Mississippi National River and Recreation Area

National Park Service
U.S. Department of the Interior

Mississippi National River
and Recreation Area
Minnesota

Wetlands Delineation Report

Bureau of Mines Twin Cities Research Center Main Campus
August 2005

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Prepared For:
National Park Service

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Hennepin County, Minnesota

Summary

engineering-environmental Management Inc. (e^2M) was contracted by the National Park Service, to conduct a wetlands investigation on an approximate 27.32-acre parcel consisting of the former Bureau of Mines Twin Cities Research Center Main Campus (Center), Hennepin County, Minnesota. The Mississippi National River and Recreation Area has been designated by Congress to lead the public planning process pursuant to the National Environmental Policy Act of 1969, to address the disposition of the Center (NPS 2005). The site is characterized by vacant buildings, storage sheds, parking lots, mowed grassy upland fields, emergent wetlands, forested wetlands, upland forests, and two small shallow ponds.

On June 15, 2005, e^2M performed a delineation of potential wetlands. Once the wetlands boundary delineation had been completed, e^2M arranged an onsite meeting with a technical evaluation panel to review the wetlands boundary line. The technical evaluation panel consisted of regulatory representatives from the U.S. Army Corps of Engineers, the Minnesota Board of Water and Soil Resources, the Minnehaha Creek Watershed District, the Hennepin Conservation District, and the National Park Service. The technical evaluation panel reviewed the wetlands boundary delineation and determined the delineation was generally accurate. One small adjustment of approximately 20 square feet was incorporated into an emergent wetlands.

There are seven wetland areas within the 27.32-acre parcel of the Center, encompassing 2.4575 acres. Emergent wetlands encompass 0.8603 acres, and forested wetlands encompass 1.5972 acres. Streams and culverts exiting the site encompass an additional 0.0198 acres.

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ACRONYMS AND ABBREVIATIONS

ASL	Above Sea Level
BWSR	Board of Water and Soil Resources
CFR	Code of Federal Regulations
DNR	Department of Natural Resources
e^2M	engineering-environmental Management, Inc.
GIS	Geographic Information Systems
GPS	Global Positioning System
MNRRA	Mississippi National River Recreation Area
NEPA	National Environmental Policy Act
NPS	National Park Service
PUBF	Palustrine Unconsolidated Bottom Semi-Permanently Flooded
USACE	U.S. Army Corps of Engineers

INTRODUCTION

The Mississippi National River and Recreation Area (MNRRA) has been designated by Congress to lead the public planning process pursuant to the National Environmental Policy Act (NEPA) to address the disposition of the federal property known as the Bureau of Mines, Twin Cities Research Center Main Campus (Center), Hennepin County, Minnesota (NPS 2005). The National Park Service will lead the NEPA planning process to identify and evaluate alternative disposition options for the federal property (NPS 2005) with the U.S. Fish and Wildlife Service as a cooperating agency. Figure 1 shows the location of the Center relative to its surroundings.

Wetlands onsite were delineated using the routine methodology listed in the U.S. Army Corps of Engineers (USACE) *Wetlands Delineation Manual* (USACE 1987). Seven wetlands were delineated during the course of the field investigations at the Center. Water resources encountered during the field investigation were characterized as forested wetlands, emergent wetlands, and two small shallow eutrophic ponds. The boundaries of the wetlands areas were marked with pink surveyors ribbon or wire pin flags and labeled with an alphanumeric nomenclature. The coordinate points of the wetland boundaries were recorded in a Global Positioning System (GPS) and exported into a Geographic Information System (GIS) mapping program. A map illustrating the spatial distribution of wetlands is provided in appendix C.

PHYSIOGRAPHIC INFORMATION

Site Location

The project area is located in the eastern broadleaf forest province of Minnesota. This plant community functions as the transition zone between prairie communities to the west and true forests to the east (MN DNR 2005a). The site is bordered to the north by undeveloped land owned by the U.S. Department of Veteran's Affairs, to the east by a state and regional bike trail managed by the Minnesota Department of Natural Resources (DNR) and Minnesota Historical Society land, to the south by Fort Snelling State Park, and to the west by Hiawatha Avenue. Topography for the site varies from relatively flat terrain to the north, west, and south, to a steep sloped bluff to the east, grading downward to the Mississippi River.

Major landforms in the geographic region of the site are characterized by outwash plains, end moraines, ground moraines, and drumlin fields (DNR 2005b). Figure 2 illustrates the topography of the site.

Climate

Hennepin County, Minnesota, has a subhumid, continental climate that favors the growth of both grassland and forest vegetation. The temperature varies widely from summer to winter.

