

Minnesota Wetland Conservation Act

Notice of Decision

Item 7B.
BCWMC 7-17-14

Local Government Unit (LGU) City of Plymouth	Address 3400 Plymouth Blvd. Plymouth, MN 55447
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1. PROJECT INFORMATION

Applicant Name Pam Segal	Project Name Plymouth/New Hope Little League	Date of Application 5/19/14	Application Number
☒ Attach site locator map.			

Type of Decision:

☒ Wetland Boundary or Type	☐ No-Loss	☐ Exemption	☐ Sequencing
☐ Replacement Plan	☐ Banking Plan		

Technical Evaluation Panel Findings and Recommendation (if any):

☐ Approve	☐ Approve with conditions	☐ Deny
Summary (or attach):		

2. LOCAL GOVERNMENT UNIT DECISION

Date of Decision: June 13, 2014		
☒ Approved	☐ Approved with conditions (include below)	☐ Denied

LGU Findings and Conclusions (attach additional sheets as necessary):

Fieldwork for this wetland boundary and type investigation was completed by Anderson Engineering on April 22, 2014. Wetland 1 is a Type 5/6/7, PFO1/SS1C/UB/F, hardwood swamp/scrub-shrub/shallow open water wetland. Wetland 1 is 0.33 acre in size on the property and is dominated by cottonwood, boxelder, red osier dogwood, and reed canary grass.
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For Replacement Plans using credits from the State Wetland Bank:

Bank Account #	Bank Service Area	County	Credits Approved for Withdrawal (sq. ft. or nearest .01 acre)

Replacement Plan Approval Conditions. In addition to any conditions specified by the LGU, the approval of a Wetland Replacement Plan is conditional upon the following:

☐ **Financial Assurance:** For project-specific replacement that is not in-advance, a financial assurance specified by the LGU must be submitted to the LGU in accordance with MN Rule 8420.0522, Subp. 9 (List amount and type in LGU Findings).

☐ **Deed Recording:** For project-specific replacement, evidence must be provided to the LGU that the BWSR "Declaration of Restrictions and Covenants" and "Consent to Replacement Wetland" forms have been filed with the county recorder's office in which the replacement wetland is located.

☐ **Credit Withdrawal:** For replacement consisting of wetland bank credits, confirmation that BWSR has withdrawn the credits from the state wetland bank as specified in the approved replacement plan.

Wetlands may not be impacted until all applicable conditions have been met!

LGU Authorized Signature:

Signing and mailing of this completed form to the appropriate recipients in accordance with 8420.0255, Subp. 5 provides notice that a decision was made by the LGU under the Wetland Conservation Act as specified above. If additional details on the decision exist, they have been provided to the landowner and are available from the LGU upon request.		
Name Derek Asche	Title Water Resources Manager	
Signature 	Date 6/13/14	Phone Number and E-mail 763-509-5526 dasche@plymouthmn.gov

THIS DECISION ONLY APPLIES TO THE MINNESOTA WETLAND CONSERVATION ACT. Additional approvals or permits from local, state, and federal agencies may be required. Check with all appropriate authorities before commencing work in or near wetlands.

Applicants proceed at their own risk if work authorized by this decision is started before the time period for appeal (30 days) has expired. If this decision is reversed or revised under appeal, the applicant may be responsible for restoring or replacing all wetland impacts.

This decision is valid for three years from the date of decision unless a longer period is advised by the TEP and specified in this notice of decision.

3. APPEAL OF THIS DECISION

Pursuant to MN Rule 8420.0905, any appeal of this decision can only be commenced by mailing a petition for appeal, including applicable fee, within thirty (30) calendar days of the date of the mailing of this Notice to the following as indicated:

Check one:

☒ Appeal of an LGU staff decision. Send petition and \$0 fee (if applicable) to: Derek Asche, Water Resources Manager City of Plymouth 3400 Plymouth Blvd. Plymouth, MN 55447	☐ Appeal of LGU governing body decision. Send petition and \$500 filing fee to: Executive Director Minnesota Board of Water and Soil Resources 520 Lafayette Road North St. Paul, MN 55155
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4. LIST OF ADDRESSEES

- ☒ HCD TEP member: Ms. Stacey Lijewski, HCD, 701 Fourth Avenue South, Suite 700, Minneapolis, MN, 55415-1600 (sent electronically)
- ☒ BWSR TEP member: Mr. Dennis Rodecker, BWSR, 520 Lafayette Rd. N., St. Paul, MN, 55155 (sent electronically)
- ☐ LGU TEP member (if different than LGU Contact):
- ☒ DNR TEP member: Brooke Haworth, MN DNR, 1200 Warner Road, St. Paul, MN, 55106 (sent electronically)
- ☐ DNR Regional Office (if different than DNR TEP member)
Ms. Kate Drewry, DNR Division of Ecological and Water Resources, 1200 Warner Road, St. Paul, MN, 55106 (sent electronically)
- ☒ WD or WMO (if applicable): BCWMC, c/o Laura Jester, Keystone Waters, LLC, 16415 Hillcrest Lane, Eden Prairie, MN, 55346 (sent electronically)
- ☒ Applicant and Landowner (if different):
West Medicine Lake Community Club, 1705 Forestview Lane, Plymouth, MN, 55441
- ☒ Members of the public who requested notice:
Marc Cottingham, Anderson Engineering (sent electronically)
Pam Segal, President, Plymouth-New Hope Little League (sent electronically)
Fred Moore, 1820 Ives Lane North, Plymouth, Mn, 55441
- ☒ Corps of Engineers Project Manager: Melissa Jenny, Army Corps of Engineers, 180 5th Street East, Suite 700, St. Paul, MN, 55101-1678 (sent electronically)
- ☐ BWSR Wetland Bank Coordinator (wetland bank plan decisions only)

5. MAILING INFORMATION

- For a list of BWSR TEP representatives: www.bwsr.state.mn.us/aboutbwsr/workareas/WCA_areas.pdf
- For a list of DNR TEP representatives: www.bwsr.state.mn.us/wetlands/wca/DNR_TEP_contacts.pdf
- Department of Natural Resources Regional Offices:

<u>NW Region:</u>	<u>NE Region:</u>	<u>Central Region:</u>	<u>Southern Region:</u>
Reg. Env. Assess. Ecol. Div. Ecol. Resources 2115 Birchmont Beach Rd. NE Bemidji, MN 56601	Reg. Env. Assess. Ecol. Div. Ecol. Resources 1201 E. Hwy. 2 Grand Rapids, MN 55744	Reg. Env. Assess. Ecol. Div. Ecol. Resources 1200 Warner Road St. Paul, MN 55106	Reg. Env. Assess. Ecol. Div. Ecol. Resources 261 Hwy. 15 South New Ulm, MN 56073

For a map of DNR Administrative Regions, see: http://files.dnr.state.mn.us/aboutdnr/dnr_regions.pdf

- For a list of Corps of Project Managers: www.mvp.usace.army.mil/regulatory/default.asp?pageid=687
or send to:

US Army Corps of Engineers
St. Paul District, ATTN: OP-R
180 Fifth St. East, Suite 700
St. Paul, MN 55101-1678

- For Wetland Bank Plan applications, also send a copy of the application to:
Minnesota Board of Water and Soil Resources
Wetland Bank Coordinator
520 Lafayette Road North
St. Paul, MN 55155

6. ATTACHMENTS

In addition to the site locator map, list any other attachments:

☐



PROJECT LOCATION

SOURCE: USDA, USGS, MN DNR, ESRI, TIGER, Anderson Engineering



Hennepin County
State of Minnesota



City of Plymouth
Hennepin County, MN

1 in = 0.25 miles



1705 Forestview Lane North
Plymouth, Hennepin County, MN

PID: 053-2611822420001



Anderson Engineering of Minnesota, LLC
13605 1st Avenue North
Suite 100
Plymouth, MN 55441
763-412-4000 (o) 763-412-4090 (f)
www.ae-mn.com

**LOCATION - FIGURE 1
WEST MEDICINE LAKE
COMMUNITY CLUB -
BALLFIELD EXPANSION**

AE Comm # 13669 Date: 4/25/2014 By: JLA

Minnesota Wetland Conservation Act

Notice of Application

Local Government Unit (LGU) City of Plymouth	Address 3400 Plymouth Blvd. Plymouth, MN 55447
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1. PROJECT INFORMATION

Applicant Name Rachel Development	Project Name 1120 Evergreen Lane	Date of Application 6/19/14	Application Number NA
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Type of Application (check all that apply):

☒ Wetland Boundary or Type	☐ No-Loss	☐ Exemption	☐ Sequencing
☐ Replacement Plan	☐ Banking Plan		

Summary and description of proposed project (attach additional sheets as necessary):

Svoboda Ecological Resources (SER) visited the above referenced property on 5/30/14 to examine the site for the presence of wetlands. One wetland was identified on-site. Wetland 1 is a Type 1L, PUBG and PFO1C wetland dominated by cottonwood, green ash, American elm, and European buckthorn. Wetland 1 is adjacent to MN DNR Public Water #693W and may be considered under the jurisdiction of the MN DNR.

2. APPLICATION REVIEW AND DECISION

Signing and mailing of this completed form to the appropriate recipients in accordance with 8420.0255, Subp. 3 provides notice that an application was made to the LGU under the Wetland Conservation Act as specified above. A copy of the application is attached. Comments can be submitted to:

Name and Title of LGU Contact Person Derek Asche Water Resources Manager	Comments must be received by (minimum 15 business-day comment period): July 16, 2014
Address (if different than LGU) Plymouth City Hall 3400 Plymouth Blvd. Plymouth, MN 55447	Date, time, and location of decision: July 17, 2014 9am Plymouth City Hall
Phone Number and E-mail Address 763-509-5526 dasche@plymouthmn.gov	Decision-maker for this application: ☒ Staff ☐ Governing Board or Council

Signature: _____

Derek Asche

Date: _____

6/19/14

3. LIST OF ADDRESSEES

☒	HCD TEP member: Ms. Stacey Lijewski, HCD, 701 Fourth Avenue South, Suite 700, Minneapolis, MN, 55415-1600 (sent electronically)
☒	BWSR TEP member: Mr. Ben Meyer, BWSR, 520 Lafayette Rd. N., St. Paul, MN, 55155 (sent electronically)
☐	LGU TEP member (if different than LGU Contact):
☒	DNR TEP member: Brooke Haworth, MN DNR, 1200 Warner Road, St. Paul, MN, 55106 (sent electronically)
☐	DNR Regional Office (if different than DNR TEP member) Ms. Kate Drewry, DNR Division of Ecological and Water Resources, 1200 Warner Road, St. Paul, MN, 55106 (sent electronically)
☒	WD or WMO (if applicable): BCWMC, c/o Laura Jester, Keystone Waters, LLC, 16415 Hillcrest Lane, Eden Prairie, MN, 55346 (sent electronically)
☒	Applicant and Landowner (if different): Jeff Holmers, Rachel Development, 4125 Napier Crt NE, St. Michael, MN (sent electronically)
☒	Members of the public who requested notice: Craig Laughlin, 1120 Evergreen Lane, Plymouth, MN, 55441 Frank Svoboda, SER, 22752 Co Rd 7, Hutchinson, MN, 55350 (sent electronically)
☒	Corps of Engineers Project Manager: Melissa Jenny, Army Corps of Engineers, 180 5 th Street East, Suite 700, St. Paul, MN, 55101-1678 (sent electronically)
☐	BWSR Wetland Bank Coordinator (wetland bank plan decisions only)

