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DRAFT REPORT
OF
SPRINGFIELD LAKE NO. 1
OUTLET STRUCTURE & CHANNEL STUDY

Task A – Conceptual Plan
Interim Report

Springfield Township, Summit County

Prepared For:

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County of Summit
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DLZ Job No. 2322-6015.00

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List of Acronyms

In preparation of this document, the following acronyms have been used:

AMC	Antecedent Moisture Condition
CMP	Corrugated Metal Pipe
CN	Curve Number
CPP	Corrugated Plastic Pipe
HEC-HMS	Hydraulic Engineering Center – Hydraulic Modeling System
HEC-RAS	Hydraulic Engineering Center – River Analysis System
GIS	Geographic Information System
LiDAR	Light Detection and Ranging
NAD	North American Datum
NAVD	North American Vertical Datum
NGVD	National Geodetic Vertical Datum
NOAA	National Oceanic and Atmospheric Administration
OGRIP	Ohio Geographically Referenced Information Program
OSIP	Ohio Statewide Imagery Program
PVC	Polyvinyl Chloride
RCN	Runoff Curve Number
RCP	Reinforced Concrete Pipe
SCS	Soil Conservation Services
Tc	Time of Concentration
USACE HEC-SSP	United States Army Corps of Engineers Hydraulic Engineering Center Statistical Software Package
USGS	United States Geological Survey

1.0 Executive Summary

DLZ was contracted by Summit County Office of the Engineer to perform an evaluation of and recommend improvements to the Springfield Lake Outlet Structure and Channel. The Springfield Lake outlet channel often requires dredging to remove debris that builds up over time. DLZ studied approximately 5,400 LF of the channel from the Springfield Lake Outlet Structure North to the City of Akron corporation limits. The improvements discussed in this report intend to mitigate debris build up, reduce long term maintenance, and improve water quality in the channel. This report discusses the following topics: surveying, waters investigation, hydraulic and hydrological analysis, structure evaluations, proposed channel design, and recommended maintenance schedules. DLZ recommends no changes to the Outlet Structure and some modifications to the outlet channel geometry at strategic locations along with on-going maintenance.

2.0 Introduction

Summit County (the County) plans to perform improvements at the Springfield Lake (the Lake) outlet structure and channel. Springfield Lake is located in Springfield Township, just South of The City of Akron border, see **Figure 1** below. The existing lake outlet structure and channel flows North to the City of Akron limits, through commercial and residential areas. In the past, Summit County has had to dredge the channel which outlets Springfield Lake to clear debris and allow continuous flow. The County intends to perform these improvements to reduce the need for future maintenance and dredging. The proposed channel improvements will be designed to provide adequate capacity, reduce bank erosion, remove encroachments, and provide maintenance access and easements, as required.

Figure 1: Springfield Lake General Project Area

DLZ has performed Preliminary Waters Investigations, including a desktop analysis and field visits to identify potential wetlands and streams in the project area. Site visits have also been performed to identify obstructions and illicit discharges along the channel. Survey has been performed in the project area including critical points such as drainage structures, culverts, channel profiles and sections within the study limits. The watershed area draining to Springfield Lake has been verified using record plans, LiDAR and GIS. Hydrologic and hydraulic (H&H) analysis has been performed including the creation of a hydrologic model utilizing HEC HMS software.

3.0 Existing Information Review

DLZ reviewed the existing information provided by the County, including record drawings and reports. A site visit to the Springfield Lake outlet channel was performed on August 1, 2023. DLZ personnel walked the entire length of the channel to find and document any illicit discharges, outfalls, bridges, and obstructions. Photos were taken upstream and downstream every 250 feet along the outlet channel and at any location with discharges/outfalls/obstructions. No illicit discharges were identified. **Appendix A** contains Conceptual Plans for the Springfield Lake project area. Existing conditions are shown in these conceptual plans, including possible structure encroachments and proposed maintenance drives. A Field Walk Photo Log from the site visit can be found in **Appendix B**. A list of notable areas identified from this site visit is shown in **Table 1** below.

Photo No. 28 in **Table 1** shows an active flow outfall into the channel. There was no indication that this is a sanitary outfall; however, it is recommended to perform water quality testing to confirm.

The following existing utilities identified along the channel route may need to be relocated: at STA 9+50 there is an approximately 8” unknown utility pipe crossing the channel, and at STA 39+25 there are two existing sanitary manholes within channel limits that could be impacted by maintenance activities. There are also multiple bridges and one fence crossing over the channel between STA 14+00 and STA 18+00 that will need to be protected or potentially removed and replaced during construction.

Table 1: Notable Items from August 1, 2023 Field Walk Photo Log

Photo No.	Station	Item Observed	Size	Material	Comments
N/A	0+00	N/A	NA	N/A	Begin study area
8	9+50	Pipe Crossing	Approx. 8”	Ductile Iron	Closed pipe crossing above channel. Wooden bench resting against pipe.
9	10+50	Pipe Outfall	18”	CMP	Storm pipe outfall on East side of channel
12	11+00	Pipe Culvert	96” x 48”	CMP	Storm culvert under Canfield Road
13	11+50	Pipe Culvert	48”	RCP	Twin storm pipes with overgrown brush under Waterloo Road
14	13+00	Pipe Culverts	48”	RCP	Three storm culverts under Waterloo Road
16	13+00	Pipe Culverts	48”	CMP, three present	Three storm culverts
17	14+00	Bridge	18 ft wide, 34” tall above water level	Concrete and steel	Driveway bridge. 18 ft wide channel with cinder block walls. There is 1 steel beam crossing between bridges at STA 14+00 and 14+75.
19	14+75	Bridge	10 ft wide	Concrete and steel	Pedestrian Bridge. 10 ft wide concrete channel walls. There is 1 steel beam crossing between bridges at STA 14+00 and 14+75.
21	15+50	Bridge	20 ft wide	Wood	Wooden pedestrian bridge. 20 ft wide channel. No longer concrete channel walls at this point.
23	17+00	Fence	Approx. 6 ft tall fence	Chainlink	Fence spans entire length of creek. Open fence at bottom.
24	17+50	Bridge	14 ft wide	Concrete and steel	Bridge driveway crossing. 14 ft wide channel.
N/A	20+50	Pipe Outlet	6”	PVC	Pipe noted, no photo taken.

28	21+25	Pipe Outlet	30”	CPP	Active flow, no indication of sanitary flow noted by survey or field crews.
29	22+25	Pipe Outlet	30”	CPP	Chainlink fence and silt fence over top half of open end pipe.
36	25+50	Tributary Inlet	N/A	N/A	Stream inlet to the Springfield Lake outlet channel.
37	26+50	Pipe Outlet	12”	CPP	Pipe outlet embedded into channel wall, red spray paint marker on top of pipe.
38	27+00	Pipe Outlet	15”	CPP	Pipe outlet into channel.
41	29+50	Pipe Outlet	12”	PVC	Pipe outlet into channel.
44	30+75	Pipe Outlet	18”	CPP	Pipe outlet into channel.
49	33+75	Tributary Inlet	N/A	N/A	Stream inlet into the Springfield Lake outlet channel.
50	34+00	Pipe Outlet	10”	PVC	Pipe outlet into channel.
59	44+00	Debris	N/A	N/A	Debris build up in channel, fell tree branches, wooden pallets, misc. items. Spans ¾ width of channel.
65	48+50	Pipe Outlet	84”	RCP	Pipe outlet into channel.
66	51+00	Culvert	90”	CPP	Culvert under Shadybrook Drive. Debris blocking entire length of channel at start of culvert. Fell tree branches, wooden pallets, and sport balls in debris. After road crossing here, the channel is 12 ft wide concrete lined.
70	52+00	Downspout Outlet	4”	PVC	Home downspouts outlet into channel. Many homes in this area downspouts outlet to channel.
72	54+00	Downspout Outlet	4”	PVC	Home downspouts outlet into channel.

75	56+00	Headwall and pipe	12”	Metal	Pipe outlet headwall into channel, just past corporation limit. End of Field Walk Photo Log.
N/A	56+00	N/A	N/A	N/A	End of study area

4.0 Preliminary Waters Investigation

A preliminary investigation was conducted to identify wetlands, streams, and other regulated waters in the Springfield Lake study area. A desktop wetlands analysis was performed, this included reviewing Federal Emergency Management Agency (FEMA) flood risk reports and maps, Natural Resources Conservation Service (NRCS) Summit County soil reports, and National Wetlands Inventory (NWI) maps. These documents can be found in **Appendix C**.

Similar to the site visit mentioned above, DLZ personnel walked the length of the outlet channel on August 7, 2023, to find and document any features regulated as Waters of the United States (WOTUS). Photos from this site visit are also found in **Appendix C**.

Based on the desktop analysis and site visit investigations, DLZ determined the possible wetland boundary as WOTUS, as shown in **Appendix C – Figure 1**. There were also two streams identified in the field, see photos 5 – 7 in **Appendix C Site Visit Photo Log**.

A list of threatened and endangered species was obtained from the Fish and Wildlife Service, Ohio Ecological Services Field Office. A total of 4 threatened, endangered or candidate species were identified in the project area: Indiana Bat, Northern Long-eared Bat, Tricolored Bat, and Monarch Butterfly. The detailed report is attached in **Appendix D**.

A Section 106 Project Summary Form was submitted to the Ohio Historic Preservation Office (OHPO). It was determined by the Ohio State Historic Preservation Office (SHPO) that the proposed project will not affect historic properties and no further coordination is necessary at this time. The Ohio SHPO response letter is attached in **Appendix E**.

4.1 WETLAND DELINEATION

A site visit to determine wetland boundaries was conducted on April 16 and 17, 2024. A summary of findings is included in **Appendix F – Waters of the US Determination Report**.

5.0 Survey

Survey has been performed in the Springfield Lake project area, including critical points such as drainage structures, culverts, channel longitudinal profile, and channel sections. Horizontal and vertical controls were based on the Ohio North State Plane coordinate system NAD 83 and NAVD 88 datums, respectively. Summit County GIS mapping data was used to determine existing property lines. OGRIP LiDAR/GIS data was utilized to create a base surface in Civil 3D.

A total of ten (10) benchmarks were set for future construction use. The 20 foot channel corridor was surveyed including 50 feet on either side; this includes fifteen (15) cross sections along the channel corridor. Pipe inverts and sizes of drainage structures and culverts located have been included in the survey.

5.1 EASEMENTS

An existing easement description along the Springfield Lake outlet channel was provided by Summit County Engineers in the development of this report. See **Appendix G** for the Springfield Lake Outlet Elevations study. As shown at the end of the study in **Appendix G**, there is an existing "Width of Right of Way 16.5 feet each side of center line of ditch." This easement has been added into the Conceptual Plans in **Appendix A**. Proposed easements will be evaluated along the chosen proposed outlet channel alignment in the next phase of design during Task B. Approximate locations of proposed permanent easements is shown in the Conceptual Plans in **Appendix A**.