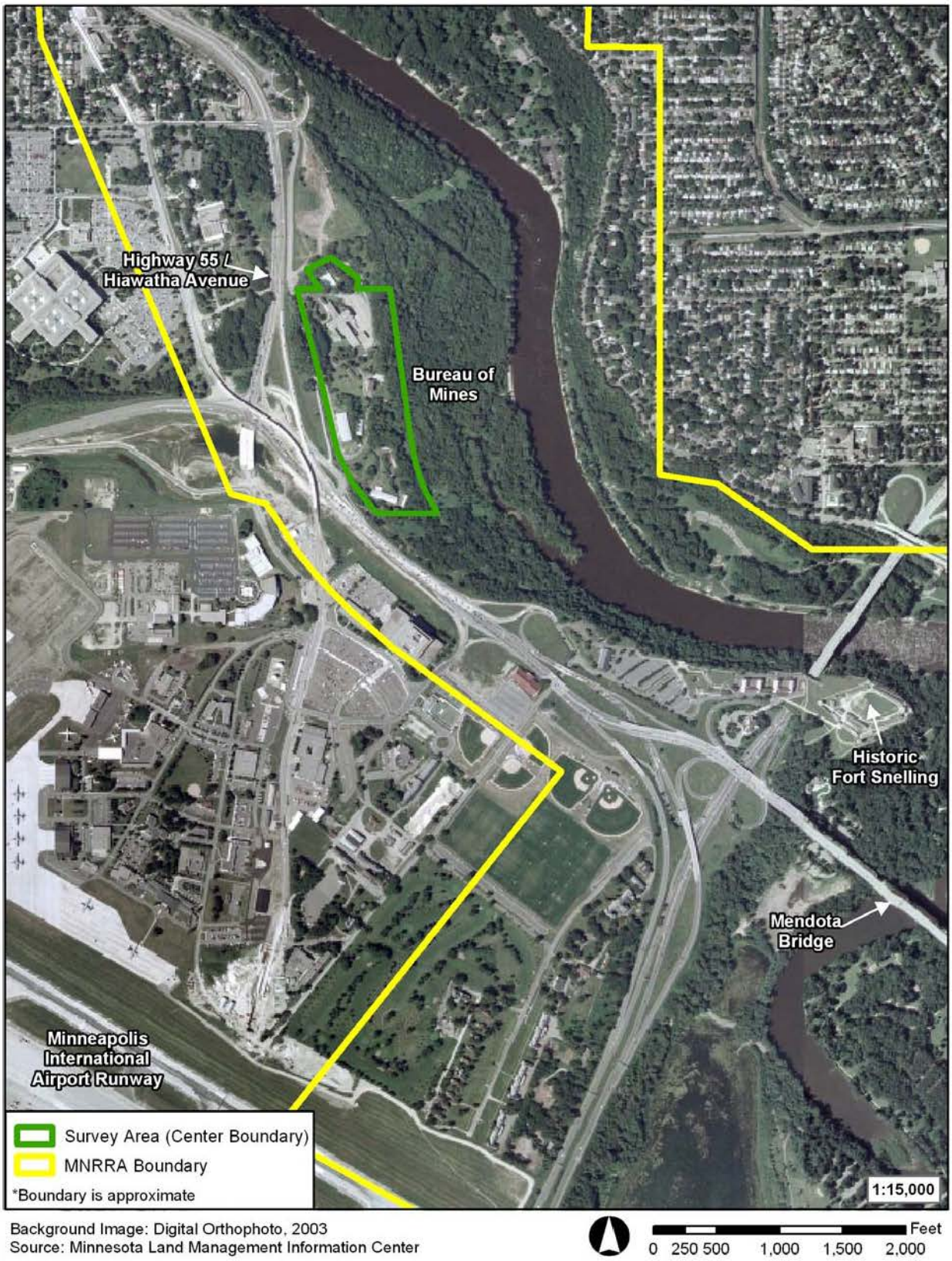

FIGURE 1. AERIAL PHOTOGRAPH FOR THE CENTER

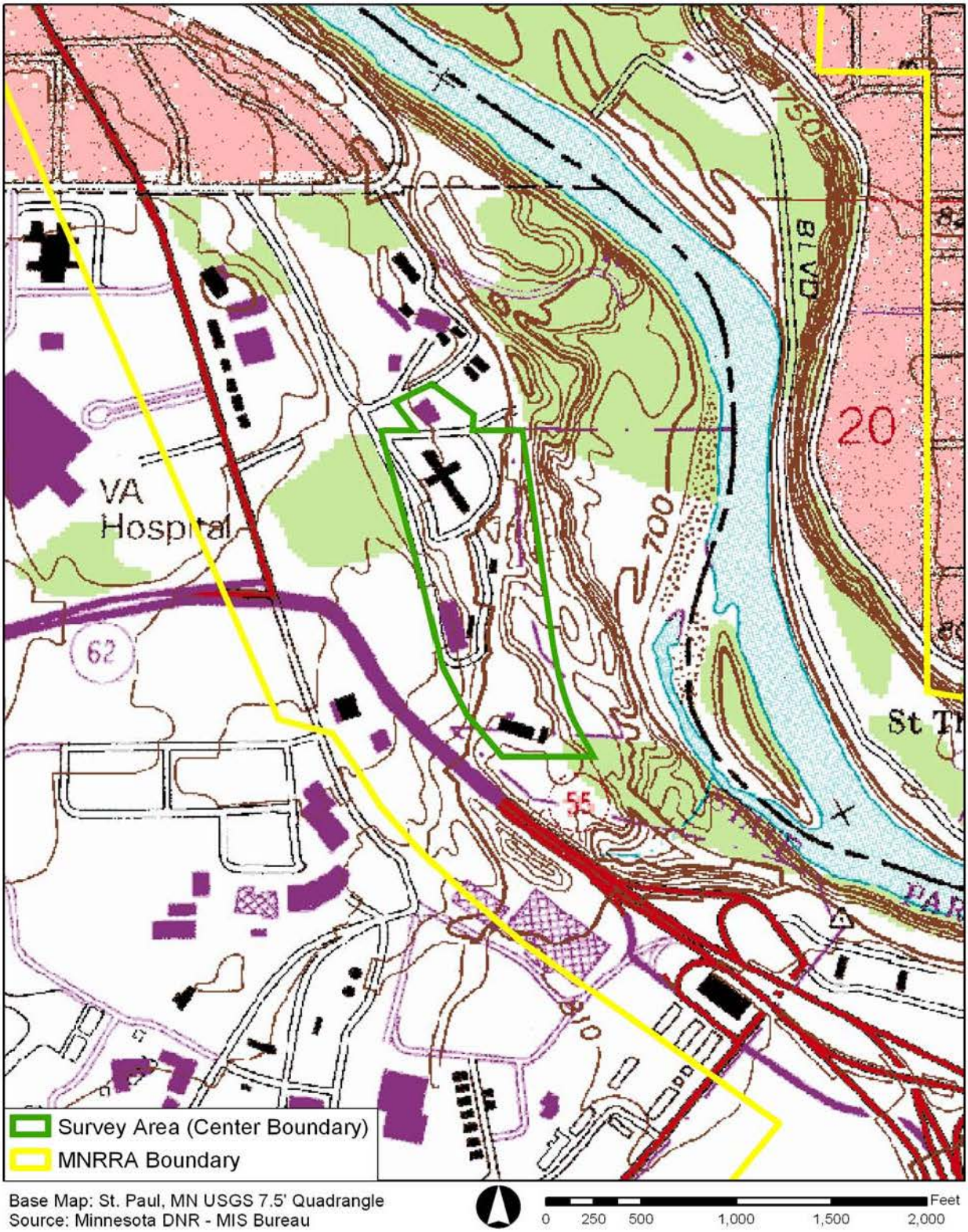

FIGURE 2. USGS SITE LOCATION MAP FOR THE CENTER

Generally, the soils are frozen four or five months each year. Temperature influences the physical, chemical, and biological activities that affect mineral weathering and microbial activities in soils (USDA/NRCS 2004).

Geology and Soils

The youngest geologic material in central Minnesota consists of unlithified glacial till and glacial outwash. These Pleistocene glacial deposits cover older bedrock units and are typically 100- to 200-feet thick, but may be as much as 400-feet thick. Cretaceous sedimentary rocks, the next oldest unit, consist primarily of poorly lithified shale, sandstone, and limestone. The Cretaceous rocks in central Minnesota occur mostly as scattered outliers or erosional remnants on top of older Precambrian rocks, but are thicker to the south and west (Boerboom 2005). Paleozoic sedimentary rocks, mainly restricted to southeastern Minnesota, consist of interlayered sequences of sandstone, shale, and limestone that decrease in thickness to the northwest of the Twin Cities. Paleozoic rocks are not present in most of central Minnesota, but are very important aquifers in the Twin Cities and southeastern Minnesota. The counties fringing the northwestern Twin Cities metropolitan area are sites of groundwater recharge for aquifers of the Twin Cities (Boerboom 2005). The site investigation indicates topography for the majority of the site is characterized as reasonably flat terrain, with a slightly undulating landscape. The eastern portion of the project area consists of a bluff that slopes steeply downward toward the Mississippi River.

A description of the soil mapping units for the site is provided below. Figure 3 illustrates the soil mapping units for the site.

Dorset Series

The Dorset soil mapping unit series consists of very deep, somewhat excessively drained soils formed in a thin loamy mantle and in underlying sandy and gravelly outwash sediments during the late Wisconsin glacial period. They occur on plane or convex slopes on outwash plains, valley trains, stream terraces, and moraines. They have moderately rapid permeability in the upper mantle and rapid permeability in the lower sediments. Slopes for these soils range from 0% to 35%. The elevation for landscape containing the Dorset soil series typically ranges from 700 to 2000 feet above sea level (NRCS 2004).

Elkriver Series

The Elkriver soil mapping unit consists of very deep, somewhat poorly and moderately well-drained soils that formed in postglacial alluvium consisting of a coarse-loamy mantle and underlying sandy sediments on floodplains. These soils have moderate and moderately rapid permeability in the upper part and rapid permeability in the underlying material. Slopes range from 0% to 3%. The soil has a coarse-loamy, mixed, superactive, frigid Cumulic Hapludolls taxanomic classification. Elkriver soil series are found in association with Fordum Hubbard, Sandberg, Winterfield, and Zimmerman soils. Fordum soils are very poorly drained and poorly

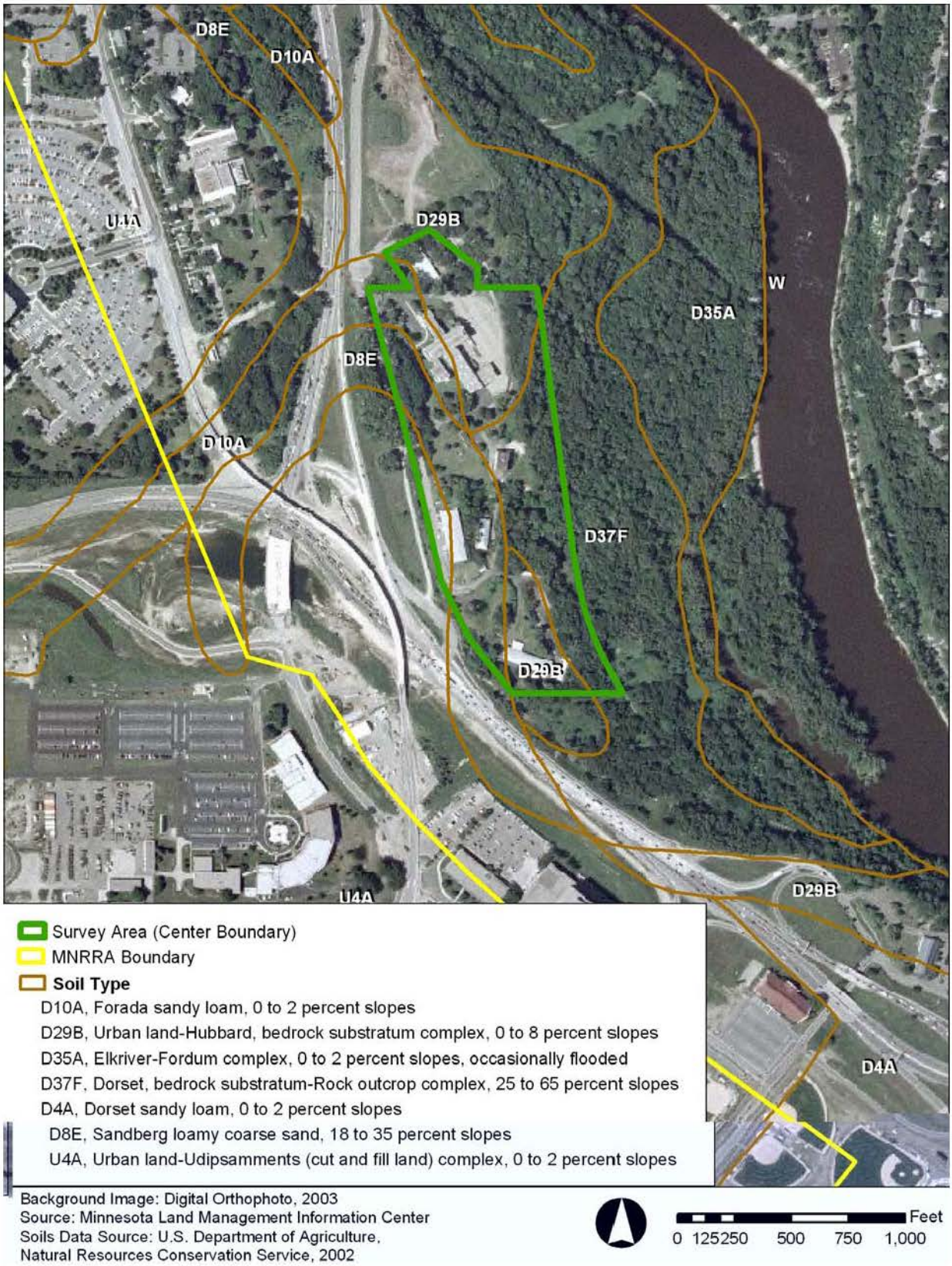

FIGURE 3. SOIL MAPPING UNITS FOR THE CENTER

drained and are lower lying on the floodplain. Winterfield soils are somewhat poorly drained and have a sandy particle size. Hubbard, Sandberg, and Zimmerman soils are excessively drained soils on nearby terraces or outwash plains that do not flood (USDA/NRCS 2004; USDA/NRCS 2005a). The Elkriver soil mapping unit contains inclusions of Forada soil. Forada soil is a national and county listed hydric soil.

Forada Series

The Forada soil mapping unit consists of very deep, poorly drained and very poorly drained soils formed in 20 to 40 inches of loamy sediments overlaying sandy and gravelly material on plane or concave surfaces on outwash plains, stream terraces, and valley trains. These soils developed during the late Wisconsin glacial period and have moderate or moderately rapid permeability in the upper loamy sediments and rapid permeability in the underlying material. An apparent water table is at depths ranging from 0.5 to 1.5 feet from October to June in most years for the poorly drained phase and plus 1.0 to 0.5 feet for the depressional phase. Runoff is negligible or very low. Permeability is moderate or moderately rapid in the upper part and rapid in the lower part. Slopes range from 0% to 2% (USDA/NRCS 2004, USDA/NRCS 2005a). The Forada soil mapping unit is a state listed hydric soil (USDA/NRCS 2005b).

Sandberg Series

The Sandberg soil mapping unit consists of very deep, excessively drained soils that formed in coarse or moderately coarse glacial outwash sediments or glacial beach deposits during the late Wisconsin glacial period. The sediments formed in sandy and gravelly outwash deposits or glacial beach deposits with or without a thin loamy upper mantle. These soils are also situated on stream terraces, valley trains, and glacial moraines. Permeability is moderately rapid or rapid in the upper part and very rapid in the lower part. Slopes range from 0% to 45%. The elevation for landscape containing the Sandberg soil series typically ranges from 800 to 2000 feet above sea level (USDA/NRCS 2004, USDA/NRCS 2005a).

Urban Land – Udipsamments

The Udipsamments soil consists of nearly level areas that have undergone minimal grading. The cut and fill material is dominantly sandy. Because of the variability of this component, interpretations for specific uses are not available (USDA/NRCS 2004, USDA/NRCS 2005a). Onsite investigation is needed to ascertain the character of the soil.

Urban Land – Hubbard

The Urban Land soil mapping unit mainly consists of residential areas covered by impervious surfaces (USDA/NRCS 2004, USDA/NRCS 2005a). Most areas have been disturbed to some degree by construction activity. Because of the variability of this component, interpretations for specific uses are not available. Onsite investigation is needed to determine the properties of the soil mapping unit (USDA/NRCS 2004, USDA/NRCS 2005a).