4. MAILING INFORMATION

- For a list of BWSR TEP representatives: www.bwsr.state.mn.us/contact/WCA_areas.pdf
- For a list of DNR TEP representatives: www.bwsr.state.mn.us/wetlands/wca/DNR_TEP_contacts.pdf
- Department of Natural Resources Regional Offices:

NW Region:	NE Region:	Central Region:	Southern Region:
Reg. Env. Assess. Ecol. Div. Ecol. Resources 2115 Birchmont Beach Rd. NE Bemidji, MN 56601	Reg. Env. Assess. Ecol. Div. Ecol. Resources 1201 E. Hwy. 2 Grand Rapids, MN 55744	Reg. Env. Assess. Ecol. Div. Ecol. Resources 1200 Warner Road St. Paul, MN 55106	Reg. Env. Assess. Ecol. Div. Ecol. Resources 261 Hwy. 15 South New Ulm, MN 56073

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US Army Corps of Engineers
St. Paul District, ATTN: OP-R
180 Fifth St. East, Suite 700
St. Paul, MN 55101-1678

- For Wetland Bank Plan applications, also send a copy of the application to:
Minnesota Board of Water and Soil Resources
Wetland Bank Coordinator
520 Lafayette Road North
St. Paul, MN 55155

5. ATTACHMENTS

In addition to the application, list any other attachments:	
☒	Wetland Delineation Report dated June 12, 2014 by SER for 1120 Evergreen Lane
☐	

PART ONE: Applicant Information

If applicant is an entity (company, government entity, partnership, etc.), an authorized contact person must be identified. If the applicant is using an agent (consultant, lawyer, or other third party) and has authorized them to act on their behalf, the agent's contact information must also be provided.

Applicant/Landowner Name: Rachel Development
Mailing Address: 4125 Napier Crt NE, St Michael, MN
Phone: 6129984010
E-mail Address: jeffholmers@gmail.com

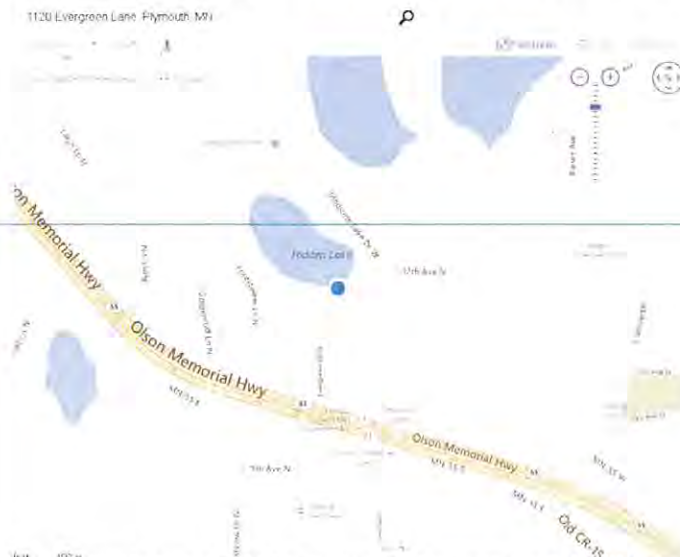
Authorized Contact (do not complete if same as above): Frank Svoboda – Svoboda Ecological Resources
Mailing Address: 22752 Co Rd 7, Hutchinson, MN 55350
Phone: 612-384-7770
E-mail Address: franks@gpsinnovatitons.com

PART TWO: Site Location Information

County: Hennepin **City/Township:** Plymouth
Parcel ID and/or Address: 1120 Evergreen Lane (PID # 3511822120028)
Legal Description (Section, Township, Range): Hidden Lake Addition Lot 6, Blk 1; A portion of the E ½ NE ¼
¼ of Section 35, T118N, R22W, City of Plymouth, Hennepin
County, Minnesota

Lat/Long (decimal degrees): Lat. 44.992124/ Long. -93.426353

Attach a map showing the location of the site in relation to local streets, roads, highways.



Approximate size of site (acres) or if a linear project, length (feet): 3.89 Acres

If you know that your proposal will require an individual Permit from the U.S. Army Corps of Engineers, you must provide the names and addresses of all property owners adjacent to the project site. This information may be provided by attaching a list to your application or by using block 25 of the Application for Department of the Army permit which can be obtained at:

http://www.mvp.usace.army.mil/Portals/57/docs/regulatory/RegulatoryDocs/engform_4345_2012oct.pdf

PART THREE: General Project/Site Information

If this application is related to a delineation approval, exemption determination, jurisdictional determination, or other correspondence submitted **prior to** this application then describe that here and provide the Corps of Engineers project number.

Describe the project that is being proposed, the project purpose and need, and schedule for implementation and completion. The project description must fully describe the nature and scope of the proposed activity including a description of all project elements that effect aquatic resources (wetland, lake, tributary, etc.) and must also include plans and cross section or profile drawings showing the location, character, and dimensions of all proposed activities and aquatic resource impacts.

The owner wants to know where the approved edge is located before starting the planning process. As soon as approval is received they will move forward with their project.

PART FOUR: Aquatic Resource Impact¹ Summary

If your proposed project involves a direct or indirect impact to an aquatic resource (wetland, lake, tributary, etc.) identify each impact in the table below. Include all anticipated impacts, including those expected to be temporary. Attach an overhead view map, aerial photo, and/or drawing showing all of the aquatic resources in the project area and the location(s) of the proposed impacts. Label each aquatic resource on the map with a reference number or letter and identify the impacts in the following table.

Aquatic Resource ID (as noted on overhead view)	Aquatic Resource Type (wetland, lake, tributary etc.)	Type of Impact (fill, excavate, drain, or remove vegetation)	Duration of Impact Permanent (P) or Temporary (T) ¹	Size of Impact ²	Overall Size of Aquatic Resource ³	Existing Plant Community Type(s) in Impact Area ⁴	County, Major Watershed #, and Bank Service Area # of Impact Area ⁵

¹If impacts are temporary; enter the duration of the impacts in days next to the "T". For example, a project with a temporary access fill that would be removed after 220 days would be entered "T (220)".

²Impacts less than 0.01 acre should be reported in square feet. Impacts 0.01 acre or greater should be reported as acres and rounded to the nearest 0.01 acre. Tributary impacts must be reported in linear feet of impact and an area of impact by indicating first the linear feet of impact along the flowline of the stream followed by the area impact in parentheses). For example, a project that impacts 50 feet of a stream that is 6 feet wide would be reported as 50 ft (300 sq/ft).

³This is generally only applicable if you are applying for a de minimis exemption under MN Rules 8420.0420 Subp. 8, otherwise enter "N/A".

⁴Use *Wetland Plants and Plant Community Types of Minnesota and Wisconsin* 3rd Ed. as modified in MN Rules 8420.0405 Subp. 2.

⁵Refer to Major Watershed and Bank Service Area maps in MN Rules 8420.0522 Subp. 7.

If any of the above identified impacts have already occurred, identify which impacts they are and the circumstances associated with each:

PART FIVE: Applicant Signature

☐ Check here if you are requesting a pre-application consultation with the Corps and LGU based on the information you have provided. Regulatory entities will not initiate a formal application review if this box is checked.

By signature below, I attest that the information in this application is complete and accurate. I further attest that I possess the authority to undertake the work described herein.

Signature: Franklin J. Svoboda

Date: June 12th, 2014

I hereby authorize _____ to act on my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this application.

¹ The term "impact" as used in this joint application form is a generic term used for disclosure purposes to identify activities that may require approval from one or more regulatory agencies. For purposes of this form it is not meant to indicate whether or not those activities may require mitigation/replacement.

Attachment A

Request for Delineation Review, Wetland Type Determination, or Jurisdictional Determination

By submission of the enclosed wetland delineation report, I am requesting that the U.S. Army Corps of Engineers, St. Paul District (Corps) and/or the Wetland Conservation Act Local Government Unit (LGU) provide me with the following (check all that apply):

