brown (10YR 3/1 – 3/2) gravelly SANDY LOAM; GRAVEL is rounded; cinder.
110-138	ACb	Very dark grayish brown (10Yr 3/2) very fine SANDY LOAM; abrupt gradational boundary.
138-174	C1	Pale brown (10YR 6/3) very fine SAND and loamy very fine SAND; laminated; unleached; very abrupt boundary.
174-210	C2	Dark grayish brown (10YR 4/2) SILT LOAM – very fine SANDY LOAM; occasional white CaCO3 masses between 183 and 187 cm; unleached.
210-256	C3	Dark grayish brown (10YR 4/2) very fine SANDY LOAM – LOAM; occasional pale brown (10YR 6/3) very fine sand laminae; unleached.
256-280	C4	Pale brown (10YR 6/3) very fine SAND; unleached.
280-324	Cg1	Light olive brown (10YR 5/3) very fine SAND and very fine SANDY LOAM; laminated; unleached; abrupt color boundary.
324-404	Cg2	Dark greenish gray (10GY 4/1 & 3/1) very fine SANDY LOAM; few white CaCO3 masses; common faint redox features; few darker loam laminae from 331-336; unleached; bedded.
404-486	Cg4	Stratified (thin bedded – laminated) dark greenish gray (10GY 4/1 – 3/1) LOAM & very fine SANDY LOAM.

Core 8: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-132	F	*Fill* brick fragments from 50-70cm; brick, pull-tab at base.
132-152	C1	*Alluvium* Laminated brown & dark gray & pale brown (10YR 4/3, 4/1 & 6/3) very fine SANDY LOAM & SILT LOAM.
152-165	C2	Pale brown (10YR 6/3) very fine SAND.
165-200	C3	Laminated very fine SAND and very fine SANDY LOAM; darker laminae have fine float.
200-243	C3	Olive brown – light olive brown (2.5Y 4/3 – 5/3) laminated very fine SAND; abrupt gradational color boundary.
243-396	Cg1	Laminated and very thin bedded dark greenish gray (10GY 3/5 – 4/2) very fine SANDY LOAM, SILT LOAM and fine – very fine SAND.

Core 9: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-52	AC	*Dredge Spoil* Very dark grayish brown (10YR 3/2) SILT LOAM with sand mode; common faint redox features; sandy from 20-22cm; very abrupt boundary.
52-131	C	Fine – medium SAND with clam shell fragments; dredge spoil.
131-158	C2	*Alluvium* Laminated, oxidized very fine SANDY LOAM with dark gray (2.5Y 4/1) SILT LOAM from 150-154cm; very abrupt boundary.
158-180	Cg1	Greenish black (10GY 2.5/1) SILT LOAM; plant fragments; white-ware fragments.
180-396	Cg2	Dark greenish gray (10GY 4/1) laminated very fine SANDY LOAM; sand fines downward; no redox; possible sawdust from 234-237cm.

Core 10: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-12		*Fill* ASPHALT.
12-34	F1	Mixed FILL sand; few GRAVEL clasts; rounded, un-weathered dolostone at base.
34-56	C1	*Alluvium* Laminated very fine SAND and very fine SANDY LOAM;.
56-59	C2	Dark gray (10YR 4/2) SILT LOAM; very abrupt boundary.
59-144	C3	Brown (10YR 5/3) very fine loamy SAND; very abrupt boundary.
144-182	C4	Dark grayish brown (10YR 4/2) laminated very fine SANDY LOAM & light LOAM; very thin lighter-colored sandy laminae.
182-234	C5	Pale brown (10YR 6/5) very fine SAND.
234-237	C6	Dark gray – dark grayish brown (10YR 4/1 – 4/2) SILT LOAM; very thin laminated; very abrupt boundary.
237-280	C5	
280-317	Cg1	Dark grayish brown (2.5Y 4/2) very fine – fine SAND; very thin laminated; very abrupt color boundary.
317-346	Cg2	Dark gray – gray (10GY 4/1) LOAM; sand is very fine textured; white masses; very abrupt boundary.
346-396	Cg3	Dark greenish gray (10GY 4/3) very fine SAND.

Core 11: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-5	F/C1	*Fill* Very dark grayish brown (10YR 3/2) SILT LOAM; unleached; very abrupt boundary.
5-10	F/C2	Dolostone road GRAVEL; unleached.
10-34	F/C3	Laminated very dark grayish brown – very dark brown (10YR 3/2 – 2/2) very fine LOAMY SAND and very fine SANDY LOAM – LOAM; brown – dark grayish brown (10YR 4/3 – 4/2) sandy laminae; unleached; very abrupt boundary.
34-46	F/C4	Very dark gray – very dark grayish brown (10YR 3/2 – 3/1) SANDY LOAM; unleached.
46-57	F/C5	Laminated brown and dark grayish brown (10YR 4/2 & 4/3) very fine LOAMY SAND and very fine SANDY LOAM; unleached; abrupt boundary.
57-63	F/C6	Clinker, cinders, few clasts; unleached.
63-100	F/C7	Laminated SILT LOAM with very fine sand; unleached.
100-136	F/C8	Brown – dark brown (10YR 4/3 – 3/3) very fine SAND; unleached.
136-145	F/C9	Poorly sorted SILT LOAM with oxidized/burned sand patches to 140cm; soil inclusion mixed with a few round fine pebbles; unleached; very abrupt boundary.
145-158	C10	*Alluvium* Very dark grayish brown – dark grayish brown (10YR 3/2 – 4/2) very fine SANDY LOAM; massive; unleached; abrupt gradational boundary.
158-164	C11	Very dark grayish brown (10YR 3/2) SILT LOAM – LOAM; few fine rounded pebbles; unleached.
164-240	C12	Laminated olive brown (2.5Y 4/3) very fine – fine SAND and dark gray (10YR 4/1) SILT LOAM with large very fine sand mode; unleached.
240-267	C13	Dark grayish brown (10YR 4/2) SILT LOAM – LOAM; few very fine shell fragments; unleached.
267-317	C14	Brown and dark grayish brown (10YR 4/3 & 4/2) very fine SANDY LOAM; laminated; unleached; abrupt gradational boundary.
317-348	C15	Dark gray – dark grayish brown (10YR 4/1 – 4/2) SILT LOAM with very fine sand mode; white soft nodules; common distinct redox features; laminated; unleached; abrupt boundary.
348-396	C16	Olive brown (2.5Y 4/3) very fine SAND; common distinct redox features; unleached.

Core 12: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-5	F/C1	*Fill* SILT LOAM.
5-18	F/C2	Dolostone GRAVEL.
18-50	F/C3	Platy over-compacted SILT LOAM with few sand layers/inclusions; very abrupt boundary.
50-60	F/ACb	Black – very dark gray (10YR 2/1 – 3/2) SILT LOAM; 20% very fine sand; few very fine sand laminae; abrupt boundary.
60-68	F/C4	cinder and burned residue
68-76	F/C5	Dark yellowish brown (10YR 6/4) medium SANDY LOAM with few granules and very fine pebbles; burnt; very abrupt boundary.
76-105	C6	*Alluvium* Laminated SILT LOAM interstratified with very fine SAND.
105-210	C7	Pale brown (10YR 6/3) very fine SAND; few laminae at base.
210-304	C8	Dark grayish brown (10YR 4/2) LOAM – very fine SANDY LOAM; very thin laminated; common faint redox features.

Core 13: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-8	F	*Fill* Dolostone GRAVEL.
8-39	F/C2	Very dark grayish brown (10YR 3/2) compacted SILT LOAM; very abrupt boundary.
39-50	ACb	Black – very dark gray (10YR 2/1 – 3/1) SILT LOAM; brick fragment; leached; abrupt boundary.
50-56	F/C3	Cinder and burnt residue; leached.
56-64	F/C4	Dark yellowish brown (10YR 4/6) light fine – medium SANDY LOAM; leached; very abrupt boundary.
64-195	C5	*Alluvium* Dark brown – brown (10YR 2/3 – 4/3) and dark grayish brown (10YR 3/2) SILT LOAM – very fine SANDY LOAM; inter-stratified with brown and pale brown (10YR 5/5 & 6/3) very fine sand and loamy sand; unleached.
195-246	C6	Laminated dark grayish brown (10Yr 4/2) very fine SAND and silty SAND; unleached; abrupt gradational boundary.
246-304	C7	Dark grayish brown – dark gray (2.5Y 4/2 – 4/1) SILT LOAM – very fine SANDY LOAM; unleached.

Core 14: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-160	F	*Fill* Very dark grayish brown (10YR 3/2) poorly sorted medium – very coarse SAND with pebbles; leached; sandstone at 14cm; igneous rock (outwash source; basement or foundation FILL; limestone at 150cm; very abrupt boundary.
160-172	C1	*Alluvium* Dark grayish brown (10YR 4/2) SILT LOAM – very fine SAND; leached.
172-190	C2	Brown (10YR 5/3) very fine SAND; leached.
190-195	C3	Very dark grayish brown (10YR 3/2) very fine SANDY LOAM; leached.
195-228	C4	Brown (10YR 5/3) very fine SAND; leached; laminated below 220cm.
228-304	C5	Laminated very fine and fine loamy SAND; few finer grained interbeds; leached.