The Hubbard soil mapping unit consists of very deep, excessively drained soils that formed in sandy glacial outwash on outwash plains, valley trains, and stream terraces. Depth to free carbonates is 40 to over 80 inches. The mollic epipedon is 10- to 26-inches thick and the series control section averages between 30% and 65% medium sand and coarser. Typically, the soil profile above a depth of 50 inches does not have rock fragments, but some pedons contain as much as 10% rock fragments by volume, either dispersed throughout or in strata. The rock fragments are of mixed lithology and mostly 2 to 5 millimeters in size (USDA/NRCS 2004, USDA/NRCS 2005a).

WETLANDS HYDROLOGY

Wetlands hydrology for the site consists of drainage patterns, first order intermittent streams, soil saturation in the upper 12 inches of the profile, oxidized rhizospheres, and standing water with a depth of 0–12 inches or more. Wooded areas along the eastern perimeter of the site have a steep topographic relief to the north, southeast, and west. Consequently, seasonal overland sheet flow is directed into and retained along the eastern perimeter in a topographic depression for an undetermined period of time.

State and Federal Regulations

There are three major regulatory programs in Minnesota that govern impacts to wetlands. These programs are identified as Section 404 of the Clean Water Act, the Department of Natural Resources Public Waters Permit Program and the Minnesota Wetlands Conservation Act (BWSR 2003). The agency responsible for implementing the federal regulatory program is the USACE. The state and local government agencies that regulate water resources consist of the DNR, the local government unit and the Board of Water and Soil Resource (BWSR) (BWSR 2003). The BWSR has the statewide regulatory authority over permitting activities in wetlands and the local government units implement the act locally.

Federal Regulatory Oversight

The USACE defines wetlands as “those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas,” as defined in 33 *Code of Federal Regulations* (CFR) Part 328. Wetlands are considered to be important natural systems because they perform diverse biologic and hydrologic functions. These functions include water quality improvement, groundwater recharge, pollution abatement, nutrient cycling, the provision of wildlife habitat, unique flora and fauna niche creation, stormwater storage, and erosion protection.

Wetlands are protected as a subset of the “waters of the United States” under section 404 of the Clean Water Act. The term “waters of the United States” has a broad meaning and incorporates deepwater aquatic habitats and special aquatic habitats, including wetlands. Jurisdictional “waters” of the United States are areas regulated under the Clean Water Act and

include coastal and inland waters, lakes, rivers, ponds, streams, intermittent streams, and "other" waters that if degraded or destroyed could affect interstate commerce.

State and Local Regulatory Oversight

The DNR regulates water resources subject to the Public Waters Permit Program for activities that will impact "public waters" or "public water wetlands." Public water wetlands are characterized as areas 10 acres or more in size in unincorporated areas or 2.5 acres or more in size in incorporated areas (Minnesota Statutes, Section 103G.005 2004). Public water wetlands are classified as type 3, 4, and 5 wetlands. Type 3 wetlands are characterized as inland shallow fresh marshes in which soil is usually waterlogged early during a growing season and often covered with as much as 6 inches or more of water. Type 4 wetlands are inland deep fresh marshes in which soil is usually covered with 6 inches to 3 feet or more of water during the growing season. Type 5 wetlands are inland open fresh water, shallow ponds, and reservoirs in which water is usually less than 10 feet deep and is fringed by a border of emergent vegetation similar to open areas of type 4 wetlands (Minnesota Statutes, Section 103G.005 2004).

The Wetlands Conservation Act governs all other wetlands not regulated by the DNR Public Waters Permit Program and is administered by the BWSR on a statewide basis (BWSR 2005). The local government unit is responsible for implementing the initial determination for the program. Typically, the local government unit is categorized as the city, county, watershed district, or soil and water conservation district (BWSR 2004). In addition to administering the act, local governments may enact their own ordinances regarding wetlands (BWSR 2003). For the Center, the local government unit is the Minnehaha Creek Watershed District. Wetlands boundary delineations and wetlands impacts are typically reviewed by a technical evaluation panel. Regulatory agencies constituting the technical evaluation panel may be represented by the USACE, BWSR, the local government unit, and the conservation district.

WETLANDS DELINEATION METHODOLOGY

METHODOLOGY

e²M conducted a preliminary desktop review of available information prior to conducting the onsite inspection. Resources reviewed for the potential distribution of wetlands and other waters of the United States consisted of the National Wetlands Inventory map (National Wetlands Inventory, St. Paul, SE Minnesota Quadrangle), U.S. Geological Survey topographic map (St. Paul, SE Minnesota Quadrangle), aerial photographs, the Natural Resources Conservation Service soil survey for Hennepin County, and the local and national list of hydric soils.

Water resources in the project area were delineated using the routine methodology outlined in the *1987 U.S. Army Corps of Engineers Wetlands Delineation Manual*. The manual requires establishing the presence of wetlands criteria identified as hydrophytic (wetlands) vegetation, hydric (wetlands) soils, and wetlands hydrology in order for an area to qualify as a jurisdictional wetlands. Determination of the wetlands criteria mentioned above consists of performing a plant community inventory in which greater than 50% of the cumulative vegetative cover types (trees, shrubs, vines, and herbs) is facultative or wetter; establishing the presence of hydric soils, and evaluating the site for evidence of wetlands hydrology. Under normal circumstances, all three wetlands criteria must be present to qualify as a jurisdictional wetlands. Two of the three criteria are needed to qualify an area as a jurisdictional wetlands in situations where an area has been recently disturbed. Definitions of the wetlands criteria are listed in the sections below.

Vegetation

The U.S. Fish and Wildlife Service uses the *National List of Plant Species that Occurs in Wetlands* (*Region 3*) to identify plant species that are commonly encountered in wetlands habitats. The U.S. Department of Agriculture plant database also uses the plant list to determine the wetlands indicator status of plant species (USDA 2005c). The wetlands indicator status of plants encountered in the field is listed as:

- *Obligate Wetland* (OBL) found greater than 99% of the time in wetlands
- *Facultative Wetland* (FACW) found 67% to 99% of the time in wetlands
- *Facultative* (FAC) found 34% to 66% of the time in wetlands
- *Facultative Upland* (FACU) found 67% to 99% of the time in nonwetlands uplands
- *Upland* (UPL) found greater than 99% of the time outside wetlands

A plus sign (+) following the wetland indicator designation indicates a higher frequency of occurrence in wetlands, and a minus sign (-) indicates a lower frequency of occurrence in wetlands. A no indicator (NI) listing is for species for which there is insufficient information available to determine the indicator status and a not listed (NL) classification is for plants not

found in the *National List of Plant Species that Occur in Wetlands*. Hydrophytic vegetation was encountered during the field investigation (appendix B).

Soils

Hydric soils are formed in saturated, flooded, or ponded areas where water remains for a sufficient duration during the growing season to develop anaerobic conditions in the upper part of the soil profile. Typical hydric soil indicators include a low-chroma matrix and redoximorphic features (low-chroma mottles or high-chroma mottles, gleying, oxidized rhizospheres, and iron or manganese concretions). A soil is generally considered to be hydric if it has a matrix chroma of 1 or a matrix chroma of 2 with mottles.

Soils in the project area were examined for hydric soil characteristics by using a Dutch auger to extract the solum for inspection within each wetlands and adjacent uplands. Soil profiles were examined from ground surface to a depth of approximately 18 inches for redoximorphic features.

Examination of the soils determined hydric soils were present.

Wetlands Hydrology

Primary wetlands hydrology indicators typically consist of inundation, drainage patterns, sediment deposits, drift lines, water marks, wrack deposits, and saturated soils in the upper 12 inches. Secondary wetlands hydrology indicators consist of water-stained leaves, the facultative neutral test, oxidized rhizospheres, adventitious or elevated root structures, and state- or federal-listed hydric soils. Two secondary wetlands criteria must be present in order to establish the presence of wetlands hydrology.

The field inspection of the project area confirmed the presence of wetlands hydrology for all wetlands areas.

NATIONAL WETLANDS INVENTORY MAP

The U.S. Fish and Wildlife Service uses the Cowardin wetlands system to categorize and classify wetlands. The Cowardin classification uses a hierarchical classification designated as "systems" to categorize wetlands habitats. There are five wetlands systems in the Cowardin classification nomenclature. They are identified as Marine, Estuarine, Riverine, Lacustrine, and Palustrine. The systems nomenclature refers to wetlands and deepwater habitats that are influenced by similar hydrologic, geomorphic, chemical, or biological factors (Cowardin et al. 1979). The hierarchical characterization of wetlands is further refined into a classification of subsytems, classes, subclasses, and dominance types. A description of palustrine wetlands is provided below.

Palustrine wetlands include all nontidal water resources vegetated by trees, shrubs, persistent and nonpersistent emergent plants, emergent mosses or lichens, and all tidal wetlands where ocean-derived salinity is less than 0.5%. Palustrine wetlands typically include aquatic resources less than 20 acres in size, lack active wave-formed or bedrock shoreline features, have a water depth less than 6 feet at the deepest part, and have an ocean-derived salinity below 0.5% (Cowardin et al. 1979).

A review of the National Wetlands Inventory map, St. Paul, SE MN, Quadrangle (figure 4) shows one palustrine wetland within the site boundaries. The wetland is classified as a palustrine unconsolidated bottom, semi-permanently flooded (PUBF) wetlands. PUBF wetlands include all wetlands and deepwater habitats with at least 25% cover of particles smaller than stones (less than 6–7 centimeters), and a vegetative cover less than 30%. Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land's surface (Cowardin et al. 1979). The field reconnaissance confirmed the presence of the PUBF wetlands, which was later determined to be Camp Coldwater Reservoir.

The National Wetlands Inventory map does not show additional wetlands or other water resources. However, the field investigation encountered water resources meeting the characteristics of palustrine wetlands. Wetlands encountered are categorized as palustrine forested, broad-leaved deciduous, palustrine scrub-shrub, and palustrine emergent wetlands. The majority of the wetlands are located along the eastern section of the property and adjacent to the bike trail and near the south-central portion of the site. First order intermittent streams drain into forested wetlands located along the eastern portion of the site. Camp Coldwater Spring and Reservoir also discharges seasonal water eastward into the forested wetlands.