☐ **Wetland Type Confirmation**

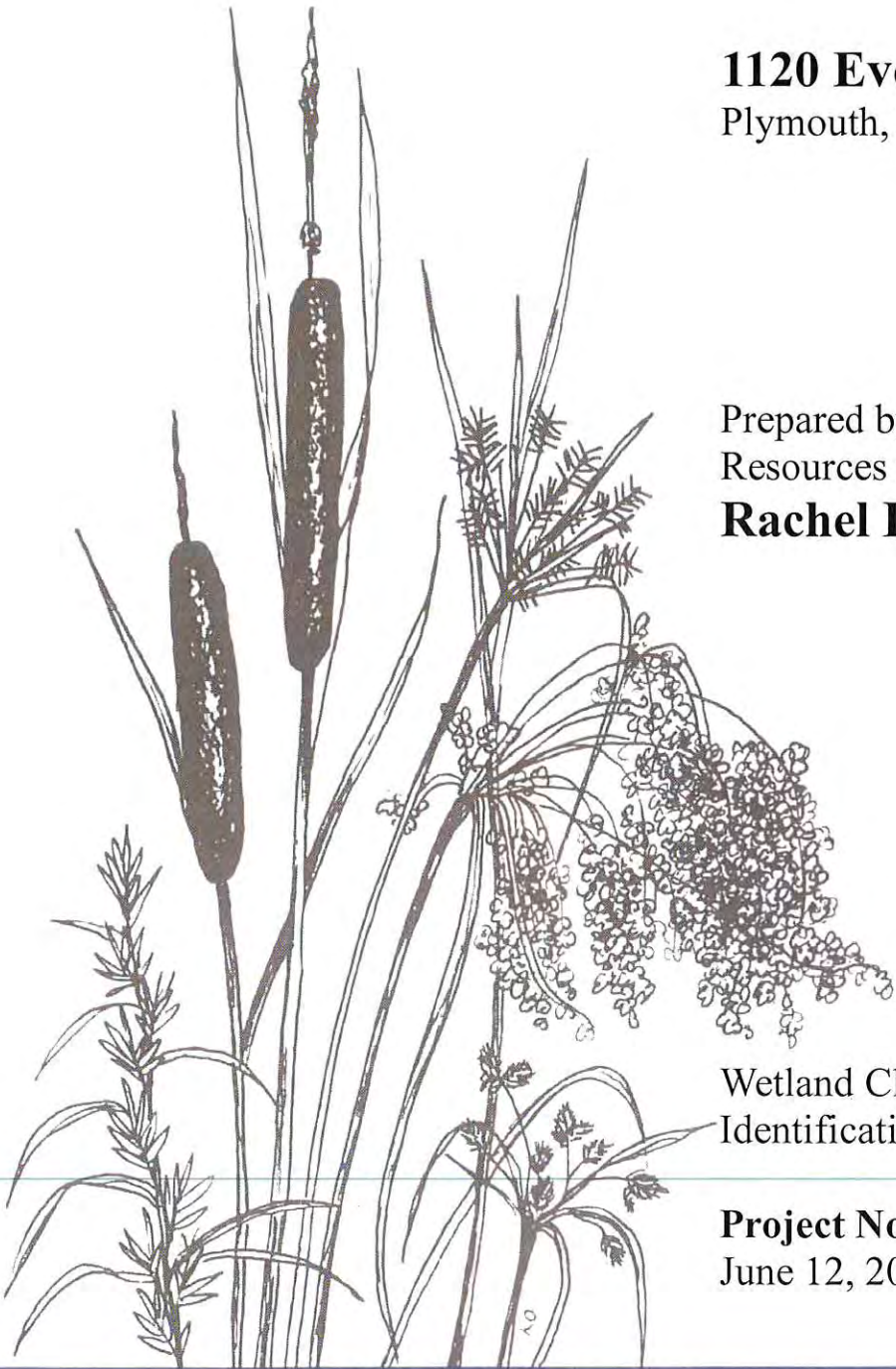
☒ **Delineation Concurrence.** Concurrence with a delineation is a written notification from the Corps and a decision from the LGU concurring, not concurring, or commenting on the boundaries of the aquatic resources delineated on the property. Delineation concurrences are generally valid for five years unless site conditions change. Under this request alone, the Corps will not address the jurisdictional status of the aquatic resources on the property, only the boundaries of the resources within the review area (including wetlands, tributaries, lakes, etc.).

☒ **Preliminary Jurisdictional Determination.** A preliminary jurisdictional determination (PJD) is a non-binding written indication from the Corps that waters, including wetlands, identified on a parcel may be waters of the United States. For purposes of computation of impacts and compensatory mitigation requirements, a permit decision made on the basis of a PJD will treat all waters and wetlands in the review area as if they are jurisdictional waters of the U.S. PJDs are advisory in nature and may not be appealed.

☐ **Approved Jurisdictional Determination.** An approved jurisdictional determination (AJD) is an official Corps determination that jurisdictional waters of the United States are either present or absent on the property. AJDs can generally be relied upon by the affected party for five years. An AJD may be appealed through the Corps administrative appeal process.

In order for the Corps and LGU to process your request, the wetland delineation must be prepared in accordance with the 1987 Corps of Engineers Wetland Delineation Manual, any approved Regional Supplements to the 1987 Manual, and the *Guidelines for Submitting Wetland Delineations in Minnesota* (2013).

<http://www.mvp.usace.army.mil/Missions/Regulatory/DelineationJDGuidance.aspx>



1120 Evergreen Lane
Plymouth, MN

Prepared by Svoboda Ecological
Resources for:
Rachel Development

Wetland Classification,
Identification, and Delineation

Project No. 2014-011-03
June 12, 2014

SVOBODA *Providing the Sharper Edge in
Natural Resources & Environmental Consulting*
ECOLOGICAL RESOURCES

1120 Evergreen Lane, Plymouth, Hennepin County, MN

Wetland Classification, Identification, and Delineation Report

Prepared for:

Rachel Development

By:

Svoboda Ecological Resources

Project Number 2014-011-03

June 9, 2014

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- Figure 1: Site Location Overlaid on Topographic Map
- Figure 2: National Wetlands Inventory
- Figure 3: Web Soil Survey-Hennepin County
- Figure 4: Public Waters Inventory
- Figure 5: Approximate Wetland Boundary and Sample Point Location

TECHNICAL DOCUMENTS:

- Photo Log
- Field Data Sheets
- Plant Indicator Status
- Soil Series Data

ABSTRACT

Svoboda Ecological Resources (SER) visited the above referenced property on 5/30/14 to examine the site for the presence of areas meeting wetland criteria. The study parcel is located in the city of Plymouth, MN in Hennepin County (Figure 1). One wetland boundary was delineated at this site. One sample transect was established along the southern edge of the wetland (Hidden Lake) in order to characterize the soil, vegetation, and existing hydrology within the wetland-to-upland transition zone. This wetland boundary is in large part consistent with one previously completed by SER in 2009.

INTRODUCTION

The subject parcel at 1120 Evergreen Lane is approximately 3.83 acres. The parcel is dominated by part of a small lake (Hidden Lake) Surrounding land use is a combination of medium-sized and small family lots, a few commercial buildings and a railroad track that passes along the northerly edge of Hidden Lake. The identified wetlands were classified according to the Cowardin et al., the Circular 39 and the Eggers and Reed classification systems and marked with pink “Wetland Delineation” pin flags. The Technical Documents section of this report contains field data sheets, plant indicator status information, soil survey information, and wetland definition information.

METHODS

The methods used to delineate the subject parcel are as described in the 1987 US Army Corps of Engineers Wetlands Delineation Manual and the 2010 Midwest Regional Supplement Manual. In the 1987 Manual, the methods used were described under the “routine” methods for sites less than 5 acres. This methodology is followed in order to assess whether the three parameters of a wetland are met for areas on the subject parcel. The three parameters required under normal circumstances in order to delineate a wetland are described in the Technical Documents section.

The Midwest Regional Supplement Wetland Delineation Manual is also being utilized to increase the accuracy of our wetland boundaries. This addendum to the original 87 Manual was created to address the many regional differences that affect wetlands and the delineation methods used throughout the country. The following explanations are passages from that document.

“This Regional Supplement is part of a nationwide effort to address regional wetland characteristics and improve the accuracy and efficiency of wetland-delineation procedures. Regional differences in climate, geology, soils, hydrology plant and animal communities, and other factors are important to the identification and functioning of wetlands. These differences cannot be considered adequately in a single national manual. The development of this supplement follows National Academy of Sciences recommendations to increase the regional sensitivity of wetland-delineation methods (National Research Council 1995). The intent of this supplement is to bring the Corps Manual up to date with current knowledge and practice in the region and not to change wetland boundaries.” “...This Regional Supplement is designed for use with the

current version of the Corps Manual (Environmental Laboratory 1987) and all subsequent versions. Where differences in the two documents occur, this Regional Supplement takes precedence over the Corps Manual for applications in the Midwest Region.”

National Wetland Inventory (NWI) maps (Figure 2), Web Soil Survey of Hennepin County map (Figure 3), Minnesota Public Waters Inventory maps (Figure 4), and 2012 aerial photographs were reviewed prior to the site visit to identify areas that may be wetlands. Areas illustrating evidence of wetland conditions were examined in greater detail during the field survey. Vegetation, soils and hydrology were examined (as outlined in the 1987 Manual) and used to characterize wetland types and determine wetland boundaries. Sample transects were established in representative wetland-to-upland transition zones in order to characterize the vegetation, soils, and hydrology of the site. Transects consist of a representative upland sample point and representative wetland sample point. Information obtained at the sample points can be found on the field data sheets located in the Technical Documents section.

Wetland boundaries were marked at the site by pink “Wetland Delineation” pin flags. In dense, brushy areas, orange wetland boundary flagging was tied above the pink boundary flags to facilitate ease of location. The wetland boundary is considered to be the topographically highest extent of the wetland basin; areas below the staked boundary met the three required wetland criteria while areas above were lacking in one or more of these criteria. Wetlands were classified in accordance with methods described by Cowardin et al. (1979) and used in the NWI (e.g. PEMB, PSS1C, etc.), completed by the U.S. Fish and Wildlife Service. The Circular 39 and Eggers and Reed classification systems are also given. The indicator status of plants, as described in the Technical Documents section, was determined using the National Wetland Plant List (Lichvar, et al. 2014. <http://wetland.plants.usace.army.mil/>).

RESULTS

The National Wetland Inventory indicates the presence of one wetland in the survey area. The wetland is categorized by the NWI as PUBG with a PFO1C fringe (Figure 2).

The Web Soil Survey of Hennepin County (Figure 3) identifies three soil map units present on the subject property. They are as follows: Muskego, Blue Earth, and Houghton soils, ponded, 0 to 1 percent slopes; Lester loam, morainic, 18 to 25 percent slopes; and a small fringe of Angus loam, morainic, 2 to 5 percent slopes at the very south edge of the parcel. The Houghton, Blue Earth and Muskego soils are hydric. The remaining types are all predominantly nonhydric. Soil series descriptions are provided in the Technical Documents section.

The Minnesota Department of Natural Resources, State Protected Waters Map (Public Waters Inventory) designates Hidden Lake as a Public Water Wetland (27-693W).

SER previously completed a wetland delineation of the site on September 28, 2009. A copy of the prior delineation is available on request. The boundary delineated in 2014 differs slightly from that in 2009. Nearly all of the flags remained from the 2009 delineation and served as a good reference for the current delineation. The amount of heavy rain that fell in the past month has assisted in a better definition of the wetland edge. Some areas previously identified as

wetland clearly were not wetland based both on vegetation as well as the absence of hydrology where other areas were clearly wetland based on evident surface or near surface water and strong buttressing of tree trunks. In large part, the 2009 and 2014 boundaries closely coincide except that a small area at the east end of boundary was excluded as non-wetland and an upland “island” at the western end was included as wetland.

Site Visit

SER ecologists examined the subject property for areas meeting jurisdictional wetland criteria during the site visit. One wetland edge meeting the jurisdictional criteria of a wetland was flagged, and the boundary was determined and delineated. The approximate wetland boundary is outlined in yellow (Figure 5). Of note, the water level appears to be higher than normal in the area. The spring snowmelt and recent precipitation have been significant and is affecting soil water tables.

Accumulated precipitation since 11/01/13 , as recorded and reported by the USDA National Agricultural Statistics Service in cooperation with the Minnesota Department of Agriculture reports that for the week ended June 1, 2014, was 7.04” above normal. Precipitation for the period 5/26/14 to 6/01/14 was reported to be 2.17” above normal.

The NWI identified the main wetland, Wetland 1, as PUBG with a PFO1C forest fringe. The wetland is a small open water lake with the forested fringe dominated by cottonwood (*Populus deltoides*), green ash (*Fraxinus pensylvanica*), American elm (*Ulmus americana*), and European buckthorn (*Rhamnus cathartica*). Ground cover was sparse to non-existent. The NWI Cowardin classification of the forested fringe is more appropriately PFO1A (Eggers and Reed Classification – Floodplain Forest; Circular 39 Type 1L). Hidden Lake is open water. Transition to uplands is marked by a well defined slope and, in some areas, increased woody vegetation.