Core 15: Gardas Locality

Depth (cm)	Horizon	Description
0-65	F	*Fill* Crushed rock and clayey diamicton; piece of sandstone at base.
65-88	ACb	*Fill and Alluvium* Very dark gray – black (10YR 3/1 – 2/1) SILT LOAM with larger sand laminae; compact; abrupt gradational boundary.
88-146	Cg1	Laminated and thin bedded grayish brown (10YR 5/2) very fine SAND and SANDY LOAM and very dark gray (10YR 3/1) heavy SILT LOAM; abrupt gradational boundary.
146-198	Cg2	Very dark gray (10YR 3/1) SILT LOAM; few very thin sand laminae; two organic layers in upper 4cm.
198-238	Cg3	Dark gray (2.5Y 4/1) and very dark gray (10YR 3/2) very fine SANDY LOAM; abrupt gradational boundary.
238-280	Cg4	Black – very dark gray (10YR 2/1) SILT with organics (wood).
280-333	Cg5	Dark gray (2.5Y 4/1) and very dark gray (10YR 3/2) very fine SANDY LOAM; abrupt gradational boundary.
333-396	Cg6	Dark grayish brown (2.5Y 4/2) SILT LOAM; shell fragments and rubber bands.
396-407	Cg7	Laminated dark greenish gray (10Y 3/1) SILT LOAM (20% very fine sand); sawdust; wood between 401 & 406 cm.
407-426	Cg8	Laminated dark greenish gray (10Y 3/1) LOAM;.
426-460	Cg9	Dark greenish gray (10Y 4/1) very fine – fine SAND; few laminae.

Core 16: Gardas Locality

Depth (cm)	Horizon	Description
0-17	F	*Fill* Parking lot GRAVEL; very abrupt boundary.
17-21	A	Very dark gray (10YRR3/1) SILT LOAM – very fine SANDY LOAM; unleached; very abrupt boundary.
21-47	C1	*Alluvium* Laminated SILT LOAM and very fine SAND; unleached; very abrupt gradational boundary.
47-131	C2	Pale brown (10YR 6/3) very fine SAND; unleached; very abrupt boundary.
131-143	C3	Very thin laminated very dark grayish brown (10YR 3/2) SILT LOAM – LOAM and very fine SAND (oxidized redox); unleached.
143-185	C4	Green (5G 4/2) SANDY LOAM; clinker; few granules; unleached.
185-220	C5	Laminated yellowish brown (10YR 5/4) SAND; unleached; very abrupt boundary.
220-229	C6	Very dark grayish brown (10YR 3/2) light SILTY CLAY LOAM; unleached; roots; very abrupt boundary.
229-235	C7	Brown (10YR 4/3) fine SAND; unleached; very abrupt boundary.
235-280	C8	Very dark gray and dark gray (10YR 3/1 & 4/1) very fine SAND and silty very fine SAND; unleached.
280-396	Cg1	(5GY 4/1) SILT LOAM; white soft nodules; laminated; unleached.

Core 17: Gardas Locality

Depth (cm)	Horizon	Description
0-20	F	*Fill* Mixed topsoil and underlying C horizon; unleached.
20-180	C1	*Alluvium* Laminated and thin bedded brown – yellowish brown (10YR 5/3 – 5/4) very fine SAND; unleached.
180-224	C2	Brown and dark grayish brown (10YR 4/3 & 4/2) laminated fine SANDY LOAM; very coarse sand and granules bed at base; unleached; very abrupt boundary.
224-239	Cg1	Dark gray – very dark gray (2.5Y 4/1 – 3/1) heavy SILT LOAM; common distinct redox features; unleached; very abrupt boundary.
239-251	C3	Laminated light olive brown (2.5Y 5/3) very fine SAND and very fine SANDY LOAM; unleached; very abrupt boundary.
251-290	Cg2	Dark gray and very dark gray (2.5Y 4/1 & 3/1) SILT LOAM – very fine SANDY LOAM; dark gray (10YR 4/1) very fine sand lamella; unleached.
290-326	Cg3	Dark greenish gray (10Y 3/1) laminated SILT LOAM and very fine SANDY LOAM; unleached; abrupt gradational boundary.
326-396	Cg4	Dark greenish gray (10Y 4/1) very thin laminated very fine SANDY LOAM and very fine SAND; unleached.

Core 18: Gardas Locality

Depth (cm)	Horizon	Description
0-38	F	*Fill* Gravel FILL; very abrupt boundary.
38-100	C1	*Alluvium* Laminated and thin bedded very dark gray SILT LOAM and brown & pale brown (10YR 3/1 & 5/3 – 6/3) very fine SAND.
100-161	C2	Very dark gray (10YR 3/1) SILT LOAM – LOAM with dark greenish gray (10Y 4/1) SANDY LOAM laminae; wood at 150 cm; fine roots; very abrupt boundary.
161-200	Cg1	Very dark gray (N 3/) SILT LOAM with 10-15% very fine sand; few fine shell fragments.
200-256	Cg2	Dark gray – very dark gray (2.5Y 4/1 – 3/1) very fine SANDY loam; indistinct lamination; very abrupt boundary.
256-290	Ab	Black (N2.5/) SILT LOAM; wood and fine wood fragments (possibly sawdust).
290-327	Cg3	Dark gray (2.5Y 4/1) laminated very fine SAND and very fine SANDY LOAM; very abrupt gradational boundary.
327-396	Cg4	Very dark gray and dark greenish gray (2.5Y 4/1 & 10Y 3/1 – 4/1) stratified SILT LOAM and very fine SANDY LOAM; bark at 353 cm; few organic rich laminae.

Core 19: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-5	F	*Fill* Asphalt
5-25	F	Subcourse GRAVEL (dolostone); very abrupt boundary; unleached.
25-155	C1	*Alluvium* very fine sandy loam; unleached.
155-250	C2	Dark grayish brown (10YR 4/2)very fine SANDY LOAM; unleached.
250-316	C3	Laminated brown (10YR 5/3 – 4/3) fine SAND and dark grayish brown (10YR 3/2) very fine SANDY LOAM; unleached; abrupt color boundary.
316-351	Cg1	Dark grayish brown (10Y 4/1) very fine SANDY LOAM – LOAM; thin laminated; unleached.
351-366	Cg2	Dark grayish brown (10Y 4/1) heavy SILT LOAM; unleached; defuse white masses.
366-396	Cg3	Dark greenish gray (10Y 3/1) very fine SANDY LOAM.

Core 20: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-5	F	*Fill* Asphalt.
5-15	F	Gravel sub-coarse.
15-30	F	Poorly sorted medium – very coarse SAND with granules; leached.
30-44	F	Dolostone from Barn Bluff; slag; green pebble; leached; abrupt boundary.
44-100	F	Very dark gray (10YR 3/1) SILT LOAM; glass; historic ceramic; leached.
100-152	C1	*Alluvium* Brown and pale brown (10YR 5/3 & 6/3) very fine SAND; likely laminated; leached; very abrupt boundary.
152-200	C2	Very dark grayish brown (10Yr 3/2) SILT LOAM; 20% very fine sand; massive; leached.
200-268	Cg1	Grayish brown (2.5Y 5/2 – 10YR 5/2) laminated very fine SAND; leached; common faint redox features; abrupt gradational boundary.
268-304	Cg2	Dark gray (2.5Y 4/1) SILT LOAM; leached; defuse white masses.

Core 21: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-5	F	*Fill* Asphalt.
5-10	F	Subcourse GRAVEL; very abrupt boundary.
10-75	F	Poorly sorted slightly sticky SANDY LOAM – SILT LOAM with GRAVEL; sand is medium to very coarse textured; clear boundary.
75-136	F	Very dark gray – black (10Yr 3/1 – 2/1) SILT LOAM; lighter colored with depth; layered; glass; rounded pebbles; wood; charcoal; ash lens at base; 1 piece of angular dolostone; stoneware; very abrupt boundary.
136-304	C1	*Alluvium* Laminated dark gray and dark grayish brown (2.5Y 4/1 and 4/2) very fine SAND and SANDY LOAM; few siltier interbeds.

Core 22: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-7	F	*Fill* Asphalt.
7-17	F	Gravel subcourse.
17-80	F	SILT LOAM – SANDY LOAM matrix with GRAVEL; rounded clasts; unleached.
80-143	F	Very dark gray (10YR 3/1) poorly sorted SANDY LOAM with very coarse sand and GRAVEL; few anthropogenic inclusions; unleached; very abrupt boundary.
143-190	C1	*Alluvium* Pale brown (10YR 6/3) very fine – fine SAND; unleached.
190-223	C2	Very dark brown (10YR 3/3) LOAM; homogeneous color; unleached; abrupt gradational boundary.
223-341	C3	Brown (10YR 4/3) very fine – fine SAND; unleached; laminated.
341-396	C4	Dark gray (2.5Y 4/1) SILT LOAM; common diffuse white masses; unleached.

Core 23: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-6	F	*Fill* Asphalt.
6-19	F	Gravel subcourse.
19-100	F	Very dark gray (10YR 3/1) SANDY LOAM – SILT LOAM; anthropogenic inclusions; rounded GRAVEL; unleached.
100-170	C1	*Alluvium* Laminated brown (10YR 4/3) very fine SAND; unleached.
170-324	C2	Brown – dark grayish brown (10YR 4/3 – 4/2) very fine SANDY LOAM – LOAM; massive; few diffuse white carbonate masses below 300cm; unleached; abrupt boundary.
324-345	Cg1	Dark grayish brown (2.5Y 4/2) SILT LOAM; slightly sticky; common faint redox features; unleached; very abrupt gradational boundary.
345-396	C3	Dark grayish brown – brown (10YR 4/2 – 4/3) laminated very fine SAND; unleached.