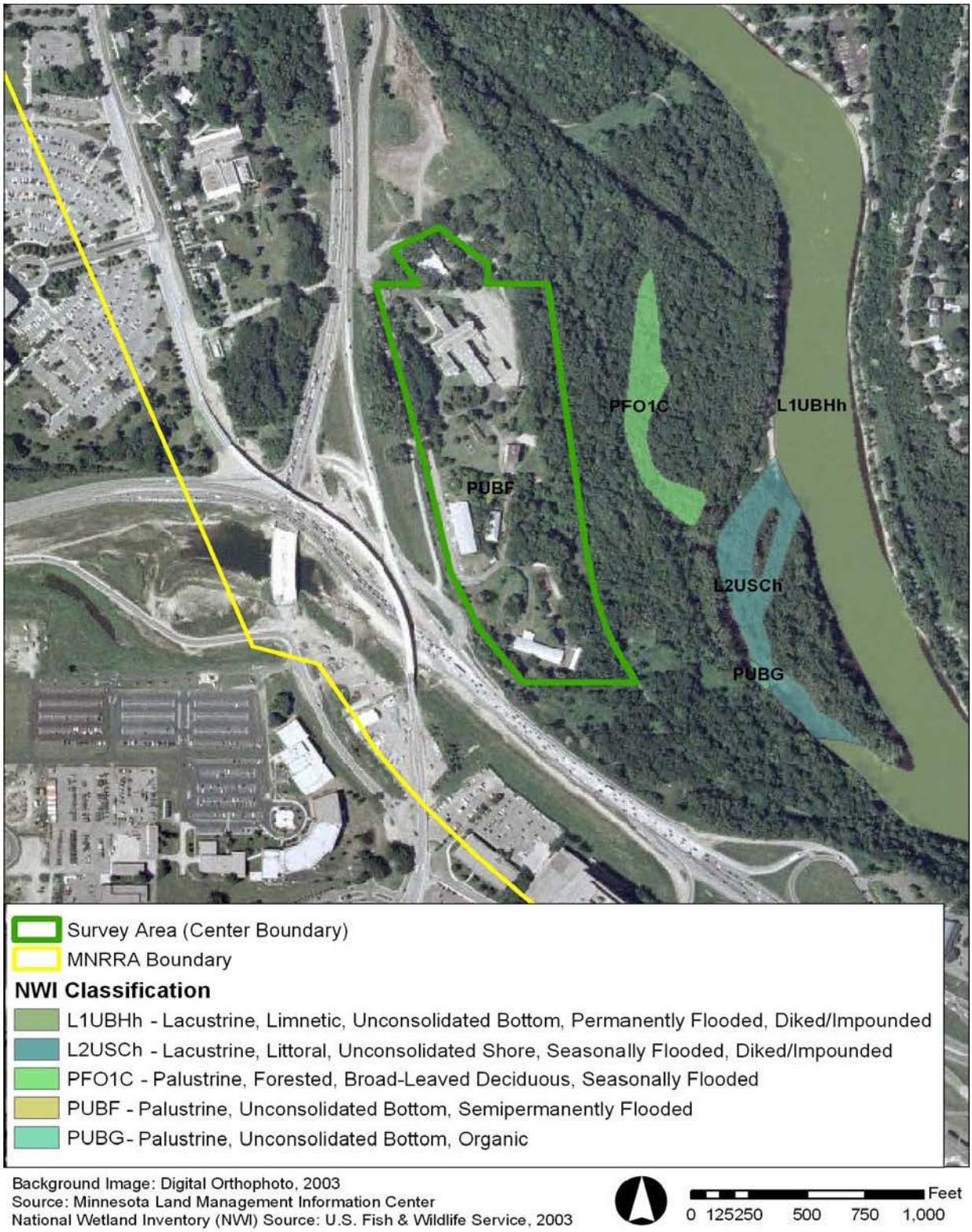

FIGURE 4. NATIONAL WETLANDS MAP FOR THE CENTER

DISCUSSION OF SURVEY AREA WETLANDS

Forested wetlands in the site are bounded to the north, south, east, and west by steep ascending slopes. The slopes appear to be created as a result of past human activities including land grading and material disposal. The land disturbance activities presumably consisted of grading and filling of the landscape in order to accommodate the construction of buildings. Trees in the forested portion of the wetlands and uplands have an estimated diameter at breast height of four to 14 inches, suggesting that the woody vegetation became established within the past 40 to 50 years. Regional wet areas of the site historically supported hardwood forests vegetated by mixed hardwoods such as black ash (*Fraxinus nigra*), American elm (*Ulmus americana*), slippery elm (*Ulmus rubra*), green ash (*Fraxinus pennsylvanica*), quaking aspen (*Populus tremuloides*), or balsam poplar (*Populus balsamifera*) (DNR 2005b). Vines such as wild grape (*Vitis* sp.) and Virginia creeper (*Parthenocissus quinquefolia*) seek out light gaps and open areas where they escape the ground layer and join the canopy (DNR 2005c). The vegetation mentioned above is similar to the plant community encountered during the field investigations.

The field investigation of the Center determined that the water resources can be categorized into three vegetative cover types: an early to mid-sucessional forest, a disturbed herbaceous plant community, and a PUBF water resource. Invasive and nonnative plants observed at the site consist of buckthorn (*Rhamus* sp.) and canary reed grass (*Phalaris arundinaceae*). Buckthorn forms a dominant understory shrub layer throughout the wooded portions of the site. Herbaceous invasive plants were observed to be canary reed grass in emergent wetlands adjacent to intermittent streams and upland fields. Appendix A contains photographs of the wetlands areas, appendix B contains the USACE routine wetlands data sheets, and appendix C contains the wetlands delineation map. A summary and discussion of the wetlands habitats are provided in the sections below.

PALUSTRINE UNCONSOLIDATED BOTTOM WETLANDS

Two PUBF wetlands are located within the site boundaries. The first PUBF wetlands is located near the center of the project area and is identified as Camp Coldwater Spring and Reservoir (wetland A). Camp Coldwater Spring and Reservoir is characterized as a nutrient rich wetlands vegetated by floating vascular emergent plants. A part of the wetlands hydrology for Camp Coldwater Spring is apparently provided by the emergent wetlands component of wetland A. Groundwater from hillside seeps bordering wetland A drains downslope into the PUBF wetlands. Surface water from Camp Cold Water Reservoir is then conveyed eastward beneath a paved road via an underground pipe and is discharged into wetland D.

The second PUBF wetlands constitutes the southeast portion of wetland D. This PUBF wetlands is bordered to the north and south by forested wetlands, an emergent wetlands to the west, and the property boundary to the east. Wetlands hydrology for this wetlands complex is provided by overland flow from Camp Coldwater Spring, seasonal precipitation, and possibly groundwater. The dominant vegetation for the palustrine unconsolidated bottom consists of floating vascular emergent plants. The emergent wetlands component immediately upstream

from the palustrine unconsolidated bottom wetlands is vegetated by reed canary grass (*Phalaris arundinaceae*) and impatiens.

DISTURBED HERBACEOUS WETLANDS

The disturbed herbaceous wetlands are adjacent to abandoned buildings or the riparian fringe of drainage ditches (wetlands A, B, and F). Vegetation in the wetlands generally consists of broad-leaved cattail (*Typha latifolia*), narrow-leaved cattail (*Typha angustifolia*), soft stem bulrush (*Scirpus validus*), green bulrush (*Scirpus atrovirens*), broom sedge (Carex *scoparia*), and impatiens (*Impatiens* sp.). Emergent wetland (wetland A) functions as the headwaters to a stream. Wetland A discharges water into wetlands D and E from two locations (appendix C). The southern portion of wetland A has a seasonal surface connection to wetland E, as well as a subsurface connection. The surface connection is characterized as a shallow drainage feature approximately 1-foot wide that drains east across a road and into wetland E. The subsurface connection is characterized as an underground PVC pipe that seasonally conveys drainage eastward and discharges the water into the drainage swale of wetland E (appendix A, photograph 11). Camp Coldwater Spring and Reservoir (wetland A) discharges water eastward beneath a paved road into wetland D. Building 4 of the Center is located entirely within wetland A.

One emergent wetlands (wetland F) consists of a vegetated drainage swale adjacent to building 8 of the Center. Wetlands hydrology for this wetlands system consists of standing water of 0–2 inches. The headwater of the drainage swale is an early seral scrub-shrub wetlands bordered by an emergent wetlands component vegetated by reed canary grass. The southern-most extension of wetland F is characterized as buried corrugated metal pipe that conveys seasonal water south and away from the site.

FORESTED WETLANDS

Forested wetlands were generally vegetated by cottonwood and box elder in the forest canopy and box elder, buckthorn in the understory (wetlands C, D, E, and G). The understory consisted of dense stands of buckthorn intermixed with green ash. Some of the wooded areas displayed indications of land-disturbance activities, probably conducted during the construction of buildings for the Center. The disturbance consists of artificially created topographic depressions. The side slopes of the end dumps consist of rubble and other forms of debris. Abandoned construction debris was also observed along the southwest boundary of wetland D. The bike trail borders forested wetlands and uplands on the east.

DISCUSSION

SUMMARY AND RECOMMENDATIONS

On June 14 through June 15, 2005, a wetlands ecologist from e^2M conducted a site investigation for the presence of wetlands on a 27.32-acre parcel known as the Bureau of Mines Twin Cities Research Center. The purpose of the site investigation was to delineate potential wetlands and other waters of the United States. Results of the field investigations identified seven wetlands. Three wetlands were characterized as emergent wetlands and the remaining wetlands were characterized as forested wetlands. Both, the emergent and forested wetlands contain PUBF aquatic components. On June 16, 2005, a technical evaluation panel, consisting of the USACE and the local regulatory agencies, met onsite to review the accuracy of the wetlands boundary delineation. The technical evaluation panel determined the wetlands delineation was generally accurate. One small area totaling an estimated 40-square feet was added to wetland B.

e^2M recommends the submission of the wetlands report requesting a jurisdictional confirmation from the federal and local regulatory agencies. Proposed encroachments in wetlands would require permitting from the USACE and BWSR. Mitigation in the form of wetlands replacement would be required for earth-disturbing activities that encroach into wetlands.

