Sanford Dam –

Midland County, Michigan

Four Lakes Task Force and Spicer Group, Inc.

Wetland Delineation Report

Prepared by:

merjent

April 2021

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ACRONYM LIST

ESRI	Environmental Systems Research Institute
FLTF	Four Lakes Task Force
GIS	Geographic Information System
GPS	Global Positioning System
Merjent	Merjent, Inc.
NHD	National Hydrography Dataset
NWI	National Wetland Inventory
OHWM	Ordinary High-Water Mark
PEM	Palustrine Emergent
PFO	Palustrine Forest
Spicer	Spicer Group, Inc.
USACE	U.S. Army Corps of Engineers
USDA-NRCS	U.S. Department of Agriculture-National Resource Conservation Service
USGS	U.S. Geological Survey
WETS	Climate Analysis for Wetlands Tables

1.0 INTRODUCTION

Merjent performed a wetland delineation in Midland County, Michigan, for FLTF and Spicer's Sanford Dam project (Project).

In May 2020, Midland and Gladwin Counties experienced an extreme rainfall event that led to the catastrophic failure of the Edenville and Sanford Dams on the Tittabawasee River. This event led to the drawdowns of Secord, Smallwood, Wixom, and Sanford Lakes. Following the dam failures, the FLTF was formed and acquired the Edenville, Sanford, Secord, and Smallwood Dams located along the Tittawabasee River. The FLTF retained Spicer to initiate a Recovery and Feasibility Study and Design Phase to explore options for maintenance at Secord and Smallwood Dams, and restoration at Edenville and Sanford Dams. This will be followed by a Restoration Phase planned to be completed by 2026.

The wetland delineation report will be used to support future maintenance and restoration activities, planning, and identify potential project permits. The associated survey area is depicted in all accompanying figures.

Based on a field investigation conducted by Merjent on March 16, 2021, and review of desktop resources, it is our professional opinion that five wetlands totaling 0.95 acres (Table 1-1) exists within the 27.37-acre survey area.

TABLE 1-1

Summary of Wetlands

Wetland ID	Cowardin Classification	Size (sq. ft.)	Size (acres)
w01	PEM	19,374	0.44
w02	PEM	1,103	0.03
w03	PEM	1,272	0.03
w04	PFO	9,926	0.23
w05	PEM	9,511	0.22
	Total	**41,186**	**0.95**

This report outlines the wetland delineation investigation, methodology, and its findings as completed by Merjent. This report has been compiled by the following staff that are trained and experienced in delineation methodologies and applicable regulations:

- **Erin Vander Stelt – Environmental Analyst; Report Author**

  Erin Vander Stelt is an Environmental Analyst specializing in environmental field surveys and desktop reviews for threatened and endangered species, wetland delineations, and floristic quality inventories in the upper Midwest. She has over a decade of experience and training in plant identification and habitat assessments in the upper Midwest and six years of experience serving oil and gas, private, academic, electric, transportation, and development sectors as well as state and federal agencies.

- **Robb Roos – Senior Environmental Analyst; Field Lead**

  Robb has worked in the fields of wetland ecology and ecological restoration for over ten years. He holds a Master of Science degree in Biology from Grand Valley State University. Robb has led wetland delineation and threatened and endangered species survey field

teams for over ten years on projects throughout the Midwest and has also completed, and instructs, State- and USACE-based wetland delineation trainings. He is currently certified as a Wetland Professional by the Society of Wetland Scientists and leads wetland delineations, habitat surveys, report writing, and permitting while managing a variety of projects.

- **Becky Norris – Environmental Analyst; GIS Analyst**

  Ms. Norris is a GIS Analyst and Field Biologist with over six years of experience in GIS, data analysis, and technical support for several projects throughout the United States. Ms. Norris regularly conducts and performs GIS management for wetland delineations, habitat assessments, and other field surveys. In particular, she specializes in preparing comprehensive environmental impact analysis reports for federal and state permit applications.

2.0 METHODS

2.1 BACKGROUND INFORMATION

Desktop resources were used to identify potential wetlands on the site. Sources of information that were consulted to identify potential wetlands within the survey area prior to field investigation are listed below:

- USGS Topographical Map (Figure 2)
- NWI (Figure 3)
- NHD (Figure 3)
- USDA-NRCS Web Soil Survey Database for Midland County, Michigan (Figure 4)
- ESRI Basemap 2016 Aerial Imagery (Figure 5)
- Google Earth™ Aerial Imagery (multiple years)

2.2 INVESTIGATION METHODOLOGY

The delineation of wetlands and other waters of the state were based on the methodology described in the U.S. Army Corps of Engineers Wetland Delineation Manual (Environmental Laboratory, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast, as required by current policy. Waterways were identified in accordance with the USACE Jurisdictional Determination Form Instructional Guidebook (USACE-U.S. Environmental Protection Agency, 2007).

Prior to the field work, background information was reviewed to establish the potential location of wetlands and waterways within the survey area. Next, a general reconnaissance of the entire survey area was conducted to evaluate site conditions. On March 16, 2021, the survey area was walked with the specific intent of determining wetland boundaries. Data points were sampled during this time at locations within and near the wetland areas to document soil characteristics, evidence of hydrology, and dominant vegetation. Vegetative community boundaries were identified according to the Cowardin Classification System (Cowardin et al., 1979).

2.2.1 Naming Protocol

Features identified in associated figures and appendices are named in the following manner:

- Wetlands (w01, w02, etc.)
- Streams (s01, s02, etc.)
- Data points (dp01, dp02, etc.)
- Photo points (pp01, pp02, etc.)

2.2.2 Site Photographs

Photographs (Appendix A) provide a visual representation of wetland communities and boundaries, as well as general site conditions at the time of inspection. Photos are geospatially referenced by their associated photo point location and presented with direction taken (e.g., “pp01 view West,” “pp02 view Northeast”). Photo point locations are depicted in the wetland delineation figure (Figure 5).

2.2.3 Delineation Data Sheets

The wetland determination data forms (Appendix B) are the written documentation of how representative data points meet or do not meet each of the wetland criteria (USACE, 2011). Plant species nomenclature follows the Regional Wetland Plant List (USACE, 2018). Soils were identified using the methods outlined in Field Indicators of Hydric Soils in the United States, Version 8.2 (USDA-NRCS, 2018).

2.2.4 Survey of Wetland Boundary

Merjent surveyed all data point locations and wetland boundaries using GPS technology capable of sub-meter accuracy. While these surveys provide reasonably accurate spatial data, they do not provide the same level of accuracy as a professional land survey. Wetland boundaries were flagged during the field survey where acquisition of more precise survey data by Spicer was required.

3.0 RESULTS AND DISCUSSION

3.1 DESKTOP REVIEW

3.1.1 USGS Topographic Map

The USGS topographic map (Figure 2) shows gently sloping areas on either side of the Tittabawassee River. Steep slopes exist along the edges of the Sanford Dam berm.

3.1.2 Soil Survey

The USDA-NRCS soil map of the survey area (Figure 4) identified eight soil types, three of which are hydric (Table 3-1).

TABLE 3-1

Mapped Soil Units

Symbol	Description	Hydric Soil Unit?	Acres
AeB	Aquents	Yes	0.47
Ch	Cohoctah fine sandy loam, gravelly substratum	Yes	2.23
CoB	Covert sand, 0 to 6 percent slopes	No	1.02
CsB	Covert sand, loamy substratum, 0 to 6 percent slopes	No	0.06
InB	Ingersoll silt loam, 0 to 3 percent slopes	No	0.91
MeB	Menominee sand, 2 to 6 percent slopes	No	3.00
Sz	Sloam loam	Yes	10.41
W	Water	Unranked	9.27
		Total	**27.37**

3.1.3 Mapped Wetlands

The NWI map of the survey area (Figure 3) shows approximately 8.25 acres of wetlands (Table 3-2). The lacustrine wetland area is mapped in the historic Sanford Lake lakebed above Sanford Dam. The riverine wetland is mapped in the Tittabawassee River course.

TABLE 3-2

Mapped NWI Features

Symbol	Description	Acres
L1UBHh	Lacustrine limnetic, unconsolidated bottom, permanently flooded, diked/impounded	1.42
PSS1C	Palustrine scrub-shrub, broad-leaved deciduous, seasonally flooded	1.81
R2UBH	Riverine lower perennial, unconsolidated bottom, permanently flooded	5.02
	Total	**8.25**

3.1.4 Current, Historic, and High-Resolution Aerial Imagery

Multiple sources of historic aerial imagery were reviewed to evaluate the survey area for wetland signatures. Based on this review, possible wetland signatures were identified throughout the survey area.

3.1.5 Recent Climatic Conditions and Precipitation Data

Recent precipitation data were compared with historic precipitation data from a 50-year dataset (1971-2021) from a nearby WETS weather station (Midland, MI) to determine if normal hydrologic and climatic conditions were present on-site during the delineation (USDA, accessed March 2021). When compared, the observed precipitation data from three months prior to the delineation indicated normal precipitation conditions at the time of the delineation (Table 3-3).

TABLE 3-3

WETS Analysis

	Long-term rainfall records (1971-2021)								
WETS Station MIDLAND, MI	**Month**	**<30%**	**Mean**	**>30%**	**Actual**	**Condition**	**Condition Value**	**Weight**	**Value X Weight**
3rd Prior Month	December	1.34	2.02	2.43	**2.61**	Wet	3	1	3
2nd Prior Month	January	1.06	1.63	1.96	**1.19**	Normal	2	2	4
1st Prior Month	February	0.84	1.55	1.89	**1.08**	Normal	2	3	6
								Sum:	**13**
								Conditions On Site:	**Normal**

If sum is:		**Condition Values:**
6 to 9	then prior period has been drier than normal	(1) Dry
10 to 14	then prior period has been normal	(2) Normal
15 to 18	then prior period has been wetter than normal	(3) Wet

3.2 GENERAL SITE CONDITIONS

Based on the field survey and review of desktop resources, it is our professional opinion that five wetlands totaling 0.95 acres and one waterway exist within the survey area (Figure 5). Descriptions of the wetlands and waterways are provided below.

Land use on site includes Sanford Lake to the northeast and the Tittabawassee River that runs east to west through the south portion of the survey area. North of the river is an undeveloped forested upland with two wetland areas as well as a large area of scarification from prior flooding. South of the river is mowed/maintained lawn, parking/staging areas, and gravel drives.

3.2.1 Uplands

Majority of the upland areas with the survey area are forested or mowed/maintained lawn and gravel drives. The forested areas are north of the Tittabawassee River. The tree stratum is dense with eastern cottonwood (*Populus deltoides*), paper birch (*Betula papyrifera*), eastern white pine (*Pinus strobus*), quaking aspen (*Populus tremuloides*), and northern red oak (*Quercus rubra*). The shrub layer is moderately vegetated with saplings of the tree layer, common buckthorn (*Rhamnus cathartica*), American witch hazel (*Hamamelis virginiana*), honeysuckle species (*Lonicera* spp.), and Russian olive (*Elaeagnus angustifolia*). The herb layer is sparsely vegetated with common buckthorn sprouts, farewell-summer (*Symphyotrichum lateriflorum*), and Pennsylvania sedge (*Carex pennsylvanica*). Forested areas were majority upland with some small wetland depressions.

South of the Tittabawassee River, along the banks of the river, and along the Sanford Dam berm was mowed/maintained lawn. The herb layer of these areas was densely vegetated with Kentucky

blue grass (*Poa pratensis*), smooth brome (*Bromus inermis*), English plantain (*Plantago lanceolata*), and orchard grass (*Dactylis glomerata*).

3.2.2 Wetlands

A total of five wetlands were identified to community type within the survey area (Figure 5) according to Cowardin classification (Appendix C). Summaries of these features are provided below (Table 3-4), and more detailed information for associated data points may be found in wetland determination forms (Appendix B).

TABLE 3-4

Delineated Wetlands

Wetland ID	Community Type	Acreage	Hydrology Indicators	Dominant Vegetation	Hydric Soil Indicators	Associated Data Points
w01	PEM	0.44	Wetland w01 was hydrologically connected to w05 and exhibited similar characteristics. A separate data point was not recorded for w01.	-	-	dp03
w02	PEM	0.03	Wetland w02 was hydrologically connected to w05 and exhibited similar characteristics. A separate data point was not recorded for w02.	-	-	dp03
w03	PEM	0.03	Wetland w03 was hydrologically connected to w05 and exhibited similar characteristics. A separate data point was not recorded for w03.	-	-	dp03
w04	PFO	0.23	High Water Table (A2), Saturation (A3), Water-Stained Leaves (B9), Geomorphic Position (D2), and FAC-Neutral Test (D5)	Brome-like sedge (*Carex bromoides*, FACW), sandbar willow (*Salix interior*, FACW)	Depleted Below Dark Surface (A11), Redox Dark Surface (F6)	dp05
w05	PEM	0.22	High Water Table (A2), Saturation (A3), Geomorphic Position (D2), and FAC-Neutral Test (D5)	Sandbar willow	Sandy Redox (S5), Depleted Matrix (F3)	dp03

3.3 WATERWAYS

Merjent determined that one waterway exists within the survey area. The Tittabawassee River flows east to west through the breach in the prior dam berm. The delineated waterway boundaries are approximate due to unsafe, unstable terrain and steep slopes that limited access to the waterway boundaries. Representative photographs of the Tittabawassee River are provided in Appendix A.

3.4 OTHER WATER RESOURCES IDENTIFIED

Sanford Lake is located north and east of Sanford Dam. The Tittabawassee River runs through the Sanford Lake basin. The lake basin is reduced from its historic size on the west edge due to a drawdown of the impoundment caused by the dam breach. Approximate current Sanford Lake margins are shown in Figure 5. The delineated Sanford Lake boundaries are approximate due to unsafe, unstable terrain and steep slopes that limited access to the old lake bottom.

4.0 SUMMARY AND CONCLUSION

On behalf of Spicer and the FLTF, Merjent performed a wetland delineation for the Sanford Dam project in Midland County, Michigan.

Based on the field survey, it is our professional opinion that five wetlands totaling 0.95 acres and one waterway exists within the 27.37-acre survey area. This report represents our best professional judgment based on our local knowledge and experience.

5.0 DISCLAIMER

The wetlands identified for this report may be subject to regulation by federal, state, and/or local jurisdiction. These authorities may require a professional land survey of the delineated boundaries to verify impacts for regulatory purposes.

The field survey results presented herein apply to the existing and reasonably foreseeable site conditions at the time of the assessment. They cannot apply to site changes of which Merjent is unaware and has not had the opportunity to review. Changes in the condition of a property may occur with time due to the natural processes or human impacts at the project site or on adjacent properties. Changes in applicable standards may also occur as a result of legislation or the expansion of knowledge over time. Accordingly, the findings of this report may be invalidated, wholly or in part, by changes beyond the control of Merjent.

6.0 LITERATURE CITED

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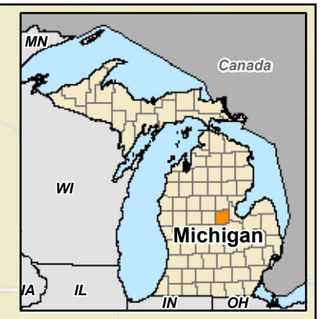
Figure 1

Location Map



0 1,000 2,000
Feet

N
W E
S

For Environmental Review Purposes Only

Project Location
Sanford Dam Site
Spicer Group
Midland County, Michigan

Survey Area

merjent

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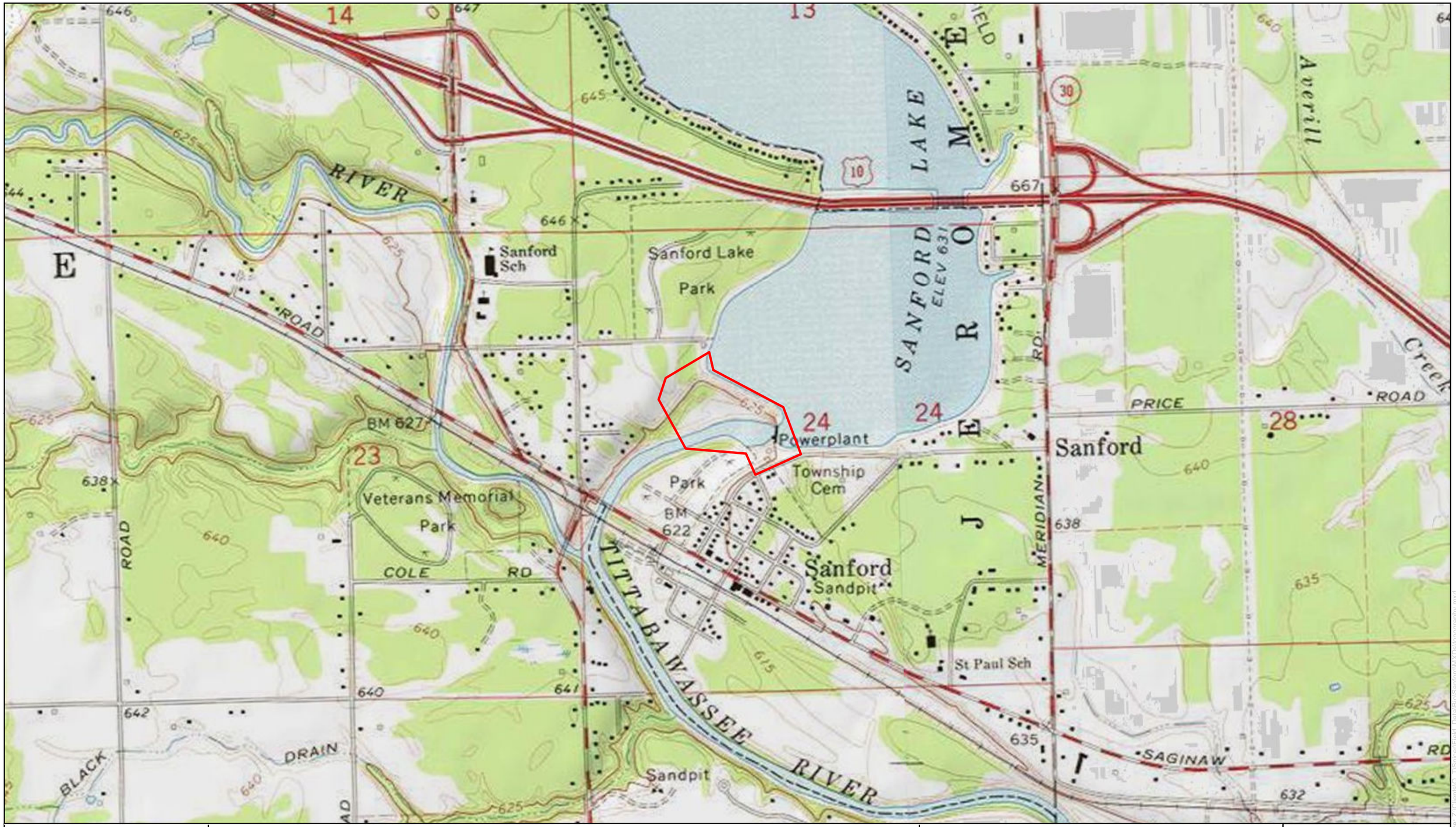
Date: (3/29/2021)

Figure 2

Topography



0 500 1,000
Feet

N
W E
S

For Environmental Review Purposes Only

Topography
Sanford Dam Site
Spicer Group
Midland County, Michigan

Survey Area

merjent

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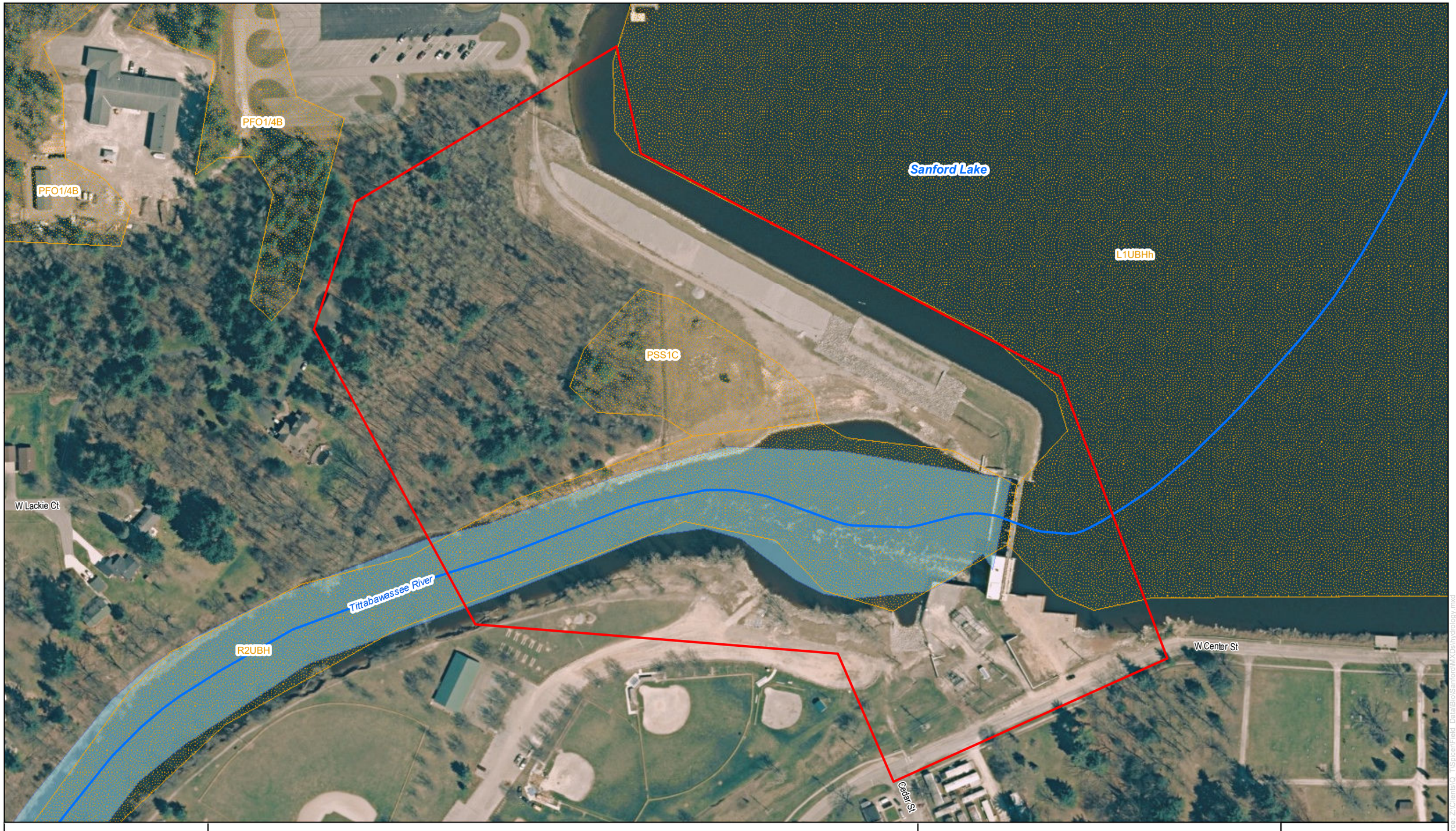
Figure 3