Core 24: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-5	F	*Fill* Asphalt.
5-50	F	Poorly sorted medium – very coarse SAND; few GRAVEL clasts.
50-62	F	Mixed SILT LOAM soil, glass, glass and GRAVEL.
62-151	C1	*Alluvium* Mixed very dark gray and dark grayish brown (10YR 3/1 & 4/2) very fine SANDY LOAM; platy interbeds.
151-213	C2	Very dark grayish brown (10YR 3/2) SILT LOAM; massive; weak pedo-structure.

Core 25: Gardas Locality

Depth (cm)	Horizon	Description
0-23	F	*Fill* Road GRAVEL.
23-36	F/C	Dark grayish brown (10YR 4/2) SANDY LOAM; platy (compact); fine GRAVEL; darker layer between 28 and 32 cm over sandy loam; very abrupt boundary.
36-41	A	*Alluvium* Very dark gray (10YR 3/2) SILT LOAM; 15% sand; plant fragments at top; very abrupt boundary.
41-62	C1	Laminated brown (10YR 4/3) very fine – fine SAND; common distinct redox features; very abrupt boundary.
62-143	ACb	Dark grayish brown – very dark grayish brown (10YR 4/2 – 3/2) heavy SILT LOAM; weak pedo-structure; abrupt boundary.
143-220	Cg1	Laminated dark grayish brown and grayish brown (10YR 4/2 and 5/2) SILT LOAM and very fine SANDY LOAM; many distinct redox features.
220-313	Cg2	Dark gray (2.5Y 4/1) very fine SANDY LOAM; laminated; white carbonate masses; common distinct redox features.
313-316	Cg3	Very dark gray (N3/) heavy SILT LOAM.
316-396	Cg4	Dark greenish gray (10YR 4/1) laminated very fine and fine SAND with medium sand bed immediately below silt loam bed.

Core 26: Gardas Locality

Depth (cm)	Horizon	Description
0-24	F	*Fill* Road FILL; abrupt boundary.
24-36	F	Road FILL; very abrupt boundary.
36-90	AC	*Alluvium* Dark grayish brown (10YR 4/2) SILTY CLAY LOAM; unleached; laminated very fine sand and organics from 50 – 55 cm; abrupt boundary.
90-140	C1	Dark gray (10YR 4/1) SILT LOAM; few faint redox features; unleached; few laminae; abrupt boundary.
140-198	Cg1	Laminated dark gray (2.5Y 4/1) very fine SANDY LOAM and SILT LOAM; common distinct redox features; unleached.
198-256	Cg2	Dark greenish gray (10Y 4/1) laminated very fine SAND, very fine SANDY LOAM, and SILT LOAM; unleached; few white masses.
256-304	Cg3	Dark greenish gray (10Y 4/1 – 3/1) very fine LOAMY SAND; unleached.

Core 27: Gardas Locality

Depth (cm)	Horizon	Description
0-28	F	*Fill* Road FILL.
28-151	F	7.5 YR hue poorly sorted SANDY LOAM with GRAVEL; black (10YR 2/1) poorly sorted SANDY LOAM from 141 – 144 cm; very abrupt boundary.
151-190	A	*Alluvium* Black (10YR 2/1) SILT LOAM with fine roots; leached.
190-304	Cg	Dark greenish gray (10GY 4/1) very fine and fine LOAMY SAND; diffuse white masses above 230 cm; very fine laminae with few thicker finer laminae; unleached.

Core 28: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-31	F	*Fill*
31-43	F	Very dark gray (10YR 3/1) gravelly SANDY LOAM.
43-57	F	Brown – dark brown (10YR 4/3 – 3/3) poorly sorted medium – coarse SAND.
57-105	ACb	*Alluvium* Very dark grayish brown (10YR 3/3) heavy SILT LOAM; dolostone at 64 cm; very abrupt boundary.
105-138	BCb1	Dark grayish brown (10YR 4/2) light SILTY CLAY LOAM; massive; few thin coarser laminae; weak pedo-structure; common faint redox features; very abrupt boundary.
138-180	C1	Very thin laminated brown – dark grayish brown (10YR 4/3 – 4/2) SILT LOAM – very fine SANDY LOAM and LOAM; common faint redox features.
180-275	C2	Dark gray – dark grayish brown (10YR 4/1 – 4/2) LOAM; sand is very fine textured; common faint redox features; diffuse white masses from 250 – 260cm; thin laminated.
275-323	C3	Dark grayish brown (10YR 4/2) light SILTY CLAY LOAM; few white masses; abrupt boundary.
323-396	Cg1	Dark grayish brown – dark gray (10YR 4/2 – 4/1) heavy SILT LOAM; indistinct laminae – very fine SANDY LOAM; common faint – distinct redox features.

Core 29: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-14	F	*Fill* Road GRAVEL.
14-20	AC	Very dark gray (10YR 3/1) poorly sorted SAND.
20-29	F	Very dark grayish brown (10YR 3/2) poorly sorted SAND; occasional GRAVEL.
29-34	F	Laminated/layered very fine SANDY LOAM and LOAM.
34-40	F	Very dark brown (10YR 3/3) poorly sorted SAND FILL.
40-55	F	Very dark gray (10YR 3/2) SILT LOAM; anthropogenic; compact.
55-122	--	Gap.
122-141	F	Layered SAND and darker SANDY LOAM with historic artifacts.
141-150	C1	*Alluvium* Dark grayish brown – very dark grayish brown (10YR 4/2 – 3/2) laminated very fine SAND.
150-213	--	Gap.
213-220	C2	Dark grayish brown – very dark grayish brown (10YR 4/2 – 3/2) laminated very fine SAND; very abrupt boundary.
220-304	C3	Dark grayish brown – grayish brown (10YR 4/2 – 4/1) heavy SILT LOAM; very fine – fine sandy loam bed from 231 – 234cm.
304-330	C4	Dark grayish brown – grayish brown (10YR 4/2 – 4/1) heavy SILT LOAM; few coarser laminae.
330-360	C5	Brown – dark gray (10YR 4/3 – 4/1) very fine SANDY LOAM and very fine SAND.

Core 30: Harbor Bar Locality

Depth (cm)	Horizon	Description
0-10	F	*Fill* Gravel driveway.
10-38	F	Very dark gray – very dark grayish brown (10YR 3/1 – 3/2) SILT LOAM – LOAM over very dark gray (10YR 3/1) SILT LOAM; few GRAVEL clasts; compact; very abrupt boundary.
38-43	F	Sandstone from Barn Bluff.
43-55	F	Black (10YR 2/1) SILT LOAM; platy.
55-100	F	SILT LOAM – SANDY LOAM matrix with brick, glass, slag, dolostone.
100-213	F?	Gap
213-252	ACb	*Alluvium* Dark gray (10YR 4/1) – dark grayish brown (10YR 4/2) SILTY CLAY LOAM; faint redox features; indistinct very thin platy parting.
252-353	Cg1	Dark gray (2.5Y 4/1) SILTY CLAY LOAM; few faint redox features; sandy laminae in lower 20cm; very abrupt boundary.
353-368	Cg2	Dark greenish gray (10Y 5/1) fine SAND.

Core 31: Levee Park Locality

Depth (cm)	Horizon	Description
0-19	F1	*Fill* Dark grayish brown (10YR 4/3) SILT LOAM; mixed; very abrupt boundary.
19-41	F2/A	Very dark gray (10YR 3/1) SILT LOAM – SANDY LOAM; weak platy parting; very abrupt boundary.
41-90	F3	Brown (10YR 4/3) fine SAND with medium sand mode.
90-178	F4	Laminated brown and yellowish brown (10YR 4/3 & 5/4) fine and very fine SAND; few very dark laminae; dredge spoil.
178-280	F5	Laminated very fine SAND with loose fine – medium sand; few darker laminae at 222cm; dredge spoil.
280-334	F6	Laminated dark yellowish brown (10YR 4/6) very fine SANDY LOAM with soil inclusions.
334-341	2C4	*Alluvium* Brown (10YR 4/3) very fine – fine SAND.
341-350	2C5	Indistinct very fine SAND laminae; very abrupt boundary.
350-396	3C	*Outwash* Fine pebbly GRAVEL.

Core 32: Levee Park Locality

Depth (cm)	Horizon	Description
0-18	A/F	*Fill* Very dark gray (10YR 3/1) SILT LOAM; 20% very fine sand; few fine pebbles & granules; clear boundary.
18-40	F1	Brown (10YR 4/3) fine and very fine LOAMY SAND; single pebble; clear boundary.
40-60	F2	Laminated brown (10YR 4/3) very fine LOAMY SAND; few darker colored laminae; abrupt boundary.
60-125	F3	Mixed SANDY LOAM and chert & dolostone pebbles.
125-190	F4	Laminated yellowish brown (10YR 5/4) very fine SAND; cinder/slag (glassy) at 140cm.
190-270	F5	Laminated very fine SAND, very fine SANDY LOAM, and fine – medium SAND.
270-341	F6	Very dark grayish brown and brown (10YR 3/2 & 4/3) laminated very fine SANDY LOAM and fine SANDY LOAM; few fine – medium sand laminae; 1 pebble.
341-346	2AC	*Alluvium* very dark gray (2.5Y 3/1) silt loam with cinder and shell fragments.
346-361	2C1	Olive green (5Y 4/2) very fine – fine SAND; few pebbles.
361-396	3C2	*Outwash* Clean, coarse SAND and GRAVEL.