Transect SP 1-1 was taken in approximately the same location as the 2009 transect although the specific location of the sample points is likely not the same. The soils at sample point SP 1-1 Wet consisted of a dark wet mucky peat layer at the surface to a depth of 18 inches with a less saturated peat layer immediately from that depth to a sampling depth of 30 inches. Water was about 1 inch deep with saturation present at 0 inches. Hydric indicators A1 (Histosl) and A2 (Histic Epipedon) were present. SP 1-1 Up was taken upslope of the wetland edge and was about 6 feet higher in elevation than the edge. The soils at sample point SP 1-1 Up consisted of a highly disturbed and mixed dark and light colored clay aggregation. Between 14 and 18 inches, the profile was mixed and dark with very 3 very large (0.5 to 1.25”) dark reddish concretions. A void was encountered at a depth between 18 and 24 inches where no resistance was present while augering. Despite the very heavy rains, no water table or saturation were present at 30 inches. No hydric indicators were present at this sample point.

At sample point SP 1-1 Wet hydrology indicators A1 (Surface Water), A2 (High Water Table) and A3 (Saturation) were present. Wetland hydrology was not indicated at sample point SP 1-1 Up.

Detailed soils, vegetation, and hydrology data for the delineated jurisdictional wetlands are provided in the data sheets of the Technical Documents section.

DISCUSSION

SER completed all on-site delineations based on the three required technical criteria as outlined by the 1987 Manual: the presence of hydric soils, a predominance of hydrophytic vegetation, and indicators of wetland hydrology in each basin. The site visit portion of the wetland delineation was completed on 5/30/2014.

SER personnel examined the subject properties for areas meeting jurisdictional wetland criteria during the site visit and delineated the edges of two wetlands as being jurisdictional wetlands (Figure 5). Detailed soils, vegetation and hydrology data is provided in the data sheets of the Technical Documents section. A set of figures is provided in the Figures section.

RECOMMENDATIONS

Activities that impact or could potentially impact wetlands are regulated at several levels of government. In Minnesota, the two primary jurisdictions are covered at the state and federal levels by the provisions of the following legislative actions.

- 1* State jurisdiction by the Wetland Conservation Act of 1991 (WCA) administered by the WCA Local Governmental Unit (LGU).
- 2* Federal jurisdiction by the Clean Water Act of 1972 and subsequent amendments. Wetland protection is implemented by the Corps of Engineers (Corps) with permit certification issued by the Environmental Protection Agency.

While the wetland boundaries that SER has delineated are not official until approved by a WCA approved local government unit (LGU), SER advises the property owner/developer to refrain from any filling, draining, or excavating, or any impact to the area SER has delineated as wetland. No grading or filling in wetland basins should commence until all necessary permits have been obtained. Violation of wetland regulations may result in substantial civil and criminal penalties. Local ordinances may regulate wetland modifications such as brush and tree removal and burning in addition to grading and filling. Depending on the location of the property, buffers around the wetland may also be protected. Any activities in the proximity of the wetland should be cleared with appropriate WCA regulatory agencies. It is also advisable to have the wetland boundary surveyed by a licensed land surveyor. Since the pin flags used along the boundary can be vandalized or inadvertently knocked over, a GPS survey of the flags will assure the permanence of the boundary. The client should also be aware that approved wetland boundaries are typically valid for five years from the date of approval.

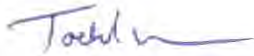
To avoid project delays associated with wetland regulations, it is essential that you acquire necessary permits from all jurisdictional agencies before initiating activities. A WCA Sequencing form, a WCA and Army Corps of Engineers Replacement Plan Application form, and a DNR permit application are among the materials that you may be required to submit if impacts are proposed for the delineated wetlands. By initiating the permit process as soon as possible, potential costly delays to the project may be avoided.

CERTIFICATION

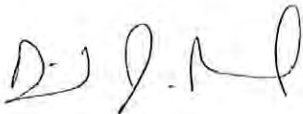
Frank Svoboda completed the above-described delineation on 5/30/14. This delineation was performed according to the procedures described by the US Army Corps of Engineers in the 1987 Wetlands Delineation Manual and the 2010 Midwest Region Supplement Wetland Delineation Manual. The delineation meets the standards and a criterion described in these manuals and conforms to the applicable standards and regulations in force at the time the delineation was completed.

Report and graphics were prepared by David Remucal (Wetland Ecologist) on this day 5/30/14. The delineation report was prepared by Frank Svoboda, President of Svoboda Ecological Resources.

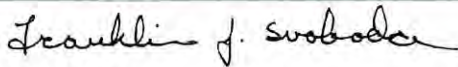
Client: Rachel Development
Project Name: 1120 Evergreen Lane
Project No.: 2014-011
Location: Plymouth, MN



Todd Ullom, Environmental Scientist/Certified Wetland Delineator



David Remucal, Wetland Ecologist



Franklin Svoboda, President

June 5, 2014
Date

DATA SOURCES

Minnesota Department of Natural Resources, Public Waters Inventory Basin Delineations, Published 7/31/2008 and retrieved from <http://deli.dnr.state.mn.us>

United States Fish and Wildlife Service National Wetland Inventory Map. Retrieved from <http://www.fws.gov/wetlands/Data/Mapper.html> on 5/28/12.

2012 Aerial Color Photos. Publicly Distributed by MN Geo WMS Service.

Topographic maps obtained via the National Geographic Society's USA Topo service through ESRI.

Web Soil Survey for Hennepin County, MN. Retrieved from <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>

LITERATURE REFERENCED

- Cowardin, L.M., V. Carter, F.C. Golet, and R.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service, FWS/OBS-79/31. 103pp.
- Eggers, Steve D. and Donald M. Reed. 2011. *Wetland Plants and Plant Communities of Minnesota and Wisconsin, Third Edition*. US Army Corps of Engineers, St. Paul District. 478pp, unclassified.
- Environmental Laboratory. 1987. *1987 U.S. Army Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.
- Gleason, H.A. and A.C. Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. New York Botanical Garden, Bronx. 910pp.
- Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. *The National Wetland Plant List: 2014 Update of Wetland Ratings*. Phytoneuron 2014-41: 1-42. http://wetland_plants.usace.army.mil/
- Shaw, S.P., and C.G. Fredine. 1956. *Wetlands of the United States*. U.S. Fish and Wildlife Service, Circular 39. 67pp.
- U.S. Army Corps of Engineers. August 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0). ERDC/EL TR-10-16. Vicksburg, MS: US Army Engineer Research and Development Center.