Table 2: Proposed Easements within Project Area

No.	Parcel ID	Approximate Stations	Approximate Dimensions/Area	Address	Owner
1	5110846	STA 9+00 TO STA 10+50	1,125 SF	CANFIELD RD	OHIO EDISON CO
2	5109154	STA 11+20 to STA 11+70	290 SF	2755 E. WATERLOO RD	HENRY DANIEL W
3	5109141	STA 13+00 to STA 15+50	3,845 SF	2755 E. WATERLOO RD	HENRY DANIEL W
4	5107269	STA 15+50 to STA 16+50	2,007 SF	1293 SHANAFELT AVE	HENRY DANIEL
5	5106416	STA 16+50 to STA 17+00	1,170 SF	1283 SHANAFELT AVE	LANHAM JAMES E

6	5106417	STA 16+50 to STA 17+00	333 SF	1283 SHANAFELT AVE	LANHAM JAMES E
7	5110178	STA 17+00 to STA 22+75	10,000 SF	1259- 1273 SHANAFELT AVE	STORAGE ZONE ENTERPRISES LLC
8	5110796	STA 21+00 to STA 23+25	1,600 SF	1116 CANTON RD	OREILLY AUTO ENTERPRISES LLC
9	5109983	STA 23+25 TO STA 23+50	65 SF	CANTON RD	HANNAH G STEPHEN & MARY K
10	5108991	STA 23+50 TO STA 25+00	160 SF	1100 CANTON RD	HANNAH G STEPHEN & MARY K
11	5103735	STA 22+75 TO STA 24+25	2,260 SF	1253 ABINGTON RD	CUMMINGS WILLIAM TRUSTEE
12	5105429	STA 24+25 TO STA 24+75	866 SF	1225 ABINGTON RD	PORTER SETH TRUSTEE
13	5107489	STA 24+75 TO STA 25+50	940 SF	1221 ABINGTON RD	WINCH BRENDON LEE
14	5102890	STA 25+50 TO STA 26+50	1,720 SF	1213 ABINGTON RD	POWELL BOBBIE J
15	5100521	STA 26+50 to STA 32+25	0.80 ACRE	ABINGTON RD	BELACIC FRANK J III
16	5100510	STA 32+25 to STA 33+25	6,250 SF	CANTON RD	BELACIC FRANK J III
17	5100511	STA 33+25 to STA 34+50	1,550 SF	CANTON RD	BELACIC FRANK J III
18	5100512	STA 34+25 to STA 34+50	141 SF	SHADYBROOK (REAR) DR	BELACIC MICHAEL
19	5100504	STA 34+50 to STA 38+50	0.40 ACRE	SHADYBROOK DR	BELACIC FRANK J III
20	5108782	STA 34+00 to STA 34+50	840 SF	SHADYBROOK DR	SAMPLE MOLLY E
21	5100531	STA 38+25 TO STA 40+00	945 SF	954 CANTON RD	FRANKS MOBILE HOMES PARK LCC
22	5108201	STA 38+50 to STA 39+50	1,940 SF	905& 1/2 SHADYBROOK DR	MORRIS KEITH O

23	5108875	STA 39+50 TO STA 41+00	4,875 SF	905 SHADYBROOK DR	HUFF LENA M
24	5108874	STA 41+00 TO STA 44+25	0.30 ACRE	895 SHADYBROOK DR	GIBSON JESSE
25	5106512	STA 44+25 TO STA 45+50	3,392 SF	873 SHADYBROOK DR	GOVIA MARY LOU
26	5111102	STA 45+50 TO STA 47+50	7,590 SF	849 SHADYBROOK DR	WEINSCHENK DANIEL
27	6763493	STA 47+50 TO STA 49+25	5,940 SF	SHADYBROOK DR	THEO LEI EBENEZER BAPTIST CHURCH
28	5111101	STA 49+25 TO STA 51+00	6,250 SF	825 SHADYBROOK DR	THEO LEI EBENEZER BAPTIST CHURCH
29	5103940	STA 51+50 TO STA 52+50	3,486 SF	2495 HILLSTOCK AVE	MILHOAN DOUG
30	5103941	STA 52+50 TO STA 53+00	2,460 SF	2495 HILLSTOCK AVE	MILHOAN DOUG
31	5103939	STA 53+00 TO STA 53+50	2,025 SF	HILLSTOCK AVE	MILHOAN DOUG
32	5102976	STA 53+50 TO STA 54+00	1,500 SF	2481 HILLSTOCK AVE	TROUT DAVID B

6.0 Hydrologic and Hydraulic (H&H) Modeling

Hydrologic & Hydraulic analysis for the Springfield Lake and outlet channel has been performed. Hydrologic models were developed using HEC-HMS software, version 4.10, to determine the design flows at the lake outlet, and several intermediate locations downstream along the outlet channel for various recurrence intervals. The event of specific interest is the 100-year event since this is the event of interest for FEMA. Hydraulic models were developed for the lake and its outlet channel using a 1-D steady state HEC-RAS to compute the water surface elevation along the outlet channel using HEC-RAS software, version 6.2. HEC-RAS results were used to assess the capacity of the existing bridges and culverts, and to provide adjustments to channel geometry to improve conveyance and minimize sediment deposition. An iterative procedure was used to ensure consistency between the HEC-HMS and HEC-RAS models at the lake outlet structure.

6.1 LAKE OUTLET HYDROLOGY

The watershed at the lake outlet, as shown in **Figure 2**, is divided into 4 subbasins, based on basin development patterns, topography, and the State of Ohio OSIP LiDAR information (2007). The total area of these subbasins is 3.58 sq mi. NOAA Atlas 14 database was employed to generate the design storm for return periods ranging from 5 years to 100 years. The design storm duration was adopted as 24 hours.

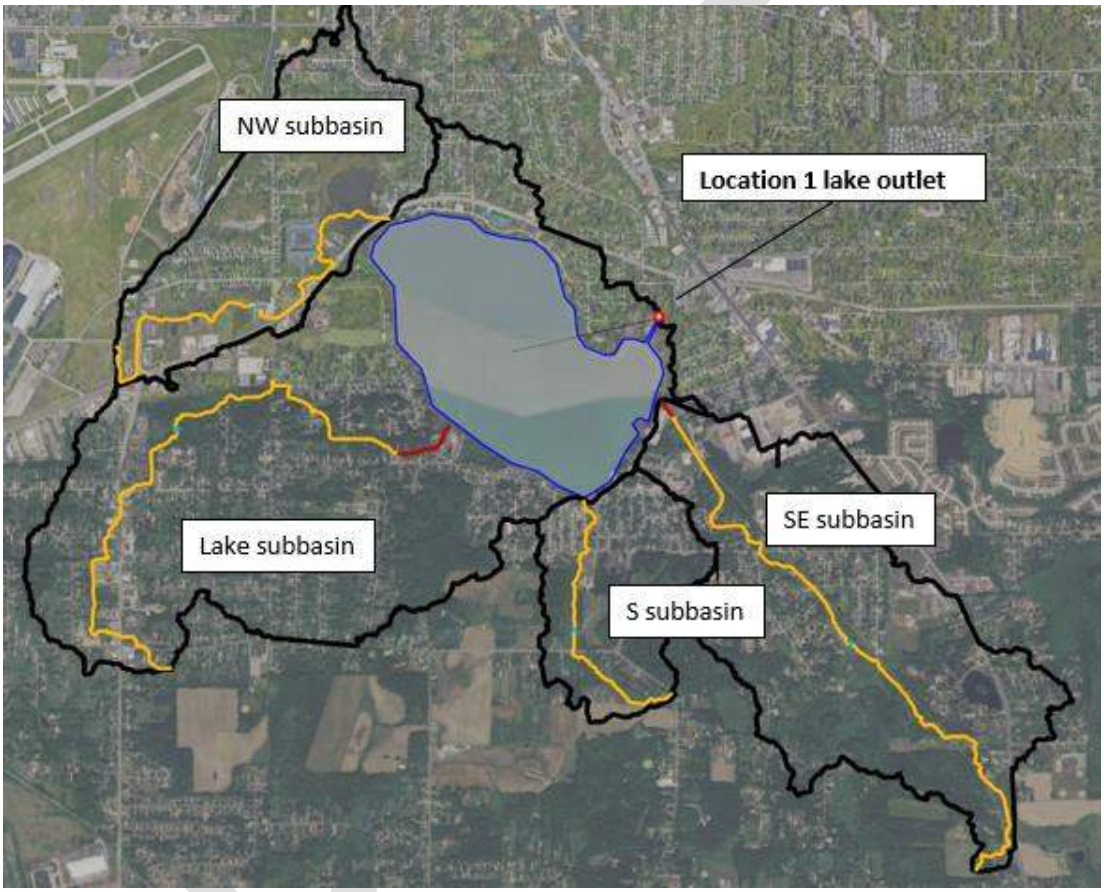


Figure 2: Delineation of Springfield Lake Watershed at the Lake Outlet

The SCS Runoff Curve Number method was used to compute the runoff losses based on soil type and land use type within each subbasin. The soil type distribution and land use distribution of the study area are shown in **Figures 3 and 4**, respectively. The runoff curve number data (AMC II conditions) for the applicable land use and soil types is shown in **Table 2**. By intersecting the runoff curve number values for the various land use and soil types within the drainage area, the composite runoff curve number for each subbasin to the lake outlet was computed in **Table 3**.