Core 33: Levee Park Locality

Depth (cm)	Horizon	Description
0-18	A/F	*Fill* Very dark gray (10YR 3/1) SILT LOAM topsoil.
18-100	F1	SANDY LOAM with rounded dolostone GRAVEL; brown and very dark brown layered interval from 150-156cm; few cinders.
100-141	F2	Brown (10YR 4/3) very fine SAND; greenish sandstone at 126cm.
141-220	F3(SS)	Broken very dark green or greenish gray sand stone.
220-252	F4	Mixed 2.5Y hue SANDY LOAM; rounded dolostone GRAVEL.
252-318	F5	Olive green (5Y 5/2) very fine LOAMY SAND with small angular rock fragments; layered below 300cm.
318-340	F6	Broken greenish dolostone GRAVEL (Barn Bluff source.)
340-350	2ACb	*Alluvium* Very dark gray (2.5Y 3/1) SILTY CLAY LOAM.
350-396	3C	*Outwash* GRAVEL.

Core 34: Levee Park Locality

Depth (cm)	Horizon	Description
0-20	A/F	*Fill* Very dark gray (10YR 3/1) SILT LOAM topsoil; abrupt boundary.
20-58	F1	Brown & brown – dark yellowish brown (10YR 4/3 & 4/3-4/4) fine LOAMY SAND; GRAVEL between 40&46cm; very abrupt boundary.
58-85	F2	Very dark gray (10YR 3/1) SILT LOAM – very fine SANDY LOAM with GRAVEL.
85-130	F3	Dark gray (2.5Y 4/1) CLAY LOAM; sand is very fine textured.
130-153	F4	Layered gravelly LOAM.
153-160	F5	Very coarse and coarse SAND.
160-224	F6	Layered gravelly LOAM; rounded rock.
224-396	2Cr	*Bedrock* Green very fine SAND over light olive brown (2.5Y 5/3) SILT – very fine SAND; weathered sandstone.

Core 35: Levee Park Locality

Depth (cm)	Horizon	Description
0-20	A/F	*Fill* Black (10YR 2/1) SILT LOAM; very abrupt boundary.
20-98	F1	Laminated brown (10YR 4/3) very fine SAND and mixed gravelly SANDY LOAM – SILT LOAM FILL; 1 piece rounded glass.
98-127	F2	Layered green very fine SAND, very dark gray very fine SANDY LOAM, and green SANDY LOAM; abrupt boundary.
127-135	F3	Brown (10YR 4/3) very fine SAND; clear boundary.
135-180	F4	Green SAND with rounded glass over weathered rock.
180-221	F5	Mixes pieces of sediment and bedrock source clasts; layered below 215cm.
221-280	F6	Local dolostone with some weathered matrix.
280-340	F7	Broken dolostone.
340-396	2ACb	*Outwash* Dark gray (2.5Y 4/1) LOAM with angular GRAVEL.

Core 36: Levee Park Locality

Depth (cm)	Horizon	Description
0-26	A/F	*Fill* Very dark gray (10YR 3/1) heavy SILT LOAM; few fine pebbles; very abrupt boundary.
26-39	F1	Very dark grayish brown (10YR 3/2) SANDY LOAM and very dark gray (10YR 2/2) LOAM with rounded GRAVEL; very abrupt boundary.
39-42	F2	Brown (10YR 4/3) very fine SAND; very abrupt boundary.
42-46	F3	Cinder and LOAM; very abrupt boundary.
46-73	F4	Brown (10YR 4/3) laminated very fine LOAMY SAND; very abrupt boundary.
73-133	F5	Mixed grayish green (5G 4/2) sandstone; interbedded with very dark grayish brown (7.5YR 3/2) heavy SILT LOAM below 120cm.
133-190	F6	Bedrock source FILL.
190-270	F7	Bedrock source FILL.
270-396	F8	Bedrock source FILL & clayey gravelly residuum.
396-487	F9	Rock and residuum.
487-547	F10	Rock and residuum.
547-579	2C1	*Outwash* Sand and Gravel rounded clasts; shell fragments.
579-670	2C2	Clean sand and GRAVEL.

Core 37: Levee Park Locality

Depth (cm)	Horizon	Description
0-32	A/F	*Fill* Very dark gray (10YR 3/2) SANDY LOAM – SILT LOAM topsoil mixed with sand below 20cm.
32-49	F1	Dolostone cobble.
49-100	F2	*Dredge Spoil or Historic Alluvium* Indistinct laminated brown – dark brown (10YR 4/3 – 3/3) fine SAND.
100-139	F3	Laminated very fine SAND.
139-252	F4	Brown – pale brown (10YR 5/3 – 6/3) very fine SAND; loose; dry.
252-290	F5	Brown (10YR 4/3) very fine SAND & very fine SANDY LOAM; laminated; clear boundary.
290-351	F6	Bedded and laminated brown – dark gray (10YR 4/3 – 4/2) very fine to fine-medium SAND.
351-358	**ACb**	Dark gray – very dark gray (5Y 4/1 – 3/1) SANDY LOAM; few shell and dolostone fragments; 1 cinder; 1 pebble; abrupt boundary.
358-365	C1	Green SANDS.
365-402	C2	Olive green (5Y 5/2) fine LOAMY SAND.
402-410	C3	Cinder; very abrupt boundary.
410-428	2C4	*Outwash* SAND and LOAM with GRAVEL; very abrupt boundary.
428-576	2C5	Very coarse and coarse SAND and GRAVEL.

Core 38 Levee Park Locality

Depth (cm)	Horizon	Description
0-20	A/F	*Fill* Black (10YR 2/1) SILT LOAM topsoil.
20-28	F1	Mixed topsoil and brown (10YR 4/3) SANDY LOAM and GRAVEL.
28-36	F2	Very dark gray (10YR 3/1) gravelly SILT LOAM; very abrupt boundary.
36-68	F3	SAND and GRAVEL.
68-100	F4	Dark gray (10YR 4/1) SANDY LOAM – LOAM; brown sand at top and bottom; poorly sorted; very fine pebbles; indistinct lamination.
100-226	F5	Laminated brown (10YR 4/3) very fine SAND and dark grayish brown (10YR 4/2) very fine LOAMY SAND.
226-228	F6	Diamicton textured LOAM and GRAVEL.
228-240	F7	Brown – dark grayish brown (10Yr 4/3 – 4/2) laminated very fine SAND; wood between 234 & 236cm; abrupt boundary.
240-280	F8	Gravelly LOAMY SAND.
280-328	F9	Bedrock source FILL.
328-338	F10	Dark greenish gray (7.5Y 4/1 – 5/1) over green bedrock; sandstone; very abrupt boundary.
338-370	**2ACb**	*Alluvium* Gray (2.5Y 5/1) SAND; cinder and ash; few rounded pebbles.
370-421	2C1	Mixed olive green (2.5Y 4/3) LOAM; rounded gravel; few shell fragments; poorly sorted; abrupt boundary.
421-487	3C2	*Outwash* SAND & GRAVEL.

Core 39: Levee Park Locality

Depth (cm)	Horizon	Description
0-20	A/F	*Fill* Very dark gray (10YR 3/1) SILT LOAM; black plastic pipe fragment at base; very abrupt boundary.
20-32	F1	Very dark gray (10YR 3/1) SILT LOAM mixed with brown (10YR 4/5) SAND; very abrupt boundary.
32-52	F2	Brown (10YR 4/3) laminated very fine SAND; very abrupt boundary.
52-57	F3	Very dark grayish brown (10YR 3/2) light very fine SANDY LOAM; very abrupt boundary.
57-90	F4	Green bedrock source sandstone.
90-133	F5	Bedrock source FILL with 1 very dark gray SILT LOAM bed.
133-180	F6	SAND & GRAVEL over gravelly LOAM.
180-270	F7	
270-428	F8	Bedrock source FILL.
428-487	2C	*Outwash* Rounded pebble GRAVEL in SAND matrix.

Core 40: Levee Park Locality

Depth (cm)	Horizon	Description
0-15	A/F	*Fill* Dark grayish brown (10YR 3/1) SILT LOAM topsoil; abrupt boundary.
15-24	F1	Dark grayish brown – very dark grayish brown (10YR 3/1 – 3/2) gravelly SILT LOAM.
24-42	F2	Very dark gray – very dark grayish brown (10YR 3/1 – 3/2) SILT LOAM with few lighter colored inclusions of soil and fine pebbles; very abrupt boundary.
42-56	F3	Brown (10YR 4/3) very fine LOAMY SAND; very abrupt boundary.
56-62	F4	Granules, cinder, and ashy silt; very abrupt boundary.
62-64	F5	Bed of light olive brown (10YR 5/3) coarse SILT; well sorted.
64-102	F6	SANDY LOAM FILL; brick fragment, granular sand, cinder.
102-152	F7	Green and olive green bedrock source FILL; very abrupt boundary.
152-170	F8	SANDY LOAM FILL; cinder from sand to pebble size.
170-235	F9	Weathered sandstone bedrock source FILL.
235-259	F10	Greenish, semi-lithified bedrock source FILL.
259-270	F11	SILTY CLAY bed; part of bedrock sequence.
270-295	F12	Sandstone bedrock FILL.
295-340	F13	Semi-lithified bedrock source FILL.
340-360	F14	Light olive brown (2.5Y 5/6) very fine SAND bedrock source fill with wood.
360-440	F15	Bedrock source FILL; very abrupt boundary.
440-508	2ACb	*Alluvium* Very dark gray and dark gray (2.5Y 3/1 & 4/1) LOAM – CLAY; large % rounded gravel; glacial source; abrupt boundary.
508-579	3C	*Outwash* Very coarse SAND and granules with few pebbles.