Hydrology



0 100 200
Feet

N
W E
S

For Environmental Review Purposes Only

Hydrology
Sanford Dam Site
Spicer Group
Midland County, Michigan

Survey Area
NWI Wetland
NHD Waterway
NHD Waterbody

merjent

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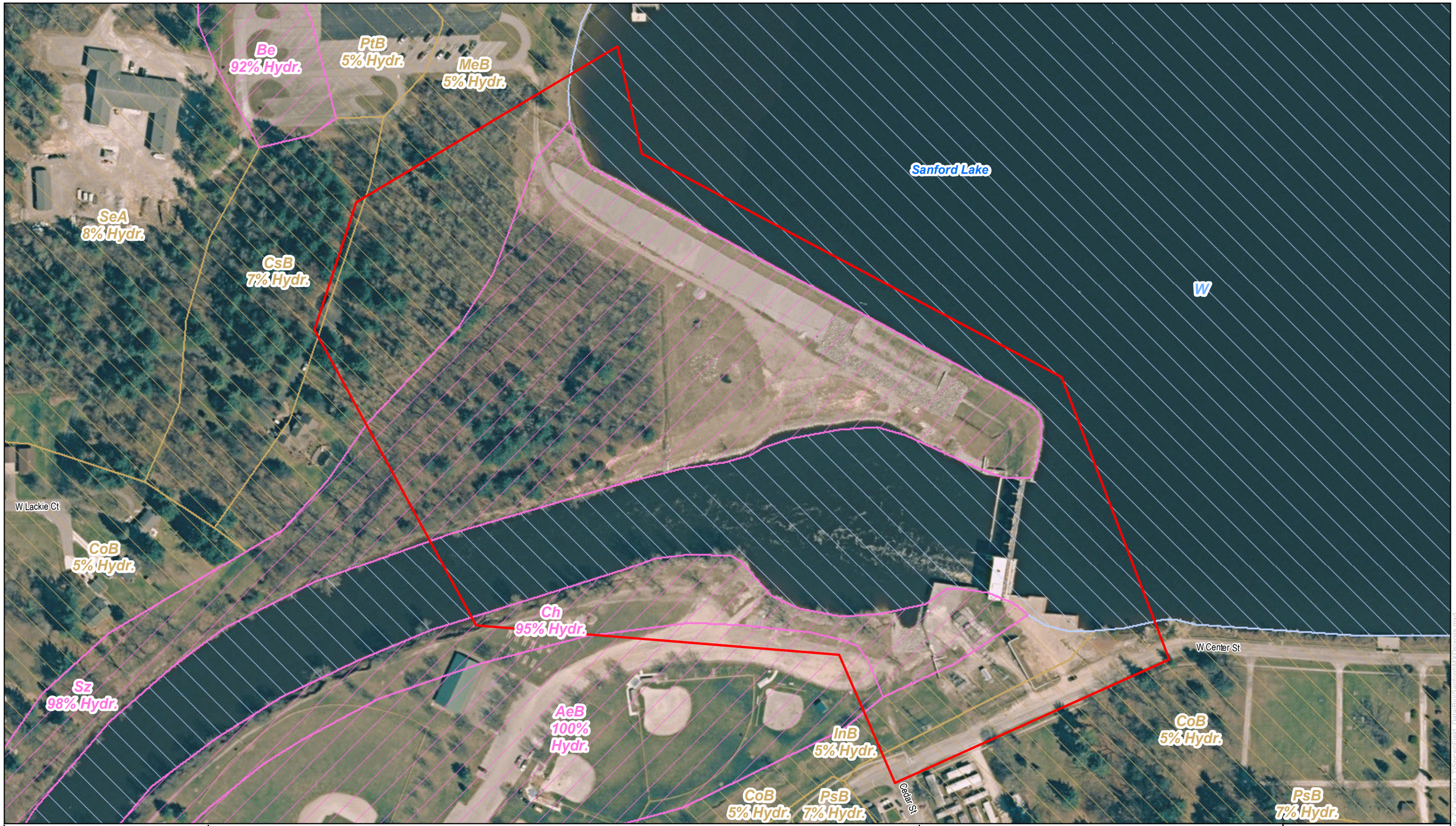
Figure 4
SSURGO Soil Type



0 100 200
Feet

N
W E
S

For Environmental Review Purposes Only

SSURGO Soil Type
Sanford Dam Site
Spicer Group
Midland County, Michigan

Survey Area
Hydric Soil
Non-Hydric Soil
Water

merjent

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Figure 5
Wetland Delineation

*Some delineated waterway boundaries are approximate; as unsafe/unstable terrain and steep slopes limited access to old lake bottom areas.

w01
w02
w03
w04
w05
pp01
pp02
pp03
pp04
pp05
pp06
pp07
pp08
pp09
pp10
pp11
pp12
pp13
pp14
pp15
pp16
pp17
pp18
pp19
pp20
pp21
pp22
dp01
dp02
dp03
dp04
dp05
W Center St
Cedar St

0 75 150
Feet

N
W E
S

For Environmental Review Purposes Only

Wetland Delineation
Sanford Dam Site
Spicer Group
Midland County, Michigan

Survey Area
Photo Point
Wetland Data Point
Delineated Waterway*
PEM Wetland
PFO Wetland

merjent

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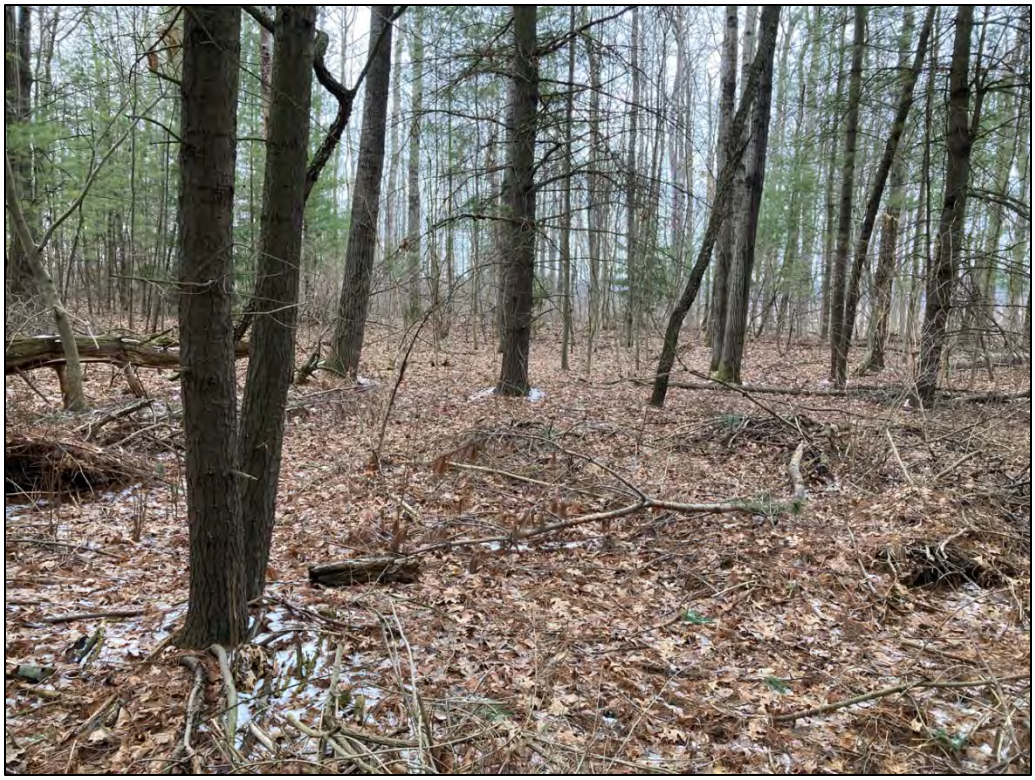
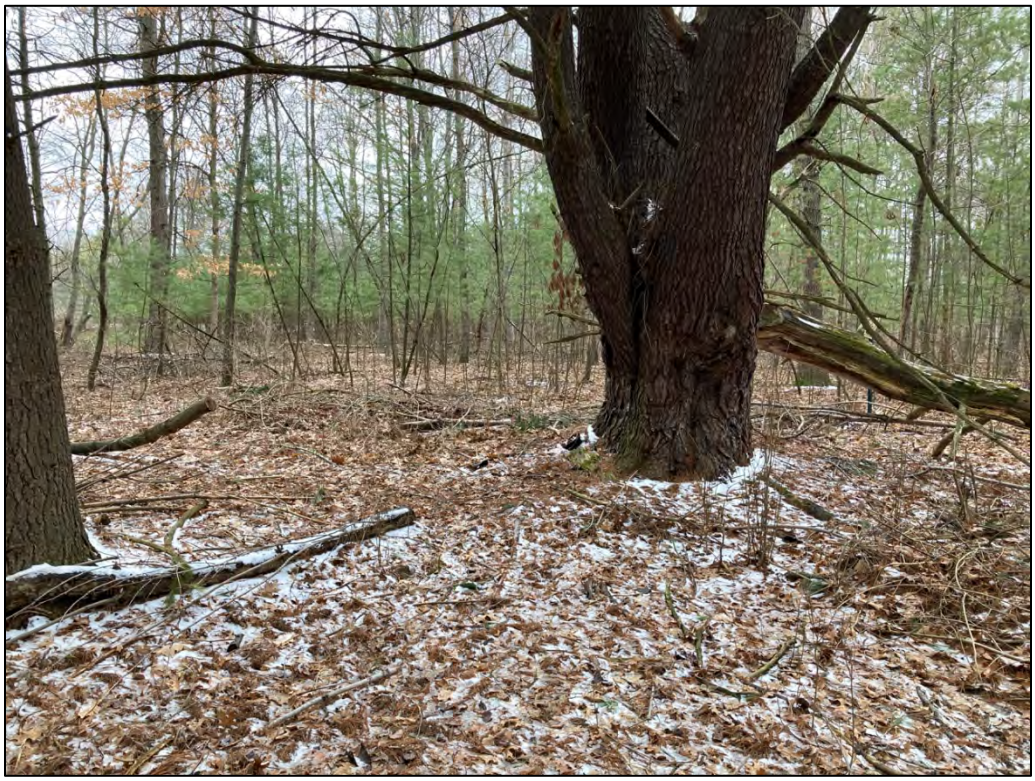
Appendix A

Survey Photographs

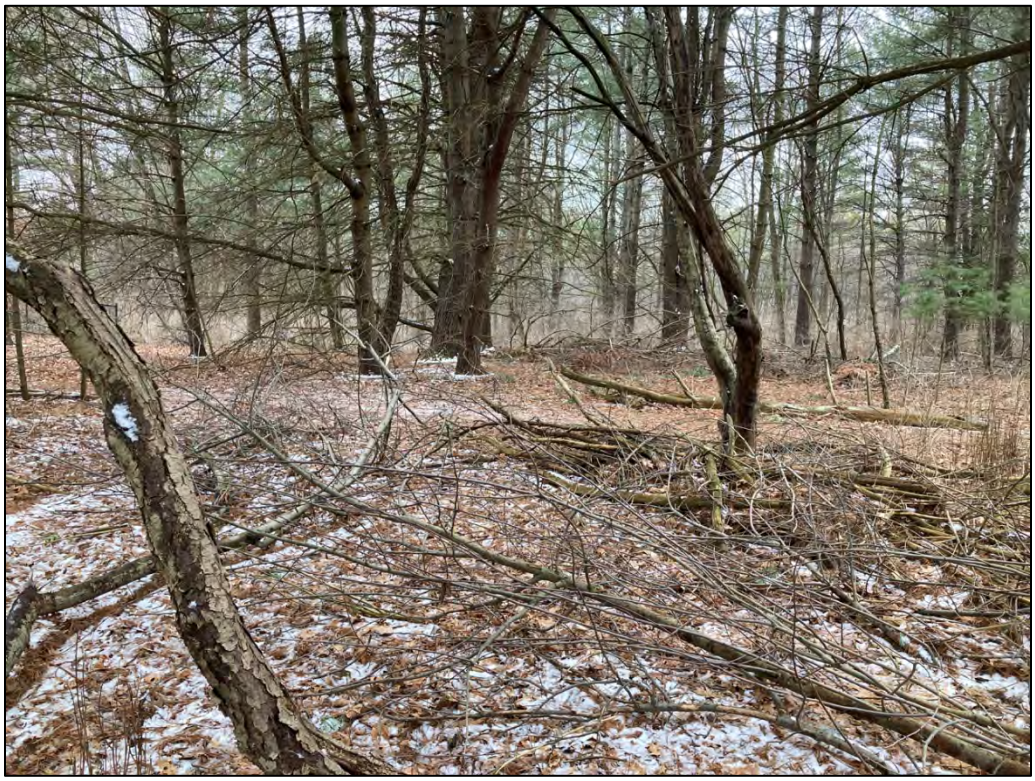


Photograph pp01 view East



Photograph pp01 view North

Photograph pp01 view South



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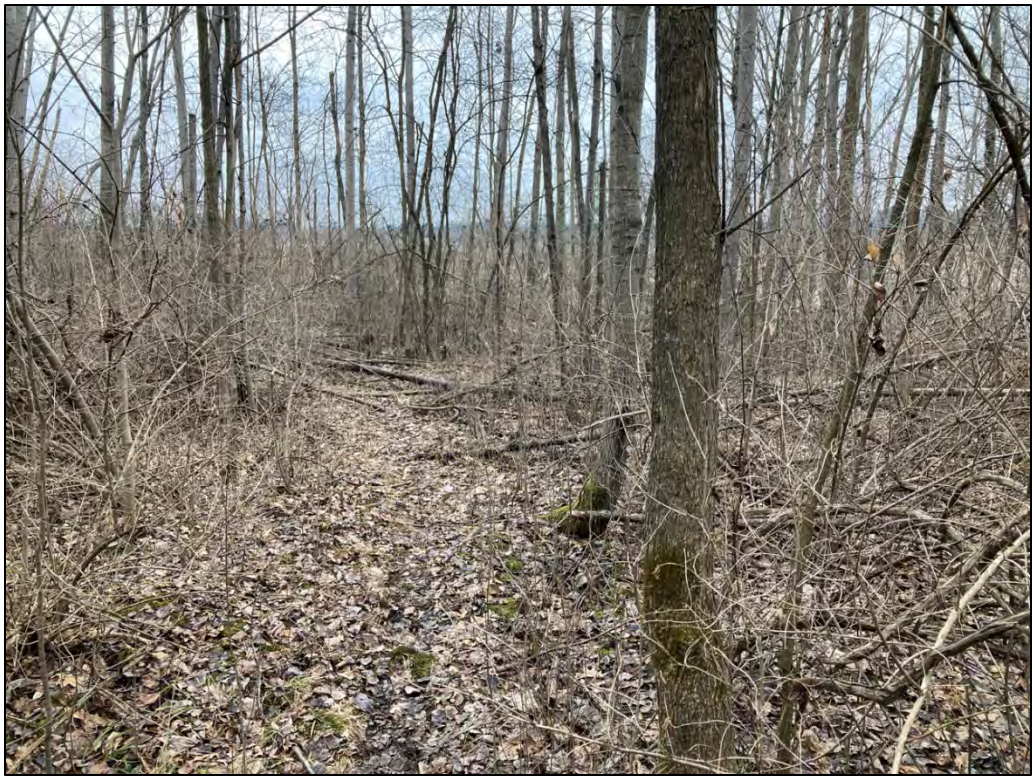
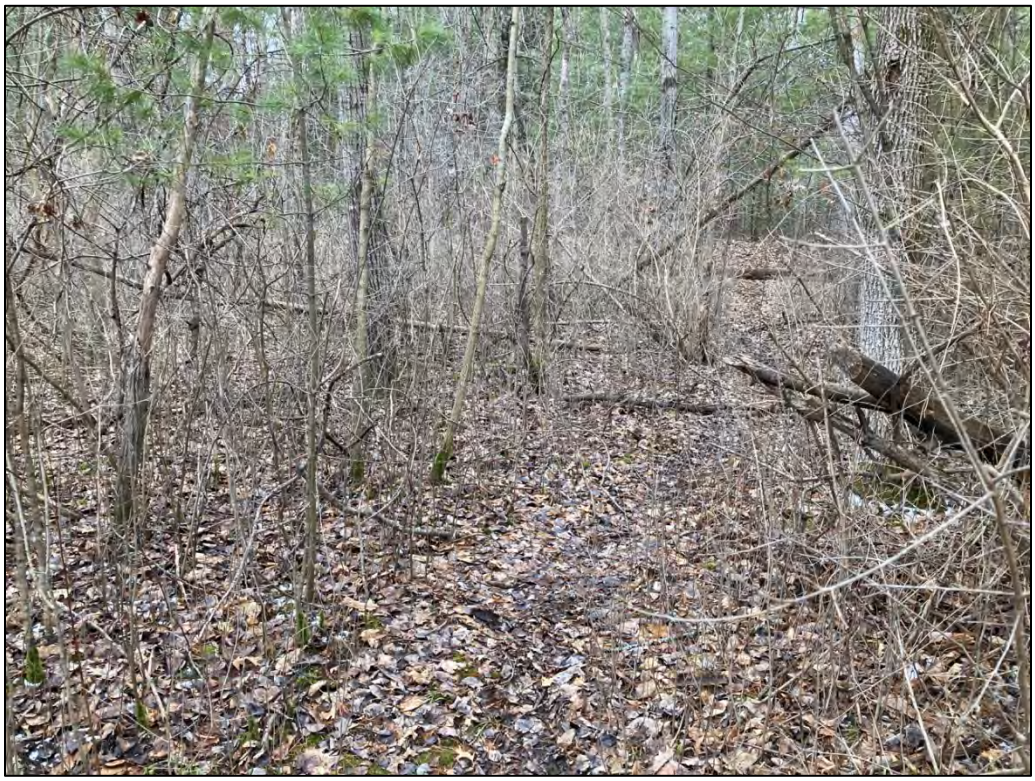


Photograph pp02 view East

Photograph pp02 view North

Photograph pp02 view South



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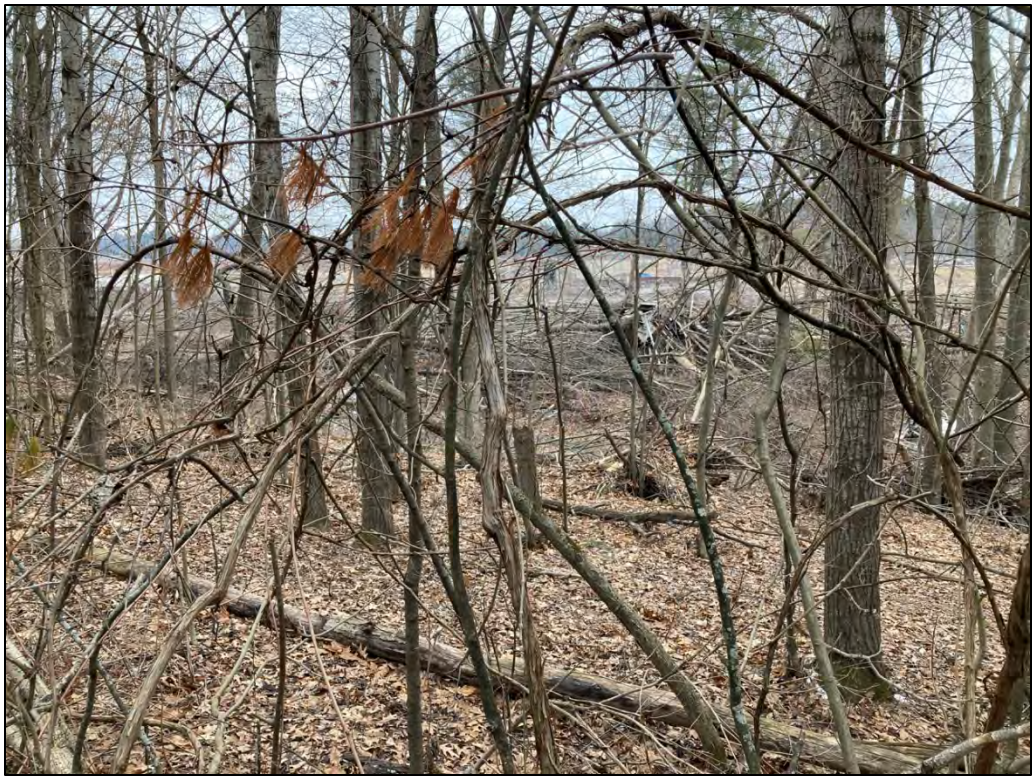

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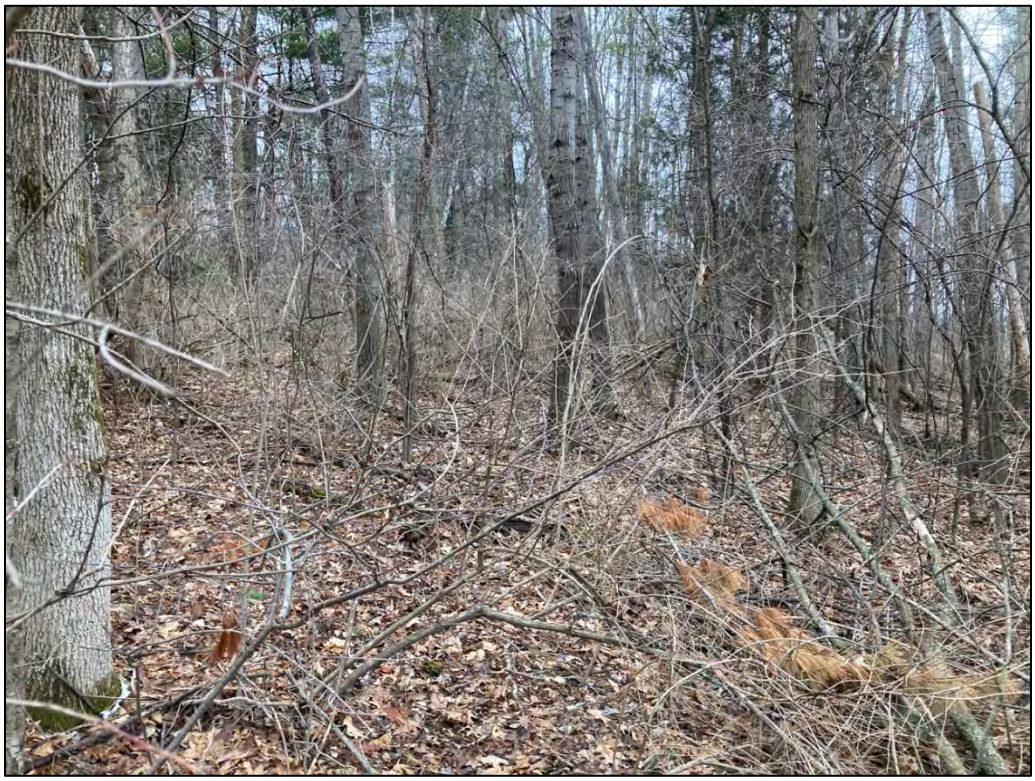

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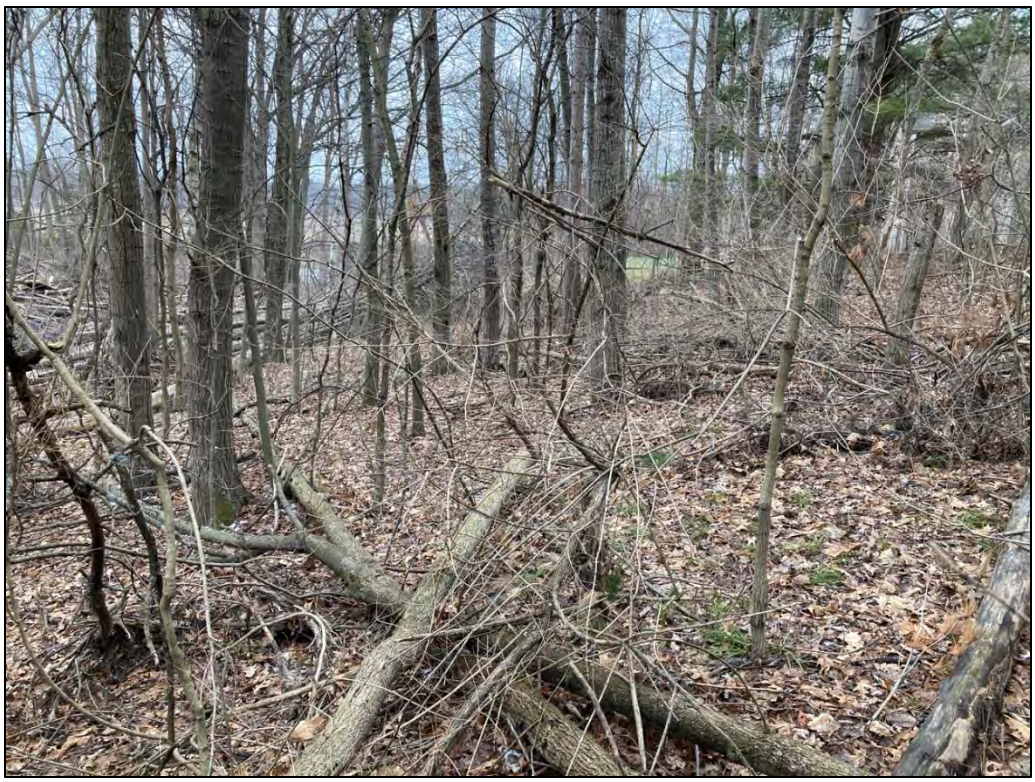