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APPENDIX A: SITE PHOTOGRAPHS

Photograph 1: Looking at Wetland A and Building 4

Photograph 2: On West Side of Building 4, Looking South at Wetland A

Photograph 3: Looking South at Building 4 and Open Water Component of Wetland A,

Photograph 4: Looking Northwest at Camp Cold Water Spring and Reservoir

Photograph 5: Looking East at Wetland B and Cattails

Photograph 6: Looking West of Wetland B at Upland Field

Photograph 7: Looking South Along Basin of Wetland C

Photograph 8: Looking North at Emergent Component of Wetland D

Photograph 9: Looking Southeast at Open Water Component of Wetland D

Photograph 10: Looking Downslope Along Wetland E

Photograph 11: Looking Upslope at Outlet Discharging Water into Wetland E

Photograph 12: Looking Northwest at Wetland F and Building 8

Photograph 13: Looking Upstream at Intermittent Stream and Wetland Fringe of Wetland G

Photograph 14: Looking Down Stream of Wetland G and Corrugated Metal Pipe

Photograph 15: Looking at Water Exiting Camp Cold Water Spring

Photograph 16: Water Monitoring Station and Corrugated Metal Pipe Discharging into Wetland D

APPENDIX B: U.S. ARMY CORPS OF ENGINEERS WETLANDS DATA SHEETS

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site Former Former Bureau of Mines Property		**Date** 6.15.05
Applicant / Owner National Park Service		**County** Hennepin
Investigator Mike Rivera		**State** Minnesota
Do Normal Circumstances exist on the site?	**YES** NO	**Community ID** PEM/PSS
Is the site significantly disturbed (Atypical Situation)?	YES **NO**	**Transect ID** WL-A
Is the area a potential Problem Area? (If needed, explain on reverse)	YES **NO**	**Plot ID** STP-1

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Typha angustifolia*	Herb	OBL	9			
2	*Eleocharis sp.*	Herb	OBL	10			
3	*Scirpus validus*	Herb	OBL	11			
4	*Salix nigra*	Shrub	FACW	12			
5	*Scirpus atrovirens*	Herb	OBL	13			
6	*Rhamus* sp.	Shrub	NL	14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 100%

Remarks: Wetland vegetation present.

1

HYDROLOGY

☐ Recorded Data (Describe in Remarks)

☐ Stream, Lake, or Tide Gauge
☐ Aerial Photographs
☐ Other

☐ No Recorded Data Available

FIELD OBSERVATIONS

Depth of Surface Water	0.5 (in)
Depth of Free Water in Pit	0 (in)
Depth to Saturated Soil	0 (in)

WETLAND HYDROLOGY INDICATORS

Primary Indicators:
- [x] Inundated
- [x] Saturated in Upper 12 Inches
- [ ] Water Marks
- [ ] Drift Lines
- [ ] Sediment Deposits
- [x] Drainage Patterns in Wetlands

Secondary Indicators (2 or more Required):
- [ ] Oxidized Root Channels in Upper 12 Inches
- [x] Water-Stained Leaves
- [ ] Local Soil Survey Data
- [x] FAC-Neutral Test
- [ ] Other (Explain in Remarks)

Remarks: Soils were saturated through out this potion of the wetland. Small pockets of standing water were observed in the western section of Wetland A.

DATA FORM – ROUTINE WETLAND DETERMINATION **Page 2**
WL-A, STP-1

SOILS

Map Unit Name (Series and Phase): Sandberg loamy sand	Drainage Class: Excessively drained.
Taxonomy (Subgroup) Sandy, mixed, frigid Calcic Hapludolls	Field Observations Confirm Mapped Type: YES **NO**

PROFILE DESCRIPTION

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	7.5YR 2.5/1			Saturated loam

HYDRIC SOIL INDICATORS:

- [ ] Histosol
- [ ] Histic Epipedon
- [ ] Sulfidic Odor
- [ ] Aquic Moisture Regime
- [x] Reducing Conditions
- [x] Gleyed or Low-Chroma Colors
- [ ] Concretions
- [ ] High Organic Content in Surface Layer in Sand Soils
- [ ] Organic Streaking in Sandy Soils
- [ ] Listed on Local Hydric Soils List
- [ ] Listed on National Hydric Soils List
- [ ] Other (Explain in Remarks)

Remarks: Hydric soils present.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	**YES**	NO	Is this Sampling Point Within a Wetland? **YES** NO
Wetland Hydrology Present?	**YES**	NO	
Hydric Soils Present?	**YES**	NO	

Remarks: This sample plot consists of the palustrine unconsolidated bottom wetland system located to the north. Wetland A discharges surface water east beneath an existing road and into Wetland D. An abandoned building rests with in the boundaries of Wetland A.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site Former Bureau of Mines Property		**Date** 6.15.05
Applicant / Owner National Park Service		**County** Hennepin
Investigator Mike Rivera		**State** Minnesota
Do Normal Circumstances exist on the site?	**YES** NO	**Community ID** Upland Field
Is the site significantly disturbed (Atypical Situation)?	YES **NO**	**Transect ID** WL-A
Is the area a potential Problem Area? (If needed, explain on reverse)	YES **NO**	**Plot ID** STP-2

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Rhus typhina*	Shrub	NL	9	9		
2	*Taraxacum officinale*	Herb	FACU	10	10		
3	*Gramaceae sp.*	Herb	NL	11	11		
4				12	12		
5				13	13		
6				14	14		
7				15	15		
8				16	16		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 0%

Remarks: Wetland vegetation absent. NL indicates insufficient information exists to provide a wetland indicator status.

1

HYDROLOGY

☐ Recorded Data (Describe in Remarks)

☐ Stream, Lake, or Tide Gauge
☐ Aerial Photographs
☐ Other

☐ No Recorded Data Available

FIELD OBSERVATIONS

Depth of Surface Water	(in)
Depth of Free Water in Pit	(in)
Depth to Saturated Soil	(in)

WETLAND HYDROLOGY INDICATORS

Primary Indicators:
☐ Inundated
☐ Saturated in Upper 12 Inches
☐ Water Marks
☐ Drift Lines
☐ Sediment Deposits
☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more Required):
☐ Oxidized Root Channels in Upper 12 Inches
☐ Water-Stained Leaves
☐ Local Soil Survey Data
☐ FAC-Neutral Test
☐ Other (Explain in Remarks)

Remarks: Wetland hydrology absent.

DATA FORM – ROUTINE WETLAND DETERMINATION **Page 2**
WL-A, STP-2

SOILS

Map Unit Name (Series and Phase): Sandberg loamy sand	Drainage Class: Excessively drained.
Taxonomy (Subgroup) Sandy, mixed, frigid Calcic Hapludolls	Field Observations Confirm Mapped Type: YES **NO**

PROFILE DESCRIPTION

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	10YR 2/1			Coarse sand, fill

HYDRIC SOIL INDICATORS:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sand Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Hydric soils present. .

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	YES	**NO**	Is this Sampling Point Within a Wetland? YES **NO**
Wetland Hydrology Present?	YES	**NO**	
Hydric Soils Present?	**YES**	NO	

Remarks: Area is an upland field south of WL-A1

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site Former Bureau of Mines Property		**Date** 6.15.05
Applicant / Owner National Park Service		**County** Hennepin
Investigator Mike Rivera		**State** Minnesota
Do Normal Circumstances exist on the site?	**YES** NO	**Community ID** Upland Forest
Is the site significantly disturbed (Atypical Situation)?	YES **NO**	**Transect ID** WL-B
Is the area a potential Problem Area? (If needed, explain on reverse)	YES **NO**	**Plot ID** STP-1

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Typha latifolia*	Herb	OBL	9			
2	*Fraxinus pennsylvanica*	Shrub	FACW-	10			
3	*Impatience sp.*	Shrub	FACU-	11			
4	*Vitis riparia*	Vine	FACW-	12			
5	*Impatience sp.*	Herb	FACW	13			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 100%

Remarks: Wetland vegetation present.

1
HYDROLOGY

☐ Recorded Data (Describe in Remarks)

☐ Stream, Lake, or Tide Gauge
☐ Aerial Photographs
☐ Other

☐ No Recorded Data Available

FIELD OBSERVATIONS

Depth of Surface Water	1 (in)
Depth of Free Water in Pit	0 (in)
Depth to Saturated Soil	0 (in)

WETLAND HYDROLOGY INDICATORS

Primary Indicators:
- [x] Inundated
- [x] Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more Required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks: Wetland hydrology present.

DATA FORM – ROUTINE WETLAND DETERMINATION **Page 2**

WL-B, STP-1

SOILS

Map Unit Name (Series and Phase): Sandberg loamy sand	Drainage Class: Excessively drained.
Taxonomy (Subgroup) Sandy, mixed, frigid Calcic Hapludolls	Field Observations Confirm Mapped Type: YES **NO**

PROFILE DESCRIPTION

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	7.5YR 2.5/1			Loam, saturated

HYDRIC SOIL INDICATORS:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sand Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Hydric soils present.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	**YES**	NO	Is this Sampling Point Within a Wetland? **YES** NO
Wetland Hydrology Present?	**YES**	NO	
Hydric Soils Present?	**YES**	NO	

Remarks: None.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site Former Bureau of Mines Property		**Date** 6.15.05
Applicant / Owner National Park Service		**County** Hennepin
Investigator Mike Rivera		**State** Minnesota
Do Normal Circumstances exist on the site?	**YES** NO	**Community ID** Upland field
Is the site significantly disturbed (Atypical Situation)?	YES **NO**	**Transect ID** WL-B
Is the area a potential Problem Area? (If needed, explain on reverse)	YES **NO**	**Plot ID** STP-2

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Medicago lupulina*	Herb	FAC-	9	9		
2	*Gramaceae sp.*	Herb	NL	10	10		
3	*Parthenocissus quinquefolia*	Herb	FAC-	11	11		
4				12	12		
5				13	13		
6				14	14		
7				15	15		
8				16	16		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 0%

Remarks: Wetland vegetation absent. NL indicates insufficient information exists to provide a wetland indicator status.

1
HYDROLOGY

☐ Recorded Data (Describe in Remarks)

☐ Stream, Lake, or Tide Gauge
☐ Aerial Photographs
☐ Other

☐ No Recorded Data Available

FIELD OBSERVATIONS

Depth of Surface Water	(in)
Depth of Free Water in Pit	(in)
Depth to Saturated Soil	(in)

WETLAND HYDROLOGY INDICATORS

Primary Indicators:
☐ Inundated
☐ Saturated in Upper 12 Inches
☐ Water Marks
☐ Drift Lines
☐ Sediment Deposits
☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more Required):
☐ Oxidized Root Channels in Upper 12 Inches
☐ Water-Stained Leaves
☐ Local Soil Survey Data
☐ FAC-Neutral Test
☐ Other (Explain in Remarks)

Remarks: Wetland hydrology absent.

DATA FORM – ROUTINE WETLAND DETERMINATION **Page 2**
WL-B, STP-2

SOILS

Map Unit Name (Series and Phase): Sandberg loamy sand	Drainage Class: Excessively drained.
Taxonomy (Subgroup) Sandy, mixed, frigid Calcic Hapludolls	Field Observations Confirm Mapped Type: YES **NO**

PROFILE DESCRIPTION

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	7.5YR 2.5/1			Loam, moist

HYDRIC SOIL INDICATORS:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sand Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Hydric soils present.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	YES	**NO**	Is this Sampling Point Within a Wetland? YES **NO**
Wetland Hydrology Present?	YES	**NO**	
Hydric Soils Present?	**YES**	NO	

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site Former Bureau of Mines Property		**Date** 6.15.05
Applicant / Owner National Park Service		**County** Hennepin
Investigator Mike Rivera		**State** Minnesota
Do Normal Circumstances exist on the site?	**YES** NO	**Community ID** Forested Wetland
Is the site significantly disturbed (Atypical Situation)?	YES **NO**	**Transect ID** WL-C1
Is the area a potential Problem Area? (If needed, explain on reverse)	YES **NO**	**Plot ID** STP-1

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Acer negundo*	Tree	FACW-	9			
2	*Acer negundo*	Shrub	FACW-	10			
3	*Sambucus racemosa*	Shrub	FACU-	11			
4	*Impatiens sp.*	Herb	FACW	12			
5	*Rhamus* sp.	Shrub	NL	13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 75%

Remarks: Wetland vegetation present.