Core 41: Levee Park Locality

Depth (cm)	Horizon	Description
0-20	A/F	*Fill* Very dark gray – black (10YR 3/1 – 2/1) SILT LOAM – very fine SANDY LOAM; very abrupt boundary.
20-43	F1	Mixed very dark grayish brown (10YR 3/1 & 4/3) very fine SANDY LOAM; rock at top; abrupt boundary.
43-60	F2	Brown (10YR 4/3 – 5/3) very fine SANDY LOAM; few laminae.
60-76	F3	Very dark gray (10YR 3/1) SILT LOAM – SANDY LOAM with fine cinder; brown laminae in upper 2 cm.
76-110	F4	ROCK/BEDROCK.
110-200	F5	Sandy bedrock source FILL with some clay and gravel inclusions below 168cm.
200-280	F6	Green bedrock source FILL.
280-490	F7	Green bedrock source FILL.
490-501	2ACb	*Outwash* Black (N2.5/) gravelly SANDY LOAM; abrupt boundary.
501-525	2C1	Dark greenish gray (10Y 4/1) GRAVEL with very coarse and coarse SAND matrix; rounded clasts.

Core 42: Levee Park Locality

Depth (cm)	Horizon	Description
0-16	A/F	*Fill* Very dark gray – very dark grayish brown (10YR 3/1 – 3/2) SILT LOAM topsoil; few pebbles; very abrupt boundary.
16-23	F1	SAND & GRAVEL; very abrupt boundary.
23-80	F2	Gravelly SANDY LOAM FILL.
80-135	F3	Very dark gray (10YR 3/1) SILT LOAM with large very fine sand mode; mixed with some brown soil; abrupt boundary.
135-180	F4	Very dark grayish brown (10YR 3/2) LOAM with coal and occasional pebbles over layered green sand & very dark gray silt loam.
180-244	F5	Green LOAM; bedrock source FILL.
244-285	F6	LOAM and rock from bedrock source.
285-360	F7	SANDY LOAM with bedrock clasts; FILL.
360-490	F8	Bedrock source FILL.
490-500	F9	Very dark gray (N 3/) gravelly SILT LOAM.
500-511	F10	Bedrock source FILL.
511-530	2C1	*Outwash* Dark greenish gray (10Y 4/1) GRAVEL in very coarse SAND matrix; layer of plant fragments/wood at top.

Core 43: 3rd Street Ridge

Depth (cm)	Horizon	Description
0-18	A/F	*Fill* Very dark gray (10YR 3/1) topsoil; abrupt boundary.
18-40	C/F	Very dark grayish brown (10YR 3/2) SILT LOAM grading to SANDY LOAM; GRAVEL in upper half; abrupt boundary.
40-85	C/F	Sandy FILL with local source GRAVEL.
85-134	Bw	*Outwash* Dark brown (10YR 3/3) LOAM – SANDY LOAM; slightly sticky; abrupt boundary.
134-180	BC1	Brown (10YR 4/3) SAND.
180-225	Bw2	Dark brown (10YR 3/3) LOAM; slightly sticky; massive; clear boundary.
225-243	BC2	Brown (10YR 4/3) SANDY LOAM – LOAM; weak pedo-structure; very abrupt boundary.
243-280	BC3	Yellowish brown (10YR 5/4) loamy fine SAND.
280-327	BC4	Brown (10YR 4/3) SANDY LOAM; very abrupt boundary.
327-396	C1	Gravelly very fine SAND.

Core 44: 3rd Street Ridge

Depth (cm)	Horizon	Description
0-23	A/F	*Fill* Black (10YR 2/1) SILT LOAM topsoil over very dark grayish brown (10YR 3/2) gravelly silt loam: very abrupt boundary.
23-37	F1	GRAVEL.
37-65	F2	Very dark grayish brown (10YR 3/2) LOAM; rounded pebbles below 50cm; very abrupt boundary.
65-120	F3	Sandstone bedrock source FILL.

Core 45: 3rd Street Ridge

Depth (cm)	Horizon	Description
0-28	A/F	*Fill* Very dark gray (10YR 3/1) SILT LOAM topsoil.
28-56	F1	Bedrock source FILL mixed with upper solum; few GRAVEL clasts; very abrupt boundary.
56-98	F2	Very dark gray (10YR 3/1) SILT LOAM – CLAY; rounded pebble; piece of glass; granule sized reddened sandstone; compact.
98-140	F3	Very dark gray – very dark grayish brown (10YR 3/1 – 3/2) SILT LOAM – SANDY LOAM; few fine angular pebbles; very abrupt boundary.
140-213	F4	Dolostone GRAVEL; machine-cut nail at 144cm.

Core 46: 3rd Street Ridge

Depth (cm)	Horizon	Description
0-30	A/F	*Fill* Topsoil FILL; wood.
30-47	F2	Mixed dark and light silt loam FILL; abrupt boundary.
47-55	F3	Very dark gray (10YR 3/2) SILT LOAM; very abrupt boundary.
55-105	F4	Mixed FILL; roots; dolostone pebbles.
105-144	**Ab**	*Loess?* Black (10YR 2/1) SILT LOAM; 10% sand; weak medium and fine angular blocky structure; very abrupt boundary.
144-200	ABb	Very dark gray – very dark grayish brown (10YR 3/1 – 3/2) heavy SILT LOAM; weak medium and fine angular blocky structure; roots.
200-275	2Cr1	*Bedrock* Broken partially weathered local bedrock/colluvium; red oxides.
275-325	2Cr2	Dark yellowish brown - yellowish brown (10YR 4/4 – 5/4) very fine SANDY LOAM; very abrupt boundary.
325-396	2Cr3	Olive green (5Y 5/2) weathered sandstone and dolostone bedrock.

Core 47: 3rd Street Ridge

Depth (cm)	Horizon	Description
0-26	Ap	*Loess* Very dark gray – black (10YR 3/1 – 2/1) SILT LOAM; not necessarily plowed; mixed; abrupt boundary.
26-90	AB	Very dark grayish brown – very dark gray (10YR 2/2 – 3/1) SILT LOAM; 10% sand; sandstone pebble at 64cm; weak medium angular blocky structure.
90-142	Bw	Dark grayish brown (10YR 4/2) SILT LOAM; slightly sticky; weak medium subangular blocky structure; very abrupt boundary.
142-213	2Cr	*Bedrock* Weathered bedrock/colluvium.

Core 48: 3rd Street Ridge

Depth (cm)	Horizon	Description
0-85	F	*Fill* SILT LOAM FILL; Old Style beer can at 45cm.
85-148	**Ab**	*Outwash* Very dark grayish brown – very dark gray (10YR 3/2 – 3/1) LOAM.
148-180		Very dark grayish brown (10YR 3/2) SANDY LOAM with GRAVEL.
180-255	Bwb1	Dark brown (7.5YR 3/3) SANDY LOAM; GRAVEL clast/layer at 229 cm; poorly sorted; stickier with depth; very abrupt boundary.
255-285	Bwb2	Brown (10YR 4/3) SANDY LOAM; GRAVEL.
285-321	Bwb3	Brown (7.5YR 4/3) SILT LOAM; 15% sand; slightly sticky; abrupt gradational boundary.
321-396	2Cr	*Bedrock* Weathered bedrock with lithified intervals.

Core 49: 3rd Street Ridge

Depth (cm)	Horizon	Description
0-18	Ap	*Fill* Very dark grayish brown (10YR 3/2 – ¾) SANDY LOAM topsoil.
18-25	A/C	Very dark grayish brown (10YR 3/2 – ¾) SANDY LOAM topsoil mixed with subsoil.
25-35	A	Very dark grayish brown (10YR 3/2) SANDY LOAM; very abrupt boundary.
35-52	C	Brown (10YR 4/3) fine SAND with GRAVEL; loose; abrupt boundary.
52-82	A	*Outwash* Dark grayish brown (10YR 4/2) fine – very fine LOAMY SAND.
82-151	Bwb	Brown (10YR 4/3) fine – medium SAND; loose; few pieces of lithified sand; clear boundary.
151-200	C1	Yellowish brown (10YR 5/6) fine – medium SAND; few lithified pieces; lighter colored with depth.
200-226	C2	Green SAND; abrupt boundary.
226-285	C3	Brown – dark yellowish brown (10YR 4/3 – 4/4) SILT and very fine SAND; darker at base.
285-396	Cr	*Bedrock* Weathered bedrock.

Core 50: Red Wing Shoe

Depth (cm)	Horizon	Description
0-11	F1	*Fill* Asphalt and SAND; abrupt boundary.
11-25	F2	Natural source angular FILL; abrupt boundary.
25-37	F3	Mixed angular GRAVEL in heavy SILT LOAM – LOAM matrix; very abrupt boundary.
37-60	F4	Black (N3/) SILT LOAM mixed with wood fragments (including plywood) and other small rocky inclusions; very abrupt boundary.
60-161	F5	Grayish green (5G 5/3) weathered bedrock source FILL; oxidized colored at base (rock); very abrupt boundary.
161-236	**2Ab**	*Alluvium* Black (2.5Y 2.5/1) SILT LOAM with 10% sand; few lighter-colored inclusions; abrupt boundary.
236-258	2Cg1	Dark greenish gray (5GY 4/1 – 3/1) SILTY CLAY LOAM; very abrupt boundary.
258-334	3Cr	Laminated weathered bedrock.