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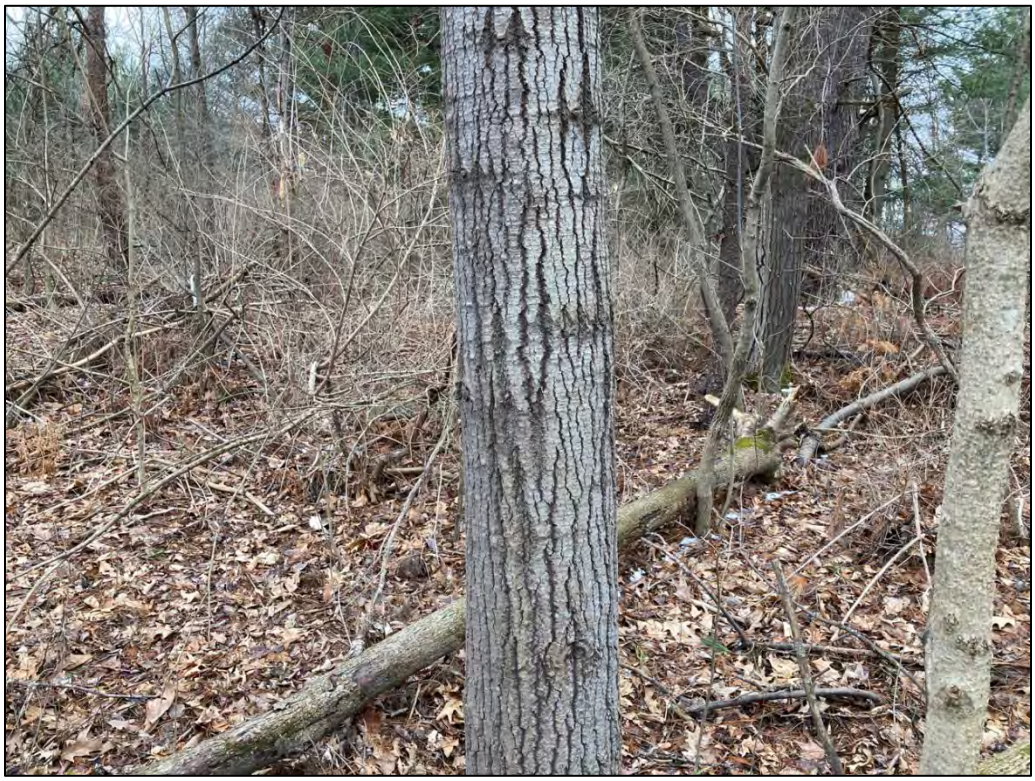

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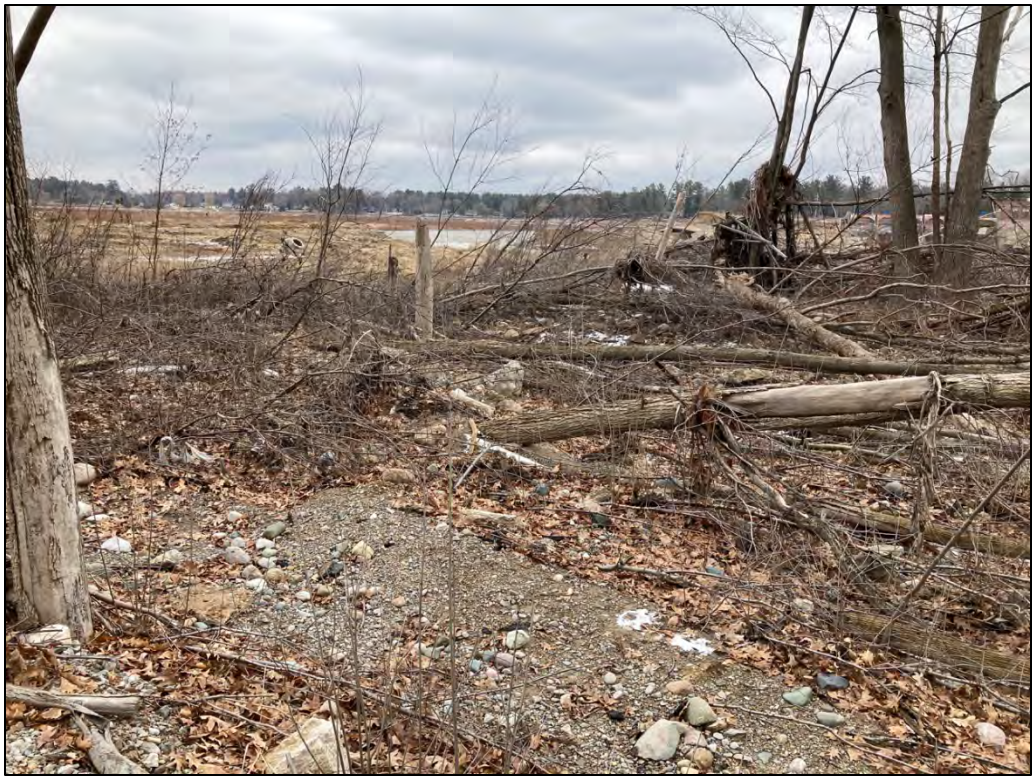

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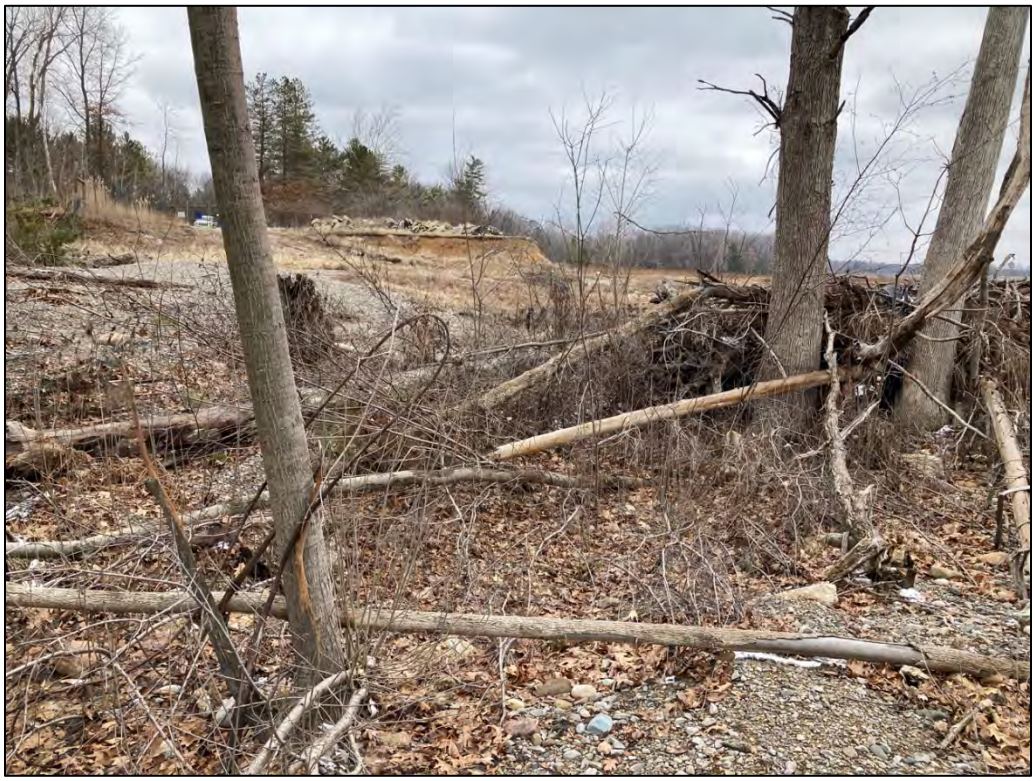

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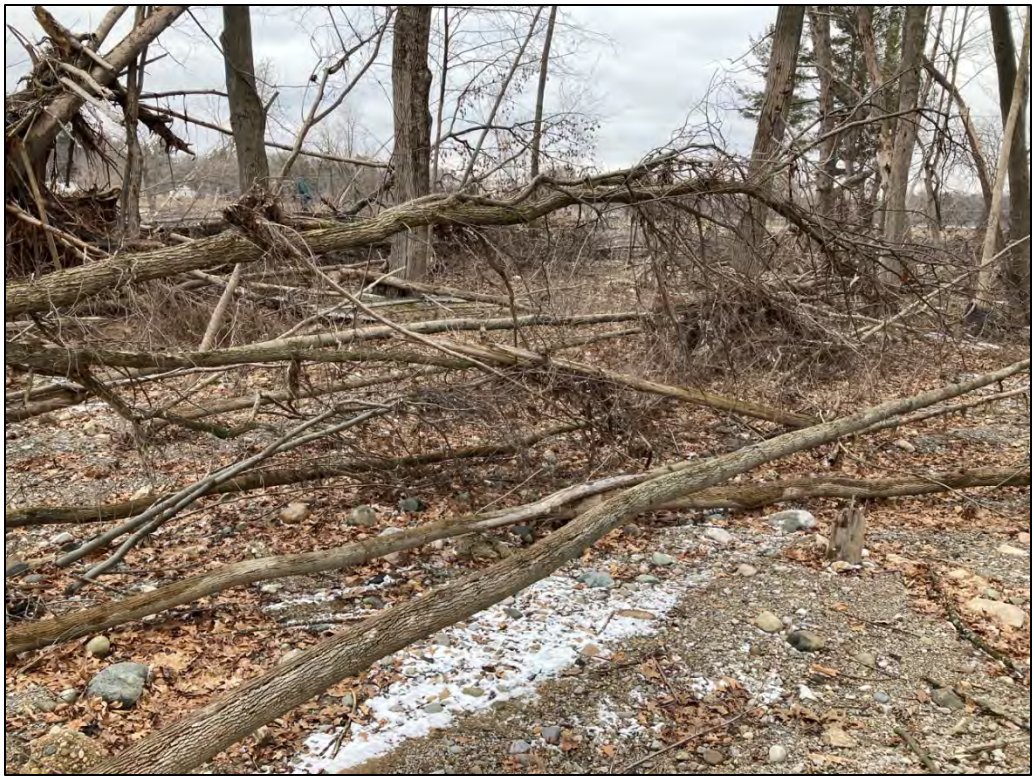

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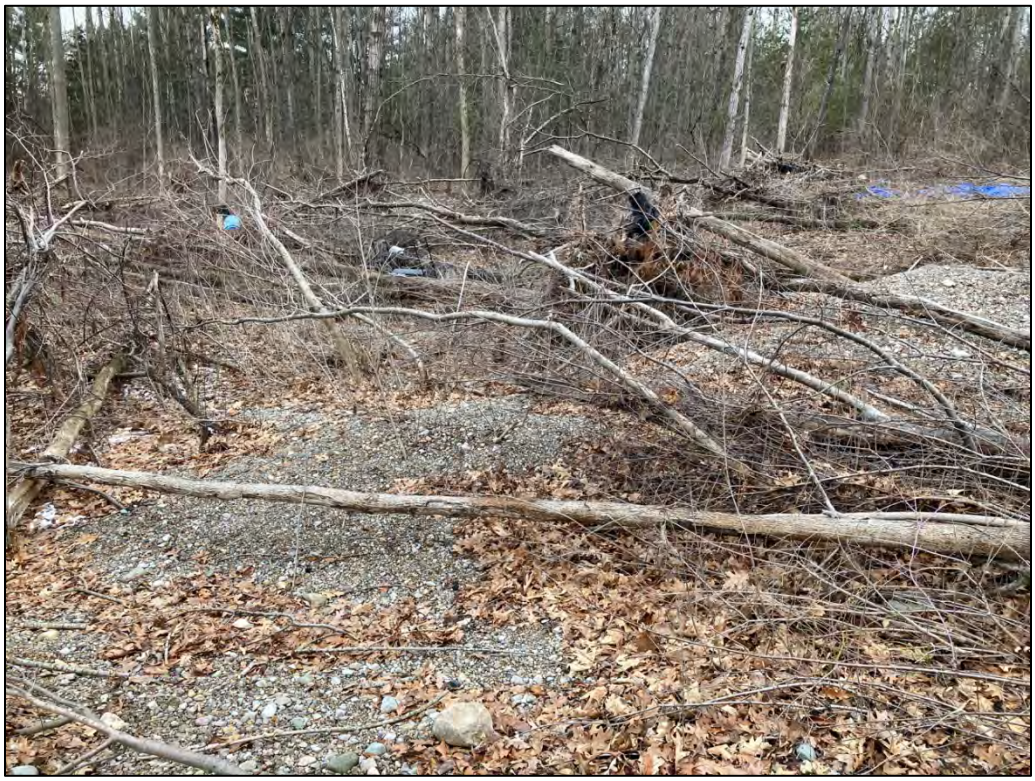

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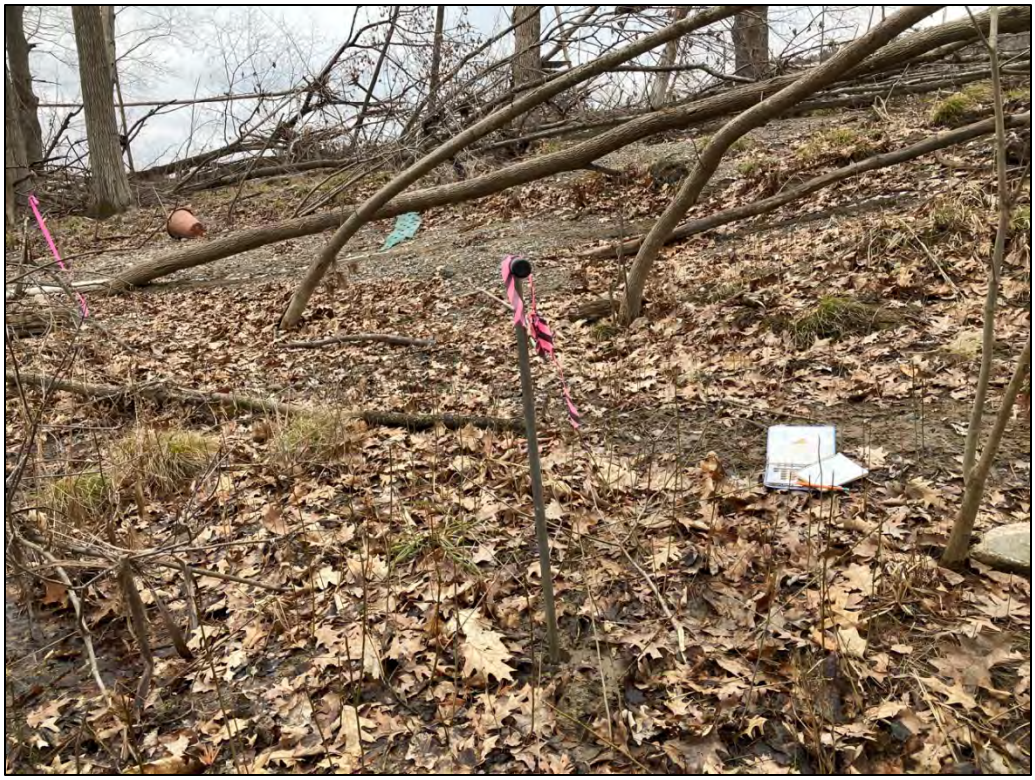

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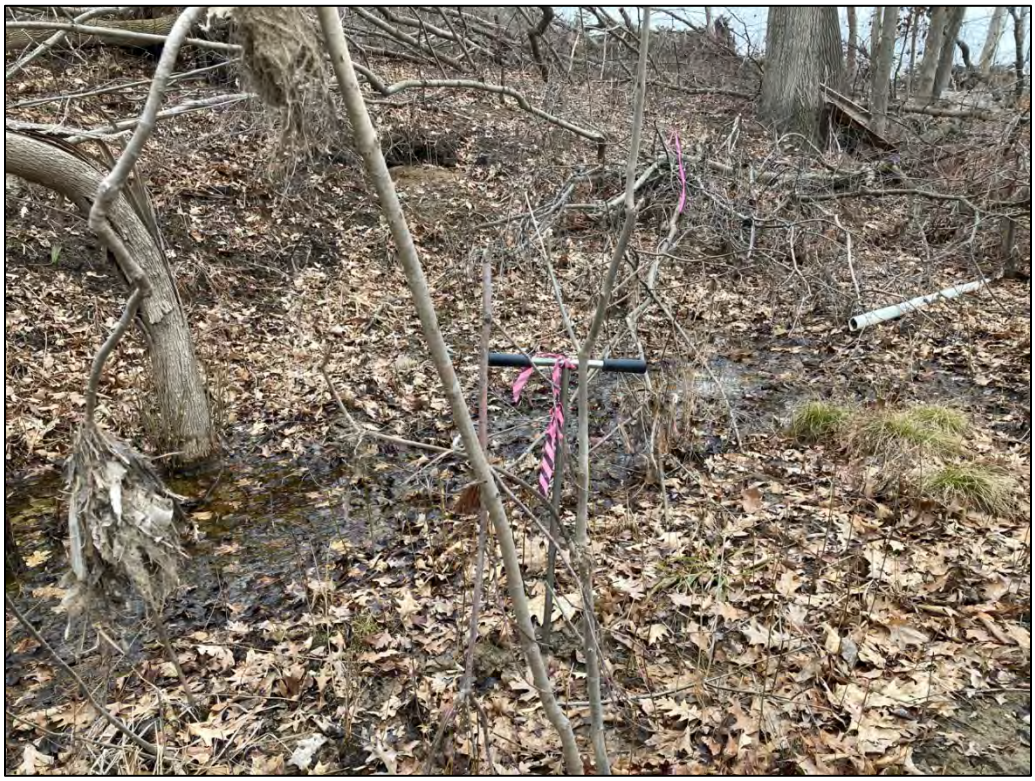
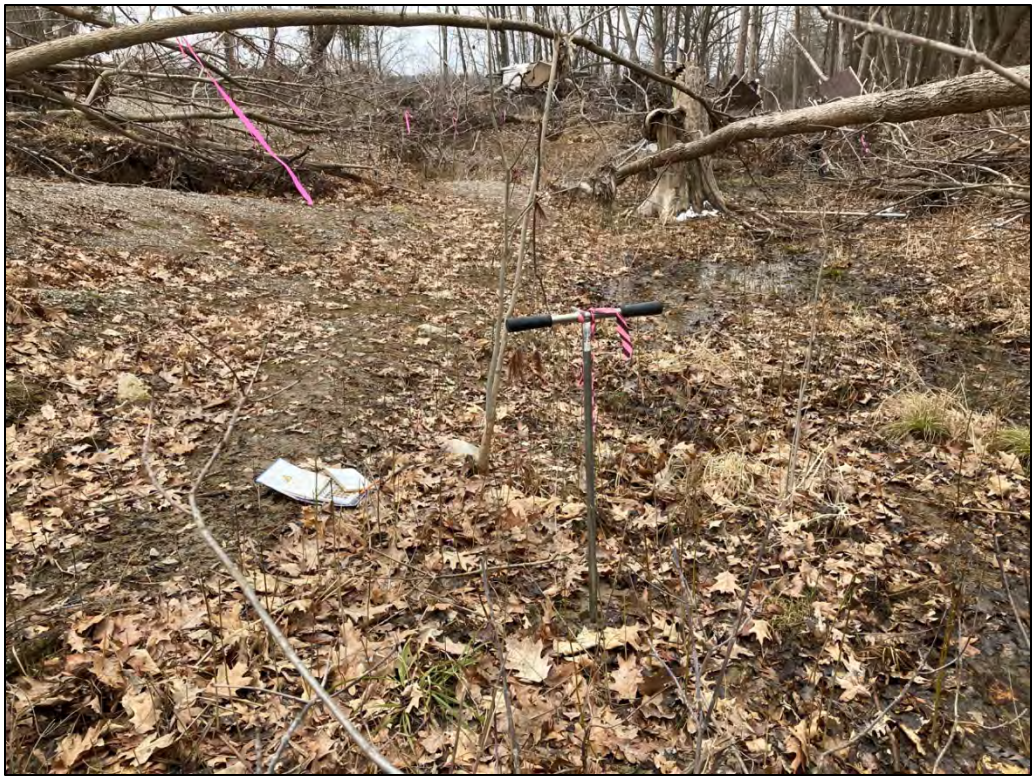
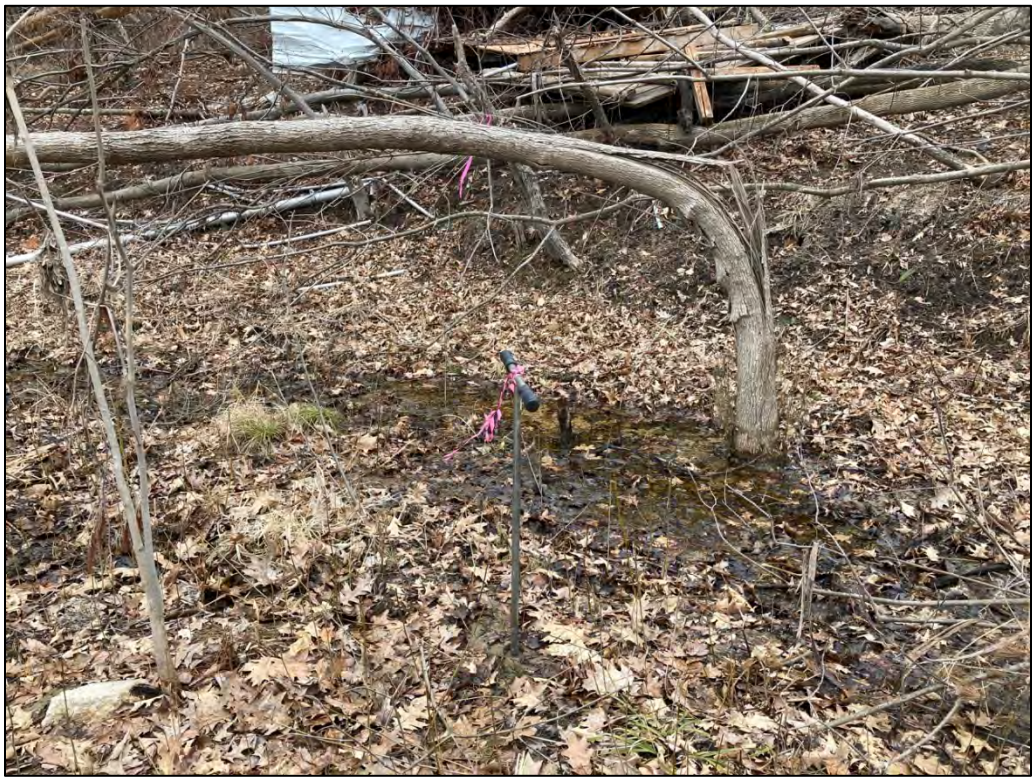