FIGURES

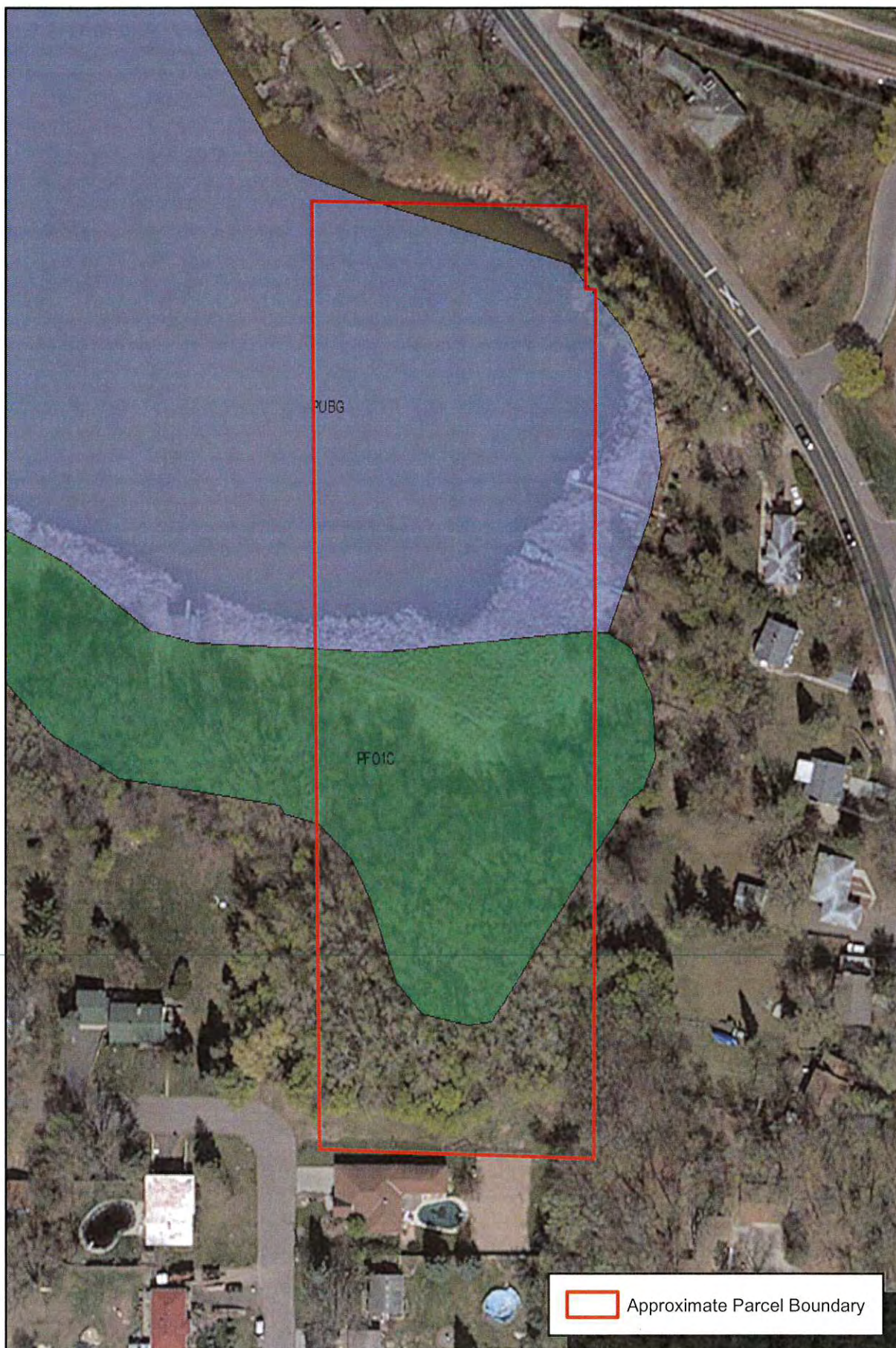


T118N R22W S26
T118N R22W S35

Overview

Overlaid on Topographic Map

Figure 1

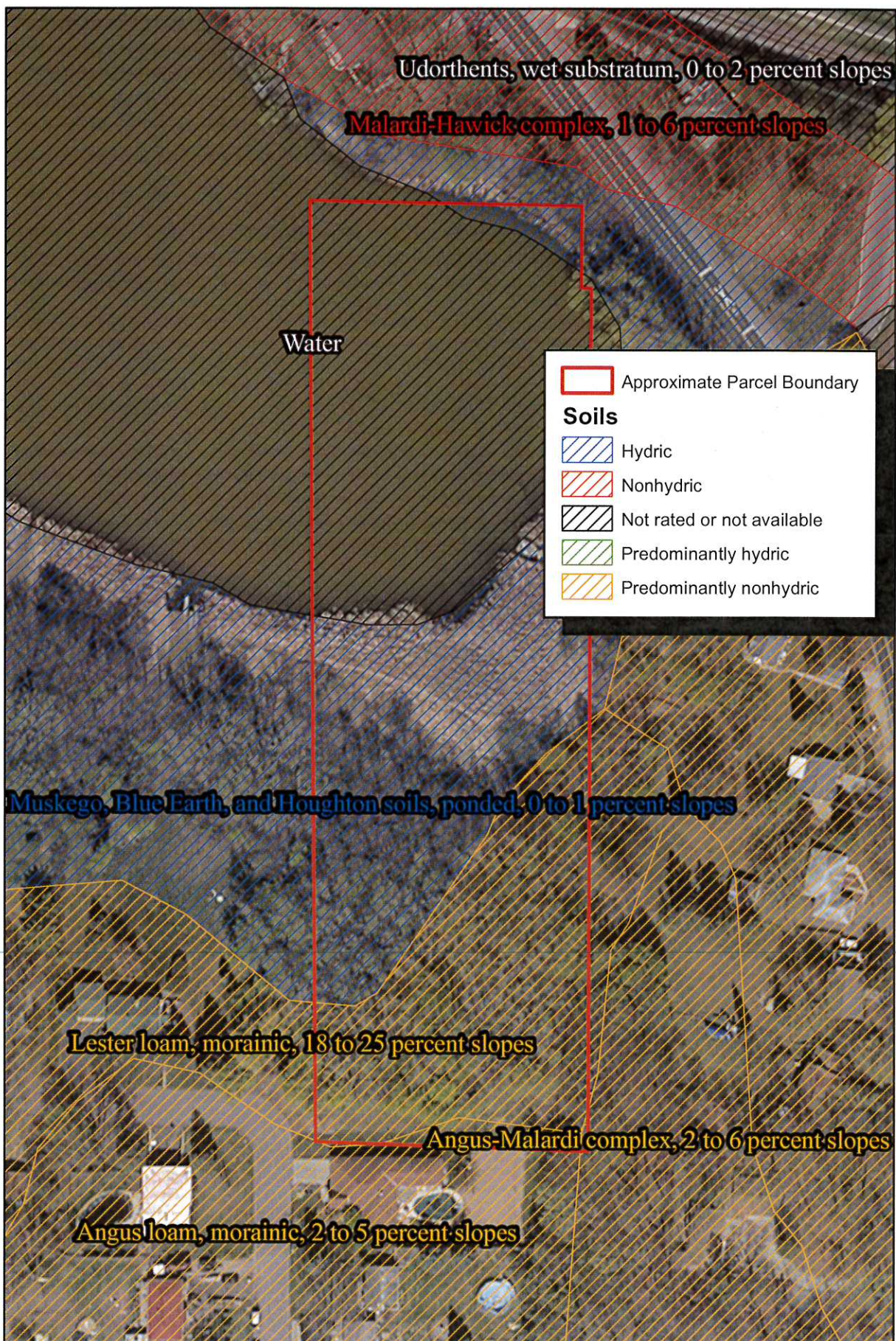


T118N R22W S26
T118N R22W S35

National Wetland Inventory

Overlaid on 2012 Aerial Photo

Figure 2



T118N R22W S26
T118N R22W S35

Hennepin County Soil Survey

Overlaid on 2012 Aerial Photo

Figure 3



T118N R22W S26
T118N R22W S35

Public Waters Inventory

Overlaid on 2012 Aerial Photo

Figure 4



T118N R22W S26
T118N R22W S35

Approximate Wetland Boundary

Overlaid on 2012 Aerial Photo

Figure 5



THE TECHNICAL DOCUMENTATION SECTION

Field Data Sheets

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site 1120 Evergreen Lane City/County: Plymouth, Hennepin Sampling Date: 5/30/2014
 Applicant/Owner: Rachel Development State: MN Sampling Point: 1-1 Upl
 Investigator(s): Svoboda Section, Township, Range: Sec 35 T118N R22W
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): None
 Slope (%): 20 Lat: Long: Datum: NAD83
 Soil Map Unit Name Lester loam, moranic 18 to 25 percent slopes NWI Classification: PFO1C

Are climatic/hydrologic conditions of the site typical for this time of the year? N (If no, explain in remarks)
 Are vegetation , soil , or hydrology significantly disturbed? Are "normal circumstances" present? Yes
 Are vegetation , soil , or hydrology naturally problematic?
SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present? <u>Y</u>	Is the sampled area within a wetland? <u>N</u> If yes, optional wetland site ID: <u></u>
Hydric soil present? <u>N</u>	
Wetland hydrology present? <u>N</u>	

Remarks: (Explain alternative procedures here or in a separate report.)
 Precipitation since 11/01/13 is 7.04" above normal as recorded at MSP by the NWS. Precipitation for the Week 5/26 to 6/1/14 was 3.04" 3.78" above normal for the preceding 4 weeks.

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across all Strata: <u>3</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B)
1	<u>Ulmus americana</u>	<u>50</u>	<u>Y</u>	<u>FACW</u>	
2	<u>Populus deltoides</u>	<u>50</u>	<u>Y</u>	<u>FAC</u>	
3					
4					
		<u>100</u>	<u>= Total Cover</u>		Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>50</u> x 2 = <u>100</u> FAC species <u>90</u> x 3 = <u>270</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>140</u> (A) <u>370</u> (B) Prevalence Index = B/A = <u>2.64</u>
Sapling/Shrub stratum	(Plot size: <u>15'</u>)				
1	<u>Rhamnus cathartica</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>	
2					
3					
		<u>40</u>	<u>= Total Cover</u>		
Herb stratum	(Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <u></u> Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u>X</u> Prevalence index is ≤3.0* Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1	<u>Arisaema triphyllum</u>	<u><1</u>	<u>Y</u>	<u>FACW</u>	
2					
3					
4					
5					
6					
7					
8					
9					
		<u>0</u>	<u>= Total Cover</u>		
Woody vine stratum	(Plot size: <u>30'</u>)				Hydrophytic vegetation present? <u>Y</u>
1	<u>Vitis riparia</u>	<u><1</u>	<u>Y</u>	<u>FACW</u>	
2					
		<u>0</u>	<u>= Total Cover</u>		

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: 1-1 Upl

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
14	10YR3/4	50					clay	Highly mixed; disturbed
14	10YR6/8	50						
18	10YR2/1	75	5YR5/8	10	C	M	Clay	Very large concretions
18	5Y5/4	10						
24	void							no resistance to probe
38	10YR3/4	50						Highly mixed and disturbed
38	10YR6/8	50						

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|---|
| ☐ Histisol (A1) | ☐ Sandy Gleyed Matrix (S4) |
| ☐ Histic Epipedon (A2) | ☐ Sandy Redox (S5) |
| ☐ Black Histic (A3) | ☐ Stripped Matrix (S6) |
| ☐ Hydrogen Sulfide (A4) | ☐ Loamy Mucky Mineral (F1) |
| ☐ Stratified Layers (A5) | ☐ Loamy Gleyed Matrix (F2) |
| ☐ 2 cm Muck (A10) | ☐ Depleted Matrix (F3) |
| ☐ Depleted Below Dark Surface (A11) | ☐ Redox Dark Surface (F6) |
| ☐ Thick Dark Surface (A12) | ☐ Depleted Dark Surface (F7) |
| ☐ Sandy Mucky Mineral (S1) | ☐ Redox Depressions (F8) |
| ☐ 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|---|
| ☐ Coast Prairie Redox (A16) (LRR K, L, R) |
| ☐ Dark Surface (S7) (LRR K, L) |
| ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) |
| ☐ Iron-Manganese Masses (F12) (LRR K, L, R) |
| ☐ Very Shallow Dark Surface (TF12) |
| ☐ Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

 Type: _____
 Depth (inches): _____
Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- | |
|--|
| ☐ Surface Water (A1) |
| ☐ High Water Table (A2) |
| ☐ Saturation (A3) |
| ☐ Water Marks (B1) |
| ☐ Sediment Deposits (B2) |
| ☐ Drift Deposits (B3) |
| ☐ Algal Mat or Crust (B4) |
| ☐ Iron Deposits (B5) |
| ☐ Inundation Visible on Aerial Imagery (B7) |
| ☐ Sparsely Vegetated Concave Surface (B8) |
| ☐ Water-Stained Leaves (B9) |

Secondary Indicators (minimum of two required)

- | | |
|---|--|
| ☐ Aquatic Fauna (B13) | ☐ Surface Soil Cracks (B6) |
| ☐ True Aquatic Plants (B14) | ☐ Drainage Patterns (B10) |
| ☐ Hydrogen Sulfide Odor (C1) | ☐ Dry-Season Water Table (C2) |
| ☐ Oxidized Rhizospheres on Living Roots (C3) | ☐ Crayfish Burrows (C8) |
| ☐ Presence of Reduced Iron (C4) | ☐ Saturation Visible on Aerial Imagery (C9) |
| ☐ Recent Iron Reduction in Tilled Soils (C6) | ☐ Stunted or Stressed Plants (D1) |
| ☐ Thin Muck Surface (C7) | ☐ Geomorphic Position (D2) |
| ☐ Gauge or Well Data (D9) | ☐ FAC-Neutral Test (D5) |
| ☐ Other (Explain in Remarks) | |

Field Observations:

Surface water present?	Yes ☐	No ☒	Depth (inches): _____
Water table present?	Yes ☐	No ☒	Depth (inches): _____
Saturation present?	Yes ☐	No ☒	Depth (inches): _____

 (includes capillary fringe)
Wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site 1120 Evergreen Lane City/County: Plymouth, Hennepin Sampling Date: 5/30/2014
 Applicant/Owner: Rachel Development State: MN Sampling Point: 1-1 Wet
 Investigator(s): Svoboda Section, Township, Range: Sec 35 T118N R22W
 Landform (hillslope, terrace, etc.): toeslope Local relief (concave, convex, none): concave
 Slope (%): 1 Lat: Long: Datum: NAD83
 Soil Map Unit Name Muskego, Blue Earth, and Houghton soils, ponded, 0 to 1 percer NWI Classification: PFO1C

Are climatic/hydrologic conditions of the site typical for this time of the year? N (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed? Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic? present?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	<u>Y</u>	Is the sampled area within a wetland <u>Y</u> If yes, optional wetland site ID: <u></u>
Hydric soil present?	<u>Y</u>	
Wetland hydrology present?	<u>Y</u>	

Remarks: (Explain alternative procedures here or in a separate report.)

