US Army Corps of Engineers®
St. Paul District

Wetland Mitigation Proposal
Prospectus

Minnesota Board of Water & Soil Resources

Submit this document to the Corps of Engineers and Wetland Conservation Act (WCA) Local Government Unit (LGU). This document provides baseline information, documentation of credit eligibility and allocation, and strategies to restore or establish vegetation and hydrology. Preparation of this document generally requires assistance from professional consultants and/or other wetland science, engineering, and vegetation professionals. This document must provide enough detail to generate informed public and agency review. Provide full and complete answers and information for all requested items on this form, even if previously addressed at the Draft Prospectus phase.

Findings and recommendations provided do not constitute final mitigation plan approval or guarantee success.

PROJECT NAME	**Project Type**
Peterson Wetland Bank	☒ Wetland Bank ☐ In Lieu Fee Site ☐ Project Specific (PRM)

SPONSOR INFORMATION **Agent Information**

Sponsor's Full Name			Authorized Agent's Name and Title (if applicable)		
Sever Peterson			**Mike Graham**		
Company			Company		
			Wenck Associates, Inc.		
Street Address			Street Address		
15900 Flying Cloud Drive			**1802 Wooddale Drive**		
City / State / Zip Code			City / State / Zip Code		
Eden Prairie	**MN**	**55347**	**Woodbury**	**MN**	**55125**
Phone (Primary) / Phone (Secondary) / Phone (Other)			Phone (Primary) / Phone (Secondary) / Phone (Other)		
952-937-1315	**612-227-1315**		**651-395-5229**	**612-670-4209**	
E-mail Address			E-mail Address		
aaronspeterson@gmail.com			**mgraham@wenck.com**		

Sponsor's Relationship to Property

☒ Fee Title Owner ☐ Contract for Deed ☐ Contract or agreement with fee owner ☐ Other: (describe)

STATEMENT OF AUTHORIZATION (required if agent is authorized to represent, and sign for, sponsor)

I hereby authorize, **Mike Graham, Wenck Assoc., Inc.** to act on my behalf as my agent in the processing of this document and to furnish, upon request, supplemental information in support of this document.

Sever Peterson — Signature of Sponsor

12-6-18 — Date

PROJECT LOCATION (Include a Site Location Map)

County	Est. Easement Size (acres)	Watershed Name/No. or HUC 8		Bank Service Area
Hennepin	**204 ac.**	**33 - Minnesota River - Shakopee**		**BSA 9**
Latitude:	Longitude:	Section No.	Township No.	Range No.
°N 44.807187	**°W -93.512448**	**See Figure 1**	**See Figure 1**	**See Figure 1**

☐ Check this box if you are only requesting review under WCA.

☐ Check this box if this is a Minnesota *Agricultural* Wetland Bank proposal.

LIST OF FIGURES

List and label all figures and appendices in the order in which they are referenced in this submission form.

The following figures are necessary for a Prospectus review (reference them in appropriate sections of the narrative):

- ✓ **Site Location Map**
- ✓ **Land Use Map** of Project Site and Surrounding Properties
- ✓ **Existing Conditions Topographic Map** (Topography should at minimum include 1-foot contour intervals for the project area. The use of LiDAR data is acceptable at this stage but additional survey data may be needed to identify elevations and descriptions of important project features such as culverts, bridges, ditches, subsurface tile lines, tile intakes and outlets, buildings, utilities, etc. Include a north arrow and scale as well as information about bench marks used or established along with their MSL datum. The prepared map should also include other pertinent features such as roads, property lines, proposed easement/project boundary and topography of adjacent lands if they contribute to or could be affected by the project)
- ✓ **Web Soil Survey Map** (or other soil information if Web Soil Survey not available for the area)
- ✓ **Watershed Map(s)** (show site location within minor watershed, major watershed, county, and Bank Service Area)
- ✓ **Existing Wetlands Map** (approved delineation or estimate based on best available data)
- ✓ **Existing Conditions Vegetation Map** (current dominant vegetative cover of site and surrounding area)
- ✓ **Proposed Easement Boundary Map** (preferably overlaid on topographic map and/or aerial photo)
- ✓ **Credit Allocation Area Map** (see Section # 6.4)
- ✓ **Proposed Vegetation Conditions Map** (based on vegetation plan)
- ✓ **Concept Plan** showing anticipated construction features (see Section # 9)

The following figures are recommended, when applicable:

- ✓ **Historical Aerial Photo(s)** (representative of pre-altered conditions)
- ✓ **Site Photographs**
- ✓ Photographs of **Reference Wetland(s)** (reflective of post plan conditions)

The following information is generally required for local, state, and federal agencies to review and comment on the Prospectus. Do not leave any of the following sections or subsections blank. If a section does not apply to your project, enter "not applicable" and provide an explanation why.

1. Regulatory Review Status and Project History

Identify and discuss the extent of review and comments received to date on this pending wetland mitigation project. Reference previous reviews and document how comments from local, state, and federal reviewers are addressed by this document.

In April 2016, a Scoping Application (Draft Prospectus) was submitted for the project which included a design that would have used a perimeter containment berm around the north side of the restored wetland. Through discussions and meetings with the TEP, the design was changed to exclude the berm, disable shallow surface drains by re-blending them with the natural site contours so that surface water isn't concentrated and encouraged to run off the site. One of the primary themes of the feedback received from the TEP was the idea of creating a "mosaic" of wetland and upland within the proposed floodplain forest. This type of undulating contouring is present in many parts of the floodplain forest that surrounds the bank site and also on the site itself. This idea has been incorporated into concept grading plans attached to this document in Appendix A.

A site visit was conducted on May 11, 2016 which included representatives from the U.S. Army Corps of Engineers, Minnesota Board of Water and Soil Resources, U.S. Fish and Wildlife Service, Carver County, Minnesota Department of Natural Resources, City of Chanhassen, City of Eden Prairie, Scott SWCD, Shakopee Mdewakanton Sioux Community, and Lower Minnesota Watershed District. The site was evaluated and the general feeling was that the site had potential but the containment berm was not seen as sustainable long-term.

A follow up office meeting took place on September 8, 2016 with the BWSR, Corps, City of Eden Prairie, and FWS. General site design was discussed. On Feb. 21, 2017, the BWSR issued a letter to Wenck which laid out a general plan for design based on previous discussions. The main points of the letter were 1) eliminate containment berm, 2) develop a plan to retain hydrology by blocking existing drainage ditches, 3) include an upland/wetland mosaic between approximately elevation 704' and 706' and 4) establish a buffer.

The plans attached hereto reflect the evolution of the discussions that have occurred to-date.

2. Project Participants and Qualifications

2.1 Project Sponsor, Ownership, and Long-Term Management

Identify the project sponsor who will complete the project, the proposed land ownership, the credit owner(s), the long-term management strategy, and any agreements among these parties. (For example, the bank sponsor and credit owner will be J. Doe who is in discussions with TNC to transfer ownership and long-term management responsibilities once all credits have been sold.)

Several members of the Peterson family own the property and an ownership entity is being established to own the credits and be responsible for long-term management of the site once the credits are sold.

2.2 Sponsor Qualifications

Describe how you and/or your agent(s) are qualified to successfully complete the mitigation project proposed and include information describing relevant past activities or previous mitigation projects.

The Sponsor owns the land and will fund the proposed mitigation project. The agent (Wenck Associates) has experienced scientists, engineers, hydrologists and surveyors who have completed mitigation projects of similar scope in similar landscapes.

3. Proposed Easement Description

Discuss the proposed easement boundary in terms of its location (e.g. coincides with property line, follows road or ditch right-of-way boundary, etc.), access to the easement from a public road right-of-way, and reasons for including or excluding certain areas (e.g. excludes field road to allow access to adjacent property, etc.). The proposed easement boundary should be accurately shown and identified on all Prospectus figures and maps.

The site location is depicted in Figure 1 and land use and cover maps are attached as Figures 2 and 3. The proposed easement boundary would match much of the existing legal boundaries on the north side of the property. The easement that would encumber the bank would include three separate areas as shown on several of the attached graphics. The southern boundaries of the two larger parcels and the northern boundary of the smallest parcel would be established approximately as shown in the graphics. The easement would be accessible from both the west and east sides via Indian Road, a two-track field road that runs along the southern boundary of the site, immediately north of the Minnesota River (see Figure 4).

Note that the site is located in Hennepin, Carver and Scott Counties and within the corporate boundaries of Eden Prairie, Chanhassen and Shakopee. The largest proposed easement area is in Hennepin County (City of Eden Prairie).

4. Historical Conditions

Provide an assessment of historical site conditions from pre-settlement to current condition. Utilize historical aerial photos, soil mapping, onsite investigations, and other available information to describe historical conditions on and near the site including historical wetland types and extent. Attach and reference supporting documents as necessary.

Exhaustive research of the site's pre-settlement has not been done. However, it is safe to assume that most or all of the site was floodplain forest before being converted to agricultural use. Historical aerial photographs going back to 1937 are included in Appendix B which show the site being used for row-cropping. In some years, river flooding has prevented cropping in some areas and delayed it in others, such as 1997 and 2006. Please see historic aerial photographs from 1937, 1945, 1951, 1953, 1960, 1963, 1964, 1971, 1991, 1997, 2000, 2003, 2006 (2), 2008, 2009, 2010, 2013 (2), 2015, 2016 and 2017 in Appendix B.

A Phase 1 Cultural Resources investigation was conducted in the eastern portion of the site in fall of 2002 which revealed no cultural materials. A second Phase 1 Cultural Resources investigation was undertaken in the summer of 2017 which found several items which were not considered significant. See Appendix C.

5. Existing Conditions

Address all of the following subparts. Attach and reference supporting documents as necessary:

5.1 General Description

Provide a description of existing features on and near your proposed mitigation site including current land uses, landscape features, roads, structures, wells, utility lines, etc. Also discuss and identify the presence of known conservation easements, contracts, or public lands adjacent to your proposed mitigation area.

Most of the proposed site is currently row-cropped as it has been for several decades. Indian Road is a two-track field road that runs along the southern boundary of the site, immediately north of the Minnesota River. Public land is present to the west and east of the site (USFWS). The Rice Lake wetland complex is immediately north of the site and the Minnesota River is to the south. Existing conditions and site topography (1/2-ft. contours as surveyed by Wenck) are shown in Figure 4 and existing vegetative conditions are depicted in Figure 5. Existing Property Ownership is depicted in Figure 6.

There are no known easements, wells or utility lines on the property.

5.2 Vegetation

Describe all existing plant communities on and adjacent to your mitigation site. Include information on community composition, dominant species, and location and abundance of invasive or exotic species.

The site is in a crop rotation so natural plant communities within the area of the proposed easement are limited to some existing emergent wetland mainly on the northern edges of the site. During on-site activities by Wenck in 2017, species such as bulrushes, sedges, and hydrophytic agricultural weeds such as nut sedge and smartweeds were observed in unplanted areas. Due to unusual flooding in 2018, Wenck did not conduct any site visits so no further observations were made.

Adjacent vegetation in the forested areas outside the property boundaries includes clearweed, wood nettle, and reed canary grass in the herbaceous layer with sandbar willow, cottonwood, black willow, box elder, silver maple, American elm, green ash and riverbank grape dominating the shrub, tree and vine strata.

5.3 Hydrology

Describe and show the location, flow direction, and condition of any drainage systems or hydrology alterations on your mitigation site (e.g. ditches and tile, level grading, wetland fill, slope reshaping, etc.) and demonstrate that sufficient water supply is available to sustain the proposed wetland(s) in the short- and long-term. Also identify public drainage systems, drainage agreements, or other legal documents/agreements (e.g. rights to remove water, soil, minerals, or biomass and/or any flowage easements) that may affect the use or modification of drainage systems or site hydrology. If monitoring well data has been collected, include and summarize this information as well.

Site Survey

Wenck surveyed the site in 2017 and produced a ½-foot contour map of the property as well as boundaries. Surveyed boundaries are provided in Appendix D and contour lines are shown on several of the attached graphics. The site is sloped to the north. The highest elevations occur along the Minnesota River bank on the south side of the site and several shallow drainage ditches within the crop fields carry overland flow north toward Rice Lake.

Watersheds

The site is located in the Minnesota River Valley in the Lower Minnesota River Major Watershed (#33) and in Bank Service Area 9. Contributing subwatersheds to the site are shown in Figure 7 and major watershed and Bank Service Area boundaries are shown in Figure 8.

On-Site Drainage and Hydrologic Restoration

As stated previously, the site currently has several shallow surface drains that direct water north to Rice Lake. These are of various lengths and are shown in Figure 4. Evidence of these ditches goes back to the 1945 aerial photo (see Appendix B). The grading proposed to disable these ditches essentially consists of flattening them out so that they are blended with the surrounding topography and are no longer a drainage channel (see Grading Plan in Appendix A). All of the disabling of current surface drains would take place within the site and would have no effect on the drainage of surrounding properties.

Hydrology would be supplied to the site primarily by high water events from Rice Lake, not by direct overbank flooding from the Minnesota River. The highest elevations on the site are in the southern portion along the river bank. The site is flooded when the Rice Lake wetland complex (immediately north of the site) rises due to flooding from the Minnesota River. The Rice Lake wetland complex receives overflow from the Minnesota River at cuts in the riverbank east of the Peterson property. Under the proposed plan, rising floodwaters would slowly encroach into the wetland bank area from north to south. This water would no longer be directed back toward the existing drainage ditches and allowed to drain back to Rice

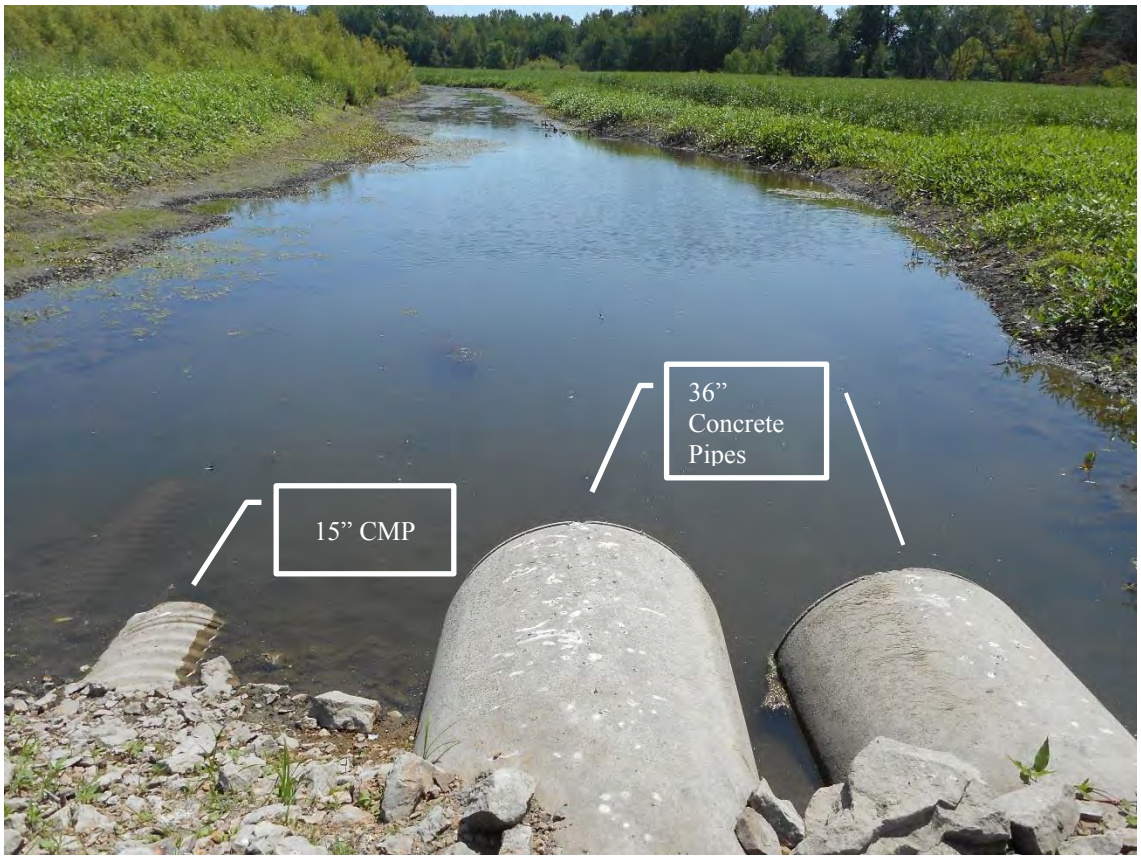
Lake. Instead, it would be retained in excavation areas designed to be depressional and also retained longer in areas at the 704' elevation and lower since the surface drains would be eliminated.

<u>Control Structures Currently In Place</u>

There are two 36" concrete pipes with stoplog weirs at the east end of Rice Lake which are the main control structures for that wetland complex (see photo below and Figure 11). The south pipe (left in the photo) has an invert elevation of 694.599' and the north pipe (right in the photo) has an invert elevation of 695.006'. Under an agreement with the U.S. Fish and Wildlife Service, the Petersons raise and lower the outlet elevation to manage the area for waterfowl and for farming. We suggest that the option to manipulate this outlet remain in place at least through the monitoring period of the wetland bank. This control could be extremely useful when the site is planted to have a better chance for optimal conditions for germination of tree seed and to have more control over potentially catastrophic flooding which could wipe out or set back seed or seedlings as they begin to emerge and are still vulnerable to flooding.

36-inch Concrete Outlet Pipes with Stoplog Weirs at East End of Rice Lake Looking Northwest (photo taken 7/17/17)

There is also a smaller 15" CMP pipe with a flap gate on the upstream end at the Rice Lake outlet. This pipe doesn't seem to be influential in control of water levels as the downstream end is mostly submerged (see photo below).



Downstream End of Outlet Drainage Pipes at Rice Lake Looking Southeast (photo taken 7/17/17)

If all the stoplogs are in place and the 15” CMP flap is shut, the outlet of Rice Lake is controlled by the field road over the structures. The top of this road has been surveyed at 698.411’. Below is a photo of the field road that crosses over the pipes.

Field Road Over Outlet Pipes at Rice Lake Outlet Looking South (photo taken 7/17/17)

The outlet channel from Rice Lake drains to "Little Rice Lake" which is east of the proposed wetland bank site. The outlet to Little Rice Lake consists of a 42-inch concrete pipe with stoplogs (invert elevation 694.30') and a 36-inch corrugated metal pipe with stoplogs (invert elevation 694.32) (see Figure 11). Each of these pipes has a flap gate on the downstream side. The pipes drain into an unnamed tributary of the Minnesota River which follows along the east side of a field road owned by the Petersons. Like the outlet to Rice Lake, the Petersons control the outlet to Little Rice Lake and we suggest that the ability to manipulate the outlet remain in place at least through the monitoring period for the same reasons cited above.

Monitoring Wells

Continuous monitoring of water levels was conducted in five wells during the 2017 and 2018 growing seasons. Monitoring during these two growing seasons took place from April – October in 2017 and May – October in 2018. The results from the 2017 monitoring are considered more reliable since the site experienced unusually high flooding during much of 2018. These data will be used to aid in determining a wetland boundary as well as potential on-site hydrology after restoration. Additional information regarding the results of these studies will be included in the forthcoming wetland delineation report.

5.4 Soils

Describe existing soil conditions on and adjacent to the site. Include soil maps that identify mapped soils, hydric versus non-hydric status, and results of any onsite soil investigations completed.

Three county soil surveys converge on the western part of the site, resulting in contradictory soil survey information. Dominant mapped soil types within the areas of wetland restoration include Minneiska loam, Rushriver very fine sandy loam and Brouillett loam (see Figure 9). Wenck soil scientists conducted their own soils investigation which consisted of approximately 80 soil pits dug along multiple transects on the site. The locations of these borings are depicted in Figure 12. For each boring, the profile has been analyzed and a determination as to whether or not the profile meets a hydric soil indicator per *Field Indicators of Hydric Soils in the United States* (Ver. 8.1, 2017) is provided in the figure. Individual descriptions of each profile are included in Appendix E. Almost all the soils at or below the 704' assumed wetland boundary elevation were determined to be hydric. Some of the soil sample points below 704' (i.e., T19-3, T20-1, WS-18 and WS-20) did not reveal a specific hydric indicator; however, these are in fine textured soils (clays) which have a relatively thick (greater than 12") and dark 3/1 surface horizon. This thick surface horizon is relatively "young" (i.e., Entisols) derived from relatively recent flood events and subsequent soil deposition. The 3/1 surface horizon void of redox essentially throws them out of standard hydric indicators, even though some of them show redox and or depleted matrices deeper in the profile. Because these soils are recently developed, at lower elevations than other documented hydric profiles and tillage activities could be obscuring hydric properties, we presume these soils are functioning as hydric. Also note that surface water was observed at WS-20, possibly masking redox. The USACE regional supplement spells out some of these "problems" for hydric indicators in soil with thick dark surfaces.

Wenck's soils investigation focused primarily in areas that were anticipated to be within the restored wetland areas to determine soil suitability for wetland restoration. Soil suitability for wetland restoration was one of the main reasons for our investigation, the other being to assist in the wetland delineation process. The soils data are still being analyzed but initial findings indicate that the portions of the site proposed to be wetland contain suitable soils to support wetland conditions. Hydric soils are generally not found above the 704' contour as shown in Figure 12 which depicts the location of the hand-augered soil pits dug by Wenck soil scientists in 2017.

5.5 Existing Wetlands

Include a discussion of existing wetlands on the site including reference to, and approval status of, any wetland delineations or determinations conducted. If offsite hydrology review was used to estimate wetland boundaries include this information as well. Include and reference figures to supplement the narrative.

Wenck has undertaken several studies of the site over the past couple of years to determine a wetland boundary. These have included on-site soil mapping, shallow monitoring well hydrology study, hydrology modeling, off-site wetland delineation and on-site observations. The site is very complicated in that it is greatly influenced by unpredictable flooding, has a very gradual gradient upslope from the Rice Lake wetlands into the adjacent crop fields, and has been manipulated by historic drainage ditch construction and farming. Using routine delineation techniques on a site like this one would almost certainly lead to an incorrect delineation boundary since it would be based on whatever the field conditions were at the time the work was done. The volatility of hydrology on this site creates inconsistent conclusions if delineation is based on field conditions at any given time.

Wenck is currently compiling data from the studies cited above and will provide the TEP with our conclusions regarding the wetland boundaries once completed. For purposes of this Prospectus, a wetland boundary of 704' has been used in sections below pertaining to crediting, etc. even though a wetland boundary of 703' or 703.5' may be more accurate based on preliminary results of our various studies. Once the boundary is concurred with, adjustments to the plan will be made based on the final boundaries.

Unfarmed areas with natural wetland vegetation are labeled as "Existing Wetland" in Figure 10. These areas consist of existing emergent and forested wetlands along the north edge of the property (Area 1 per Figure 10) and existing partially drained wetland within crop fields (Area 4 per Figure 10).

6. Objectives, Need, and Feasibility

Address each of the following subparts. Attach and reference supporting documents as necessary:

6.1 Objectives

Describe your project objective(s) and how they will be achieved. Discuss these objectives in terms of plant communities, wetland types, hydrology, and wetland functions.

The objective of the project is to perform activities that will begin to return the site to a floodplain forest wetland system that would blend with the adjacent natural areas. The main goal of the restoration plan is to return the site back to a floodplain forest while eliminating drainage features and also creating undulating topography over portions of the site to retain hydrology and provide a range of hydrologic regimes. Upland buffer would also be established. The basis for hydrologic restoration would be the disabling of the existing drainage ditches by re-grading them so that they no longer act as a conduit for runoff to the north. Additional grading would be done within the 704'-706' elevations to create topographic relief and lower the ground elevation in much of these areas so that water could be retained for longer periods on the site and a naturalized mosaic of wet to mesic floodplain forest could be established. This mosaic zone would consist of wetlands (704' and below) and upland buffer areas (above assumed 704' wetland boundary). Areas above the 706' elevation and up to the proposed conservation easement boundary would be considered upland buffer and would be revegetated in a similar way as the wetland areas (i.e., floodplain forest) which is explained in more detail in Section 8 below.

The proposed plan is very feasible because it is fairly simple and should be sustainable long-term. A fair amount of grading area is proposed within the mosaic zone (704'-706') but the depth of grading is relatively shallow (1-2 feet).

6.2 Need

Describe the need for your project relative to regulatory programs, expected wetland impacts, other mitigation options, and overall watershed conditions.

There remains a need for wetland credits within the watershed and within BSA 9. There are currently only a handful of credits in BSA 9 and the Minnesota River watershed. Fewer yet are available in metro counties within this BSA and watershed. The proposed site is in an area where development has been brisk in recent years and is expected to continue to be, creating a demand for credits. Primary users would likely include road authorities and private developers. A bank of this size could provide a substantial supply of credits for years to come.

Beyond credit availability, implementation of this project would restore this landscape to a natural habitat that fits with its surroundings. There are very few agricultural crop fields left in the Minnesota River valley in this area and the restoration of this site would be a great benefit for flood storage/attenuation, water quality improvement and wildlife habitat.

6.3 Technical Feasibility

Describe why your project is technically feasible and capable of providing the desired mitigation. Include a description of the expertise and experience possessed by you or your contractors in completing similar projects and a description of proven construction and restoration methods used in comparable landscape positions. Describe any constraints that may prevent full restoration of historical conditions (e.g. access to other lands, encroachment on other lands, drainage maintenance from other properties, etc.). If the project is a wetland creation, discuss historical watershed conditions, current hydrology sources, and how the project will replace or enhance important wetland functions.

Although the site is very large, especially for an urban metro-based wetland bank, the technical aspects of its restoration are really quite simple. As described above, the primary action to restore hydrology is the disabling of the existing drainage ditches through re-grading that would blend them into the landscape and essentially return the topography of those areas to pre-ditch conditions as shown in the Grading Plans (Appendix A). After completion of grading, the ditches will no longer be discernible and will not be capable of moving water off the site. Along with the ditch disabling, a wet to mesic hydrologic regime will be created through shallow excavations to restore a naturalized floodplain forest complex.

The target vegetation community of the site is floodplain forest. This wetland type is not commonly proposed in restoration or wetland bank plans, thus there is not a lot of research and experience in the wetland community to draw from. However, Wenck staff have been involved in the planning and plan implementation of successful floodplain forest wetland restorations on the Minnesota River not far from this site. Wenck also has experienced engineers and hydrologists on staff that have worked on many wetland bank projects.

The project is a wetland restoration in two different ways. As mentioned earlier, the wetland boundary has yet to be determined but it is apparent that some portion of the northern part of the site that is commonly farmed is wetland. These areas would be fully restored through the hydrologic restoration techniques described earlier (disabling of ditches). The other way in which wetland would be restored involves the portions of the site that are being farmed between the 704' and 706' contours that would be deepened to create a mosaic of wetland and upland. The wetland areas in this zone are considered a restoration of what was likely to have been present on the site before agricultural practices eliminated them. The best evidence for such areas is on the site in the southeastern part of the wetland bank that is close to the river (see below).

Example of Low Area on the Site Being Mimicked Through the Restoration Plan

This area is currently farmed and is proposed as part of the mosaic zone. On several of the historic aerial photographs in Appendix B, low areas that may have been the old river channel can be seen in a parallel orientation with the river (see 1951, 2006, 2010, 2017) in this area. Similar depressional areas exist in wooded areas of the floodplain in this vicinity; however, they are difficult to detect in aerial photography due to tree cover.

The hydrology source for the entire site is floodwaters from the Rice Lake wetland complex as it responds and rises when the Minnesota River floods. Groundwater may also be a hydrologic influence as well as sheet flow from within the site.

6.4 Credit Eligibility and Allocation

For each map ID on the Credit Area Map, identify state and federal credit actions used and describe why your project is eligible for each credit action identified. Wetland credits are generally allocated based on a demonstrated functional "lift" over existing conditions. Offsite hydrology/wetland determinations, approved wetland delineations, drainage setback tables, and pre-project hydrology monitoring may be required to demonstrate the extent of functional lift. If credit eligibility under WCA or allocation is dependent on cropping frequency, include a detailed assessment of cropping history that identifies each unique area independently. Identify credit areas on a Credit Allocation Map and complete the following Wetland Credit Allocation Table.

The February 21, 2017 letter from BWSR provided a starting point to consider how to allocate credits on the site. In the narrative and table below, we have broken down the potential credit areas in a way that is similar to that suggested by BWSR. These areas are identified on the attached Proposed Vegetation Conditions/Credit Allocation Area Map (Figure 10). The credit zones would include:

Area 1 – Protected Existing Wetland. This area includes existing emergent and forested wetlands along the north fringe of the site. These areas are not necessarily affected by the shallow drainage features since they are at low elevations. However, their importance and value should be considered for credit under Minn. Rules 8420.0526 Subp. 8 (A)(5). These areas have been farmed in the past, and if not protected under an easement, could be altered and impacted through cutting of woody vegetation, motor vehicle

operation, etc. since these areas are used for hunting and other recreating. In Figure 10, these areas total 25.35 acres. For purposes of this Prospectus, we have assumed 25% credit which equates to 6.34 acres.

Area 2 – Existing Forested Buffer. There are three areas of existing forested stands that are proposed to be incorporated into the wetland bank per Minn. Rules 8420.0526 Subp. 2 (A). These areas are shown in Figure 10 and total 4.94 acres. For purposes of this Prospectus, we have assumed 25% credit for these areas which equates to 1.23 acres.

Area 3 – Proposed Floodplain Forest Buffer. These areas are shown in Figure 10 between the 704' and 706' contours and would be part of the "mosaic" complex described earlier. The total acreage of this zone is 56.64 acres. These areas, although not technically wetland under an assumed 704' wetland boundary, would be designed as mesic floodplain forest. For purposes of this Prospectus, we have assumed 25% credit for these areas which equates to 14.16 acres (Minn. Rules 8420.0526 Subp. 2 (A)).

Area 4 – Restored Partially Drained Wetland. There are two wetlands in the northeastern part of the site that have historic drainage ditches to direct water to the north. These are shown in blue in Figure 10 and their outlets are shown in Figure 11. The total acreage of these wetlands was calculated to be 4.15 based on an assumed wetland boundary that will need to be refined based on data collected in 2017. The grading plans to restore hydrology to these two basins has not yet been completed and is not currently reflected in Appendix A. However, the ditches that drain these areas would be disabled so that they are no longer being drained. The eastern wetland (labeled as Wetland A in Figure 11) has a concrete pipe outlet structure under the field road to its east. There is no stoplog structure for this outlet but it is blocked with a board when the Petersons elect to retain water in it for waterfowl hunting. If allowed to drain out, the invert elevation of the concrete pipe at approximately 698' would allow a near total draining of the basin. The western wetland (labeled as Wetland B) in Figure 11) is currently acting as a drainage ditch for this area and has no culvert or structure. The wetland/ditch drains overland to Rice Lake at approximately the 700.5' elevation. Assuming 50% credit for these wetlands per Minn. Rules 8420.0526 Subp. 4 (B), would yield 2.07 acres of credit.

Area 5 – Proposed Floodplain Forest Wetland in Existing Cropland. This zone includes partially drained wetland that is farmed and also completely drained wetland that is farmed below the 704' elevation. In our review of historic aerial photographs and based on information from the landowner, the farmed areas in this zone have been cropped in at least 10 of the last 20 years (see Minn. Rules 8420.0526 Subp. 4 (A)). For purposes of this Prospectus, we have assumed that this area has been cropped 70% of the last 20 years (per WCA) and is therefore eligible for 70% credit per WCA. A more detailed analysis of the cropping history will be provided before the Full Application Form is submitted and the results discussed with the TEP to determine appropriate crediting. The total area of this zone is 87.45 acres and would generate 61.21 acres based on the assumptions made. It is depicted in green in Figure 10.

Area 6 – Proposed Floodplain Forest Wetland. These areas include the areas proposed to be excavated between elevations 704' and 706' in the mosaic zone and are depicted in dark green in Figure 10. The areas shown for credit in Figure 10 (24.91 acres) are proposed for 100% credit per Minn. Rules 8420.0526 Subp. 3. Proposed crediting of these areas is predicated on the evidence that there were lower areas such as these before farming practices leveled the areas currently used for cropland. Similar areas can be found in the floodplain of the Minnesota River including the on-site currently cropped area discussed in Section 6.3 above.

Area 7 – Swale Connections. To provide hydrologic connectivity to the Area 6 restoration sites, shallow swales are proposed. We have assumed these would be approximately eight feet wide with very gradual sideslopes. As such, they would essentially become narrower wetland connections between the wider excavated areas. These could easily be modified by widening to match the widths of the Area 6 wetlands. Either these narrower swales or wider wetland connections are proposed to ensure hydrologic connectivity so that surface water runoff or floodwater that is captured in one of the Area 6 basins can be distributed equally among all of the basins. These will provide a continuous pathway for aquatic organisms and also help stabilize the hydrology in all of the Area 6 basins. The areas shown for credit in Figure 10 (0.345 acres) are proposed for 100% credit per Minn. Rules 8420.0526 Subp. 3.

The Grading Plan (Appendix A) and the Proposed Vegetation Conditions/Credit Allocation Area Map (Figure 10) represent a starting point for the design. These draft designs could be modified to increase the amount of wetland credits that could be generated at this site and still maintain the design's intent. Narrow wedges of Proposed Floodplain Forest Buffer (Area 3) between Areas 5 and 6 as shown in Figure 10 could be deepened and made part of the Area 6 wetlands, thus increasing the potential wetland credits. In Figure 10, any of the beige Area 3 is above the 704' elevation and below 706'; additional parts of these areas could be excavated for additional credits. This should be further discussed with the TEP.

Wetland Credit Allocation Table [1]

Map ID	Credit Action[2]	Acres[3] (x.x acres)	% Credit	Credit Amount[3] (x.xxxx)
Area 1: Protected Existing Wetland	Subp. 8 - Restoration/Enhancement	25.35	25	6.34
Area 2: Existing Forested Buffer	Subp. 2 - Buffer	4.94	25	1.24
Area 3: Proposed Floodplain Forest Buffer	Subp. 2 - Buffer	56.64	25	14.16
Area 4: Restored Partially Drained Wetland	Subp. 4b - Rehabilitation	4.15	50	2.08
Area 5: Proposed Floodplain Forest Wetland in Existing Cropland	Subp. 4a - Rehabilitation	87.45	70	61.22
Area 6: Proposed Floodplain Forest Wetland	Subp. 3 - Reestablishment	24.91	100	24.91
Area 7: Swale Connections	Subp. 3 - Reestablishment	0.35	100	0.35
Click.	Choose an item.			0.0000
	TOTAL EASEMENT SIZE:	203.79	**TOTAL:**	110.3

[1]**Wetland Credit Allocation Map** must accompany this form and:

- Provide a clear depiction of the easement boundary
- Show separate Map IDs for each credit action within the easement boundary.

[2]As identified by MN Rules Chapter 8420.0526 and St. Paul District Policy for Wetland Compensatory Mitigation in Minnesota.

- **Subp. 2:** *Buffer* — **Buffer**
- **Subp. 3:** *Restoration of Completely Drained or Filled* — **Restoration via Reestablishment**
- **Subp. 4:** *Restoration of Partially Drained or Filled* — **Restoration via Rehabilitation**
- **Subp. 5:** *Vegetative Restoration of Farmed Wetlands* — **Enhancement**
- **Subp. 6:** *Protection of Wetlands Previously Restored via Conservation Easements* — **Extended Restoration**
- **Subp. 7:** *Wetland Creations* — **Establishment**
- **Subp. 8:** *Restoration and Protection of Exceptional Natural Resource Value* — **Restoration or Enhancement**
- **Subp. 9:** *Preservation of Wetlands* — **Preservation**
- **No Credit:** *Portions of easement area not receiving credit* — **No Credit**

[3]Acres of land that correspond to an identified credit action are rounded to one decimal place. The sum total of acres must equal total easement size. Credit Amounts, as a product of acres and percent credit, are rounded to four decimal places.

7. Ecological Suitability and Sustainability

7.1 Ecological Suitability

Describe suitability of the site to achieve the objectives of the proposed mitigation bank, including physical, chemical, and biological characteristics of the bank site and how that site will support the planned types of aquatic resources and functions. Proposals involving preservation of aquatic resources must also include the information required under 33 CFR 332.3(h).

The proposed plan would begin to return the site back to its pre-agricultural conditions. Although the process for the site to become a mature floodplain forest system will take several decades, the proposed plan would take the area within the proposed easement out of a long history of row cropping and return it to a naturalized condition. The overall goal for the site is to blend the proposed restored floodplain forest in with the adjoining floodplain forest systems that surround the site. A connected floodplain forest would provide a continuous/connected corridor for wildlife as well as food and cover.

As far as long-term sustainability, the design is fairly simple and does not involve a lot of engineering controls. Most of the hydrologic restoration would involve the disabling of drainage ditches by re-grading these such that they are no longer ditches but returned to a pre-ditch topographic condition. The end result of this grading will be that the surfaces where the ditches had been will follow a natural grade that will not concentrate water and direct it off the site (see Section 5.3, 6.1 and Grading Plan in Appendix A). As mentioned earlier, the outlet ditches that drain the two Existing Wetlands in the northeastern part of the site would need to be disabled. This could be done relatively simply with ditch plugs; however, the final design has not yet been determined and is not reflected with this Prospectus.

7.2 Sustainability

Discuss the relative permanence of your mitigation actions in the context of reasonably foreseeable land use and landscape changes and your project's ability to sustain improved physical, chemical, and biological wetland functions into the future.

The setting for this site is in the Minnesota River floodplain with natural areas that are mostly publicly owned and highly unlikely to be changed as far as land use into the foreseeable future (see Figure 2). The plan proposes to return the site to land uses/cover types consistent with those around it and would also do this in a way that is not over-engineered nor out of keeping with the pre-ag history of the site. With a good plan, plan implementation and monitoring/maintenance, there is every reason to believe the site will return to a sustainable floodplain forest.

Perhaps the biggest threat to the site's sustainability (at least in the first several years after planting) is the potential for catastrophic flooding. If the site was simply graded and abandoned, we believe that it would eventually return to a floodplain forest community. The proposed vegetation plan (see next section) is proposed to "jump start" the revegetation of the site and direct it towards the desired cover type. Flooding at the level and duration of 2018 (or 1997-see photo in Appendix B) could devastate the site if it occurred within the first few years after seeding. Although limited, the only control we have on such an event are the outlet controls at Rice and Little Rice Lakes. As discussed in Section 5.3, maintaining the ability to manipulate these controls (both in terms of allowing water out of the system and not allowing it to back up into the system) will be critical to revegetation success.

8. Vegetation Establishment

Identify and briefly discuss anticipated actions or strategies to establish, enhance, or maintain vegetation including (but not limited to) plant communities planned, seeding or planting materials expected, invasive species control, and anticipated maintenance/management activities.

The seeding/planting plan would be similar across the site and would include seeding of typical floodplain forest trees. The areas to be seeded include all areas within the proposed Easement Boundary (Figure 10) that are outside of any "Protected Existing Wetland" (Area 1), "Existing Forested Buffer" (Area 2) or "Restored Partially Drained Wetland" (Area 4). The Sponsor has been in contact with a seeding vendor that specializes in planting floodplain forest systems and has completed a number of such projects in southern Minnesota and Wisconsin. The general plan is to utilize seed materials that would be collected by the vendor. Species that are being considered at this time include silver maple, eastern cottonwood and hackberry. No herbaceous seeding is proposed since the seeding contractor has stated that these species tend to outcompete the tree seed and cause poor germination.

A phased approach to the seeding program would be implemented for several reasons. First, seed collection must be done at different times of the year (i.e., silver maple-spring, hackberry-fall). Second, there will probably not be enough seed available to supply the entire site at once. Third, a catastrophic event such as a major flood could potentially wipe out the entire planting if it is done at one time. Fourth, it will be beneficial to observe the success of initial plantings and make any necessary adjustments if necessary to promote the best chances for success of subsequent plantings.

The timing of when this plan is approved and when seed is available is one of the more critical issues for this site. Once there is a better understanding of when approval might occur, planning for seed collection will be done and at that point a plan for the first phase of planting would be proposed. This plan will depend on the time of year planting is expected to occur and the availability of seed to cover a given area that would constitute the first revegetation phase.

A specific vegetation/seeding plan is not included with this submittal; however, all areas within the proposed Easement Boundary per Figure 10 (except Areas 1, 2 and 4) would be seeded with a mix of floodplain forest tree seeds appropriate for the site such as silver maple, cottonwood and hackberry. The landowner is working with Zumbro Valley Forestry to develop a seeding plan and more information regarding seeding zones and timing will be provided at a later date.

Maintenance that would be expected after seeding would include targeting of invasive and weedy species. These could include both herbaceous (i.e., reed canary grass) and woody (i.e., box elder) species. Reed canary grass and box elder are both present around the proposed site and are believed to pose the most significant threat to the desired native vegetation. As a preventative measure, the Sponsor may begin girdling box elder trees on and near the site over the winter of 2018/2019. This will reduce the number of potential seed-producing box elder trees and thus the potential amount of seed that could blow into the site. This program could be continued beyond this winter to further reduce box elder seed on the site. Reed canary grass does not have significant presence on or near the site but is present in some smaller open areas. Control of this species off the site is out of the hands of the Sponsor's control; however, it could be reduced with a targeted herbicide treatment program on the site. An adaptive management program to control invasive and weed species would be developed as site planning continues.

9. Design, Construction, and Operation

Describe your general design strategies (e.g. plug/fill drainage ditches, plug/remove drainage tile, remove sediment, divert/reroute drainage system waters, construct embankments, outlet structures, etc.) and how your mitigation site will be operated to achieve your project objectives. Discuss soils, topography, and hydrology as it relates to the conceptual construction plan and identify and discuss additional investigations needed before final design/construction plans are developed (e.g. watershed modeling, geotechnical investigations, etc.).

The grading plan in Appendix A represents a starting point for the wetland restoration design. The premise of the plan is a mimicking of undulating floodplain forest communities that are seen in the Minnesota River Valley, for example in areas south of the proposed site on the other side of the river. While these areas can be broadly defined as "floodplain forests", flood frequency and duration determines whether certain areas technically meet the definition of "wetland" and others at higher elevations do not. Many of the functions and values of either area are equal regardless of this distinction since the floodplain forest ecosystem is, in reality,

seamless between wetland floodplain forest and upland floodplain forest. The "upland buffer" credit areas (essentially all areas above the 704' contour in the attached design) are intended to be planted with the same mix of tree species as the wetland areas. These are not the typical native prairie grassland upland buffers proposed in most wetland bank plans. The effort and maintenance that will be required to establish and maintain these areas during the monitoring period is potentially much greater than the normal grassland buffers. For these reasons, the applicant looks forward to discussing the possibility of crediting these areas at something greater than 25% as assumed in the crediting information provided in this Prospectus.