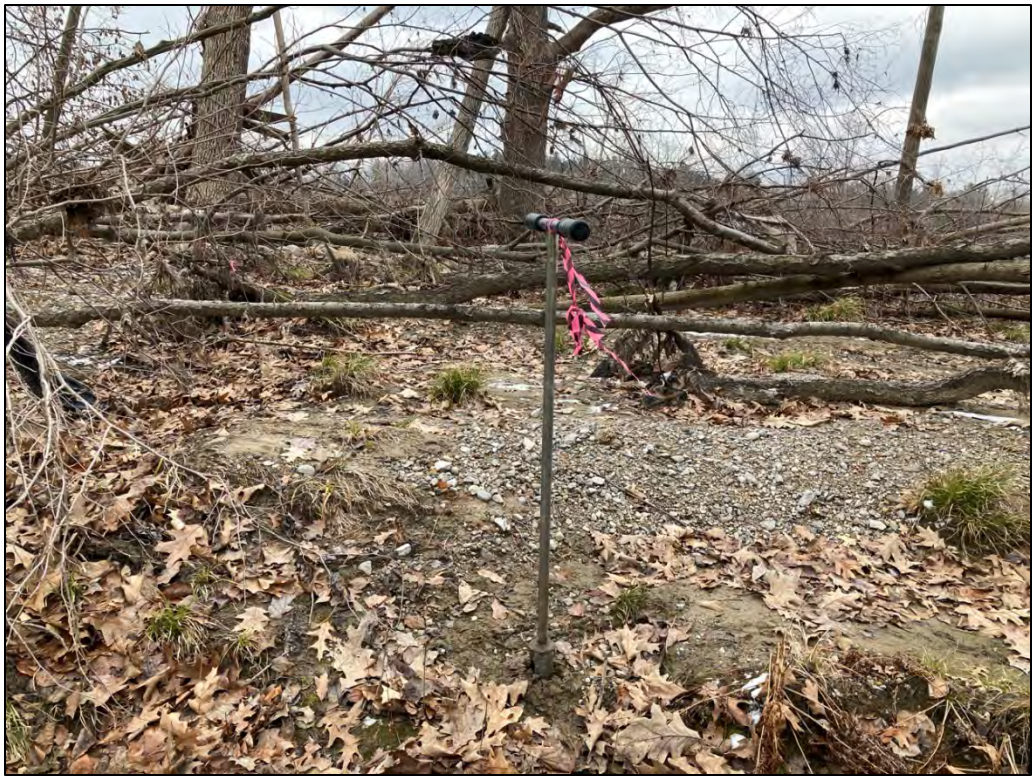
Photograph pp05 view North at dp05



Photograph pp05 view South ad dp05



Photograph pp05 view West at dp05



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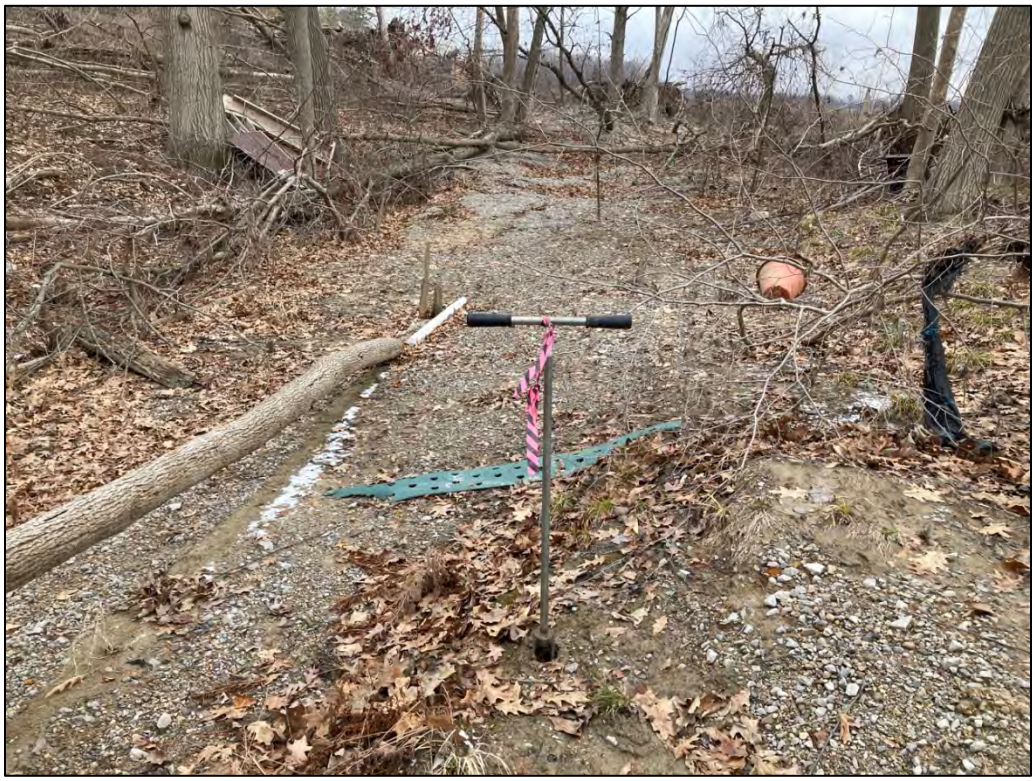

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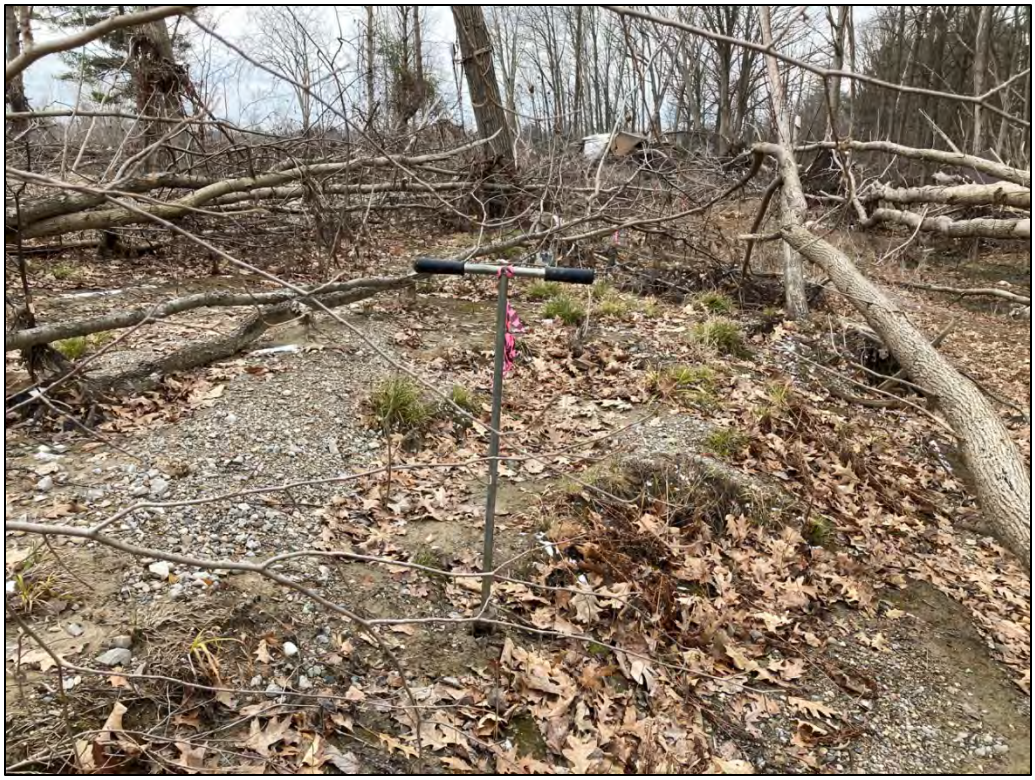
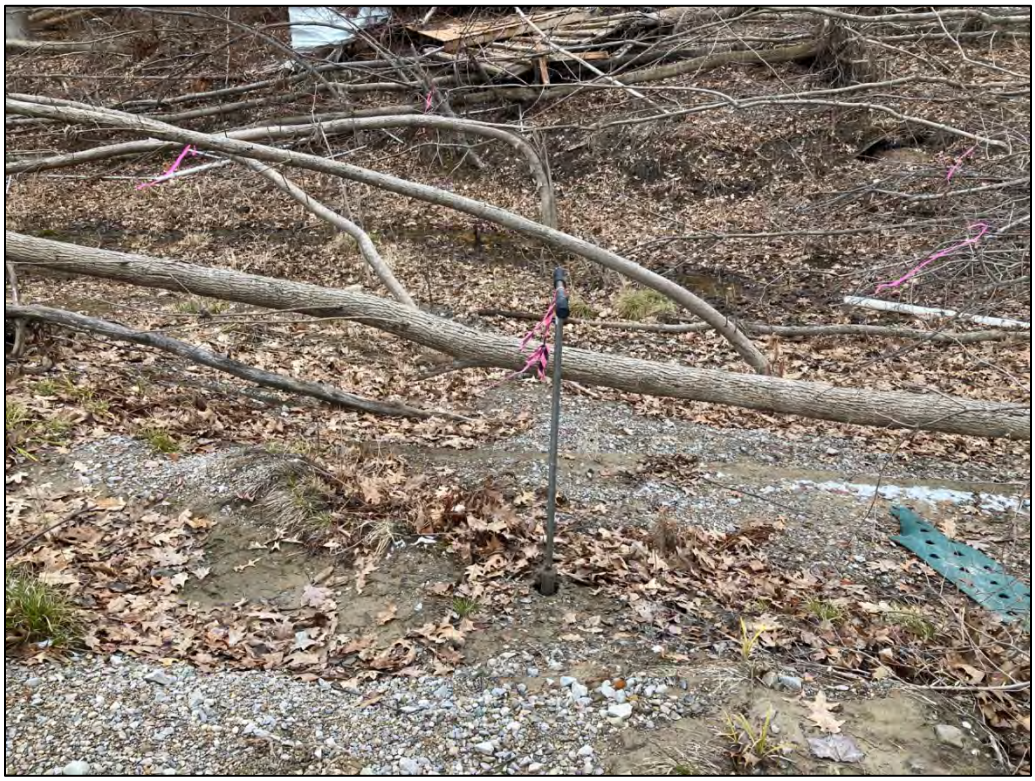


Photograph pp06 view South at dp04



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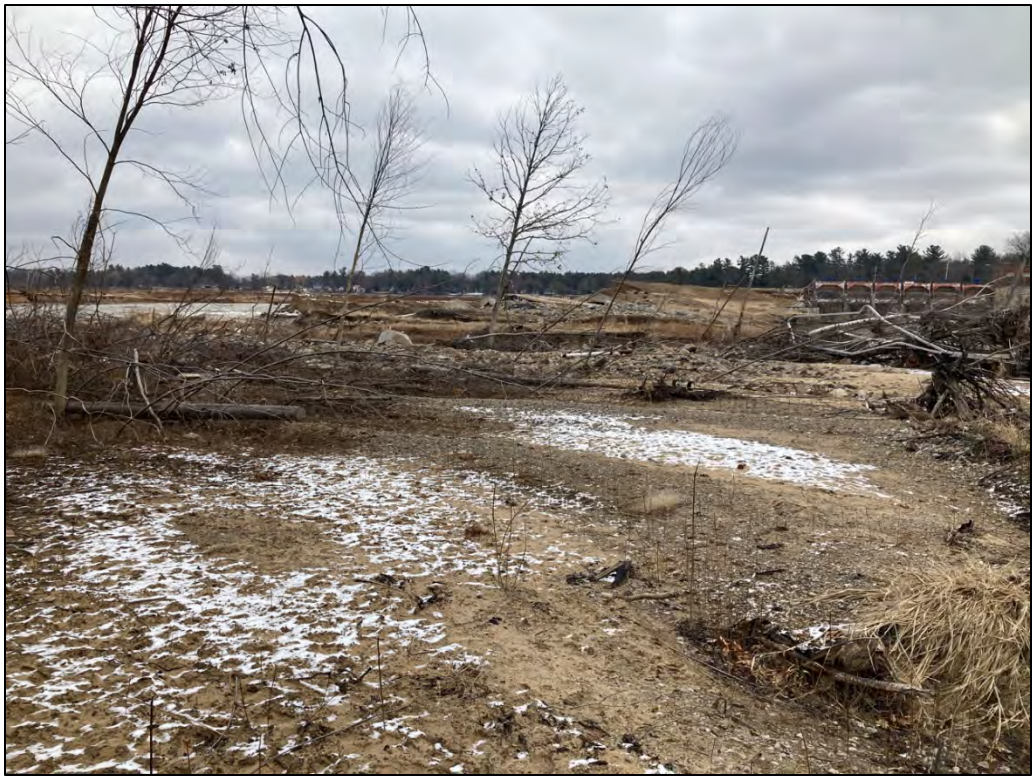
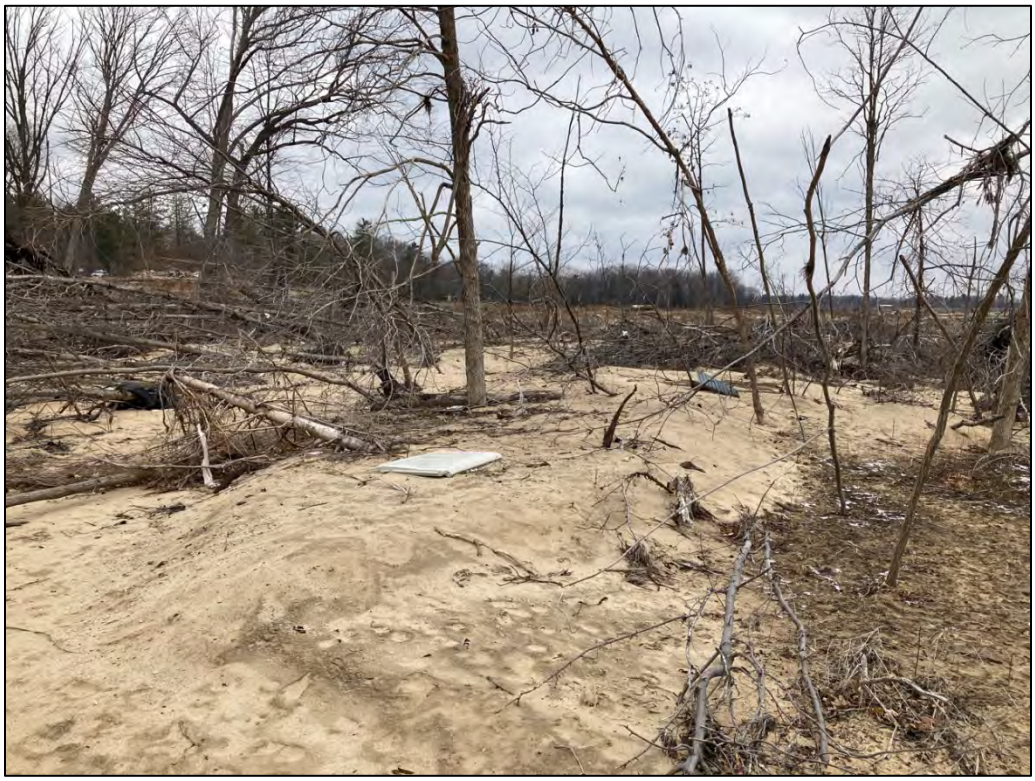


Photograph pp07 view East



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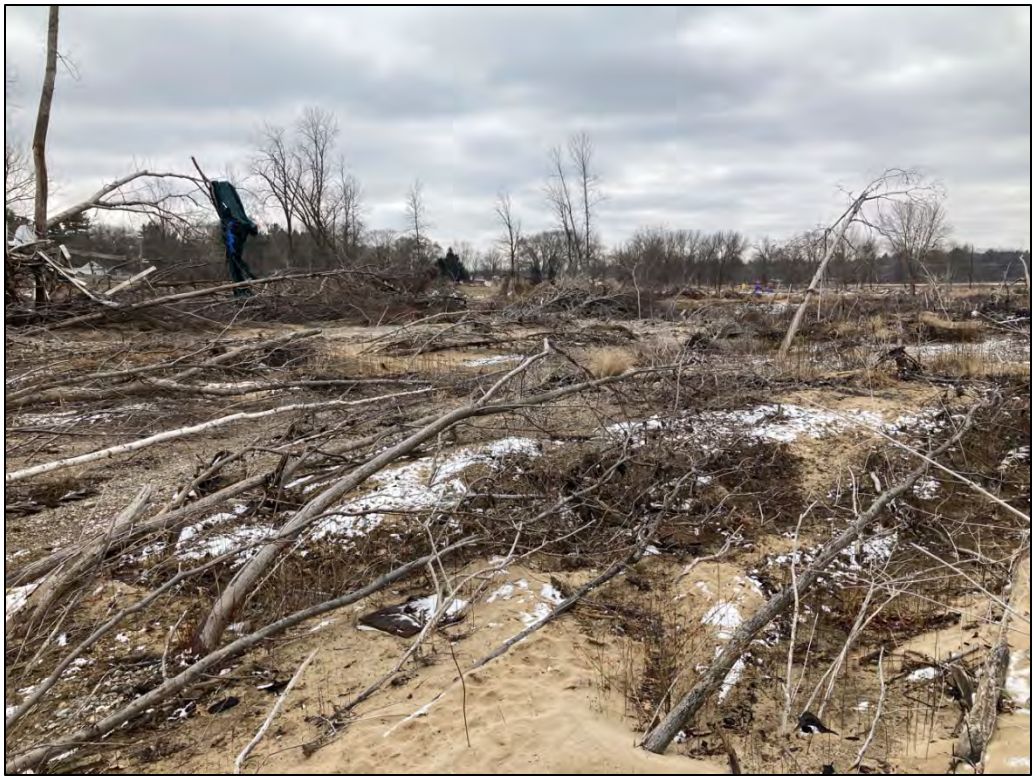

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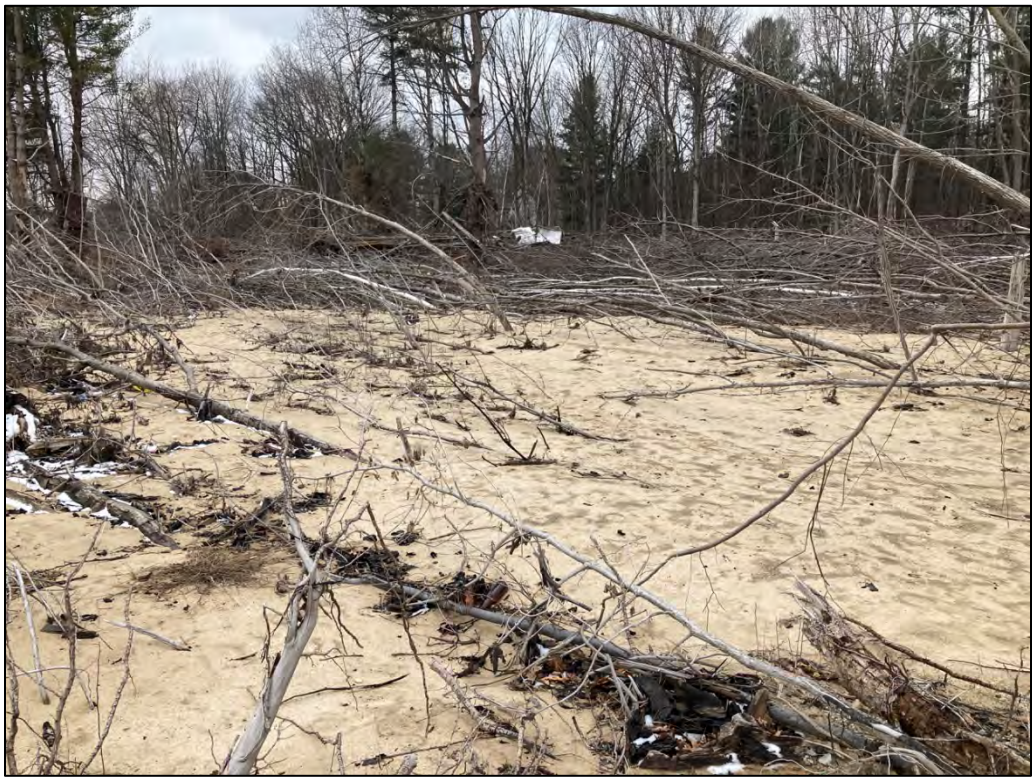

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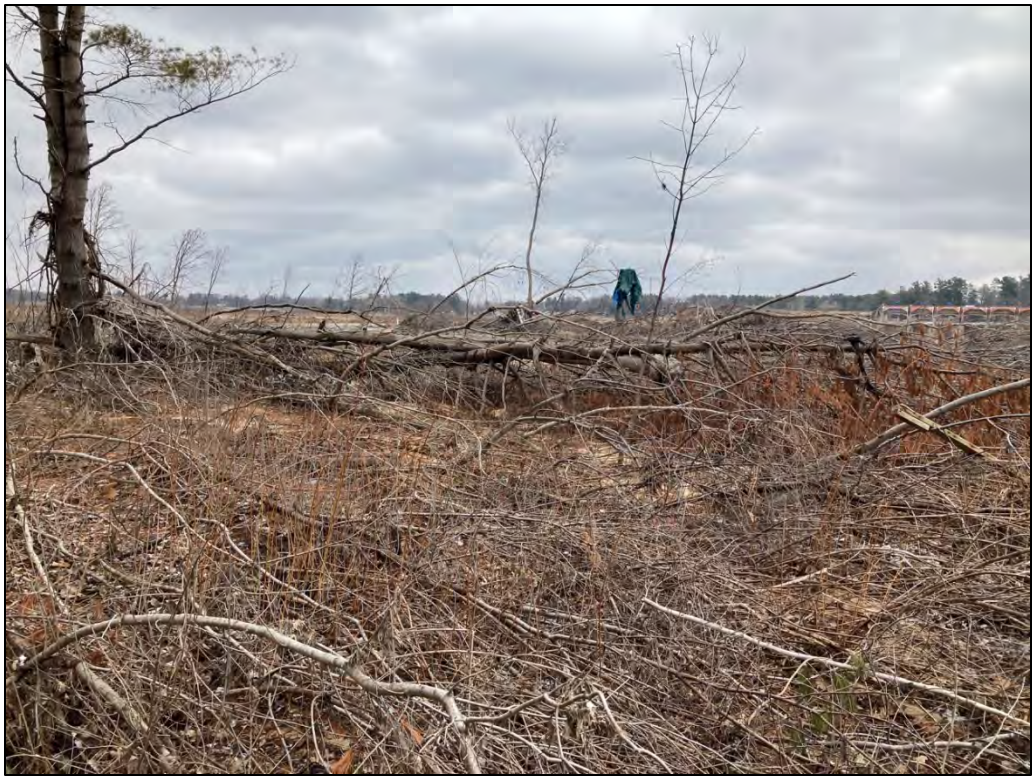
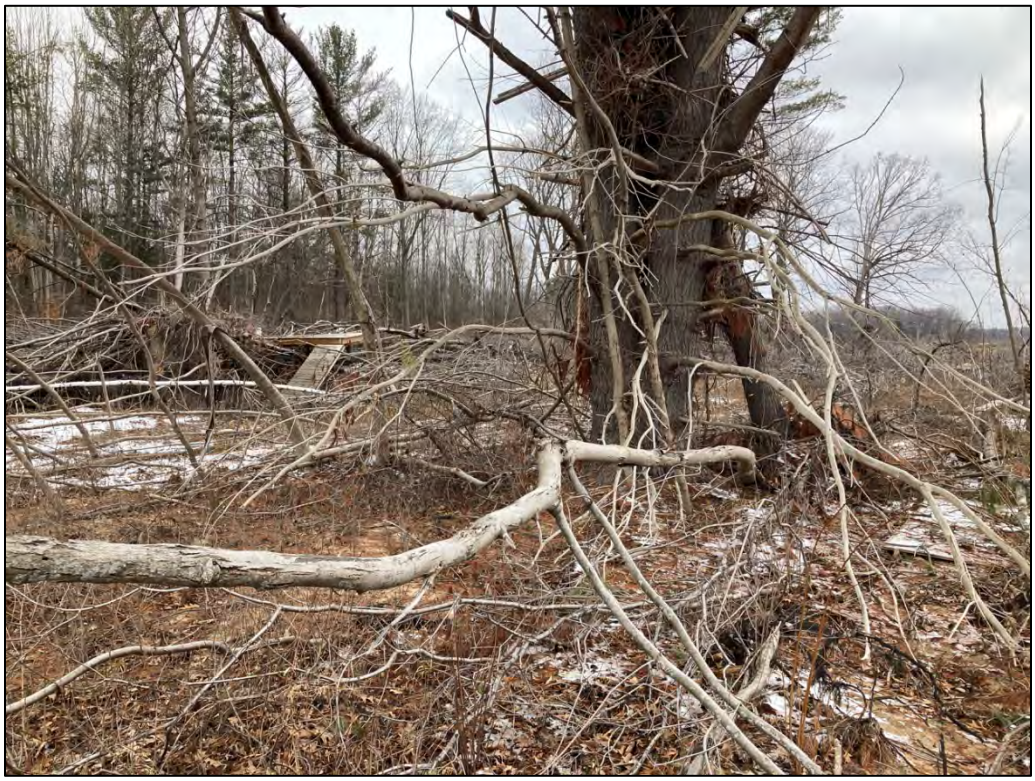


Photograph pp08 view East



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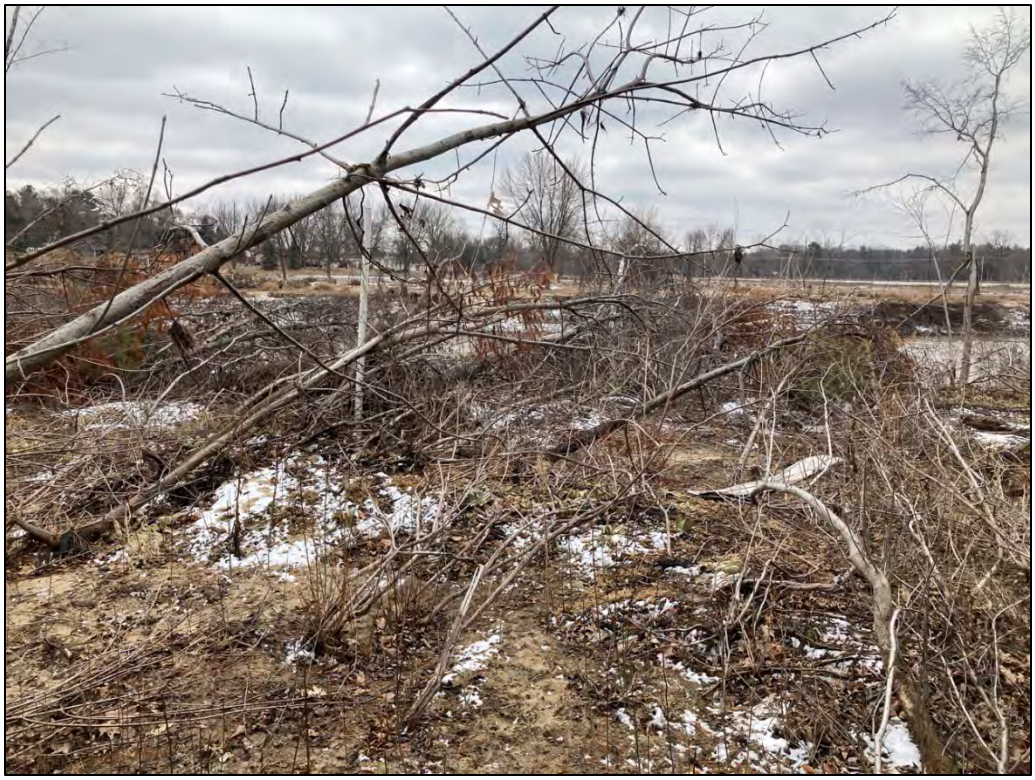