Precipitation since 11/01/13 is 7.04" above normal as recorded at MSP by the NWS. Precipitation for the Week 5/26 to 6/1/14 was 3.04" 3.78" above normal for the preceding 4 weeks.

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet
1 <u>Fraxinus pennsylvanica</u>		75	Y	FACW	
2 <u>Ulmus americana</u>		15	N	FACW	
3 <u>Populus deltoides</u>		5	N	FAC	
4					
5					
		95	= Total Cover		Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>90</u> x 2 = <u>180</u> FAC species <u>65</u> x 3 = <u>195</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>155</u> (A) <u>375</u> (B) Prevalence Index = B/A = <u>2.42</u>
Sapling/Shrub stratum	(Plot size: <u>15'</u>)				
1 <u>Rhamnus cathartica</u>		60	Y	FAC	
2					
3					
4					
5					
		60	= Total Cover		
Herb stratum	(Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: Rapid test for hydrophytic vegetation ☒ Dominance test is >50% ☒ Prevalence index is ≤3.0* Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
		0	= Total Cover		
Woody vine stratum	(Plot size: <u>30'</u>)				Hydrophytic vegetation present? <u>Y</u>
1					
2					
		0	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: 1-1 Wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
18	10YR2/1	100					mucky	sapric peat
30	10YR3/4	100					fibrous	hemic peat, brownish, fibrous

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|---|
| ☒ Histisol (A1) | ☐ Sandy Gleyed Matrix (S4) |
| ☒ Histic Epipedon (A2) | ☐ Sandy Redox (S5) |
| ☐ Black Histic (A3) | ☐ Stripped Matrix (S6) |
| ☐ Hydrogen Sulfide (A4) | ☐ Loamy Mucky Mineral (F1) |
| ☐ Stratified Layers (A5) | ☐ Loamy Gleyed Matrix (F2) |
| ☐ 2 cm Muck (A10) | ☐ Depleted Matrix (F3) |
| ☐ Depleted Below Dark Surface (A11) | ☐ Redox Dark Surface (F6) |
| ☐ Thick Dark Surface (A12) | ☐ Depleted Dark Surface (F7) |
| ☐ Sandy Mucky Mineral (S1) | ☐ Redox Depressions (F8) |
| ☐ 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|---|
| ☐ Coast Prairie Redox (A16) (LRR K, L, R) |
| ☐ Dark Surface (S7) (LRR K, L) |
| ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) |
| ☐ Iron-Manganese Masses (F12) (LRR K, L, R) |
| ☐ Very Shallow Dark Surface (TF12) |
| ☐ Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

 Type: _____
 Depth (inches): _____
Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- | | |
|--|---|
| ☒ Surface Water (A1) | ☐ Aquatic Fauna (B13) |
| ☒ High Water Table (A2) | ☐ True Aquatic Plants (B14) |
| ☒ Saturation (A3) | ☐ Hydrogen Sulfide Odor (C1) |
| ☐ Water Marks (B1) | ☐ Oxidized Rhizospheres on Living Roots (C3) |
| ☐ Sediment Deposits (B2) | ☐ Presence of Reduced Iron (C4) |
| ☐ Drift Deposits (B3) | ☐ Recent Iron Reduction in Tilled Soils (C6) |
| ☐ Algal Mat or Crust (B4) | ☐ Thin Muck Surface (C7) |
| ☐ Iron Deposits (B5) | ☐ Gauge or Well Data (D9) |
| ☐ Inundation Visible on Aerial Imagery (B7) | ☐ Other (Explain in Remarks) |
| ☐ Sparsely Vegetated Concave Surface (B8) | |
| ☐ Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- | |
|--|
| ☐ Surface Soil Cracks (B6) |
| ☐ Drainage Patterns (B10) |
| ☐ Dry-Season Water Table (C2) |
| ☐ Crayfish Burrows (C8) |
| ☐ Saturation Visible on Aerial Imagery (C9) |
| ☐ Stunted or Stressed Plants (D1) |
| ☐ Geomorphic Position (D2) |
| ☐ FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes <u>X</u>	No _____	Depth (inches): <u>1</u>
Water table present?	Yes <u>X</u>	No _____	Depth (inches): <u>0</u>
Saturation present?	Yes <u>X</u>	No _____	Depth (inches): <u>0</u>

 (includes capillary fringe)
Wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

THE TECHNICAL DOCUMENTATION SECTION

Plant Indicator Status

INDICATOR CATEGORIES*

Obligate Wetland (OBL) – Occur almost always (*estimated probability >99%*) under natural conditions in wetlands.

Facultative Wetland (FACW) – Usually occur in wetlands (*estimated probability 67% - 99%*), but occasionally found in non-wetlands.

Facultative (FAC) – Equally likely to occur in wetlands or non-wetlands (*estimated probability 34% - 66%*).

Facultative Upland (FACU) – Usually occur in non-wetlands (*estimated probability 67% - 99%*), but occasionally found in wetlands (*estimated probability 1% - 33%*).

Obligate Upland (UPL) – Occur in wetlands in another region, but occur almost always (*estimated probability >99%*) under natural conditions in non-wetlands in the region specified. If a species does not occur in wetlands in any region, it is not on the National List.

*Reed, P.B. 1988. National list of plant species that occur in wetlands: Minnesota. National Wetlands Inventory, U.S. Fish and Wildlife Service, St. Petersburg, Florida.

THE TECHNICAL DOCUMENTATION SECTION

Soil Series Descriptions

Acquired from Natural Resource Conservation Service Website, Official Soil Series Descriptions

BLUE EARTH SERIES

The Blue Earth series consists of very deep, very poorly drained soils that formed in coprogenous earth in postglacial lakes and flood plains. Slopes range from 0 to 1 percent. Mean annual precipitation is about 711 mm (28 inches). Mean annual temperature is about 9 degrees C (48 degrees F).

TAXONOMIC CLASS: Fine-silty, mixed, superactive, calcareous, mesic Mollic Fluvaquents

TYPICAL PEDON: Blue Earth mucky silty clay loam with a plane level slope in the bottom of a former postglacial lake; cultivated field. (Colors are for moist soil unless otherwise noted.)

Ap--0 to 25 cm (0 to 10 inches); black (10YR 2/1) mucky silty clay loam (coprogenous earth), dark gray (5Y 4/1) dry; weak fine granular structure; very friable; few snail shells and fragments of snail shells; slightly effervescent; slightly alkaline; abrupt smooth boundary. [20 to 30 cm (8 to 12 inches thick)]

Cg--25 to 173 cm (10 to 68 inches); very dark gray (10YR 3/1) mucky silty clay loam (coprogenous earth), very dark gray (5Y 3/1) clay loam, and dark olive gray (5Y 3/2) clay loam; few fine prominent dark brown (7.5YR 3/2) and few fine dark reddish brown (5YR 3/2) Fe concentrations; massive with distinct bedding planes; very friable; snail shells ranging from few to many in different parts; strongly effervescent; slightly alkaline.

2Cg1--173 to 183 cm (68 to 72 inches); dark olive gray (5Y 3/2) clay loam; massive; friable; few snail shells; strongly effervescent; slightly alkaline; clear smooth boundary.

2Cg2--183 to 203 cm (72 to 80 inches); very dark gray (5Y 3/1) clay loam; massive; friable; common snail shells; strongly effervescent; slightly alkaline.

TYPE LOCATION: Martin County, Minnesota; about 9 miles south and 7 miles east of Fairmont; about 472 m (1,550 feet) east and 30 m (100 feet) south of the northwest corner of sec. 28, T. 101 N., R. 29 W.; USGS East Chain quadrangle; lat. 43 degrees 31 minutes 44 seconds N. and long. 94 degrees 19 minutes 16 seconds W., NAD 27.

RANGE IN CHARACTERISTICS: The thickness of the coprogenous earth and the depth to loamy glacial till or glacial lacustrine sediments ranges from 76 cm (30 to more than 203 cm (80 inches). Free carbonates are in all parts of these sediments. The coprogenous earth contains from 0 to 25 percent by volume of shell fragments.

The Ap or A horizon has hue of 10YR, 2.5Y, 5Y or neutral, value of 2 or 3 and chroma of 0 to 2. It is mucky silty clay loam, mucky silt loam, mucky silty clay, silt loam or silty clay loam. Some pedons have muck (sapric) surface layers less than 20 cm (8 inches) thick.

The Cg horizon has hue of 10YR, 2.5Y, 5Y or neutral, value of 2 to 4, and chroma of 0 to 2. It is silt loam, silty clay loam, loam, or clay loam, or mucky analogues. The sand

fraction is mostly fragments of shells. It is slightly alkaline or moderately alkaline. The calcium carbonate equivalent ranges from 5 to 40 percent.

The 2Cg horizon has hue of 2.5Y or 5Y, value of 3 to 5, and chroma of 1 or 2. It is loam, silt loam, clay loam, or silty clay loam. It contains 0 to 8 percent by volume of rock fragments of mixed lithology. It is slightly alkaline or moderately alkaline and has a calcium carbonate equivalent of 5 to 20 percent. A firm till phase of clay loam with a moist bulk density of 1.6 to 1.9 gm/cc is also recognized.

COMPETING SERIES: These are the [Moundprairie](#) and [Uturin](#) (T) series. These soils do not have coprogenous earth in the series control section.

GEOGRAPHIC SETTING: These soils have plane or slightly concave slopes with gradient of 0 to 1 percent. They are in small to large lake basins in glacial moraines, flood plains, and lacustrine plains. These basins formerly had lakes, and most of the lakes were drained since settlement. These sediments are underlain by loamy till or lacustrine sediments of the Late Wisconsin glaciation at depths of 76 cm (2.5 to more than 203 cm. Mean annual temperature is 7 to 11 degrees C (45 to 50 degrees F). Mean annual precipitation is 610 mm to 813 mm (24 to 32 inches). Frost free days range from 155 to 200. Elevations above sea level range from 213 m to 480 m (700 to 1570 feet).

GEOGRAPHICALLY ASSOCIATED SOILS: These are other poorly drained and very poorly drained mineral and organic soils within the basin and the [Clarion](#) and [Lester](#) soils and their respective topographic associates on the adjacent uplands.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Very poorly drained. Surface runoff is negligible to ponded. The saturated hydraulic conductivity, measured in cm per hour, is .05 to 5.1 (.02 to 2.0 inches) in the upper material and .05 to 1.5 (.02 to .6 inches) in the lower part. Seasonal high saturation ranges from plus 91 to 30 cm (3 to 1 foot) for undrained areas of this soil. Areas that are drained have variable depths to saturation based on the effectiveness of the drainage network.