The design reflected in the grading plan attempts to create a natural mosaic pattern in the 704'-706' zone by establishing a mix of wetland and upland without going too far in "maximizing" the area potentially credited as wetland. This design is considered a starting point and additional areas could be graded to increase the amount of potential wetland credit. The 704' elevation itself is considered a starting point for an assumed wetland boundary. As mentioned previously, the various studies being conducted to inform the most accurate wetland boundary seem to be pointing closer to a wetland elevation of 703' or perhaps 703.5'. Once these studies are synthesized and a delineation report is prepared for agency review, we would expect discussion to follow and a final wetland boundary to be agreed to. Should that elevation be determined to be 703' (or 703.5'), the grading plan proposed herein could be easily modified to accommodate whatever the final wetland elevation is. One of the advantages of this site is that it is relatively large which allows for greater freedom to modify the plan and still remain faithful to the intent and functionality of the design.

Implementation of the plan involves grading to create the mosaic floodplain forest area between the 704' and 706' elevations and the restoration of pre-ag grades to disable shallow drainage ditches. Currently, no outlet control structures are proposed with this design. Plans for plugging outlets of the Restored Partially Drained Wetlands per Figure 10 will likely include ditch plugs and will be added to the next generation of the grading plan. There is a culvert known to be present under Indian Road along the eastern boundary of the proposed bank site. This culvert will be located and added to the plan. Once more is known about its character, a plan to disable it will be presented. The grading plan would establish lower areas in the mosaic zone that are generally parallel with the river and designed to fit with existing topography. Features such as these are seen on the south side of the river and are suspected to have been present at one time on the site before agricultural use began. There are no available aerial photographs to demonstrate pre-ag site conditions as the earliest photo (1937-see Appendix B) shows that the site was already in ag use. Regardless of the extent to which such features were on the site historically, the value of such a floodplain forest mosaic should not be diminished. Returning this site to floodplain forest will bring it back to what it almost certainly was prior to farming, will re-connect this area to floodplain forest systems to the east and west and will provide habitat for a wide variety of species that rely on these areas. Additional benefits will result such as flood attenuation and water quality.

Prepare and attach a Concept Plan, preferably overlaid on the site topography map, clearly showing locations of all planned construction features.

10. Supplemental Information

If your project involves protection of wetlands previously restored via conservation programs/easements, restoration and protection of exceptional natural resource value, or preservation credit actions (WCA rule subparts 6, 8, and 9, respectively), provide a narrative discussion of how your project meets requirements of the proposed actions. Discuss and reference applicable guidance documents and support materials. If necessary, include any other information relevant to the mitigation plan that is not discussed in the other sections of this document.

Click here to enter text.

Special Considerations

WCA rules (8420.0515) identify factors that must be considered when submitting a wetland replacement/banking plan. Identify and discuss any of these factors that are potentially applicable to the site.

Click here to enter text.

Signature

By signing this form I acknowledge that:

A. I am authorizing the review of my Prospectus by the appropriate regulatory authorities as part of establishing a compensatory wetland mitigation project.

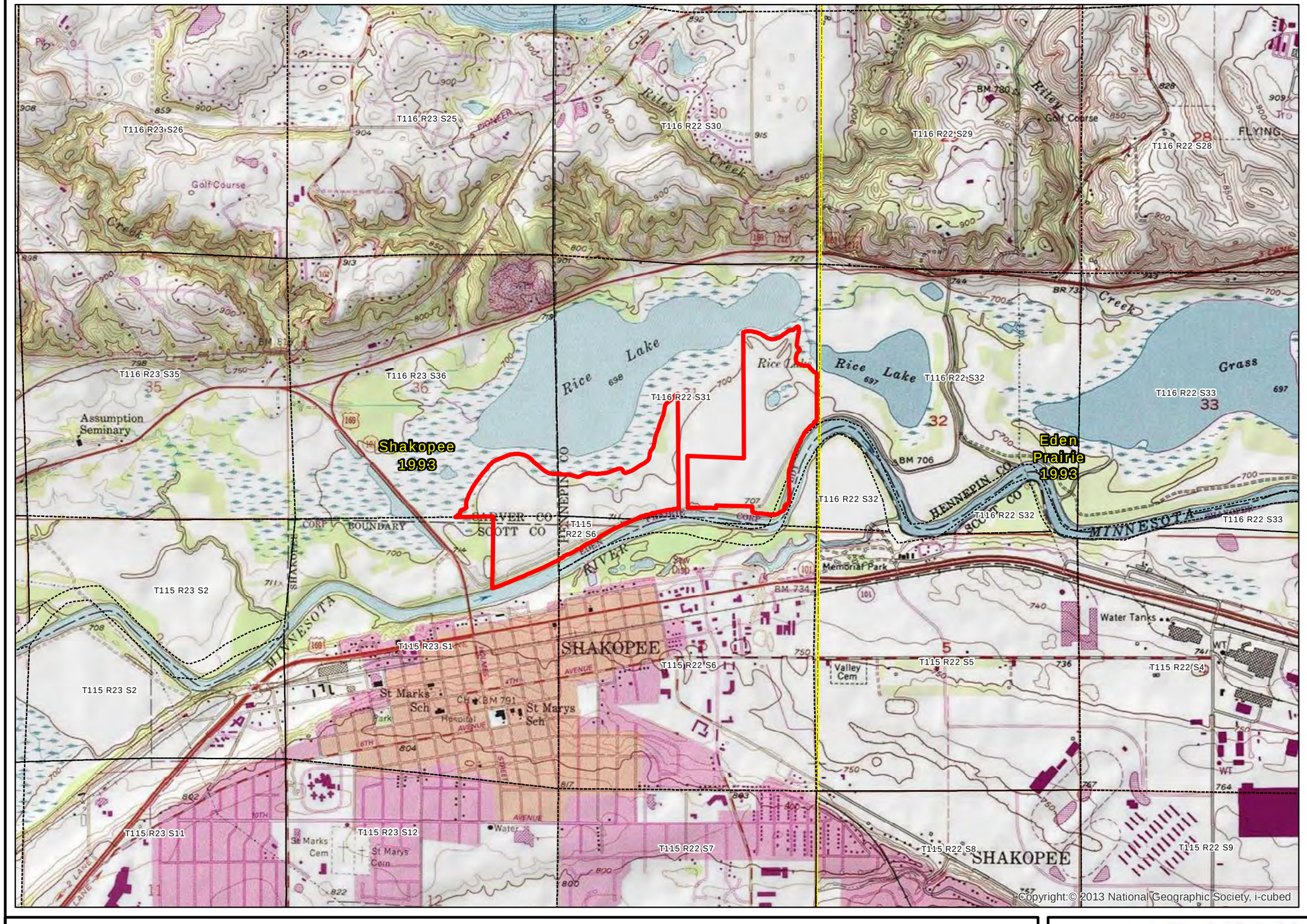
B. I am familiar with the information contained in this submittal and, to the best of my knowledge and belief, all information is true, complete, and accurate.

C. I understand that this document is not a government approval request subject to MN section 15.99 decision time limits. Submittal of this document will result in findings and recommendations that can be used to assemble a Mitigation Plan document if I choose to pursue one.

D. I understand that findings or recommendations received do not constitute a formal decision, nor do they imply future approval of a Mitigation Plan.

E. I understand that Prospectus review may require regulatory agency staff to inspect my project site, that agency staff will contact me in advance to schedule a site visit, and I agree (or am authorized) to allow agency staff reasonable access to the property when prior notification is given.

Sponsor's Signature (Authorized Agent) **Date**



Shakopee 7.5 Minute Quadrangle (USGS: 1993)
Eden Prairie 7.5 Minute Quadrangle (USGS: 1993)

Legend

- Property Boundary
- Section Boundary
- 24K Index (MN)

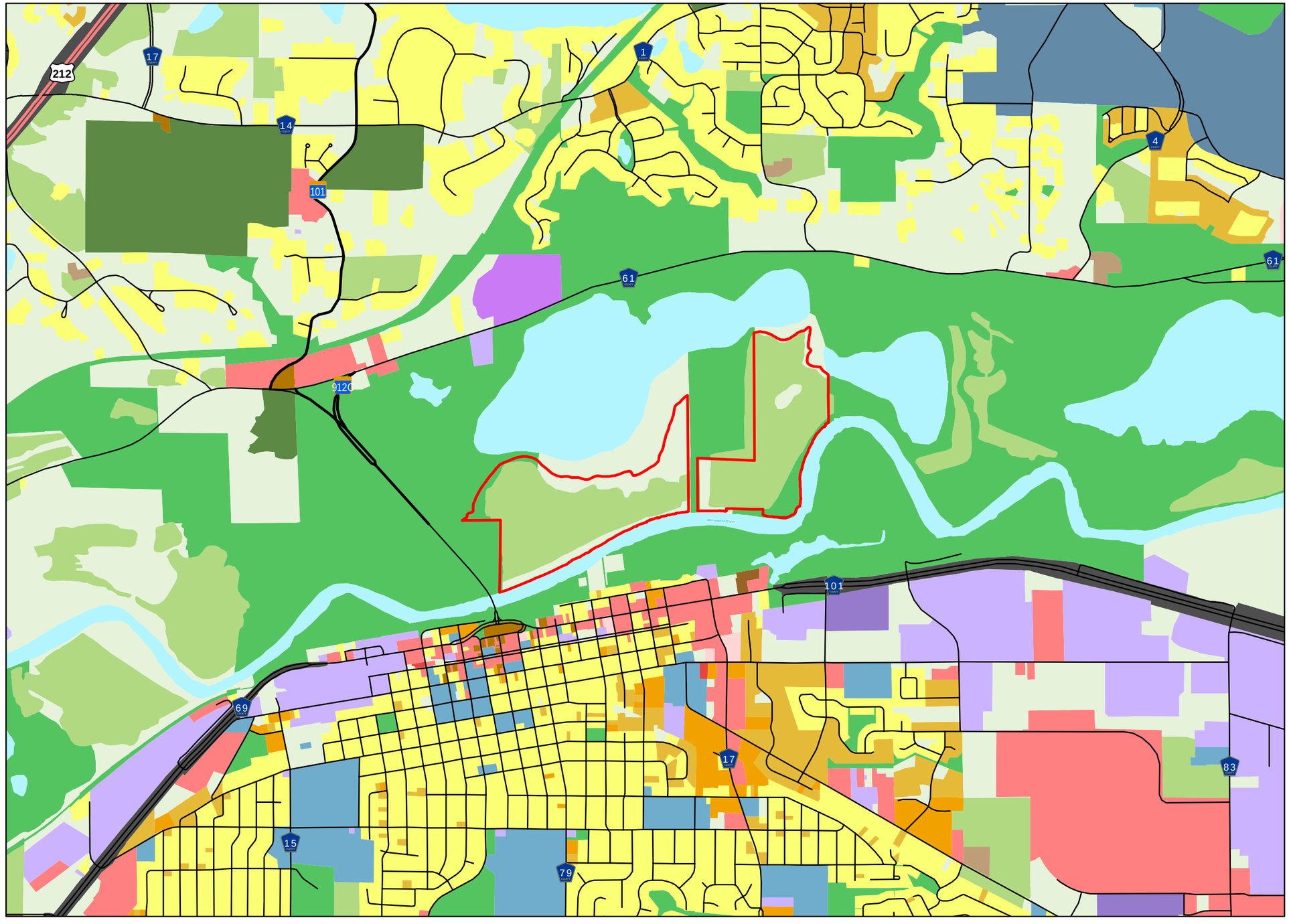
N

2,000 1,000 0 2,000

Feet

Path: V:\GIS\4607\0003\mxd\Wetland_Bank\Figure 1 - USGS Quad.mxd
Date: 12/6/2018 Time: 10:20:59 AM User: WatME0697

SEVER PETERSON	WENCK ASSOCIATES Responsive partner. Exceptional outcomes.	DEC 2018
7.5 Minute USGS Quadrangle Map		Figure 1



Property Boundary

Generalized Land Use 2016

- Farmstead
- Single Family Detached
- Manufactured Housing Park
- Single Family Attached
- Multifamily
- Retail and Other Commercial
- Office
- Mixed Use Residential
- Mixed Use Industrial
- Mixed Use Commercial and Other
- Industrial and Utility
- Extractive
- Institutional
- Park, Recreational or Preserve
- Golf Course
- Major Highway
- Airport
- Agricultural
- Undeveloped
- Water

2,000 1,000 0 2,000 Feet

N

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SEVER PETERSON

Land Cover Map

WENCK
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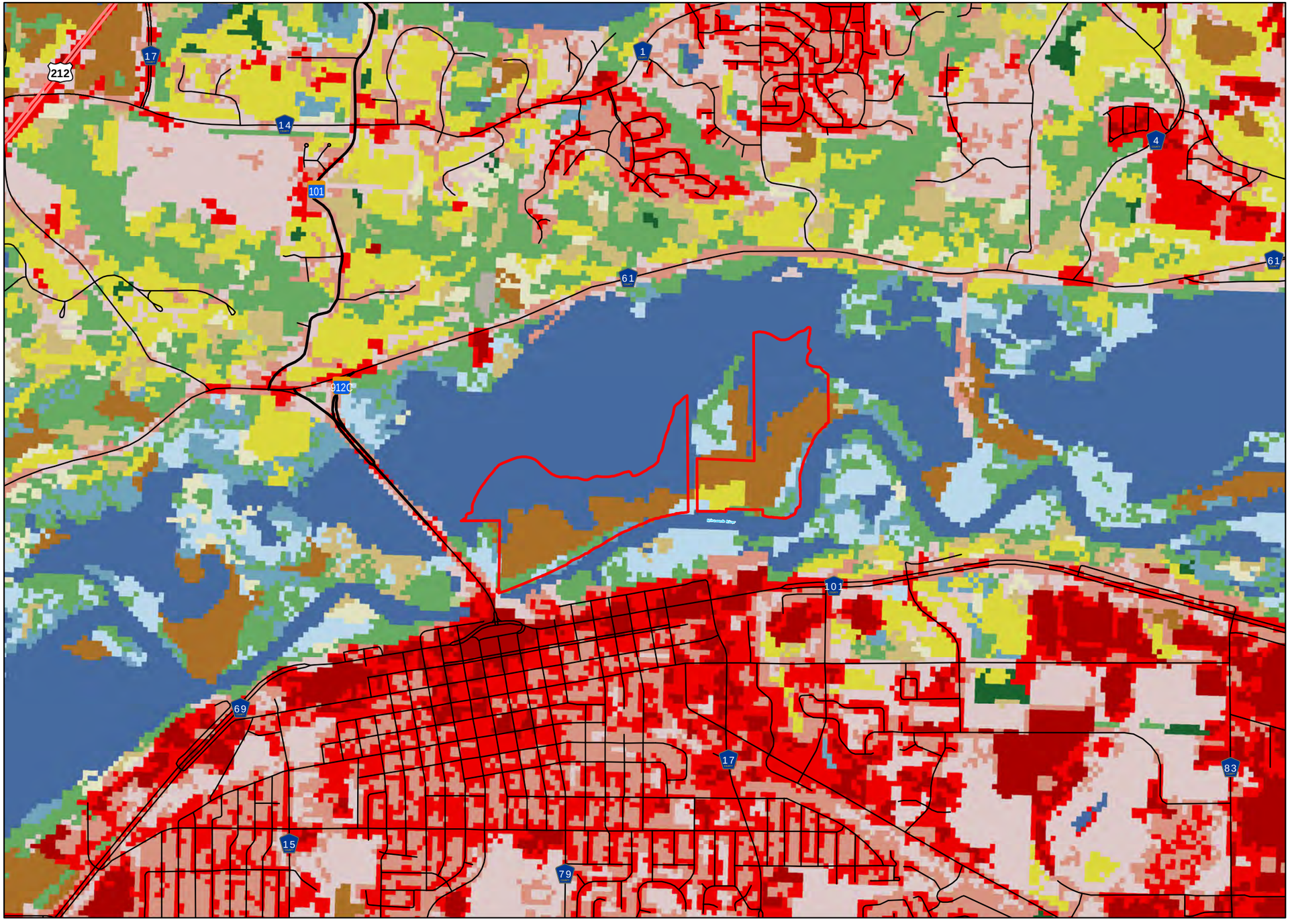
DEC 2018

Figure 2



Property Boundary

2011 National Land Cover

- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Herbaceuous
- Hay/Pasture
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceuous Wetlands

2,000 1,000 0 2,000 Feet

N

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SEVER PETERSON

Land Cover Map

WENCK
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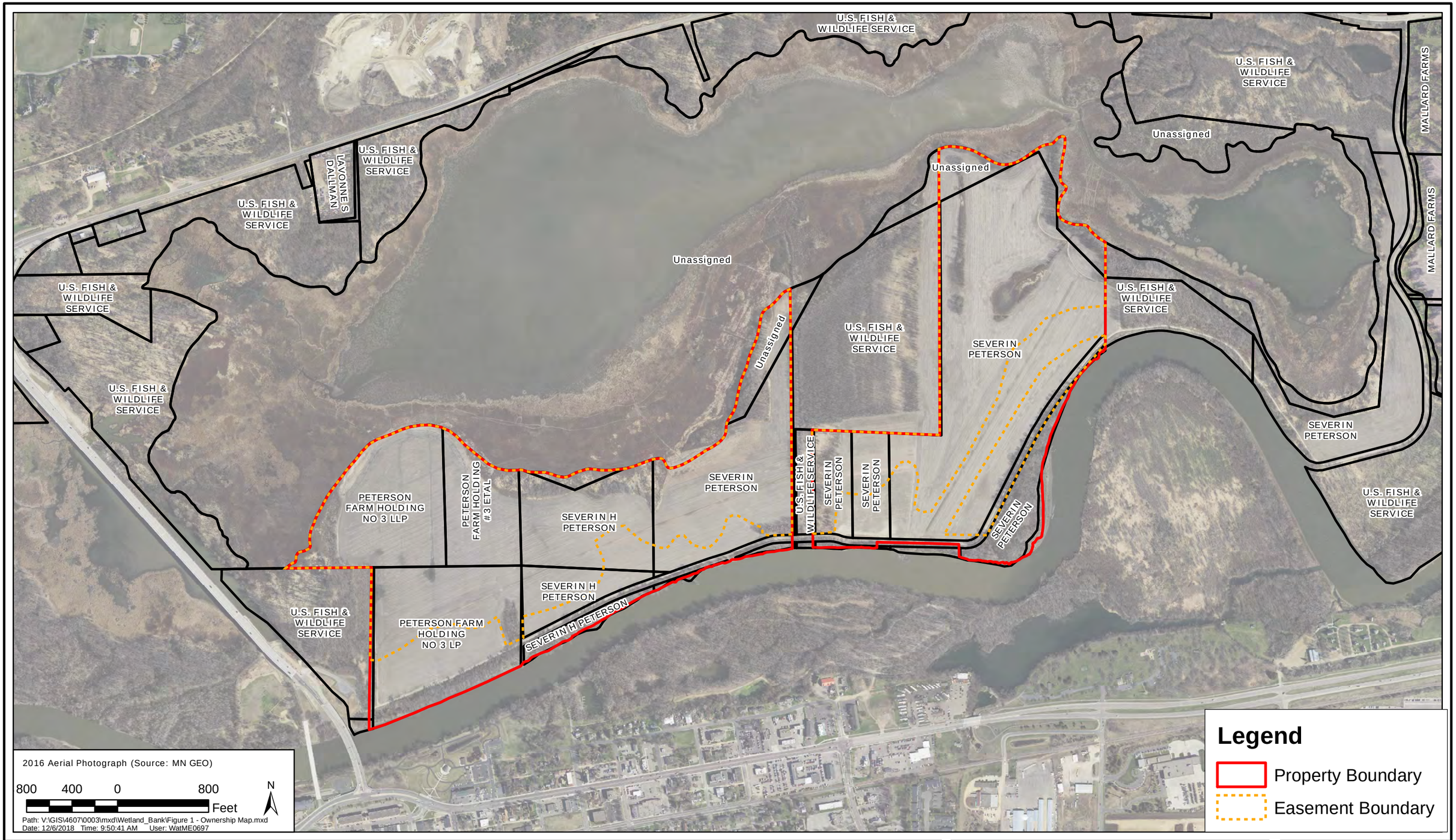
DEC 2018

Figure 3

SEVER PETERSON	WENCK Responsive partner. Exceptional outcomes.	DEC 2018
Existing Conditions and Site Topography		Figure 4

SEVER PETERSON	WENCK Responsive partner. Exceptional outcomes.	DEC 2018
Existing Vegetation Conditions		Figure 5



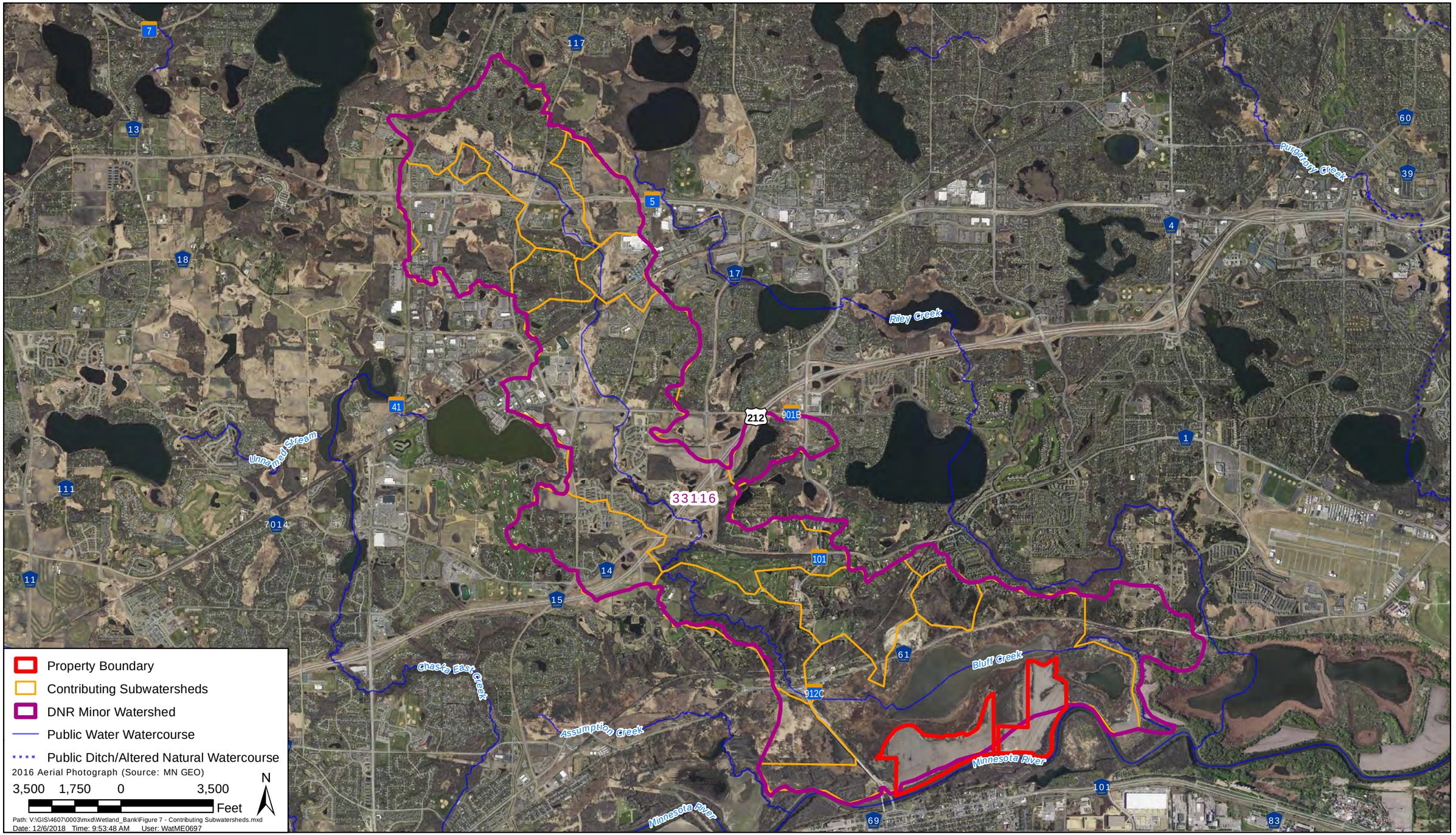
SEVER PETERSON

Property Ownership Map

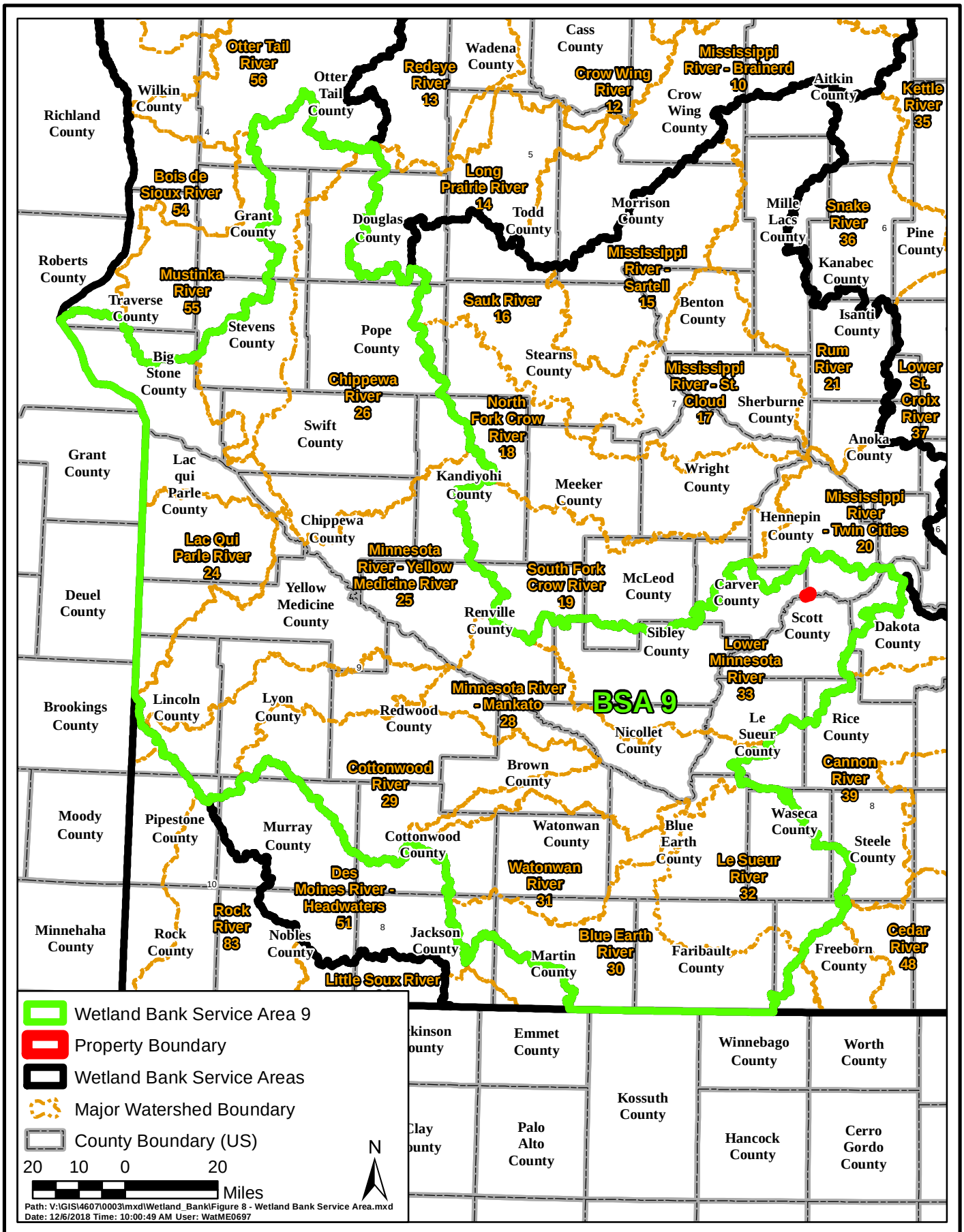
WENCK ASSOCIATES
Responsive partner. Exceptional outcomes.

DEC 2018

Figure 6



SEVER PETERSON	WENCK Responsive partner. Exceptional outcomes.	DEC 2018
Contributing Subwatersheds		Figure 7



SEVER PETERSON

Wetland Bank Service Area and Watershed

WENCK ASSOCIATES

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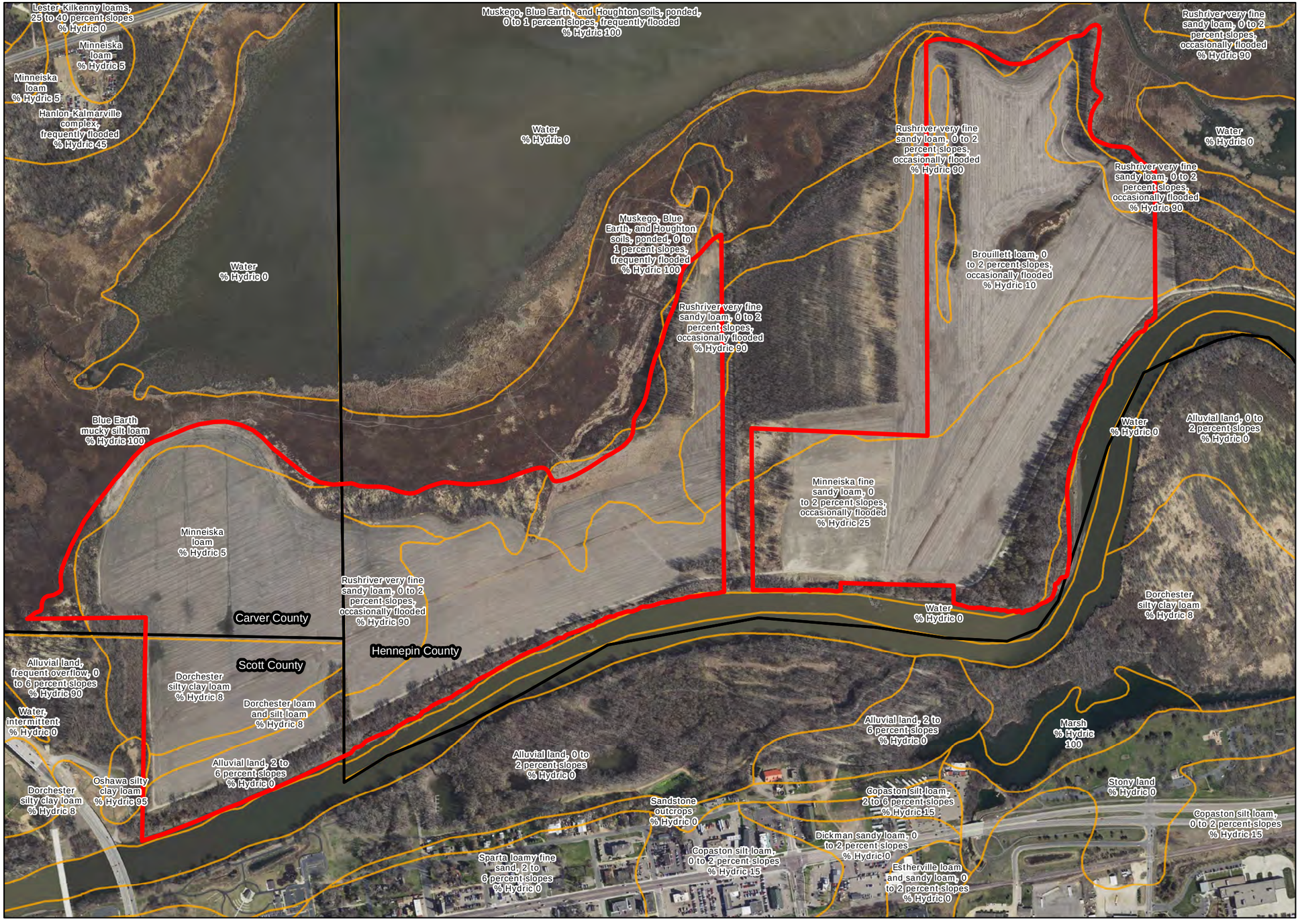
DEC 2018

Figure 8



Legend

- Property Boundary
- County Boundaries
- Soil Survey Map Unit

N

650 325 0 650

Feet

2013 Aerial Photograph (Source: MN GEO)

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Date: 12/6/2018 Time: 10:12:27 AM User: WatME0697

SEVER PETERSON

Hennepin, Scott, and Carver County Soil Survey

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DEC 2018

Figure 9

Property Boundary
Easement Boundary
704' Contour

Area 1: Protected Existing Wetland - 25% Credit, 6.34 Acres (MN Rules 8420.0526 Subp. 8(a)(5))
Area 2: Existing Forested Buffer - 25% Credit, 1.24 Acres (MN Rules 8420.0526 Subp. 2(A))
Area 3: Proposed Floodplain Forest Buffer– 25% Credit, 14.16 Acres (MN Rules 8420.0526 Subp. 2(A))
Area 4: Restored Partially Drained Wetland - 50% Credit, 2.08 Acres (MN Rules 8420.0526 Subp. 4(B))
Area 5: Proposed Floodplain Forest Wetland in Existing Cropland – 70% Credit, 61.22 Acres (MN Rules 8420.0526 Subp. 4(A))
Area 6: Proposed Floodplain Forest Wetland – 100% Credit, 24.91 Acres (MN Rules 8420.0526 Subp. 3)
Area 7: Swale Connections - 100% Credit, 0.35 Acres (MN Rules 8420.0526 Subp. 3)

Total Proposed Credits = 110.30 Acres

Rice Lake Outlet
Existing Floodplain Forest Wetland
Rice Lake
Existing Floodplain Forest Wetland
Existing Emergent Wetland
Existing Floodplain Forest Wetland
Existing Floodplain Forest Wetland
704
Minnesota River
Retained as Cropland
Retained as Cropland
Retained as Cropland
101
CSAH 101
Bluff Ave
Marshall Rd
1st Ave
Cavanaugh
17

2016 Aerial Photograph (Source: MN GEO)
650 325 0 650 Feet
N
Path: V:\GIS\4607\0003\mxd\Wetland_Bank\Figure 10 - Proposed Vegetation Conditions.mxd
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SEVER PETERSON

Proposed Vegetation Conditions/Credit Allocation Area Map

WENCK
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DEC 2018

Figure 10

SEVER PETERSON

Outlet Survey Information (October 26 & November 20, 2017)

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DEC 2018

Figure 11

Legend

- Property Boundary
- Hydric
- Non-Hydric
- 704' Contour
- Surveyed 1/2 Foot Contours

N

650 325 0 650

Feet

2016 Aerial Photograph (Source: MN GEO)

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SEVER PETERSON

Soil Sample Locations

WENCK ASSOCIATES
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DEC 2018

Figure 12

Appendix A

Grading Plans

Plot Date & Time: 29 November 2018 8:41 PM

RICE LAKE

PRAIRIE

CITY OF HENDERSON

EDEN

CARVER COUNTY

SCOTT COUNTY

CITY OF SHAKOPEE

EX. 0.5 FT CONTOURS (TYP)

PROPOSED GRADING (TYP)

Approximate Meander Line

APPROX. MEANDER LINE

PETERSON FARM HOLDING NO. 3 L.P.
PID 250361900

PETERSON FARM HOLDING NO. 3 L.P.
PID 250361800

PETERSON FARM HOLDING NO. 3 L.P.
PID: 311622330001

PETERSON FARM HOLDING NO. 3 L.P.
PID 311622340002

PETERSON FARM HOLDING NO. 3 L.P.
PID 311622430001

PETERSON FARM HOLDING NO. 3 L.P.
PID 311622430002

PETERSON FARM HOLDING NO. 3 L.P.
PID: 311622140001

PETERSON FARM HOLDING NO. 3 L.P.
PID: 0611522220001

US DEPT. OF THE INTERIOR
FISH AND WILDLIFE SERVICE

JOAN M. CHEVALIER TRUST
PID 279010330

PROPERTY BOUNDARY (TYP)

SEE SHEET C-302

SEE SHEET C-303

SEE SHEET C-304

SEE SHEET C-305

N

0 300 600
GRAPHIC SCALE IN FEET

REV	REVISION DESCRIPTION	DWN	APP	REV DATE

SEAL

NOT FOR CONSTRUCTION

PRIME CONSULTANT

WENCK ASSOCIATES
Responsive partner. Exceptional outcomes.

PROJECT TITLE
SEVER PETERSON WETLAND BANK

CLIENT
SEVER PETERSON

SHEET TITLE
OVERALL GRADING AND DRAINAGE PLAN

DWN BY	CHK'D	APP'D	DWG DATE
XXX	XXX	XXX	NOV 2018

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
4607-0003	C-301	0

M:\4607\0003\CAD\CIVIL\C-301.dwg

REV	REVISION DESCRIPTION	DWN	APP	REV DATE

SEAL

NOT FOR CONSTRUCTION

PRIME CONSULTANT

WENCK ASSOCIATES

Responsive partner. Exceptional outcomes.

PROJECT TITLE
SEVER PETERSON WETLAND BANK

CLIENT
SEVER PETERSON

SHEET TITLE
ENLARGED GRADING AND DRAINAGE PLAN

DWN BY	CHK'D	APP'D	DWG DATE	NOV 2018
XXX	XXX	XXX	SCALE	AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
4607-0003	C-302	0

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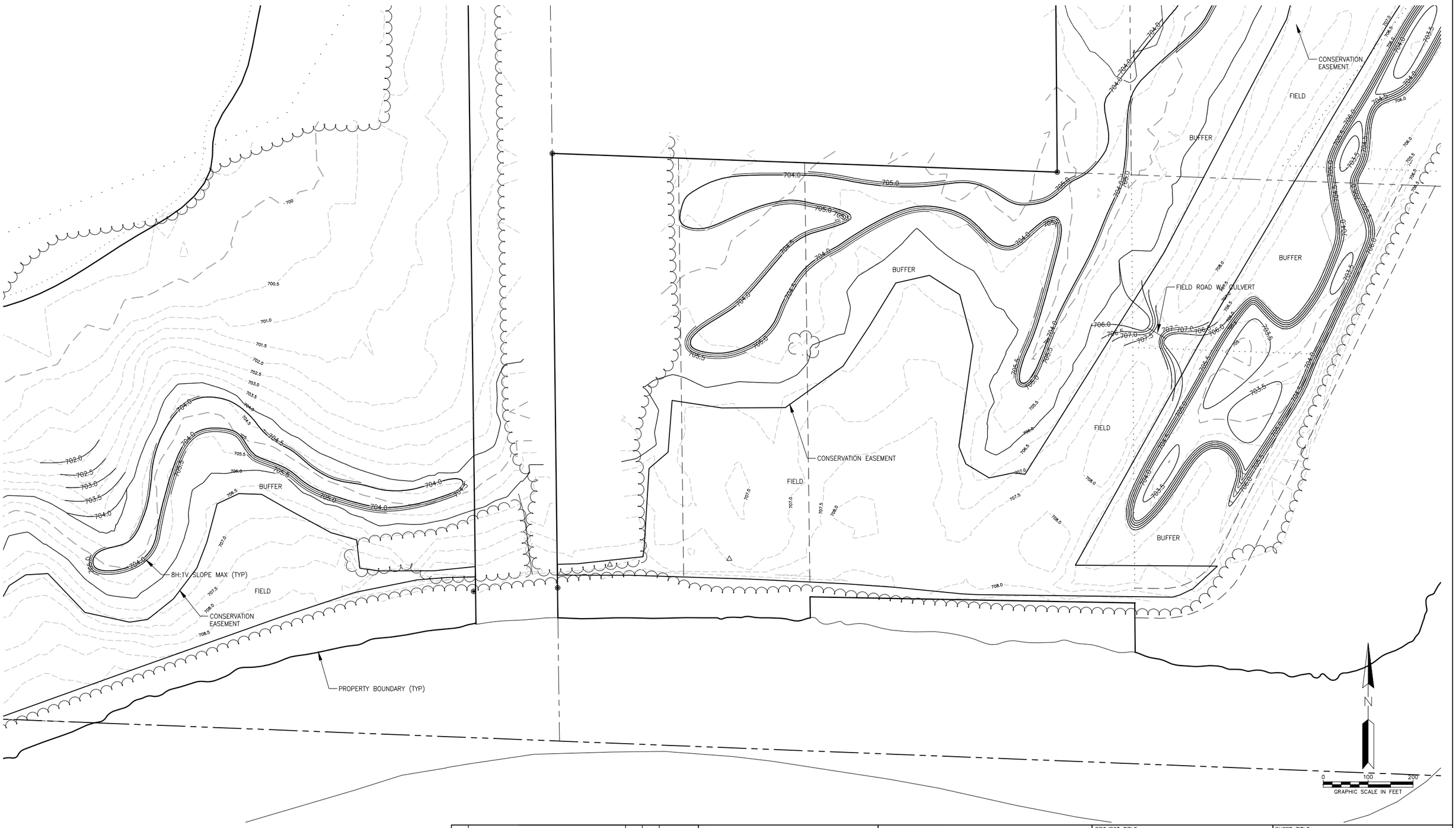

REV	REVISION DESCRIPTION	DWN	APP	REV DATE

SEAL

NOT FOR CONSTRUCTION

PRIME CONSULTANT

WENCK ASSOCIATES

Responsive partner. Exceptional outcomes.