1
HYDROLOGY

☐ Recorded Data (Describe in Remarks)

☐ Stream, Lake, or Tide Gauge
☐ Aerial Photographs
☐ Other

☐ No Recorded Data Available

FIELD OBSERVATIONS

Depth of Surface Water	(in)
Depth of Free Water in Pit	(in)
Depth to Saturated Soil	(in)

WETLAND HYDROLOGY INDICATORS

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- [x] Drainage Patterns in Wetlands

Secondary Indicators (2 or more Required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- [x] FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks: Wetland hydrology present.

DATA FORM – ROUTINE WETLAND DETERMINATION **Page 2**
WL-C, STP-1

SOILS

Map Unit Name (Series and Phase): Dorset Bedrock Substratum	Drainage Class: Somewhat excessively drained.
Taxonomy (Subgroup) Coarse-loamy, mixed, superactive, frigid Calcic Argiudolls	Field Observations Confirm Mapped Type: YES **NO**

PROFILE DESCRIPTION

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	7.5YR 2.5/1			Loam, moist
		10YR 2/1			

HYDRIC SOIL INDICATORS:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sand Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Polychromatic soils present. Substrate consists of a loam.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	**YES**	NO	Is this Sampling Point Within a Wetland? **YES** NO
Wetland Hydrology Present?	**YES**	NO	
Hydric Soils Present?	**YES**	NO	

Remarks: This wetland system is bordered by steep ascending slopes to the north, east and west.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site Former Bureau of Mines Property		**Date** 6.15.05
Applicant / Owner National Park Service		**County** Hennepin
Investigator Mike Rivera		**State** Minnesota
Do Normal Circumstances exist on the site?	**YES** NO	**Community ID** Upland Forest
Is the site significantly disturbed (Atypical Situation)?	YES **NO**	**Transect ID** WL-C2
Is the area a potential Problem Area? (If needed, explain on reverse)	YES **NO**	**Plot ID** STP-2

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Impatiens sp.*	Herb	FACW	9			
2	*Sambucus racemosa*	Shrub	FACU-	10			
3	*Rhamus* sp.	Shrub	NL	11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 50%

Remarks: Wetland vegetation absent, plant community does not exceed the 50 percent criteria.

1

HYDROLOGY

☐ Recorded Data (Describe in Remarks)

☐ Stream, Lake, or Tide Gauge
☐ Aerial Photographs
☐ Other

☐ No Recorded Data Available

FIELD OBSERVATIONS

Depth of Surface Water	(in)
Depth of Free Water in Pit	(in)
Depth to Saturated Soil	(in)

WETLAND HYDROLOGY INDICATORS

Primary Indicators:
☐ Inundated
☐ Saturated in Upper 12 Inches
☐ Water Marks
☐ Drift Lines
☐ Sediment Deposits
☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more Required):
☐ Oxidized Root Channels in Upper 12 Inches
☐ Water-Stained Leaves
☐ Local Soil Survey Data
☐ FAC-Neutral Test
☐ Other (Explain in Remarks)

Remarks: Wetland hydrology absent.

DATA FORM – ROUTINE WETLAND DETERMINATION **Page 2**
WL-C, STP-2

SOILS

Map Unit Name (Series and Phase): Dorset Bedrock Substratum	Drainage Class: Somewhat excessively drained.
Taxonomy (Subgroup) Coarse-loamy, mixed, superactive, frigid Calcic Argiudolls	Field Observations Confirm Mapped Type: YES **NO**

PROFILE DESCRIPTION

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	10YR 2/1			Friable fill

HYDRIC SOIL INDICATORS:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sand Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Polychromatic soil present. However, the soil matrix consists of asphalt and coarse fill, including rubble.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	YES	**NO**	Is this Sampling Point Within a Wetland? YES **NO**
Wetland Hydrology Present?	YES	**NO**	
Hydric Soils Present?	**YES**	NO	

Remarks: This sample plot is a south facing hill side slope.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site Former Bureau of Mines Property		**Date** 6.15.05
Applicant / Owner National Park Service		**County** Hennepin
Investigator Mike Rivera		**State** Minnesota
Do Normal Circumstances exist on the site?	**YES** NO	**Community ID** Palustrine Forested/Palustrine emergent
Is the site significantly disturbed (Atypical Situation)?	YES **NO**	**Transect ID** WL-D
Is the area a potential Problem Area? (If needed, explain on reverse)	YES **NO**	**Plot ID** STP-1

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Acer negundo*	Tree	FACW-	9			
2	*Arisaema triphyllum*	Herb	FACW-	10			
3	*Populus deltoides*	Tree	FAC+	11			
4	*Impatiens sp.*	Herb	FACW	12			
5	*Phalaris arundinacea*	Herb	FACW+	13			
6	*Solanum dulcamara*	Herb	FAC	14			
7	*Sambucus racemosa*	Shrub	FACU+	15			
8	*Rhamus* sp.	Shrub	NL	16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 87%

Remarks: Wetland vegetation present.

1

HYDROLOGY

☐ Recorded Data (Describe in Remarks)

☐ Stream, Lake, or Tide Gauge
☐ Aerial Photographs
☐ Other

☐ No Recorded Data Available

FIELD OBSERVATIONS

Depth of Surface Water	>12 inches (in)
Depth of Free Water in Pit	0(in)
Depth to Saturated Soil	0 (in)

WETLAND HYDROLOGY INDICATORS

Primary Indicators:
- [x] Inundated
- [x] Saturated in Upper 12 Inches
- [ ] Water Marks
- [ ] Drift Lines
- [ ] Sediment Deposits
- [x] Drainage Patterns in Wetlands

Secondary Indicators (2 or more Required):
- [ ] Oxidized Root Channels in Upper 12 Inches
- [x] Water-Stained Leaves
- [ ] Local Soil Survey Data
- [x] FAC-Neutral Test
- [ ] Other (Explain in Remarks)

Remarks: Wetland hydrology present. The open water component of the wetland is located near the eastern boundary of the project area.

DATA FORM – ROUTINE WETLAND DETERMINATION **Page 2**
WL-D, STP-1

SOILS

Map Unit Name (Series and Phase): Dorset Bedrock Substratum	Drainage Class: Somewhat excessively drained.
Taxonomy (Subgroup) Coarse-loamy, mixed, superactive, frigid Calcic Argiudolls	Field Observations Confirm Mapped Type: YES **NO**

PROFILE DESCRIPTION

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	10YR 2/1			Saturated loam

HYDRIC SOIL INDICATORS:

- [ ] Histosol
- [ ] Histic Epipedon
- [ ] Sulfidic Odor
- [ ] Aquic Moisture Regime
- [x] Reducing Conditions
- [x] Gleyed or Low-Chroma Colors
- [ ] Concretions
- [ ] High Organic Content in Surface Layer in Sand Soils
- [ ] Organic Streaking in Sandy Soils
- [ ] Listed on Local Hydric Soils List
- [ ] Listed on National Hydric Soils List
- [ ] Other (Explain in Remarks)

Remarks: Hydric soils present

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	**YES**	NO	Is this Sampling Point Within a Wetland? **YES** NO
Wetland Hydrology Present?	**YES**	NO	
Hydric Soils Present?	**YES**	NO	

Remarks: This sample plot is the down stream portion of Wetland A. Reed canary grass forms a dominant component of the herbaceous wetland. *Sambucus racemosa* appears to be dying due to a possible increase in wetland hydrology.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site Former Bureau of Mines Property		**Date** 6.15.05
Applicant / Owner National Park Service		**County** Hennepin
Investigator Mike Rivera		**State** Minnesota
Do Normal Circumstances exist on the site?	**YES** NO	**Community ID** Upland Forest
Is the site significantly disturbed (Atypical Situation)?	YES **NO**	**Transect ID** WL-D
Is the area a potential Problem Area? (If needed, explain on reverse)	YES **NO**	**Plot ID** STP-2

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Acer negundo*	Tree	FACW-	9			
2	*Acer negundo*	Shrub	FACW-	10			
3	*Parthenocissus quinquefolia*	Herb	FAC-	11			
4	*Alliaria petiolata*	Herb	FAC	12			
5	*Rhamus* sp.	Shrub	NL	13			
6				14			
7				15			
8				16			
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 75%							
Remarks: Wetland vegetation present.							

1
HYDROLOGY

☐ Recorded Data (Describe in Remarks)

☐ Stream, Lake, or Tide Gauge
☐ Aerial Photographs
☐ Other

☐ No Recorded Data Available

FIELD OBSERVATIONS

Depth of Surface Water	(in)
Depth of Free Water in Pit	(in)
Depth to Saturated Soil	(in)

WETLAND HYDROLOGY INDICATORS

Primary Indicators:
☐ Inundated
☐ Saturated in Upper 12 Inches
☐ Water Marks
☐ Drift Lines
☐ Sediment Deposits
☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more Required):
☐ Oxidized Root Channels in Upper 12 Inches
☐ Water-Stained Leaves
☐ Local Soil Survey Data
☐ FAC-Neutral Test
☐ Other (Explain in Remarks)

Remarks: Wetland hydrology absent.

DATA FORM – ROUTINE WETLAND DETERMINATION **Page 2**
WL-D, STP-2

SOILS

Map Unit Name (Series and Phase): Dorset Bedrock Substratum	Drainage Class: Somewhat excessively drained.
Taxonomy (Subgroup) Coarse-loamy, mixed, superactive, frigid Calcic Argiudolls	Field Observations Confirm Mapped Type: YES **NO**

PROFILE DESCRIPTION

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	10YR 2/1			Loam, slightly moist

HYDRIC SOIL INDICATORS:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sand Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Hydric soils present.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	**YES**	NO	Is this Sampling Point Within a Wetland? YES **NO**
Wetland Hydrology Present?	YES	**NO**	
Hydric Soils Present?	**YES**	NO	

Remarks: This sample plot consists of a mid sucessional upland forest and was taken approximately 20 feet upslope of WL-D22. Wetland hydrology is absent from the site.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site Former Bureau of Mines Property		**Date** 6.15.05
Applicant / Owner National Park Service		**County** Hennepin
Investigator Mike Rivera		**State** Minnesota
Do Normal Circumstances exist on the site?	**YES** NO	**Community ID** Palustrine Forested
Is the site significantly disturbed (Atypical Situation)?	YES **NO**	**Transect ID** WL-E
Is the area a potential Problem Area? (If needed, explain on reverse)	YES **NO**	**Plot ID** STP-1

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Populus deltoides*	Tree	FAC+	9			
2	*Acer negundo*	Tree	FACW-	10			
3	*Alliaria petiolata*	Herb	FAC	11			
4	*Impatience sp.*	Herb	FACW	12			
5	*Arisaema triphyllum*	Herb	FACW-	13			
6	*Parthenocissus quinquefolia*	Herb	FAC-	14			
7	*Rhamus* sp.	Shrub	NL	15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 83%

Remarks: Wetland vegetation present.