USE AND VEGETATION: Most of this soil is cropped to corn and soybeans. Some is used for pasture or hay. Invasive vegetation (after drainage) is mostly sedges, reeds, and grasses. They lack native vegetation in the conventional sense because these soils were, until recently, sediments in the bottom of lakes.

DISTRIBUTION AND EXTENT: MLRA-103. Southern Minnesota and north-central Iowa. Moderately extensive.

MLRA OFFICE RESPONSIBLE: St. Paul, Minnesota

SERIES ESTABLISHED: Rock County, Minnesota, 1945.

REMARKS: Problems remain in the classification of these series because no taxon has been defined in Soil Taxonomy that adequately accommodates soils that have formed entirely in coprogenous earth. Diagnostic horizons and features recognized in this pedon are: Surface horizon that meets requirements of a mollic epipedon except it is underlain

by stratified C horizon. A firm till substratum is recognized in the geomorphic surface landform of the Kandiyohi till.

In the past some sloping fens were included in the concept of Blue Earth. Blue Earth is being restricted to ponded basins and lake beds.

ADDITIONAL DATA: Refer to MAES Central File Code No. 1135 for results of some laboratory analysis of a representative pedon of this series.

HOUGHTON SERIES

The Houghton series consists of very deep, very poorly drained soils formed in herbaceous organic deposits more than 51 inches thick in depressions on lake plains, outwash plains, ground and end moraines and on floodplains. These soils have moderately slow to moderately rapid permeability. Slope ranges from 0 to 2 percent. Mean annual precipitation is about 35 inches, and mean annual temperature is about 50 degrees F.

TAXONOMIC CLASS: Euic, mesic Typic Haplosaprists

TYPICAL PEDON: Houghton muck - on a level area in a cultivated field. (Colors are for moist soils unless otherwise stated.)

Oa1--0 to 9 inches; black (N 2.5/0) broken face and rubbed muck (sapric material); about 5 percent fiber, a trace rubbed; weak coarse subangular blocky structure; neutral (pH 7.0 in KCl); abrupt smooth boundary.

Oa2--9 to 13 inches; black (N 2.5/0) broken face, very dark brown (7.5YR 2/2) rubbed muck (sapric material); about 5 percent fiber, a trace rubbed; weak medium granular structure; neutral (pH 7.0 in KCl); abrupt smooth boundary.

Oa3--13 to 24 inches; dark reddish brown (5YR 3/2) broken face, dark reddish brown (5YR 2/2) rubbed muck (sapric material); about 15 percent fiber, less than 5 percent rubbed; massive, breaking to thick platy fragments; neutral (pH 7.0 KCl); abrupt smooth boundary.

Oa4--24 to 32 inches; black (5YR 2/1) broken face and rubbed muck (sapric material); about 10 percent fiber, a trace rubbed; massive; about 1 percent woody fragments; neutral (pH 7.0 in KCl); clear wavy boundary.

Oa5--32 to 48 inches; dark reddish brown (5YR 2/2) broken face, black (5YR 2/1) rubbed muck (Sapric material); about 20 percent fiber, less than 10 percent rubbed; massive, breaking to thick platy fragments; neutral (pH 7.0 in KCl); abrupt smooth boundary.

Oa6--48 to 80 inches; dark reddish brown (5YR 2/2) broken face and rubbed muck (sapric material); about 10 percent fiber, less than 10 percent rubbed; massive; slightly sticky; about 15 percent mineral soil; neutral (pH 7.0 in KCl).

TYPE LOCATION: Clinton County, Michigan; about 3 miles northeast of the village of Bath; 200 feet north and 400 feet east of the southwest corner of sec. 12, T. 5 N., R. 1 W. USGS Bath topographic quadrangle, lat. 42 degrees 49 minutes 43.4 seconds N. and long. 84 degrees 52 minutes 56.9 seconds W.; NAD 27.

RANGE IN CHARACTERISTICS: The organic layers are more than 51 inches thick. The organic fibers are derived primarily from herbaceous plants, but some pedons contain individual layers which contain as much as 30 percent woody material, however,

the woody fragment content averages less than 15 percent by volume in the control section. It is very strongly acid to slightly alkaline.

The organic layers have hue of 10YR, 7.5YR, or 5YR, value of 2 to 3, and chroma of 1 to 3, or is in 2.5/0. The layers are predominantly muck (sapric material), but in some pedons mucky peat (hemic material) has a combined thickness of less than 10 inches and peat (fibric material) less than 5 inches. Some pedons have coprogenous material or marly material below 51 inches

COMPETING SERIES: These are the Carlisle, Lena, Peteetneet, Saltese, and Semiahmoo series. Similar soils are the Adrian, Carbondale, Greenwood, Linwood, Lupton, Palms, Rifle, and Willette series. Carlisle soils derived dominantly from woody materials and contain an average of 15 to 30 percent woody fragments in the control section. Lena soils contain free carbonates throughout. Peteetneet soils are massive or platy in bottom tier, are on elevations of about 4,500 feet, and are substantially drier in the moisture control section during the 120 days following the summer solstice. Saltese and Semiahmoo soils are in areas with mild humid climates. Adrian, Linwood, Palms, and Willette soils have a mineral substrata depths ranging from 16 to about 50 inches. Carbondale, Greenwood, Lupton, and Rifle soils are frigid.

GEOGRAPHIC SETTING: Houghton soils occupy closed depressions within lake plains, outwash plains, ground and end moraines, and on floodplains. Slope gradients are less than 2 percent. The mean annual precipitation ranges from about 30 to 42 inches, and the mean annual temperature is about 48 to 53 degrees F.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Adrian, Edselton(T), Edwards, Moston(T), Muskego, Palms, and Willette soils. Edselton(T) and Edwards soils are underlain by marly material at depths of 16 to 51 inches. Moston(T), and Muskego soils are underlain by coprogenous material between 16 and 51 inches. Poorly or very poorly drained mineral soils are commonly associated along the margins of the bogs.

DRAINAGE AND PERMEABILITY: Very poorly drained. Depth to the seasonal high water table ranges from 2 foot above the surface in ponded phases to 1 foot below the surface from September to June. The potential for surface runoff is very slow or ponded. Permeability is moderately slow to moderately rapid.

USE AND VEGETATION: A considerable area of these soils is used for cropland or pasture. Common crops are onions, lettuce, potatoes, celery, radishes, carrots, mint, and some corn. Native vegetation was primarily of marsh grasses, sedges, reeds, buttonbrush, and cattails. Some water-tolerant trees were near the margin of the bog.

DISTRIBUTION AND EXTENT: MLRA 95, 98, 110, 111. Southern part of the lower peninsula of Michigan, Wisconsin, Indiana, Iowa, Minnesota, and Illinois. The series is of large extent.

MLRA OFFICE RESPONSIBLE: Indianapolis, Indiana

SERIES ESTABLISHED: Roscommon County, Michigan, 1924.

REMARKS: Diagnostic horizons and features recognized in this pedon are: Well decomposed organic material from the surface to greater than 51 inches (Oa1, Oa2, Oa3, Oa4, Oa5 and Oa6 horizons)
histic epipedon - muck from the surface to 16 inches (Oa1, Oa2, Oa3);
aquic conditions - from the surface to 40 inches.

ADDITIONAL DATA: Soil Interpretation Record - (MI0024, MI0291 (PONEED), MI0532 (SLOPING), MI0390 (MAAT>50), MI0383 (FREQUENTLY FLOODED).
Transect data (T98-MI-003) is on file in MLRA project office, Plymouth, Indiana.
Transect shows 100 percent Houghton.

LESTER SERIES

The Lester series consists of very deep, well drained soils that formed in calcareous loamy glacial till on till plains and moraines. These soils have moderate permeability. Their slopes range from 5 to 70 percent. Mean annual precipitation is about 28 inches. Mean annual temperature is about 47 degrees F.

TAXONOMIC CLASS: Fine-loamy, mixed, superactive, mesic Mollic Hapludalfs

TYPICAL PEDON: Lester loam with a convex slope of about 9 percent on a ground moraine in a cultivated field. (Colors are for moist soil unless otherwise noted.)

Ap--0 to 7 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; many fine roots; about 3 percent gravel; slightly acid; abrupt smooth boundary. (6 to 10 inches thick)

Bt1--7 to 21 inches; brown (10YR 4/3) clay loam; moderate medium subangular blocky structure; firm; many very fine roots; common very dark grayish brown (10YR 3/2) clay films on faces of peds and few very dark gray (10YR 3/1) organic coats on faces of peds; about 2 percent gravel; slightly acid; clear smooth boundary.

Bt2--21 to 38 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; friable; common fine roots; common dark grayish brown (10YR 4/2) clay films on faces of peds and few very dark brown (10YR 2/2) organic coats on faces of peds; about 3 percent gravel; slightly acid; gradual smooth boundary. (Combined Bt horizon is 10 to 40 inches.)

Bk1--38 to 50 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; few fine roots; common very pale brown (10YR 8/2) carbonate threads; about 2 percent gravel; violently effervescent; slightly alkaline; clear wavy boundary.

Bk2--50 to 60 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; common fine distinct yellowish brown (10YR 5/6) relict Fe concentrations; common very pale brown (10YR 8/2) carbonate threads; about 2 percent gravel; violently effervescent; slightly alkaline; clear wavy boundary.

C--60 to 80 inches; yellowish brown (10YR 5/4) loam; ; massive; friable; common medium distinct yellowish brown (10YR 5/6) relict Fe concentrations and few fine distinct light brownish gray (10YR 6/2) relict Fe depletions; about 1 percent gravel; strongly effervescent; slightly alkaline.

TYPE LOCATION: Wright County, Minnesota; about 3 miles west of Otsego, 1460 feet south and 200 feet west of the northeast corner of Sec. 15, T.121 N., R.24 W.; USGS Big Lake quadrangle; lat. 45 degrees 17 minutes 29 seconds N.; long. 93 degrees 41 minutes 3 seconds W., NAD27

RANGE IN CHARACTERISTICS: Depth to free carbonates ranges from 20 to 54 inches. Rock fragments of mixed lithology comprise 1 to 8 percent of the volume of the control section.

The A or Ap horizons have hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The E horizon where present, has value of 3 to 5, and chroma of 1 to 3. The A and E horizons are loam or clay loam, but sandy loam, fine sandy loam, or silt loam is within the range. They range from moderately acid to neutral.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 or 4. It is clay loam or loam and has 24 to 35 percent clay and 30 to 45 percent sand. The B/A clay ratios range from 1.2 to 1.4. It is strongly acid to slightly acid in the upper part and moderately acid to neutral in the lower part. A Bw horizon is sometimes present below the Bt.