Core 51: Red Wing Shoe

Depth (cm)	Horizon	Description
0-12	F1	*Fill* Asphalt.
12-21	F2	Gravel subcourse.
21-33	F3	Rounded GRAVEL in LOAM matrix; very abrupt boundary.
33-55	F4	Black (10YR 2/1) SILT LOAM; 15% sand; platy pebbles from bedrock source; plant fragments.
55-125	F5	Bedrock source FILL; mostly lithified; abrupt boundary.
125-169	F	Gravelly diamicton-textured with SILT LOAM matrix and urban source FILL; very abrupt boundary.
169-173	ACb	*Alluvium* Very dark gray (N3/) – dark greenish gray (10Y 3/1) SILT LOAM; fine roots; many plant fragments; very abrupt boundary.
173-198	**Ab/Ob**	Black (N 2.5/) mucky SILT LOAM.
198-232	**Ab**	Black (N 2.5/) SILTY CLAY LOAM; poorly sorted; few fine weathered rock pebbles; clear boundary.
232-252	Cg1	(5Gy 3/1) SILTY CLAY – SILTY CLAY LOAM; massive; roots; abrupt boundary.
252-304	Cr	Green weathered rock.

Core 52: Red Wing Shoe

Depth (cm)	Horizon	Description
0-11	F1	*Fill* Asphalt.
11-26	F2	Layered subcourse.
26-54	F3	Gravelly urban FILL.
54-63	F4	Green bedrock source FILL; very abrupt boundary.
63-98	F5	2 cm black SILT LOAM over very dark brown SILT LOAM; 1 rounded pebble; 1 platy pebble.
98-132	F6	Very dark brown (10YR 2/2) SILT LOAM mixed with soil from below in lower half; abrupt boundary.
132-260	Cr	*Bedrock* Stratified weathered sandstone bedrock.

Core 53: Red Wing Shoe

Depth (cm)	Horizon	Description
0-9	F	*Fill* Asphalt.
9-18	F2	Subcourse GRAVEL; very abrupt boundary.
18-27	F3	Brown (10YR 4/3) SAND & rounded GRAVEL.
27-33	F4	Very dark gray (10Y 3/1) SILT LOAM; few fine brick fragments; white burned shell or limestone; very abrupt boundary.
33-167	F5	Green bedrock source FILL; very abrupt boundary.
167-217	**Ab/Ob**	*Alluvium/Paludal Deposits* Black (N2.5/) MUCK or mucky SILT with one piece of angular GRAVEL from FILL; fine roots; very abrupt boundary.
217-246	**Ab**	Black – very dark gray (N 2.5/ - N3/) light SILTY CLAY LOAM; fine roots; fine tabular pebble; very abrupt boundary.
246-257	Cg	Dark greenish gray (10Y 4/1) SILT LOAM (silt & very fine sand) abrupt gradational boundary.
257-304	Cr	Bedrock.

Core 54: Red Wing Shoe

Depth (cm)	Horizon	Description
0-15	F1	*Fill* Gravelly FILL.
15-54	F2	Layered sandy FILL; very dark gray SILT LOAM from 40-48cm; very abrupt boundary.
54-141	**Ab**	*Alluvium* Black (10YR 2/1) SILT LOAM; metal artifact; slightly lighter with depth; grusified GRAVEL at 134cm; very abrupt boundary.
141-174	Cr1	*Bedrock* Light olive stratified weathered bedrock.
174-213	Cr2	Light green weathered stratified bedrock.

Core 55: Railroad Depot Locality

Depth (cm)	Horizon	Description
0-36	F1	*Fill* Very dark grayish brown and very dark gray (10YR 3/2 & 3/1) SILT LOAM – SANDY LOAM FILL; rounded pebbles below 24cm.
36-61	F2	Layered dark grayish brown (10YR 4/2) SILT LOAM FILL; 1 rounded pebble; very abrupt boundary.
61-72	F3	Cinder; very abrupt boundary.
72-80	F4	Bedrock source FILL; very abrupt boundary.
80-110	F5	Burned/weathered mortar and GRAVEL; clay loam matrix.
110-131	F6	Layered bedrock source FILL; 1 rounded pebble; very abrupt boundary.
131-396	F7	Glacial source sand and GRAVEL FILL; shell fragment at 260cm.

Core 56: YMCA Locality

Depth (cm)	Horizon	Description
0-8	F1	*Fill* Asphalt.
8-24	F2	Subcourse GRAVEL; very abrupt boundary.
24-48	F3	Brown – dark brown (10YR 4/3 – 3/3) glacial source sand and GRAVEL FILL; very abrupt boundary.
48-65	F4	Mixed sandy FILL; few pebbles; abrupt boundary.
65-90	F5	Glacial source sand and GRAVEL.
90-180	F6	Dark grayish brown (2.5Y 4/2) gravelly SANDY LOAM.
180-318	F7	CLAY LOAM; wood; low recovery; gravelly loam with few wood fragments near base; refusal at 318cm.

Core 57: YMCA Locality

Depth (cm)	Horizon	Description
0-7	F1	*Fill* Asphalt.
7-21	F2	Subcourse GRAVEL; very abrupt boundary.
21-54	F3	Very dark gray and very dark grayish brown layered SANDY LOAM and SILT LOAM FILL; GRAVEL; very abrupt boundary.
54-127	F4	Bedrock source FILL.
127-180	F5	Mixed sand and GRAVEL FILL with few bedrock clasts; few black soil inclusions from below.
180-241	ACb1	*Alluvium* Black (10YR 2/1) poorly sorted SILT LOAM with rounded GRAVEL and granules; very abrupt boundary.
241-321	ACb2	Black – very dark gray (10YR 2/1 – 3/1) poorly sorted CLAY LOAM; few rounded pebbles; large % of very coarse sand; low recovery.
321-487	2C	*Outwash* Wet Sand and GRAVEL; low recovery.

Core 58: YMCA Locality

Depth (cm)	Horizon	Description
0-15	F1	*Fill* Asphalt.
15-31	F2	Subcourse GRAVEL; abrupt boundary.
31-54	F3	Subcourse; bedrock source FILL; abrupt boundary.
54-150	F4	Very dark gray and very dark grayish brown (10YR 3/1 & 3/2) SANDY LOAM matrix; diamicton FILL; round and angular pebbles; many historic artifact fragments; wood and brick fragments from 90-126cm; dolostone at 142cm.
150-230	F5	Very dark brown (10YR 2/2) SANDY LOAM with brick fragments and orange mortar/burned brick.
230-290	F6	Olive green and dark gray (5Y 4/2 & 4/1) very fine SANDY LOAM – SILT LOAM; brick fragments at 255cm; wood fragments from 264-276cm.
290-396	F7/Cr	*Bedrock* Dark greenish gray (10Y 3/1) mixed with olive fine SAND; semi-lithified FILL and bedrock.

Core 59: City Ramp Locality

Depth (cm)	Horizon	Description
0-37	F1	*Fill* Very dark grayish brown (10Yr 3/2) SILT LOAM.
37-50	F2	Green sandstone bedrock source FILL; very abrupt boundary.
50-68	F3	Sand and GRAVEL with pieces of concrete; abrupt boundary.
68-100	F4	Mixed building material and olive green fine sand.
100-156	Cr	*Bedrock* Olive (5Y hue) weathered bedrock; refusal at 150cm.

Core 60: Red Wing Shoe

Depth (cm)	Horizon	Description
0-16	F1	*Fill* Recent GRAVEL; very abrupt boundary.
16-78	F2	Mixed SANDY LOAM FILL; cinder; GRAVEL; brick fragments from 42-50cm; urban source FILL.
78-152	F3	Brown – dark grayish brown (10YR 4/3 – 4/2) SANDY LOAM FILL; few pebbles; very abrupt boundary.
152-174	**Ab**	*Alluvium* Black (N 2.5/) SILTY CLAY LOAM; angular GRAVEL clast and small brick fragment; very abrupt boundary.
174-200	Cg1	Dark grayish brown – grayish brown (2.5Y 4/2 – 5/2) SILTY CLAY LOAM.
200-218	Cg2	Light olive brown (2.5Y 5/3) SILT LOAM and very fine SAND.
218-270	Cr	*Bedrock* Weathered stratified bedrock.

Core 61: Red Wing Shoe

Depth (cm)	Horizon	Description
0-5	F1	*Fill* ASPHALT.
5-52	F2	Mixed source GRAVEL FILL; very abrupt boundary.
52-171	F3	Bedrock source FILL; sawdust layer <1 cm thick at 134 cm; very abrupt boundary.
171-213	**Ab**	*Alluvium* Black (N 2.5/) heavy SILT LOAM; sawdust clast and few wood fragments at 180cm.

Core 62: Red Wing Shoe

Depth (cm)	Horizon	Description
0-10	F1	*Fill* Bedrock source GRAVEL.
10-24	F2	Mixed urban FILL.
24-70		Dolostone Foundation.
70-213	**Ab**	*Alluvium* Black (N2.5/) heavy SILT LOAM grading down to SILTY CLAY LOAM; wood at 134 cm.

Core 63: Red Wing Shoe

Depth (cm)	Horizon	Description
0-11	F1	*Fill* Fresh Gravel; very abrupt boundary.
11-43	F2	Brick and mortar; abrupt boundary.
43-63	F3	Layered SAND and FILL.
63-128	**Ab**	*Alluvium* Black (N2.5/) heavy SILT LOAM; pebble at 70cm.
128-213	Cr	*Bedrock* Green weathered bedrock.