1

HYDROLOGY

☐ Recorded Data (Describe in Remarks)

☐ Stream, Lake, or Tide Gauge
☐ Aerial Photographs
☐ Other

☐ No Recorded Data Available

FIELD OBSERVATIONS

Depth of Surface Water	(in)
Depth of Free Water in Pit	(in)
Depth to Saturated Soil	(in)

WETLAND HYDROLOGY INDICATORS

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Indicators (2 or more Required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks: Wetland hydrology present. Wetland E receives a portion of hydrology from Wetland A.

DATA FORM – ROUTINE WETLAND DETERMINATION **Page 2**
WL-E, STP-1

SOILS

Map Unit Name (Series and Phase): Urban Land-Hubbard	Drainage Class: excessively drained
Taxonomy (Subgroup) Sandy, mixed, frigid Entic Hapludolls	Field Observations Confirm Mapped Type: YES **NO**

PROFILE DESCRIPTION

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	7.5YR 2.5/1			Saturated loam,

HYDRIC SOIL INDICATORS:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sand Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Hydric soils present.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	**YES**	NO	Is this Sampling Point Within a Wetland? **YES** NO
Wetland Hydrology Present?	**YES**	NO	
Hydric Soils Present?	**YES**	NO	

Remarks: Two outfall pipes were observed to be contributing to wetland hydrology. All wetland criteria were present. The sample plot was taken north of WL-E5.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site Former Bureau of Mines Property		**Date** 6.15.05
Applicant / Owner National Park Service		**County** Hennepin
Investigator Mike Rivera		**State** Minnesota
Do Normal Circumstances exist on the site?	**YES** NO	**Community ID** Upland Forest.
Is the site significantly disturbed (Atypical Situation)?	YES **NO**	**Transect ID** WL-E
Is the area a potential Problem Area? (If needed, explain on reverse)	YES **NO**	**Plot ID** STP-2

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Acer negundo*	Tree	FACW-	9			
2	*Acer negundo*	Shrub	FACW-	10			
3	*Alliaria petiolata*	Herb	FAC	11			
4	*Rhamus* sp.	Shrub	NL	12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 100%

Remarks: Wetland vegetation present.

1

HYDROLOGY

☐ Recorded Data (Describe in Remarks)

☐ Stream, Lake, or Tide Gauge
☐ Aerial Photographs
☐ Other

☐ No Recorded Data Available

FIELD OBSERVATIONS

Depth of Surface Water	(in)
Depth of Free Water in Pit	(in)
Depth to Saturated Soil	(in)

WETLAND HYDROLOGY INDICATORS

Primary Indicators:
☐ Inundated
☐ Saturated in Upper 12 Inches
☐ Water Marks
☐ Drift Lines
☐ Sediment Deposits
☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more Required):
☐ Oxidized Root Channels in Upper 12 Inches
☐ Water-Stained Leaves
☐ Local Soil Survey Data
☐ FAC-Neutral Test
☐ Other (Explain in Remarks)

Remarks: Wetland hydrology absent.

DATA FORM – ROUTINE WETLAND DETERMINATION **Page 2**
WL-E, STP-2

SOILS

Map Unit Name (Series and Phase): Urban Land -Hubbard	Drainage Class: excessively drained- variable
Taxonomy (Subgroup) Sandy, mixed, frigid Entic Hapludolls	Field Observations Confirm Mapped Type: **YES** NO

PROFILE DESCRIPTION

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	10YR 2/1			Coarse fill, friable,

HYDRIC SOIL INDICATORS:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sand Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Hydric soils absent.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	**YES**	NO	Is this Sampling Point Within a Wetland? YES **NO**
Wetland Hydrology Present?	YES	**NO**	
Hydric Soils Present?	**YES**	NO	

Remarks: This sample plot is located south of E-5 and is situated in an area that appears to be disturbed. .

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site Former Bureau of Mines Property		**Date** 6.15.05
Applicant / Owner National Park Service		**County** Hennepin
Investigator Mike Rivera		**State** Minnesota
Do Normal Circumstances exist on the site?	**YES** NO	**Community ID** Palustrine Emergent
Is the site significantly disturbed (Atypical Situation)?	YES **NO**	**Transect ID** WL-F
Is the area a potential Problem Area? (If needed, explain on reverse)	YES **NO**	**Plot ID** STP-1

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Typha angustifolia*	Herb	OBL	9			
2	*Carex scoparium*	Herb	OBL	10			
3	*Solidago sp.*	Herb	NI	11			
4	*Scirpus atrovirens*	Herb	OBL	12			
5	*Parthenocissus quinquefolia*	Herb	FAC-	13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 75%

Remarks: Wetland vegetation present. The *Solidago* was not identifiable to the species level.

1

HYDROLOGY

☐ Recorded Data (Describe in Remarks)

☐ Stream, Lake, or Tide Gauge
☐ Aerial Photographs
☐ Other

☐ No Recorded Data Available

FIELD OBSERVATIONS	
Depth of Surface Water	1 (in)
Depth of Free Water in Pit	0 (in)
Depth to Saturated Soil	0 (in)

WETLAND HYDROLOGY INDICATORS

Primary Indicators:
- [x] Inundated
- [x] Saturated in Upper 12 Inches
- [ ] Water Marks
- [ ] Drift Lines
- [ ] Sediment Deposits
- [x] Drainage Patterns in Wetlands

Secondary Indicators (2 or more Required):
- [ ] Oxidized Root Channels in Upper 12 Inches
- [x] Water-Stained Leaves
- [ ] Local Soil Survey Data
- [x] FAC-Neutral Test
- [ ] Other (Explain in Remarks)

Remarks: Wetland hydrology present.

DATA FORM – ROUTINE WETLAND DETERMINATION **Page 2**
WL-F, STP-1

SOILS

Map Unit Name (Series and Phase): Urban Land -Hubbard	Drainage Class: excessively drained- variable
Taxonomy (Subgroup) Sandy, mixed, frigid Entic Hapludolls	Field Observations Confirm Mapped Type: **YES** NO

PROFILE DESCRIPTION

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	7.5YR 2.5/1			Saturated silt,

HYDRIC SOIL INDICATORS:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sand Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Hydric soils present

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	**YES**	NO	Is this Sampling Point Within a Wetland? **YES** NO
Wetland Hydrology Present?	**YES**	NO	
Hydric Soils Present?	**YES**	NO	

Remarks: This sample plot is located near an old ammunitions bunker. Wetland hydrology emerges from an upstream corrugated metal pipe. Canary reed grass forms a dominant component of the vegetative community near the head waters.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site Former Bureau of Mines Property		**Date** 6.15.05
Applicant / Owner National Park Service		**County** Hennepin
Investigator Mike Rivera		**State** Minnesota
Do Normal Circumstances exist on the site?	**YES** NO	**Community ID** Upland field
Is the site significantly disturbed (Atypical Situation)?	YES **NO**	**Transect ID** WL-F
Is the area a potential Problem Area? (If needed, explain on reverse)	YES **NO**	**Plot ID** STP-2

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Medicago lupulina*	Herb	FACU-	9			
2	*Gramaceae sp.*	Herb	NI	10			
3	*Taraxacum officinale*	Herb	FACU	11			
4	*Apocynum androsaemifolium*	Herb	NL	12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 0%

Remarks: Wetland vegetation absent. NL indicates insufficient information exists to provide a wetland indicator status. NI indicates the species was not identifiable to the species level.

1

HYDROLOGY

☐ Recorded Data (Describe in Remarks)

☐ Stream, Lake, or Tide Gauge
☐ Aerial Photographs
☐ Other

☐ No Recorded Data Available

FIELD OBSERVATIONS

Depth of Surface Water	(in)
Depth of Free Water in Pit	(in)
Depth to Saturated Soil	(in)

WETLAND HYDROLOGY INDICATORS

Primary Indicators:
☐ Inundated
☐ Saturated in Upper 12 Inches
☐ Water Marks
☐ Drift Lines
☐ Sediment Deposits
☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more Required):
☐ Oxidized Root Channels in Upper 12 Inches
☐ Water-Stained Leaves
☐ Local Soil Survey Data
☐ FAC-Neutral Test
☐ Other (Explain in Remarks)

Remarks: Wetland hydrology absent.

DATA FORM – ROUTINE WETLAND DETERMINATION **Page 2**
WL-F, STP-2

SOILS

Map Unit Name (Series and Phase): Urban Land -Hubbard	Drainage Class: excessively drained- variable
Taxonomy (Subgroup) Sandy, mixed, frigid Entic Hapludolls	Field Observations Confirm Mapped Type: **YES** NO

PROFILE DESCRIPTION

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-6	A	10YR 2/1			Friable coarse sand fill

HYDRIC SOIL INDICATORS:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sand Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Hydric soils absent.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	YES	**NO**	Is this Sampling Point Within a Wetland? YES **NO**
Wetland Hydrology Present?	YES	**NO**	
Hydric Soils Present?	YES	**NO**	

Remarks: None.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site Former Bureau of Mines Property		**Date** 6.15.05
Applicant / Owner National Park Service		**County** Hennepin
Investigator Mike Rivera		**State** Minnesota
Do Normal Circumstances exist on the site?	**YES** NO	**Community ID** Palustrine Forest/Stream
Is the site significantly disturbed (Atypical Situation)?	YES **NO**	**Transect ID** WL-G
Is the area a potential Problem Area? (If needed, explain on reverse)	YES **NO**	**Plot ID** STP-1

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Ulmus americana*	Tree	FACW	9			
2	*Populus deltoides*	Tree	FAC+	10			
3	*Impatience sp.*	Herb	FACW	11			
4	*Rhamus sp.*	Shrub	NL	12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 100%

Remarks: Wetland vegetation present.