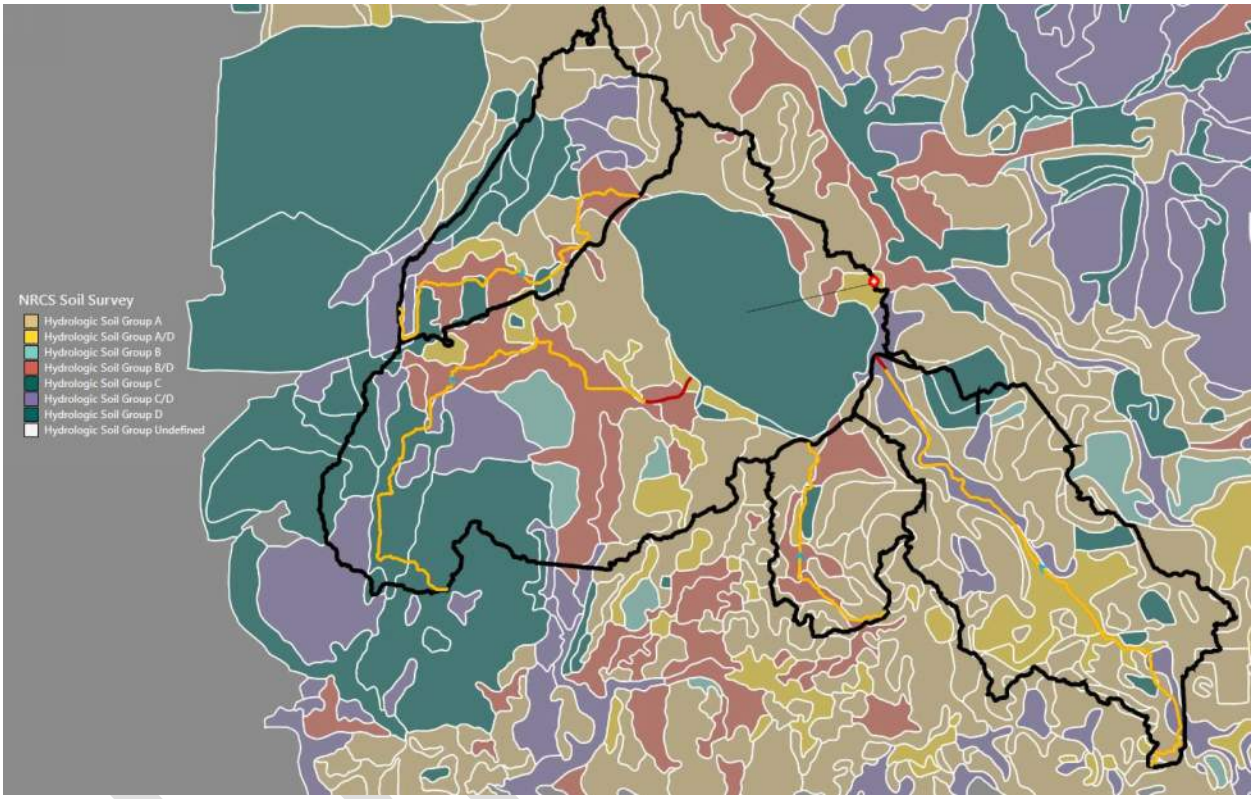


Figure 3: Soil Group Distribution

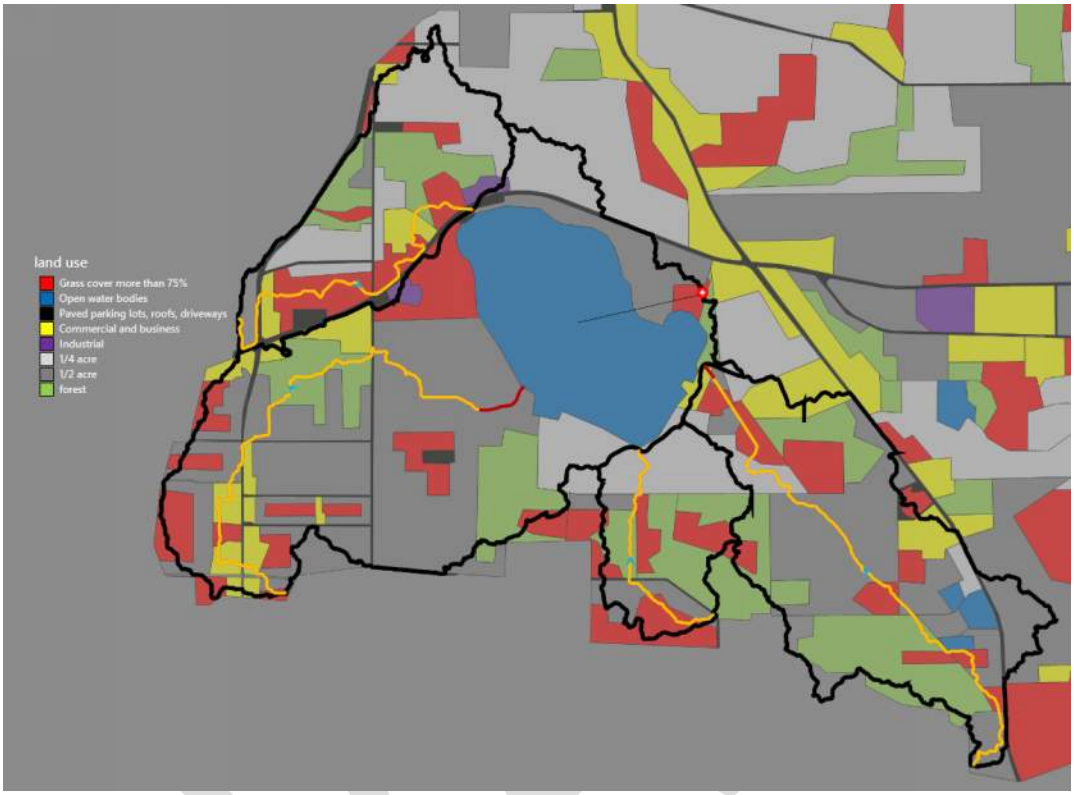


Figure 4: Land Use Distribution

Table 3: Runoff Curve Number for Hydrologic Soil-Cover Complexes

Land use	Soil Group A	Soil Group B	Soil Group C	Soil Group D
Grass cover more than 75%	39	61	74	80
Open water bodies	100	100	100	100
Paved parking lots, roofs, driveways	98	98	98	98
Commercial and business	89	92	94	95
Industrial	81	88	91	93
1/4 acre residential	61	75	83	87
1/2 acre residential	54	70	80	85
forest	45	60	73	79

The SCS lag method was employed to transform the effective rainfall into surface runoff. The time of concentration, Tc, is determined based on the flow travel time from the farthest point within the subbasin to the outlet point. The travel flow path includes various flow segments such as overland flow (100 ft at maximum), shallow concentrated flow, open channel flow, and flow through ponded water (zero flow travel time). Lag time was defined as 0.6Tc. A summary of subbasin parameters is presented in **Table 4**.
See **Appendix H** for a breakdown of the longest flow path.

Table 4: Subbasin Parameters

Subbasin #	Area (sq mi)	RCN	Tc (min)	Lag time (min)	Impervious area ratio (%)
Lake subbasin	1.87	76.33	252.32	151.39	60
NW subbasin	0.52	71.78	126.16	75.70	65
S subbasin	0.30	54.82	69.30	41.58	30
SE subbasin	0.88	59.30	135.14	81.08	50

As depicted in **Figure 4**, Springfield Lake is situated within an urbanized area. The existing plan identifies networks of stormwater drainage systems in this area. These stormwater drainage systems are connected to the lake, and significantly impact the natural hydrological processes of the area. To account for these effects, the HEC-HMS model was modified by adjusting the impervious area ratio for the more urbanized subbasins.

In the HEC-HMS analysis, the modified Puls method was employed to simulate the outflow routing through the lake. As per DLZ's field inspection, the flow control structure at lake outlet features a rectangular sharp crested weir with a width of approximately 15 ft. The crest of the weir is at 1074.75 ft, which was used as the normal pool elevation in the analysis. The elevation of high ground surrounding the outlet level is 1078 ft or higher according to the State of Ohio OSIP LiDAR data.

It should be noted that the weir elevation determined by DLZ field survey is quite close to the weir information documented in the 2015 survey report (See **Appendix G** – Springfield Lake Outlet Elevations Report of Survey by Summit County Engineer's Office, 2015). The 2015 survey report indicate the crest of the weir is at approximately 1074.9 ft using the NAVD 88 referenced datum. See **Appendix I** for Vertical Datum Conversion Methodology.

The weir discharge coefficient, Cd, for the outlet weir, is an important parameter for accurately predicting water levels and flows in the lake and at the entrance to the outlet channel. During high flow events, the outlet weir is subject to submergence effects, as the water depth on the downstream side of the weir is comparable to or even higher than the maximum pool level predicted by HEC-HMS for certain flow events.

In this case, for the 100-year event, an iterative adjustment of the Cd value was performed, which resulted in a Cd value of 1.5 for the 100-year event. The adjustment process involves conducting multiple HEC-HMS and HEC-RAS runs in a trial-and-error approach. During each iteration, different Cd values were applied, and the resulting water levels and outflows predicted by HEC-HMS were compared against the corresponding HEC-RAS model results. The Cd value was adjusted iteratively until a satisfactory match for outlet flows and lake elevations was achieved between the HEC-HMS and HEC-RAS models.

Table 5 provides the elevation-area relationship for the lake which was obtained from the State of Ohio OSIP LiDAR data.

Table 5: Storage-to-Elevation Relationship

Elevation (ft)	Area (acre)	Incremental storage volume (ac-ft)	Total storage volume (ac-ft)
1074.7	290	0	0
1075.0	291	87	87
1076.0	294	292	380
1077.0	297	295	675
1078.0	301	299	974
1079.0	305	303	1277

The resulting inflow hydrograph to the lake and outflow hydrograph exiting the lake during the 100-year flood condition from the HEC-HMS model results are shown in **Figure 5**. In the 100-year storm, HEC-HMS predicted a peak outflow discharge of 84 cfs with a maximum pool level of 1077.2 ft.

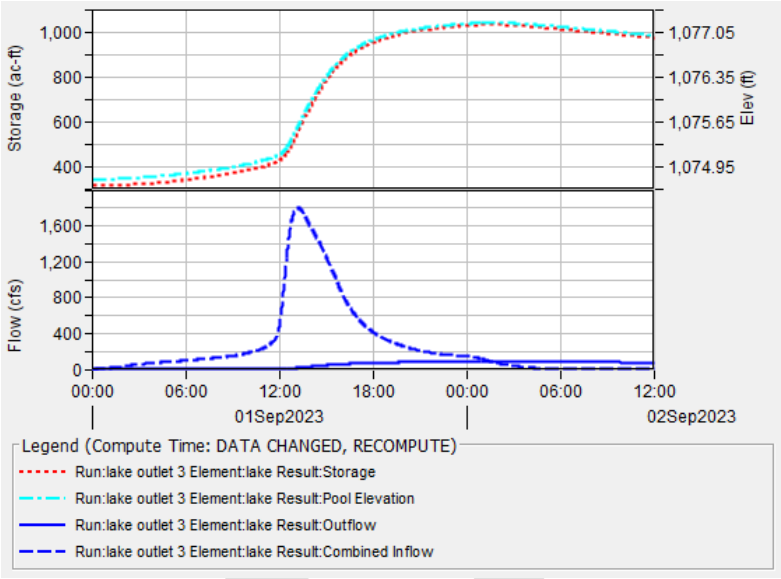


Figure 5: Inflow Hydrograph to the Lake and Routed Outflow Hydrograph in the 100-year Condition

There are significant challenges in determining tributary inflows discharging to the outlet channel downstream of the lake outlet. Streamflow data from the downstream USGS gage (Gage No. 04205000) and the flow frequency values in the FIS report (effective for Summit County dated 04/19/2016, see **Appendix J**) were analyzed for this purpose. As shown in **Figure 6**, the gage site (Location 6) is situated 3 miles downstream of the Springfield Lake outlet (Location 1) and FIS flow frequency values are available at the downstream limit of this study (Location 5). Flood frequency analysis was conducted using the HEC-SSP software on the flow data at the gage site to determine the simulated peak flows for return periods ranging from 5-year to 100-year. See **Appendix K – Flood Frequency Analysis on the Gage Data Flow**. The drainage area at Locations 1, 5, 6 and the computed/available flow frequency values from various sources are presented in **Table 6**. Note that flow enters the lake outlet channel at three locations (2,3, and 4) downstream of the lake outlet.

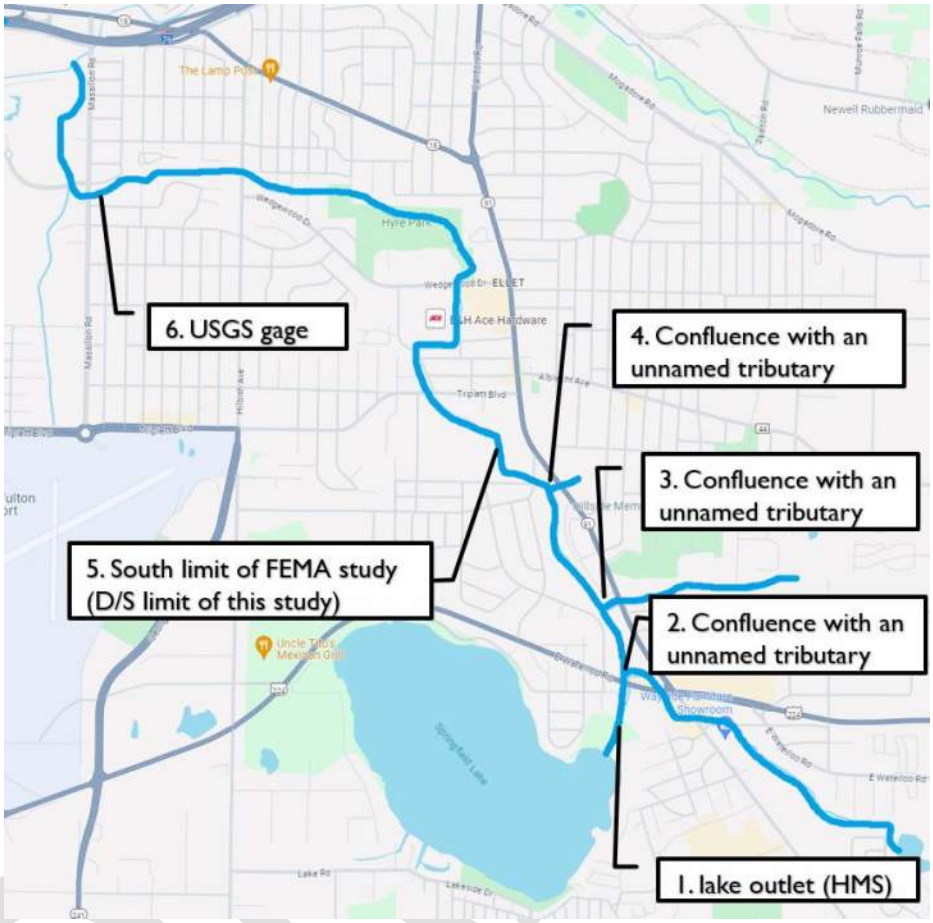


Figure 6: Aerial Map Showing the Locations of Interest.

Table 6: Peak Flow Discharges at Lake Outlet and Downstream Locations with Data

Location	Source	DA (sq mi)	Q5 (cfs)	Q10 (cfs)	Q50 (cfs)	Q100 (cfs)
1	HEC-HMS/HEC-RAS	3.6	29	38	67	84
5	FIS report	8.2	-	186	297	348
6	HEC-SSP (gage)	9.7	184	226	324	370

6.2 OUTLET CHANNEL HYDROLOGY

Figure 6 illustrates several locations of interest within the project limit. These include Locations 2, 3, and 4, where tributary flows join the outlet channel, resulting in an increase of peak flow. DLZ field verified the existence of pipes and culverts that deliver the tributary flow into the outlet channel at these locations.

Due to the budget and time constraints, comprehensive watershed analyses were not carried out at these intermediate locations to obtain the flow hydrograph. Instead, this study estimated the stream peak flow by adding the peak inflow from each contributing watershed. These intermediate flow estimates are approximate, because the adding of peak flows does not account for time impacts (at each of the locations along the outlet channel, factors such as the storage, travel time, and constriction due to culvert along contributing creeks are not considered).