Core 64: City Ramp Locality

Depth (cm)	Horizon	Description
0-22	F1	*Fill* Very dark grayish brown (10YR 3/2) SILT LOAM FILL.
22-42	A/F	Very dark gray (10YR 3/1) SILT LOAM; fine cinder and GRAVEL.
42-128	F2	Green bedrock source FILL; very abrupt boundary.
128-145	F3	Dark greenish gray (10GY 4/1 – 3/1) fine SANDY LOAM; layered (laminated) with urban FILL; very abrupt boundary.
145-161	Ob1	*Paludal Deposits* Very dark gray (7.5YR 3/1) PEAT; fibric; abrupt boundary.
161-182	Ob2	Black (7.5YR 2.5/1) PEAT; fibric; abrupt boundary.
182-220	Ob3	Very dark gray – black (10YR 3/1 – 2/1) mucky PEAT; fibric; mixed with SILT and CLAY near base; clear boundary.
220-251	C/O	Dark greenish gray (5GY 3/1) PEATY LOAM; sand is very fine textured.
251-304	2Cr	*Bedrock* Bedded SANDSTONE BEDROCK.

Core 65: City Ramp Locality

Depth (cm)	Horizon	Description
0-13	F1	*Fill* Very dark grayish brown (10YR 3/2) SILT LOAM topsoil; very abrupt boundary at wood.
13-41	F2	URBAN FILL; very fine sandy loam with GRAVEL, small brick fragments, and wood; very abrupt boundary.
41-90	F3	Bedrock source FILL.
90-128	**Ab**	*Alluvium* Very dark gray (N3/) mucky SILT LOAM.
128-165	Abg1	Dark greenish gray (10Y 3/1 – N3/) SILT LOAM; sand is 15% very fine texture; very fine lithified sandstone at 150cm; very abrupt boundary.
165-170	Abg2	Very dark gray (N3/) SILT LOAM with low sand %; very abrupt gradational boundary.
170-213		SANDSTONE BEDROCK.

Core 66: City Ramp Locality

Depth (cm)	Horizon	Description
0-19	F1	*Fill* Topsoil.
19-35	F2	Gravelly, cindery sandy URBAN FILL.
35-42	F3	Bedrock source SANDY FILL.
42-60	F4	Bedrock source FILL with some rounded pebbles and artifact fragments.
60-100	F5	Bedrock source FILL.
100-130	Ob1	*Paludal Deposits* Black (N2.5/) PEAT; fine; fibric; very abrupt boundary.
130-140	Cg	Dark greenish gray (5GY 3/1) sandy PEAT; lots of fibers; very abrupt boundary.
140-161	Ob2	Very dark grayish brown (7.5YT 2.5/3) fibric PEAT; clear gradual boundary.
161-191	Cg	Grades from above to black – dark greenish gray (10GY 3/1) PEATY SAND then very fine SAND with peat or roots; sand at base is weakly lithified/cemented; very abrupt boundary.
191-247	Ob3	Fibric PEAT grading to MUCK; very abrupt boundary.
247-255	**2Ab**	*Bedrock* Greenish black (5GY 2.5/1) very fine SANDY LOAM – SILT LOAM; slightly sticky; no roots.
255-265	2Cg4	Laminated green and very dark gray very fine SANDY LOAM.
265-304	2Cr	Light olive brown (2.5Y 5/4) fine SAND over oxidized fine sand with 5YR hue.

Core 67: City Ramp Locality

Depth (cm)	Horizon	Description
0-24	F1	*Fill* Gravel over FILL.
24-41	F2	Bedrock source FILL.
41-51	F3	Fill.
51-150	Cr	*Bedrock* Green sandstone bedrock.

Core 68: Gardas Locality

Depth (cm)	Horizon	Description
0-36	A/F	*Fill* Very dark gray (10Yr 3/1) SILT LOAM topsoil fill; 15% sand; very abrupt boundary.
36-45	C1	Brown (10YR 5/3) very fine SAND; very abrupt boundary.
45-126	F	Gravelly SANDY LOAM – LOAM.
126-152	F	Crushed gravel fill.
152-190	F	Mix of above and below.
190-250	Cg1	*Alluvium* Dark greenish gray (5GY 3/1) SILTY CLAY; fine roots; reduced plant fragments.
250-254	Cg2	Plant fragments.
254-265	Cg3	Dark greenish gray (5GY 3/1) SILTY CLAY; fine roots; reduced plant fragments.
265-290	Cg4	Laminated Dark greenish gray (10GY 3/1) very fine SAND and very fine SAND – SILT LOAM; few fine roots.
290-320	Cg5	Dark greenish gray (10GY ¾) very fine – fine SAND.
320-371	Cg6	Dark greenish gray (5GY 3/1) very fine SAND – SILT; few laminae; loam bed at 335cm.
371-420	Cg7	Dark greenish gray (10Y 3/1 & 10GY 3/1) laminated very fine SAND and silty very fine SAND; abrupt gradational boundary.
420-560	Cg8	(5gy 3/1) fine – medium SAND; grades down to (10GY 4/1) weakly graded; thin bedded between 520 and 538; gradational boundary.
560-620	Cg8	Dark greenish gray (10GY 4/1) fine – medium SAND; abrupt gradational boundary.
620-670	Cg9	Dark greenish gray (10GY 4/2) interbedded coarse – medium SAND and fine – medium SAND.

Core 69: Gardas Locality

Depth (cm)	Horizon	Description
0-26	C1	*Alluvium* Dark grayish brown (10YR 4/3) very fine SANDY LOAM; strong platy parting; very abrupt boundary.
26-28	F1	Crushed rock bed.
28-70	C2	Very dark grayish brown – very dark gray (10YR 3/2 – 3/1) SANDY LOAM; sand laminae at 43cm; few pieces of fine rounded gravel; white-ware ceramic at 54cm; weak pedo-structure; abrupt boundary.
70-74	C3	Brown – dark brown (10YR 4/3 – 3/3) very fine LOAMY SAND.
74-86	C4	Very dark grayish brown (10YR 3/2) SILT LOAM – very fine SANDY LOAM; few anthropogenic inclusions; abrupt boundary.
86-118	**ACb**	Black (10YR 2/1) SAND and fine gravel in upper 2 cm; very dark gray (10YR ¾) SILT LOAM; 15% very fine sand; few plant fragments; few sandy blebs.
118-128	Cg1	Dark greenish gray (10GY 3/1) very fine SANDY LOAM – SILT LOAM; very abrupt boundary.
128-185	Cg2	(10GY 3/1) CLAY; no redox; very fine shell fragments; few plant fragments fro 150-160cm.
185-254	Cg3	Dark greenish gray (10Y 3/1) SILTY CLAY LOAM; indistinct laminae; very abrupt boundary.
254-280	Cg4	Laminated SAND; common plant fragments.
280-360	Cg5	Dark greenish gray (10Y 3/1) laminated SILT LOAM; plant fragments.
360-670	Cg6	(10YR 3/1) fine – medium SAND; bedded medium and coarse SAND; stratified very fine SAND and few coarser sand beds.

Core 70: *Barn Bluff Subarea*

Depth (cm)	Horizon	Description
0-18	AC	*Fill* Very dark gray (10YR 3/1) SILT LOAM topsoil.
18-38	C1	Olive yellow (2.5Y 6/6) SANDSTONE, SAND (weathered sandstone), and CLAY.
38-78	C2	Mixed local source bedrock gravel and rounded gravel with sandy matrix.
78-90	R	*Bedrock* Light olive brown (2.5Y 5/3) fine SANDSTONE.

Core 71: *Barn Bluff Subarea*

Depth (cm)	Horizon	Description
0-26	A/C	*Fill* Very dark gray (10YR 3/1) SILT LOAM topsoil.
26-43	C1	Olive yellow weathered SANDSTONE fill or colluvium.
43-70	C2	Mixed local bedrock source gravel and rounded glacial source gravel in sand matrix.
70-122	R	*Bedrock* Soft very fine SANDSTONE – SILTSTONE.

Core 72: *Barn Bluff Subarea*

Depth (cm)	Horizon	Description
0-16	A/C	*Fill* Very dark grayish brown (2.5Y 3/2) SILT LOAM FILL; abrupt boundary.
16-48	C1/F	Olive yellow (2.5Y 6/6) fine – medium SAND (bedrock source).
48-60	C2/F	SAND & GRAVEL; rounded.
60-98	R	*Bedrock* bedrock

Core 73: *Barn Bluff Subarea*

Depth (cm)	Horizon	Description
0-19	AC	*Fill* Very dark grayish brown (10YR 7/2 – 2.5YT 3/2) SILT LOAM topsoil FILL; local source gravel; very abrupt boundary.
19-40	C1/F	Olive yellow (2.5Y 6/6) SAND with gravel.
40-67	C2/F	Rounded gravel bed; very abrupt boundary.
67-122	R	*Bedrock* 5Y hue very fine glauconitic SANDSTONE residuum.

Core 74: *Barn Bluff Subarea*

Depth (cm)	Horizon	Description
0-18	AC	*Fill* Very dark grayish brown (10YR 3/2) SANDY LOAM; very abrupt boundary.
18-22	AC2	Very dark gray (10YR 3/1) SILT LOAM; very abrupt boundary.
22-40	C1/F	Olive yellow SAND with sandstone gravel; dolostone pebble.
40-60	C2/F	Rounded gravel bed; very abrupt boundary.
60-122	R	*Bedrock* Glauconitic SILTSTONE and very fine SANDSTONE.

Core 75: *Barn Bluff Subarea*

Depth (cm)	Horizon	Description
0-20	AC/F	*Fill* Very dark gray (10YR 3/1) SANDY LOAM; very abrupt boundary.
20-25	AC2/F	Very dark gray (10YR 3/1) SILT LOAM; very abrupt boundary.
25-60	C1/F	Olive yellow SAND with sandstone gravel; few rounded pebbles.
60-90	C2/F	Rounded gravel bed.
90-120	Cr	*Bedrock* Weathered glauconitic SILTSTONE.