1

HYDROLOGY

☐ Recorded Data (Describe in Remarks)

☐ Stream, Lake, or Tide Gauge
☐ Aerial Photographs
☐ Other

☐ No Recorded Data Available

FIELD OBSERVATIONS

Depth of Surface Water	(in)
Depth of Free Water in Pit	0 (in)
Depth to Saturated Soil	0 (in)

WETLAND HYDROLOGY INDICATORS

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Indicators (2 or more Required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks: Wetland hydrology present.

DATA FORM – ROUTINE WETLAND DETERMINATION **Page 2**
WL-G, STP-1

SOILS

Map Unit Name (Series and Phase): Urban Land -Hubbard	Drainage Class: excessively drained- variable
Taxonomy (Subgroup) Sandy, mixed, frigid Entic Hapludolls	Field Observations Confirm Mapped Type: YES **NO**

PROFILE DESCRIPTION

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	10YR 2/1			Saturated loam

HYDRIC SOIL INDICATORS:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sand Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Hydric soils present.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	**YES**	NO	Is this Sampling Point Within a Wetland? **YES** NO
Wetland Hydrology Present?	**YES**	NO	
Hydric Soils Present?	**YES**	NO	

Remarks: Wetland G is associated with a wooded drainage swale.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site Former Bureau of Mines Property		**Date** 6.15.05
Applicant / Owner National Park Service		**County** Hennepin
Investigator Mike Rivera		**State** Minnesota
Do Normal Circumstances exist on the site?	**YES** NO	**Community ID** Upland Forest
Is the site significantly disturbed (Atypical Situation)?	YES **NO**	**Transect ID** WL-G
Is the area a potential Problem Area? (If needed, explain on reverse)	YES **NO**	**Plot ID** STP-2

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Acer negundo*	Tree	FACW-	9			
2	*Acer negundo*	Shrub	FACW-	10			
3	*Sambucus racemosa*	Shrub	FACU-	11			
4	*Parthenocissus quinquefolia*	Herb	FAC-	12			
5	*Impatience sp.*	Herb	FACW	13			
6	*Rhamus sp.*	Shrub	NL	14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 60%

Remarks: Wetland vegetation present.

1
HYDROLOGY

☐ Recorded Data (Describe in Remarks)

☐ Stream, Lake, or Tide Gauge
☐ Aerial Photographs
☐ Other

☐ No Recorded Data Available

FIELD OBSERVATIONS

Depth of Surface Water	(in)
Depth of Free Water in Pit	(in)
Depth to Saturated Soil	(in)

WETLAND HYDROLOGY INDICATORS

Primary Indicators:
☐ Inundated
☐ Saturated in Upper 12 Inches
☐ Water Marks
☐ Drift Lines
☐ Sediment Deposits
☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more Required):
☐ Oxidized Root Channels in Upper 12 Inches
☐ Water-Stained Leaves
☐ Local Soil Survey Data
☐ FAC-Neutral Test
☐ Other (Explain in Remarks)

Remarks: Wetland hydrology absent.

DATA FORM – ROUTINE WETLAND DETERMINATION **Page 2**
WL-G, STP-2

SOILS

Map Unit Name (Series and Phase): Urban Land -Hubbard	Drainage Class: excessively drained- variable
Taxonomy (Subgroup) Sandy, mixed, frigid Entic Hapludolls	Field Observations Confirm Mapped Type: YES **NO**

PROFILE DESCRIPTION

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	10YR 2/1			Sand, fill.

HYDRIC SOIL INDICATORS:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sand Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Hydric soils present. However, the soil matrix has a coarse sand matrix.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	**YES**	NO	Is this Sampling Point Within a Wetland? **YES** NO
Wetland Hydrology Present?	YES	**NO**	
Hydric Soils Present?	**YES**	NO	

Remarks: Upland point for WL-G STP-2 is on an old road and the sub substrate consists of fill.

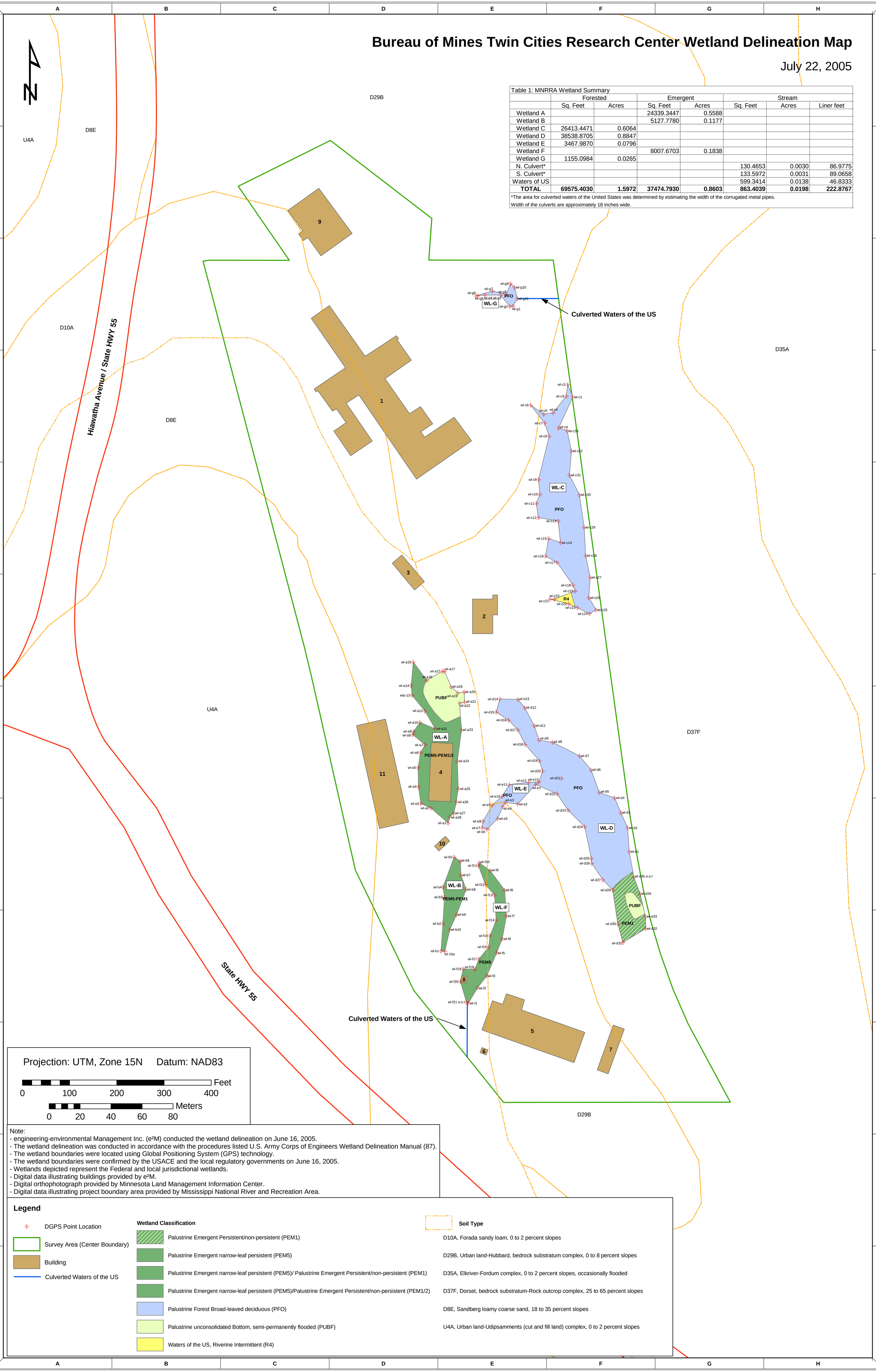
APPENDIX C: WETLANDS DELINEATION MAP

Bureau of Mines Twin Cities Research Center Wetland Delineation Map

July 22, 2005

Table 1: MNRRA Wetland Summary							
	Forested		Emergent		Stream		
	Sq. Feet	Acres	Sq. Feet	Acres	Sq. Feet	Acres	Liner feet
Wetland A			24339.3447	0.5588			
Wetland B			5127.7780	0.1177			
Wetland C	26413.4471	0.6064					
Wetland D	38538.8705	0.8847					
Wetland E	3467.9870	0.0796					
Wetland F			8007.6703	0.1838			
Wetland G	1155.0984	0.0265					
N. Culvert*					130.4653	0.0030	86.9775
S. Culvert*					133.5972	0.0031	89.0658
Waters of US					599.3414	0.0138	46.8333
TOTAL	**69575.4030**	**1.5972**	**37474.7930**	**0.8603**	**863.4039**	**0.0198**	**222.8767**

*The area for culverted waters of the United States was determined by estimating the width of the corrugated metal pipes.
Width of the culverts are approximately 18 inches wide.



Projection: UTM, Zone 15N Datum: NAD83

Feet: 0 100 200 300 400

Meters: 0 20 40 60 80

Note:
- engineering-environmental Management Inc. (e²M) conducted the wetland delineation on June 16, 2005.
- The wetland delineation was conducted in accordance with the procedures listed U.S. Army Corps of Engineers Wetland Delineation Manual (87).
- The wetland boundaries were located using Global Positioning System (GPS) technology.
- The wetland boundaries were confirmed by the USACE and the local regulatory governments on June 16, 2005.
- Wetlands depicted represent the Federal and local jurisdictional wetlands.
- Digital data illustrating buildings provided by e²M.
- Digital orthophotograph provided by Minnesota Land Management Information Center.
- Digital data illustrating project boundary area provided by Mississippi National River and Recreation Area.

Legend

- DGPS Point Location
- Survey Area (Center Boundary)
- Building
- Culverted Waters of the US

Wetland Classification

- Palustrine Emergent Persistent/non-persistent (PEM1)
- Palustrine Emergent narrow-leaf persistent (PEM5)
- Palustrine Emergent narrow-leaf persistent (PEM5)/ Palustrine Emergent Persistent/non-persistent (PEM1)
- Palustrine Emergent narrow-leaf persistent (PEM5)/Palustrine Emergent Persistent/non-persistent (PEM1/2)
- Palustrine Forest Broad-leaved deciduous (PFO)
- Palustrine unconsolidated Bottom, semi-permanently flooded (PUBF)
- Waters of the US, Riverine Intermittent (R4)

Soil Type

- D10A, Forada sandy loam, 0 to 2 percent slopes
- D29B, Urban land-Hubbard, bedrock substratum complex, 0 to 8 percent slopes
- D35A, Elkriver-Fordum complex, 0 to 2 percent slopes, occasionally flooded
- D37F, Dorset, bedrock substratum-Rock outcrop complex, 25 to 65 percent slopes
- D8E, Sandberg loamy coarse sand, 18 to 35 percent slopes
- U4A, Urban land-Udipsamments (cut and fill land) complex, 0 to 2 percent slopes

As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historic places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. Administration.