Peak flow estimates contributed by the intermediate watersheds along the outlet channel were obtained with the help of USGS StreamStats. The HEC-HMS/HEC-RAS peak flow data at lake outlet (Location 1) and FEMA values (Location 5) were utilized to determine the total flow increase between these two locations. Linear interpolation based on ratios of peak flows predicted by StreamStats was employed to assign the flow from each tributary watershed such that it equals the total flow increase required between Location 1 and 5. The results are summarized in **Table 7**. Details are provided in the **Appendix L – StreamStats Peak Flow Estimate**.

Note that the iterative process for determining the Cd at the lake outlet requires re-computation of the tributary inflow every time the flow at Location 1 is changed.

Table 7: Peak Flow Data within the Project Scope

Location	Source	Q5 (cfs)	Q10 (cfs)	Q50 (cfs)	Q100 (cfs)
1	HEC-HMS/HEC-RAS	29	38	67	84
2	StreamStats ratio	61	90	148	175
3	StreamStats ratio	88	137	224	263
4	StreamStats ratio	100	159	260	306
5	FIS report	-	186	297	348

6.3 EXISTING OUTLET CHANNEL AND CULVERT CAPACITY EVALUATION

As stated in the conceptual plan report, an approximate hydraulic analysis based on the Manning equation was conducted to evaluate the capacity of the existing channel sections just upstream of each hydraulic structure along the lake outlet channel. Though the Manning equation analysis shows that the water surface elevation at each cross section does not surcharge the adjacent structure for the 100-year event, such analysis may not represent the true conditions when all stream cross sections are considered as a unit.

Consequently, for a more detailed analysis, a 1-D steady state HEC-RAS model was created that covered the entire stream and all the roadway crossings starting upstream at the lake outlet to the downstream end of the project limit (**Figure 7**). The channel geometries were developed using DLZ field surveyed stream cross section data, merged with the overbank data obtained from the OGRIP topographic map. Manning "n" values used in the model were based on the field observations of the existing channel and floodplain conditions. The known maximum pool level from HEC-HMS analysis and the water surface elevation in the FIS report were used to determine the upstream and downstream boundary conditions, respectively. Expansion and contraction losses of 0.3 and 0.1, respectively, were used for the cross sections, except at the two sections upstream and downstream of each roadway where the expansion and contraction coefficients were increased to 0.5 and 0.3, respectively to reflect impacts of manmade obstructions. Ineffective flow areas were established to identify the areas of the cross sections that do not have conveyance due to the embankment blockage of the roadway.

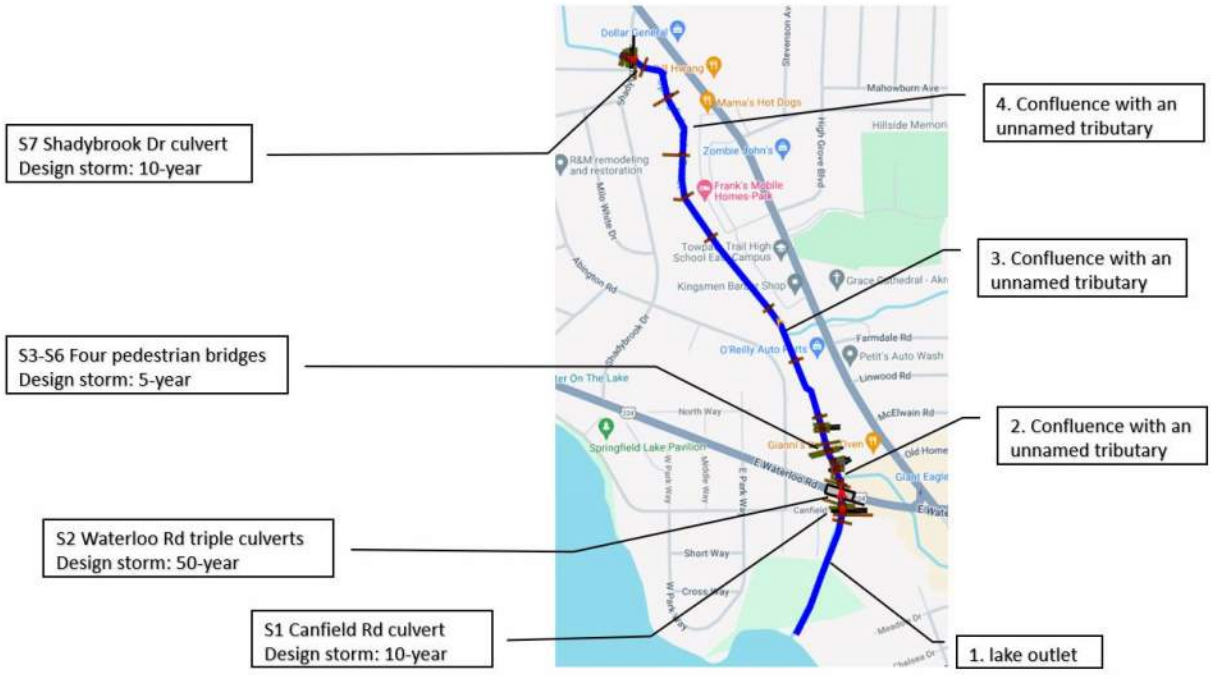


Figure 7: Sketch of HEC-RAS Model Showing the Location of the Existing Structures

Figure 7 depicts a total of 7 roadway crossings. The design storm and check storm were determined in accordance with ODOT L&D vol. 2, based on roadway designation and the ADT (**Table 8**). Therefore, culvert and bridge replacements are not required to support the hydraulic design. Note, bridges will need to be protected during construction. Some bridges may need to be removed and replaced if it is determined necessary during Task B.

The peak flow values at Locations 1 to 4 (**Table 7**) were applied to the cross sections at the corresponding locations. The resulting discharge profile is shown in **Figure 8**.

Figure 9 illustrates the water surface elevation profile. All the existing bridges and culverts meet ODOT requirements. During the design storm, the flow can pass the roadway crossing without rising above the low chord. During the check storm, the flow does not overtop the roadway (see **Table 7**).

Figure 10 illustrates the existing condition velocity profile in the main channel. The HEC-RAS analysis indicates low velocities (less than 1.5 fps) at the cross sections from STA 10+00 to STA 13+80 and from STA 43+00 to STA 50+00 (near Canfield Road, Waterloo Road and Shadybrook Drive as shown in **Figure 7**), which

could result in siltation. These findings are consistent with photographs at these locations/structures taken during field inspection that show siltation/ debris accumulation in the channel.

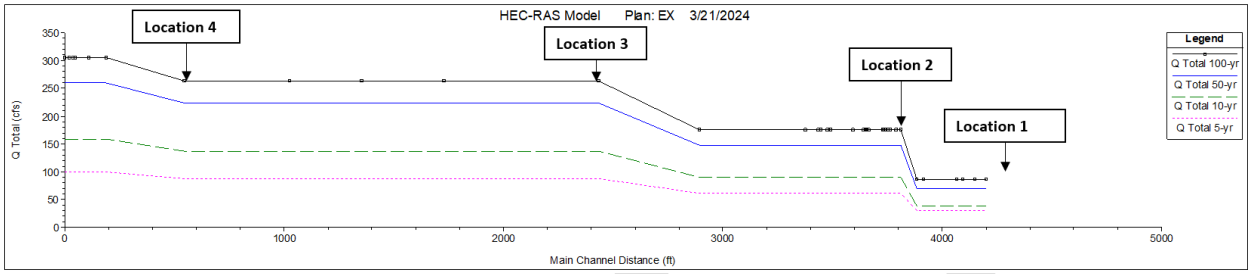


Figure 8: Total Discharge Profile

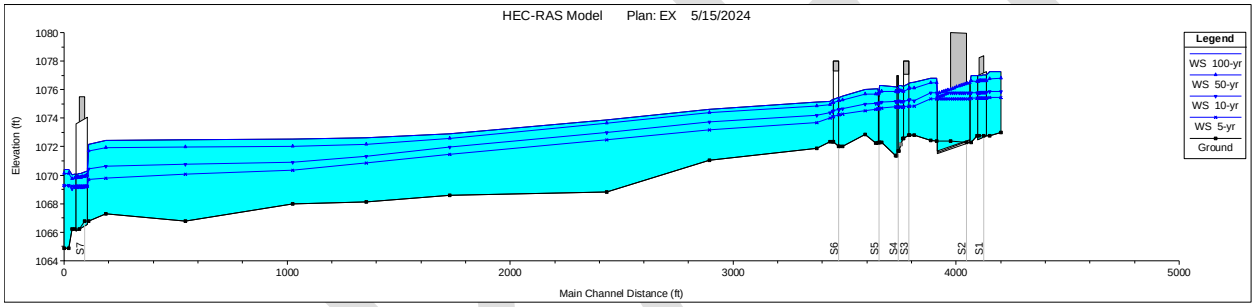


Figure 9: Water Surface Elevation Profile in the Existing Condition

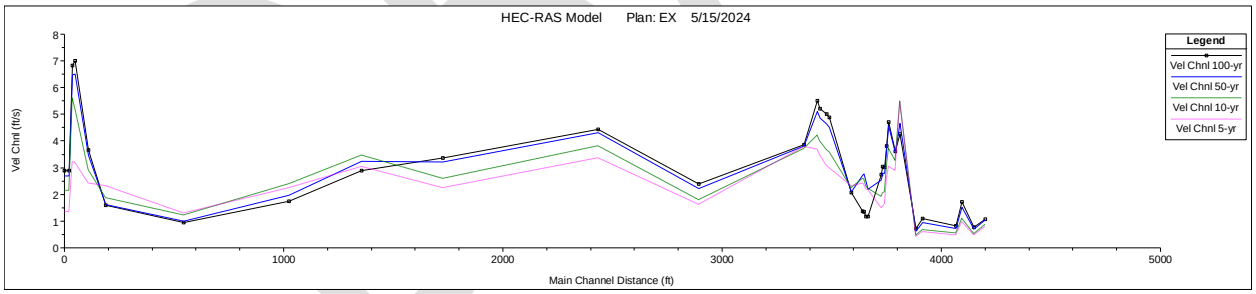


Figure 10: Channel Velocity Profile in the Existing Condition

Table 8: Hydraulic parameters adjacent to structures in the existing condition model

Structure		Design flood		Check flood	
	Low chord (ft)		HW (ft)		HW (ft)
S1 Canfield Rd STA10+50	1077.40	10-year	1075.88	100-year	1077.25
S2 Waterloo Rd STA11+50	1076.73	50-year	1076.59	100-year	1076.97
S3 Pedestrian bridge STA14+00	1077.10	5-year	1074.86	100-year	1076.49
S4 Pedestrian bridge STA14+50	1076.20	5-year	1074.81	100-year	1076.30
S5 Pedestrian bridge STA15+50	1075.50	5-year	1074.69	100-year	1076.27
S6 Pedestrian bridge STA17+50	1077.31	5-year	1074.27	100-year	1075.46
S7 Shadybrook Rd STA51+00	1074.05	10-year	1070.45	100-year	1072.16

6.4 PROPOSED OUTLET CHANNEL AND CULVERT CAPACITY EVALUATION

The HEC-RAS analysis has identified two critical locations within the existing outlet channel that require comprehensive stream regrading.

First, the upstream portion of the outlet channel, from STA 10+00 to STA 18+40 (from Canfield Road to the downstream pedestrian bridges), exhibits a negative longitudinal slope, amplifying the risk of siltation. To mitigate this issue, the streambed should be adjusted to establish a mild longitudinal slope ranging from 0.05% to 0.5%. Refinement of section geometries are implemented to align with the surrounding high ground. The existing side slope is maintained, or a 2H:1V side slope configuration is implemented to ensure lateral stability of the channel bank.

Second, the channel velocity is low within the areas between STA 10+00 and STA 13+80 (Canfield Road to Waterloo Road) and between STA43+00 and STA50+00 (upstream of Shadybrook Drive), raising a red flag regarding excessive sediment deposition. To address this, a series of measures are proposed. For the segment from STA10+00 to STA13+80, a two-stage channel design is proposed to modify the existing channel geometry. This approach narrows the cross-sectional width to augment channel velocity. The first stage inset channel is designed to accommodate the low flow events, while the second stage benches are intended to

manage high flow events. Additionally, it is crucial to schedule periodic sediment removal, especially within the low velocity zones, to prevent blockages and ensure optimal channel performance.