PROJECT TITLE
SEVER PETERSON WETLAND BANK

CLIENT
SEVER PETERSON

SHEET TITLE
ENLARGED GRADING AND DRAINAGE PLAN

DWN BY	CHK'D	APP'D	DWG DATE
XXX	XXX	XXX	NOV 2018

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
4607-0003	C-303	0

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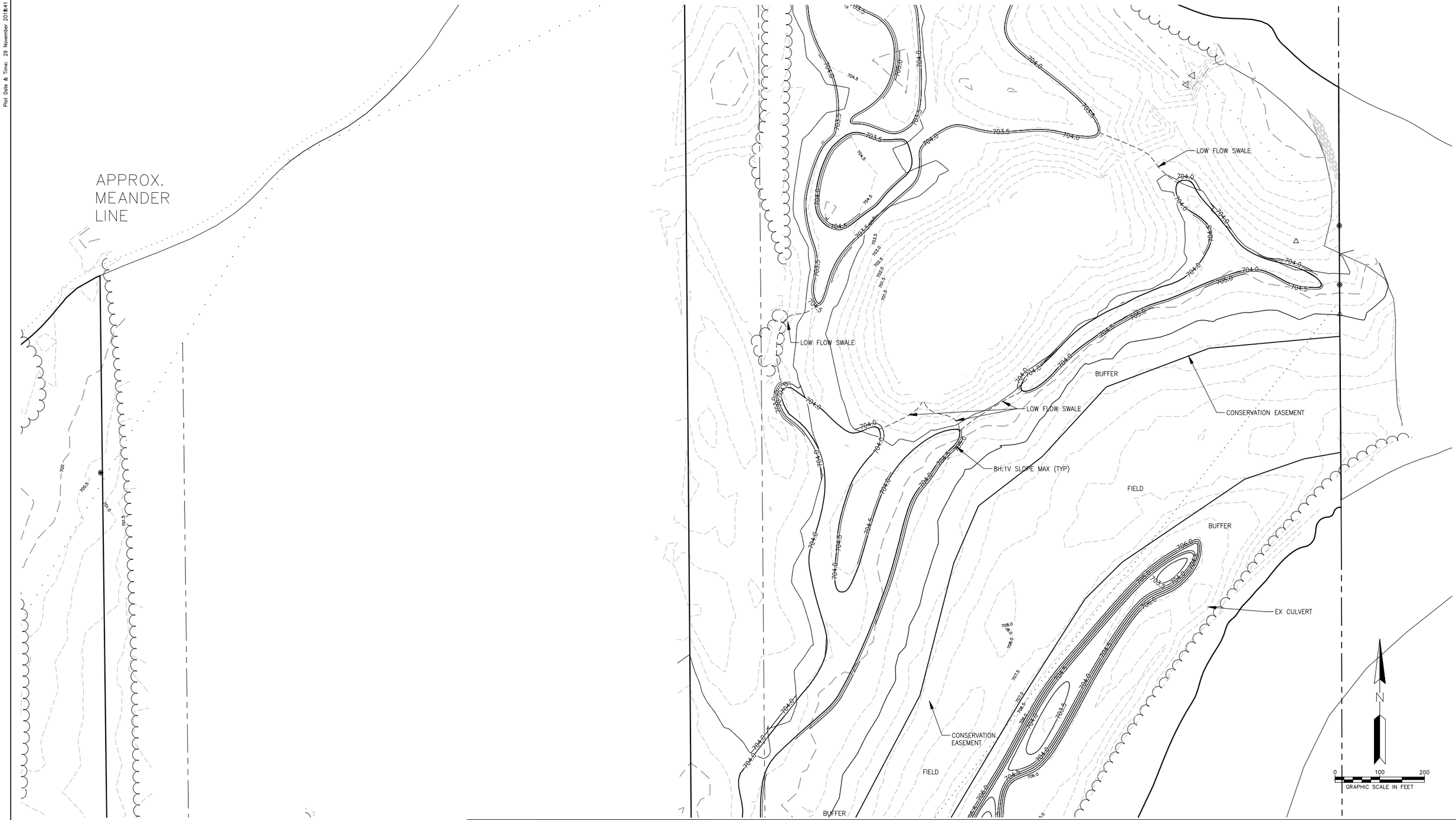

REV	REVISION DESCRIPTION	DWN	APP	REV DATE

SEAL

NOT FOR CONSTRUCTION

PRIME CONSULTANT

WENCK ASSOCIATES

Responsive partner. Exceptional outcomes.

PROJECT TITLE
SEVER PETERSON WETLAND BANK

CLIENT
SEVER PETERSON

SHEET TITLE
ENLARGED GRADING AND DRAINAGE PLAN

DWN BY	CHK'D	APP'D	DWG DATE	NOV 2018
XXX	XXX	XXX	SCALE	AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
4607-0003	C-304	0

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REV	REVISION DESCRIPTION	DWN	APP	REV DATE

SEAL

NOT FOR CONSTRUCTION

PRIME CONSULTANT

WENCK ASSOCIATES

Responsive partner. Exceptional outcomes.

PROJECT TITLE
SEVER PETERSON WETLAND BANK

CLIENT
SEVER PETERSON

SHEET TITLE
ENLARGED GRADING AND DRAINAGE PLAN

DWN BY	CHK'D	APP'D	DWG DATE	NOV 2018
XXX	XXX	XXX	SCALE	AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
4607-0003	C-305	0

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Appendix B

Historical Aerial Photographs

Legend

Project Boundary

1937 Aerial Photograph (Source: MHAPO)

600 300 0 600 Feet

N

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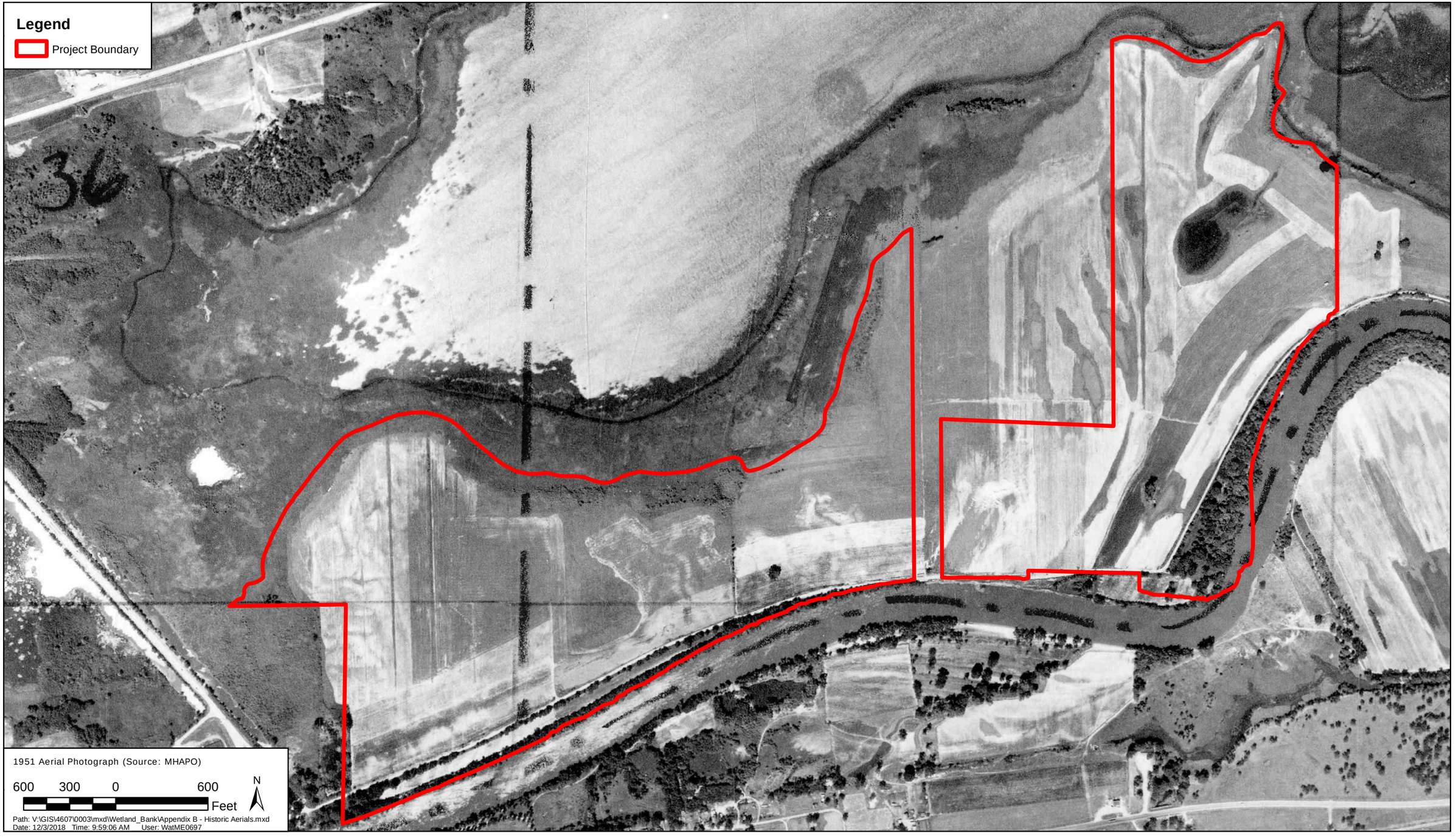
Date: 12/3/2018 Time: 9:57:45 AM User: WatME0697

SEVER PETERSON	WENCK ASSOCIATES Responsive partner. Exceptional outcomes.	DEC 2018
Peterson Wetland Bank - 1937		Appendix B

SEVER PETERSON	WENCK ASSOCIATES Responsive partner. Exceptional outcomes.	DEC 2018
Peterson Wetland Bank - 1945		Appendix B



SEVER PETERSON	WENCK ASSOCIATES Responsive partner. Exceptional outcomes.	DEC 2018
Peterson Wetland Bank - 1951		Appendix B

Legend

Project Boundary

1953 Aerial Photograph (Source: MHAPO)

600 300 0 600 Feet

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SEVER PETERSON

Peterson Wetland Bank - 1953

WENCK ASSOCIATES

Responsive partner. Exceptional outcomes.

DEC 2018

Appendix B

Legend

Project Boundary

1960 Aerial Photograph (Source: MHAPO)

600 300 0 600 Feet

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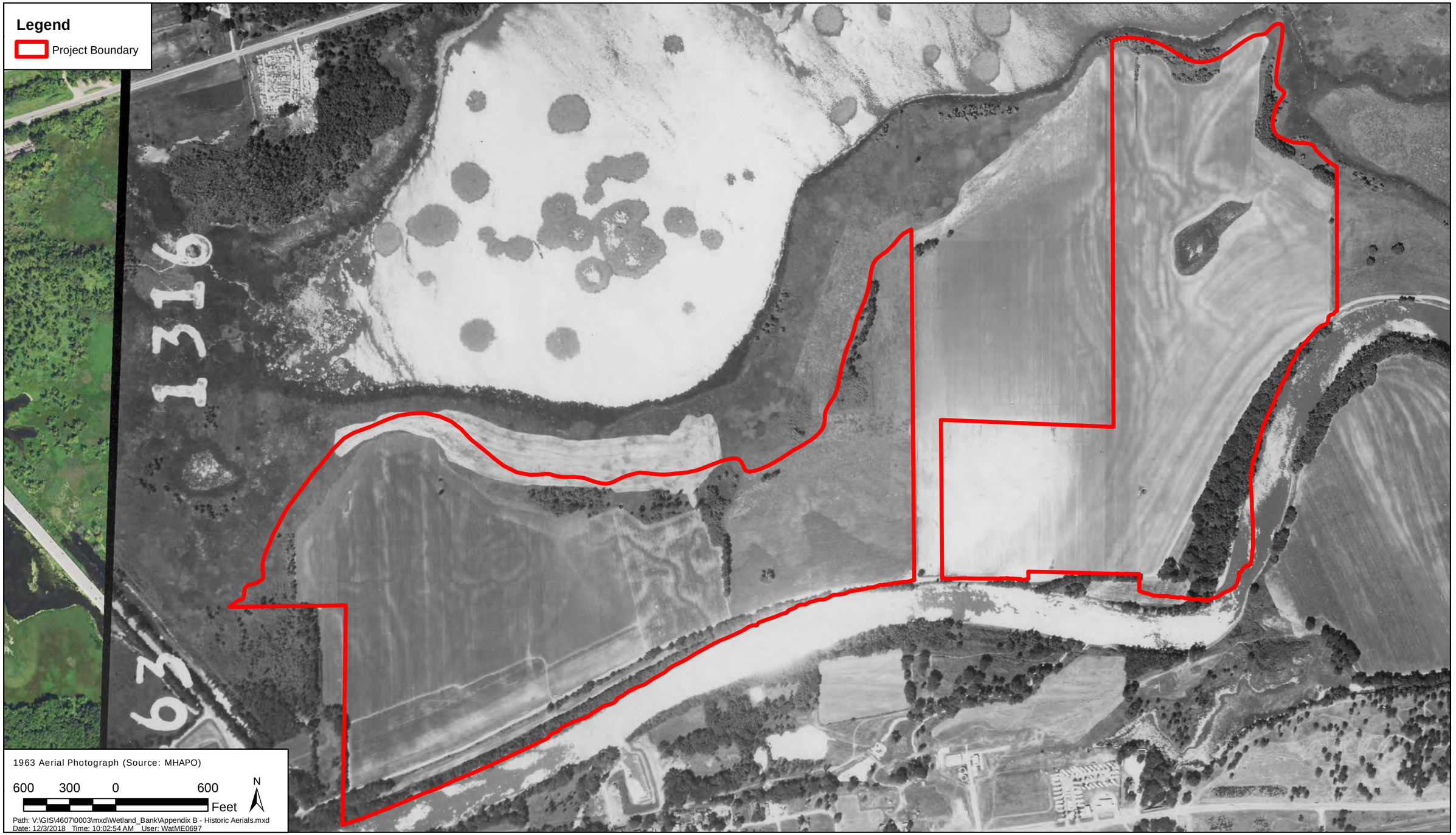
SEVER PETERSON	WENCK ASSOCIATES Responsive partner. Exceptional outcomes.	DEC 2018
Peterson Wetland Bank - 1960		Appendix B



SEVER PETERSON	WENCK ASSOCIATES Responsive partner. Exceptional outcomes.	DEC 2018
Peterson Wetland Bank - 1963		Appendix B

Legend

Project Boundary

1964 Aerial Photograph (Source: MHAPO)

600 300 0 600 Feet

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SEVER PETERSON	WENCK ASSOCIATES Responsive partner. Exceptional outcomes.	DEC 2018
Peterson Wetland Bank - 1964		Appendix B

Legend

Project Boundary

1971 Aerial Photograph (Source: MHAPO)

600 300 0 600 Feet

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SEVER PETERSON

Peterson Wetland Bank - 1971

WENCK ASSOCIATES

Responsive partner. Exceptional outcomes.

DEC 2018

Appendix B

SEVER PETERSON	WENCK ASSOCIATES Responsive partner. Exceptional outcomes.	DEC 2018
Peterson Wetland Bank - 1991		Appendix B

SEVER PETERSON	WENCK ASSOCIATES Responsive partner. Exceptional outcomes.	DEC 2018
Peterson Wetland Bank - 1997 (Flooded)		Appendix B

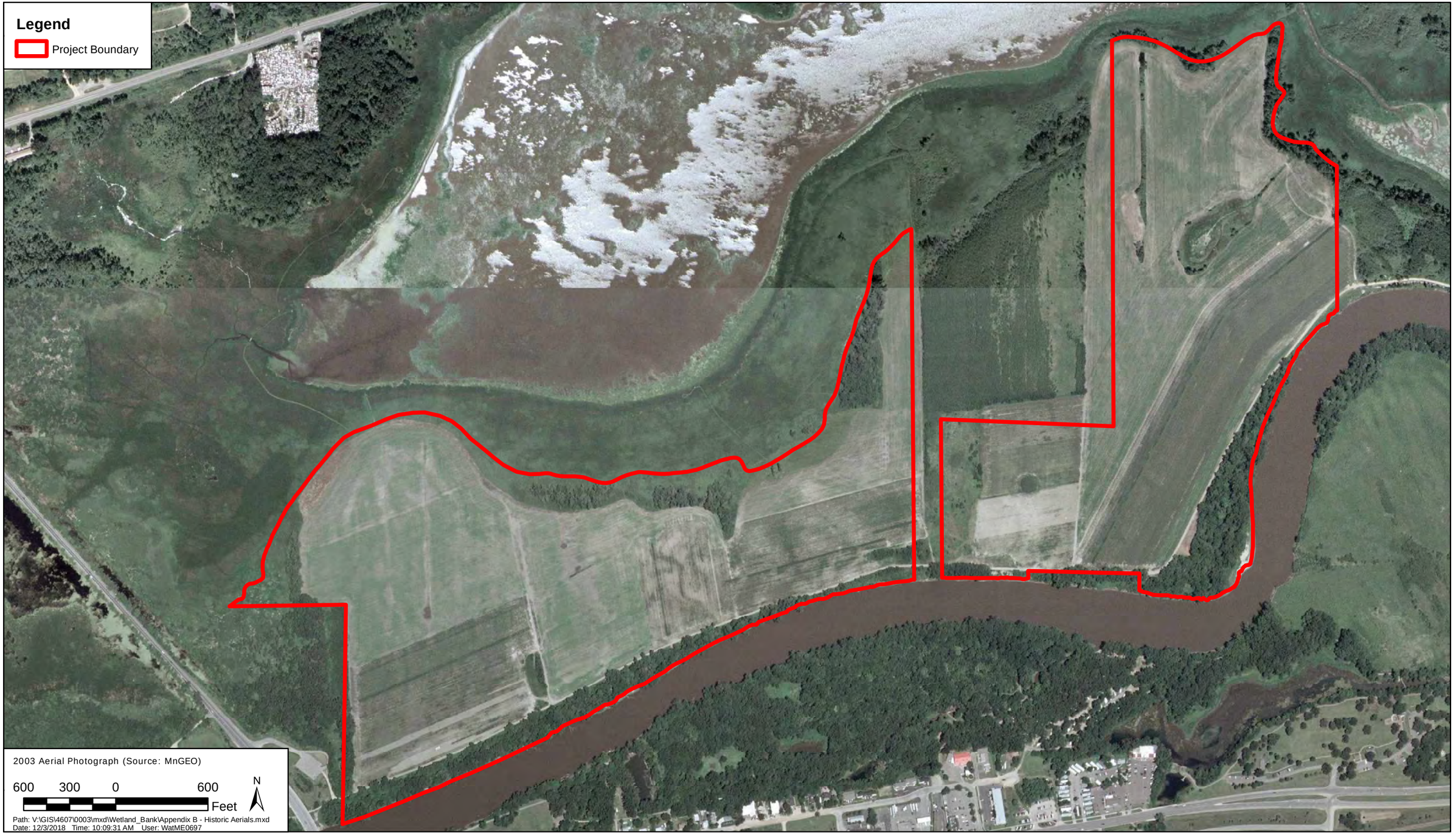
SEVER PETERSON

Peterson Wetland Bank - 2000

WENCK ASSOCIATES
Responsive partner. Exceptional outcomes.

DEC 2018

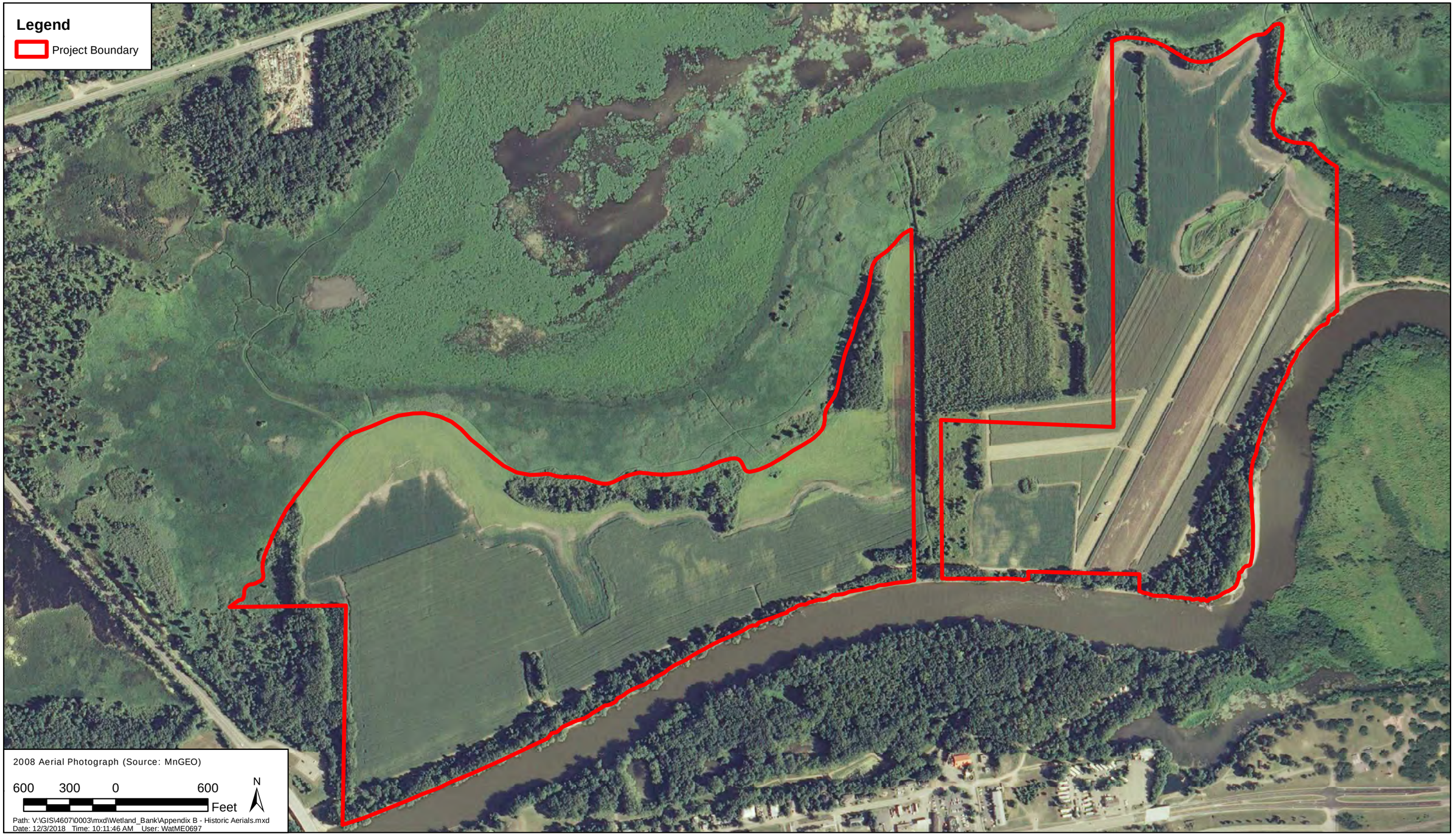
Appendix B



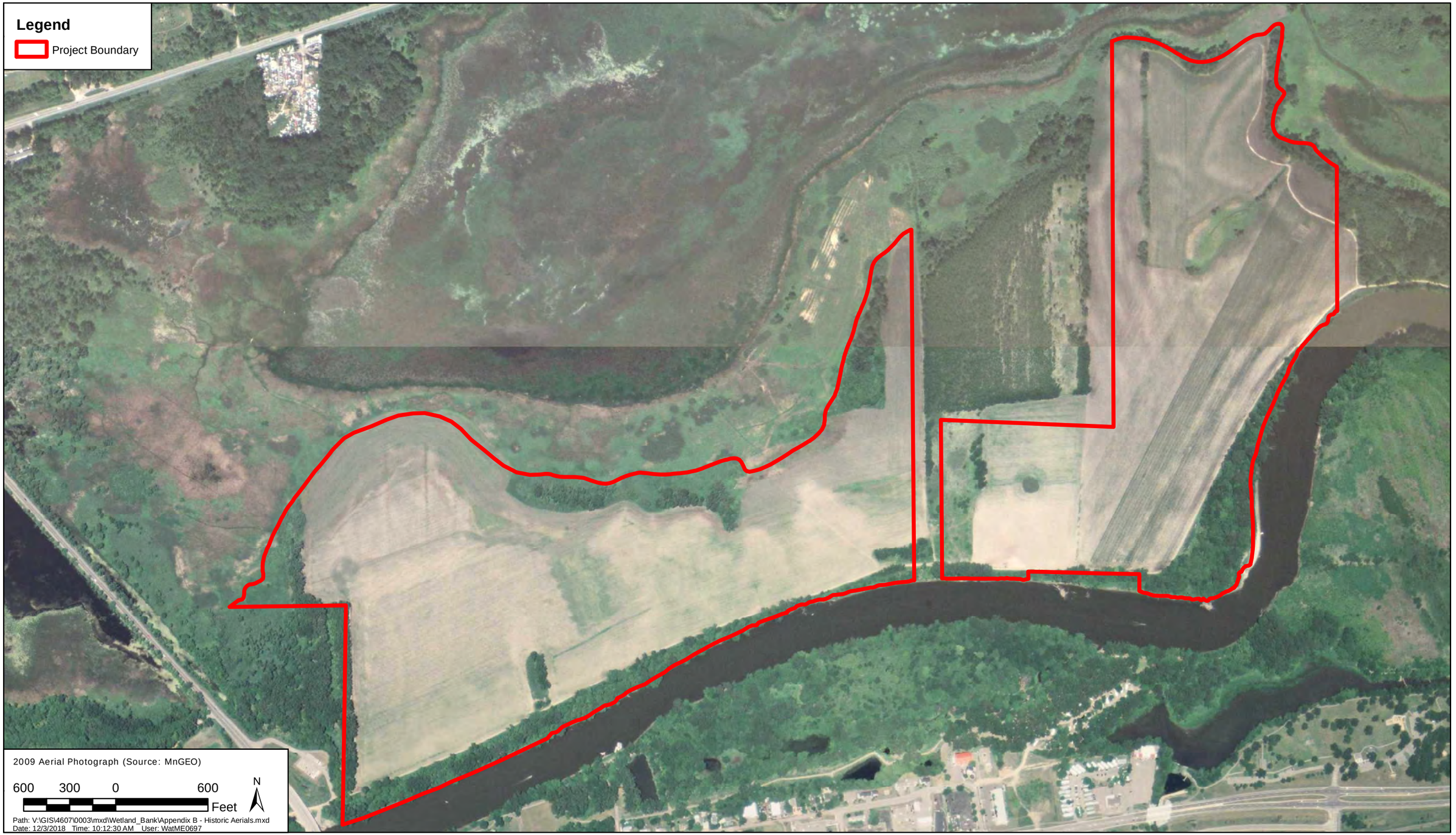
SEVER PETERSON	WENCK ASSOCIATES Responsive partner. Exceptional outcomes.	DEC 2018
Peterson Wetland Bank - 2003		Appendix B

SEVER PETERSON	WENCK ASSOCIATES Responsive partner. Exceptional outcomes.	DEC 2018
Peterson Wetland Bank - 2006 (Flooded)		Appendix B

SEVER PETERSON	WENCK ASSOCIATES Responsive partner. Exceptional outcomes.	DEC 2018
Peterson Wetland Bank - 2006		Appendix B



SEVER PETERSON	WENCK ASSOCIATES Responsive partner. Exceptional outcomes.	DEC 2018
Peterson Wetland Bank - 2008		Appendix B



SEVER PETERSON	DEC 2018
Peterson Wetland Bank - 2009	Appendix B

WENCK ASSOCIATES
Responsive partner. Exceptional outcomes.

SEVER PETERSON

Peterson Wetland Bank - 2010

WENCK ASSOCIATES
Responsive partner. Exceptional outcomes.

DEC 2018

Appendix B

Legend

Project Boundary

2013 Aerial Photograph (Source: MnGEO)

600 300 0 600 Feet

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Path: V:\GIS\4607\0003\mxd\Wetland_Bank\Appendix B - Historic Aerials.mxd
Date: 12/3/2018 Time: 10:19:50 AM User: WatME0697

SEVER PETERSON

Peterson Wetland Bank - 2013 (Fall)

WENCK ASSOCIATES

Responsive partner. Exceptional outcomes.

DEC 2018

Appendix B

Legend

Project Boundary

2015 Aerial Photograph (Source: MnGEO)

600 300 0 600 Feet

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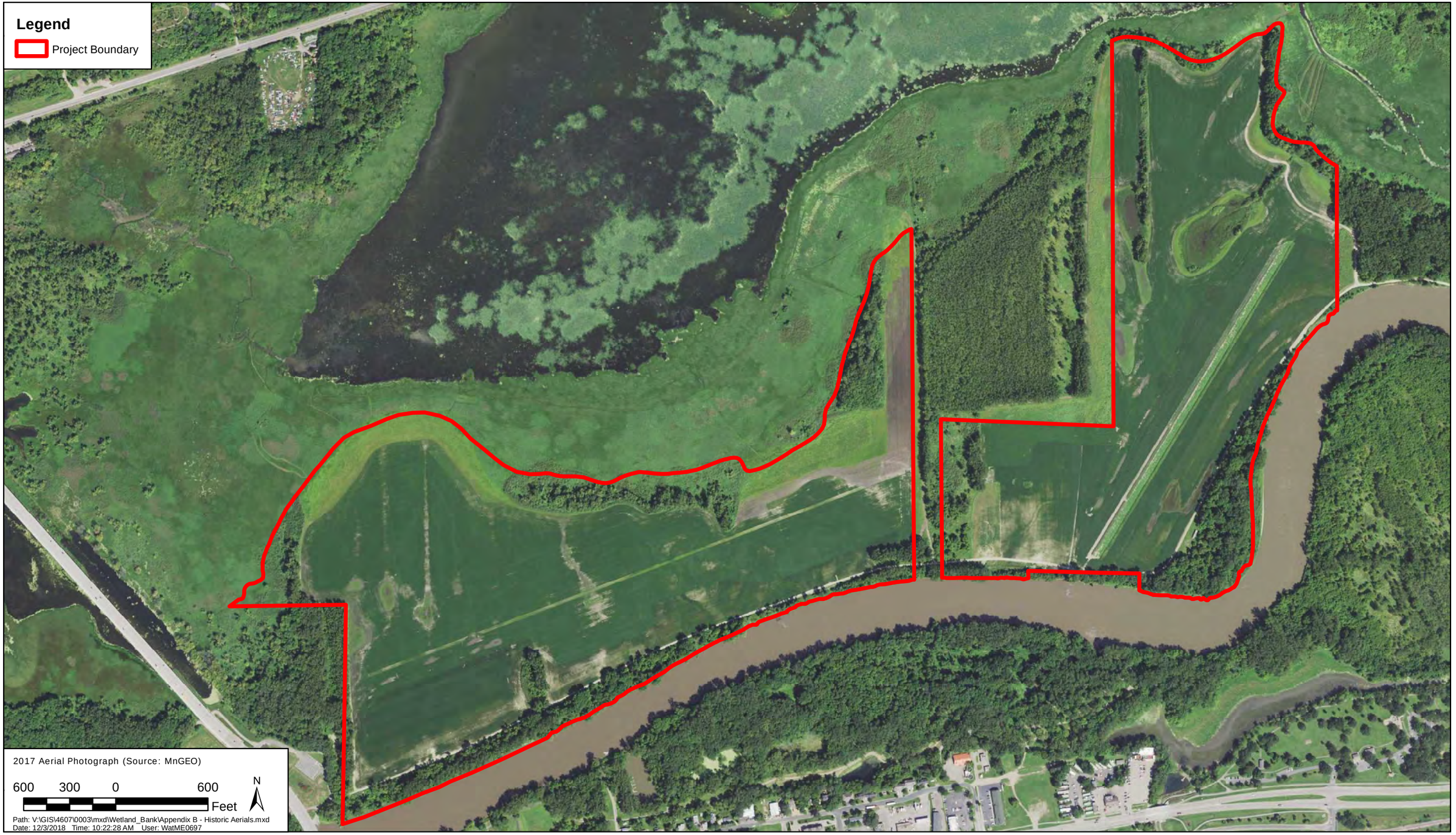
SEVER PETERSON	WENCK ASSOCIATES Responsive partner. Exceptional outcomes.	DEC 2018
Peterson Wetland Bank - 2015		Appendix B

SEVER PETERSON	WENCK ASSOCIATES Responsive partner. Exceptional outcomes.	DEC 2018
Peterson Wetland Bank - 2016 (Fall)		Appendix B



SEVER PETERSON

Peterson Wetland Bank - 2017

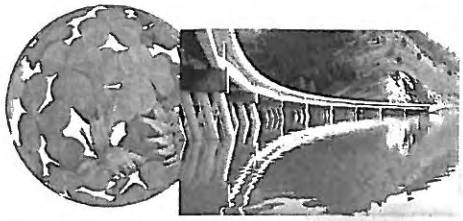
WENCK ASSOCIATES
Responsive partner. Exceptional outcomes.

DEC 2018

Appendix B

Appendix C

Cultural Resource Reports



Final Report

Cultural Resources Management

Proposed West and North Development Areas, Burnsville Sanitary Landfill, Dakota and Hennepin Counties, Minnesota Phase I Investigation

Prepared For

McCain and Associates

SHPO # 2002-3567

By

Amy Ollendorf, Ph.D.
Erika Palmer
Donna Stubbs, M.A.
and
Daniel R. Pratt, M.A.

HDR
Employee Owned

Project No. 12005-001-164-01
December 12, 2002

December 13, 2002

COPY

Mr. John McCain
McCain & Associates, Inc.
434 2nd Street
Excelsior, MN 55331

Dear Mr. McCain:

RE: Proposed West and North Development Areas, Burnsville Sanitary Landfill, Inc.
SHPO Number: 2002-3567

HDR, Inc. (HDR) is pleased to submit a Final Report for compliance with Section 106 and 36CFR800, procedures of the Advisory Council on Historic Preservation. Section 106 compliance is necessary, because a U.S. Army Corps of Engineers (USACE) permit is required and a permit application already has been submitted. Therefore, HDR already submitted a copy of this report to Dennis Gimmestad at the State Historic Preservation Office (SHPO) and Brad Johnson at the USACE, on behalf of McCain and Associates and your clients. For your convenience, HDR is sending additional copies of this report directly to Mike Niewind (Burnsville Sanitary Landfill) and Debra McDonald (Waste Management).

This version of the report incorporates all of the feedback you faxed to me. I understand that Mike and Debra authorized the report's finalization following the changes as indicated in your fax. If you need additional information for your review, please call me at your earliest convenience (763/278-5921).

Sincerely,

Amy L. Ollendorf

Amy L. Ollendorf, Ph.D., P.G.
Senior Professional Associate

Enclosure

CC: M. Graham; M. Niewind; D. McDonald

HDR Engineering, Inc.
6190 Golden Hills Drive
Minneapolis, MN 55416-1567
Phone: (763) 591-5400
Fax: (763) 591-5413
www.hdrinc.com

December 13, 2002

COPY

Mr. Brad Johnson
U.S. Army Corps of Engineers
PM-E
Army Corps of Engineers Center
190 5th Street E.
St. Paul, MN 55101-1638

Dear Mr. Johnson:

RE: Proposed West and North Development Areas, Burnsville Sanitary Landfill, Inc.
SHPO Number: 2002-3567

HDR, Inc. (HDR), as a subconsultant to McCain and Associates, is pleased to submit the enclosed Final Report for compliance with Section 106 and 36CFR800, procedures of the Advisory Council on Historic Preservation. Section 106 compliance is necessary, because a U.S. Army Corps of Engineers (USACE) permit is required and a permit application already has been submitted. Please consider this information during the permit decision-making process.

The following topics are covered in HDR's report: (1) description of HDR's systematic archaeological investigation and (2) information, including photographs, about standing structures near the project area. The latter is submitted per a request to assist the State Historic Preservation Office (SHPO) in determining whether or not to recommend an architectural inventory for historic standing structures.

If you need additional information for your review, please call me at your earliest convenience (763/278-5921).

Sincerely,

Amy L. Ollendorf

Amy L. Ollendorf, Ph.D., P.G.
Senior Professional Associate

Enclosure

CC: J. McCain; M. Graham; M. Niewind; D. McDonald; D. Gimmestad

HDR Engineering, Inc.
6190 Golden Hills Drive
Minneapolis, MN 55416-1567
Phone: (763) 591-5400
Fax: (763) 591-5413
www.hdrinc.com

December 13, 2002

COPY

Mr. Dennis Gimmestad
Minnesota State Historic Preservation Office
345 Kellogg Boulevard West
St. Paul, MN 55102-1906

Dear Mr. Gimmestad:

RE: Proposed West and North Development Areas, Burnsville Sanitary Landfill, Inc.
SHPO Number: 2002-3567

HDR, Inc. (HDR), as a subconsultant to McCain and Associates, is pleased to submit the enclosed Final Report for compliance with Section 106 and 36CFR800, procedures of the Advisory Council on Historic Preservation. Section 106 compliance is necessary, because a U.S. Army Corps of Engineers (USACE) permit is required and a permit application already has been submitted.

The following topics are covered in HDR's report: (1) description of HDR's systematic archaeological investigation and (2) information, including photographs, about standing structures near the project area. The latter is submitted per your request to assist the State Historic Preservation Office (SHPO) in determining whether or not to recommend an architectural inventory for historic standing structures.

If you need additional information for your review, please call me at your earliest convenience (763/278-5921).

Sincerely,

Amy L. Ollendorf

Amy L. Ollendorf, Ph.D., P.G.
Senior Professional Associate

Enclosure

CC: J. McCain; M. Graham; M. Niewind; D. McDonald; B. Johnson

HDR Engineering, Inc.
6190 Golden Hills Drive
Minneapolis, MN 55416-1567
Phone: (763) 591-5400
Fax: (763) 591-5413
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Management Summary

McCain and Associates, on behalf of Waste Management and Burnsville Sanitary Landfill, Inc., retained HDR Engineering, Inc. (HDR) to provide cultural resource management (CRM) services in support of wetland-creation projects associated with future development at Burnsville Sanitary Landfill. At this time, two areas are under consideration for development (Areas 1 and 3).

Dr. Amy Ollendorf was the Project Manager and Co-Principal Investigator for this CRM investigation. Donna Stubbs, Co-Principal Investigator (for archaeology), conducted archival research at the Minnesota Historical Society (MHS) and the SHPO on September 12, 2002. Field work commenced on November 7, 2002 and was completed on November 8, 2002. Donna Stubbs also completed the photo-documentation of standing structures on November 8, 2002; Daniel Pratt provided the narrative description. The purpose of the photo-documentation was to assist the SHPO in the determination of whether or not to recommend a formal standing structures survey for the present project.

Donna Stubbs served as the Field Supervisor for the field work. Field crewmembers included Erika Palmer, Dylan Eigenberger, and Brandy Stearns. Daniel Pratt, a federally qualified architectural historian, was the project's Co-Principal Investigator (for architectural history). Erika Palmer wrote substantial portions of the report along with the three principal investigators.

Area 1 is north of State Highway 13 directly off Washburn Avenue on undeveloped land to the north and to the west of the existing landfill. It consists of ca. 89 ha (220 ac) in Sections 29 and 32, Township 27 North, Range 24 West, Dakota County. Approximately 5 ha (12 ac) will be directly impacted by excavations, and another ca. 17 ha (43 ac) are slated for infilling by landfill development. Area 1 presently consists of floodplain forest and marshland, and surface visibility was poor. Excavations will not exceed 91-cm (3-ft) depth, so the maximum depth of subsurface tests was 90 cm below the ground surface (cmbs) (2.9 ft). The subsurface tests documented typical alluvial deposits, but no cultural horizons were encountered.

A geomorphological assessment conducted independently by James Aiken of McCain and Associates indicated the depositional environment of Area 1 is similar to those found upriver from the project area within the Minnesota River Wildlife Refuge. In his estimation, the archaeological potential of Area 1 is low at depths greater than those attained by HDR's hand excavations. HDR recommends no further archaeological testing in this area.

Area 3 is south of U.S. Highway 212 on agricultural land with excellent surface visibility. Therefore, no subsurface testing was needed and the proposed impact areas were covered by pedestrian reconnaissance. Only ca. 0.4 ha (7 ac) will be directly affected by using plowzone soils to create berms around the northern perimeter of the site. No cultural materials were noted during the surface survey, and HDR recommends no further archaeological testing in Area 3.

Residential, commercial, and industrial standing structures also were photographed within 0.8 km (0.5 mi) of the proposed landfill development (Area 1) and within 0.8 km (0.5 mi) of the proposed wetland creation (Area 3). HDR concludes that no historic standing structures eligible or potentially eligible for nomination to the National Register of Historic Places (NRHP) will be physically or visually impacted by the proposed landfill development in Area 1 and wetland creation in Areas 1 and 3.

Introduction

McCain and Associates, on behalf of Waste Management and Burnsville Sanitary Landfill, Inc., retained HDR Engineering, Inc. (HDR) to provide cultural resource management (CRM) services in support of wetland-creation projects associated with future development at Burnsville Sanitary Landfill. At this time, two areas are under consideration for development (Areas 1 and 3). Overviews of these areas are shown on the attached USGS topographic quadrangles (Figures 1 and 2) and aerial photographs (Figures 3 and 4).

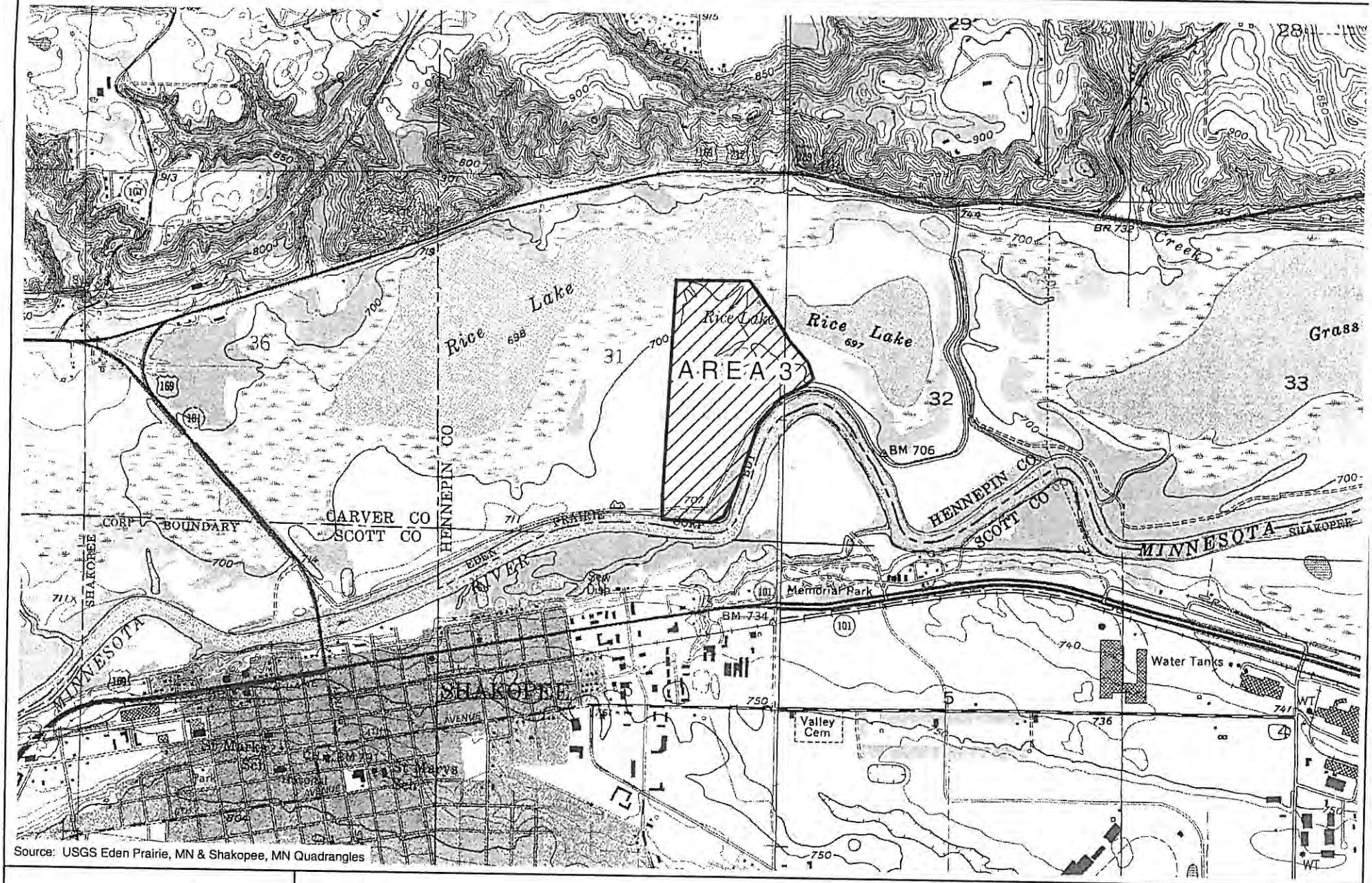
Dr. Amy Ollendorf was the Project Manager and Co-Principal Investigator for this CRM investigation. Donna Stubbs was Co-Principal Investigator (for archaeology) and Field Supervisor, and Daniel Pratt was the project's Co-Principal Investigator (for architectural history). Erika Palmer wrote substantial portions of the report along with the three principal investigators.