The Bk horizon has hue of 10YR or 2.5YR, value of 4 or 5, and chroma of 3 to 6. The Bk horizon is loam or clay loam. It is slightly alkaline or moderately alkaline. Relict redoximorphic features are present in some pedons.

The C horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 3 to 6. It is loam or clay loam. It is slightly alkaline or moderately alkaline. Relict redoximorphic features are present in some pedons.

COMPETING SERIES: These are the [Angus](#), [Argyle](#), [Baltimore](#), [Bassett](#), [Blooming](#), [Caleb](#), [Dowagiac](#), [Dunbridge](#), [Gara](#), [Koronis](#), [Lauramie](#), [Longlois](#), [Lydick](#), [Mohawk](#), [Neda](#), [Newcomer](#), [Oneco](#), [Orwood](#), [Racine](#), [Razort](#), [Sebbo](#), [Taopi](#), [Waucoma](#), and [Winneshiek](#) soils in the same family. Angus and Sebbo soil have saturation in the lower third of the series control section. Argyle, Baltimore, and Oneco soils have B horizons with 7.5YR or redder hue. Bassett soils are very strongly acid to moderately acid in the upper part of the Bt horizon. Blooming and Racine soils have 15 to 35 percent sand in the upper part of the particle-size control section. Caleb soils have some subhorizons that have more than 45 percent in the lower part of the control section. Dowagiac and Koronis soils have less than 24 percent clay in the lower one third of the particle-size control section. Dunbridge, Waucoma, Newcomer and Winneshiek soils have sola terminated by bedrock at depths above 60 inches. Gara soils average less than 2 percent rock fragments in the control section. Longlois, Lydic, and Neda soils have more than 8 percent rock fragments in some subhorizon of the control section. Lauramie soils have more than 45 percent sand in some subhorizon in the middle part of the control section. Mohawk soils have a higher content of silt and have dark colors in the B horizon which apparently are inherited from dark shale. Orwood soils have no rock fragments in the particle-size control section. Razort soils have less than 30 percent sand in the control section.

GEOGRAPHIC SETTING: These soils have convex slopes on moraines and till plains. Slope gradients range from 5 to 70 percent. They formed in calcareous, loamy glacial till of late Wisconsinan Age. Mean annual temperature ranges from 45 degrees to 52 degrees F. Mean annual precipitation ranges from 25 to 33 inches. Frost free days range from 125 to 165. Elevations range from 700 to 1600 feet.

GEOGRAPHICALLY ASSOCIATED SOILS: These include the [Cordova](#), [Dundas](#), [Glencoe](#), [Hamel](#), [Houghton](#), [Klossner](#), [Le Sueur](#), [Muskego](#), and [Nessel](#) soils. Poorly drained Cordova and somewhat poorly and poorly drained Dundas soils are on flats and upper drainageways with a high seasonal water table. Very poorly drained Glencoe,

Houghton, Klossner, and Muskego soils are mostly in depressions. Poorly drained Hamel soils are on foot and toe slopes. Moderately well drained Le Sueur and Nessel soils are on slightly elevated flats and gently convex slopes.

DRAINAGE AND PERMEABILITY: Well drained. Permeability is moderate. Runoff is medium to high.

USE AND VEGETATION: Mostly cropped to corn and soybeans. Some is in pasture and forest. Native vegetation is savanna.

DISTRIBUTION AND EXTENT: South-central and east-central Minnesota and northeastern Iowa. Extensive.

MLRA OFFICE RESPONSIBLE: St. Paul, Minnesota

SERIES ESTABLISHED: Dakota County, Minnesota, 1945.

REMARKS: Diagnostic horizons and featured recognized in this pedon are: mollic subgroup - the zone from the surface to 7 inches (Ap horizon); argillic horizon - the zone from 7 to 38 inches (Bt horizons). Type location moved from Waseca County, Mn. to Wright County, Mn., 11/96 to better exemplify the series concept within the MLRA. Slopes of 1 to 5 percent that were previously correlated as Lester may be included with the Angus series in the future.

MUSKEGO SERIES

The Muskego series consists of very deep, very poorly drained soils formed in herbaceous organic material over coprogenous limnic material (sedimentary peat) on glacial lake plains and flood plains. These soils have moderate or moderately rapid permeability in the herbaceous organic material and slow permeability in the coprogenous material. Slopes range from 0 to 2 percent. Mean annual precipitation is about 30 inches near the typical pedon site. Mean annual temperature is about 49 degrees F.

TAXONOMIC CLASS: Coprogenous, euic, mesic Limnic Haplosaprists

TYPICAL PEDON: Muskego muck - on a slope of less than 1 percent in a cultivated field at an elevation of about 815 feet. (Colors are for moist soil unless otherwise stated.)

Oap--0 to 9 inches; black (10YR 2/1) broken face and rubbed muck (sapric material); about 25 percent fiber, 4 percent rubbed; moderate very thick platy structure parting to moderate fine subangular blocky; friable; many fine roots; mostly herbaceous fiber; neutral; abrupt smooth boundary.

Oa1--9 to 14 inches; black (10YR 2/1) broken face muck (sapric material); about 30 percent fiber, 5 percent rubbed; moderate very thick platy structure parting to moderate fine subangular blocky; friable; many fine roots; mostly herbaceous fiber; neutral; abrupt smooth boundary.

Oa2--14 to 30 inches; dark brown (7.5YR 3/2) broken face muck (sapric material) with few thin (less than 1 inch) layers of mucky peat (hemic material); about 50 percent fiber, 7 percent rubbed; weak thin platy structure; few fine roots; slightly acid; gradual smooth boundary.

Lco1--30 to 48 inches; dark olive gray (5Y 3/2) coprogenous material with fine thin (less than 1 inch) lenses of yellowish brown (10YR 5/6) mucky peat (hemic material); weak very thin platy structure; slightly plastic; neutral; diffuse smooth boundary.

Lco2--48 to 60 inches; very dark grayish brown (2.5Y 3/2) coprogenous material; massive; slightly plastic; slightly alkaline.

TYPE LOCATION: Ozaukee County, Wisconsin; about 1 mile east and 2 1/2 miles south of Fredonia; 2,500 feet north and 500 feet west of the southeast corner of sec. 11, T. 11 N., R. 21 E. or 350 feet north and 375 feet west of end of farmstead driveway; USGS Fort Washington topographic quadrangle; latitude - 43 degrees, 25 minutes, 58 seconds N. and longitude - 37 degrees, 56 minutes, 34 seconds W. NAD 27.

RANGE IN CHARACTERISTICS: Thickness of the herbaceous organic layers and depth to coprogenous material (sedimentary peat) ranges from 16 to 51 inches. Fibers are derived primarily from herbaceous plants. Some pedons contain fragments of twigs, branches, or logs that range from 1/8 to 5 inches in diameter and amount to less than 15 percent of the volume. Reaction ranges from strongly acid to neutral (water, 1:1) in the surface tier and from strongly acid to slightly alkaline (water, 1:1) in the subsurface and

bottom tiers. Silty clay loam overwash, clay loam substratum, marshy (ponded), and flooded phases are recognized in some places.

The surface tier has hue of 10YR, 7.5YR, or neutral, value of 2 or 3 and chroma of 0 to 2. The herbaceous organic part of the subsurface and bottom tiers has hue of 5YR, 7.5YR or 10YR or is neutral in hue. Value is 2 or 3 and chroma is 0 to 4. It is dominantly muck (sapric material), but some pedons have layers of mucky peat (hemic material) up to 10 inches thick.

The Lco horizon has hue of 10YR, 2.5Y, 5Y, or 5GY, value of 2 to 5 and chroma of 1 to 3. It is coprogenous material. Reaction ranges from neutral to moderately alkaline and carbonates are present in some pedons. The Lco horizon has slightly plastic consistence and shrinks upon drying to form hard clods that are difficult to re-wet.

COMPETING SERIES: These are the Moston and Toto series. Moston soils have sand below the limnic layer within the 51 inch control section. Toto soils have marl and sand below the limnic layer within the 51 inch control section.

GEOGRAPHIC SETTING: The Muskego soils commonly are in depressional areas principally associated with glacial lake plains and flood plains, but other geographical locations are not excluded. Slope ranges from 0 to 2 percent. These soils formed in herbaceous organic material dominantly from grasses, sedges, and reeds over coprogenous limnic material (sedimentary peat). Mean annual temperature ranges from 46 to 52 degrees F. Mean annual precipitation ranges from 25 to 40 inches. The frost free period ranges from about 130 to 180 days. Elevation ranges from 679 to 1400 feet.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Houghton and Klossner series. Houghton soils are in nearby areas where the organic deposits are more than 51 inches thick and coprogenous material is not in the lower part of the control section. Klossner soils are in areas where the coprogenous material is absent and the herbaceous organic material is underlain by loamy mineral material.

DRAINAGE AND PERMEABILITY: Very poorly drained. The potential for surface runoff is low or negligible. Permeability is moderate or moderately rapid in the herbaceous sapric material and slow in the coprogenous material (sedimentary peat). Most Muskego soils have an apparent water table from 1 foot above the surface to 1 foot below the surface in most years for much of the period from November to August. Some Muskego soils have an apparent water table from 3 feet to 1 foot above the surface in most years for much of the period from January to December.

USE AND VEGETATION: Most areas remain in natural vegetation and provide wildlife habitat. Natural vegetation is dominantly grasses, reeds, and sedges with scattered hardwoods. A few areas have been drained and are used cropland.

DISTRIBUTION AND EXTENT: Southern Wisconsin and southern Minnesota and in Illinois, Indiana, Iowa, and Ohio. MLRA 95B, 98, 102A, 103, 104, 105, 108, 110, 111, 114, and 144A. The Muskego soils are of moderate extent.

MLRA OFFICE RESPONSIBLE: Indianapolis, Indiana

SERIES ESTABLISHED: Ozaukee County, Wisconsin, 1971.

REMARKS: Diagnostic horizons and features recognized in this pedon are: sapric materials dominant in the subsurface tier; saturated with water for 6 months or more of the year; have a limnic layer (coprogenous material) greater than 5 cm thick within the control section.

ADDITIONAL DATA: Soil Interpretation Records - WI0046; WI0335 (OVERWASH); WI0437 (MARSHY); WI0462 (CLAY LOAM SUBST.); WI0520 (FLOODED).

Photo Log

1120 Evergreen Lane Plymouth, MN

Photo 1: View of the wetland boundary facing east. Areas to the right of the pink flagging are upland and areas to the left are wetland.



Photo 2: View of the wetland boundary facing west. Areas to the right of the pink flagging are wetland and areas to the left are upland.



Photo 3: View of wetland boundary 1A facing southwest. The upland area also has hydric soil and one primary indicator of hydrology.