HEC-RAS was employed to validate the hydraulic performance of proposed channel modifications. Updated cross section geometries were integrated into the existing condition HEC-RAS model to execute the proposed condition model. **Figure 11** illustrates that the proposed condition water surface level meets ODOT's design requirements, ensuring no water level increase in the check storm, and providing sufficient freeboard in the design storm (**Table 9**). In contrast to the existing condition, there is a decrease in water levels by 0.3 ft in the outlet channel where the two-stage channel is proposed. The 100-year flood map is presented in **Appendix M**.

Figure 12 illustrates the channel velocity profile in the proposed condition. Within the segment from STA 10+00 to STA 13+80, the channel velocity is increased to 1.5 fps during the 50-year and 100-year flow scenarios. However, this velocity does not reach the desired threshold of 2 fps at which sediment deposition will be minimal. It is recommended that a sediment removal plan be implemented to address potential sediment buildup, this is discussed more in **Section 8.0**.

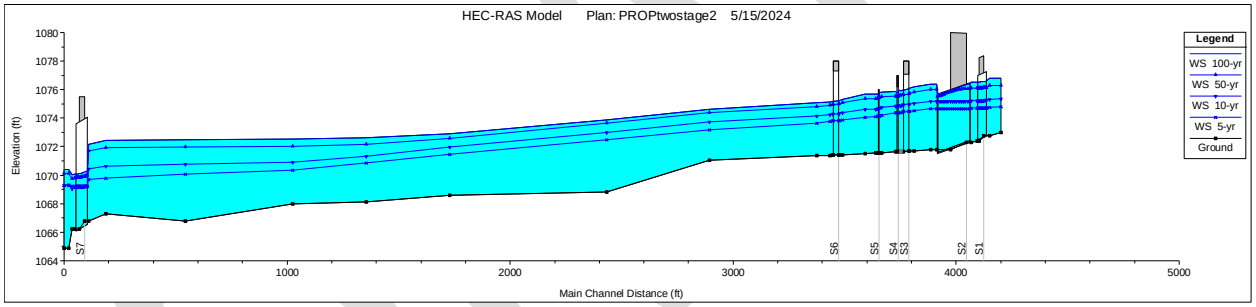


Figure 11: Water Surface Profile in the Proposed Condition

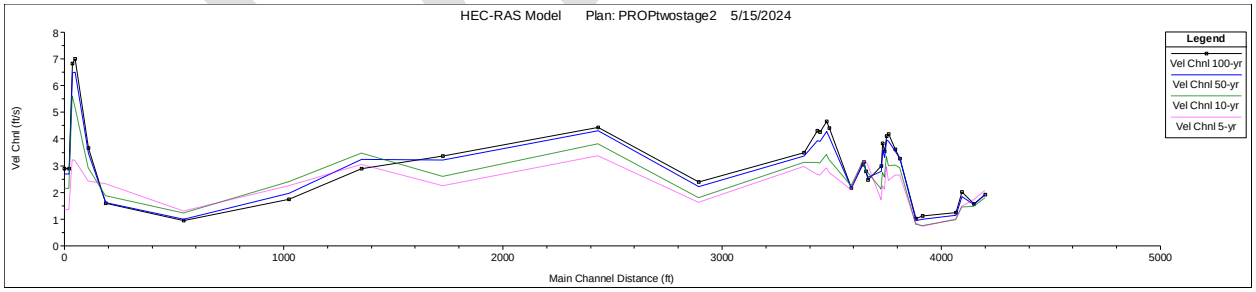


Figure 12: Channel Velocity Profile in the Proposed Condition

Table 9: Hydraulic parameter adjacent to structures in the proposed condition model

Structure		Design flood		Check flood	
	Low chord (ft)		HW (ft)		HW (ft)
S1 Canfield Rd STA10+50	1077.40	10-year	1075.32	100-year	1076.81
S2 Waterloo Rd STA11+50	1076.73	50-year	1076.10	100-year	1076.53
S3 Pedestrian bridge STA14+00	1077.10	5-year	1074.49	100-year	1076.11
S4 Pedestrian bridge STA14+50	1076.20	5-year	1074.41	100-year	1075.96
S5 Pedestrian bridge STA15+50	1075.50	5-year	1074.18	100-year	1075.80
S6 Pedestrian bridge STA17+50	1077.31	5-year	1073.85	100-year	1075.24
S7 Shadybrook Rd STA51+00	1074.05	10-year	1070.45	100-year	1072.16

6.5 IMPACT OF TRIBUTARY DETENTION

A preliminary analysis was conducted to determine the impact of flow detention along the tributary streams that flow into the outlet channel. This involves the construction of detention ponds to regulate the tributary flow entering the outlet channel, which will reduce water levels along the outlet channel.

The proposed condition HEC-RAS model was rerun with lower inflows to the outlet channel. A reduction factor of 0.7 was applied to the peak flow from each of the tributary watersheds at Locations 2, 3, and 4. As shown in **Figure 13**, the flow discharge profile exhibits the expected decrease in flow rates. The corresponding water level profile indicates a reduction of 0.3 ft compared to the proposed condition baseline case (**Figure 14**). Despite these changes, the velocity of the outlet channel does not decrease significantly (**Figure 15**). The flood map can be found in **Appendix M**. While these findings are very promising, further discussion with the county is necessary to see if this is a desired option to pursue in the future.

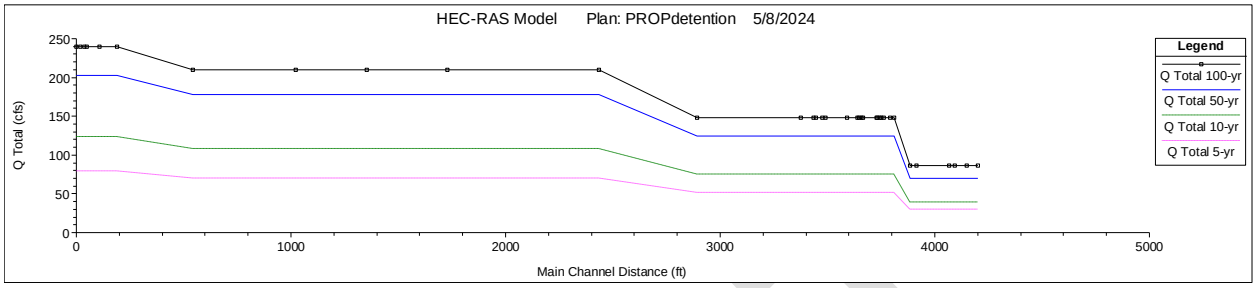


Figure 13: Total Discharge Profile in the Proposed Condition with Reduced Tributary Flows due to the Detention Pond

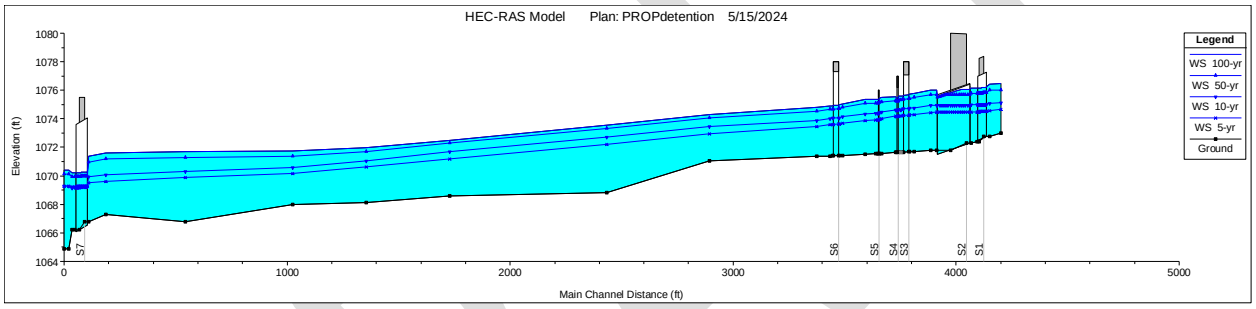


Figure 14: Total Surface Elevation Profile in the Proposed Condition with Reduced Tributary Flows due to the Detention Pond

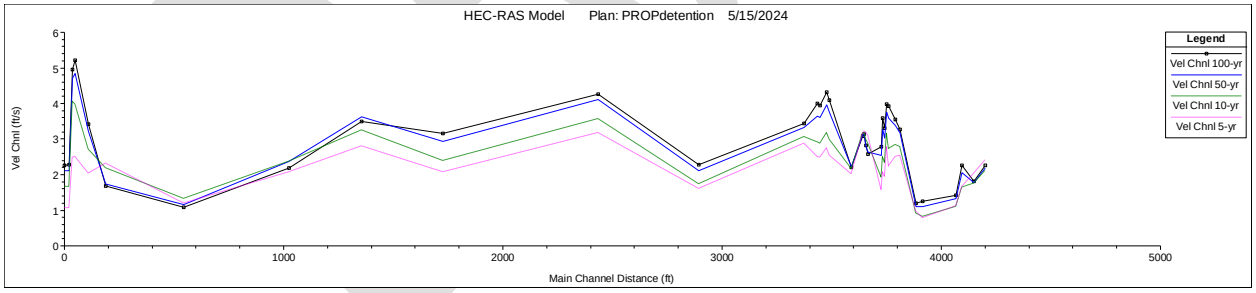


Figure 15: Water Surface Elevation Profile in the Proposed Condition with Reduced Tributary Flows due to the Detention Pond

6.6 H&H MODELING CONCLUSIONS

This report outlines the hydrological and hydraulic analyses conducted for the Springfield Lake watershed, outlet structure, and lake outlet channel. A HEC-HMS model was utilized to determine the lake outlet flow discharges, while flow estimates using ratios of USGS StreamStats was employed to estimate the flow discharges contributions at intermediate locations along the stream where tributary channels discharge to the outlet channel. It should be noted that the intermediate flow estimations are approximate.

Based on the current analysis, the outlet weir appears to be hydraulically adequate. The HEC-RAS analysis demonstrates that existing roadway crossings are capable of passing the required flow, with the design flood not surcharging the structures and the check flood not overtopping the structures.

Two significant hydraulic issues were identified, particularly in proximity to the existing hydraulic structures. There is a potential of sediment accumulation in the outlet channel due to low channel velocity. The longitudinal slope is not consistently positive. To mitigate these issues, adjustments should be made to the cross-section geometries. A two-stage channel geometry is proposed for the segment near the Canfield Road and Waterloo Road, while modifications to the channel streambed elevation ensure a positive slope over the entire outlet channel length. Though these improvements do increase the velocities at these sections, several sections (STA 10+00 to STA 13+80, STA 43+00 to STA 50+00) will still have velocities below the threshold velocity of 2 fps. Consequently, regular maintenance comprised of periodic sediment/debris removal is recommended at these locations.

7.0 Structural

A structural visual inspection of the Springfield Lake Overflow Outlet Structure was performed on April 10, 2024. A summary of findings is available in **Appendix N**.

8.0 Recommended Maintenance Schedule

The proposed channel improvements are intended to limit debris and sediment buildup to the area between Station 43+00 and 50+00. It has been determined that in some areas of the overflow channel, routine maintenance should be implemented to ensure proper performance. During surveying and field work investigations, DLZ identified areas of the outlet channel and culverts with debris and sediment buildup. It is recommended that the contract documents associated with this project include one (1) foot of sediment cleaning from the culverts under Waterloo Road and miscellaneous allowances for additional channel sediment cleaning. In some areas where there may not be access drives, temporary timber matting or similar methods may be placed over wetlands for maintenance access.

Construction will be in accordance with Ohio Revised Code 6131,Single County Drainage Improvements. Fees for future maintenance cost to be determined.

DLZ recommends the following maintenance schedule.

Table 10: Future Maintenance Schedule

Item	Description	Frequency
Inspect Overflow Channel from STA 10+00 to 13+80 and STA 43+00 to STA 50+00	Inspect this approximate area for sediment and debris build up. Remove debris if necessary.	Monitor annually to record debris levels; Recommend observing sediment level within culverts to determine debris increases; Remove debris when greater than three (3) inches of debris is recorded.
Inspect Outlet Structure	Visually inspect the lake outlet structure during low flow periods.	Perform structural inspection every five (5) years.
Inspect Overflow Channel from STA 13+80 to 43+00	Visually inspect the channel during low flow periods.	Monitor once every two (2) years to record debris levels.
Canfield Road, Waterloo Road, and Shadybrook Drive Culverts	Areas noted during inspection that contain sediment or debris build up in roadway culverts should be removed by an industrial pipe cleaning company.	Monitor annually to record debris levels; Remove debris when greater than three (3) inches of debris is recorded within culverts.