Area 1

This area is north of State Highway 13 directly off Washburn Avenue on undeveloped land to the north and to the west of the existing landfill. Future landfill development and wetland creation would occur within Area 1. This area consists of ca. 89 ha (220 ac) in Sections 29 and 32, Township 27 North, Range 24 West, Dakota County (Figure 1). Excavations to a depth of up to 92 cm (3 ft) will directly impact approximately 5 ha (12 ac). Another ca. 17 ha (43 ac) are slated for infilling by landfill development.

Figure 3 shows where the landfill development would take place (each is labeled "Fill Area"). The rest of Area 1 is an existing wetland that will remain as such. Portions of the upland in the northwestern corner would be excavated as part of the planned wetland creation (Figure 3). Also, three excavation areas in the southwestern portion would be restored as wetlands (Figure 3).

For HDR's archaeological survey, the northern tier of Area 1, consisting of ca. 6 ha (14 ac) was divided into three subsections (Figure 5). The first is in the extreme eastern end of this area (1.4 ha or 3.5 ac). It has been used as a dredge area, and the current ground surface is higher than the surrounding area because of dredge piles. Consequently, HDR did not test in this location. Subsection A (Figure 5), consisting of ca. 3 ha (7 ac) in the middle of the northern tier, was also a dredge area. Because most of the dredge spoil had been removed and the land surface was lower than the surrounding area at the time of HDR's survey, soil probes were placed within Subsection A to determine if any intact original soils remained (See the **Results** section, below). Subsection B, in the northwest corner of Area 1, consisted of ca. 4 ha (10 ac) of floodplain forest with mostly intact soils. This subsection was tested during the current investigation.



Source: USGS Eden Prairie, MN & Shakopee, MN Quadrangles

Feet
0 1,000 2,000 3,000

N

Area 3
Proposed Burnsville Landfill Expansion
Eden Prairie, Hennepin County, Minnesota

HDR

GIS: DPS	Date:12/02/02
PM: AO	
Proj No.: 12005-001-164	
File: fig1.mxd	
Figure No. 2	SHEET OF

Subsections C and D, in the lower southwest portion of Area 1 (Figure 5), consisted of ca. 0.32 ha (0.79 ac) and ca. 0.37 ha (0.92 ac), respectively, of meadow and marshlands with mostly intact soils. HDR tested these subsections.

Subsection E, in the southwest corner of Area 1, (Figure 3), consisted of ca. 0.8 ha (2 ac) of wooded area, containing mostly shrubs and scrub brush. Soils in the area were mostly intact. This subsection was tested during the current investigation.

Area 3

This area is south of U.S. Highway 212 on agricultural land with excellent surface visibility. It consists of approximately 180 acres in Sections 31 and 32, Township 116 North, Range 22 West, Eden Prairie, Hennepin County (Figure 2). This is another proposed location for wetland creation.

Only ca. 0.4 ha (7 ac) will be directly impacted by borrow areas for berms (Figure 4). The plan is to construct a low-head berm around the northern perimeter of the site in the agricultural field to retain floodwaters from draining north through ditch systems to wetland complexes north of the site. The berm would be several thousand feet in length and would use only plowzone soils. Excavation for material to construct the berm will take place next to the south side of the berm and would be approximately wide 15 m (50 ft). The excavated material would then be pushed up and graded to form the berm.

Environmental Background

The project area is located along the Minnesota River floodplain in east-central Minnesota within the Big Woods and Southern Oak Plains ecosystems of the Southeastern Minnesota Savanna. According to the U.S. Geological Survey (USGS) Northern Prairie Wildlife Research Center (1998), the Big Woods subsection itself has irregular, hilly topography with many lakes and wetlands. Oak woodland and maple-basswood forest were the most common vegetation types before Euro-American settlement. Much of the Southern Oak Plains is a rolling plain of loess-mantled ridges over sandstone and carbonate bedrock and till. The pre-settlement vegetation was primarily bur oak savanna, but also included tall-grass prairie and maple-basswood forest (USGS 1998).

The project area consists of mostly poorly drained alluvial soils (Table 1). Area 1 soils are in the Colo-Algansee-Minneiska and Waukegan-Wadena-Hawick association (Hundley 1983). Soil types include Minneiska loam, which are poorly drained soils that formed in calcareous alluvium on floodplains of major rivers. These soils are located in Subsections A and B of Area 1. Within Subsections C, D and E of Area 1 the soils consist of Faxon silty clay loam. This poorly to very poorly drained soil formed in glacial drift and is found on bedrock terraces along floodplains of major rivers (Hundley 1983).

Area 3 soils are in the Mixed Alluvial-Marsh-Chaska Association (Lueth and Chamberlain 1974). Soils include Dorchester loams and Chaska clay loams. The Dorchester series is comprised of well-drained and moderately well drained soils that formed in alluvium on broad flats along the Minnesota River. Typically, it is found between areas of mixed alluvial land, which occurs next to the river and areas of Chaska soils, which are found further back from the river. Chaska clay loams consist of poorly drained soils that formed in deep, recent, calcareous loamy alluvium on floodplains. Native vegetation consists of prairie grasses, sedges and patches of willow and poplar (Lueth and Chamberlain 1974).

In addition to the officially named soil series, both Area 1 and Area 3 of the project area also include subareas with moderately shallow Entisols, and ponded Mollisols and Histosols.

Table 1. Soils in the APE

Series	Suborder	Order
Chaska	Aeric Fluvaquents	Entisols
Dorchester	Typic Udifluvents	Entisols
Oshawa	Fluvaquentic Endoaquolls	Mollisols
Faxon	Typic Endoaquolls	Mollisols
Minneiska, occasionally flooded	Mollic Udifluvents	Entisols

Archaeological and Historical Background

Native Americans have utilized the Minnesota region through time, especially the higher elevations near the plentiful lakeshores and riverbanks. Before Le Sueur's expedition to the Mankato areas in September 1700, Native Americans had been living in the Minnesota River Valley for more than 10,000 years. The following paragraphs provide a brief overview of the cultural traditions, as recognized by archaeologists. In general, these archaeological traditions show the change in aboriginal lifestyles from small, nomadic hunting and gathering groups to comparatively sedentary, complex societies who met the first Europeans who explored the region.

Although there are a few surface finds of **Paleoindian (ca. 12,000 - 8,000 yr B.P.)** fluted and lanceolate projectile points in what is now Minnesota, few intact sites are known. Migratory groups of people settled upon the grasslands, hunting native herding animals such as bison and the now extinct megafauna such as the mastodon, and likely exploiting available small game, fish, and plant resources. Throughout much of this period, the climate was becoming successively warmer and drier. No Paleoindian sites have been documented in the project area.

The **Archaic Tradition (ca. 8,000 to ca. 2,800 yr B.P.)** represents a continuation of semi-nomadic hunting and gathering, likely in a seasonal round of resource procurement. A wider range of resources was utilized during the period, generally reflecting the increasingly rich environment of the early to middle Holocene, although bison was probably of local importance. Characteristic of the Archaic period is continued reliance on large game hunting (e.g., bison) and increasingly diversified technologies associated with hunting, trapping, fishing, foraging, wood working, and plant processing. The

diversification of culture and associated technologies reflects more highly regionalized adaptations to specific or local environmental conditions as climatic trends shifted to a cooler, wetter configuration, a pattern that continues to this day. No Archaic sites have been documented in the project area.

The **Woodland Tradition (ca. 2,800 - 900 yr B.P.)** is characterized by the initial appearance of ceramic vessels and the construction of earthen mounds. The broad elements of the Woodland Tradition include the development of regional resources, the appearance of additional distinctive artifact styles, and steadily increasing population. No Woodland sites have been documented in the project area.

The **Late Prehistoric Period (ca. 1,000 yr B.P. - A.D. 1200)** continued until the time of initial contact between Native Americans and European and American explorers. Several major trends are apparent during this period, including the intensification of food production. The Plains Village culture, one manifestation of late prehistoric groups, is associated with the Cambria site, which is located on the Minnesota River near Mankato. No Late Prehistoric sites have been documented in the project area.

By the mid-1800s, the fur trade era had ended and was followed by the intensification of Euro-American settlement, which resulted in a depletion of native animal populations and the displacement of the Native Americans. The treaties of 1805 and 1837 removed the Dakota from their ancestral lands. The Sisseton, Wahpeton, Wahpekute, and Mdewakanton bands of the Dakota along with agents of the U.S. Government signed the Treaty of Traverse des Sioux in 1851. This treaty established reservations for the Dakota bands on tracts along the upper and lower Minnesota River.

For descriptions of previously documented archaeological sites and historic standing structures in the vicinity of the project area, as well as land use of the project area during the Historic Period, the reader is directed to the informational packet submitted by HDR on behalf of McCain and Associates (October 7, 2002) to the State Historic Preservation Office (SHPO) for review. This packet includes project area overlays on the 1957, 1970, and 2000 aerial photographs for Area 1 and the 1937, 1964, and 2000 aerial photographs for Area 3.

Previous Investigations

Most of the verified archaeological sites in the region are located on the bluff edges along the Minnesota River. Some sites and site leads, however, have been documented in and around the proposed project area. The majority of architectural structures that have been inventoried in the vicinity of the project area are in the cities of Savage or Shakopee. To HDR's knowledge, no traditional cultural properties (TCPs) have been inventoried in the project area. The known cultural resources in the vicinity of the project area are summarized in the informational packet submitted by HDR on behalf of McCain and Associates (October 7, 2002) to the SHPO for review.

This packet also includes a geomorphological assessment of Area 1 by James Aiken of McCain and Associates so it is not repeated herein. In summary, Aiken found that the geology of Area 1 suggests a depositional environment (i.e., marshes, bog swamps, and floodplain lakes) similar to those found upriver from the project area within the Minnesota River Wildlife Refuge. Area 3 is slated for neither deep excavations nor thick overburden deposition, so it was excluded from geomorphological assessment.

Methods

Archival Research

Donna Stubbs conducted archival research at the Minnesota Historical Society (MHS) and the SHPO on September 12, 2002. The twofold purpose of this research was to compile information about known cultural resources in and near the project area as well as to identify locations within the project area that might contain cultural resources.

Stubbs searched the SHPO archaeological sites database and maps in addition to the historic standing structures database and maps. She also located and photocopied relevant portions of previous investigators' CRM reports. She furthermore examined historic plat maps, historic mining maps, and early explorer's maps as part of this research.

Field - Archaeology

Field work commenced on November 7, 2002 and was completed on November 8, 2002. Donna Stubbs served as the field supervisor with off-site guidance by Dr. Amy Ollendorf for the field work. Field crewmembers included Erika Palmer, Dylan Eigenberger, and Brandy Stearns.

HDR's field methods followed the Minnesota SHPO's *Manual for Archaeological Projects in Minnesota* (Anfinson 2001). Divergences from these guidelines are described below. Field methods included pedestrian (surface) survey, shovel testing, and soil probing. USGS topographic maps and aerial photographs were used to determine areas for shovel tests and soil probes. HDR staff completed standard field notes, shovel test forms, and photo-documentation in the field.

Area 1

Subsurface testing was conducted to locate buried cultural deposits and to determine soil conditions in this area since surface visibility was inadequate. Shovel test diameters averaged 30-40 cm (12-16 in), whereas the soil probe has a diameter of 3.8 cm (1.5 in). Shovel tests and soil probes were spaced along the approximate centerline of each subsection at 20-m (65-ft) intervals. Shovel tests alternated with soil probes.

HDR staff excavated shovel tests to an average depth of 50 cm (20 in), whereas soil probes were excavated typically to 80 cmbs (31.5 in). Shovel tests were excavated in 10-cm (4-in) thick levels. Shovel testing ceased when subsoil was reached, or until the depth precluded further hand-excavation.

Sediments removed from the shovel tests were sieved through ¼-inch (6.4 mm) hardware mesh screens, while soil removed from probing was noted but not screened. All soil descriptions employed U.S. Department of Agriculture (USDA) soil terminology and Munsell color descriptions. Soil stratigraphy, locational information, artifact content, and other pertinent data for each subsurface test were recorded on standardized forms. Each subsurface test was backfilled after HDR documented its soil profile and attributes.

Area 3

Since surface visibility was adequate, HDR staff completed surface reconnaissance of the entire proposed excavation footprint in this area. The pedestrian survey was conducted at approximately 10 m intervals. Visibility within the plowed field was 100%, whereas visibility within the bean field was only 30-50%. Due to the comparatively low visibility in the bean field, crewmembers cleared a small portion of the ground surface at 10 m intervals until surface visibility reached 100%.

Field - Architectural History

Residential, commercial, and industrial standing structures were photographed within 0.8 km (0.5 mi) of the proposed landfill development (Area 1) and within 0.8 km (0.5 mi) of the proposed wetland creation (Area 3). The purpose of the photo-documentation was to assist the SHPO in the determination of whether or not to recommend a formal standing structures survey for the present project. Donna Stubbs completed the photo-documentation on November 8, 2002 and Daniel Pratt provided the narrative description in Appendix A.

Archaeological Results

Since HDR did not complete a formal architectural inventory of historic standing structures, this section describes only the results of the archaeological investigation. A brief architectural history narrative is provided in Appendix A to assist the SHPO in determining whether or not to recommend a formal inventory.

Area 1

The results of HDR's archaeological investigation of this area are summarized on a subsection by subsection basis. See the **Introduction** (above) for a description of each subsection.

Subsection A was a large dredge area. Three soil probes, with an average depth of 70 cm (26 in) and a maximum depth of 90 cm (35 in), were placed within the disturbed area at 50-m (164-ft) intervals to determine the presence of any intact soils (Figure 6). HDR staff encountered a pond at the end of the probe transect, linking Subsections A and B. Subsection A's soils consisted of mottled silty clay to silty sandy clay, with clay loam in some areas. The top 30 cm (12 in) consisted of very dark gray (10 YR 3/1) silty clay to silty sandy clay. From this depth to the bottom of the probes, the soils were very dark grayish brown (10 YR 3/2) silty sandy clay to sandy clay. No intact buried soils or cultural materials were noted in the soil probes in this subsection.

Shovel testing began with two transects on a north-south axis in the northwesternmost portion of Subsection A. Four shovel tests were completed on a 20-m-by-20-m grid (Figure 6). The average depth for the tests was 50 cm (20 in) and the maximum depth was 60 cm (24 in). Soils ranged from black (10 YR 2/1) silty loam to very dark gray (10 YR 3/1) clay loam to very dark grayish brown (10 YR 3/2) sandy clay loam within the top 10-40 cm (4-16 in), and mottled black to very black (10 YR 2/1) to very dark grayish brown (10 YR 2/1-10 YR 3/2) silty clay to very dark grayish brown (10 YR 3/2) clay loam below 40 cmbs (16 in). No intact buried soils or cultural materials were encountered in the four shovel tests.

Subsection B was a wooded area with heavy grass cover and leaf litter (Plate 1). Due to disturbed soils across adjacent Subsection A, HDR placed one transect on an east-west axis and one transect on a north-south axis through the center of Subsection B. Shovel tests alternated with soil probes every 20 m (65 ft) (Figure 6). The east-west transect consisted of six shovel tests with an average depth of 55 cm (22 in) and a maximum depth of 65 cm (26 in) and six soil probes with an average depth of 80 cm (31 in) and a maximum depth of 89 cm (35 in). The north-south transect consisted of six shovel tests with an average depth of 55 cm (22 in) and a maximum depth of 65 cm (26 in) and six soil probes with an average depth of 80 cm (31 in) and a maximum depth of 89 cm (35 in). Most tests in Subsection B contained high concentrations of shell (small bi-valve and snail) and gravel. Soils consisted of black to very dark gray (10 YR 2/1-10 YR 3/1) silty clay loam within the first 30 cmbs (12 in), transitioning to very dark grayish brown (10 YR 3/2) silty clay.

Shovel Test T4 220 produced a single piece of green plastic at 20 cmbs (8 in). The plastic fragment was noted but not collected. This shovel test was located within heavy tree-fall, and miscellaneous boards with nails were lying on the ground surface nearby. Since HDR crewmembers did not observe any indications of previous structures (i.e., no depressions or structural remnants, no former structures on plat maps), the boards with nails are interpreted as secondary deposits from springtime flooding of the Minnesota River.

Plate 3. Overview of Area 1, Subsection D, facing north.

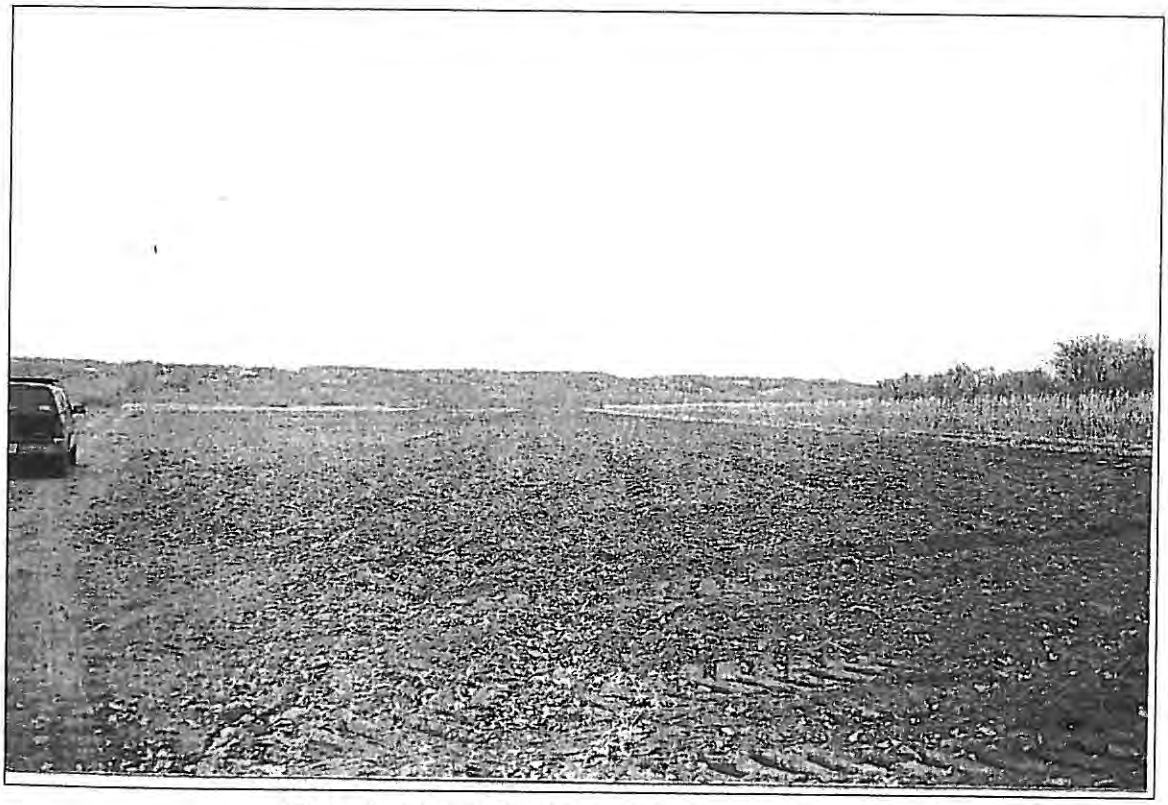


Plate 4. Overview of Area 3, facing northeast.

Conclusions and Recommendations

Excavations in Area 1 are planned to not exceed 91-cm (3-ft) depth. Shovel tests and soil probes extending 90 cm (2.9 ft) documented alluvial deposits. No cultural horizons were noted during the testing. In addition, a geomorphological assessment conducted independently by James Aiken of McCain and Associates indicated the depositional environment of Area 1 is similar to those found upriver from the project area within the Minnesota River Wildlife Refuge. In his estimation, the archaeological potential of Area 1 is low at depths greater than those attained by HDR's hand excavations. Based on HDR's investigation, further archaeological testing is not recommended in Area 1.

Area 3 is currently agricultural land with excellent surface visibility. Therefore, no subsurface testing was needed and the proposed impact areas were covered by pedestrian reconnaissance. Only ca. 0.4 ha (7 ac) will be directly affected by using plowzone soils to create berms around the northern perimeter of the site. No cultural materials were noted during the surface survey, and based on HDR's investigation of the area, no further archaeological testing is recommended in Area 3.

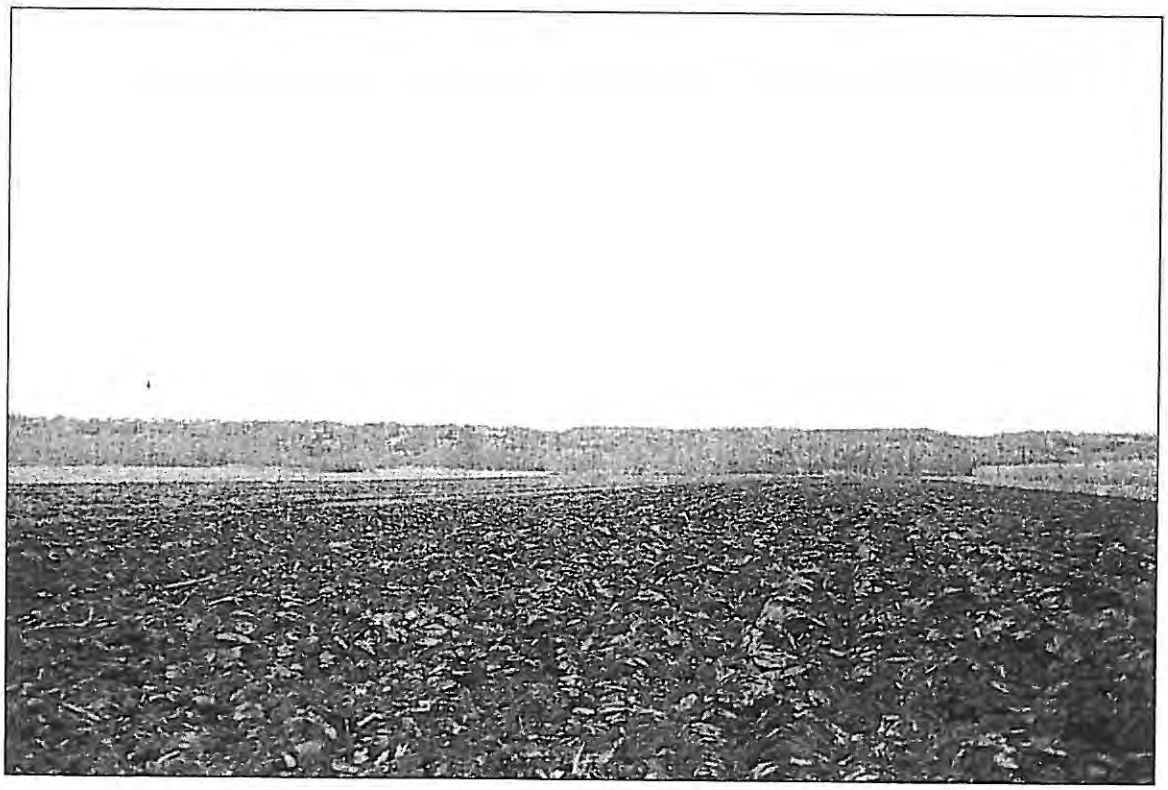


Plate 5. Another Overview of Area 3, facing north.

Final Report

Cultural Resources Management

Phase I Cultural Resources Investigation,
Peterson Wetland Mitigation Bank Project,
Carver, Scott, and Hennepin Counties, Minnesota

By

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Woodbury, Minnesota

August 21, 2017

ALO Project No. 2017-001

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Executive Summary

The Peterson Wetland Mitigation Bank (Project) is proposed for parcels in Section 31 and 32, T116N, R22W (Hennepin County), Section 36, T116N, R23W (Carver County), Section 1, T115N, R23W (Scott/Carver counties), and Section 6, T115N, R22W (Scott County). Wetland development triggers the need for the Project to obtain a US Army Corps of Engineers (USACE) permit under Section 404 of the Clean Water Act. Therefore, a Phase I cultural resources investigation is necessary for compliance with Section 106 of the National Historic Preservation Act (NHPA). Wenck subcontracted the Phase I cultural resources investigation to ALO Environmental Associates LLC (ALO).

Per Wenck's Project Manager and Wetland Designer, Michael Graham, the Area of Potential Effects (APE) was limited to those specific locations within the Project Area boundaries that are between elevations 704 feet above mean sea level (ft amsl) and 706 ft amsl (214.6-215.2 m amsl). The justification is that these locations will undergo scraping by heavy machinery for the creation of a "wetland mosaic." Because of implications for subsurface testing in the field, it is important to note that this 2-ft elevation difference corresponds to only 61 cm.

Locations above 706 ft amsl will become upland habitat through natural succession; direct land-disturbing impacts will not occur there. Locations below 704 ft amsl will be submerged more permanently through localized sediment plugs to be placed on the lakeside of the existing drainage features. Wetlands in those locations will be enhanced through additive measures (i.e., placement of sediments); therefore, the APE does not include locations below 704 ft amsl.

ALO's Principal Investigator for the Phase I investigation was Dr. Amy Ollendorf. She also completed all the off-site meetings and research as well as the on-site field work. ALO coordinated in the field with Wenck's soil science team for the identification of buried A (Ab) horizons in the APE. A kickoff team meeting occurred at Wenck's Woodbury office on July 11, 2017. Ollendorf completed background research at the Minnesota Historical Society (MHS) on July 11th and 14th. She also coordinated with regional and local specialists for further information:

- Past archaeological surveys (David Stanley, Bear Creek Archaeology, July 14th; Lori Creamer, City of Eden Prairie, July 18th and August 17th; Bruce Koenen, Minnesota Office of the State Archaeologist, August 14th; Leonard Wabasha, Shakopee Mdewakanton Sioux Community, August 17th).
- MnModel output data (Craig Johnson, Minnesota Department of Transportation, July 7-12th).
- Recent geoarchaeological investigations of deeply buried sites nearby (Frank Florin, Florin Cultural Resource Services, July 10th).
- Land-use history (Aaron and Severin Peterson, landowners, July 19th and August 17th).

This investigation's research design for field work had two objectives: (1) to confirm the previously reported site boundaries of 21HE0225 and 21HE0226 in relation to the APE and (2) to test for the presence or absence of archaeological deposits at specific locations in the APE where buried A (Ab) or horizons had been documented independently by the Project's soils team. ALO completed close-interval systematic surface reconnaissance (2-3 m spacing) with limited controlled surface collection on July 17-18th to address the first objective. ALO also completed limited shovel/auger testing on July 19th to satisfy the second objective.

Field conditions were dry and ground-surface visibility was generally 75-100%. Ollendorf verified the cultural origin of all artifacts as they were recorded in the field with a Trimble GeoExplorer XR global positioning system (GPS). The GPS unit also was used to record the location of the seven shovel tests. An auger was used to extend the maximum depth of two shovel tests to 120-122 cmbs. Sediment from all shovel tests and auger extensions was passed through ¼-inch mesh archaeological sifting screens. Ollendorf described all archaeological subsurface tests with a Munsell color chart and USDA's soil texture triangle. The controlled artifact collection was limited to only unique or possibly diagnostic objects for preparation and description in ALO's laboratory.

Three archaeological sites are previously recorded in the Project Area – 21HE0092, 21HE0225, and 21HE0226.

Buried A Horizons

Maximum depths of shovel tests reached 70-102 cmbs. The Ab horizon was encountered as shallowly as 52 cm depth in some places and as deeply as 83 cm depth at others. A bucket auger was used in two of the shovel tests to sample farther into the Ab horizons, attaining maximum depths of 122 cm and 120 cm, respectively, where water was encountered. The Ab horizon at these locations is characterized by 10YR2/1 (black) color with varying textures – silty clay loams, clay loams, and silty clays. No archaeological artifacts or deposits were encountered in any of the shovel/auger tests. No further geoarchaeological work is recommended to the maximum depth examined in the portions of the APE where Ab horizons were documented (i.e., 122 cmbs). If future excavations are planned for depths exceeding those in the present APE and documented by this investigation, then regulators may decide whether or not to require re-examination for the possibility of deeper Ab horizons with possible historic properties.

Site 21HE0092

This site is within the Project Area but outside of the present APE; therefore, ALO made only minor efforts to gather additional data. ALO supports the original recommendation by previous investigators for the future evaluation of the NRHP eligibility of 21HE0092 under criteria A, C, and D. If this site is in any future APE, then ALO recommends carefully analyzing new archival and archeological data as well as obtaining additional oral histories with the Petersons and other long-time residents of the area, including members of the Shakopee Mdewakanton Sioux Community (SMSC).

Site 21HE0225

A total of 67 archaeological artifacts were inventoried at 65 locations during the field survey at this site; 26 of the artifacts were collected for analysis in ALO's laboratory. ALO recommends the constriction but elongation of the boundaries of 21HE0225. Both the old and new site boundaries fall outside of the APE for the presently proposed project. Therefore, a finding of No Historic Properties is recommended for the APE in the vicinity of this site. If the proposed wetland mitigation bank project will restrict access to the APE and thereby avoid 21HE0225, then no further archaeological work should be required here prior to construction. It should be noted, however, that ALO does support the original recommendation by previous investigators that this site is potentially eligible for nomination to the NRHP under criteria A, B, and D. ALO is submitting an updated site form to the OSA under separate cover.

Site 21HE0226

A total of 472 archaeological artifacts were inventoried at 208 locations during the field survey; 34 of them were collected for analysis in ALO's laboratory

As a result of the present close-interval surface reconnaissance survey, ALO recommends the addition of a long linear area adjacent to the old boundaries of 21HE0226. Both the old and new site boundaries fall

outside of the APE for the presently proposed project. Therefore, a finding of No Historic Properties is recommended for the APE in the vicinity of this site. If the proposed wetland mitigation bank project will restrict access to the APE and thereby avoid 21HE0226, then no further archaeological work should be required here prior to construction.

It should be noted that the western portion of the ALO-recorded artifact concentration is dense and ALO recommends extending the site boundaries northward and westward, but no structural remnants are present and decades of cultivation have dispersed artifacts even further northwardly and northwestwardly. Therefore, the site appears to be lacking structural integrity.

Previous investigators recommended detailed archival research to determine if this site has any regional or local significance. Such detailed research was outside the scope of ALO's present investigation, so the original recommendation still stands. ALO does wish to emphasize that the present investigation did not reveal any structural remnants or standing structures so it is unlikely that 21HE0226 would be found in the future to be NRHP-eligible. ALO is submitting an updated site form to the OSA under separate cover.

1.0 INTRODUCTION

The Peterson Wetland Mitigation Bank (Project) is proposed for parcels in Section 31 and 32, T116N, R22W (Hennepin County), Section 36, T116N, R23W (Carver County), Section 1, T115N, R23W (Scott/Carver counties), and Section 6, T115N, R22W (Scott County). **Figure 1** shows the location of the Project Area.

Wetland development triggers the need for the Project to obtain a US Army Corps of Engineers (USACE) permit under Section 404 of the Clean Water Act. A Phase I cultural resources investigation is necessary for compliance with Section 106 of the National Historic Preservation Act (NHPA). Wenck subcontracted the Phase I cultural resources investigation to ALO Environmental Associates LLC (ALO).

Per Wenck's Project Manager and Wetland Designer, Michael Graham, the Area of Potential Effects (APE) for compliance with Section 106 was limited to those specific locations within the Project Area boundaries that are between elevations 704 feet above mean sea level (ft amsl) and 706 ft amsl (214.6-215.2 m amsl). The justification is that these locations will undergo scraping by heavy machinery for the creation of a "wetland mosaic" (**Figure 2**). Because of implications for subsurface testing in the field, it is important to note that this 2-ft elevation difference corresponds to only 61 cm.

Locations above 706 ft amsl will become upland habitat through natural succession; direct land-disturbing impacts will not occur there. Locations below 704 ft amsl will be submerged more permanently through localized sediment plugs to be placed on the lakeside of the existing drainage features (**Figure 2**). Wetlands in those locations will be enhanced through additive measures (i.e., placement of sediments); therefore, the APE does not include locations below 704 ft amsl.

2.0 METHODS

2.1 Pre-Field

These tasks consisted of a team kickoff meeting and background research. The details are described below.

2.1.1 Team Meeting

Project Manager & Wetland Designer, Michael Graham, and Lead Soil Scientist, Matt Summers (both Wenck), met with ALO Environmental Associates' (ALO) Principal Investigator, Amy Ollendorf, during a kickoff meeting on July 11th. At this meeting, it was agreed that Wenck's soil science team would look for and mark in the field any locations containing a buried A (Ab) horizon because of the potential for deeply buried intact and significant archaeological sites. The soil science team would coordinate closely in the field with ALO, if any Ab horizons were mapped.

2.1.2 Background Research

On July 11th and July 14th, Ollendorf completed background research at the Minnesota Historical Society (MHS) in the State Historic Preservation Office (SHPO), Gale Family Library, and Hubbs Microfilm Room for those portions of Hennepin, Carver, and Scott counties in the APE. In the SHPO, ALO examined base maps showing previously recorded archaeological sites and historic standing structures in addition to the Trygg (1969) map from the 1854-1855 General Land Office (GLO) surveys. ALO also made photocopies of relevant maps, site and HSS files, and previous archaeological reports in and around the APE. Historic plat maps then were obtained from the Library and Microfilm Room (Wright and Rice 1873; Andreas 1874; Dahl 1898; Dahlgren 1944, 1958; Farm & Home Publishers 1991, 1992, 1997a, 1997b; Hixson & Company 1916; Hudson Map Company 1925; Northwest Publishing Company 1898a, 1898b; Rockford Map Publishers 1962, 1973, 1987; Westby 1913).

In addition to the historic map research, Wenck provided historic aerial photographs for the period 1937-2016. Under Ollendorf's supervision, Wenck's GIS Specialist, Jordan Shuck, produced a digital elevation model (DEM) for the Project Area in its broader environmental context as well as a soils map showing the distribution of soils as mapped by the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS). The DEM and soils maps are shown in **Figure 3** and **Figure 4**, respectively. Ollendorf also had email contact with Craig Johnson (Minnesota Department of Transportation [MNDOT] Archaeologist) July 7-12th for MnModel output data. Under Ollendorf's supervision, Shuck subsequently summarized Johnson's data in a project-specific map (**Figure 5**).

On July 10th, Ollendorf spoke with Frank Florin (Florin Cultural Resource Services LLC) about geoarchaeological methods and findings of archaeological sites buried at depth in colluvial toe slope settings and alluvial fans in the Minnesota River Valley, and a levee/scroll bar along the river. He referred

Ollendorf to investigations in the general vicinity of the present APE (Anderson 2015; Florin 2013; Florin et al. 2015; Kaeding 2015; Ketz et al. 1997; Kolb 2013) in addition to MnDoT's protocol for deeply buried archaeological sites (Monaghan, Egan-Bruhy, Hambacher et al. 2006). Detailed cultural history descriptions are readily available for the region and present APE so they are not repeated herein (e.g., Florin et al. 2015; Kaeding 2015; Ollendorf et al. 2002).

On July 14th, Ollendorf spoke by phone with David Stanley (Bear Creek Archaeology) since he had been the Principal Investigator for the archaeological portions of the historic landscapes study completed for the City of Eden Prairie more than 20 years ago (Vogel et al. 1994). It was hoped that Stanley could provide access to original copies of the report and field photos, geoarchaeological maps by Arthur Bettis, and artifact collection. However, Stanley believes all those deliverables were submitted to the City of Eden Prairie.

On July 18th, Ollendorf met with Lori Creamer, Planning Technician (City of Eden Prairie), hoping to look at the original Vogel et al. (1994) report and the associated artifact collections. Ollendorf sent a follow up email to Creamer on August 14th to see if she had been able to locate any relevant materials in the City's archives.

2.2 Field Work

Vogel et al. (1994) completed pedestrian surface survey of the entire Project Area with limited soil probing (**Figure 6**), but their report and maps do not specify the intervals for the archaeological survey or the exact locations of the soil probing. Ollendorf's pre- and post-field efforts were unsuccessful in locating original copies of Vogel et al. (1994), Bettis (1994), and associated maps as well as their artifact collection (see Stanley above; Creamer above and below, and Koenen below).

Ollendorf et al. (2002) a completed pedestrian reconnaissance survey of approximately 180 acres in portions of Sections 31 and 32 in the present APE (**Figure 6**). This project was completed for compliance with Section 106 of the NHPA since an USACE Section 404 permit was necessary for another proposed wetland-creation project. The presently proposed Peterson Wetland Mitigation Bank Project is a continuation of the previously proposed project, which, to date, has not yet been built. Survey interval of the Ollendorf et al. (2002) survey was approximately 10 m in plowed and soybean fields with 100% ground-surface visibility. No cultural materials were encountered and no further archaeological testing was recommended.

For the present investigation, ALO completed close-interval systematic surface reconnaissance with limited controlled surface collection on July 17-18th and limited shovel testing on July 19th (**Figure 7**). This investigation's research design for field work had two objectives: (1) to confirm the previously reported site boundaries of 21HE0225 and 21HE0226 in relation to the APE and (2) to test for the presence or absence of archaeological deposits at specific locations in the APE where buried A (Ab) or horizons had been documented independently by the Project's soils team. ALO completed close-interval systematic surface reconnaissance (2-3 m spacing) with limited controlled surface collection on July 17-18th to

address the first objective. ALO also completed limited shovel/auger testing on July 19th to satisfy the second objective.

Field conditions were dry and weather conditions were clear but extremely hot (100 degrees Fahrenheit) on July 17th. Rain fell intermittently during the morning surface survey on July 18th. The close-interval surface reconnaissance was completed at 2-3-meter intervals across the existing soybean fields (**Figure 7**). Ground-surface visibility was 75-100%. Surface reconnaissance participants under Ollendorf's direct field supervision on one or both days included Aaron Peterson (client); Andrew and Philip Bondarenko, Dan Melnichek, Andrew Machukans (client employees); Hendrik Ruchunsdorf, Henrique Vita, Vlad Kovoliov, and Tainan Almeida (MAST participants)[1]; Mike Graham, Eric Osterdyk, and Meaghan Watson (Wenck). Ollendorf personally verified the cultural origin of all artifacts as they were recorded in the field with a Trimble GeoExplorer XR global positioning system (GPS) by either Watson or Osterdyk. The controlled artifact collection was limited to only unique or possibly diagnostic objects for laboratory preparation and description.

During the early afternoon of July 18th, after the conclusion of the surface survey, Ollendorf met with Lori Creamer, Planning Technician for the City of Eden Prairie, in the hopes of securing copies of Vogel et al. (1994) and Bettis (1994), and possibly also to examine artifacts that had been collected during their field work more than 20 years ago. As noted above, these efforts were unsuccessful as the City could not confirm the whereabouts of the reports, maps, and artifact collections. August 14th, Ollendorf exchanged emails with Bruce Koenen, Research Archaeologist in the Office of the State Archaeologist (OSA), confirming the OSA also does not possess the missing items.

Simultaneous to the CRM field work, Wenck soil scientists, Matt Summers and Matt Rettke, completed 78 manual soil test pits across the entire Project Area in a variety of landforms to inform the wetland design (**Figures 8 and 9**). Six of those locations yielded Ab horizons (T13-1 through T13-4, T15-1 & T15-2) and one additional location yielded a possible Ab horizon (T14-1). Consequently, ALO excavated an archaeological shovel test (ST) at each location to various depths (70-102 cm below the surface [cmbs]) at those locations (**Figures 7 and 9**). A bucket auger was used in ST 14-1 to extend to a maximum depth of 122 cmbs and in ST 15-2 to 120 cmbs. All excavated sediment was passed through ¼-inch mesh archaeological sifting screens. Ollendorf described all archaeological subsurface tests with a Munsell color chart and USDA's soil texture triangle. Excavators assisting Ollendorf for shovel/auger tests were Vlad Kovoliov, Tainan Almeida, Henrique Vita, Meaghan Watson, and Eric Osterdyk.

2.3 Laboratory Work and Mapping Efforts

Following the completion of all pre-field and field tasks as documented above, Ollendorf cleaned and examined the artifacts collected during the survey. Those not discarded as non-cultural were inventoried,

[1] The Minnesota Agricultural Student Trainee (MAST) Program is designed to provide young agriculturists from around the world with the opportunity to come to the U.S. to live, learn, and study with Americans.

using standard archaeological methods of description, scaled photography, linear measurements, and weights.

Simultaneous to the laboratory efforts, Wenck downloaded GPS data and produced GIS maps to show ALO's survey results. Details are provided below.

3.0 RESULTS

The Project Area and surrounding region in general and the APE in particular have been well-studied archaeologically (Florin 2013; Florin et al. 2015; Kaeding 2015; Ketz et al. 1997; Ollendorf et al. 2002; Vogel et al. 1994) and now also by the present investigation. The regional environmental setting also has been well-studied by geomorphologists and geoarchaeologists (e.g., Anderson 2015; Kolb 2013; Monaghan, Egan-Bruhy, Hambacher et al. 2006). The following sections synthesize the results of the previous and present investigations.

3.1 Background Research

3.1.1 Environmental Setting

The DEM for this reach of the Minnesota River, shows the entire Project Area is located a sufficient distance from the colluvial and alluvial fans associated with the bluffs to the north (**Figure 3**). Most of the Project Area has moderate elevations, with the slightly higher elevations associated with flood deposits in a variety of landforms as shown in **Figure 8** (e.g., crevasse-splay in “Hl” Natural Levee adjacent to the Minnesota River and other flood deposits “Hfm” Minnesota River Valley Floodplain through the isthmus between Rice Lake and Grass Lake. Wenck findings about the history and mechanisms of flooding in the Project Area are reported elsewhere and not repeated here.

A great amount of cultural resources and geoarchaeological efforts have been made recently in the general vicinity of the present APE. For instance, immediately adjacent on the west was the APE for the Trunk Highway 101/County State Aid Highway 61 (TH 101/CSAH 61) “Y” reconstruction and TH 101 bridge replacement project. A total of 41 5-cm-diameter truck-mounted Geoprobe cores were extracted on the north and south sides of the bridge. Many sites have been documented and studied on the north side of the river in the TH 101/CSAH 61 “Y” and east-west approaches on the colluvial toe slopes and alluvial fans (e.g., Anderson 2015; Florin 2013; Florin et al. 2015; Kaeding 2015), and some, such as 21CR155, eventually have been subjected to Phase III archaeological excavation as mitigation.

Three of the 41 cores were taken at the south bridge approach, which is closest to the APE for the presently proposed Peterson Wetland Mitigation Bank Project. These cores were taken from a very different sedimentological context - the levee/scroll bar and floodplain adjacent to the river channel.

> Deposits beneath the levee/scroll bar were recorded as fine stratified very fine sands and silts initially deposited in the abandoned channel belt of the Minnesota River immediately after it moved laterally to the south. Secondary flood channels that are perpendicular to the Minnesota River channel are visible on the levee backslope on an air photo from the 1960s indicating it was still accreting laterally and vertically at that time. The channel cannot move further south due to bedrock along the south bank. Deposits get finer-grained and more poorly sorted with depth at the floodplain edge of the levee/scroll bar with a weakly developed buried soil formed in loam at 3.65 m below the surface. Shovel tests

> and hand probes from the floodplain surface indicate the deposits are vertical accretion silts and clays" (Kolb 2013:10-11).