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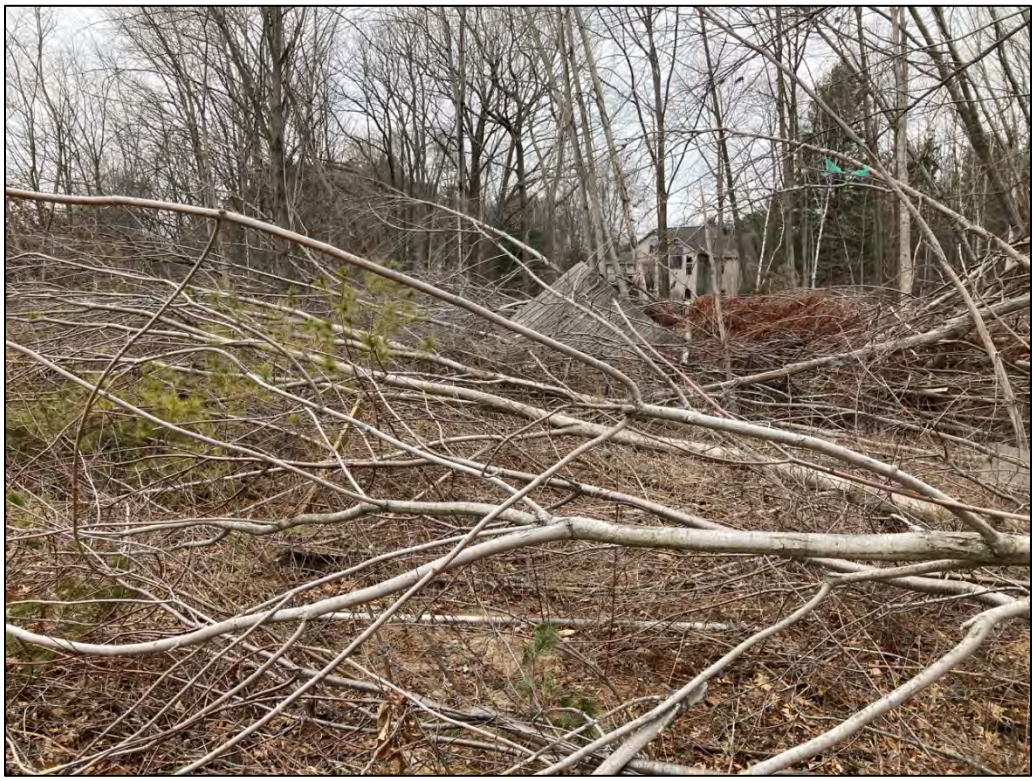

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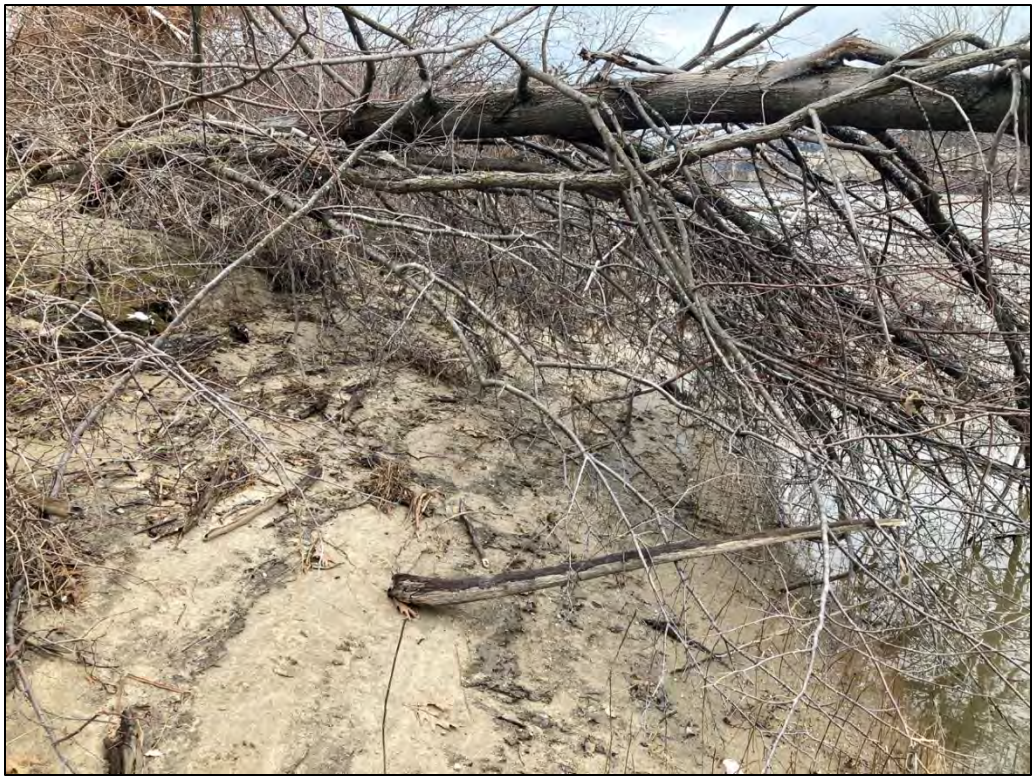
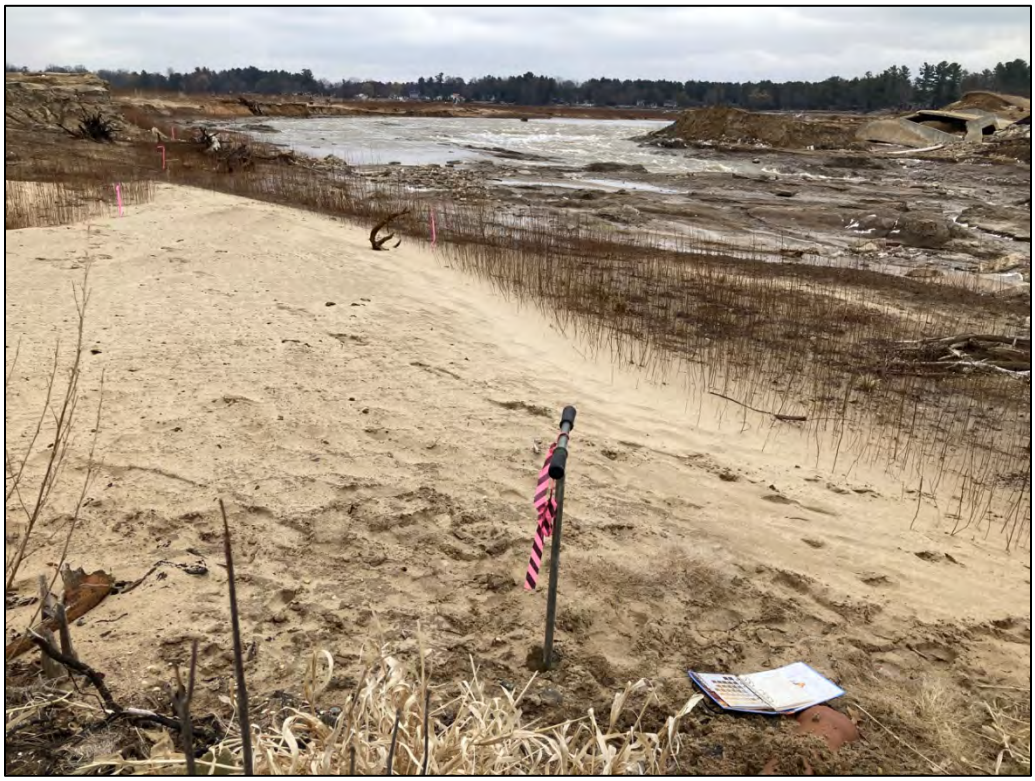
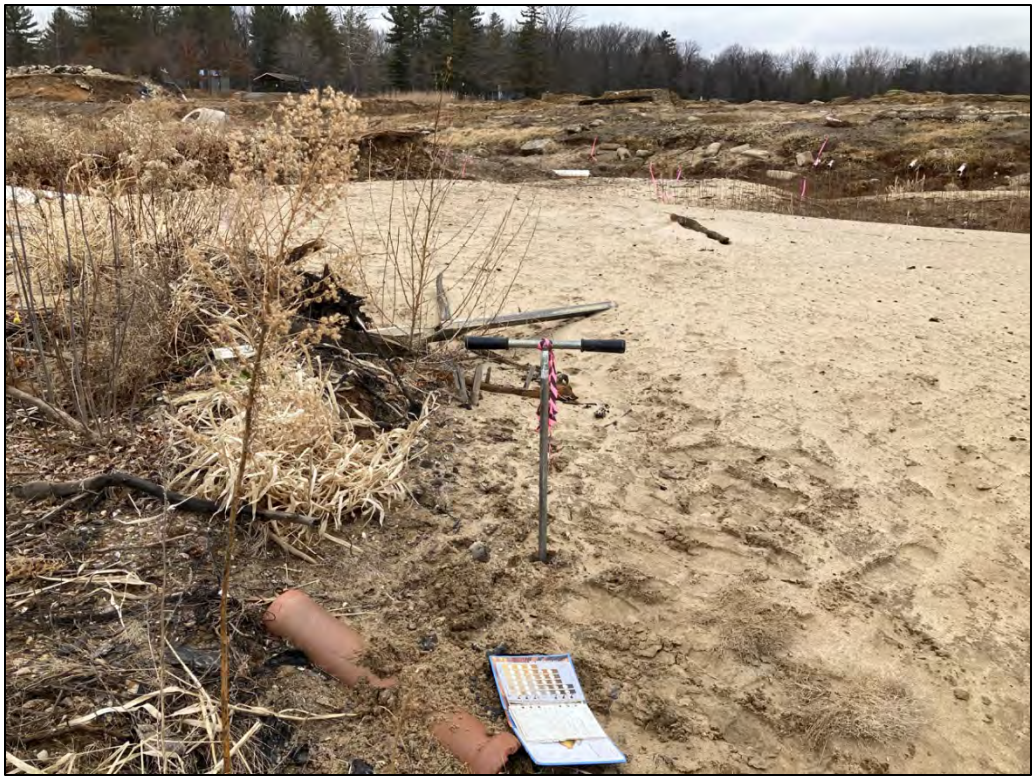