Core 76: *Barn Bluff Subarea*

Depth (cm)	Horizon	Description
0-25	AC/F	*Fill* Very dark gray (10YR 3/1) SILT LOAM – SANDY LOAM.
25-46	C1/F	SAND with sandstone gravel.
46-61	C2/F	SAND & GRAVEL layer.
61-80	R	Glauconitic SILTSTONE.

Core 77: *Viking Coca Cola Locality*

Depth (cm)	Horizon	Description
0-10	C1/F	*Fill* ASPHALT.
10-35	C2/F	Crushed gravel SUBCOURSE.
35-47	AC	Cinders, rounded pebbles, anthropogenic sediments; very abrupt boundary.
47-62	**Ab**	*Loess* Black (10YR 2/1) SILT LOAM; 10% sand; few rounded pebbles; anthropogenically enhanced; very abrupt boundary.
62-72	AB	Very dark gray – dark gray (10YR 3/1 – 4/1) heavy SILT LOAM; few pebbles (angular, bedrock source) very abrupt boundary.
72-130	2Cr1	*Bedrock* Strong brown (7.5YR 4/6) SILT with gravel.
130-164	2Cr2	Light olive green – pale olive (5Y 6/4 – 6/3) oxidized SILT and SAND with bedrock clasts.
164-240	2Cr3	Pale olive (5Y 6/3) weathered, thin bedded siltstone.

Core 78: *Viking Coca Cola Locality*

Depth (cm)	Horizon	Description
0-10	C1/F	*Fill* ASPHALT.
10-28	C2/F	SUBCOURSE.
28-30	AC	Anthropogenic sediment.
30-38	**Ab**	*Loess* Very dark gray (10YR 3/1) SILT LOAM; 10% very fine sand; few fine gravels and cinders.
38-59	AB	Dark gray (10YR 4/1) heavy SILT LOAM; few angular pebbles.
59-151	2Cr1	*Bedrock* Strong brown and dark yellowish brown (7.5Yr 6/4 & 10YR 4/2) SILT LOAM; weathered bedrock; very abrupt boundary.
151-185	2Cr2	Pale olive (7.5YR 6/4) laminated and thin bedded SILT.

Gardas Locality Trench 1

Depth	Horizon	Description
0-43	F	*Fill* Dark grayish brown (10YR 4/6) very fine SANDY LOAM with gravel, cinder and brick; very abrupt wavy boundary.
43-61	F2	Mix of very dark gray LOAM fill with common cinder and rounded rock; coarse sand at top; abrupt wavy boundary.
61-68	**Ab1**	*Alluvium* Dark gray (2.5Y 4/1) heavy SILT LOAM with 20% sand; very abrupt wavy boundary.
68-89	C1	Laminated pale brown (10YR 6/3) very fine SAND and dark gray (10YR 4/1) very fine SANDY LOAM; very abrupt boundary.
89-92	C2	Yellowish brown (10YR 5/4) medium – coarse SAND; very abrupt boundary.
92-95	CB	Dark grayish brown – grayish brown (2.5Y 4/2 – 5/2) SILT LOAM with 20% angular rock.
95-116	Cg1	Bedded and laminated very fine SAND and very fine SANDY LOAM; very abrupt boundary.
116-185	Cg2	Dark gray (2.5Y 4/1) SILTY CLAY.

Gardas Locality Trench 2

Depth	Horizon	Description
0-10	F1	*Fill* Very dark grayish brown – dark grayish brown (10YR 3/2 – 4/2) SILT LOAM; 10% very fine sand; topsoil in-fill with alluvium; clear boundary.
10-24	F2	Brown – yellowish brown (10YR 4/3 – 5/4) very fine SANDY LOAM; fill and alluvium; very abrupt boundary.
24-35	AC/F	Dark gray and very dark gray (10YR 3/1 – 4/1) SILT LOAM; very abrupt boundary.
35-37	F3	Medium – coarse SAND with cinder.
37-55	ACb	*Alluvium* Dark grayish brown (10YR 4/2) SILT LOAM – very fine SANDY LOAM; abrupt wavy boundary.
55-71	C1	Pale brown (10YR 6/3) very fine – fine SAND with laminae; lenses with redox; very abrupt wavy boundary.
71-78	C2	Dark gray – dark grayish brown (2.5Y 4/1 – 4/2) SILT LOAM; 1-2% very fine sand; layer of rock and charcoal at top; very abrupt boundary.
78-105	C	Pale brown (10YR 6/3) laminated very fine SAND; very abrupt boundary.
105-115	2C	Very dark grayish brown – dark grayish brown (2.5Y 3/2 – 4/2) SILTY CLAY; charcoal and wood fragments; common faint redox features.

Gardas Locality Trench 4

Depth	Horizon	Description
0-22	F	*Fill* Brown (10YR 4/3) SANDY LOAM; rubble; creosote timbers; road surface; abrupt broken boundary.
22-51	C/Ab	Very dark grayish brown and brown (10YR 3/2 and 4/3) SANDY LOAM; gravel rubble in lower 5-8cm; A horizon broken; very abrupt boundary.
51-64	C1	*Alluvium* Brown and pale brown (10YR 4/3 and 6/3); laminated very abrupt erosional boundary.
64-67	Cg1	Dark gray (2.5YR 4/1) SILT LOAM – very fine SANDY LOAM; few rocks; thickens to north; very abrupt wavy boundary.
67-112	Cg2	Grayish brown (10YR 5/2) laminated very fine LOAMY SAND; common light low chroma redox features; very abrupt planar boundary.
112-115	Cg/O	Dark brown (7.5YR 4/3) PEAT with sand interface; gradual boundary.
115-123	C2	Grayish brown (10YR 5/2) laminated very fine LOAMY SAND; common light low chroma redox features; very abrupt planar boundary.
185	ACb	Dark gray (4/) SILTY CLAY; snail shells; plant fragments.

APPENDIX B
RADIOCARBON ASSAY DATA SHEETS

BETA ANALYTIC INC.
DR. M.A. TAMERS and MR. D.G. HOOD
4985 S.W. 74 COURT
MIAMI, FLORIDA, USA 33155
PH: 305-667-5167 FAX:305-663-0964
beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Dr. Michael F. Kolb — Report Date: 3/18/2013

Strata Morph Geoexploration, Incorporated — Material Received: 3/8/2013

Sample Data	Measured Radiocarbon Age	13C / 12C Ratio	Conventional Radiocarbon Age(*)
Beta - 344274	490 +/- 30 BP	-26.8 o/oo	460 +/- 30 BP
SAMPLE : 63C3D350			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (plant material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1420 to 1450 (Cal BP 530 to 500)			

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.8:lab. mult=1)

Laboratory number: **Beta-344274**

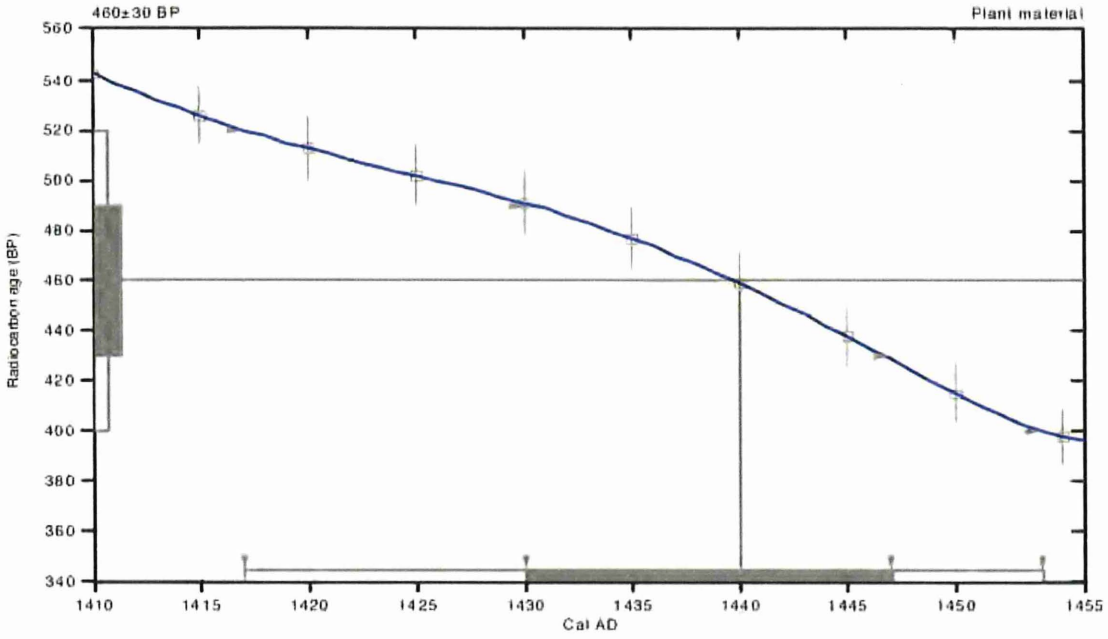
Conventional radiocarbon age: **460±30 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 1420 to 1450 (Cal BP 530 to 500)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1440 (Cal BP 510)

1 Sigma calibrated result: (68% probability) Cal AD 1430 to 1450 (Cal BP 520 to 500)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

Beta Analytic Radiocarbon Dating Laboratory

4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • E-Mail: beta@radiocarbon.com