No archaeological sites were encountered by Florin (2013) or Kolb (2013) in these deposits on the south approach of the TH 101 bridge.

MnModel by the MnDOT landscape suitability ranking characterizes the entire Project Area are "moderate potential" for archaeological sites at 0-2 m (0-6.5 ft) depth (**Figure 5**). US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) maps several soil series throughout the Project Area (**Figure 4**). As summarized in **Table 1**, most are recent soils lacking B horizons (Entisols) with soil development prevented by repeated deposition of sediment in periodic floods. The others series are either organic mucks common to wetlands (Histosols) with highly decomposed organic materials or silty clay-silt loams common to grasslands (Mollisols) commonly water-saturated (Oshawa series) or sufficiently high soil moisture to meet plant requirements (Brouillet series).

Although the Dorchester soil series is mapped only in the far southwest corner of the Project Area (**Figure 4**), ALO paid special attention to it, because its type location in the Mississippi River Valley (Clayton County, Iowa) is described by the USDA-NRCS as possessing two Ab horizons:

- **Ab1** 45 cm thick - 79 cm to 124 cm below the surface (cmbs); black (10YR 2/1) silt loam; weak fine granular structure; friable; neutral; gradual smooth boundary.
- **Ab2** 28 cm thick - 124 cmbs to 152 cmbs; very dark brown (10YR 2/2) silt loam; black (10YR 2/1) coats on faces of peds; weak fine subangular blocky structure; friable; neutral.

3.1.2 Previously Documented Cultural Resources

This section consolidates the results of ALO's research at the MN-SHPO and in the MHS library and microfilm room. There are many historic standing structures and archaeological sites recorded outside of the APE and Project Area (e.g., in the City of Shakopee, and along the bluff edge overlooking the Minnesota River Valley and at the toeslopes beneath the bluffs). Only those recorded in the Project Area are presented here; their relationship to the APE is detailed as well.

<u>MN-SHPO Recorded History/Architecture Resources</u>

There are no recorded historic standing structures in the Project Area or APE. Many historic standing structures are inventoried at the MN-SHPO in the cities of Shakopee and Eden Prairie, but these are far outside of the present Project Area. Less commonly and also outside of the Project Area are historic standing structures in the waning rural locales (e.g., bridges, barns, etc.). It should be noted that the Indian Road Corridor has is inventoried in both the MN-SHPO History/Architecture and Archaeology databases with numbers HE-EPC-092 and 21HE0092, respectively. Consequently, this resource is discussed in the section immediately below with the other archaeological sites previously recorded for the Project Area.

<u>MN-SHPO Recorded Archaeological Sites</u>

Figure 10 shows the three archaeological sites that are recorded in the Project Area (Vogel et al. 1994). The west side of 21HE0225 and only a small portion of the northern fringe of 21HE0226 are immediately adjacent to the APE. The other site, 21HE0092, is outside of the APE.

21HE0092 (Indian Road). Vogel et al. (1994) described this site as "an abandoned gravel road, …[that]… follows the historic route of the wagon from Shakopee to Lake Harriet and Fort Snelling shown on late 19th century maps…, although it is not shown on the earliest maps" (e.g., Andreas 1874; Trygg 1969). "…The road crosses through bottomland forest and agricultural fields and crosses the Narrows... [21HE0093] …between Rice and Grass lakes, the site of the 1858 'Battle of Shakopee.'" Vogel et al. (1994) recommended careful analysis of archival and archeological data developed by future surveys for the evaluation of National Register of Historic Places (NRHP) eligibility under criteria A, C, and D.

21HE0225 (Peterson Site 1). According to Vogel et al. (1994), this site consists of a long, linear deposit of sparse cultural materials scattered ca. 1,000 m x 100 m on a natural levee, which is probably late Holocene in age. Soil cores taken with a handheld probe did not yield any buried surfaces to a depth of 1.75 m and the plowzone extended to varying depths of 28-30 cm in the sandy loam.

Vogel et al. (1994:93) reported a recollection from the landowner, Severin Peterson, who still, to this day, owns and farms the property, "that Native Americans were camping at this location in the 1950s; they were presumably Mdewakanton Dakota from the Prior Lake area, and some of the descendants of these individuals are still in the area." Considering some of the unique finds, the older date of some of the historic objects, and the possible association with ancestors of present-day tribal members, Vogel et al. (1994) recommended 21HE0225 as potentially eligible for nomination to the National Register of Historic Places (NRHP) under at least Criterion D.[2] Criteria A and B also may be worthy of consideration if indicated through oral histories with present-day tribal descendants.

During the 1994 survey, this site appeared to be comprised of two distinct artifact scatters – a large scatter to the southwest and a smaller scatter to the northeast. Each of the descriptions is reprinted here for ease of discussion in a later section of this report.

The Southwest Scatter consisted of lithics (n=5), ceramics (n=10), glass (n=11), metal (n=1), bone (n=2), and shell (n=1). The lithic assemblage consisted of a gray quartzite cobble fragment with red-brown iron inclusions (interpreted as a possible hand-held chopper); one slightly polished stone; one basalt fragment; one catlinite waste material [flake?]; and one manually shaped and incised catlinite possible pipe fragment). The incised pattern on the manually shaped catilinite fragment appeared to approximate the British "Union Jack," according to Vogel et al. (1994:91). They also suggested the entire lithic assemblage had been purposely transported to the site. "Some of the lithic artifacts imply a prehistoric component…but it could be that historic groups just continued the tradition of using stone tools. Certainly

[2] Criterion A associated with events that have made a significant contribution to the broad patterns of our history; Criterion B associated with the lives of significant persons in our past; and Criterion D yielded or may be likely to yield, information important in history or prehistory (National Park Service 2002).

the worked glass indicates a knapping technology that extended into the late 19th and early 20th centuries. The catlinite pipe base with the British Union Jack may indicate an early 19th century component, but it may also reflect a curated artifact that had been in a family for several generations and only recently discarded" (Vogel et al. 1994:93).

The mean ceramic date for the collection is 1871.2 (Vogel et al. 1994:93). The ceramic assemblage consisted of three porcelain fragments, including one plate base, one bowl rim, and one small plate rim/base fragment though to have possibly derived from a child's toy. Three ceramic sherds dated to ca. 1840-1890 - a single plain white ironstone plate base fragment, one plain whiteware plate rim and one plain whiteware bowl body. Two flow-blue whiteware fragments from unknown vessel forms dated to ca. 1844-1860. One gilded slightly cream-colored whiteware plate rim sherd (ca. 1925) and one large plain yellow ware vessel base (ca. 1827-1922).

The glass collection consisted of three burned and melted glass chunks; two flat glass fragments, possibly window glass; and six machine-made container shards, including an amber base, a clear base, a cobalt blue body, one clear molded body, and two large clear bases, which appear to have been reworked, possibly for use as cutting tools. Vogel et al. (1994:92) commented the two worked glass fragments were particularly interesting, because "this represents 20th-century machine-made glass."

The collected metal was "one apparently handmade iron rose head spike" (Vogel et al. 1994:92). The bone collection consisted of two small mammal fragments with one sawn through at one end, and the shell was a mollusc fragment.

The Northeast Scatter consisted of only four collected objects – one amber machine-made container body fragment, one small mammal bone fragment, and two mollusc shell fragments.

21HE0226 (Peterson Site 2). According to Vogel et al. (1994), this site is an approximately circular (ca. 50 m x 50 m) moderately dense deposit of Euro-American cultural materials scattered on a low topographic rise also in the natural levee and floodplain like 21HE0225. Soil cores with a handheld probe indicated a 28-cm-thick plowzone overlying light-colored sandy loam. It is presumed the soil cores did not encounter any Ab horizons since none were mentioned in their report.

Vogel et al. (1994:94) reported another recollection from Severin Peterson, the landowner at that time and still today, that the location was the site of a 19th century Euro-American meat-packing enterprise. The investigators remarked that the artifact inventory did not seem to be reflective of a slaughterhouse, but that was clearly different from the artifact collection from 21HE0225. Vogel et al. (1994) recommended detailed archival research to determine if this site has any historical significance. If so, then NRHP Criteria A and B also may be worthy of consideration.
This artifact scatter consisted of ceramics (n=22),[3] glass (n=6), and brick (n=1). The mean ceramic date was calculated to 1869.9 (Vogel et al. 1994:95). The assemblage consisted of one field (drain) tile

[3] A discrepancy is noted between the total ceramic count of 14 (Vogel et al. 1994:94) versus the description of 22 ceramic artifacts (in (Vogel et al. 1994:94-95).

fragment, classified as stoneware; one gray-bodied small-mouthed stoneware jar rim fragment (ca. 1860-1875); two buff-bodied stoneware fragments (post-1875); one plain salt glaze bowl rim fragment (ca. 1860-1875); 10 earthenware fragments; one plain yellow ware plate rim (ca. 1827-1922); three plain white ironstone fragments (one body fragment from an unknown vessel, one plate rim fragment, and one rim fragment from a mug - all ca. 1840-1890); and three plain whiteware fragments (one plate rim, two bowl rims, and two body – all ca. 1840-1890).

One light green glass vessel base shard was collected that possessed evidence of machine-made with a wide range of possible manufacture dates (1889-early 1950s). Other glass artifacts collected were a clear glass molded tumbler base fragment with a six-paneled body; one aqua container glass body fragment from a mold-blown vessel (early to mid-1800s through the early 20th century); and three clear container fragments of unknown manufacturing technique (one plain body, one body with "P.D." embossed on it, and one finish fragment).

One brick fragment showing three outer surfaces and the interior also was collected. "It appears to be salt-glazed and the body clay is a gray-buff color…the brick also appears to be hand-molded…Most bricks continued to be hand-molded until the last quarter of the 19th century. By the end of the 19th century, automatic molding machines were widely used" (Vogel et al. 1994:94).

3.2 Field Work

3.2.1 Buried A Horizons

Plates 1-4 illustrate the field conditions in the area subjected to ALO shovel testing.

As shown in **Figure 9**, six of Wenck's soil pits yielded Ab horizons (T13-1 through T13-4, T15-1, and T15-2) and one additional location yielded a possible Ab horizon (T14-1). ALO excavated one archaeological shovel test (ST) at each of these seven locations. Maximum depths of shovel tests reached 70-102 cmbs, and a bucket auger was used in two of the shovel tests (STs 14-1 and 15-2) to sample through the Ab horizons, attaining maximum depths of 122 cm and 120 cm, respectively, where water was encountered.

The Ab horizon was encountered as shallowly as 52 cm depth (ST 15-2) and as deeply as 83 cm depth (ST 13-1). The Ab horizon is characterized by 10YR2/1 (black) color with varying textures – silty clay loams (STs 13-2, 13-3, 13-4, 14-1, and 15-2), clay loams (ST 13-1), and silty clays (ST 15-1).

Table 2 provides generalized summaries of soils encountered in the seven shovel tests. ALO confirmed an Ab horizon in ST 14-1. No cultural objects were recovered from any of ALO's shovel/auger tests.

3.2.2 21HE0092

Field work was not conducted in Indian Road, but **Plate 5** is included to demonstrate the nature and condition of the road.

3.2.3 21HE0225

A total of 65 locations were mapped at archaeological surface finds at 21HE0225 as a result of the surface reconnaissance survey in the soybean fields comprising the APE (**Figure 9**). **Plate 6** illustrates the field conditions at this site. A total of 67 archaeological artifacts were inventoried during the field survey; 26 of them were collected for analysis in ALO's laboratory (**Table 3**).

The total artifact assemblage, as recorded in the field, is comprised of 25 ceramic fragments, 16 glass fragments, 12 bone fragments, eight shell fragments, four lithic objects, and two metal fragments. The ceramic assemblage includes five stoneware (three collected, **Plate 7a & b**), 14 whiteware (one collected, **Plate 8a & b**), two earthenware (both collected, **Plate 9a & b**), three porcelain (two collected, **Plate 10a & b**), and one rim with blue-white transfer printing (one collected, **Plate 11a & b**) fragments.

The glass assemblage as recorded in the field includes brown (n=8), blue (n=2), clear (n=4), green (n=1), and amethyst (n=1) fragments. Of these, two glass rim shards – one green and one clear - were collected (**Plate 12a & b**). Two other fragments collected were an aquamarine (one of the two blues observed) glass chunk and a clear glass chunk, both likely from telephone line insulators (**Plate 13a & b**). Two glass base fragments also were collected (one clear, one clear-bluish, **Plate 14a & b**).

Twelve bone fragments were recorded in the field, and three were collected (**Plate 15a & b**). Two of the bone fragments were calcined, and one was burnt.

The shell assemblage is comprised of five gastropods and three mollusc fragments (only two molllusc fragments collected, **Plate 16a & b**).

Four lithics were recorded in the field, and all four were collected. One was a small chunk of Knife River Flint (KRF) and one was a small chunk of coal (**Plate 17a & b**). The other two collected lithics were very unique. One was a cube-shaped stone object with smoothed edges and the other was a chunk of likely lithic raw material that appeared to be worked into a flat surface on one face with one of the other surfaces seemingly in the shaping/smoothing process (**Plate 18a & b**).

Two metal artifacts were recorded and collected – one was a metal spike and the other was a thin sheet (**Plate 19a & b**). Both were completely rusted.

3.2.4 21HE0226

A total of 208 locations were mapped at 21HE0226 as a result of the surface reconnaissance survey in the soybean fields comprising the APE (**Figure 9**). **Plate 20 and Plate 21** illustrate the field conditions at

this site. A total of 472 archaeological artifacts were inventoried during the field survey; 34 of them were collected for analysis in ALO's laboratory (**Table 4**).

The total artifact assemblage, as recorded in the field, is comprised of 181 cement fragments, 135 drain tile fragments, 44 brick and 44 glass fragments, 27 ceramic fragments, 24 lithic fragments (including coal), six shell fragments, four metal fragments, two each of bone, terra cotta, and unknown fragments, and one charcoal fragment (distinct from coal chunks in the Lithics category).

Unlike the total artifact assemblage at 21HE0225, the total artifact assemblage at 21HE0226 contains a great deal of building materials. The abundant cement fragments range in size. One large, possibly brick mortar fragment was collected (**Plate 22a & b**) in addition to one smaller mortar fragment and one brick fragment **(Plate 23a & b)**. It should be noted that mortar fragments were counted in the Cement category. The abundant drain tile fragments also range in size and only one large fragment was collected (with "..[R]ED WING…" incised on one surface, **Plate 24a & b)**. Drain tile was counted separately from stoneware in the Ceramics category; this method differs from Vogel et al. (1994). Of the 44 glass fragments recorded in the field, 28 were clear glass and 13 of those were likely window glass shards, including four with patination. None of the possible window glass shards was collected. However, three clear non-window glass shards were collected. One is a bottle base fragment with "…5…" embossing on the exterior (bottom only), one is a possible bottle base shard with a light bluish hue, and the third is a possible bottle body shard that may have been worked **(Plate 25a & b)**.

The rest of the glass assemblage was comprised of brown (n=6), blue (n=4), green (n=5), and amethyst (n=1) fragments. Of these, two brown bottle glass shards were collected (**Plate 26a & b**). One of these fragments is thinner than the other and it has "…I[?] T[?] S E[?] or F[?]…" embossing on the exterior. This fragment was broken from either the shoulder or near the base of a bottle. It also has patination on its surfaces. The other, thicker brown bottle fragment, has parallel horizontal "rib" embossing on the exterior. It is a body shard but broken from near the base of the bottle.

All four blue glass fragments were collected. Three are cobalt blue (two bottle bases and one body bottle glass shards, **Plate 27a & b**) and one is an aquamarine body shard possibly also from a bottle (**Plate 28a & b**). One green bottle glass fragment was collected – a rim shard (**Plate 29a & b**). One fragment of melted green glass also was collected (**Plate 30a & b**).

The ceramic assemblage is comprised of stoneware (n=10), whiteware (n=15), other (n=2). Seven of the stoneware sherds were collected. They have a variety of glazes and finishes, including one with dark blue decoration (**Plate 31a & b**). Four whiteware base sherds were collected (**Plate 32a & b**).

Two other ceramic fragments were collected as well – a possible piece of red ceramic, possibly from a clay pigeon **(Plate 33a & b)** and a clay pipe fragment **(**Cultural Item ID #188 – see **Figure 10, Table 4, and Plate 34a & b)**. The clay pipe fragment is the most unique artifact observed and collected by ALO from 21HE0226. Likely manufactured from kaolin clay, no base or spur appears to be present on this pipe fragment. Clay pipes were considered inexpensive and disposable items that were generally manufactured, used, and thrown away within a very short timeframe. Individual styles often can be traced

to a specific manufacturer and period of production (National Pipe Archive 1975). The fragmentary nature of the pipe collected at 21HE0226, however, precludes the determination of such specifics.

Twenty-four lithic fragments, mostly coal chunks, were recorded in the field. Only the largest chunk was collected (**Plate 35a & b**).

Six shell fragments were recorded in the field (n=3 mollusc, n=3 gastropod), but none was collected. Four metal fragments were recorded during the survey, but only one was collected (**Plate 36a & b**). Two bone fragments from an unidentified mammal were observed, but neither was collected. Two fragments of terra cotta (e.g., flower pot material) were observed, but neither was collected. Two unknown fragments were encountered and collected (**Plate 35a & b**); they may be pieces of coal or degraded clay pigeon. One charcoal fragment was observed, but not collected (distinct from coal chunks in the Lithics category).

4.0 DISCUSSION

4.1 Buried A Horizons

Previous research and an understanding of the nature and magnitude of each undertaking are essential when considering deep testing as an appropriate and necessary method consistent with a reasonable and good faith effort to identify sites within the APE (Monaghan, Egan-Bruhy, and Hambacher et al. 2006). Although "backhoe trenching, under most circumstances, is the most effective and efficient method for discovery of buried archaeological deposits" (Monaghan, Egan-Bruhy, and Hambacher et al. 2006:12-2), it is not practical in every environmental setting or for every project.

The location with documented Ab horizons in the APE is a dynamic floodplain setting where extensive flooding is common. **Figure 16** illustrates the extent of two recent floods covering the APE. Consequently, the Ab horizon encountered in ALO's shovel/auger tests may be modern/recent. Furthermore, the scope of the present Project is a maximum change in elevation of only 2 ft (61 cm) in some portions of the APE. No historic properties were found in three deep geoarchaeological cores taken from a nearby APE along the Minnesota River for the replacement of the TH 101 bridge (Kolb 2013). No archaeological materials or features were encountered in any of ALO's shovel/auger tests.

Given our understanding of the dynamic nature of the local floodplain environment and the limited magnitude of the proposed Project in the present APE, ALO's hand-excavated shovel tests and auger extensions were compatible with MnDOT's Phase I Deep Test/Site Identification Process (Monaghan, Egan-Bruhy, and Hambacher et al. 2006:12-3). ALO suggests that the present level of effort reported herein suffices for the relatively shallow impact depth proposed for the APE. Given the dynamic nature of this floodplain and if future effects are proposed to greater depths than for the presently proposed Project, then additional deep testing, perhaps through backhoe trenching or coring, may be warranted to assess the presence or absence of historic properties below the maximum depth tested here (122 cmbs).

4.2 21HE0092

This site is within the Project Area but outside of the APE. Consequently, ALO made only minor efforts to gather additional data about 21HE0092. The road is depicted through the Project Area only on the Northwest Publishing Company (1898b), Westby (1913), Hixson (1916), and Dahlgren (1944) historic plat maps.

ALO completed a telephone interview with Severin Peterson on August 17th during which he mentioned that Indian Road had been the route between Minneapolis to Shakopee before the highway was built in the 1930s. He also disclosed that a telephone line ran along the entire length of the north side of Indian Road (21HE0092) and that glass insulators were screwed onto wooden pegs, which were attached to cross members that were bolted onto telephone poles. He said there had been approximately eight cross members, each with at least 10 telephone lines. He also said that the telephone company used a large earth-moving vehicle to tear down the phone line and poles about 60 years ago (ca. 1957), but he has

continued to see remnants of many of the glass insulators in the fields. The on-site deconstruction activities and subsequent agricultural cultivation likely account for the origin of the several variously-colored glass chunks observed by ALO at 21HE0225 (see above and below).

4.3 21HE0225

Vogel et al. (1994) reported two surface artifact scatters within the confines of their proposed site boundaries (**Figure 10**). The distribution of surface artifacts as mapped in the field by ALO does confirm the locations of the two surface scatters mapped by Vogel et al. (1994), but ALO's field work also recommends a constriction of the old site boundaries and an extension of them across the landform northeastwardly at the same topographic elevations (**Figure 10**). ALO suggests two hypotheses for the artifacts mapped outside of the proposed new site boundaries to the east and northeast at lower elevations, including those between the new site boundaries and Indian Road. They may have been deposited in those locations through dispersal from the site by decades of agricultural tilling or they are associated with gravels imported for the maintenance of Indian Road over the past decades. Consequently, ALO has excluded those locations from the revised delineation of 21HE0225.

Most of the artifacts observed and those collected by ALO are consistent in type and average date with those recorded by Vogel et al. (1994). However, ALO encountered and collected two unique artifacts – the cube-shaped lithic object and the chunk of similar and likely worked lithic raw material (Cultural Item ID #s 5 & 7, respectively – see **Figure 10, Table 3, and Plate 18a & b**). The cube-shaped object certainly was prepared intentionally by someone in the past since rocks do not naturally occur so smoothed and almost perfectly square. In fact, naturally occurring rocks in this alluvial depositional environment are expected to be smoothed but well rounded. Furthermore, the similar lithic raw material possesses one almost certainly worked flat surface that approximates the cube-shaped object in length (25.42 mm compared to 23.73 mm cube-shaped object).

Perhaps the cube-shaped lithic object and lithic raw material were intentionally worked for gaming pieces (e.g., dice) or personal amulets. In the hope of receiving a possible American Indian cultural interpretation from the Shakopee Mdewakanton Sioux Community (SMSC), on August 17th Ollendorf emailed photographs to Leonard Wabasha, the tribe's Cultural Resource Specialist. At the time of this report writing, however, no reply had been received. Regardless of the original intentions, ALO can say with certainty that both objects along with the chunks of KRF and coal all were culturally transported to this area sometime in the past. It should be noted that both unique lithic objects were collected outside of ALO's proposed new site boundaries. Their 21HE0225 provenience should be considered uncertain at this time because of the multiple working hypotheses for their deposition with other surface artifacts outside of the revised site boundaries, as described above.

In terms of most of the bone observed during the present survey, Peterson also mentioned in the August 17th telephone interview that his family has a long tradition of hunting deer and, after butchering, dumping the bones out in the fields for coyote bait. He also acknowledged his family has a meat saw, which would account for most if not all of the cleanly sawn animal bones observed in the fields; they also sometimes bring bones from the butcher shop to supplement the bait, which also have been cleanly sawn. In

contrast, the few pieces of calcined bone and one fragment of burnt bone collected by ALO may pertain to original domestic function of 21HE0225.

All of the objects observed during ALO's survey, with the possible exceptions of the cube-shaped lithic object, worked lithic raw material, KRF chunk (Cultural Item ID #4, **Table 3**), and possibly worked clear glass chunk (Cultural Item ID #6, **Table 3**), have Euro-American cultural affiliations. As already pointed out, some previously reported artifacts (e.g., pipestone chunk with possible Union Jack symbol incised surface decoration and other lithics transported intentionally to the site) may have been prehistoric legacy items deposited on-site by Euro-American or American Indian occupants during the Historic Period (by Vogel et al. 1994). The clear glass chunk is possibly worked, but ALO believes it is just as likely the "worked" edges may have resulted from modern deconstruction of the associated telephone poles and cross members along Indian Road (see Peterson's description above, 21HE0092).

In terms of site-formation processes, Vogel et al. (1994) report the plowzone extends to a maximum depth of 30 cm. Vogel et al. (1994) interpreted 21HE0225 as a Dakota and Euro-American habitation site. Both total artifact assemblages recorded by Vogel et al. (1994) and ALO presently are consistent with a past domestic function of the site. This location may have been utilized for a long period of time or repeatedly due to the fact that the artifact concentration is still moderately dense in spite of more than two additional decades of agricultural cultivation (with at least some lateral dispersal of artifact distribution) since the survey by Vogel et al. (1994).

It is still unknown whether the habitation occurred on-site or if the deposit is a pile of domestic refuse accessed repeatedly over time for dumping via the field trail/road at least since 1937, if not earlier (**Figure 13**). If habitation did occur on-site, then occupation likely was temporary but episodic for several reasons. First, neither Vogel et al. (1994) nor ALO observed any structural remnants. Second, possible window glass fragments were either few in number (n=2, Vogel et al. 1994) or absent (ALO's present investigation). Additionally, no buildings are shown on the earliest historic plat maps for the Project Area and APE (Andreas 1874; Dahl 1898; Wright and Rice 1873).[4] In general, structures also are not shown on the later historic plat maps and/or they are not shown for the Project Area and APE (Northwest Publishing Company 1898a, 1898b; Westby 1913; Hixson & Company 1916; Hudson Map Company 1925; Dahlgren 1944, 1958; Rockford Map Publishers 1962, 1973, 1987; Farm & Home Publishers 1991, 1992, 1997a, 1997b).[5]

Historic aerial photographs and the August 17th telephone interview with Peterson provide additional clues about past land use in this portion of the APE and the immediately adjacent lands. Two possible building

[4] A structure is shown in the Project Area on the Dahl (1898) plat map, but on the opposite side of Indian Road from the recorded location of 21HE0225 (**Figure 11**). This location actually corresponds to the "Ecklund Family Summer Home" as described by Peterson during the August 17th phone interview (see discussion below).

[5] One possible but unlikely exception is the north side of Indian Road in the vicinity of 21HE0225 is somewhat obscured on the Hixson & Company (1916) plat map (**Figure 12**). Therefore, this map may be considered inconclusive by some for the purposes of the present investigation, although ALO believes a structure in that portion of the map actually would be evident had one been drawn there.

locations are shown on the 1937 aerial photograph – one to the north with a clump of trees and a field trail/road corresponding to the location of 21HE0225 and the other to the south adjacent to but outside of the south side of the Project Area also with trees and an access trail/field road (**Figure 13**). Both these landscape features/possible structures persisted through the 1940s and 1950s (**Figure 14**) until they had been completely removed by 1967 (**Figure 15**). The field trail/road also had been abandoned and converted to cultivation by the time of the 1967 aerial photograph (**Figure 15**).

Peterson recalled the location corresponding to 21HE0225 as having been comprised of three trees on a grass knoll, but no buildings as far as his earliest recollections (he is now 70+ years old). He also recalled "Indian Minnie" and her children[6] had camped amid the floodplain forest in the far southeast corner of the Project Area (outside of the APE), but she and/or other American Indians also may have camped on the grass knoll and elsewhere on Peterson lands since his father had a friendship with them.

Peterson also recalled the "Ecklund Family Summer Home" had eroded into the Minnesota River sometime during the mid-to-late 1960s. **Figure 15** confirms Peterson's recollection since this structure had been removed by the time of the 1967 aerial photograph.

4.4 21HE0226

Vogel et al. (1994) report the total artifact assemblage is consistent with past slaughterhouse/meat-packing functions at this location. ALO did not survey within the already-recorded site boundaries, because those locations were outside the present APE. However, ALO did find a very dense surface scatter to the west-northwest and a less abundant surface scatter along the north fringe of the previous site boundaries (**Figure 10**).

Most of the artifacts observed and those collected by ALO are consistent in type and average date with those recorded by Vogel et al. (1994), including the unique artifact – clay pipe fragment (Cultural Item ID #188, **Figure 10**). The following general information about clay pipes was taken from several sources (Atkinson & Oswald 1969; Boyle & Boyle 2017; Sudbury & Hunt 2017). In the 17th and 18th centuries, thousands of clay pipes were exported from the United Kingdom to the New World. After 1840, the number of known American pipe makers seems to have exploded. Production locations moved across the US with westward expansion, but generally stayed east of the Mississippi River. For instance, clay pipes manufactured by the Pamplin and Taber companies in Virginia and New Hampshire, respectively, were shipped by sea from the east coast to New Orleans and then up river to St. Louis. The Ohio pipes (e.g., Akron Smoking Pipe Company) came down the Ohio River to St. Louis. From there, they went up the Missouri River and Mississippi rivers by steamboat. By the late 1850s, domestic output began to surpass imports. Pipe fragments and some intact clays have been excavated on Civil War battlefields and in encampments in great numbers showing the strong presence of clay pipes in the 1860s among the soldiers who fought on both sides. "The Clay remained king" until the later part of the 19th century.

[6] Peterson also indicated this family was ancestral to Charlie Vig, the present Chairman of the Shakopee Mdewakanton Sioux Community.

All of the objects observed during ALO's survey, with the possible exception of a possibly worked clear glass shard (Cultural Item ID #109b, **Table 4**) and the clay pipe fragment (Cultural Item ID #188), have Euro-American cultural affiliations. These two items most likely were also used by Euro-Americans as they worked in the slaughterhouse/meat-packing facility, although it is possible that American Indians also worked there. In terms of site-formation processes, Vogel et al. (1994) report the plowzone extends to a maximum depth of 28 cm. In spite of the lack of structural remnants and because of the abundance of building materials (e.g., fragments of cement, brick, mortar, and window glass), ALO agrees with the interpretation of site function recorded by Vogel et al. (1994), although it is surprising that more metal artifacts were not observed on-site. As mentioned above for 21HE0225, the clear glass chunk is possibly worked, but ALO believes it is just as likely the "worked" edges may have resulted from modern deconstruction of the associated telephone poles and cross members along Indian Road (see Peterson's description above, 21HE0092).

No buildings are shown on the earliest historic plat maps for the Project Area or APE (Andreas 1874; Wright and Rice 1873). However, a structure is shown in the Project Area and possibly also in APE on the Dahl (1898) and Hixson & Company (1916) plat maps in the approximate location of 21HE0226 (**Figure 11** and **Figure 12**). Structures generally are not shown on the later historic plat maps and/or they are not shown for the Project Area and APE (Northwest Publishing Company 1898a, 1898b; Westby 1913; Hudson Map Company 1925; Dahlgren 1944, 1958; Rockford Map Publishers 1962, 1973, 1987; Farm & Home Publishers 1991, 1992, 1997a, 1997b).

Historic aerial photographs and the August 17th telephone interview with Peterson provide additional clues about past land use in this portion of the APE and the immediately adjacent lands. Two possible building locations are shown on the 1937 aerial photograph – one corresponding to the location of 21HE0226 and in the far southwest corner of the Project Area (**Figure 13**). Only the structure at 21HE0226 persisted through the 1940s and 1950s (**Figure 14**), but it had been completely removed by 1967 (**Figure 15**). Peterson recalled the location corresponding to 21HE0226 as a slaughterhouse/meat-packing facility with an extensive system of drain tiles (i.e., not for the agricultural fields) throughout his youth, but all had been removed prior to about 1970.

5.0 RECOMMENDATIONS

ALO's recommendations for NRHP eligibility and future cultural resources work is summarized below for 21HE0092 21HE0225, and 21HE0226.

5.1 Buried A Horizons

No further geoarchaeological work is recommended to the maximum depth examined in the portions of the APE where Ab horizons were documented (i.e., 122 cmbs). If future excavations are planned for depths exceeding those in the present APE and documented by this investigation, then regulators may decide whether or not to require re-examination for the possibility of deeper Ab horizons with possible historic properties.

5.2 21HE0092

Because this site is within the Project Area but outside of the present APE, ALO made only minor efforts to gather additional data. Therefore, ALO supports the original recommendation by Vogel et al. (1994) for the future evaluation of the NRHP eligibility of 21HE0092 under criteria A, C, and D. If this site is in any future APE, then ALO recommends carefully analyzing new archival and archeological data as well as obtaining additional oral histories with Peterson and other long-time residents of the area, including members of the SMSC.

5.3 21HE0225

As a result of the present close-interval surface reconnaissance survey, ALO recommends the constriction but elongation of the boundaries of 21HE0225 (**Figure 10**). Both the old and new site boundaries fall outside of the APE for the presently proposed project. Therefore, a finding of No Historic Properties is recommended for the APE in the vicinity of this site. If the proposed wetland mitigation bank project will restrict access to the APE and thereby avoid 21HE0225, then no further archaeological work should be required here prior to construction.

It should be noted, however, that ALO does support the original recommendation by Vogel et al. (1994) that this site is potentially eligible for nomination to the NRHP under criteria A, B, and D. "This site offers an opportunity for the investigation of cultural contact and change, specifically, acculturation as experience[d] by a Native American ethnic group" (Vogel 1994:93). Today, the site's function and depositional processes remain elusive. Future archaeological investigation of the site may address these research questions (Criterion D). ALO is submitting an updated site form to the OSA under separate cover.

The presence of the unique cube-shaped lithic artifact and the worked lithic from similar raw material alone do not merit consideration of NRHP eligibility for 21HE0225. The artifact scatter, although extended laterally by ALO's survey, remains sparse and, therefore, limited in its research potential. Peterson, the landowner, also remembered that "Indian Minnie" and her offspring had camped at least in the vicinity of 21HE0225, if not in that location as well. Although Peterson believes Minnie and/or her offspring were ancestral to the present SMSC Tribal Chair, Charlie Vig, it is also likely that his ancestors occupied other locations proximal to the Minnesota River also in the general vicinity of present-day City of Shakopee. Those other locations may have more extensive archaeological records of past occupations than the one at 21HE0225.

Furthermore, oral histories with Peterson and other long-time residents of the area, including present-day SMSC tribal descendants, may provide additional information for the site's consideration under criteria A and B. For instance, was the site associated with a possible ancestor of the present SMSC Chair, Charlie Vig? It is also possible that Vig's ancestors occupied other locations proximal to the Minnesota River also in the general vicinity of present-day City of Shakopee. Those other locations may have more extensive archaeological records of past occupations than the one at 21HE0225. Oral histories with SMSC members may also assist with the identification of the past function of the cube-shaped object and the possibly associated partially worked lithic raw. Was the cube-shaped object a gaming piece or personal amulet? Was it a ceremonial object? Knowing its past use for a particular purpose on-site also may assist with the evaluation of this site under all three NRHP criteria (A, B, and D).

5.4 21HE0226

As a result of the present close-interval surface reconnaissance survey, ALO recommends the addition of a long linear area adjacent to the old boundaries of 21HE0226 (**Figure 10**). Both the old and new site boundaries fall outside of the APE for the presently proposed project. Therefore, a finding of No Historic Properties is recommended for the APE in the vicinity of this site. If the proposed wetland mitigation bank project will restrict access to the APE and thereby avoid 21HE0226, then no further archaeological work should be required here prior to construction.

The presence of the clay pipe fragment and the possible worked clear glass chunk alone do not merit the nomination of 21HE0226 to the NRHP. Although the western portion of the ALO-recorded artifact concentration is dense and ALO recommends extending the site boundaries northward and westward, no structural remnants are present and decades of cultivation have dispersed artifacts even further northwardly and northwestwardly. Therefore, the site appears to be lacking structural integrity. ALO is submitting an updated site form to the OSA under separate cover.

Vogel et al. (1994:95) recommended detailed archival research to determine if this site has any regional or local significance. Such detailed research was outside the scope of ALO's present investigation, so the original recommendation still stands. ALO does wish to emphasize that the present investigation did not reveal any structural remnants or standing structures so it is unlikely that 21HE0226 would be found in the future to be NRHP-eligible.

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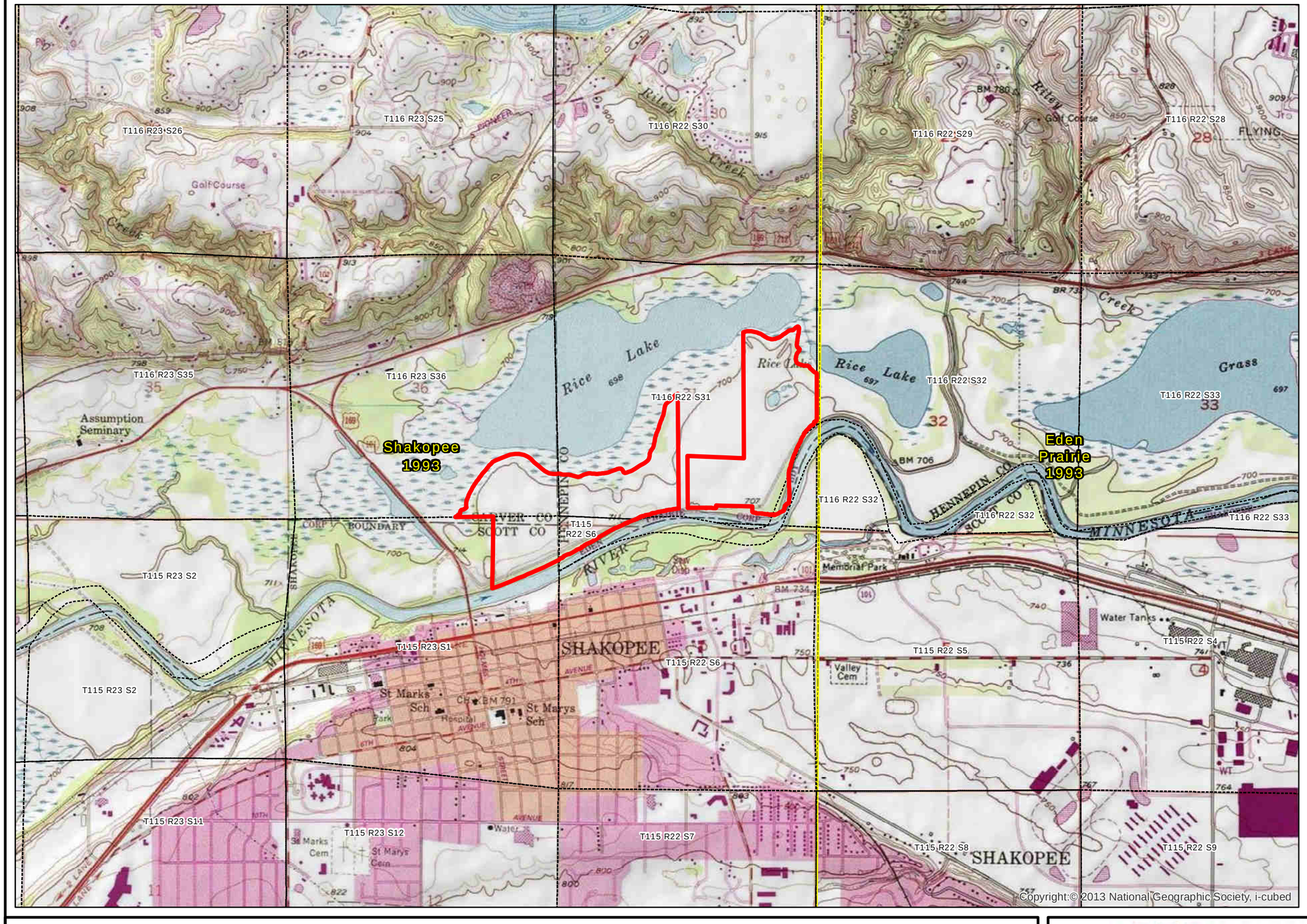
FIGURES



Legend

- Project Area
- Section Boundary
- 24K Index (MN)

Shakopee 7.5 Minute Quadrangle (USGS: 1993)
Eden Prairie 7.5 Minute Quadrangle (USGS: 1993)

N

2,000 1,000 0 2,000

Feet

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SEVER PETERSON

Peterson Wetland Bank - 7.5 Minute USGS Quadrangle Map

WENCK
Responsive partner. Exceptional outcomes.

JULY 2017

Figure 1

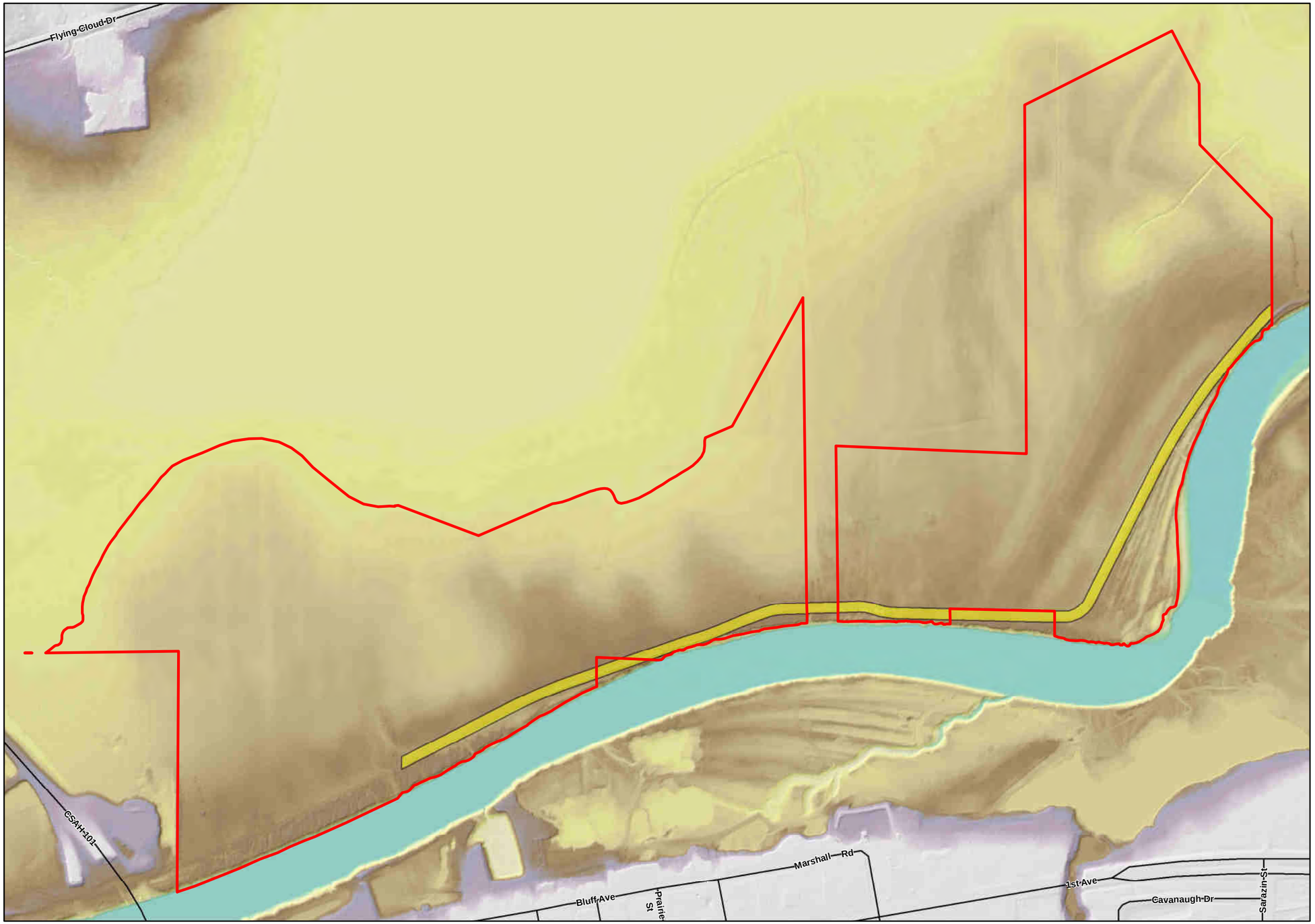
SEVER PETERSON

Peterson Wetland Bank - Conceptual Wetland Bank Plan

WENCK ASSOCIATES
Responsive partner. Exceptional outcomes.