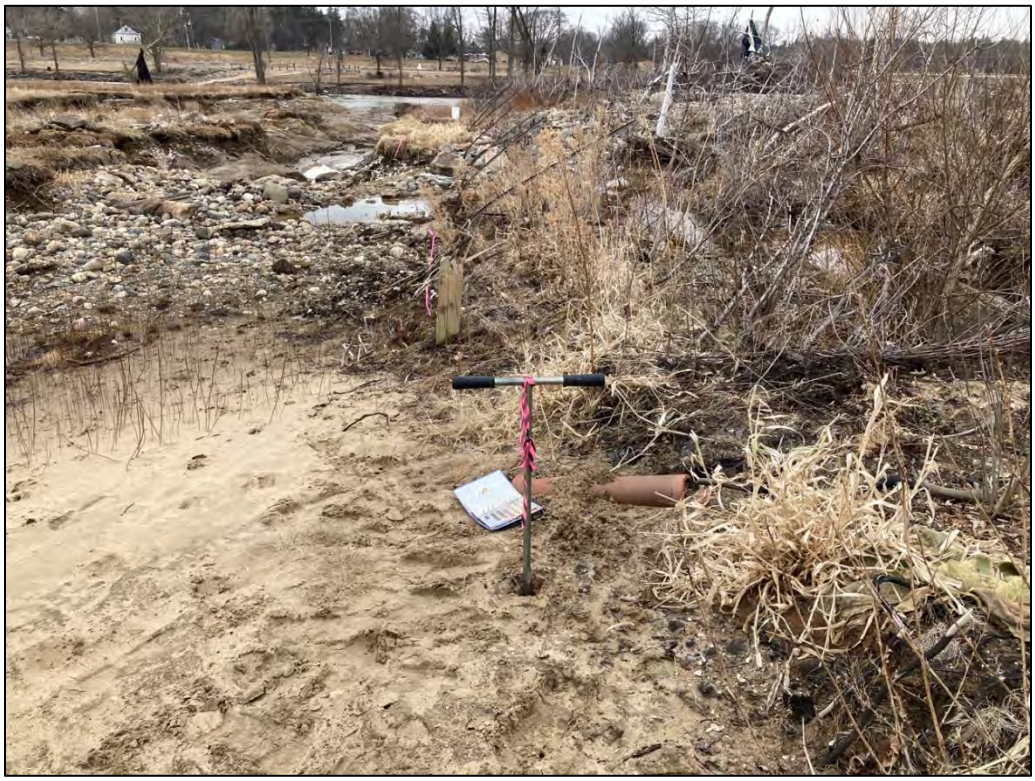
Photograph pp09 view East



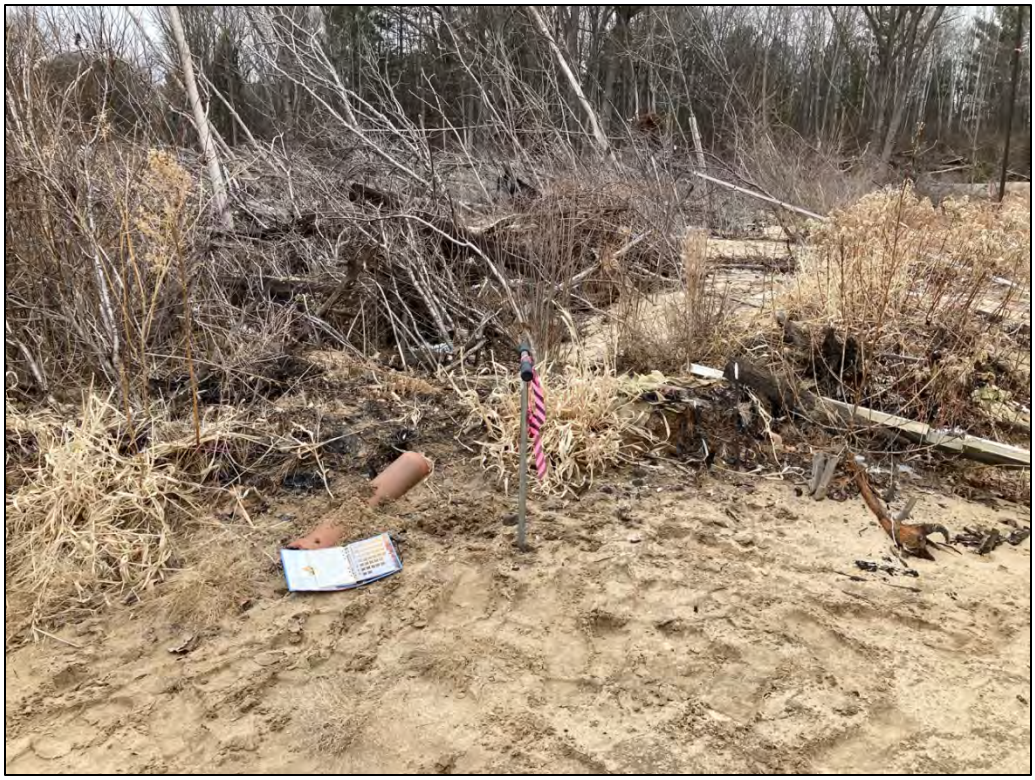
Photograph pp10 view East at dp02



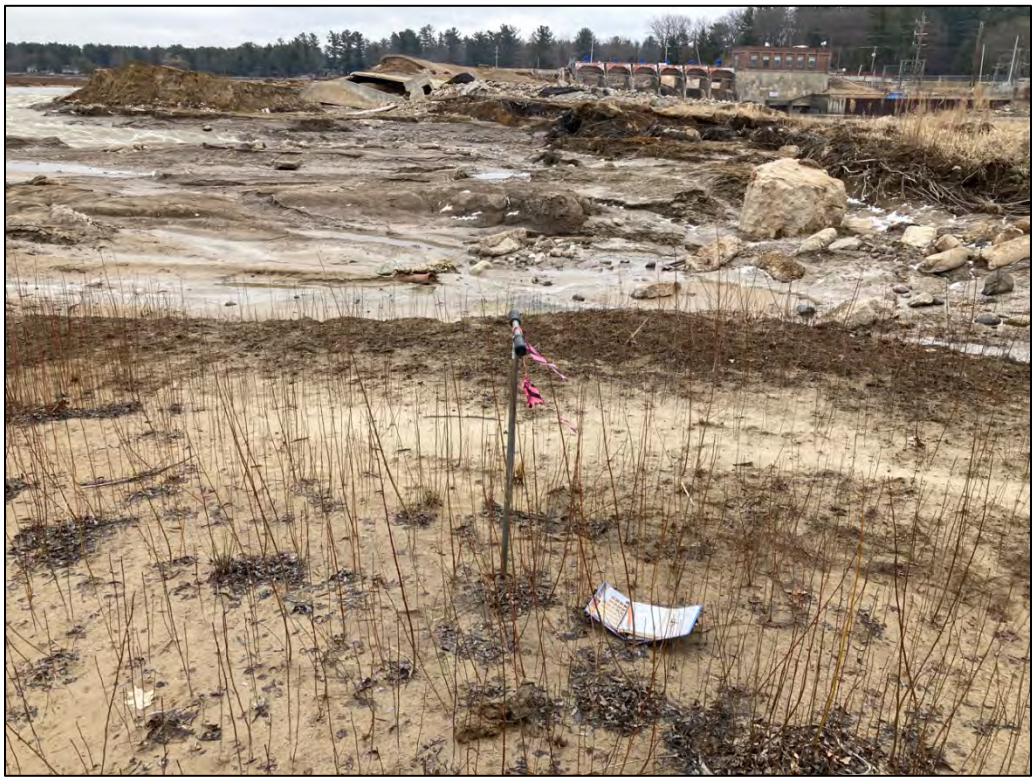
Photograph pp10 view North at dp02



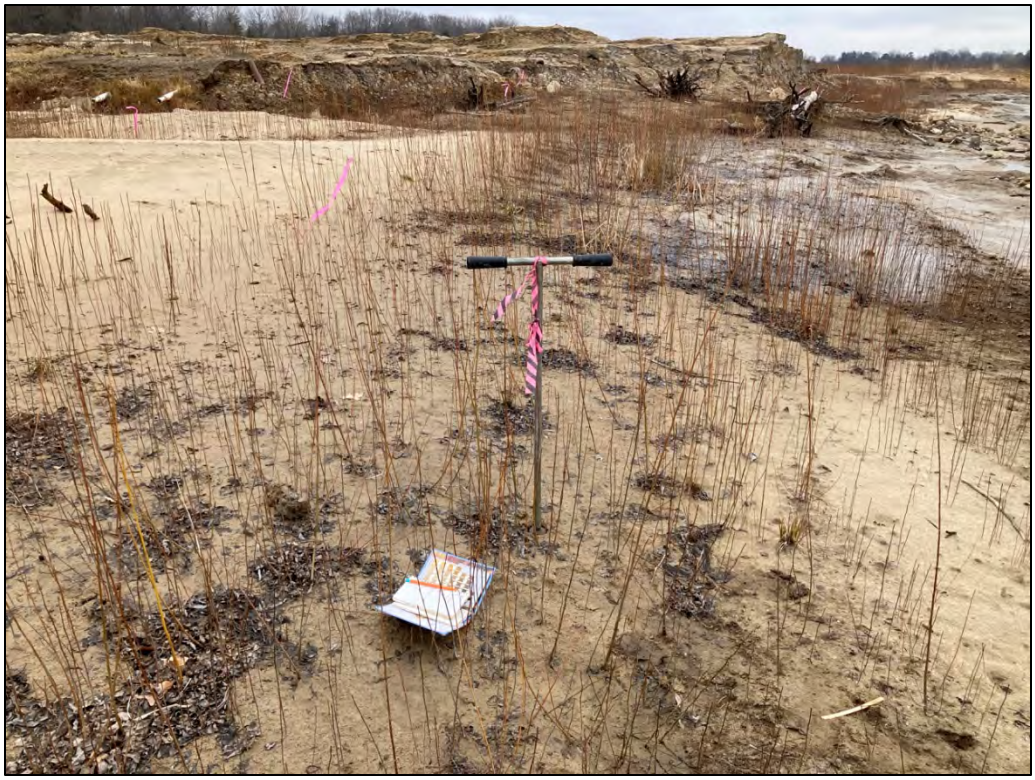
Photograph pp10 view South at dp02



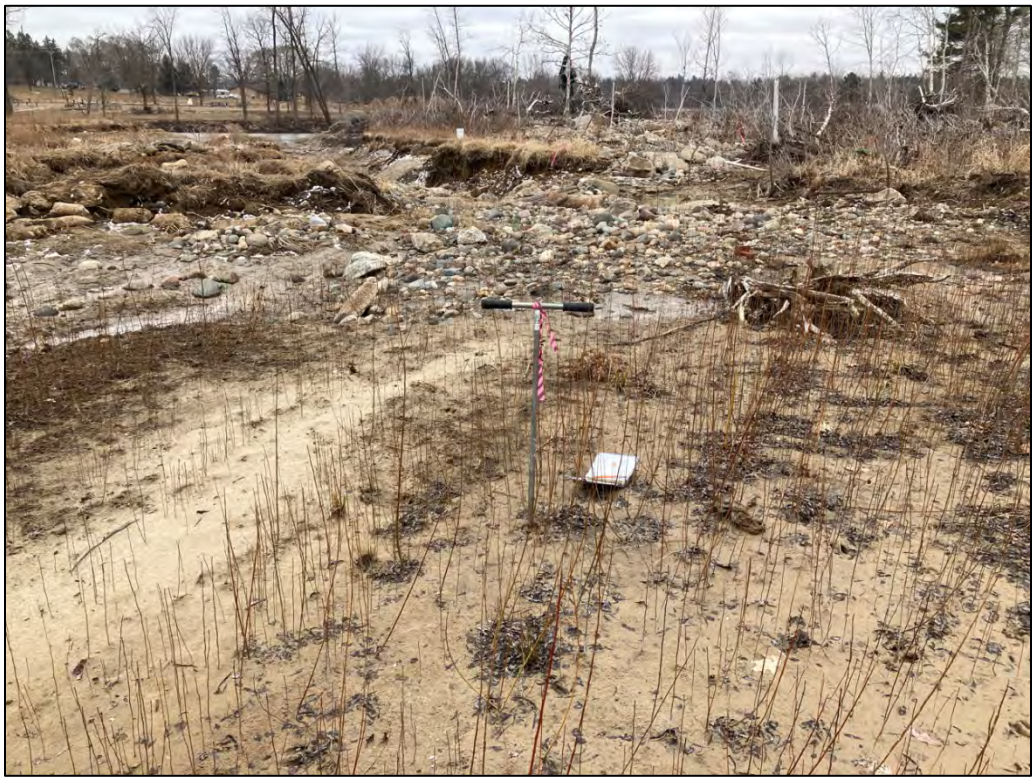
Photograph pp10 view West at dp02



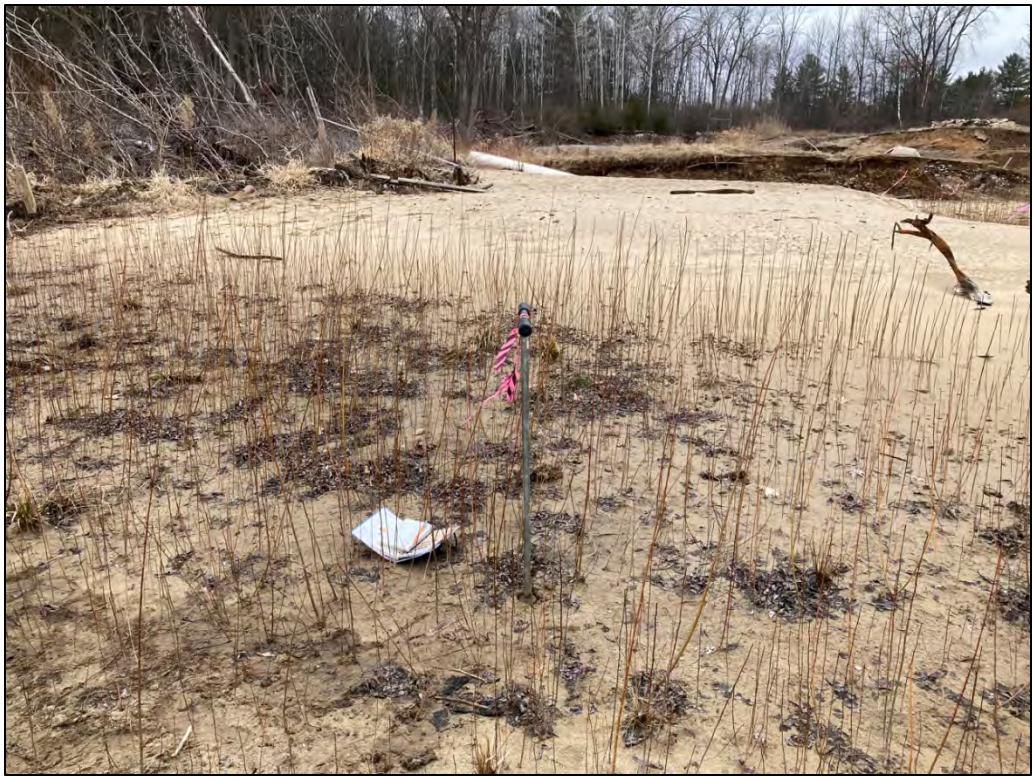
Photograph pp11 view East at dp03



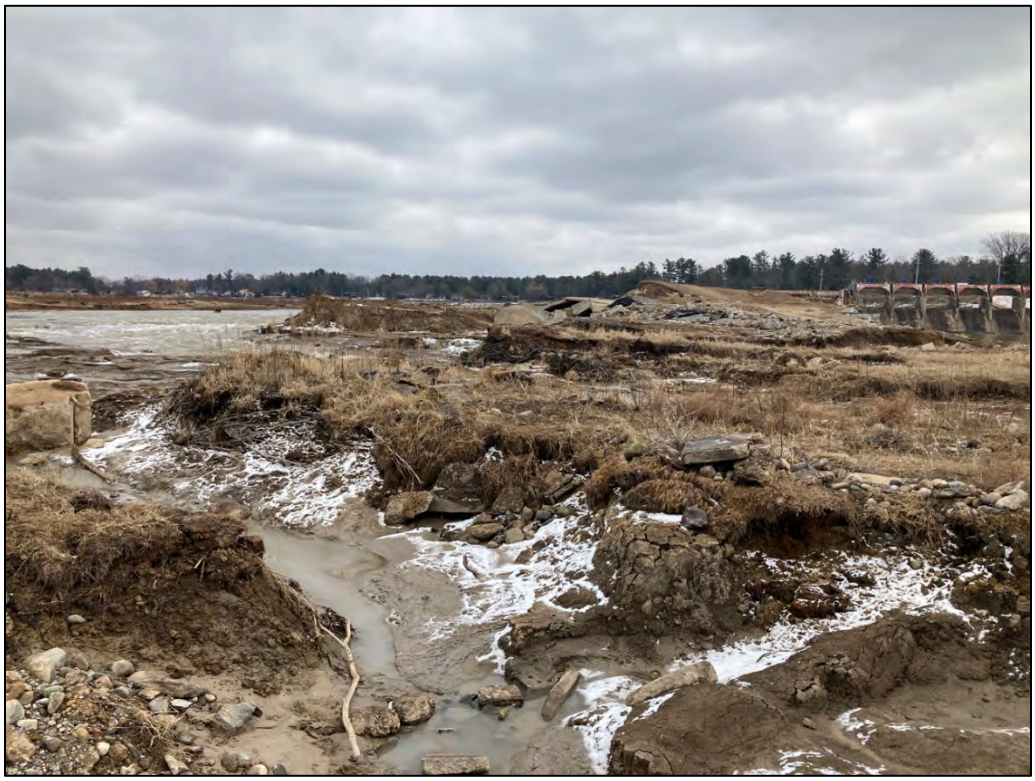
Photograph pp11 view North at dp03



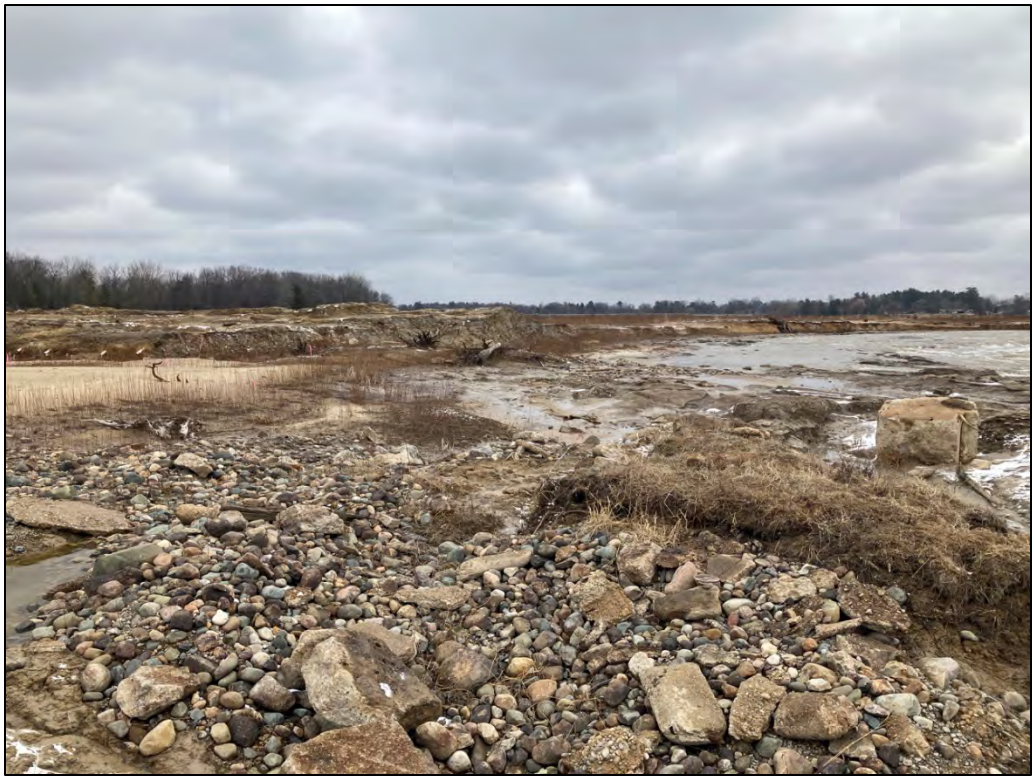
Photograph pp11 view South at dp03



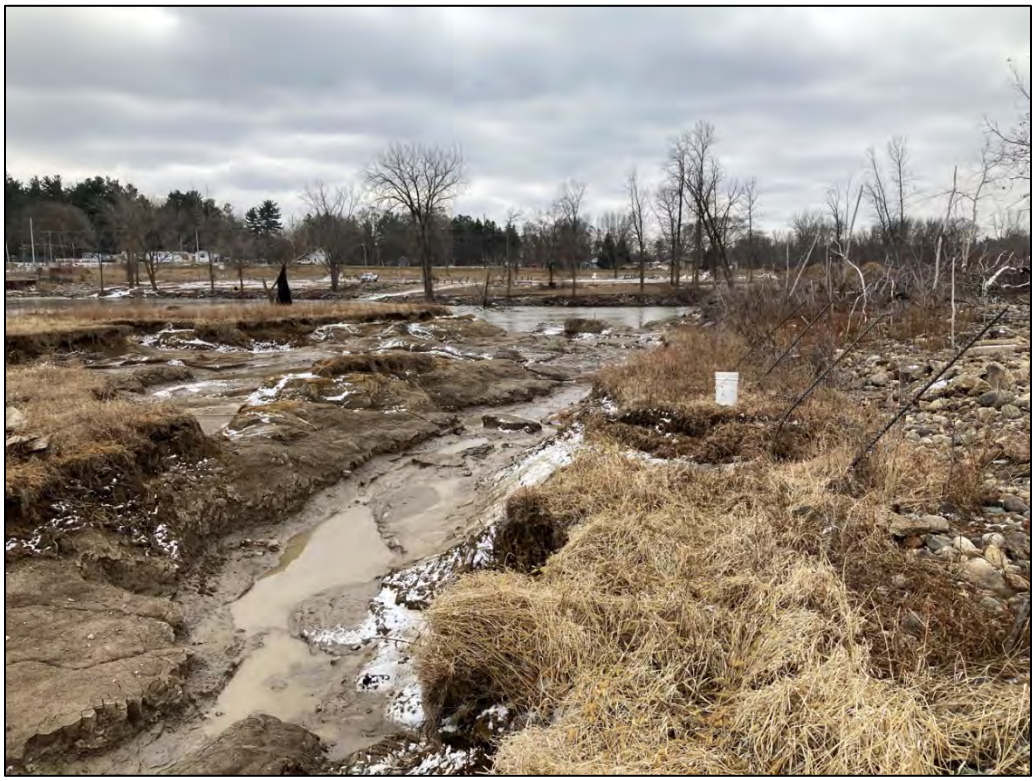
Photograph pp11 view West at dp03



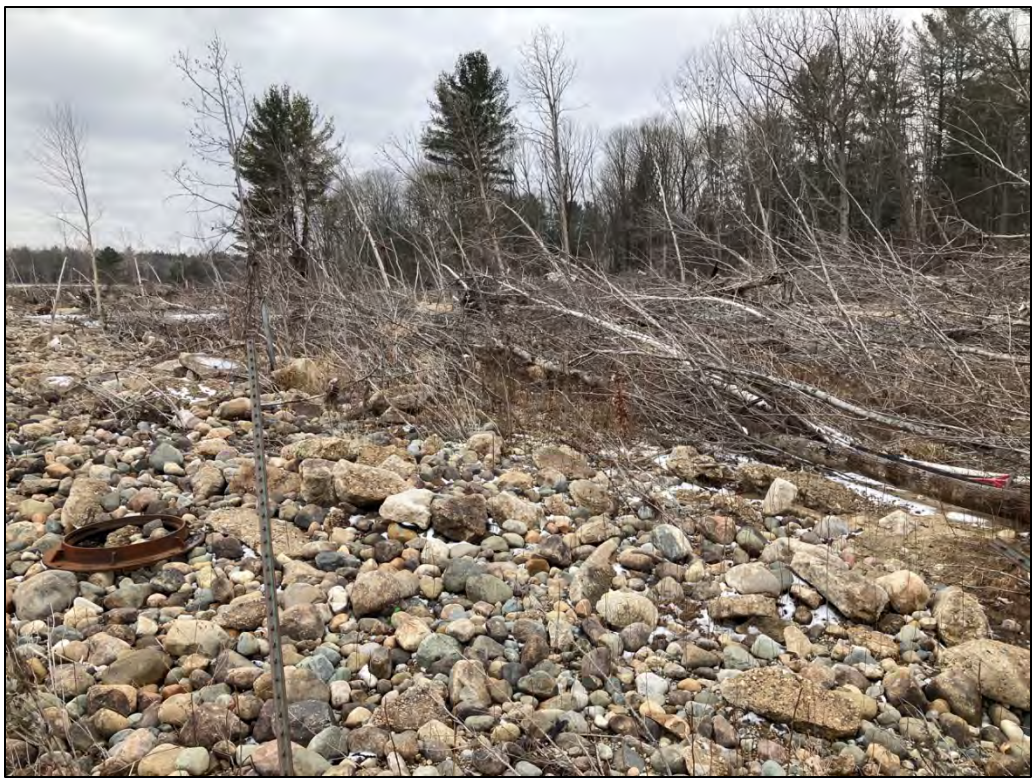
Photograph pp12 view East



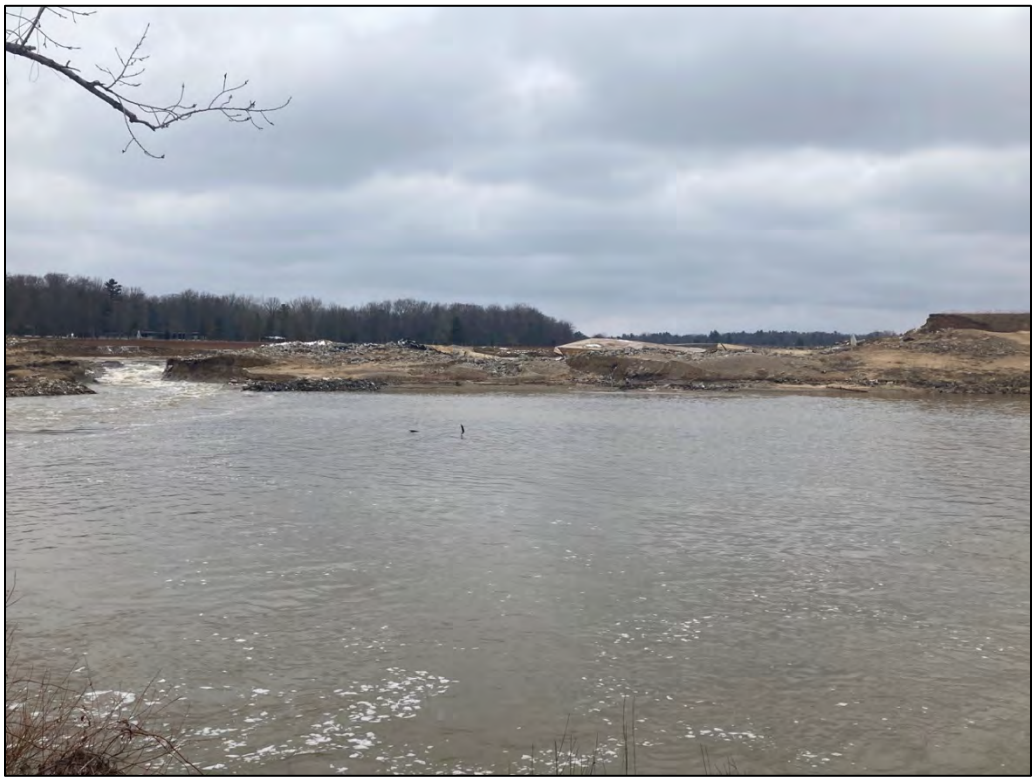
Photograph pp12 view North



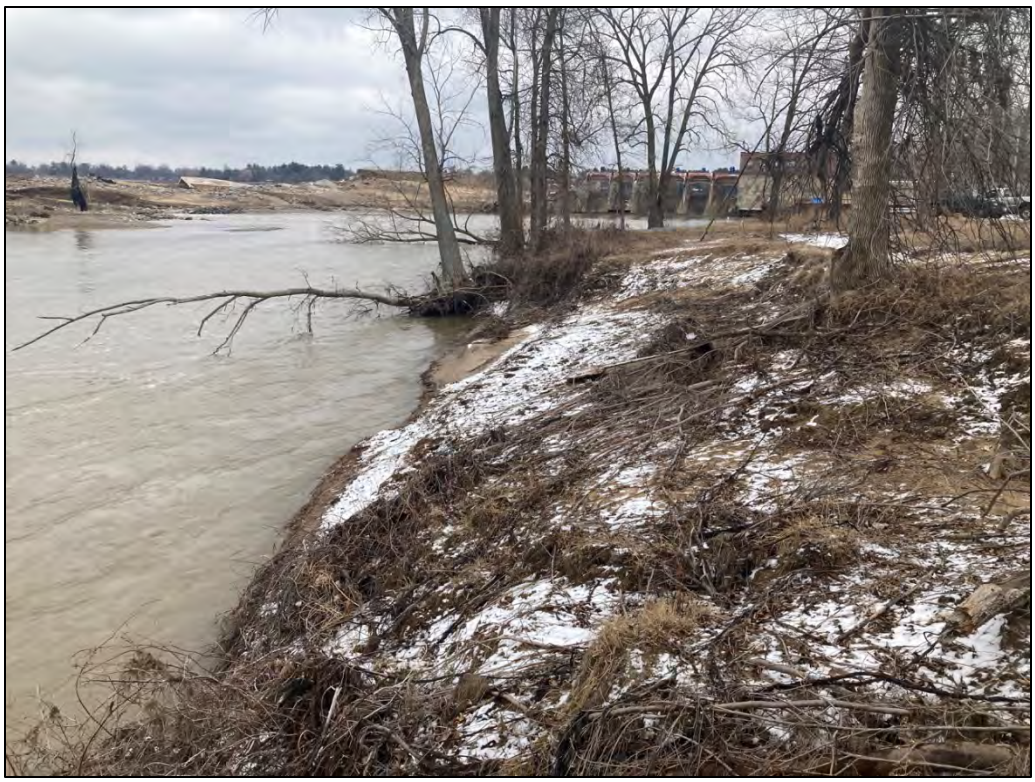
Photograph pp12 view South



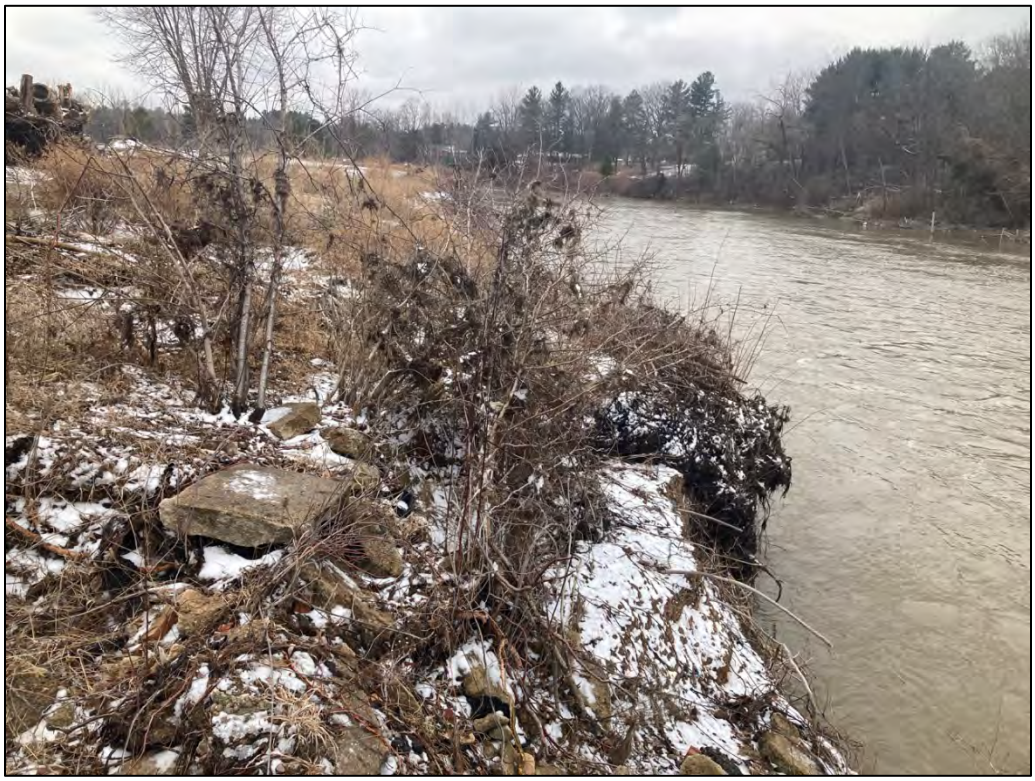
Photograph pp12 view West



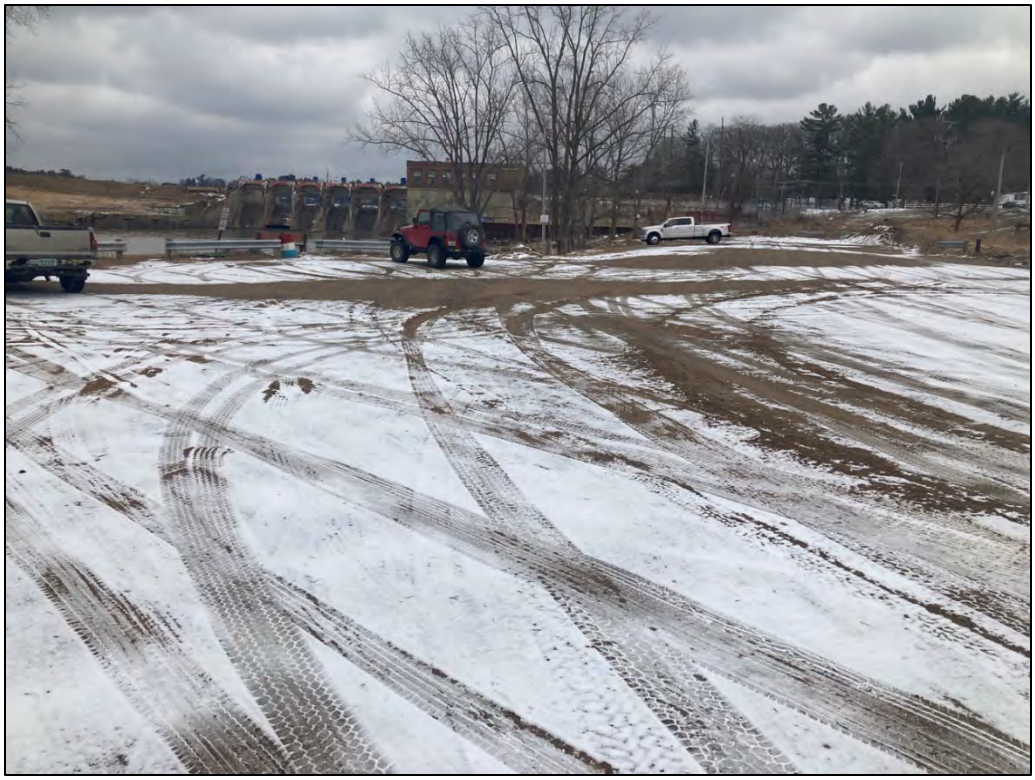
Photograph pp13 view North



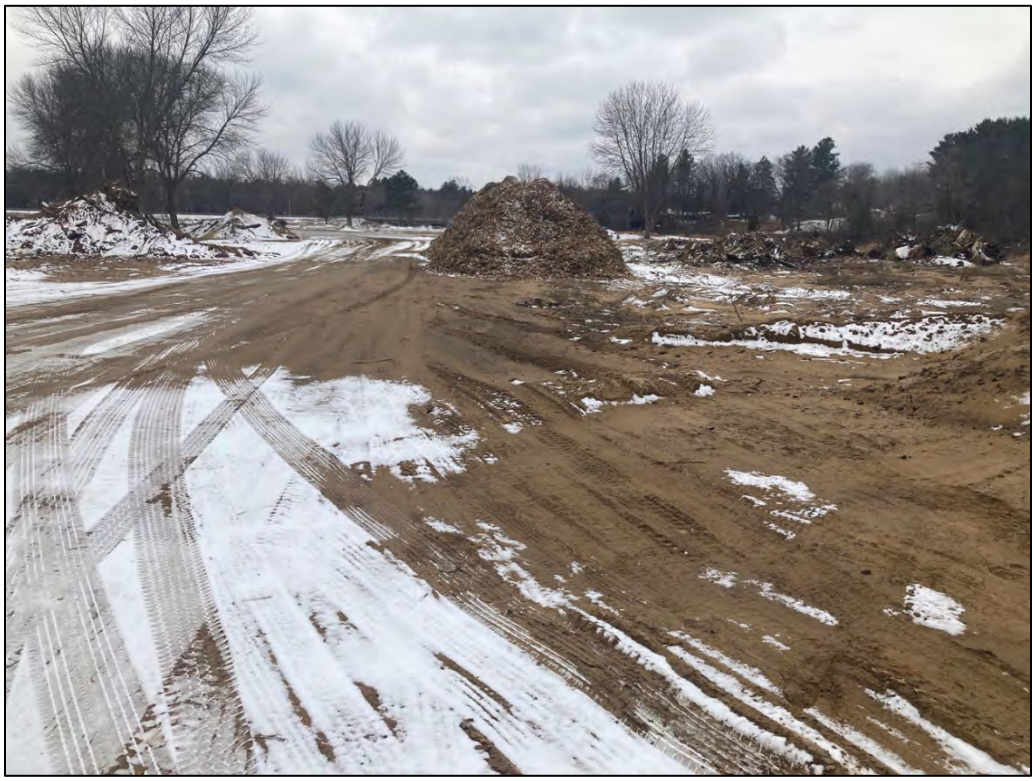
Photograph pp14 view East



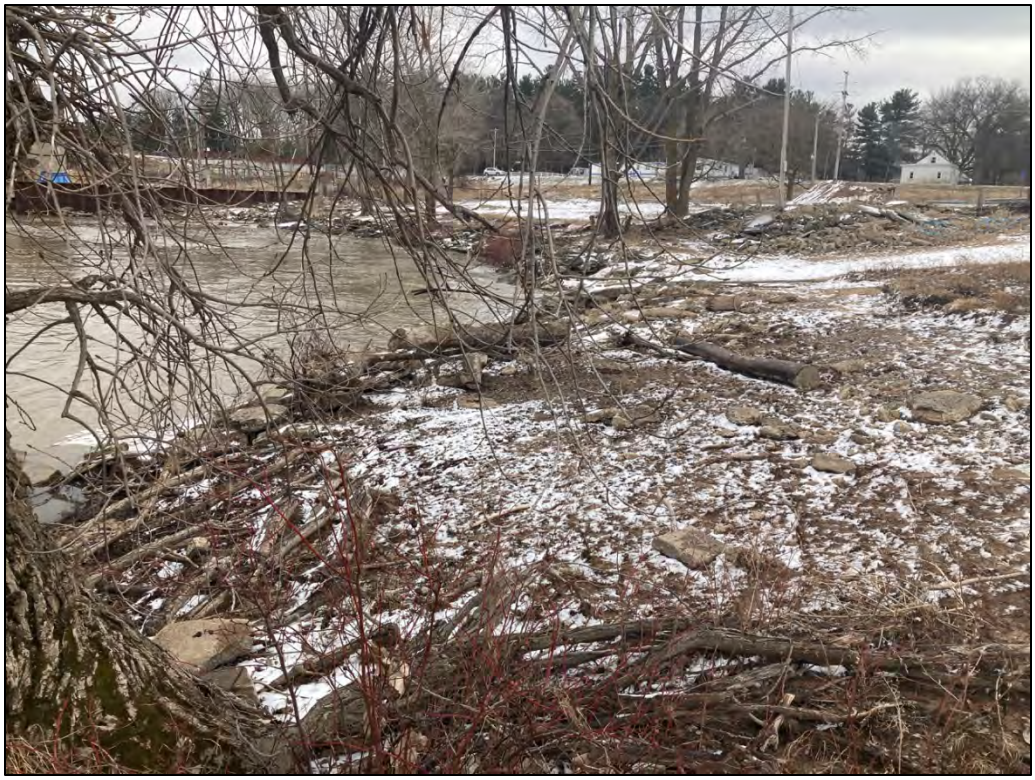
Photograph pp14 view West



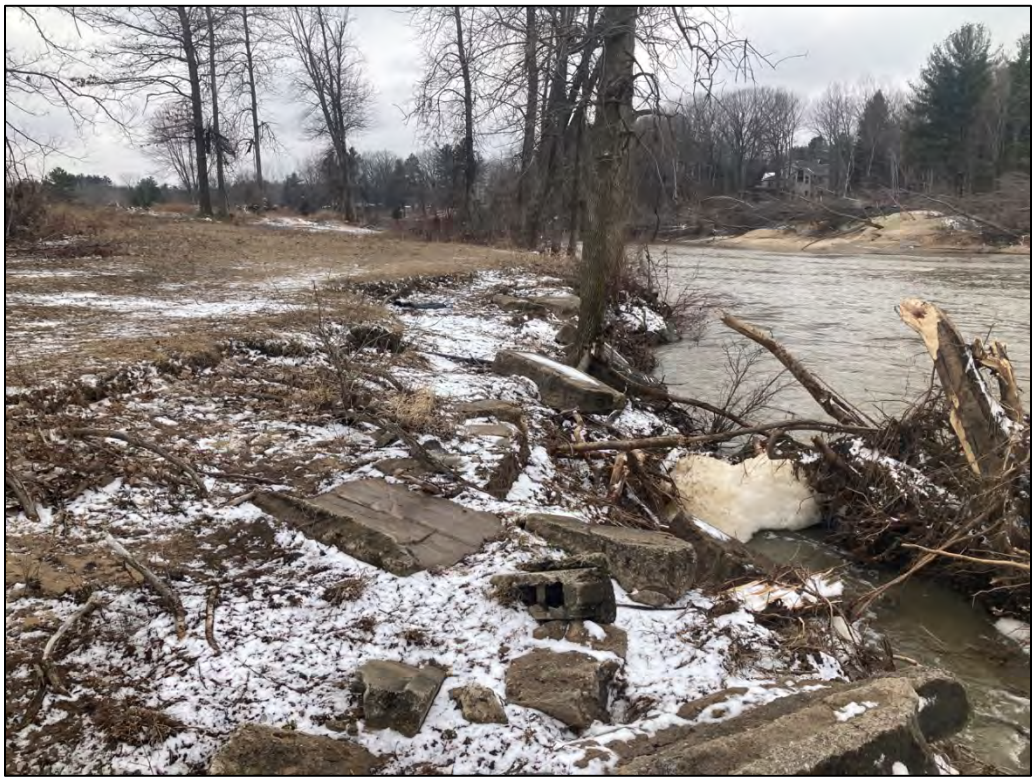
Photograph pp15 view East



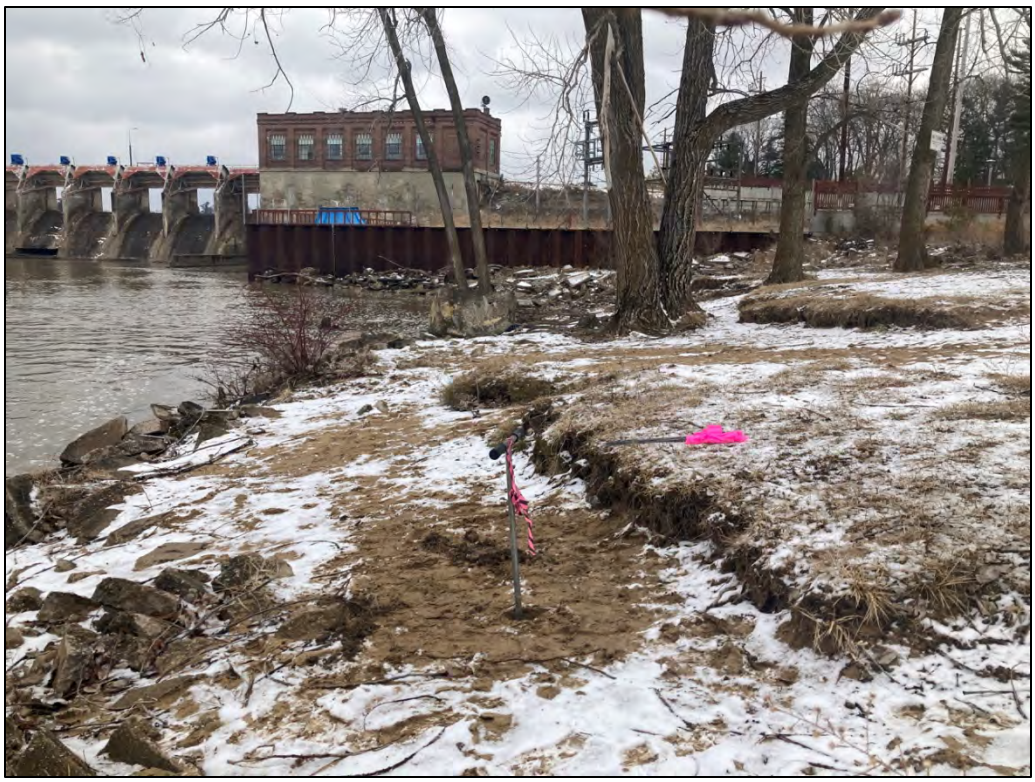
Photograph pp15 view West



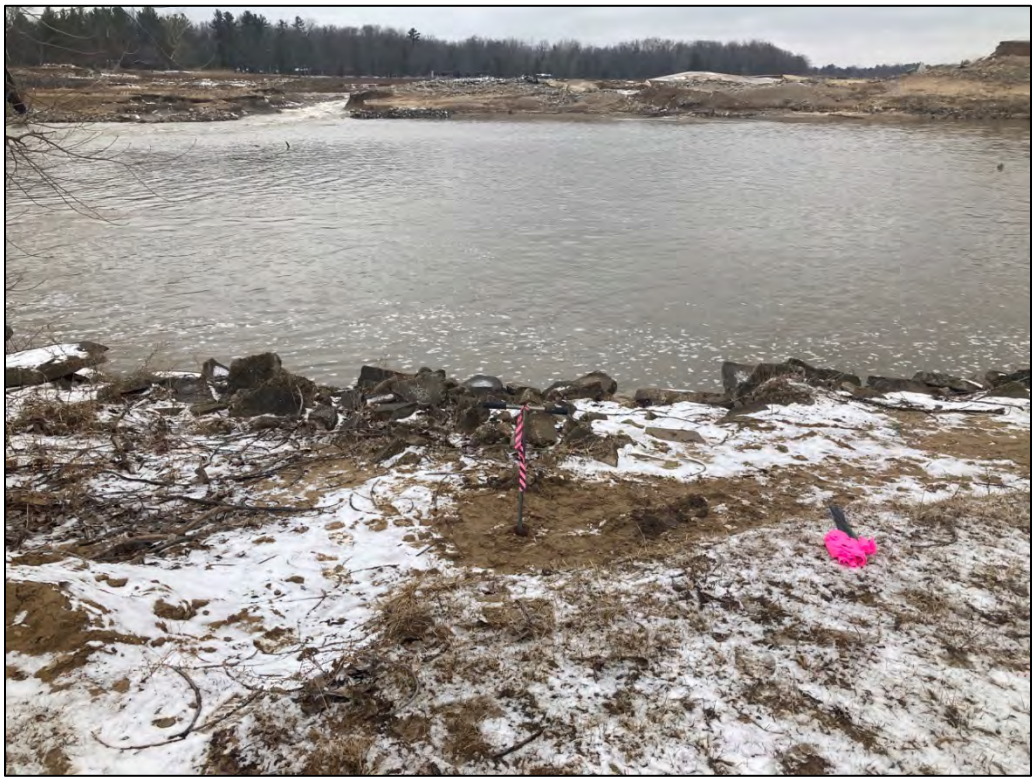
Photograph pp16 view East



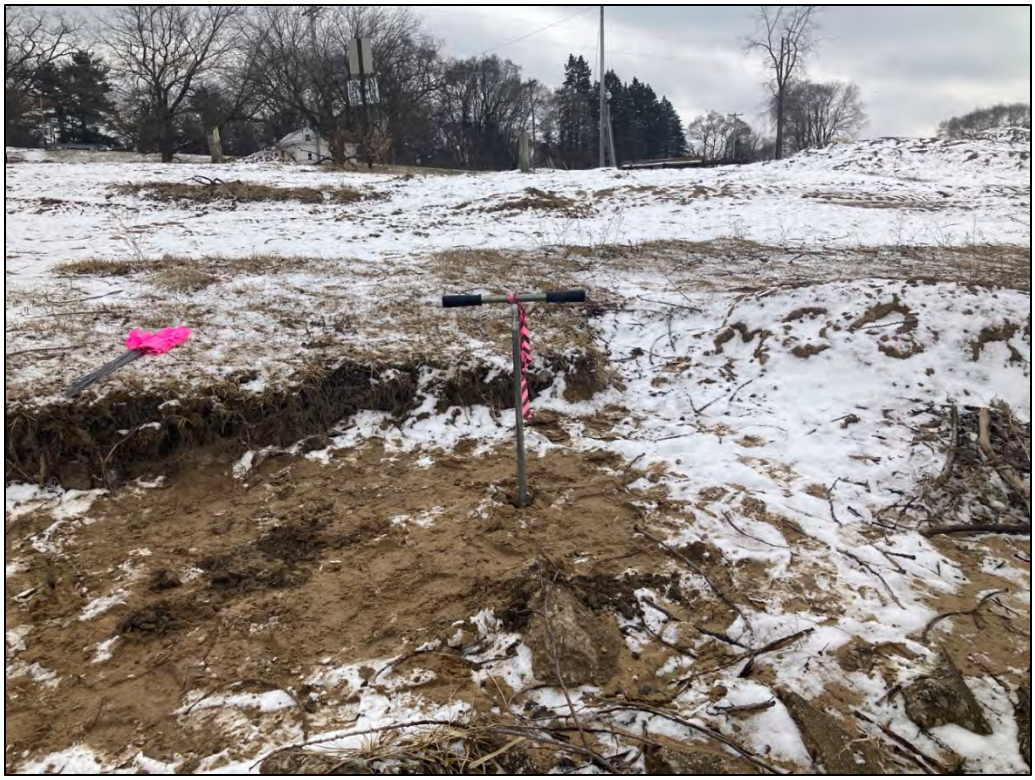
Photograph pp16 view West



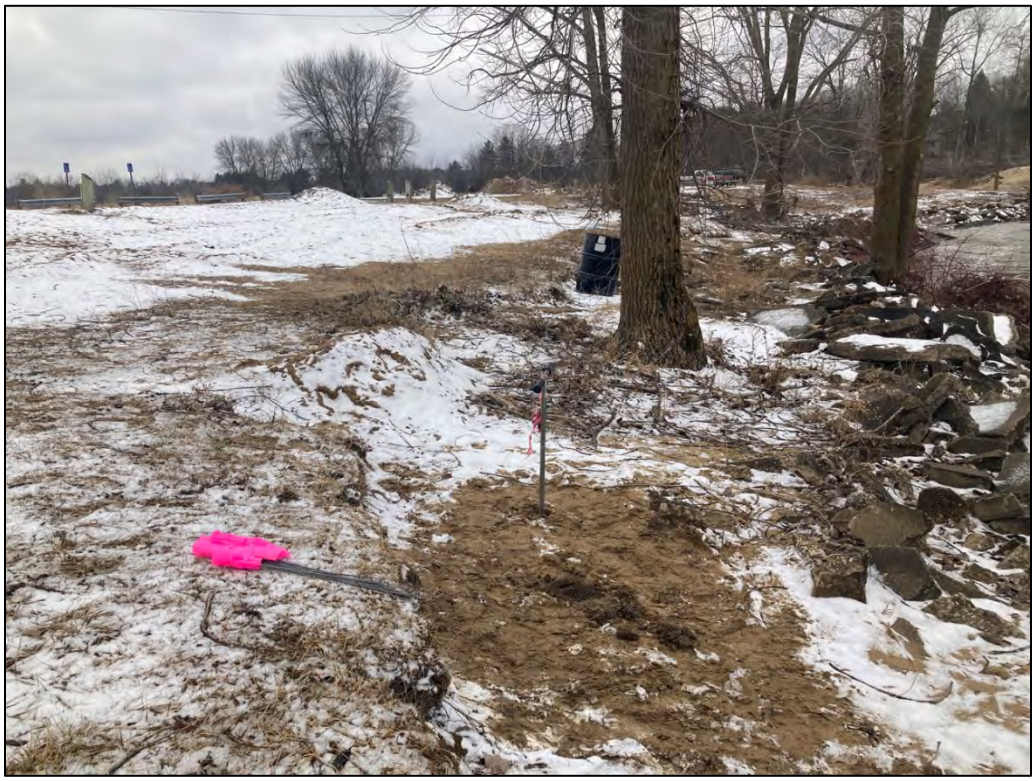
Photograph pp17 view East at dp01



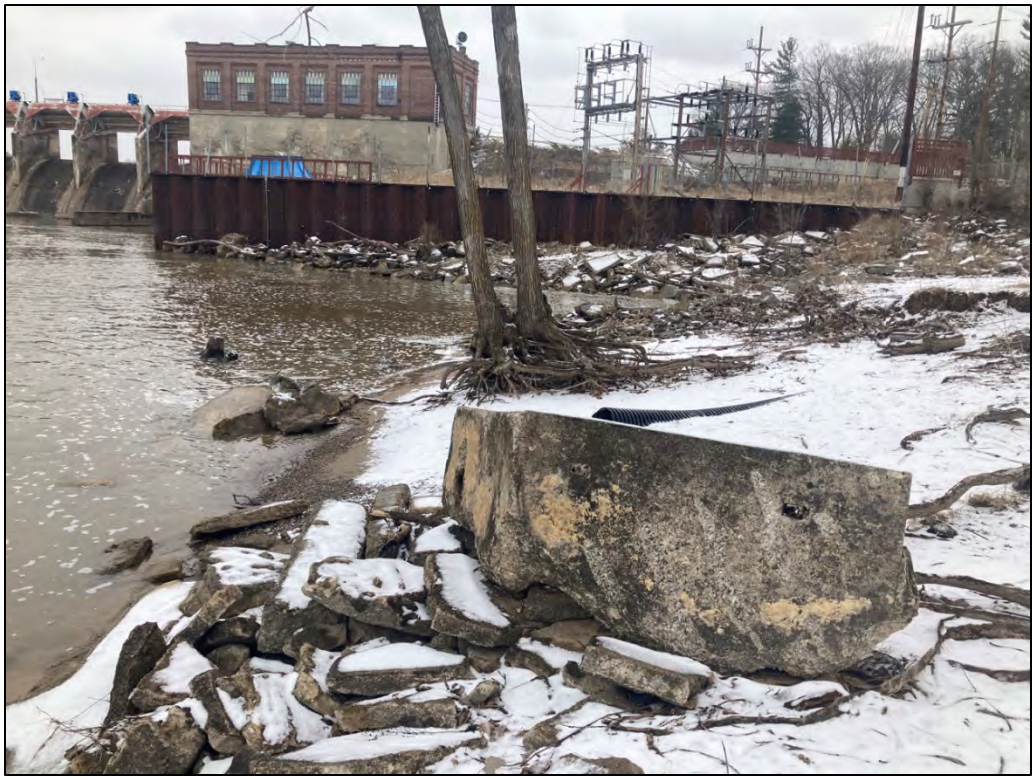
Photograph pp17 view North at dp01



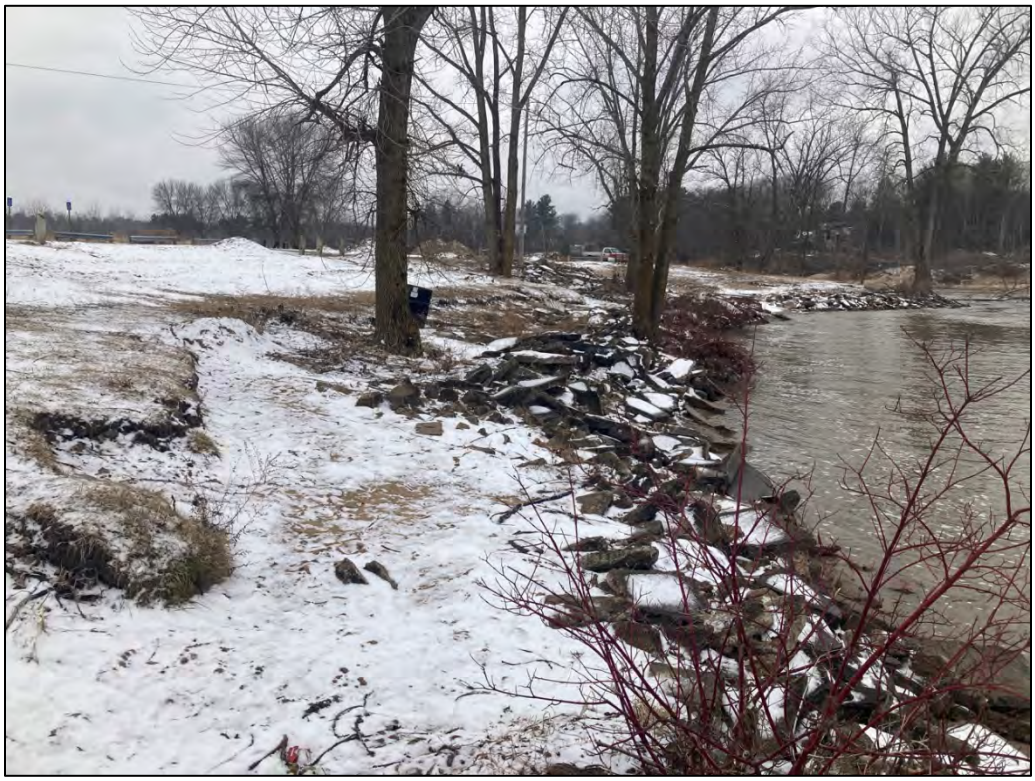
Photograph pp17 view South at dp01



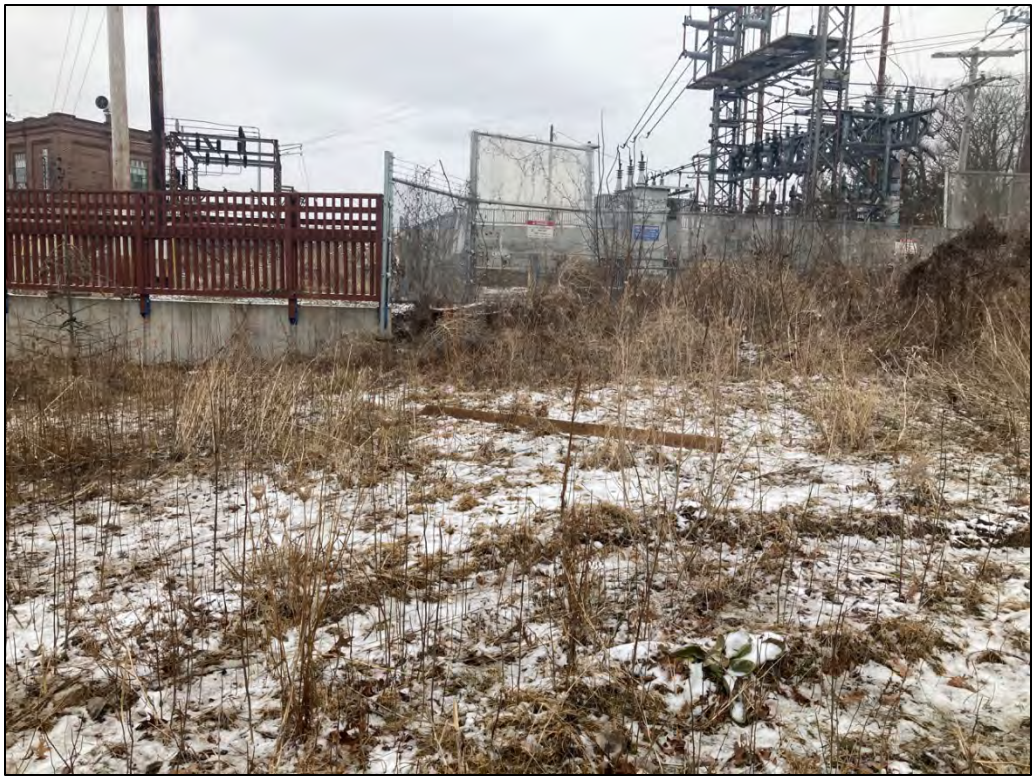
Photograph pp17 view West at dp01



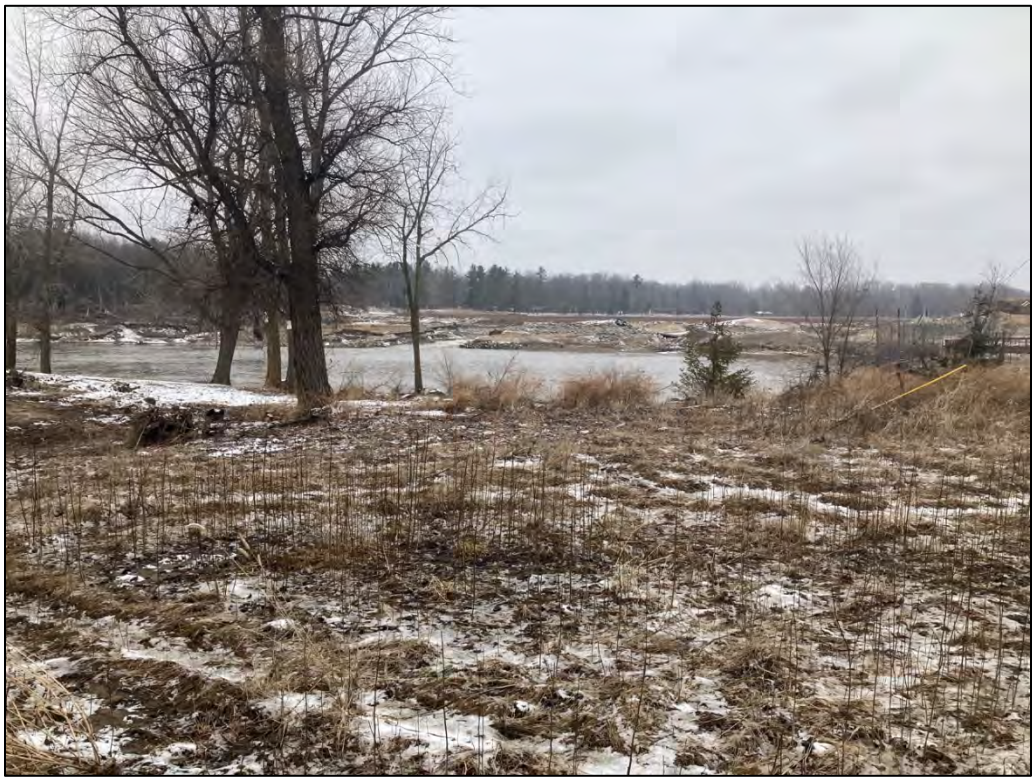
Photograph pp18 view East



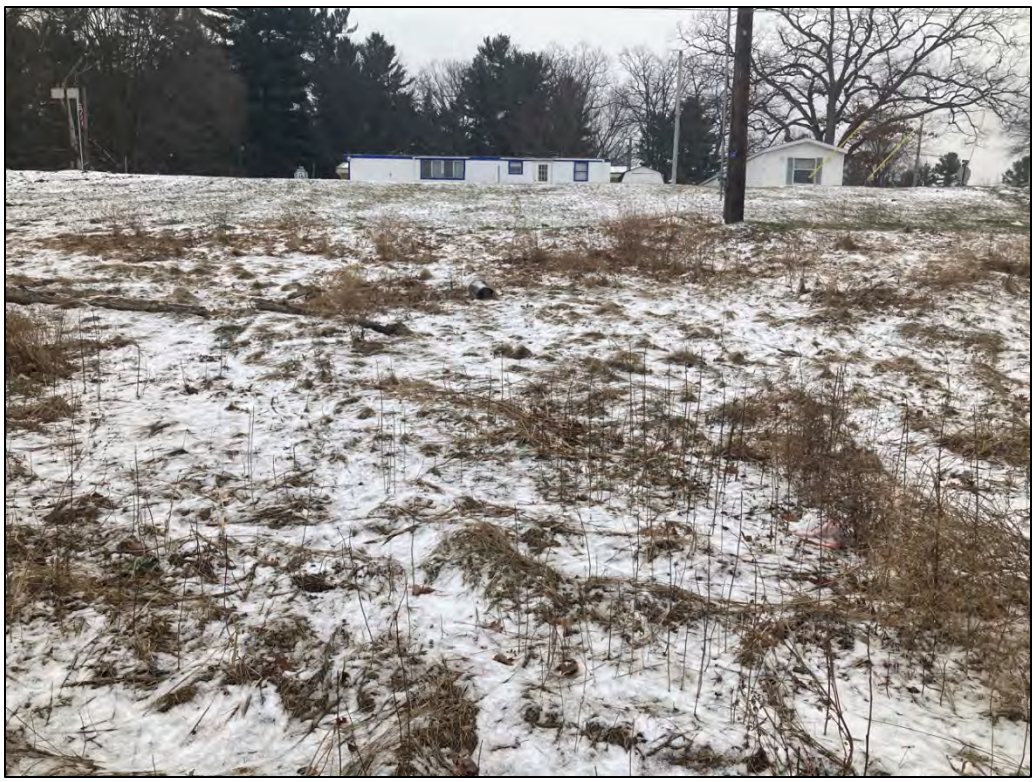
Photograph pp18 view West



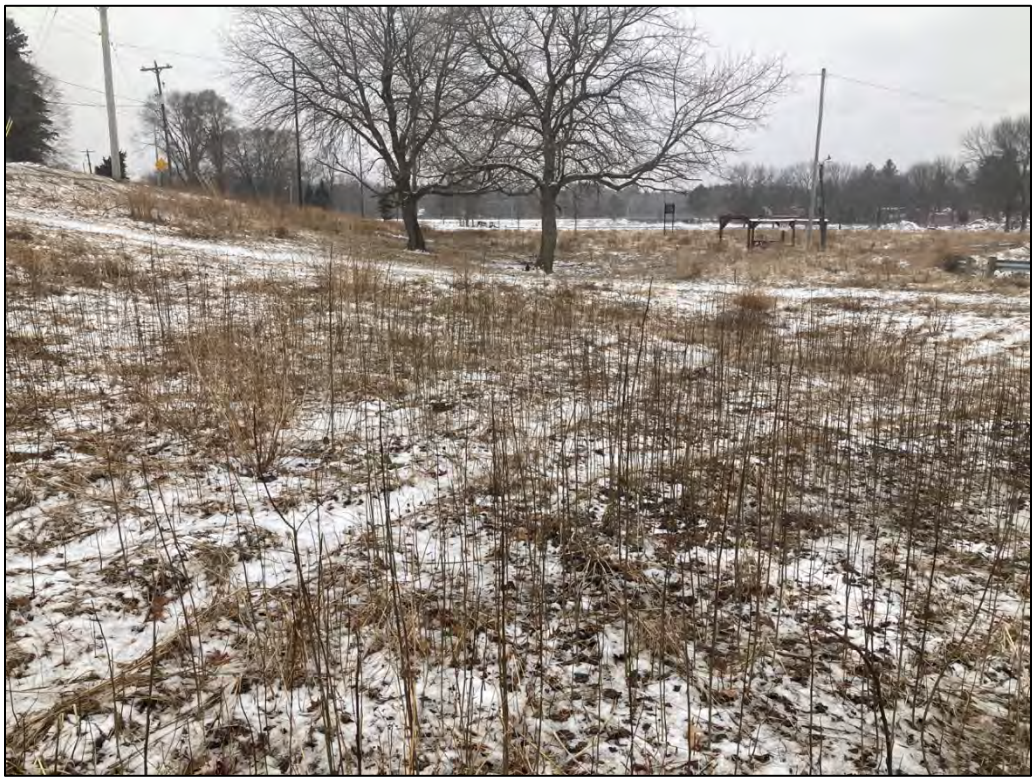
Photograph pp19 view East



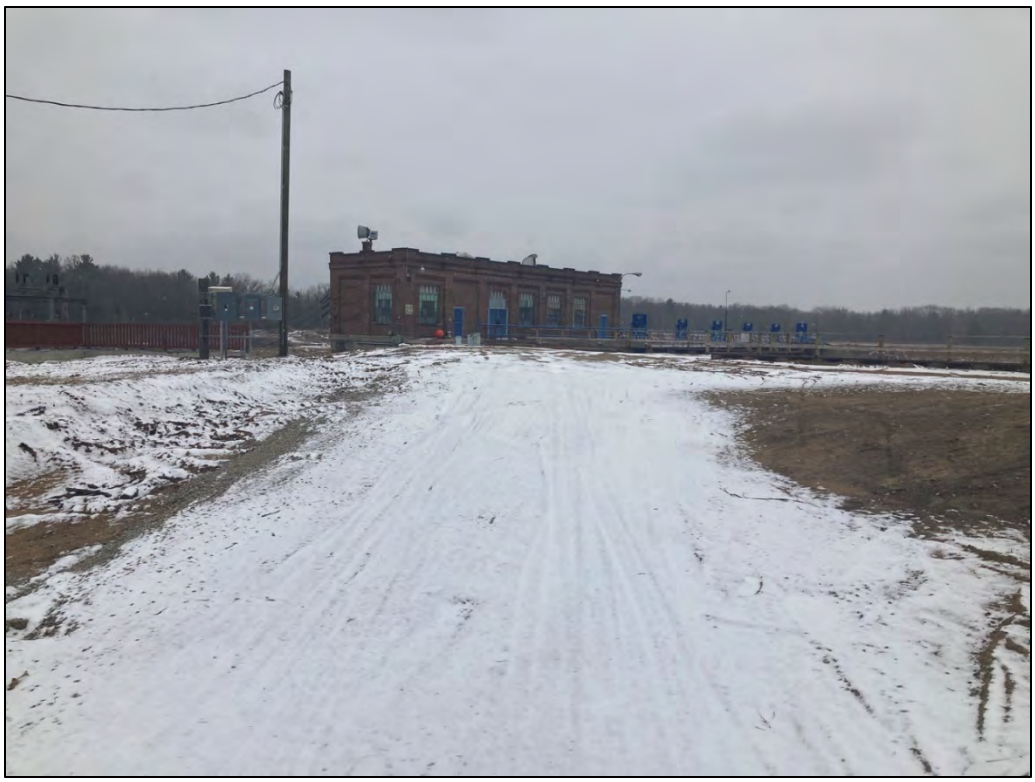
Photograph pp19 view North



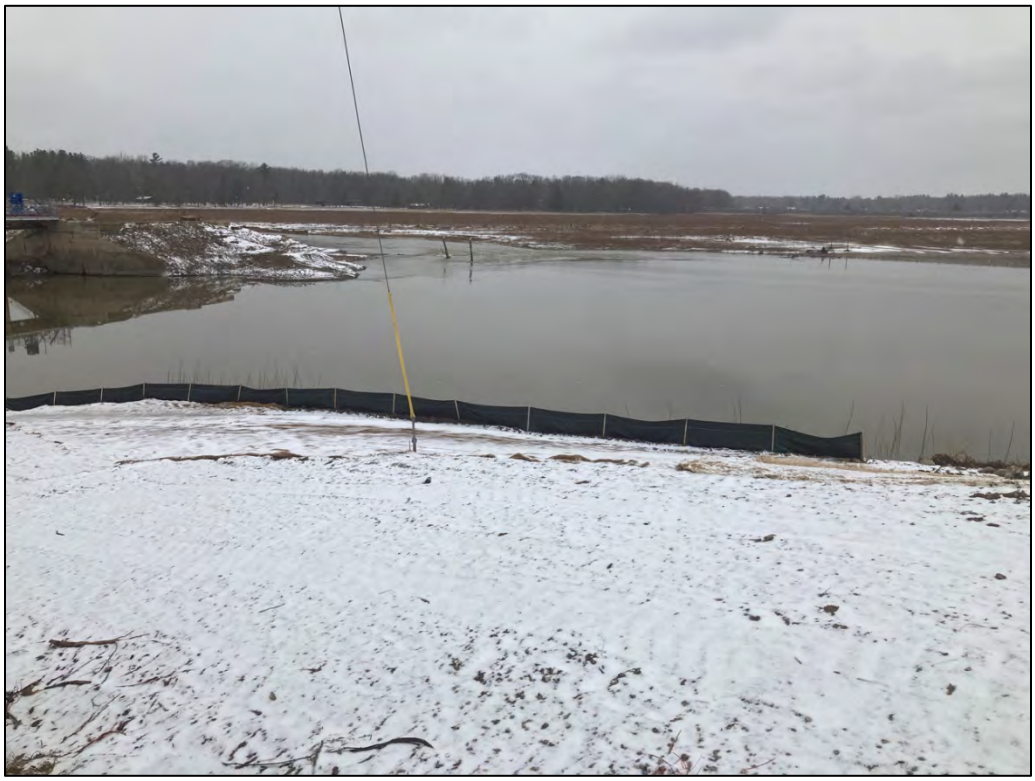
Photograph pp19 view South



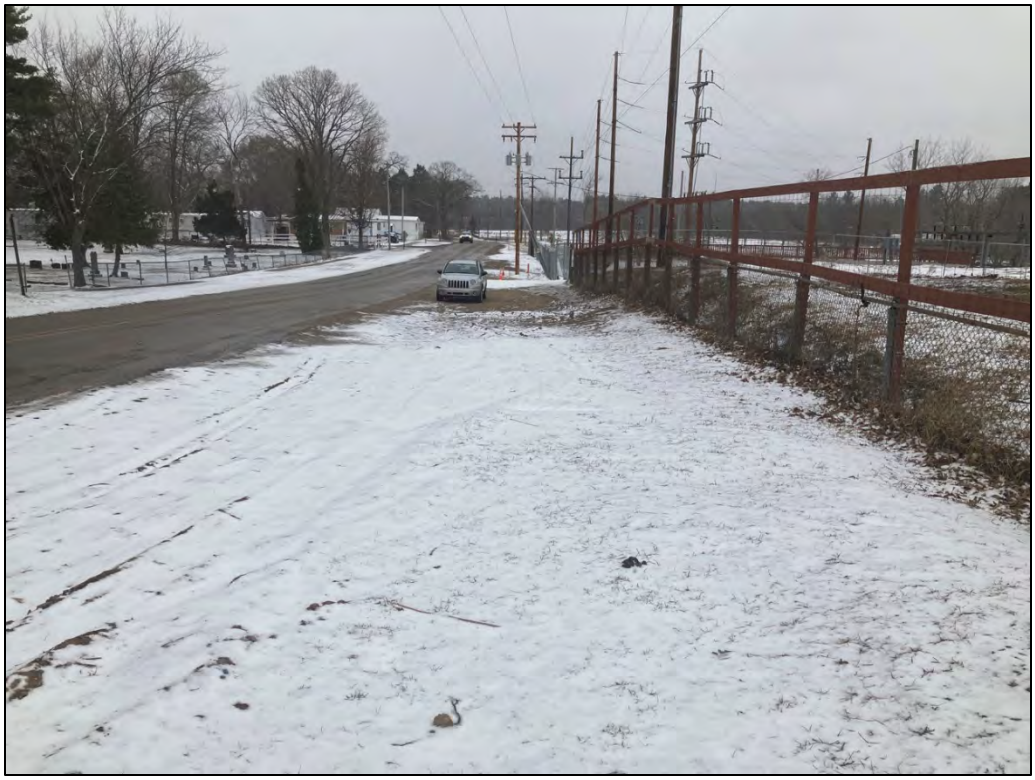
Photograph pp19 view West



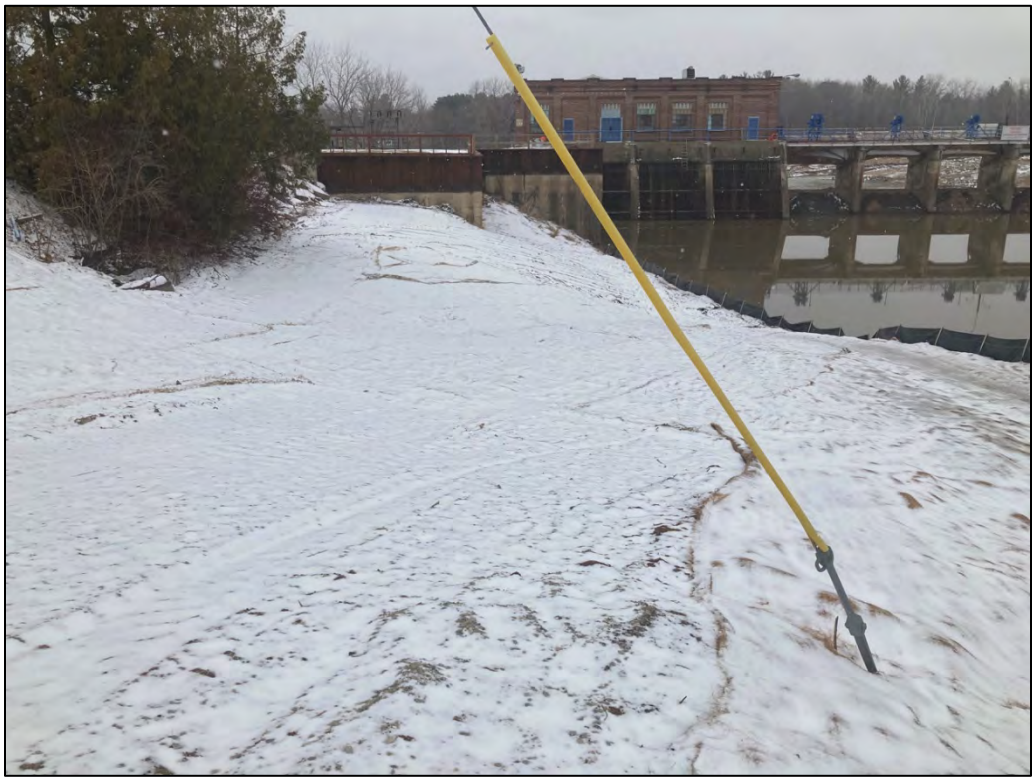
Photograph pp20 view Northwest



Photograph pp21 view Northwest



Photograph pp21 view Southwest



Photograph pp22 view West

Appendix B
Wetland Delineation Data Forms – Northcentral and Northeast Region

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Sanford Dam City/County: Midland Sampling Date: 16 Mar 2021

Applicant/Owner: Four Lakes Task Force State: MI Sampling Point: dp01

Investigator(s): R. Roos Section, Township, Range: Sec. 24, T15N R1W

Landform (hillside, terrace, etc.): terrace Local relief (concave, convex, none): none Slope %: 0-2

Subregion (LRR or MLRA): LRR L, MLRA 98 Lat: 43.676559 Long: -84.38142 Datum: WGS 84

Soil Map Unit Name: Cohoctah fine sandy loam, gravelly substratum NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

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

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)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No wetland hydrology observed at this data point location. This area is situated above the river (which is rip-rap lined) about 6' above the current water levels.

VEGETATION – Use scientific names of plants.

Sampling Point: dp01

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	25	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	25 =Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5')			
1. *Dichanthelium implicatum*	15	Yes	FAC
2. *Elymus repens*	15	Yes	FACU
3. *Phleum pratense*	5	No	FACU
4. *Symphyotrichum lateriflorum*	5	No	FAC
5. *Centaurea stoebe*	3	No	UPL
6. *Glechoma hederacea*	3	No	FACU
7. *Oenothera biennis*	2	No	FACU
8. *Plantago lanceolata*	2	No	FACU
9.			
10.			
11.			
12.			
	50 =Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. *None*			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	45	x 3 =	135
FACU species	27	x 4 =	108
UPL species	3	x 5 =	15
Column Totals:	75 (A)		258 (B

Prevalence Index = B/A = 3.44

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diamet at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

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

SOIL

Sampling Point: dp01