9.0 Next Steps

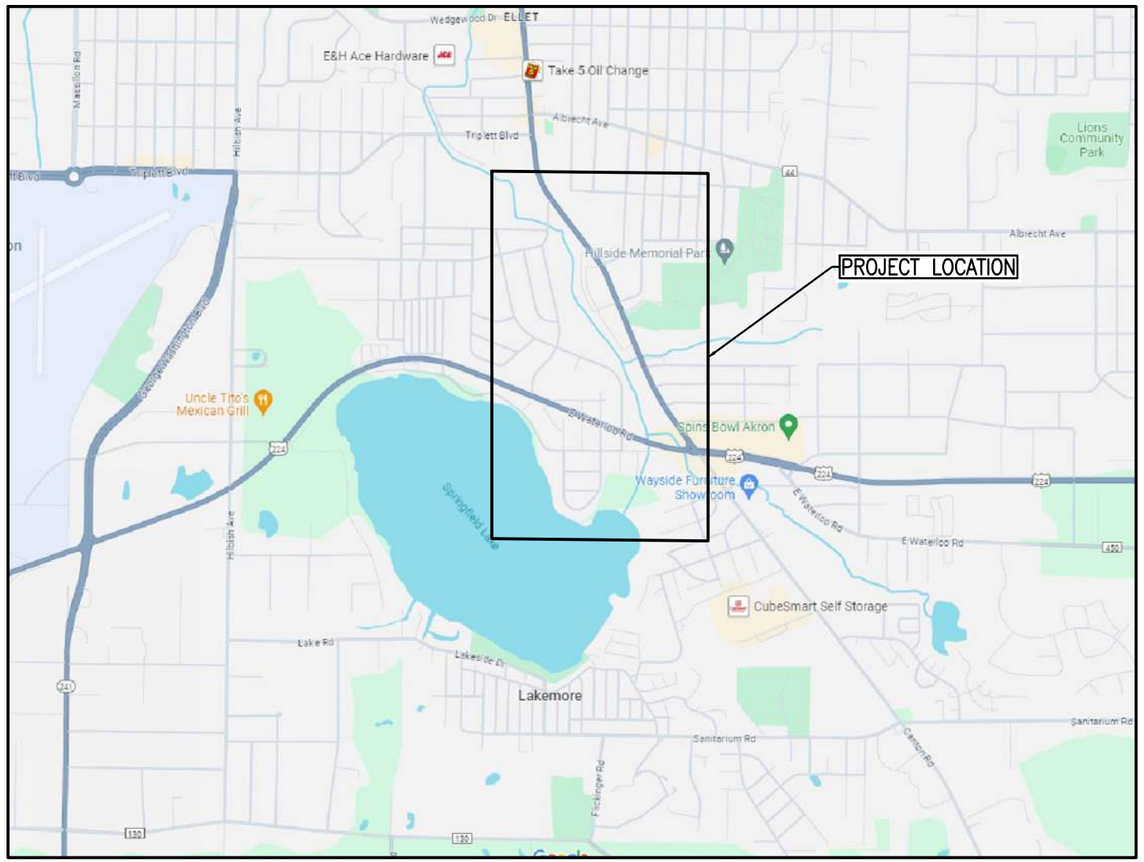
The next steps (in Task B) will involve preparing Preliminary Plans. A Class 4 AACE Estimate of Probable Construction Cost will be developed. Additionally, the wetlands delineation and streams evaluation will be finalized.

APPENDIX A – Conceptual Plans

SUMMIT COUNTY ENGINEER'S OFFICE

SUMMIT COUNTY, OHIO
SPRINGFIELD LAKE OUTLET STRUCTURE & CHANNEL STUDY
CONCEPTUAL PLANS
MAY 31, 2024

SHEET LIST TABLE	
0	TITLE SHEET
1	SURVEY CONTROL POINTS LIST
2	STA 0+00 TO STA 14+50
3	STA 14+50 TO 28+50
4	STA 28+50 TO 40+50
5	STA 40+50 TO STA 54+00
6	ENLARGED VIEW STA 10+00 TO STA 18+50
7	TYPICAL CROSS SECTIONS I
8	TYPICAL CROSS SECTIONS II



ALAN BRUBAKER, P.E., P.S.
SUMMIT COUNTY ENGINEER

CHARLES HAUBER, P.E., P.S.
ENGINEERING PROJECT MANAGER

PROJECT CONTROL

POSITIONING METHOD: ____GPS_____

MONUMENT TYPE: _____ODOT-VRS_____

VERTICAL POSITIONING

ORTHOMETRIC HEIGHT DATUM: __NAVD88_____

GEOID: _____GEOID18A_____

HORIZONTAL POSITIONING

REFERENCE FRAME: _____NAD83(2011)_____

ELLIPSOID: _____GRS1980_____

MAP PROJECTION: _Lambert Conformal Conic Projection_____

COORDINATE SYSTEM: __Ohio State Plane, North Zone_____

COMBINED SCALE FACTOR: 1.000000

ORIGIN OF COORDINATE SYSTEM: __Northing: 0 USft
Easting: 0 US ft
Lat. :N 39° 27' 01.76097"
Lon.:W 89° 28' 32.98476"

SUBMITTED BY Michael Evans DATE 5-31-2024

DLZ OHIO, INC.

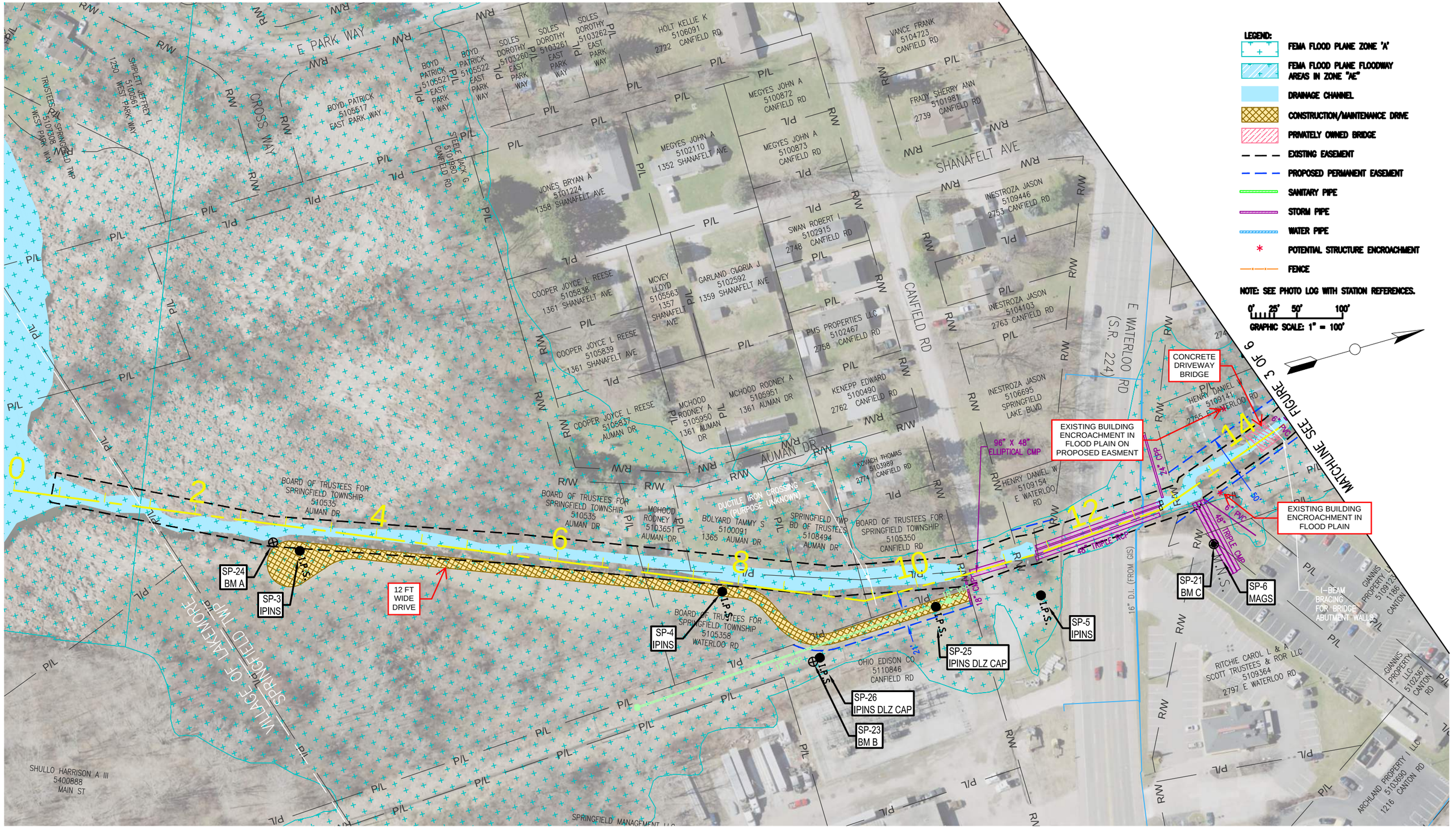
NOTES:

1. SEE PLAN SHEETS 2 THROUGH 5 FOR SURVEY CONTROL POINT LOCATIONS.

SURVEY CONTROL POINTS				
POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
SP-1	500,441.53	2,262,611.88	1075.66	IPINS
SP-2	500,624.24	2,262,917.22	1075.84	IPINS
SP-3	498,277.98	2,263,373.89	1075.68	IPINS
SP-4	498,711.40	2,263,542.24	1075.26	IPINS
SP-5	499,046.37	2,263,640.77	1078.67	IPINS
SP-6	499,243.88	2,263,638.23	1082.77	MAGS
SP-7	499,601.68	2,263,421.84	1077.29	MAGS
SP-8	499,926.27	2,263,336.54	1075.52	MAGS
SP-9	500,469.71	2,263,128.89	1075.85	IPINS
SP-10	500,677.52	2,263,304.09	1079.74	MAGS
SP-11	501,310.18	2,262,931.61	1077.79	IPINS
SP-12	501,075.72	2,262,673.11	1078.43	IPINS
SP-13	502,815.92	2,261,944.18	1089.93	IPINS
SP-14	502,367.68	2,261,977.46	1073.45	IPINS
SP-15	502,374.82	2,261,945.22	1073.24	BM J
SP-16	502,384.78	2,262,139.61	1072.12	BM I
SP-17	501,280.53	2,262,501.11	1072.50	BM H
SP-18	501,006.05	2,262,722.89	1076.04	BM G
SP-19	500,733.75	2,262,943.66	1075.44	BM F
SP-20	500,477.74	2,263,150.26	1076.47	BM E

SURVEY CONTROL POINTS				
POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
SP-21	499,243.83	2,263,638.21	1082.77	BM C
SP-22	499,931.88	2,263,304.01	1076.58	BM D
SP-23	498,786.38	2,263,643.28	1078.34	BM B
SP-24	498,252.43	2,263,357.21	1076.06	BM A
SP-25	498,932.22	2,263,621.59	1077.32	IPINS DLZ CAP
SP-26	498,794.73	2,263,640.87	1077.29	IPINS DLZ CAP
SP-27	499,373.35	2,263,512.74	1077.88	MAGS
SP-28	499,447.63	2,263,466.39	1074.78	IPINS DLZ CAP
SP-29	500,060.60	2,263,374.90	1077.31	MAGS
SP-30	500,263.85	2,263,238.42	1077.25	IPINS DLZ CAP
SP-31	500,628.27	2,262,995.48	1072.49	IPINS DLZ CAP
SP-32	500,847.48	2,262,826.17	1072.45	IPINS DLZ CAP
SP-33	501,455.20	2,262,398.63	1071.50	IPINS DLZ CAP
SP-34	501,761.21	2,262,295.96	1071.42	IPINS DLZ CAP
SP-35	502,025.30	2,262,266.59	1071.05	IPINS DLZ CAP
SP-36	502,233.86	2,262,175.78	1071.49	IPINS DLZ CAP
SP-37	502,368.74	2,262,153.83	1071.96	IPINS DLZ CAP