APR 2016

Figure 2



Legend

- Project Boundary
- Indian Road Easement

Digital Elevation Model

Value

High : 779.703

Low : 687.667

N

600 300 0 600

Feet

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SEVER PETERSON

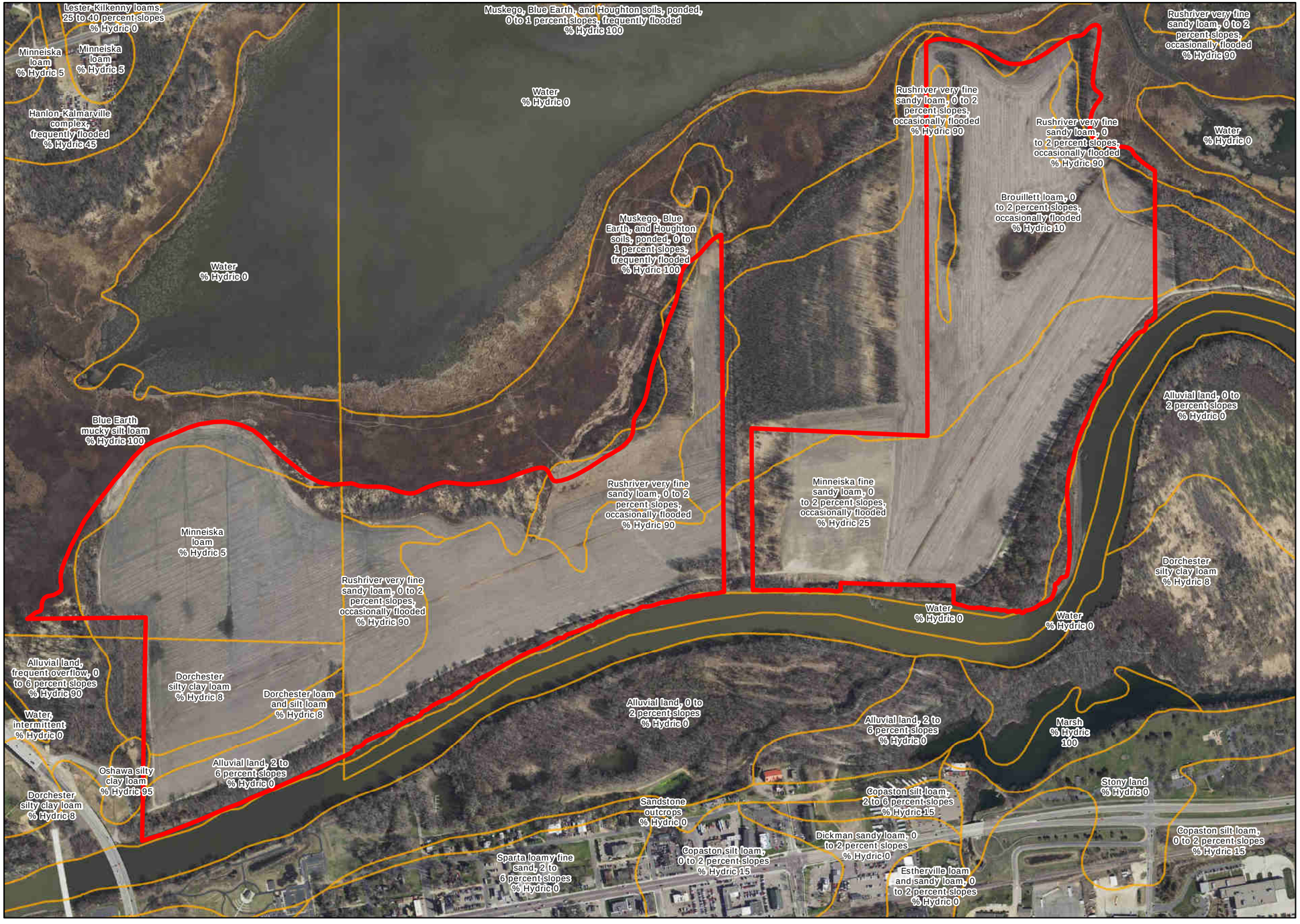
Peterson Wetland Bank - Digital Elevation Model

WENCK

Responsive partner. Exceptional outcomes.

JULY 2016

FIGURE 3



Legend

- Project Area
- Soil Survey Map Unit

N

650 325 0 650

Feet

2013 Aerial Photograph (Source: MN GEO)

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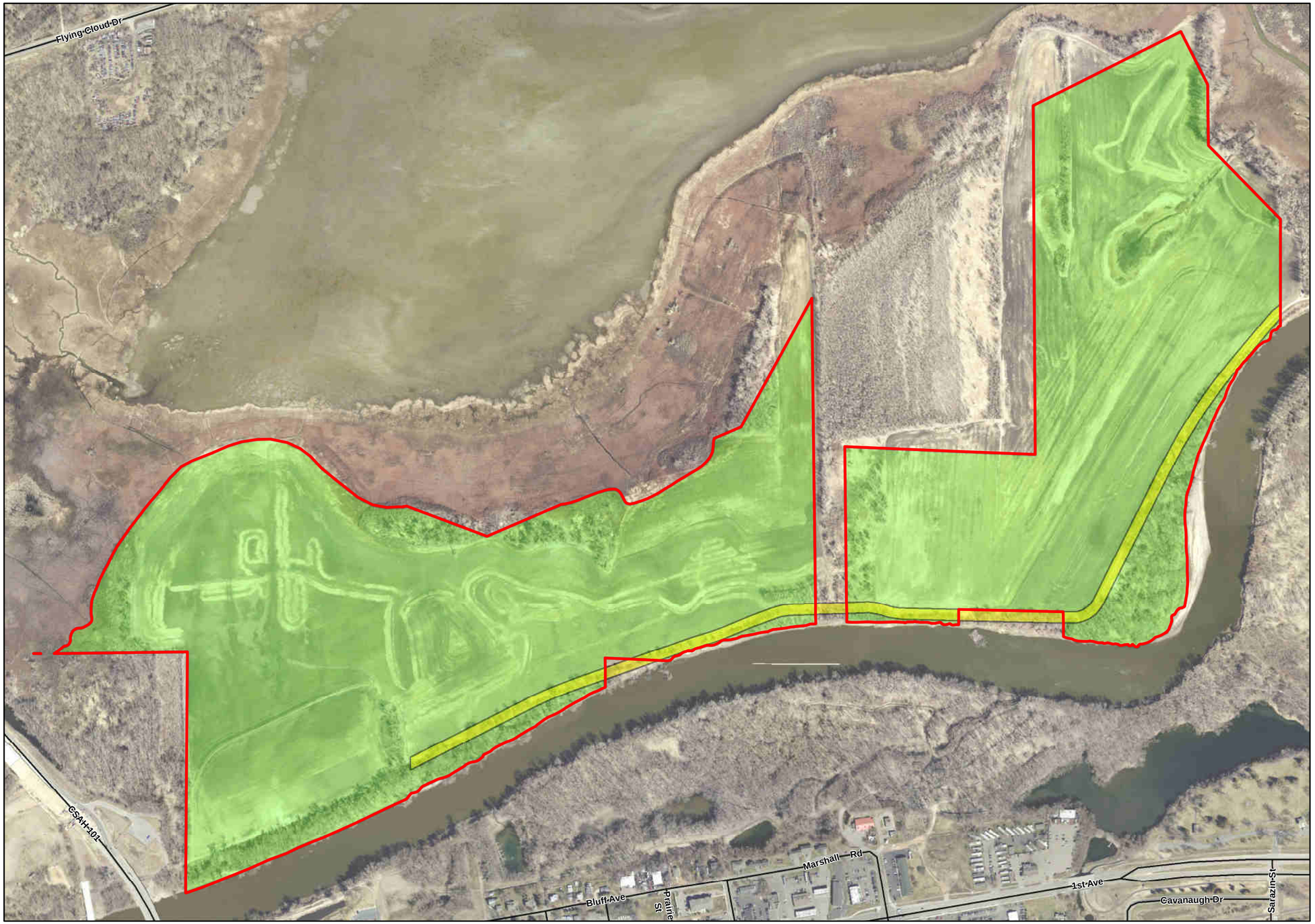
SEVER PETERSON

Peterson Wetland Bank - Soil Survey

WENCK ASSOCIATES
Responsive partner. Exceptional outcomes.

JULY 2017

Figure 4



Legend

- Project Boundary
- Indian Road Easement

Landscape Suitability Ratings

- No Potential
- Low Potential
- Moderate Potential
- High Potential

N

600 300 0 600

Feet

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SEVER PETERSON

Peterson Wetland Bank - Landscape Suitability Ratings - 0-2 Meters

WENCK
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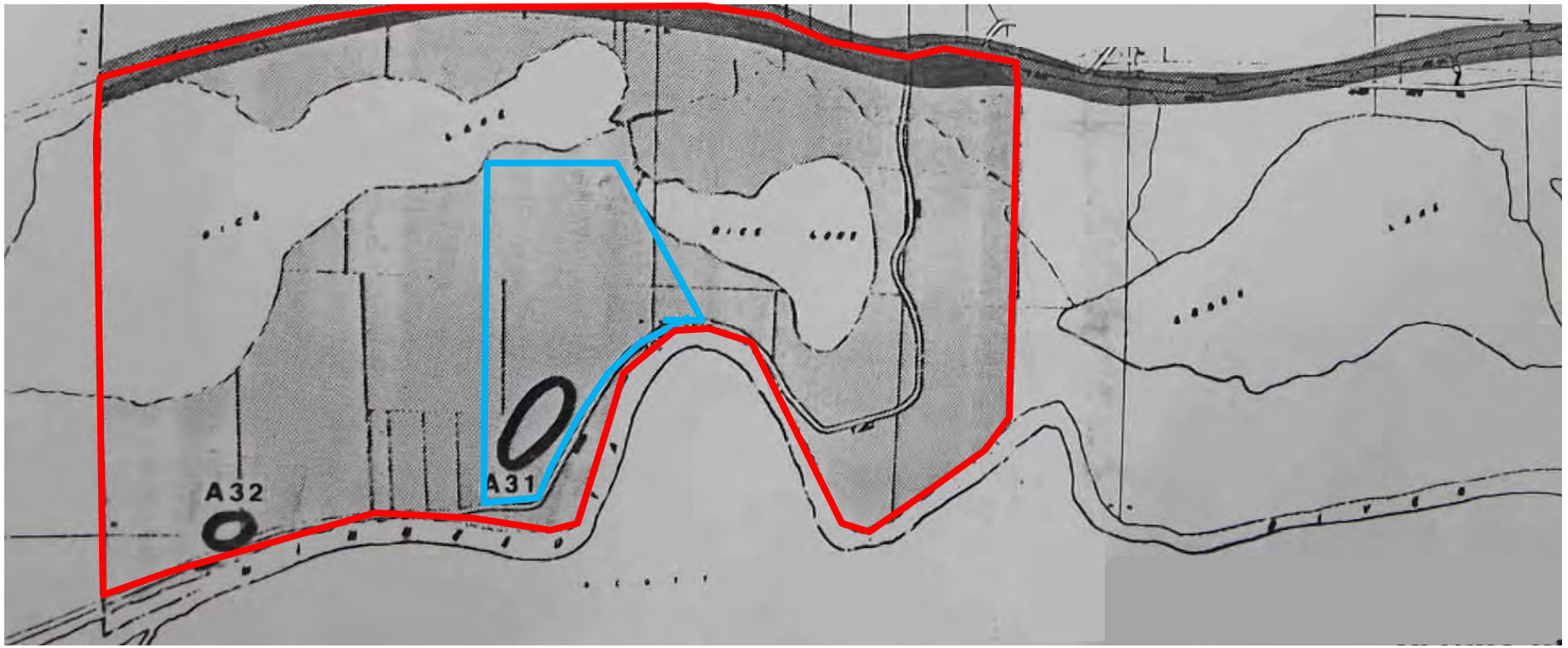
JULY 2016

FIGURE 5



LEGEND

Previous Survey (Vogel et al. 1994)

Previous Survey (Ollendorf et al. 2002)

Recorded Sites (Field Numbers)

Source: Base Map (Vogel et al. 1994).

ALO ENVIRONMENTAL ASSOCIATES LLC

N

No Scale

Previous Surveys and Recorded Archaeological Sites

Peterson Wetland Mitigation Bank
Eden Prairie, MN

FIGURE 6

Legend

Project Area

Approximate Cultural Survey Boundaries

Shovel Test Survey Area

Surface Reconnaissance Survey Area

2016 Aerial Photo (Source: MnGEO)

N

650 325 0 650

Feet

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SEVER PETERSON

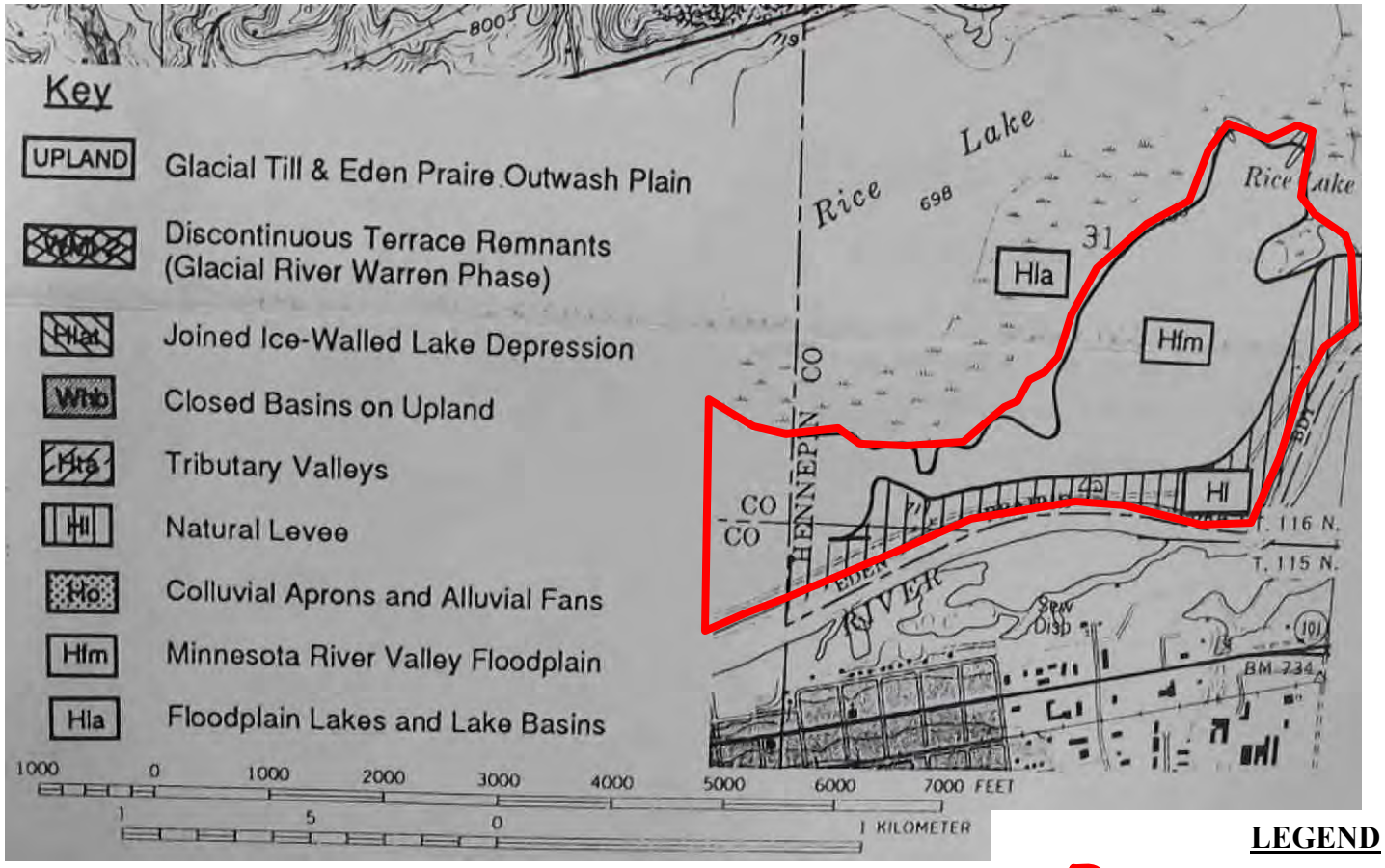
ALO Cultural Survey Areas

WENCK

Responsive partner. Exceptional outcomes.

JULY 2017

Figure 7



Source: Figure 6b Eden Prairie Landforms in Bettis (1994).

LEGEND

Approximate Project Area Boundaries.

ALO ENVIRONMENTAL ASSOCIATES LLC

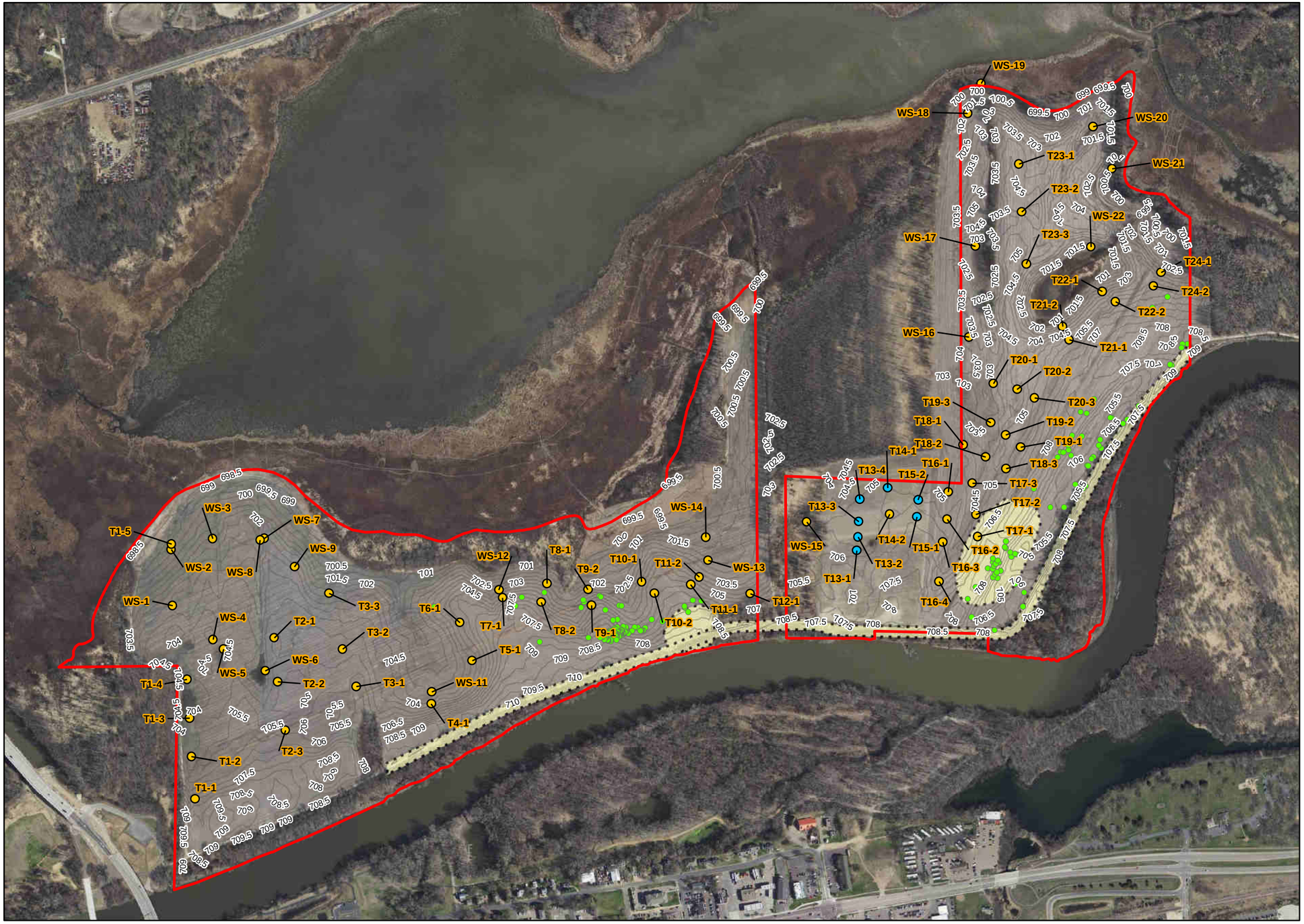
N

Landforms Mapped in the Project Area

Peterson Wetland Mitigation Bank

Eden Prairie, MN

FIGURE 8



Legend

- Project Boundary
- ALO Ground Recon Findings

Wenck Soil Test Pits

Ab Horizon?

- No
- Yes

- Surveyed 1/2 Foot Contours
- Previously Recorded Archeological Site Boundaries

N

650 325 0 650

Feet

2016 Aerial Photograph (Source: MN GEO)

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SEVER PETERSON

Wenck and ALO Survey Results

WENCK ASSOCIATES
Responsive partner. Exceptional outcomes.

JULY 2017

Figure 9

Legend

- Project Boundary
- Ground Recon Findings
- Shovel Test Locations
- Surveyed 1/2 Foot Contours
- Between 704 and 706 (APE)
- Previously Recorded Archeological Site Boundaries
- ALO Archeological Site Boundaries

N

650 325 0 650

Feet

2016 Aerial Photograph (Source: MN GEO)

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SEVER PETERSON

Old and New Site Boundaries in Relation to the APE

WENCK ASSOCIATES
Responsive partner. Exceptional outcomes.

JULY 2017

Figure 10

Historic Plat Map (Dahl 1898)

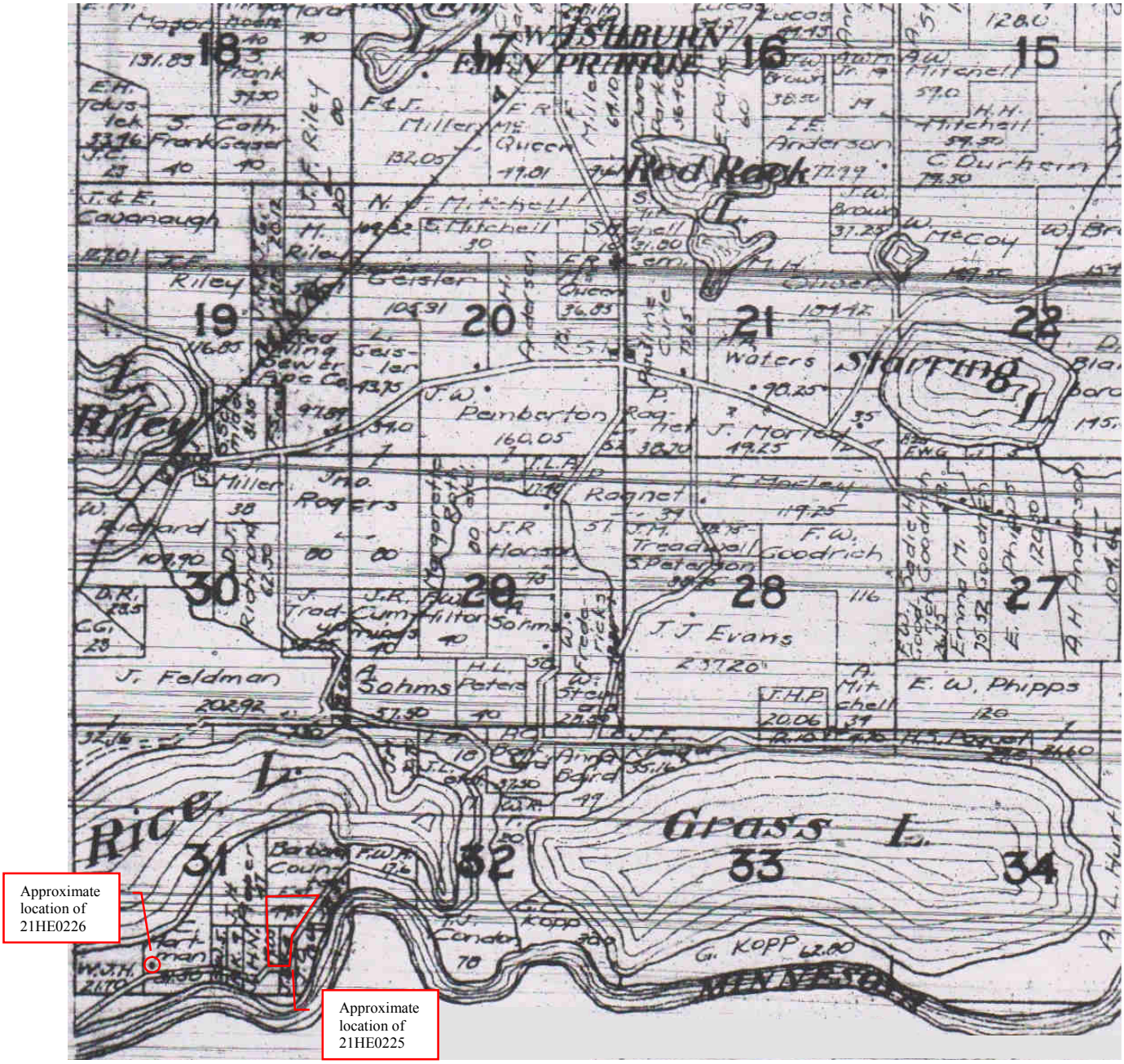
Peterson Wetland Mitigation Bank

Eden Prairie, MN

N

No Scale

FIGURE 11



ALO ENVIRONMENTAL ASSOCIATES LLC

N

No Scale

Historic Plat Map
(Hixson & Company 1916)

Peterson Wetland Mitigation Bank

Eden Prairie, MN

FIGURE 12

Legend

Project Boundary

21HE0226 (Sever Peterson: former slaughterhouse)

21HE0225 (Sever Peterson: clump of 3 trees. Former unplatted building(s)? Former historic American Indian campsite? Former Euro-American refuse dump?)

Sever Peterson: Ecklund Family Summer Home

former building(s)?

600 300 0 600 Feet

N

Path: V:\GIS\4607\0003\mxd\Aerials.mxd
Date: 7/31/2017 Time: 12:40:37 PM User: WatME0697

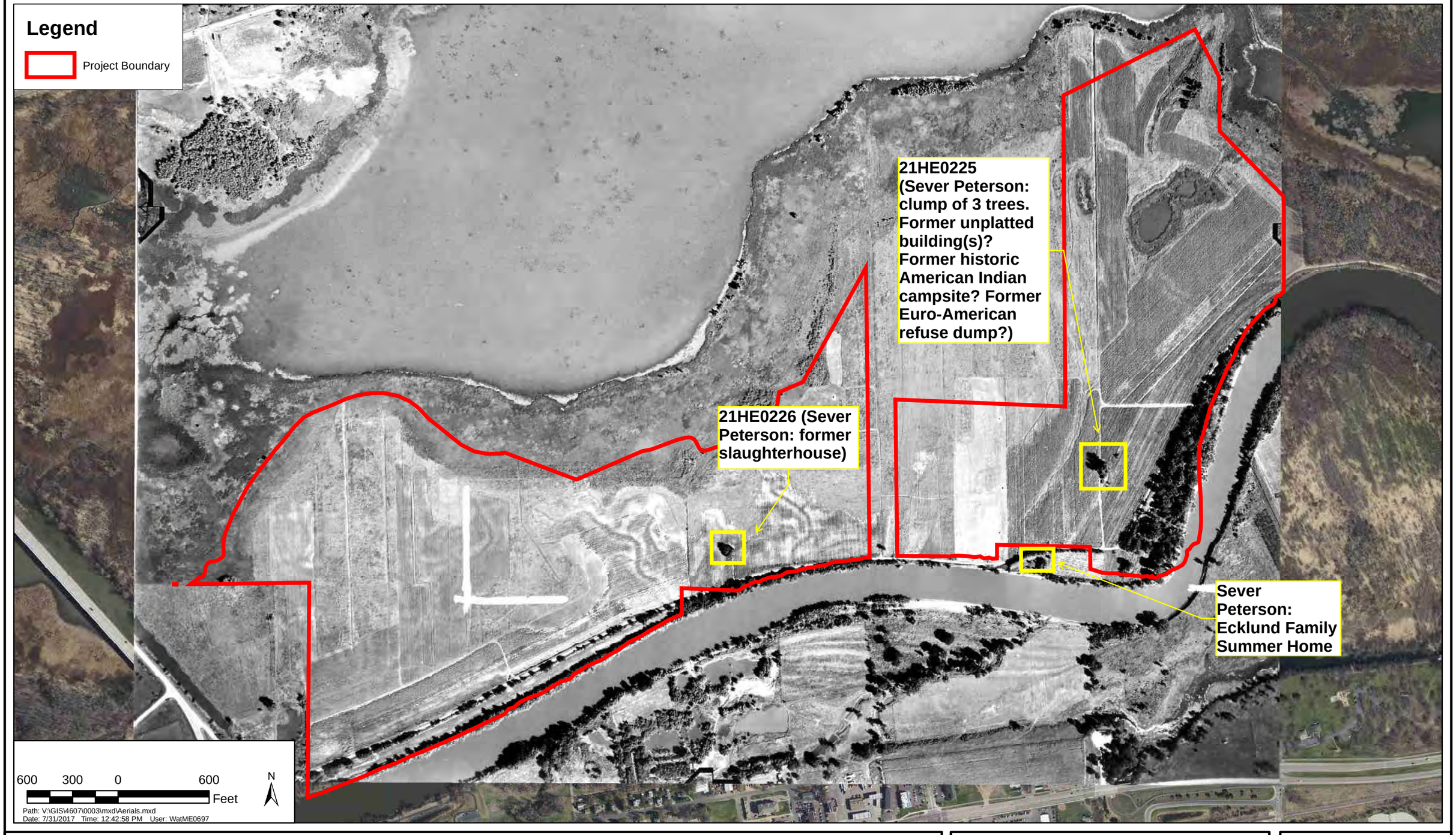
PETERSON WETLAND BANK

1937 **Aerial Photo**

WENCK ASSOCIATES
Responsive partner. Exceptional outcomes.

JUL 2017

Figure **13**



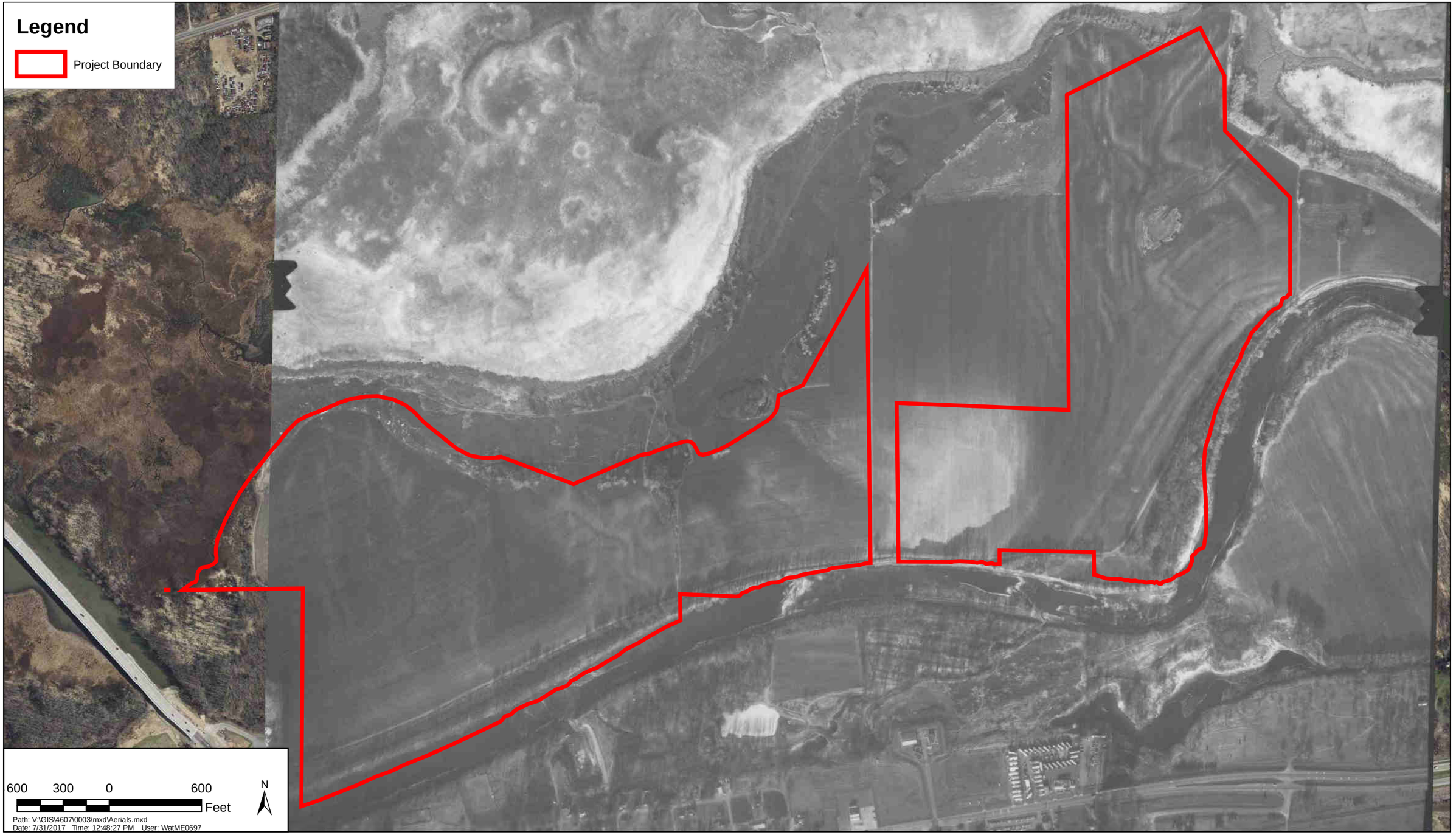
PETERSON WETLAND BANK

1945 **Aerial Photo**

WENCK ASSOCIATES
Responsive partner. Exceptional outcomes.

JUL 2017

Figure **14**



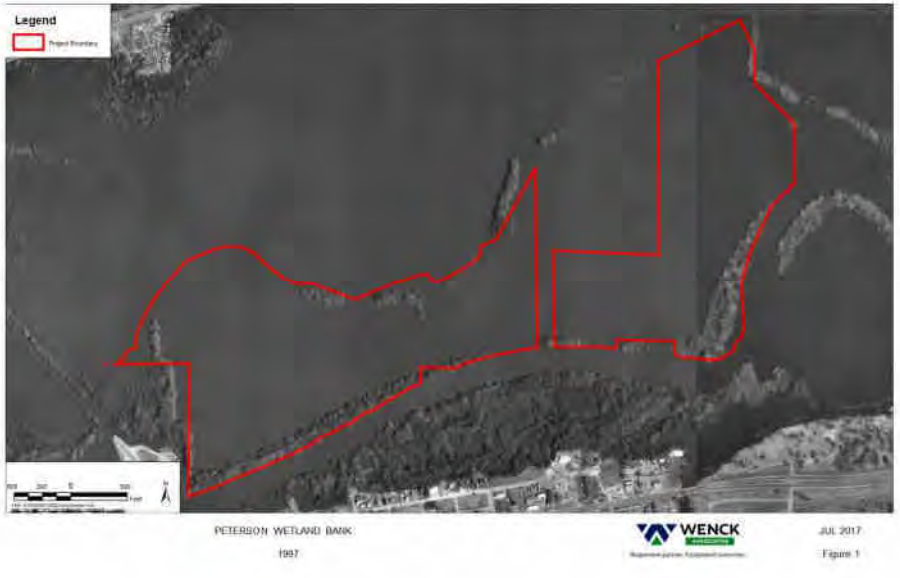
PETERSON WETLAND BANK

1967 **Aerial Photo**

WENCK ASSOCIATES
Responsive partner. Exceptional outcomes.

JUL 2017

Figure **15**



ALO ENVIRONMENTAL ASSOCIATES LLC

N

No Scale

Flooding in the APE: 1997 and 2010 Aerial Photos

Peterson Wetland Mitigation Bank

Eden Prairie, MN

FIGURE 16

TABLES

Table 1. Project Area Soils As Mapped by USDA-NRCS.