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 5/4	100					Sandy	
4-8	10YR 4/2	80	10YR 4/1	20	D	M	Loamy/Clayey	
8-18	10YR 3/2	100					Loamy/Clayey	
18-24	10YR 4/2	90	10YR 4/1	10	D	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Sanford Dam City/County: Midland Sampling Date: 16 Mar 2021

Applicant/Owner: Four Lakes Task Force State: MI Sampling Point: dp02

Investigator(s): R. Roos Section, Township, Range: Sec. 24, T15N R1W

Landform (hillside, terrace, etc.): shoulder slope Local relief (concave, convex, none): convex Slope %: 3-7

Subregion (LRR or MLRA): LRR L, MLRA 98 Lat: 43.678323 Long: -84.38263 Datum: WGS 84

Soil Map Unit Name: Sloan loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No ____	**within a Wetland?**	**Yes** ____	**No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)
Location is significantly disturbed due to extreme sedimentation event associated with May 2020 flooding. Vegetation is limited due to excessive sand layer. All shrub vegetation that was previously present has become blown over/uprooted as a part of this event.

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)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ? Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 21
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 18

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: dp02

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5')			
1. *Panicum capillare*	10	Yes	FAC
2. *Erigeron canadensis*	10	Yes	FACU
3. *Verbascum thapsus*	5	No	UPL
4. *Amaranthus albus*	5	No	FACU
5. *Daucus carota*	2	No	UPL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	32 =Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. *None*			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	10	x 3 =	30
FACU species	15	x 4 =	60
UPL species	7	x 5 =	35
Column Totals:	32 (A)		125 (B

Prevalence Index = B/A = 3.91

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diamet at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Vegetation is significantly disturbed in this area from the recent (May 2020) flood event. It appears that vegetation resettling this area is primarily uplan vegetation.

SOIL

Sampling Point: dp02

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 6/3	100					Sandy	
18-26	10YR 5/2	90	10YR 4/6	10	C	M	Sandy	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** ____

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Sanford Dam City/County: Midland Sampling Date: 16 Mar 2021

Applicant/Owner: Four Lakes Task Force State: MI Sampling Point: dp03

Investigator(s): R. Roos Section, Township, Range: Sec. 24, T15N R1W

Landform (hillside, terrace, etc.): footslope Local relief (concave, convex, none): concave Slope %: 3-7

Subregion (LRR or MLRA): LRR L, MLRA 98 Lat: 43.67832 Long: -84.382517 Datum: WGS 84

Soil Map Unit Name: Sloan loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
This data point was taken in an area that experienced heavy sedimentation as a result of the May 2020 flood event. Vegetation at this location is new growth. This data point is situated on the banks of the present day river channel that was recently formed as a result of the Sanford Dam failure.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- X High Water Table (A2)
- X 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)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 4
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: dp03

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Salix interior*	15	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	15 =Total Cover		
Herb Stratum (Plot size: 5')			
1. *Salix interior*	15	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	15 =Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. *None*			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	30	x 2 =	60
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	30 (A)		60 (B

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diamet at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
New vegetative growth following flood event. All other areas are devoid of vegetation due to heavy sand content/sedimentation as a result of the May 2020 flood event.

SOIL

Sampling Point: dp03

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 4/2	95	10YR 5/6	5	C	M	Sandy	