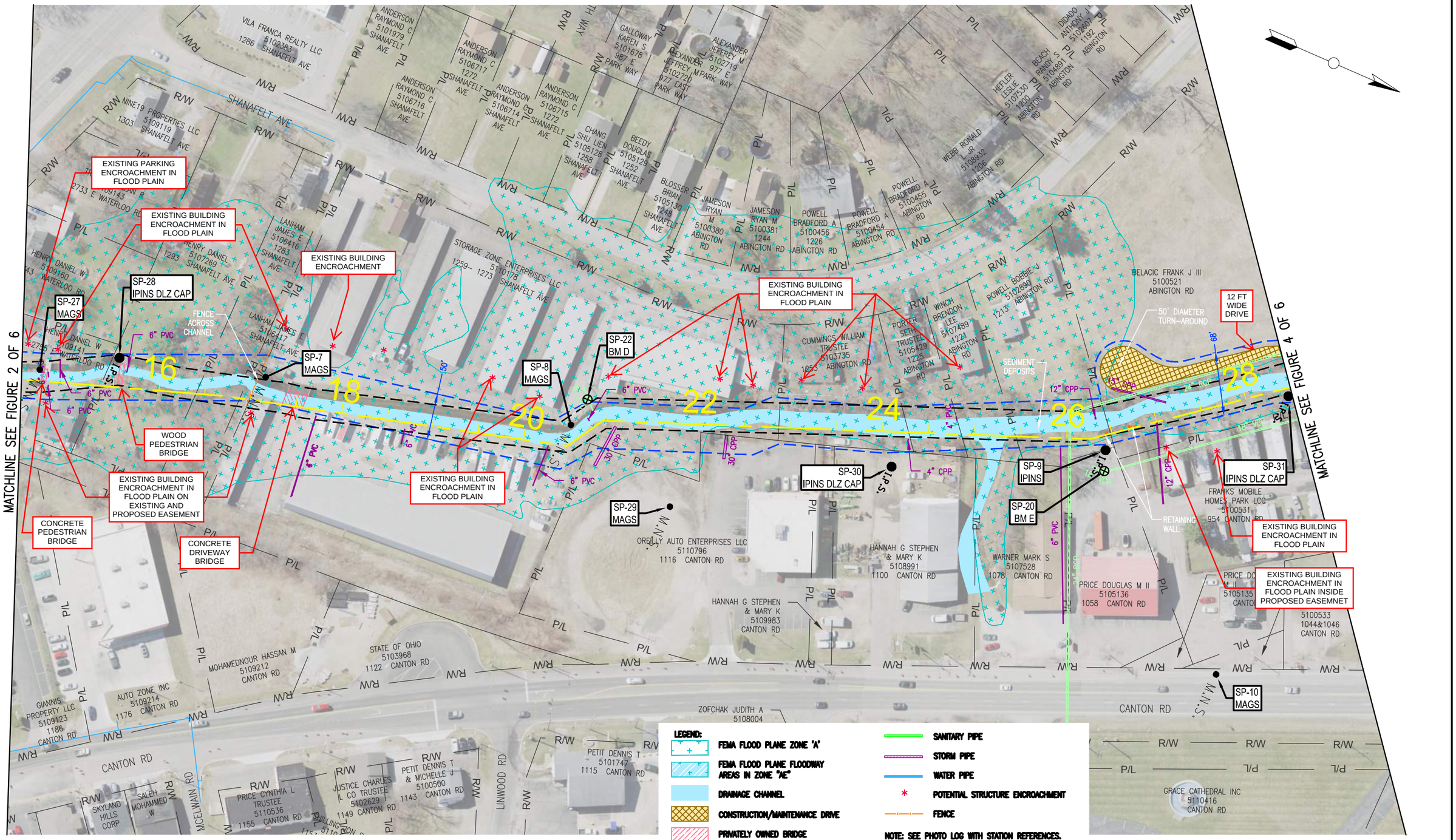
SPRINGFIELD LAKE OUTLET STRUCTURE & CHANNEL STUDY	SCALE : N/A
SURVEY CONTROL POINTS LIST	FIGURE 1 OF 8



NOTES:

1. ACCESS DRIVES WILL BE ADJUSTED BASED ON WETLAND DELINEATIONS BEING VERIFIED.
2. UTILITIES ON WATERLOO ROAD ARE SHOWN FROM GIS. CONTRACTOR TO VERIFY ALL UTILITIES.

SPRINGFIELD LAKE OUTLET STRUCTURE & CHANNEL STUDY	SCALE : 1" = 100'
PLAN VIEW STATION 0+00 TO 14+50	FIGURE 2 OF 8



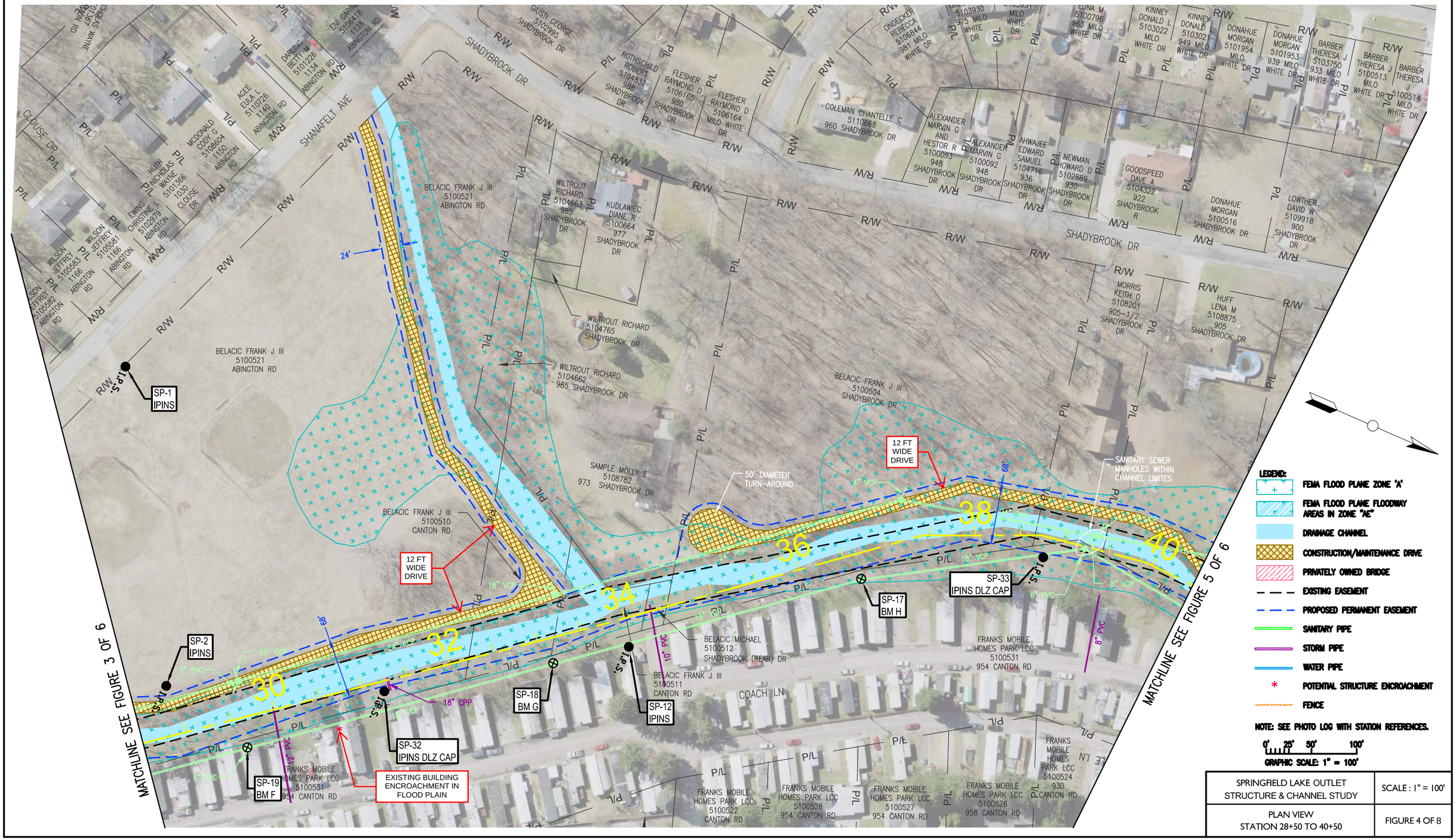
NOTES:

1. ACCESS DRIVES WILL BE ADJUSTED BASED ON WETLAND DELINEATIONS BEING VERIFIED.

SPRINGFIELD LAKE OUTLET STRUCTURE & CHANNEL STUDY	SCALE : 1" = 100'
PLAN VIEW STATION 14+50 TO 28+50	FIGURE 3 OF 8

NOTES:

1. ACCESS DRIVES WILL BE ADJUSTED BASED ON WETLAND DELINEATIONS BEING VERIFIED.



SPRINGFIELD LAKE OUTLET STRUCTURE & CHANNEL STUDY	SCALE : 1" = 100'
PLAN VIEW STATION 28+50 TO 40+50	FIGURE 4 OF 8

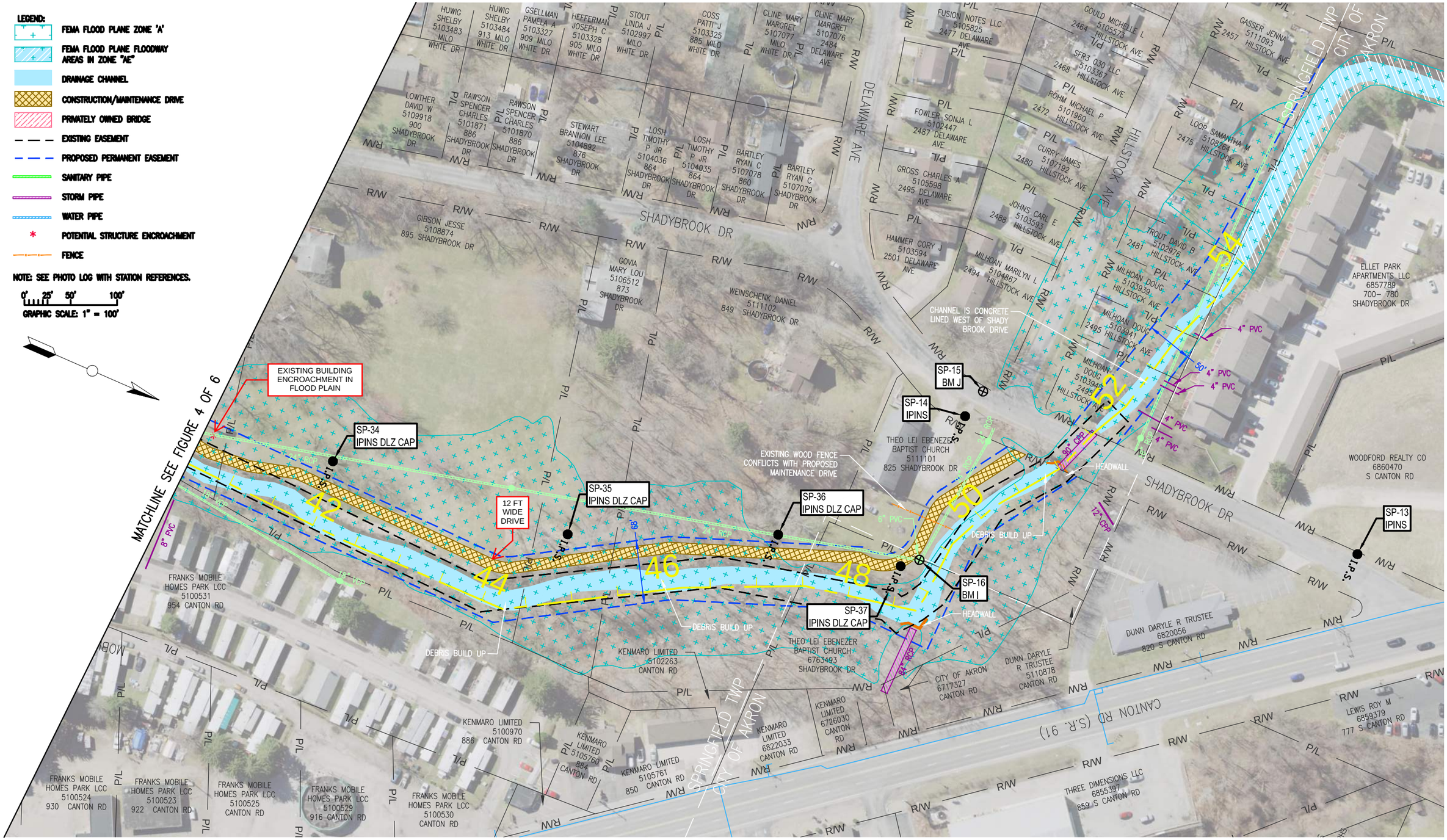
LEGEND:

- FEMA FLOOD PLANE ZONE 'A'
- FEMA FLOOD PLANE FLOODWAY AREAS IN ZONE "AE"
- DRAINAGE CHANNEL
- CONSTRUCTION/MAINTENANCE DRIVE
- PRIVATELY OWNED BRIDGE
- EXISTING EASEMENT
- PROPOSED PERMANENT EASEMENT
- SANITARY PIPE
- STORM PIPE
- WATER PIPE
- * POTENTIAL STRUCTURE ENCROACHMENT
- FENCE

NOTE: SEE PHOTO LOG WITH STATION REFERENCES.