Soil Series	Soil Order (Class)	Textural Description
Minneiska	Entisol (Mollic Udifluvents)	fine sandy loams
Blue Earth	Entisol (Mollic Fluvaquents)	mucky silt loams
Oshawa	Mollisol (Fluvaquentic Endoaquolls)	silty clay loams
Rushriver	Entisol (Mollic Fluvaquents)	very fine sandy loams
Muskego	Histosol (Limnic Haplosaprists)	mucks
Houghton	Histosol (Typic Haplosaprists)	mucks
Brouillet	Mollisol (Aquic Cumulic Hapludolls)	silt loams
Dorchester	Entisol (Typic Udifluvents)	silt loams

Table 2. Generalized Summaries of Shovel & Auger Test Results

ST 13-1	ST 13-2	ST 13-3	ST 13-4	ST/Bucket Auger Test 14-1	ST 15-1	ST/Bucket Auger Test 15-2
0-11 cm: 10YR3/2 (brown) fine sandy loam	0-17 cm: 10YR3/2 (brown) fine sandy loam	0-17 cm: 10YR3/3 (dark brown) fine sandy loam	0-13 cm: 10YR3/3 (dark brown) silty loam	0-34 cm: 10YR3/3 (dark brown) fine sandy loam	0-40 cm: 10YR3/3 (dark brown) fine sandy loam	0-40 cm: 10YR3/3 (dark brown) fine sandy loam
11-45 cm: 10YR3/2 (brown) fine sand	17-30 cm: 10YR3/3 (dark brown) fine sandy loam	17-55 cm: 10YR3/3 (dark brown) silty clay loam w 10YR5/3 (brown) fine sand inclusions and some Ab inclusions near bottom	13-66 cm: 10YR3/2 (brown) silty loam	34-69 cm: 10YR3/3 (dark brown) silty clay loam w 10YR5/3 (brown) fine sand inclusions	40-60 cm: 10YR3/3 (dark brown) silty clay loam w 10YR/5/3 (brown) fine sand inclusions	40-52 cm: 10YR3/3 (dark brown) silty clay loam w 10YR5/3 (brown) fine sand inclusions
45-83 cm: 10YR5/3 (brown) fine sand w 10YR2/1 (black) mottles	30-65 cm: 10YR3/3 (dark brown) silty clay loam w 10YR5/3 fine sand inclusions	55-93 cm – **Ab:** 10YR2/1 (black) clay loam w gastropod at 80 cm	66-70 cm: 10YR4/3 (brown) fine sand	69-102 cm – **Ab:** 10YR2/1 (black) silty clay (bucket auger)	60-80 cm – **Ab:** 10YR2/1 (black) silty clay	52-70 cm: 10YR2/1(black) silty clay
83 cm – **Ab:** 10YR2/1 (black) clay loam	65-80 cm – **Ab:** 10YR2/1 (black) clay loam	n/a	80 cm – **Ab:** 10YR2/1 (black) silty clay loam	102-122 cm – **Ab:** 10YR3/2 (brown) silty clay loam w mottles (bucket auger)		70-120 cm – **Ab:** 10YR3/2 (brown) silty clay loam (bucket auger)
n/a	n/a	n/a		water		water

Table 3. ALO Artifact Inventory: 21HE0225

GPS PointID	Collection Date	Material Class	Description	Total Count	Count by Material Class															Collected	Photograph Numbers	Notes
					Glass					Ceramic					Lithic	Bone	Metal	Shell				
					Brown	Blue	Clear	Amethyst	Green	Stoneware	Whiteware	Earthenware	Porcelain	Other				Mollusc	Gastropod			
1	7/17/17	Glass	brown, bottle, body shard	1	1																	
2	7/17/17	Glass	brown, bottle, body shard	1	1																	
3a	7/17/17	Ceramic	cream, stoneware body sherd	1						1										1	3a & 3b	19.12 mm long x 13.71 mm wide x5.12 mm thick; 2.08 g; found w 3b gastropod
3b	7/17/17	Shell	gastropod	1															1			found w 3a cream stoneware sherd
4	7/17/17	Lithic	Knife River Flint, chunk	1											1					1	12a & 12b	31.26 mm long x 26.36 mm wide x 15.22 mm thick; 18.79 g
5	7/17/17	Lithic	cube-shaped object	1											1					1	11a-11e	22.73 mm long x 23.73 mm wide x 21.41 mm thick; 25.42 g
6	7/17/17	Glass	clear glass, worked(?), large chunk	1			1													1	9a & 9b	43.28 mm long x 30.87 mm wide x 18.15 mm thick; likely from telephone-line insulator; possibly worked; 24.90 g
7	7/17/17	Lithic	worked(?) raw material	1											1					1	11a-11e	56.91 mm long x 25.42 mm wide x 18.25 mm thick; possibly source material for cube-shaped object - see #5 above; 33.19 g
8	7/17/17	Glass	brown, bottle, body shard	1	1																	
9	7/17/17	Lithic	coal, black, shiny, chunk	1											1					1	12a & 12b	29.41 mm long x 226.5 mm wide x 11.96 mm thick; 4.31 g
10	7/17/17	Bone	vertebra, deer?	1												1						
11	7/17/17	Bone	vertebra, deer?	1												1						
12	7/17/17	Bone	femur, deer?, fragment	1												1						
13	7/17/17	Bone	femur, deer, sawn, fragment	1												1						
14	7/17/17	Ceramic	whiteware base sherd	1							1									1	5a & 5 b	32.58 mm long x 22.88 mm wide x 3.89 mm thick; 5.01 g
15	7/17/17	Ceramic	whiteware body sherd	1							1											
16	7/17/17	Ceramic	whiteware body sherd	1							1											
17	7/17/17	Ceramic	white, green stripe transfer printing, porcelain rim sherd	1									1							1	6a & 6b	36.03 mm long x 27.49 mm wide x 9.66 mm thick; green stripe transfer printing exterior only; 14.94 g
18	7/17/17	Glass	aquamarine, chunk	1		1														1	9a & 9b	33.28 mm long x 31.98 mm wide x 11.35 mm thick; likely from telephone-line insulator(?); 6.99 g
19	7/17/17	Ceramic	brown, stoneware crock rim sherd	1						1										1	3a & 3b	45.79 mm long x 41.17 mm wide x 11.17 mm thick; 27.88 g
20	7/17/17	Glass	brown, bottle, body shard	1		1																
21	7/17/17	Glass	light-blue, bottle, body shard	1		1																
22	7/17/17	Glass	green, bottle, rim shard	1					1											1	8a & 8b	58.15 mm long x 28.27 mm wide x 5.12 mm thick; 18.04 g
23	7/17/17	Ceramic	whiteware body sherd	1							1											
24	7/17/17	Ceramic	whiteware body sherd	1							1											
25	7/17/17	Bone	vertebra, deer?	1												1						
26	7/17/17	Bone	vertebra, deer?	1												1						
27	7/17/17	Ceramic	white, porcelain bowl or cup, rim sherd	1									1							1	6a & 6b	70.75 mm x 60.18 mm wide x 8.82 mm thick; 39.39 g
28	7/17/17	Metal	rusted, spike	1													1			1	1a & 1b	spike: 97.74 mm long x 15.51-20.23 mm wide; head: 25.65 mm diameter; 127.45 g
29	7/17/17	Ceramic	earthenware base sherd	1								1								1	4a & 4b	65.34 mm long x 34.38 mm wide x 6.43 thick; 28.20 g
30	7/17/17	Ceramic	earthenware rim sherd	1								1								1	4a & 4b	50.84 mm long x 28.77 mm wide x 7.30 mm thick; scallopped rim edge; 15.84 g
31	7/17/17	Ceramic	white, porcelain plate, body sherd	1									1									
32	7/17/17	Glass	clear, bottle, base shard	1			1													1	10a & 10b	30.81 mm long x 23.06 mm wide x 5.70 mm thick; "...UART..." embossed on exterior; 8.32 g
33	7/17/17	Shell	mollusc, fragment	1														1		1	13a & 13b	20.40 mm long x 14.31 mm wide x 2.82 mm thick; 0.99 g
34	7/17/17	Ceramic	whiteware body sherd	1							1											
35	7/17/17	Ceramic	whiteware body sherd	1							1											
36	7/17/17	Glass	brown, bottle, body shard	1	1																	
37	7/17/17	Ceramic	whiteware body sherd	1							1											

Table 3. ALO Artifact Inventory: 21HE0225

GPS PointID	Collection Date	Material Class	Description	Total Count	Count by Material Class															Collected	Photograph Numbers	Notes
					Glass					Ceramic					Lithic	Bone	Metal	Shell				
					Brown	Blue	Clear	Amethyst	Green	Stoneware	Whiteware	Earthenware	Porcelain	Other				Mollusc	Gastropod			
38	7/17/17	Glass	clear, bottle, rim shard	1			1													1	8a & 8b	37.11 mm long x 30.08 mm wide x 4.10 mm thick; 20.38 g
39	7/17/17	Ceramic	whiteware body sherd	1							1											
40	7/17/17	Shell	mollusc, fragment	1														1		1	13a & 13b	57.60 mm long x 47.07 mm wide x 5.36 mm thick; 23.43 g
41	7/17/17	Ceramic	stoneware handle sherd	1						1										1	3a & 3b	66.08 mm long x 37.97 mm wide x 18.32 mm thick; 67.70 g; yellow-gold spots on top of handle; orange-brown vessel interior
42	7/17/17	Shell	gastropod	1															1			
43	7/17/17	Shell	gastropod	1															1			
44	7/17/17	Ceramic	white, stoneware body sherd	1						1												
45	7/17/17	Glass	purple, bottle, body shard	1				1														
46	7/17/17	Bone	unID, calcined, fragment	1												1				1	2a & 2b	71.04 mm long x 31.47 mm wide x 19.28 mm thick; 23.01 g
47	7/17/17	Bone	unID, calcined, fragment	1												1				1	2a & 2b	18.04 mm long x 14.19 mm wide x 2.56 mm thick; 0.61 g
48	7/17/17	Ceramic	whiteware body sherd	1							1											
49a	7/17/17	Metal	sheet	1													1			1	1a & 1b	112.11 long x 100.66 mm wide x 1.2 mm thick; 44.76 g; found w 49b glass shard
49b	7/17/17	Glass	clear-bluish, patinated, bottle, base shard	1			1													1	10a & 10b	30.85 mm long x 17.31 mm wide x 3.50 mm thick; 2.56 g; found w 49a metal plate (sheet?)
50a	7/17/17	Ceramic	whiteware body sherd	1							1											found w 50b whiteware w blue/white transfer printing rim sherd
50b	7/17/17	Ceramic	whiteware, blue/white transfer printing, rim sherd	1										1						1	7a & 7b	18.46 mm long x 19.23 mm wide x 4.36 mm thick; 1.09 g; blue/white transfer printing exterior only, white interior; found w 50a whiteware body sherd
51	7/17/17	Glass	brown, bottle, body shard	1	1																	
52	7/17/17	Glass	brown, bottle, body shard	1	1																	
53	7/17/17	Bone	unID, burnt, fragment	1												1				1	2a & 2b	17.24 mm long x 10.82 mm wide x 6.78 mm thick; 1.77 g
55	7/17/17	Shell	gastropod	1															1			
56	7/17/17	Ceramic	whiteware body sherd	1							1											
57	7/17/17	Ceramic	whiteware body sherd	1							1											
58	7/17/17	Ceramic	whiteware body sherd	1							1											
59	7/17/17	Ceramic	white, stoneware body sherd	1						1												
60	7/17/17	Bone	unID, fragment	1												1						
61	7/17/17	Shell	gastropod	1															1			
62	7/17/17	Bone	vertebra, deer?, fragment	1												1						
63	7/17/17	Bone	unID, fragment	1												1						
64	7/17/17	Glass	brown, bottle, body shard	1	1																	
65	7/17/17	Shell	mollusc, fragment	1														1				
			TOTAL	**67**	**7**	**3**	**4**	**1**	**1**	**5**	**14**	**2**	**3**	**1**	**4**	**12**	**2**	**3**	**5**	**26**		

Table 4. ALO Artifact Inventory: 21HE0226

GPS PointID	GPS Date	Material Class	Description	Total Count	Count by Material Class																	Unknown	Collected	Photograph Numbers	Notes
					Glass					Ceramic			Lithic	Bone	Charcoal	Metal	Drain Tile	Brick	Cement	Terra Cotta	Shell				
					Brown	Blue	Clear	Amethyst	Green	Stoneware	Whiteware	Other									Mollusc	Gastropod				
70	7/18/2017	Ceramic	stoneware shoulder-body sherd	1						1														1	13a & 13b	65.49 mm long x 45.65 mm wide x 12.50 mm thick at shoulder; 44.64 g; slightly curved; cream-colored glaze exterior & interior
71	7/18/2017	Ceramic	drain tile fragment	1													1								
72	7/18/2017	Ceramic	brick(?) fragment	1														1						1	8a & 8b	25.68 mm long x 17.09 mm wide x 12.97 mm thick; 4.61 g; possible mortar smudge on one surface
74	7/18/2017	Shell	mollusc(?), fragment	1																	1					
75	7/18/2017	Glass	brown, patinated, bottle, base or shoulder shard	1	1																			1	9a & 9b	32.18 mm long x 20.34 mm wide x 3.09 mm thick; 3.25 g; slightly curved; "...I[?] T[?] S E[?] or F[?]..." embossing, exterior only
76	7/18/2017	Ceramic	whiteware body sherd	1							1															
77	7/18/2017	Shell	gastropod	1																		1				
78	7/18/2017	Ceramic	whiteware body sherd	1							1															
79	7/18/2017	Unknown	black, fragment (possibly coal or degraded clay pigeon?)	1																			1	1	1a & 1b	18.37 mm long x 14.08 mm wide x 7.84 mm thick; 1.69 g
80	7/18/2017	Ceramic	brick(?) fragment	1														1								
81	7/18/2017	Unknown	black, fragment (possibly coal or degraded clay pigeon?)	1																			1	1	1a & 1b	17.37 mm long x 14.37 mm wide x 7.82 mm thick; 1.22 g
82	7/18/2017	Ceramic	drain tile fragment	1													1									
83	7/18/2017	Cement	mortar(?) fragment	1															1					1	8a & 8b	25.43 mm long x 20.28 mm wide x 8.72 mm thick; 4.88 g; lightly incised striations on one surface
84	7/18/2017	Glass	clear, window shard	1			1																			
85	7/18/2017	Ceramic	whiteware body sherd	1							1															
86	7/18/2017	Ceramic	drain tile fragment	1													1									
87	7/18/2017	Bone	unID, fragment	1										1												
88	7/18/2017	Ceramic	whiteware body sherd	1							1															
89	7/18/2017	Glass	cobalt blue, bottle, base shard	1		1																		1	10a & 10b	43.73 mm long x 42.41 mm wide x7.69 mm thick; 18.06 g; "...S. A." and "...M..." (90 degrees from other printing) embossing, exterior bottom only
90	7/18/2017	Cement	fragment	2															2							
91	7/18/2017	Cement	fragment	1															1							
92	7/18/2017	Ceramic	drain tile fragment	1													1									
93	7/18/2017	Glass	clear, bottle	1			1																			
94	7/18/2017	Ceramic	drain tile fragment	1													1									
95	7/18/2017	Ceramic	drain tile fragment	1													1									
96	7/18/2017	Cement	fragment	1															1							
97	7/18/2017	Cement	fragment	1															1							
98	7/18/2017	Ceramic	drain tile fragment	1													1									
99	7/18/2017	Ceramic	drain tile fragment	1													1									
100	7/18/2017	Ceramic	drain tile fragment	1													1									
101	7/18/2017	Ceramic	drain tile fragment	1													1									
102	7/18/2017	Ceramic	terra cotta, fragment	1																1						
103	7/18/2017	Ceramic	drain tile fragment	1													1									
104	7/18/2017	Ceramic	drain tile fragment	1													1									
105	7/18/2017	Ceramic	drain tile fragment	1													1									
106	7/18/2017	Ceramic	drain tile fragment	1													1									
107	7/18/2017	Lithic	coal, chunk	1									1											1	1a & 1b	44.84 mm long x 42.96 mm wide x 19.54 mm thick; 18.90g
108	7/18/2017	Cement	fragment	2															2							
109a	7/18/2017	Glass	clear, bottle, body shard	1			1																			found w 109b clear glass shard, possibly worked
109b	7/18/2017	Glass	clear, bottle(?), body(?) shard, possibly worked	1			1																	1	11a & 11b	29.11 mm long x 20.24 mm wide x 6.83 mm thick; 4.24 g; curved; found w 109a clear glass shard
110a	7/18/2017	Ceramic	brick fragment	1														1								found w 110b green glass shard
110b	7/18/2017	Glass	green, bottle, body shard	1					1																	found w 110a brick fragment
111	7/18/2017	Ceramic	drain tile	2													2									
112	7/18/2017	Ceramic	drain tile	1													1									
113	7/18/2017	Cement	red, pottery(?), body sherd	1															1							from ceramic vessel or possbily clay pigeon?
114a	7/18/2017	Ceramic	drain tile fragment	2													2									found w 114b terra cotta fragment & 114c coal chunk
114b	7/18/2017	Ceramic	terra cotta, fragment	1																1						found w 114a drain tile fragment & 114c coal chunk

Table 4. ALO Artifact Inventory: 21HE0226

GPS PointID	GPS Date	Material Class	Description	Total Count	Count by Material Class																	Unknown	Collected	Photograph Numbers	Notes
					Glass					Ceramic			Lithic	Bone	Charcoal	Metal	Drain Tile	Brick	Cement	Terra Cotta	Shell				
					Brown	Blue	Clear	Amethyst	Green	Stoneware	Whiteware	Other									Mollusc	Gastropod				
114c	7/18/2017	Lithic	coal, chunk	1									1												found w 114a drain tile fragment & 114b terra cotta fragment
115	7/18/2017	Ceramic	drain tile fragment	2													2								
116a	7/18/2017	Lithic	coal, chunk	2									2												found w 116b drain tile fragment & 116c cement fragment
116b	7/18/2017	Ceramic	drain tile fragment	1													1								found w 116a coal chunk & 116c cement fragment
116c	7/18/2017	Cement	fragment	1															1						found w 116a coal chunk & 116 b drain tile fragment
117	7/18/2017	Cement	fragment	2															2						
118a	7/18/2017	Cement	fragment	3															3						found w 118b brick fragment, 118c brown glass shard, 118d cobalt blue glass shard, 118e drain tile fragment & 118f stoneware sherd
118b	7/18/2017	Ceramic	brick fragment	2														2							found w 118a cement fragments, 118c brown glass shard, 118d cobalt blue glass shard, 118e drain tile fragment & 118f stoneware sherd
118c	7/18/2017	Glass	brown, bottle, body shard	1	1																		1	9a & 9b	54.66 mm long x 45.60 mm wide x 6.51 mm thick; 27.84 g; curved; broken from just above base; approx. 47.17 mm diameter; parallel horizontal "rib" embossing, exterior only; machine-made mold seam; found w 118a cement fragments, 118b brick fragment, 118d cobalt blue glass shard, 118e drain tile fragment & 118f stoneware sherd
118d	7/18/2017	Glass	cobalt blue, bottle, base shard	1		1																	1	10a & 10b	20.19 mm long x 18.59 mm wide x 7.08 mm thick; 4.37 g; "...S..." embossing, exterior bottom only; found w 118a cement fragments, 118b brick fragment, 118c brown glass shard, 118e drain tile fragment & 118f stoneware sherd
118e	7/18/2017	Ceramic	drain tile fragment	1													1								found w 118a cement fragments, 118b brick fragment, 118c brown glass shard, 118d cobalt blue glass shard & 118f stoneware sherd
118f	7/18/2017	Ceramic	stoneware, body sherd	1						1													1	13a & 13b	47.56 mm long x 36.59 mm wide x 9.33 mm thick; 24.02 g; slightly curved; grayish cream glaze w few small rounded brown inclusions exterior; black glaze interior; found w 118a cement fragments, 118b brick fragment, 118c brown glass shard, 118d cobalt blue glass shard & 118e drain tile fragment
119a	7/18/2017	Ceramic	brick fragment	1														1							found w 119b stoneware sherd
119b	7/18/2017	Ceramic	stoneware rim sherd	1						1													1	13a 7 13b	57.86 mm long x 35.05 mm wide x 8.57 mm thick; 31.03 g; slightly curved; light bluish gray glaze exterior; dark brown glaze interior and partially interior on rim; found w 119a brick fragment
120a	7/18/2017	Ceramic	drain tile fragment	3													3								found w 120b cement fragment
120b	7/18/2017	Cement	fragment	1															1						found w 120a drain tile fragments
121a	7/18/2017	Glass	clear, patinated, window shard	1			1																		found 121b drain tile fragment
121b	7/18/2017	Ceramic	drain tile fragment	1													1								found w 121a clear glass shard
122	7/18/2017	Glass	cobalt blue, bottle, body shard	1		1																	1	10a & 10b	24.63 mm long x 14.31 mm wide x 3.12 mm thick; 1.53 g; curved; no embossing or other markings
123a	7/18/2017	Ceramic	drain tile fragment	1													1								found w 123b coal chunks
123b	7/18/2017	Lithic	coal, chunk	2									2												found w 123a drain tile fragment
124a	7/18/2017	Ceramic	drain tile fragment	2													2								found w 124b cement fragment
124b	7/18/2017	Cement	fragment	1															1						found w 124a drain tile fragment
125a	7/18/2017	Glass	clear, window shard	1			1																		found w 125b cement fragment & 125c brown glass shard
125b	7/18/2017	Cement	fragment	1															1						found w 125a clear window shard & 125c brown glass shard

Table 4. ALO Artifact Inventory: 21HE0226

GPS PointID	GPS Date	Material Class	Description	Total Count	Count by Material Class																	Unknown	Collected	Photograph Numbers	Notes
					Glass					Ceramic			Lithic	Bone	Charcoal	Metal	Drain Tile	Brick	Cement	Terra Cotta	Shell				
					Brown	Blue	Clear	Amethyst	Green	Stoneware	Whiteware	Other									Mollusc	Gastropod				
125c	7/18/2017	Glass	brown, bottle, body shard	1	1																				found w 125a clear window shard & 125b cement fragment
126a	7/18/2017	Ceramic	drain tile fragment	4													4								found w 126b cement & 126c brick fragments
126b	7/18/2017	Cement	fragment	1															1						found w 126a drain tile & 126c brick fragments
126c	7/18/2017	Ceramic	brick fragment	3														3							found w 126a drain tile & 126b cement fragments
127a	7/18/2017	Ceramic	stoneware partial rim sherd	1						1													1	13a & 13b	53.98 mm long x 44.73 mm wide x 7.95 mm thick; 27.29 g; slightly curved; whitish cream glaze exterior; brown glaze interior; found w 127b drain tile fragment, 127c coal chunk, 127d clear window shard, 127e clear glass shard, 127f cement fragment
127b	7/18/2017	Ceramic	drain tile fragment	1													1								found w 127a stoneware sherd, 127c coal chunk, 127d clear window shard, 127e clear glass shard, 127f cement fragment
127c	7/18/2017	Lithic	coal, chunk	2									2												found w 127a stoneware sherd, 127b drain tile fragment, 127d clear window shard, 127e clear glass shard, 127f cement fragment
127d	7/18/2017	Glass	clear, window shard	1			1																		found w 127a stoneware sherd, 127b drain tile fragment, 127c coal chunks, 127e clear glass shard, 127f cement fragment
127e	7/18/2017	Glass	clear, bottle, body shard	1			1																		found w 127a stoneware sherd, 127b drain tile fragment, 127c coal chunks, 127d clear window shard, 127f cement fragment
127f	7/18/2017	Cement	fragment	1															1						found w 127a stoneware sherd, 127b drain tile fragment, 127c coal chunks, 127d clear window shard, 127e clear glass shard
128a	7/18/2017	Ceramic	drain tile fragment	1													1								found w 128b cement fragment
128b	7/18/2017	Cement	fragment	1															1						found w 128a drain tile fragment
129a	7/18/2017	Ceramic	drain tile fragment	3													3								found w 129b cement fragment
129b	7/18/2017	Cement	fragment	4															4						found w 129a drain tile fragment
130a	7/18/2017	Ceramic	drain tile fragment	1													1								found w 130b clear glass shard
130b	7/18/2017	Glass	clear, bottle, body shard	1			1																		found w 130a drain tile fragment
131	7/18/2017	Glass	clear, patinated, window shard	1			1																		
132	7/18/2017	Ceramic	drain tile fragment	2													2								
133a	7/18/2017	Ceramic	drain tile fragment	1													1								found w 133b cement fragments
133b	7/18/2017	Cement	fragment	2															2						found w 133a drain tile fragment
134a	7/18/2017	Ceramic	drain tile fragment	2													2								found w 134b cement fragments
134b	7/18/2017	Cement	fragment	3															3						found w 134a drain tile fragments
135a	7/18/2017	Cement	fragment	4															4						found w 135b drain tile fragments & 135c brick fragment
135b	7/18/2017	Ceramic	drain tile fragment	2													2								found w 135a cement fragments & 135c brick fragments
135c	7/18/2017	Ceramic	brick fragment	1														1							found w 135a cement fragments & 135b drain tile fragments
136a	7/18/2017	Ceramic	drain tile fragment	2													2								found w 136b cement fragments, 136c brick fragment & 136d coal chunk
136b	7/18/2017	Cement	fragment	2															2						found w 136a drain tile fragments, 136c brick fragment & 136d coal chunk
136c	7/18/2017	Ceramic	brick fragment	1														1							found w 136a drain tile fragments, 136b cement fragments & 136d coal chunk
136d	7/18/2017	Lithic	coal, chunk	1									1												found w 136a drain tile fragments, 136b cement fragments & 136c brick fragment
137a	7/18/2017	Cement	fragment	1															1						found w 137b brick fragment & 137c drain tile fragment
137b	7/18/2017	Ceramic	brick fragment	1														1							found w 137a cement fragment & 137c drain tile fragment

Table 4. ALO Artifact Inventory: 21HE0226

GPS PointID	GPS Date	Material Class	Description	Total Count	Count by Material Class																	Unknown	Collected	Photograph Numbers	Notes
					Glass					Ceramic			Lithic	Bone	Charcoal	Metal	Drain Tile	Brick	Cement	Terra Cotta	Shell				
					Brown	Blue	Clear	Amethyst	Green	Stoneware	Whiteware	Other									Mollusc	Gastropod				
137c	7/18/2017	Ceramic	drain tile fragment	1													1								found w 137a cement fragment & 137b brick fragment
138a	7/18/2017	Cement	fragment	3															3						found w 138b brick fragments & 138c drain tile fragment
138b	7/18/2017	Ceramic	brick fragment	2														2							found w 138a cement fragments & 138c drain tile fragment
138c	7/18/2017	Ceramic	drain tile fragment	1													1								found w 138a cement fragments & 138b brick fragments
139a	7/18/2017	Glass	clear, window shard	1			1																		found w 139b bottle glass shard
139b	7/18/2017	Glass	clear, bottle, body shard	1			1																		found w 139a window glass shard
140a	7/18/2017	Ceramic	drain tile fragment	4													4								found w 140b cement fragment
140b	7/18/2017	Cement	fragment	1															1						found w 140a drain tile fragments
141a	7/18/2017	Cement	fragment	3															3						found w 141b brick fragment & 141c drain tile fragment
141b	7/18/2017	Ceramic	brick fragment	1														1							found w 141a cement fragments & 141c drainn tile fragment
141c	7/18/2017	Ceramic	drain tile fragment	1													1								found w 141a cement fragments & 141b brick fragment
142a	7/18/2017	Ceramic	drain tile fragment	2													2								found w 142b cement fragments
142b	7/18/2017	Cement	fragment	3															3						found w 142a drain tile fragments
143a	7/18/2017	Ceramic	drain tile fragment	1													1								found w 143b window glass shards
143b	7/18/2017	Glass	clear, window shard	2			2																		found w 143a drain tile fragment
144a	7/18/2017	Ceramic	drain tile fragment	1													1								found w 144b brick fragment, 144c cement fragments, 144d unID bone fragment
144b	7/18/2017	Ceramic	brick fragment	1														1							found w 144a drain tile fragment, 144c cement fragments, 144d unID bone fragment
144c	7/18/2017	Cement	fragment	4															4						found w 144a drain tile fragment, 144b brick fragment, 144d unID bone fragment
144d	7/18/2017	Bone	unID, fragment	1										1											found w 144a drain tile fragment, 144b brick fragment, 144c cement fragments
145a	7/18/2017	Ceramic	drain tile fragment	1													1								found w 145b cement fragments
145b	7/18/2017	Cement	fragment	2															2						found w 145a drain tile fragment
146a	7/18/2017	Ceramic	drain tile fragment	1													1								found w 146b cement fragment
146b	7/18/2017	Cement	fragment	1															1						found w 146a drain tile fragment
147a	7/18/2017	Cement	fragment	3															3						found w 147b clear glass shard
147b	7/18/2017	Glass	clear, bottle, body shard	1			1																		found w 147a cement fragments
148a	7/18/2017	Cement	fragment	9															9						found w 148b brick fragment
148b	7/18/2017	Ceramic	brick fragment	1														1							found w 148a cement fragments
149a	7/18/2017	Ceramic	stoneware, body sherd	1						1															found w 149b brick fragment, 149c cement fragments & 149d red pottery(?) body sherd
149b	7/18/2017	Ceramic	brick fragment	1														1							found w 149a stoneware body sherd, 149c cement fragments & 149d red pottery(?) body sherd
149c	7/18/2017	Cement	fragment	2															2						found w 149a stoneware body sherd, 149b brick fragment & 149d red pottery(?) body sherd
149d	7/18/2017	Ceramic	red, pottery(?), body sherd	1								1											1	4a & 4b	14.46 mm long x 10.89 mm wide x 4.49 mm thick; 0.60 g; found w 149a stoneware body sherd, 149b brick fragment & 149c cement fragments
150a	7/18/2017	Cement	fragment	3															3						found w 150b coal chunks
150b	7/18/2017	Lithic	coal chunks	3									3												found w 150a cement fragments
151a	7/18/2017	Ceramic	drain tile fragment	5													5								found w 151b brick fragment, 151c cement fragment & 151d coal chunk
151b	7/18/2017	Ceramic	brick fragment	1														1							found w 151a drain tile fragments, 151c cement fragment & 151d coal chunk
151c	7/18/2017	Cement	fragment	1															1						found w 151a drain tile fragments, 151b brick fragment & 151d coal chunk
151d	7/18/2017	Lithic	coal chunk	1									1												found w 151a drain tile fragments, 151b brick fragment & 151c cement fragment
152a	7/18/2017	Cement	fragment	4															4						found w 152b drain tile fragments
152b	7/18/2017	Ceramic	drain tile fragment	2													2								found w 152a cement fragments
153a	7/18/2017	Ceramic	drain tile fragment	1													1								found w 153b cement fragments

Table 4. ALO Artifact Inventory: 21HE0226

GPS PointID	GPS Date	Material Class	Description	Total Count	Count by Material Class																		Unknown	Collected	Photograph Numbers	Notes
					Glass					Ceramic			Lithic	Bone	Charcoal	Metal	Drain Tile	Brick	Cement	Terra Cotta	Shell					
					Brown	Blue	Clear	Amethyst	Green	Stoneware	Whiteware	Other									Mollusc	Gastropod				
153b	7/18/2017	Cement	fragment	3															3							found w 153a drain tile fragment
154a	7/18/2017	Glass	clear, bottle, base shard	1			1																	1	11a & 11b	51.97 mm long x 39.00 mm wide x 8.84 mm thick; 25.16 g; partial oval shape; "...5..." embossing, exterior bottom only; found w 154b drain tile fragment & 154c brick fragment
154b	7/18/2017	Ceramic	drain tile fragment	1													1									found w 154a clear glass shard & 154c brick fragment
154c	7/18/2017	Ceramic	brick fragment	1														1								found 2 154a clear glass shard & 154b drain tile fragment
155a	7/18/2017	Cement	fragment	2															2							found w 155b drain tile fragment & 155c brick fragment
155b	7/18/2017	Ceramic	drain tile fragment	1													1									found w 155a cement fragments & 155c brick fragment
155c	7/18/2017	Ceramic	brick fragment	2														2								found w 155a cement fragments & 155b drain tile fragment
156a	7/18/2017	Cement	fragment	8															8							found w 156b drain tile fragment
156b	7/18/2017	Ceramic	drain tile fragment	1													1									found w 156a cement fragments
157a	7/18/2017	Cement	fragment	4															4							found w 157b drain tile fragment, 157c window glass shard & 157d rusted nail
157b	7/18/2017	Ceramic	drain tile fragment	1													1									found w 157a cement fragments, 157c window glass shard & 157d rusted nail
157c	7/18/2017	Glass	clear, patinated, window shard	1			1																			found w 157a cement fragments, 157b drain tile fragments & 157d rusted nail
157d	7/18/2017	Metal	rusted, nail	1												1										found w 157a cement fragments, 157b drain tile fragments & 157c window glass shard
158a	7/18/2017	Ceramic	drain tile fragment	1													1									found w 158b clear bottle shard
158b	7/18/2017	Glass	clear, bottle, body shard	1			1																			found w 158a drain tile fragment
159a	7/18/2017	Glass	clear, patinated, window shard	1			1																			found w 159b brown bottle glass shard
159b	7/18/2017	Glass	brown, bottle, body shard	1	1																					found w 159a window glass shard
160a	7/18/2017	Ceramic	drain tile fragment	3													3									found w 160b cement fragments
160b	7/18/2017	Cement	fragment	4															4							found w 160a drain tile fragments
161a	7/18/2017	Ceramic	drain tile fragment	1													1									found w 161b brick fragments & 161c cement fragments
161b	7/18/2017	Ceramic	brick fragment	2														2								found w 161a drain tile fragment & 161c cement fragments
161c	7/18/2017	Cement	fragment	3															3							found w 161a drain tile fragment & 161b brick fragments
162a	7/18/2017	Ceramic	drain tile fragment	2													2									found w 162b cement fragments
162b	7/18/2017	Cement	fragment	2															2							found w 162a drain tile fragments
163a	7/18/2017	Ceramic	drain tile fragment	2													2									found w 163b cement fragments
163b	7/18/2017	Cement	fragment	4															4							found w 163a drain tile fragments
164a	7/18/2017	Glass	clear, bottle, body shard	2			2																			found w 164b drain tile fragments & 164c brick fragments
164b	7/18/2017	Ceramic	drain tile fragment	6													6									found w 164a clear bottle glass shards & 164c brick fragments
164c	7/18/2017	Ceramic	brick fragment	2														2								found w 164a clear bottle glass shards & 164b drain tile fragments
165a	7/18/2017	Cement	fragment	5															5							found w 165b drain tile fragments & 165c clear bottle glass shard
165b	7/18/2017	Ceramic	drain tile fragment	2													2									found w 165a cement fragments & 165c clear bottle glass shard
165c	7/18/2017	Glass	clear, bottle, body shard	1			1																			found w 165a cement fragments & 165b drain tile fragments
166a	7/18/2017	Ceramic	brick fragment	1														1								found w 166b metal bracket
166b	7/18/2017	Metal	rusted, broken, bracket	1												1								1	7a & 7b	87.60 mmlong x 49.63 mm wide x 8.40 mm thick; 46.15 g; found w 166a brick fragment
167a	7/18/2017	Ceramic	drain tile fragment	1													1									found w 167b cement fragments
167b	7/18/2017	Cement	fragment	2															2							found w 167a drain tile fragment
168a	7/18/2017	Ceramic	drain tile fragment	2													2									found w 168b cement fragments, 168c green bottle glass rim shard & 168d coal chunks
168b	7/18/2017	Cement	fragment	4															4							found w 168a drain tile fragments, 168c green bottle glass rim shard & 168d coal chunks

Table 4. ALO Artifact Inventory: 21HE0226

GPS PointID	GPS Date	Material Class	Description	Total Count	Count by Material Class																	Unknown	Collected	Photograph Numbers	Notes
					Glass					Ceramic			Lithic	Bone	Charcoal	Metal	Drain Tile	Brick	Cement	Terra Cotta	Shell				
					Brown	Blue	Clear	Amethyst	Green	Stoneware	Whiteware	Other									Mollusc	Gastropod				
168c	7/18/2017	Glass	green, bottle, rim shard	1					1															1	2a & 2b	35.81 mm long x 28.45 mm wide x 6.56 mm thick; 12.47 g; found w 168a drain tile fragments, 168b cement fragments & 168d coal chunks
168d	7/18/2017	Lithic	coal, chunk	2									2												found w 168a drain tile fragments, 168b cement fragments & 168c green bottle glass rim shard
169a	7/18/2017	Ceramic	drain tile fragment	2													2								found w 169b cement fragments
169b	7/18/2017	Cement	fragment	4															4						found w 169a drain tile fragments
170a	7/18/2017	Metal	rusted, bent, sheet fragment	1												1									found w 170b coal chunks
170b	7/18/2017	Lithic	coal, chunk	2									2												found w 170a rusted sheet metal fragment
171a	7/18/2017	Cement	fragment	8															8						found w 171b drain tile fragment, 171c brick fragments & 171d mollusc fragment
171b	7/18/2017	Ceramic	drain tile	1													1								found w 171a cement fragment, 171c brick fragments & 171d mollusc fragment
171c	7/18/2017	Ceramic	brick fragment	3														3							found w 171a cement fragment, 171b drain tile fragment, & 171d mollusc fragment
171d	7/18/2017	Shell	mollusc, fragment	1																	1				found w 171a cement fragment, 171b drain tile fragment & 171c brick fragments
172a	7/18/2017	Cement	fragment	3															3						found w 172b drain tile fragment
172b	7/18/2017	Ceramic	drain tile fragment	1													1								found w 172a cement fragments
173a	7/18/2017	Ceramic	drain tile fragment	3													3								found w 173b cement fragements, 173c coal chunks & 173d prehistoric(?) body sherd
173b	7/18/2017	Cement	fragment	2															2						found w 173a drain tile fragments, 173c coal chunks & 173d prehistoric(?) body sherd
173c	7/18/2017	Lithic	coal, chunk	2									2												found w 173a drain tile fragments, 173b cement fragements & 173d prehistoric(?) body sherd
174a	7/18/2017	Ceramic	drain tile fragment	1													1							1	5a & 5b	109.78 mm long x 58.70 mm wide x 22.80 mm thick; 210.35 g; "..[R]ED WING..." imprinted on exterior only; found w 174b cement fragment
174b	7/18/2017	Cement	fragment, possibly brick mortar	1															1					1	6a & 6b	145.24 mm long x 60.85 mm wide x 24.03 mm thick; 243.35 g; brick mortar?; found w 174a drain tile fragment
175a	7/18/2017	Ceramic	drain tile fragment	1													1								found w 175b cement fragments
175b	7/18/2017	Cement	fragment	3															3						found w 175a drain tile fragment
176a	7/18/2017	Ceramic	drain tile fragment	1													1								found w 176b brick fragment, 176c green glass shard & 176d stoneware body sherd
176b	7/18/2017	Ceramic	brick fragment	1														1							found w 175a drain tile fragment, 176c green glass shard & 176d stoneware body sherd
176c	7/18/2017	Glass	green, bottle, body shard	1					1																found w 175a drain tile fragment, 176b brick fragment & 176d stoneware body sherd
176d	7/18/2017	Ceramic	stoneware, body sherd	1						1															found w 175a drain tile fragment, 176b brick fragment & 176c green glass shard
177a	7/18/2017	Cement	fragment	2															2						found w 177b drain tile fragment
177b	7/18/2017	Ceramic	drain tile fragment	1													1								found w 177a cement fragments
178a	7/18/2017	Cement	fragment	2															2						found w 178b drain tile fragment & 178c coal chunk
178b	7/18/2017	Ceramic	drain tile fragment	1													1								found w 178a cement fragments & 178c coal chunk
178c	7/18/2017	Lithic	coal, chunk	1									1												found w 178a cement fragments & 178b drain tile fragment

Table 4. ALO Artifact Inventory: 21HE0226

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					Glass					Ceramic			Lithic	Bone	Charcoal	Metal	Drain Tile	Brick	Cement	Terra Cotta	Shell				
					Brown	Blue	Clear	Amethyst	Green	Stoneware	Whiteware	Other									Mollusc	Gastropod				
179a	7/18/2017	Ceramic	whiteware base sherd	1							1													1	15a & 15b	19.81 mm long x 14.12 mm wide x 4.09 mm thick; 1.96g; cracked white glaze exterior; degraded & unglazed interior; found w 179b stoneware body sherd, 179c cement fragments, 179d brick fragments, 179e drain tile fragments, 179f metal slab fragment & 178g window glass shard
179b	7/18/2017	Ceramic	stoneware, body sherd	1						1															found w 179a whiteware base sherd, 179c cement fragments, 179d brick fragments, 179e drain tile fragments, 179f metal slab fragment & 178g window glass shard
179c	7/18/2017	Cement	fragment	9															9						found w 179a whiteware base sherd, 179b stoneware body sherd, 179d brick fragments, 179e drain tile fragments, 179f metal slab fragment & 178g window glass shard
179d	7/18/2017	Ceramic	brick fragment	4														4							found w 179a whiteware base sherd, 179b stoneware body sherd, 179c cement fragments, 179e drain tile fragments, 179f metal slab fragment & 178g window glass shard
179e	7/18/2017	Ceramic	drain tile fragment	4													4								found w 179a whiteware base sherd, 179b stoneware body sherd, 179c cement fragments, 179d brick fragments, 179f metal slab fragment & 178g window glass shard
179f	7/18/2017	Metal	rusted, slab fragment	1												1									found w 179a whiteware base sherd, 179b stoneware body sherd, 179c cement fragments, 179d brick fragments, 179e drain tile fragments & 178g window glass shard
179g	7/18/2017	Glass	clear, window shard	1			1																		found w 179a whiteware base sherd, 179b stoneware body sherd, 179c cement fragments, 179d brick fragments, 179e drain tile fragments & 178f metal slab fragment
180a	7/18/2017	Ceramic	drain tile fragment	2													2								found w 180b cement fragments, 180c coal chunk & 180d brick fragment
180b	7/18/2017	Cement	fragment	4															4						found w 180a drain tile fragment, 180c coal chunk & 180d brick fragment
180c	7/18/2017	Lithic	coal, chunk	1									1												found w 180a drain tile fragment, 180b cement fragments & 180d brick fragment
180d	7/18/2017	Ceramic	brick fragment	1														1							found w 180a drain tile fragment, 180b cement fragments & 180c coal chunk
181a	7/18/2017	Ceramic	drain tile fragment	2													2								found w 181b cement fragments & 181c brick fragments
181b	7/18/2017	Cement	fragment	11															11						found w 181a drain tile fragments & 181c brick fragments
181c	7/18/2017	Ceramic	brick fragment	3														3							found w 181a drain tile fragments & 181b cement fragments
182a	7/18/2017	Ceramic	drain tile fragment	2													2								found w 182b cement fragments, 182c brick fragment & 182d whiteware body sherd
182b	7/18/2017	Cement	fragment	2															2						found w 182a drain tile fragment, 182c brick fragment & 182d whiteware body sherd

Table 4. ALO Artifact Inventory: 21HE0226

GPS PointID	GPS Date	Material Class	Description	Total Count	Count by Material Class																	Unknown	Collected	Photograph Numbers	Notes
					Glass					Ceramic			Lithic	Bone	Charcoal	Metal	Drain Tile	Brick	Cement	Terra Cotta	Shell				
					Brown	Blue	Clear	Amethyst	Green	Stoneware	Whiteware	Other									Mollusc	Gastropod				
182c	7/18/2017	Ceramic	brick fragment	1														1							found w 182a drain tile fragment, 182b cement fragments & 182d whiteware body sherd
182d	7/18/2017	Ceramic	whiteware, body sherd	1							1														found w 182a drain tile fragment, 182b cement fragments & 182c brick fragment
183a	7/18/2017	Glass	clear, glass shard	1			1																		found w 183b cement fragments, 183c drain tile fragment & 183d brick fragment
183b	7/18/2017	Cement	fragment	2															2						found w 183a glass shard, 183c drain tile fragment & 183d brick fragment
183c	7/18/2017	Ceramic	drain tile fragment	1														1							found w 183a glass shard, 183b cement fragments & 183d brick fragment
183d	7/18/2017	Ceramic	brick fragment	1													1								found w 183a glass shard, 183b cement fragments & 183c drain tile fragment
184a	7/18/2017	Ceramic	brick fragment	1														1							found w 184b drain tile fragments & 184c cement fragments
184b	7/18/2017	Ceramic	drain tile fragment	2													2								found w 184a brick fragment & 184c cement fragments
184c	7/18/2017	Cement	fragment	2															2						found w 184a brick fragment & 184b drain tile fragments
185a	7/18/2017	Ceramic	whiteware, body sherd	1							1														found w 185b coal chunks, 185c brick fragment, 185d drain tile fragments & 185e cement fragments
185b	7/18/2017	Lithic	coal, chunk	3									3												found w 185a whiteware body sherd, 185c brick fragment, 185d drain tile fragments & 185e cement fragments
185c	7/18/2017	Ceramic	brick fragment	1														1							found w 185a whiteware body sherd, 185b coal chunks, 185d drain tile fragments & 185e cement fragments
185d	7/18/2017	Ceramic	drain tile fragment	6													6								found w 185a whiteware body sherd, 185b coal chunks, 185c brick fragment & 185e cement fragments
185e	7/18/2017	Cement	fragment	3															3						found w 185a whiteware body sherd, 185b coal chunks, 185c brick fragment & 185d drain tile fragments
186	7/18/2017	Ceramic	drain tile fragment	1													1								
187a	7/18/2017	Ceramic	drain tile fragment	2													2								found w 187b cement fragment
187b	7/18/2017	Cement	fragment	1															1						found w 187a drain tile fragments
188a	7/18/2017	Ceramic	pipe bowl fragment, undecorated	1									1										1	14a & 14b	22.88 mm long x 22.33 mm wide x 6.71 mm thick; 4.17 g; white clay (kaolin?), base and/or spur absent, unglazed & undecorated; found w 188b clear window shard
188b	7/18/2017	Glass	clear, window shard	1			1																		found w 188a pipe bowl fragment
189	7/18/2017	Ceramic	drain tile fragment	1													1								
190	7/18/2017	Cement	fragment	1															1						
191	7/18/2017	Cement	fragment	1															1						
192a	7/18/2017	Ceramic	drain tile fragment	1													1								found w 192b charcoal fragment
192b	7/18/2017	Charcoal	fragment	1											1										found w 192a drain tile fragment
193a	7/18/2017	Ceramic	drain tile fragment	1													1								found w 193b cement fragments
193b	7/18/2017	Cement	fragment	3															3						found w 193a drain tile fragment
194a	7/18/2017	Ceramic	drain tile fragment	2													2								found w 194b melted glass chunk & 194c brick fragment
194b	7/18/2017	Glass	clear-light blueish, melted, chunk	1			1																1	3a & 3b	36.07 mm long x 24.71 mm wide x 16.56 mm thick; 13.95 g; found w 194a drain tile fragment & 194c brick fragment
194c	7/18/2017	Ceramic	brick fragment	1														1							found w 194a drain tile fragment & 194b melted glass chunk
195	7/18/2017	Glass	clear, window shard	1			1																		
196	7/18/2017	Shell	gastropod	1																		1			
197	7/18/2017	Glass	brown, bottle, body shard	1	1																				
198	7/18/2017	Shell	gastropod	1																		1			

Table 4. ALO Artifact Inventory: 21HE0226

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					Glass					Ceramic			Lithic	Bone	Charcoal	Metal	Drain Tile	Brick	Cement	Terra Cotta	Shell					
					Brown	Blue	Clear	Amethyst	Green	Stoneware	Whiteware	Other									Mollusc	Gastropod				
199	7/18/2017	Glass	brown, bottle, body shard	1	1																					
200	7/18/2017	Ceramic	drain tile fragment	1													1									
201	7/18/2017	Ceramic	stoneware, body sherd	1						1																
201a	7/18/2017	Ceramic	stoneware, rim sherd	1						1														1	13a & 13b	64.14 mm long x 50.00 mm wide x 14.95 mm thick; 64.35 g; slightly curved; brownish tan glaze w common brown round inclusions exterior; orangish brown glaze top of rim; darker brownish tan glaze w frequent brown round inclusions interior
202a	7/18/2017	Glass	aquamarine, bottle(?), body shard	1		1																		1	12a & 12b	32.64 mm long x 22.68 mm wide x 4.38 mm thick; 5.06 g; machine-made(?) mold seam; found w 202b stoneware sherd, 202c whiteware body sherd & 202d whiteware base sherds
202b	7/18/2017	Ceramic	stoneware, base sherd	1						1														1	13a & 13b	34.37 mm long x 32.74 mm wide x 7.46 mm thick; 14.56 g; white glaze partially on exterior; brown glaze interior; found w 202a aquamarine body shard, 202c whiteware body sherd & 202d whiteware base sherds
202c	7/18/2017	Ceramic	whiteware, body sherd	5							5															found w 202a aquamarine body shard, 202b stoneware sherd & 202d whiteware base sherds
202d	7/18/2017	Ceramic	whiteware, base sherd	2							2													2	15a & 15b	50.70 mm long x 34.16 mm wide x 4.28 mm thick; 11.63 g; white glaze exterior & interior; very slight curve from base to body AND 35.36 mm long x 32.38 mm wide x 2.81 mm thick; 5.05 g; slight curve from base to body; white glaze exterior & interior; both found w 202a aquamarine body shard, 202b stoneware sherd & 202c whiteware body sherd
203a	7/18/2017	Ceramic	whiteware, base sherd	1							1													1	15a & 15b	40.36 mm long x 33.98 mm wide x 3.66 mm thick; 6.58 g; slight curve from base to body; scalloped ridgeline around base; white glaze exterior & interior; found w 203b amethyst body shard
203b	7/18/2017	Glass	amethyst, bottle(?), base shard	1				1																1	12a & 12b	30.61 mm long x 26.22 mm wide x 6.49 mm thick; 5.10 g; found w 203a whiteware base sherd
204	7/18/2017	Glass	clear-light bluish, bottle, base(?) shard	1			1																	1	11a & 11b	36.41 mm long x 25.97 mm wide x 4.96 mm thick; 10.84 g
205	7/18/2017	Ceramic	drain tile fragment	1													1									
206	7/18/2017	Shell	mollusc, fragment	1																	1					
207	7/18/2017	Ceramic	stoneware, body sherd	1					1																	
208	7/18/2017	Ceramic	stoneware, dark blue decoration, body sherd	1					1															1	13a & 13b	47.28 mm long x 34.41 mm wide x 1032. mm thick; 18.94 g; grayish cream glaze exterior w dark blue glazed decoration; grayish black interior w matte finish; slightly curved
			Total	**472**	**6**	**4**	**28**	**1**	**5**	**10**	**15**	**2**	**24**	**2**	**1**	**4**	**135**	**44**	**181**	**2**	**3**	**3**	**2**	**33**		

PLATES

Plate 1. View from ST 13-4 Looking North Across Soybeans Toward Woods

Plate 2. View from ST 13-4 Looking South Toward STs 13-1 through 13-3 and Indian Road

Plate 3. View from ST 13-3 Looking Northeast Toward ST 14-1

Plate 4. View from ST 13-1 Looking North to ST 13-2

Plate 5. View of Typical Condition of 21HE0092 Looking East from Point South of 21HE0225
Note: Hunting trailer parked permanently along Indian Road to the northeast.