5-24	10YR 5/1	80	10YR 5/6	20	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- _X_ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _X_ **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

5" of sandy soil present ontop of what appears to be a historic clay soil surface layer. Sand likely from 2020 flood event.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Sanford Dam City/County: Midland Sampling Date: 16 Mar 2021

Applicant/Owner: Four Lakes Task Force State: MI Sampling Point: dp04

Investigator(s): R. Roos Section, Township, Range: Sec. 24, T15N R1W

Landform (hillside, terrace, etc.): shoulder slope Local relief (concave, convex, none): convex Slope %: 1-4

Subregion (LRR or MLRA): LRR L, MLRA 98 Lat: 43.6782032 Long: -84.3837387 Datum: WGS 84

Soil Map Unit Name: Sloan loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

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

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)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No evidence of wetland hydrology present at this data point location.

VEGETATION – Use scientific names of plants.

Sampling Point: dp04

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus rubra*	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	15	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. *Carpinus caroliniana*	5	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	5	=Total Cover	
Herb Stratum (Plot size: 5')			
1. *Pteridium aquilinum*	5	Yes	FACU
2. *Carex rosea*	5	Yes	FACU
3. *Carex blanda*	2	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	12	=Total Cover	
Woody Vine Stratum (Plot size: 30')			
1. *None*			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	7	x 3 =	21
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column Totals:	32	(A)	121 (B

Prevalence Index = B/A = 3.78

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diamet at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Area once contained a higher percentage of trees and shrubs. Following the May 2020 flood disaster, multiple trees and shrubs were blown over/uprooted in the area.

SOIL

Sampling Point: dp04

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 5/4	100					Sandy	
18-26	10YR 5/4	90	10YR 5/6	10	C	M	Sandy	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Sanford Dam City/County: Midland Sampling Date: 16 Mar 2021

Applicant/Owner: Four Lakes Task Force State: MI Sampling Point: dp05

Investigator(s): R. Roos Section, Township, Range: Sec. 24, T15N R1W

Landform (hillside, terrace, etc.): footslope, swale Local relief (concave, convex, none): concave Slope %: 1-3

Subregion (LRR or MLRA): LRR L, MLRA 98 Lat: 43.6782344 Long: -84.383773 Datum: WGS 84

Soil Map Unit Name: Sloan loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: ____

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

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- X High Water Table (A2)
- X 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)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 3
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: dp05

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Sambucus canadensis*	3	No	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	3 =Total Cover		
Herb Stratum (Plot size: 5')			
1. *Carex bromoides*	5	Yes	FACW
2. *Salix interior*	5	Yes	FACW
3. *Carex intumescens*	2	No	FACW
4. *Panicum capillare*	2	No	FAC
5. *Juncus effusus*	2	No	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	16 =Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. *None*			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	2	x 1 =	2
FACW species	15	x 2 =	30
FAC species	2	x 3 =	6
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	19 (A)		38 (B

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supportin data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

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Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Area once contained a higher percentage of trees and shrubs. Following the May 2020 flood disaster, multiple trees and shrubs were blown over/uprooted in the area.

SOIL

Sampling Point: dp05

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 4/2	100					Loamy/Clayey	
1-8	10YR 2/1	95	2.5YR 4/6	5	C	M	Loamy/Clayey	Prominent redox concentrations
8-24	10YR 5/1	80	10YR 5/6	20	C	M	Sandy	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)