Plate 6. View from Indian Road Looking at South End of 21HE0225 and Northeastward Across Site
Note: Hunting trailer parked permanently along Indian Road to the east.

Plate 7. Stoneware Collected from 21HE0225

a. handle, rim & body, exterior.

b. obverse.

Plate 8. Whiteware Collected from 21HE0225

a. base, exterior.

b. obverse.

Plate 9. Earthenware Collected from 21HE0225

a. base & rim.

b. obverse.

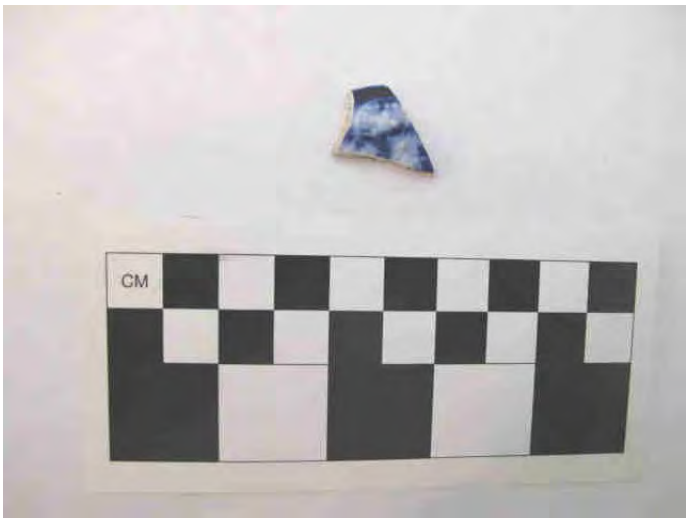
Plate 10. Porcelain Collected from 21HE0225

a. rims, exterior.

b. obverse.

Plate 11. Other Ceramics Collected from 21HE0225

a. blue-white rim, exterior.



b. obverse.

Plate 12. Glass Rims Collected from 21HE0225

a. exterior.

b. obverse.

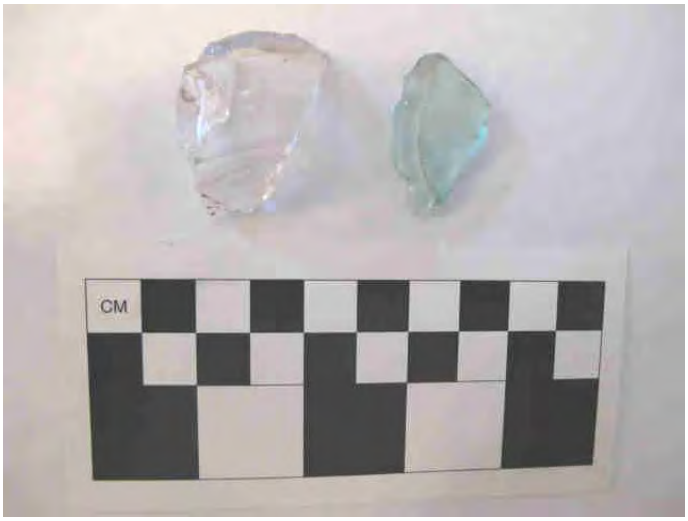
Plate 13. Glass Chunks Collected from 21HE0225

a. clear glass chunk possibly worked.

b. obverse.

Plate 14. Glass Bases Collected from 21HE0225

a. clear-bluish base patinated.



b. obverse.

Plate 15. Bone Fragments Collected from 21HE0225

a. two calcined, one burnt.

b. obverse.

Plate 16. Shell Fragments Collected from 21HE0225

a. exterior.

b. obverse.

Plate 17. Lithic Chunks Collected from 21HE0225

a. Knife River Flint & coal chunks.

b. obverse.

Plate 18. Cube-Shaped Lithic Object and Possibly Worked Raw Material

a. side view.

b. top view.

Plate 19. Metal Objects Collected from 21HE0225

a. sheet and spike.

b. obverse.

Plate 20. View of Middle of West End of 21HE0226 Looking Southwest
Note: Pin flags in densest portion of artifact scatter

Plate 21. View Across 21HE0226 from East End Looking West

Plate 22. Cement Collected from 21HE0226

a. possibly brick mortar.

b. obverse.

Plate 23. Mortar and Brick Fragments from 21HE0226

a. brlck (left) & mortar (right).

b. obverse.

Plate 24. Drain Tile Fragment

a. "..[R]ED WING…" incised on surface.

b. obverse.

Plate 25. Clear Glass Collected from 21HE0226

a. "…5…" embossing on base, exterior (left); possible base shard with light bluish hue (middle); possible body shard, possibly worked.

b. obverse, including interior of base.

Plate 26. Brown Glass Collected from 21HE0226

a. parallel horizontal "rib" embossing (left); "…I[?] T[?] S E[?] or F[?]…" embossing (right) – exterior.

b. obverse – interior.

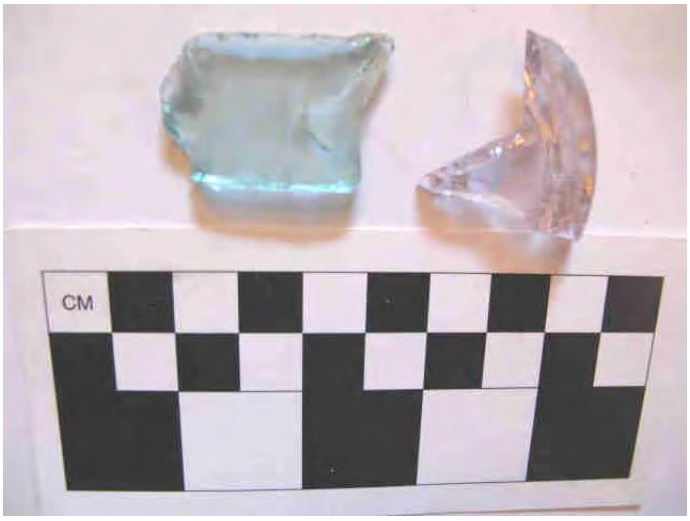
Plate 27. Cobalt Blue Glass Collected from 21HE0226

a. "…S. A." and "…M…" (90 degrees from other printing) embossing (left); "…S…" embossing, exterior bottom only (middle); body shard (right) – exterior.

b. obverse – interior.

Plate 28. Aquamarine and Amethyst Glass Collected from 21HE0226

a. possible bottle body shard (left); possible bottle base shard (right).



b. obverse.

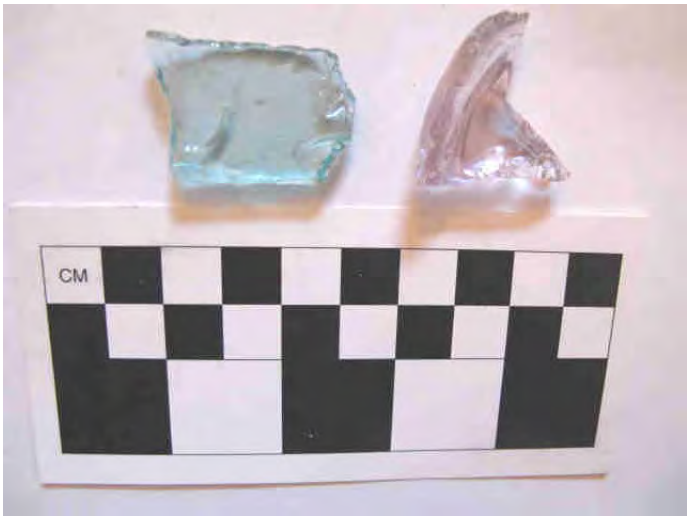
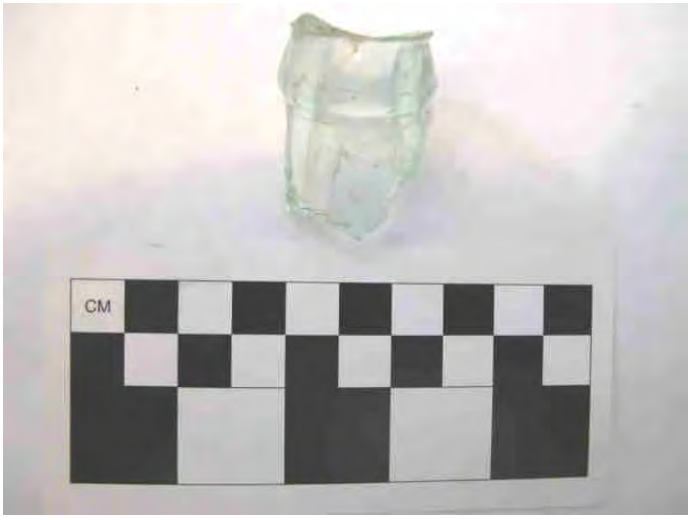


Plate 29. Green Bottle Glass Collected from 21HE0226

a. rim, exterior.



b. obverse – interior.

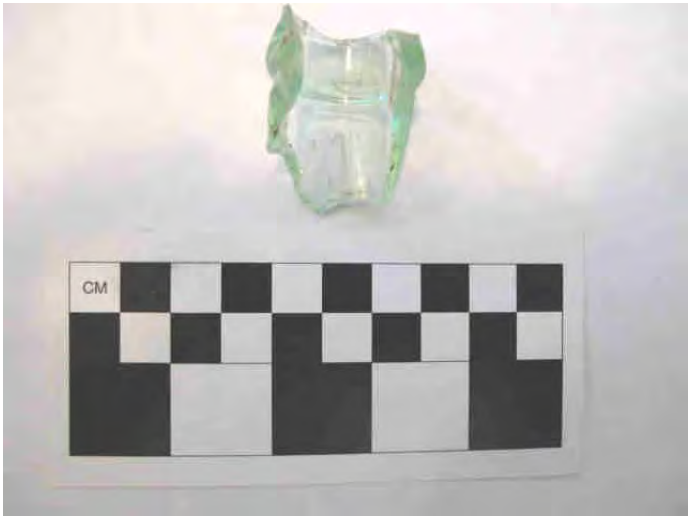


Plate 30. Melted Glass Collected from 21HE0226

a. view 1.

b. obverse.

Plate 31. Stoneware Collected from 21HE0226

a. All exterior. Top Row left to right: slightly curved brownish tan glaze rim sherd w common brown round inclusions; slightly curved whitish cream glaze partial rim sherd; white glaze partially on base sherd.

Middle Row left to right: slightly curved cream-colored shoulder sherd; slightly curved; light bluish gray glaze rim sherd; slightly curved grayish cream glaze body sherd w few small rounded brown inclusions.

Bottom Row: body sherd with dark blue decoration.

b. Obverse – all interior. Top Row left to right: darker brownish tan glaze w frequent brown round inclusions; brown glaze ; brown glaze.

Middle Row left to right: cream-colored glaze; dark brown glaze; black glaze.

Bottom Row: grayish black with matte finish.

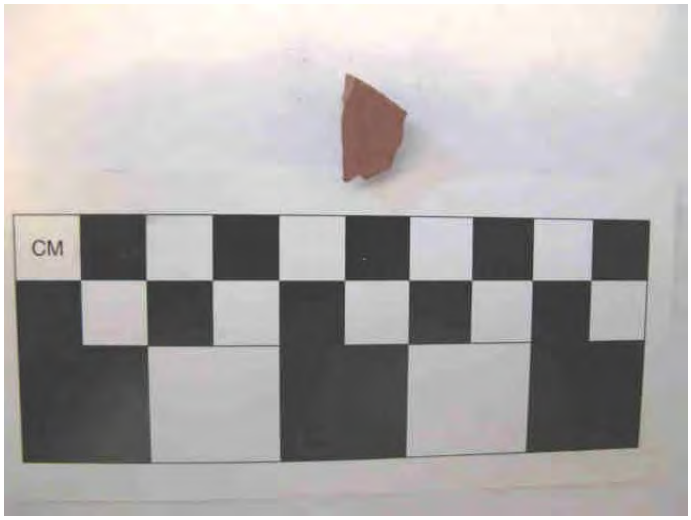
Plate 32. Whiteware Collected from 21HE0226

a. exterior.

b. obverse – interior.

Plate 33. Possible Red Ceramic Fragment Collected from 21HE0226

a. View 1.



b. obverse.

Plate 34. Pipe Bowl Fragment Collected from 21HE0226

a. exterior.

b. obverse – interior.

Plate 35. Lithics Collected from 21HE0226

a. Left to right: coal and two unknown black fragments (possibly coal or degraded clay pigeon).

b. obverse.

Plate 36. Metal Collected from 21HE0226

a. broken bracket, rusted.

b. obverse.

Appendix D

Property Boundary Survey

RICE LAKE

EDEN

RICE LAKE SHORELINE
(APPROX. LOC. FROM AERIAL PHOTO)

Approximate Meander Line

APPROX. MEANDER LINE

HENN. CO. MONUMENT–M.C. 02

PRAIRIE

COUNTY

EDEN

CITY

HENNEPIN

GOV'T LOT 7

SECTION 36

TWP. 116 RGE. 23

PETERSON FARM HOLDING NO. 3 L.P.
PID 250361900

PETERSON FARM HOLDING NO. 3 L.P.
PID 250361800

GOV'T LOT 6

PETERSON FARM HOLDING NO. 3 L.P.
PID 3111622330001

GOV'T LOT 5

PETERSON FARM HOLDING NO. 3 L.P.
PID 3111622340002

U.S. FISH & WILDLIFE MONUMENT

CARVER COUNTY

SCOTT COUNTY

HENN. CO. MONUMENT
SW COR. SEC. 31,
TWP. 116, RGE. 22

U.S.FISH & WILDLIFE MONUMENT FOUND 7.56' WEST OF DESC. LINE–SEE NOTE 2

US DEPT. OF THE INTERIOR
FISH AND WILDLIFE SERVICE

S 1/4 COR. SEC. 31 (OBLITERATED)

GOV'T LOT 1

JOAN M. CHEVALIER TRUST
PID 279010330

SECTION 1

TWP. 115 RGE. 23

PETERSON FARM HOLDING NO. 3 L.P.
PID: 0611522220001

INDIAN ROAD (APPROX. LOC. FROM AERIAL PHOTO)

INDIAN ROAD (APPROX. LOC. FROM AERIAL PHOTO)

MINNESOTA RIVER
(APPROX. LOC. FROM AERIAL PHOTO)

SECTION 6

TWP. 115 RGE. 22

CITY OF SHAKOPEE

S 1/4 COR. SEC. 31 (NOT MONUMENTED BY GLO)

SE COR. SEC. 31

TWP. 116, RGE. 22

SECTION 31

RICE LAKE SHORELINE
(APPROX. LOC. FROM AERIAL PHOTO)

Approximate Meander Line

165.00
(10 R)

HENN. CO. MONUMENT–M.C. 40

EAST LINE OF G.L. 4

EAST QUARTER
COR. SEC. 31

WEST LINE OF G.L. 4

GOV'T LOT 4

GOV'T LOT 2

PETERSON FARM HOLDING NO. 3 L.P.
PID: 3111622140001

HENN. CO. R.M TO M.C. 15
(NOT MAINTAINED)

U.S. FISH & WILDLIFE MONUMENT 5.0' WEST OF DESCRIBED LINE–SEE NOTE 2

US DEPT. OF THE INTERIOR
FISH AND WILDLIFE SERVICE

182.77
(11 1/13 R)

SW COR. GOV'T LOT 2

U.S.FISH & WILDLIFE MONUMENT

SE COR. GOV'T LOT 4

PETERSON FARM HOLDING NO. 3 L.P.
PID 3111622430001

PETERSON FARM HOLDING NO. 3 L.P.
PID 3111622430002

INDIAN ROAD (APPROX. LOC. FROM AERIAL PHOTO)

US DEPT. OF THE INTERIOR
FISH AND WILDLIFE SERVICE

GOV'T LOT 3

PETERSON FARM HOLDING NO. 3 L.P.
PID: 3111622140001

MINNESOTA RIVER
(APPROX. LOC. FROM AERIAL PHOTO)

GOV'T LOT 7

TWP. 116, RGE. 22

SECTION 32

Appendix E

Soil Profile Descriptions

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T1-1
Completed By:	Matthew Summers	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Dorchester silty clay loam	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	34"	Total Bore Depth:	40"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
13	10YR 3/2	LFS			
16	10YR 3/2	VFSL			
34	10YR 3/1	VFSL			Potential Buried A
40	10YR 4/3	VFSL		5% concentrations 5% depletions	saturated @ 35-inches

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T1-2
Completed By:	Matthew Summers	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Dorchester silty clay loam	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	20"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
16	10YR 3/1	SiC/C			
20	10YR 3/1 (70%) 10YR 3/2 (30%)	SiCl		5% concentrations	Saturated at 26-inches
30	10YR 4/2	LFS		5% concentrations 5% depletions	

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T1-3
Completed By:	Matthew Summers	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Dorchester silty clay loam	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	11"	Total Bore Depth:	26"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
11	10YR 3/1	C			
26	10YR 4/3-4/2	LFS		5% concentrations 10% depletions	Saturated at 20-inches

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T1-4
Completed By:	Matthew Summers	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% backslope	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:	A11	Comments:	
Depth to Seasonal Sat:	12"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
12	10YR 3/1	C			
30	10YR 4/2	LFS		10% depletions 5% concentrations	saturated at 23"

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T1-5
Completed By:	Matthew Summers	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:	"Other" assumed A12 under more developed condit	Comments:	in known wetland
Depth to Seasonal Sat:	0"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
16	10YR 3/1	C			
30	10YR 3/1	SiC			few CaCO2
36+	10YR 5/2	SiC		10% concentrations	

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T2-1
Completed By:	Matthew Summers	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-hydric
Landscape Position:	<5% backslope	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	20"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
16	10YR 3/1	C			
20	10YR 3/2	C			
30	10YR 4/2	LFS		10% depletions 5% concentrations	saturated at 24"

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T2-2
Completed By:	Matthew Summers	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% backslope	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:	A11	Comments:	
Depth to Seasonal Sat:	12"	Total Bore Depth:	24"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
12	10YR 3/1	C			
24	10YR 4/2	LFS		5% depletions 10% concentrations	saturated at 19"

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T2-3
Completed By:	Matthew Summers	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Dorchester silty clay loam	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	24"	Total Bore Depth:	36"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
13	10YR 2/2	C			
24	10YR 3/1-3/2	C			
36	10YR 4/2	SiL		5% depletions 5% concentrations	saturated at 30"

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T3-1
Completed By:	Matthew Summers	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	28"	Total Bore Depth:	36"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
13	10YR 3/2	LFS			
18	10YR 3/2-2/2	FSL			
28	10YR 3/1	SiC			
36+	10YR 4/2	LFS		5% depletions 5% concentrations	

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T3-2
Completed By:	Matthew Summers	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	17"	Total Bore Depth:	24"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
17	10YR 2/2	C			
24	10YR 4/2	LFS		10% depletions 10% concentrations	

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T3-3
Completed By:	Matthew Summers	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:	A11	Comments:	
Depth to Seasonal Sat:	9"	Total Bore Depth:	20"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
9	10YR 3/1	C			
20	10YR 4/2	LFS		10% depletions 10% concentrations	

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T4-1
Completed By:	Matthew Summers, Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Rushriver very fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	19"	Total Bore Depth:	24"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
19	10YR 3/1	C			
24	10YR 4/2	L/SiL		5% depletions 5% concentrations	

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T4-2
Completed By:	Matthew Summers, Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:		Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	15"	Total Bore Depth:	24"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
15	10YR 2/2	SiC			
24	10YR 3/1	SiC		5% concentrations	saturated at 24"

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T5-1
Completed By:	Matthew Summers, Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	16"?	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
16	10YR 2/2	SCL		2% concentrations 2% depletions	
30	10YR 4/2	LFS		10% concentrations 10% depletions	

Soil Profile Description

Date Completed: 7/17/2017
Completed By: Matthew Summers, Matt Retka
Project Peterson Wetland Bank
Landscape Position: <5% rise
Mapped Soil Type: Rushriver very fine sandy loam, 0 to 2 percent slopes, occasionally flooded
Hydric Soil Indicator: None
Depth to Seasonal Sat: 8"

Test Pit # T6-1
Equipment: Hand Auger
Hydric Status: Non-hydric
Vegetation: Soybeans
Mapped Parent Material:
Comments:
Total Bore Depth: 30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
8	10YR 3/2	SCL			
20	10YR 5/3	FS		2-5% concentrations	
30	10YR 4/2	LFS		5% concentrations	saturated at 28"

Soil Profile Description

Date Completed: 7/17/2017
Completed By: Matthew Summers, Matt Retka
Project Peterson Wetland Bank
Landscape Position: <5% rise
Mapped Soil Type: Rushriver very fine sandy loam, 0 to 2 percent slopes, occasionally flooded
Hydric Soil Indicator: None
Depth to Seasonal Sat: 17"

Test Pit # T7-1
Equipment: Hand Auger
Hydric Status: Non-hydric
Vegetation: Soybeans
Mapped Parent Material:
Comments:
Total Bore Depth: 36"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
17	10YR 3/3	LFS			
27	10YR 4/2	LFS		10% concentrations 10% depletions	
36	10YR 4/2	VFSL			saturated at 33"

Soil Profile Description

Date Completed: 7/17/2017
Completed By: Matthew Summers, Matt Retka
Project: Peterson Wetland Bank
Landscape Position: <5% toeslope
Mapped Soil Type: Muskego, Blue Earth, and Houghton soils, ponded, 0 to 1 percent slopes, frequently flooded
Hydric Soil Indicator: A11
Depth to Seasonal Sat: 8"

Test Pit #: T8-1
Equipment: Hand Auger
Hydric Status: Hydric
Vegetation: Soybeans
Mapped Parent Material:
Comments:
Total Bore Depth: 30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
8	10YR 2/2	FSL			
30	10YR 4/2	LFS		10% concentrations 10% depletions	saturated at 23"

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T8-2
Completed By:	Matthew Summers, Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	19"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
10	10YR 3/1	FSL			
19	10YR 3/2	FSL			
30	10YR 5/3-5/2	FS		5% concentrations 5% depletions	

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T9-1
Completed By:	Matthew Summers, Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	33"	Total Bore Depth:	40"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
9	10YR 2/2	FSL			
18	2.5Y 4/3-5/3	LFS/FSL			
33	10YR 3/2	FSL			
40	10YR 4/2	LFS		5-10% concentrations 5-10% depletions	

Soil Profile Description

Date Completed: 7/17/2017
Completed By: Matthew Summers, Matt Retka
Project: Peterson Wetland Bank
Landscape Position: <5% toeslope
Mapped Soil Type: Rushriver very fine sandy loam, 0 to 2 percent slopes, occasionally flooded
Hydric Soil Indicator: A12 & F6
Depth to Seasonal Sat: 0"

Test Pit #: T9-2
Equipment: Hand Auger
Hydric Status: Hydric
Vegetation: Soybeans
Mapped Parent Material:
Comments:
Total Bore Depth: 30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
12	10YR 3/1	L		5% concentrations	
23	10YR 4/2	FSL		10% concentrations 10% depletions	
30	10YR 4/1	VFSL		15% concentrations 15% depletions	saturated at 24"

Soil Profile Description

Date Completed: 7/17/2017
Completed By: Matthew Summers, Matt Retka
Project Peterson Wetland Bank
Landscape Position: <5% toeslope
Mapped Soil Type: Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded
Hydric Soil Indicator: F6/A11
Depth to Seasonal Sat: 0"

Test Pit # T10-1
Equipment: Hand Auger
Hydric Status: Hydric
Vegetation: Soybeans
Mapped Parent Material:
Comments:
Total Bore Depth: 30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
7	10YR 3/1	FSL		5% concentrations	
10	10YR 2/2	FSL		2-5% concentrations	
22	10YR 4/2	LFS		5% concentrations	saturated at 22"
30	10YR 4/2	VFSL		10% concentrations	

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T10-2
Completed By:	Matthew Summers, Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	13"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
13	10YR 2/2	L			
21	10YR 3/2	L		10% concentrations	
30	10YR 4/2	FSL		5% depletions	

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T11-1
Completed By:	Matthew Summers, Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	12"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
12	10YR 3/2	FSL			
22	10YR 4/3	FS		5% concentrations	
30	10YR 4/2	LFS		10% concentrations	

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T11-2
Completed By:	Matthew Summers, Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	13"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
13	10YR 3/2	FSL			
21	10YR 4/2	VFSL		2% concentrations	Saturated at 21"
30	10YR 4/1	VFSL		10-15% concentrations	

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T12-1
Completed By:	Matthew Summers, Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	22"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
6	10YR 2/2	LFS			
15	10YR 3/2	LFS			
22	10YR 3/1	L			
30	10YR 4/2	VFSL		5% concentrations	

Soil Profile Description

Date Completed: 7/17/2017
Completed By: Matthew Summers, Matt Retka
Project: Peterson Wetland Bank
Landscape Position: <5% rise
Mapped Soil Type: Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded
Hydric Soil Indicator: None
Depth to Seasonal Sat: 18"

Test Pit #: T13-1
Equipment: Hand Auger
Hydric Status: Non-Hydric
Vegetation: Soybeans
Mapped Parent Material:
Comments:
Total Bore Depth: 50"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
10	10YR 3/2	FSL			some redox - plow?
18	10YR 4/3	FS		2% concentrations	
30	10YR 5/2	FS		5% concentrations	buried A
40	10YR 3/1	SiL		10-15% concentrations	buried A
50	10YR 3/1	CL		10% concentrations	

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T13-2
Completed By:	Matthew Summers, Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	17"	Total Bore Depth:	40"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
7	10YR 3/2	FSL			
17	10YR 4/3	FS		2% concentrations	
24	10YR 5/2	FS		5% concentrations	
31	10YR 3/1	L		20% concentrations	buried A
40	10YR 3/1	CL		20% concentrations	buried A

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T13-3
Completed By:	Matthew Summers, Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	21"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
9	10YR 3/1	FSL		2% concentrations	
21	2.5Y 4/3	FS		2-5% concentrations	
24	10YR 5/2	FS		5-10% concentrations	
30+	10YR 3/1	SiCL		2-5% concentrations	buried A

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T13-4
Completed By:	Matthew Summers, Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	S5/F3	Comments:	
Depth to Seasonal Sat:	6"	Total Bore Depth:	36"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
6	10YR 3/1	FSL			
24	10YR 4/2	FS		5-10% concentrations	
36	10YR 3/1	SiCL		20% concentrations	buried A

Soil Profile Description

Date Completed: 7/17/2017
Completed By: Matthew Summers, Matt Retka
Project: Peterson Wetland Bank
Landscape Position: <5% rise
Mapped Soil Type: Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded
Hydric Soil Indicator: None
Depth to Seasonal Sat: 30"

Test Pit # T14-1
Equipment: Hand Auger
Hydric Status: Non-Hydric
Vegetation: Soybeans
Mapped Parent Material:
Comments:
Total Bore Depth: 36"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
12	10YR 3/2	LFS			
24	2.5Y 3/2	FSL			
30	10YR 3/1	CL			Ab?
36	10YR 3/1	SCL		2% concentrations	

Soil Profile Description

Date Completed:	7/17/2017	Test Pit #	T14-2
Completed By:	Matthew Summers, Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	>40"	Total Bore Depth:	40"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
14	10YR 3/2	FS			
40	10YR 3/1	CL			

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T15-1
Completed By:	Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	28"	Total Bore Depth:	36"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
12	10YR 3/2	LFS			
16	10YR 4/2	FS			
28	10YR 3/1	CL			Buried A
36	10YR 3/1	SiC		2% concentrations	Buried A

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T15-2
Completed By:	Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	24"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
12	10YR 3/2	LFS			
16	10YR 4/2	FS			
24	10YR 3/1	CL			Buried A
30	10YR 3/1	SiC		2% concnetrations	Buried A

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T16-1
Completed By:	Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	18"	Total Bore Depth:	32"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
18	10YR 3/1	CL			
27	10YR 3/1	SiC		2% concentrations	
32	10YR 4/2	SiC		5% concentrations	

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T16-2
Completed By:	Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	17"	Total Bore Depth:	40"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
10	10YR 3/1	L			
17	10YR 3/2	L		2% concentrations	
40	2.5Y 4/2	LFS		5% concentrations	saturated at 22"

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T16-3
Completed By:	Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	26"	Total Bore Depth:	32"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
15	10YR 3/2	L			
26	10YR 3/2	L		2% concentrations	
32	2.5Y 5/2	LVFS		10% concentrations	

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T16-4
Completed By:	Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	22"	Total Bore Depth:	32"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
11	10YR 3/2	FSL			
22	10YR 4/3	LFS		2% concentrations	
32	10YR 3/2	L		5% concentrations	

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T17-1
Completed By:	Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	19"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
19	10YR 3/2	SiCL			
30	10YR 4/2	SiL		5% concentrations	

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T17-2
Completed By:	Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	25"	Total Bore Depth:	31"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
12	10YR 3/1	SCL			
25	10YR 4/3	SiL			
31	10YR 4/2	SiL		5% concentrations	

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T17-3
Completed By:	Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	26"	Total Bore Depth:	32"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
17	10YR 3/1	C			
26	10YR 3/2	L		5% concentrations	
32	10YR 4/2	VFSL		10% concentrations	

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T18-1
Completed By:	Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	18"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
12	10YR 3/1	CL			
18	10YR 3/2	SiCL			
30	10YR 4/2	VFSL		10% concentrations	

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T18-2
Completed By:	Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	16"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
16	10YR 3/1	CL			
30	2.5Y 4/2	SiCL		5% concentrations	

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T18-3
Completed By:	Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	30"	Total Bore Depth:	36"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
20	10YR 3/2	CL			
30	10YR 4/3	L			
36	10YR 4/3	LFS		5% concentrations 5% depletions	

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T19-1
Completed By:	Matt Retka	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	36"	Total Bore Depth:	40"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
9	10YR 3/1	SiCL			
26	10YR 3/2	SL			
36	2.5Y 4/3	LFS			
40	2.5Y 4/3	LFS		5% concentrations 5% depletions	

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T19-2
Completed By:	Matt Retka, Meaghan Watson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	22"	Total Bore Depth:	32"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
10	10YR 3/1	CL			
22	10YR 3/2	VFSL			
32	10YR 4/2	VFSL		5% concentrations	

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T19-3
Completed By:	Matt Retka, Meaghan Watson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	15"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
15	10YR 3/1	SiCL			
25	10YR 4/2	VFSL		5% concentrations	
30	10YR 4/2	LFS		5% concentrations 5% depletions	

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T20-1
Completed By:	Matt Retka, Meaghan Watson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	15"	Total Bore Depth:	34"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
15	10YR 3/1	SiCL			
34	2.5Y 4/2	VFSL		5% concentrations	saturation at 30"

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T20-2
Completed By:	Matt Retka, Meaghan Watson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	23"	Total Bore Depth:	35"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
16	10YR 3/1	C			
23	10YR 3/2	L			
35	10YR 4/2	VFSL		5% concentrations	

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T20-3
Completed By:	Matt Retka, Meaghan Watson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	22"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
10	10YR 3/1	SiCL			
22	10YR 4/2	LFS		2% concentrations	
30	2.5Y 5/2	VFSL		5% concentrations	

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T21-1
Completed By:	Matt Retka, Meaghan Watson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	24"	Total Bore Depth:	32"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
11	10YR 3/2	SiCL			
24	10YR 4/3	L			
32	2.5Y 4/2	LFS/FSL		2% concentrations	

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T21-2
Completed By:	Matt Retka, Meaghan Watson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	F3	Comments:	
Depth to Seasonal Sat:	0"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
7	10YR 3/1	C			
24	10YR 4/2	VFSL		5-10% concentrations	Saturated at 24"
30	2.5Y 4/1	LFS		15% concentrations	Water table at 30"

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T22-1
Completed By:	Matt Retka, Meaghan Watson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	14"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
14	10YR 3/1	SiCL			
24	2.5Y 4/1	L		10% concentrations	Saturated at 24"
30	2.5Y 4/1	LFS/FSL		10% concentrations	Water table at 30"

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T22-2
Completed By:	Matt Retka, Meaghan Watson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	26"	Total Bore Depth:	32"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
13	10YR 3/1	SiCL			
26	10YR 4/3	VFSL		2% concentrations	
32	2.5Y 4/2	LFS		5% concentrations	Saturated at 32"

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T23-1
Completed By:	Matt Retka, Meaghan Watson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	17"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
11	10YR 3/1	C			
17	10YR 3/2	L			
30	2.5Y 4/2	LFS		5% concentrations	Saturated at 26"

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T23-2
Completed By:	Matt Retka, Meaghan Watson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	21"	Total Bore Depth:	31"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
6	10YR 3/1	SCL			
21	10YR 4/3	FS			
31	2.5Y 4/2	FS		5% concentrations	Saturated at 30"

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T23-3
Completed By:	Matt Retka, Meaghan Watson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	14"	Total Bore Depth:	36"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
14	10YR 3/1	C			
28	2.5Y 4/2	SiC		5% concentrations	Saturated at 28"
36	2.5Y 4/2	LFS			

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T24-1
Completed By:	Matt Retka, Meaghan Watson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	13"	Total Bore Depth:	34"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
13	10YR 3/1	SCL			
22	10YR 4/2	FSL		5% concentrations	
34	10YR 4/2	LFS		10% concentrations	Saturated at 30"

Soil Profile Description

Date Completed:	7/18/2017	Test Pit #	T24-2
Completed By:	Matt Retka, Meaghan Watson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	25"	Total Bore Depth:	32"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
11	10YR 3/1	SCL			
25	10YR 4/3	FSL		2% concentrations	
32	2.5Y 5/2	LFS		5% concentrations	Saturated at 30"

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-1
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:	A11	Comments:	
Depth to Seasonal Sat:	10"	Total Bore Depth:	20"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
10	10YR 3/1	C			
20	10YR 4/2-4/1	LFS		10% concentrations	

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-2
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	Smartweed/yellow nutsedg
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:	"Other" assumed A12 under more developed condit	Comments:	Saturated at 0"
Depth to Seasonal Sat:	0"	Total Bore Depth:	36"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
16	10YR 3/1	C			
30	10YR 3/1	SiC			few CaCO2
36+	10YR 5/2	SiC		10% concentrations	

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-3
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	Soybeans/yellow nutsedge
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:	A11	Comments:	
Depth to Seasonal Sat:	0"	Total Bore Depth:	20"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
11	10YR 3/1	C			
20	10YR 4/1	LFS		10% concentrations	

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-4
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:		Comments:	Head of drain, ponded
Depth to Seasonal Sat:	0"	Total Bore Depth:	20"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
13	10YR 3/1	C			
20	10YR 4/1	FSL		10% concentrations	No saturation

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-5
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:		Comments:	6" standing water
Depth to Seasonal Sat:	0"	Total Bore Depth:	20"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
14	10YR 3/1	C			
20	10YR 4/1	FSL		10% concentrations	

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-6
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	natural hydrophyte comm
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:	"other"	Comments:	2" standing water
Depth to Seasonal Sat:	0"	Total Bore Depth:	20"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
13	10YR 3/1	C			
20	10YR 4/1	C		10% concentrations 10% depletions	

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-7
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% toeslope	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	Topsoil very thick for site, s
Depth to Seasonal Sat:	22"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
22	10YR 3/1	C			
30	10YR 4/1	LFS		10% concentrations	

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-8
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:	A11	Comments:	algal mat, 1" standing wate
Depth to Seasonal Sat:	0"	Total Bore Depth:	16"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
7	10YR 3/1	C			Saturated horizon
16	10YR 4/2	LFS		10% concentrations	Not saturated

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-9
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:	A11	Comments:	
Depth to Seasonal Sat:	0"	Total Bore Depth:	16"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
7	10YR 3/1	CL			
16	10YR 4/2	LFS		10% concentrations	

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-10
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska loam	Mapped Parent Material:	
Hydric Soil Indicator:	A11	Comments:	
Depth to Seasonal Sat:	0"	Total Bore Depth:	16"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
7	10YR 3/1	CL			
16	10YR 4/2	LFS		10% concentrations	

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-11
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	Soybeans
Mapped Soil Type:	Rushriver very fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	F6	Comments:	
Depth to Seasonal Sat:	0"	Total Bore Depth:	20"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
7	10YR 3/1	C			
14	10YR 3/1	C		5% concentrations	
20	10YR 4/1	C		10% concentrations	

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-12
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	17"	Total Bore Depth:	24"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
12	10YR 3/2	LFS			
17	10YR 3/2	SCL			
24	10YR 4/2	LFS		10% concentrations	

Soil Profile Description

Date Completed: 7/20/2017
Completed By: Matt Summers, Meaghan Watson, Mitch Larson
Project Peterson Wetland Bank
Landscape Position: <5% toeslope
Mapped Soil Type: Rushriver very fine sandy loam, 0 to 2 percent slopes, occasionally flooded
Hydric Soil Indicator: F3/A11
Depth to Seasonal Sat: 0"

Test Pit # WS-13
Equipment: Hand Auger
Hydric Status: Hydric
Vegetation: Soybeans
Mapped Parent Material:
Comments:
Total Bore Depth: 16"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
10	10YR 3/1	C			
16	10YR 4/1	C		10% concentrations	

Soil Profile Description

Date Completed: 7/20/2017
Completed By: Matt Summers, Meaghan Watson, Mitch Larson
Project Peterson Wetland Bank
Landscape Position: <5% toeslope
Mapped Soil Type: Rushriver very fine sandy loam, 0 to 2 percent slopes, occasionally flooded
Hydric Soil Indicator: "Other"
Depth to Seasonal Sat: 0"

Test Pit # WS-14
Equipment: Hand Auger
Hydric Status: Hydric
Vegetation: smartweed/yellow nutsedg
Mapped Parent Material:
Comments: Hydric soil reference point/
Total Bore Depth: 20"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
14	10YR 3/1	C			
20	10YR 5/2	C		5-10% concentrations	

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-15
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	Willow, grape vine, RCG
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	0	Comments:	Hydric soil reference point/
Depth to Seasonal Sat:	0"	Total Bore Depth:	20"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
8	10YR 3/1	C			
16	10YR 4/1	FSL		10% concentrations	

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-16
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	
Mapped Soil Type:	Minneiska fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	"other"	Comments:	8" standing water/ponded
Depth to Seasonal Sat:	0"	Total Bore Depth:	36"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
29	10YR 3/1	C			
36	10YR 4/1	CL		10% concentrations	

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-17
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	River bulrush/arrowhead/w
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	"other"	Comments:	In wetland - 10" water
Depth to Seasonal Sat:	0"	Total Bore Depth:	36"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
29	10YR 3/1	C			
36	10YR 4/1	CL		10% concentrations	

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-18
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None	Comments:	
Depth to Seasonal Sat:	16"	Total Bore Depth:	32"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
16	10YR 3/1	C			
32	10YR 3/1	C		10% concentrations	inclusions of 10YR 2/1

Soil Profile Description

Date Completed: 7/20/2017
Completed By: Matt Summers, Meaghan Watson, Mitch Larson
Project Peterson Wetland Bank
Landscape Position: <5% toeslope
Mapped Soil Type: Brouillett loam, 0 to 2 percent slopes, occasionally flooded
Hydric Soil Indicator: None or other
Depth to Seasonal Sat: 0"

Test Pit # WS-19
Equipment: Hand Auger
Hydric Status: Hydric
Vegetation: Smartweed/silver maple/wi
Mapped Parent Material:
Comments: Saturated at 0", water table
Total Bore Depth: 36"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
21	10YR 3/1	CL			Saturated at 0" Water table at 2"
26	10YR 3/1	C		5% concentrations	
36	10YR 4/1	C		10% concentrations	

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-20
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Non-Hydric
Landscape Position:	<5% rise	Vegetation:	Soybeans
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	None?	Comments:	Non-hydric, ponds at surfac
Depth to Seasonal Sat:	36"	Total Bore Depth:	40"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
23	10YR 3/1	CL			Saturated at 0" Water table at 2"
36	10YR 3/1	C		5-10% concentrations	
40	10YR 5/1	C		20% concentrations	

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-21
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	smartweed/yellow nutsedge
Mapped Soil Type:	Rushriver very fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	none/other?	Comments:	surface water"
Depth to Seasonal Sat:	0"	Total Bore Depth:	24"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
16	10YR 3/1	C		5-10% concentrations	saturated horizon
24	10YR 5/1	LFS		15% concentrations	not saturated

Soil Profile Description

Date Completed:	7/20/2017	Test Pit #	WS-22
Completed By:	Matt Summers, Meaghan Watson, Mitch Larson	Equipment:	Hand Auger
Project	Peterson Wetland Bank	Hydric Status:	Hydric
Landscape Position:	<5% toeslope	Vegetation:	smartweed/arrowhead/water p
Mapped Soil Type:	Brouillett loam, 0 to 2 percent slopes, occasionally flooded	Mapped Parent Material:	
Hydric Soil Indicator:	none/other?	Comments:	6" surface water
Depth to Seasonal Sat:	0"	Total Bore Depth:	30"

Horizon Bottom Depth (inches)	Matrix Color	Texture	Structure/Consistence	Redoximorphic Features	Notes
24	10YR 3/1	C		20% concentrations	
30	10YR 5/2	C		25% concentrations	