0' 25' 50' 100'

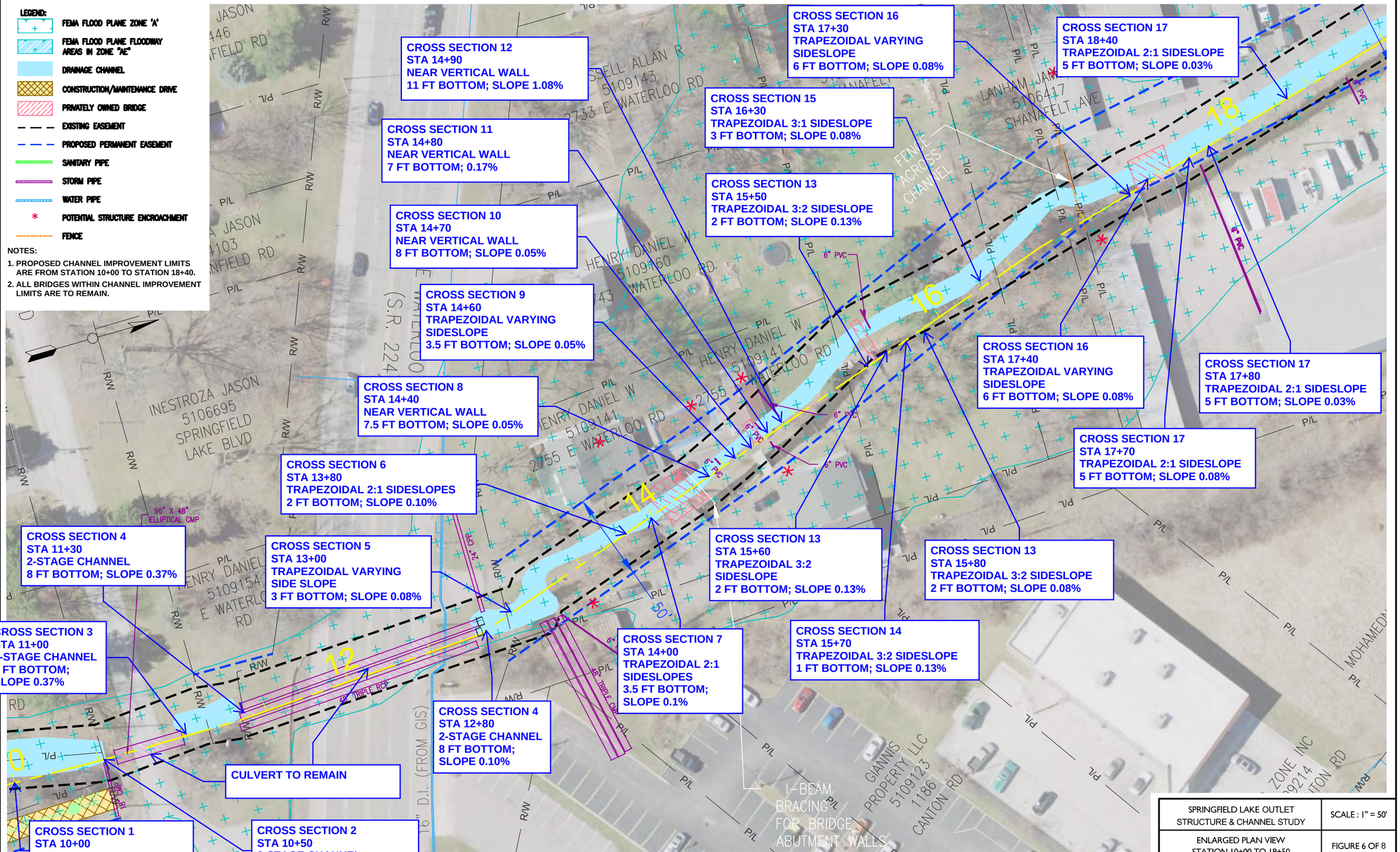
GRAPHIC SCALE: 1" = 100'

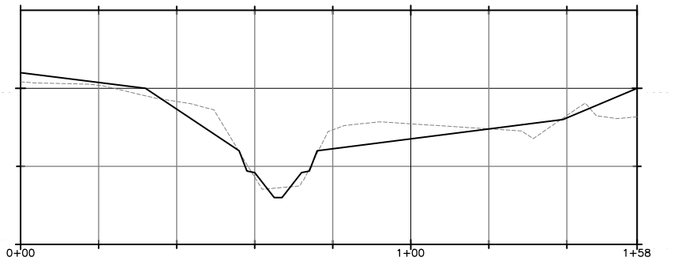


NOTES:

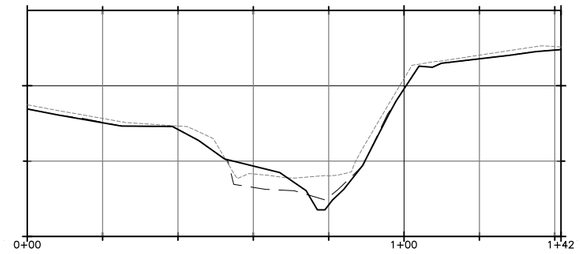
1. ACCESS DRIVES WILL BE ADJUSTED BASED ON WETLAND DELINEATIONS BEING VERIFIED.

SPRINGFIELD LAKE OUTLET STRUCTURE & CHANNEL STUDY	SCALE : 1" = 100'
PLAN VIEW STATION 40+50 TO 54+00	FIGURE 5 OF 8


LEGEND:
FEMA FLOOD PLANE ZONE 'A'
FEMA FLOOD PLANE FLOODWAY AREAS IN ZONE "AE"
DRAINAGE CHANNEL
CONSTRUCTION/MAINTENANCE DRIVE
PRIVATELY OWNED BRIDGE
EXISTING EASEMENT
PROPOSED PERMANENT EASEMENT
SANITARY PIPE
STORM PIPE
WATER PIPE
POTENTIAL STRUCTURE ENCROACHMENT
FENCE
NOTES:
1. PROPOSED CHANNEL IMPROVEMENT LIMITS ARE FROM STATION 10+00 TO STATION 18+40.
2. ALL BRIDGES WITHIN CHANNEL IMPROVEMENT LIMITS ARE TO REMAIN.
CROSS SECTION 1
STA 10+00
2-STAGE CHANNEL
3 FT BOTTOM; SLOPE 0.42%
CROSS SECTION 2
STA 10+50
2-STAGE CHANNEL
5 FT BOTTOM: SLOPE 0.42%
CROSS SECTION 3
STA 11+00
2-STAGE CHANNEL
4 FT BOTTOM;
SLOPE 0.37%
CROSS SECTION 4
STA 11+30
2-STAGE CHANNEL
8 FT BOTTOM; SLOPE 0.37%
CROSS SECTION 5
STA 13+00
TRAPEZOIDAL VARYING
SIDE SLOPE
3 FT BOTTOM; SLOPE 0.08%
CROSS SECTION 6
STA 13+80
TRAPEZOIDAL 2:1 SIDESLOPES
2 FT BOTTOM; SLOPE 0.10%
CROSS SECTION 7
STA 14+00
TRAPEZOIDAL 2:1
SIDESLOPES
3.5 FT BOTTOM;
SLOPE 0.1%
CROSS SECTION 4
STA 12+80
2-STAGE CHANNEL
8 FT BOTTOM;
SLOPE 0.10%
CULVERT TO REMAIN
CROSS SECTION 8
STA 14+40
NEAR VERTICAL WALL
7.5 FT BOTTOM; SLOPE 0.05%
CROSS SECTION 9
STA 14+60
TRAPEZOIDAL VARYING
SIDESLOPE
3.5 FT BOTTOM; SLOPE 0.05%
CROSS SECTION 10
STA 14+70
NEAR VERTICAL WALL
8 FT BOTTOM; SLOPE 0.05%
CROSS SECTION 11
STA 14+80
NEAR VERTICAL WALL
7 FT BOTTOM; 0.17%
CROSS SECTION 12
STA 14+90
NEAR VERTICAL WALL
11 FT BOTTOM; SLOPE 1.08%
CROSS SECTION 13
STA 15+50
TRAPEZOIDAL 3:2 SIDESLOPE
2 FT BOTTOM; SLOPE 0.13%
CROSS SECTION 15
STA 16+30
TRAPEZOIDAL 3:1 SIDESLOPE
3 FT BOTTOM; SLOPE 0.08%
CROSS SECTION 16
STA 17+30
TRAPEZOIDAL VARYING
SIDESLOPE
6 FT BOTTOM; SLOPE 0.08%
CROSS SECTION 13
STA 15+60
TRAPEZOIDAL 3:2
SIDESLOPE
2 FT BOTTOM; SLOPE 0.13%
CROSS SECTION 14
STA 15+70
TRAPEZOIDAL 3:2 SIDESLOPE
1 FT BOTTOM; SLOPE 0.13%
CROSS SECTION 16
STA 17+40
TRAPEZOIDAL VARYING
SIDESLOPE
6 FT BOTTOM; SLOPE 0.08%
CROSS SECTION 13
STA 15+80
TRAPEZOIDAL 3:2 SIDESLOPE
2 FT BOTTOM; SLOPE 0.08%
CROSS SECTION 17
STA 17+70
TRAPEZOIDAL 2:1 SIDESLOPE
5 FT BOTTOM; SLOPE 0.08%
CROSS SECTION 17
STA 17+80
TRAPEZOIDAL 2:1 SIDESLOPE
5 FT BOTTOM; SLOPE 0.03%
CROSS SECTION 17
STA 18+40
TRAPEZOIDAL 2:1 SIDESLOPE
5 FT BOTTOM; SLOPE 0.03%
I-BEAM BRACING FOR BRIDGE ABUTMENT WALLS
FENCE ACROSS CHANNEL
96" X 48" ELLIPTICAL CMP
24" CMP
48" TRIPLE RCP
48" TRIPLE CMP
6" PVC
16" D.I. (FROM GIS)
INESTROZA JASON 5106695 SPRINGFIELD LAKE BLVD
HENRY DANIEL W 5109141 2755 E WATERLOO RD
HENRY DANIEL W 5109160 WATERLOO RD
RUSSELL ALLAN R 5109143 2733 E WATERLOO RD
LANHAM JAMES 5106417 SHANAFELT AVE
GIANNIS PROPERTY LLC 5109123 1186 CANTON RD
MOHAMEDA
ZONE INC
SPRINGFIELD LAKE OUTLET STRUCTURE & CHANNEL STUDY
SCALE : 1" = 50'
ENLARGED PLAN VIEW STATION 10+00 TO 18+50
FIGURE 6 OF 8



CROSS SECTION 1



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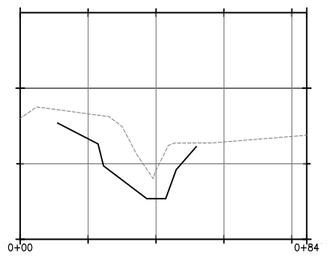

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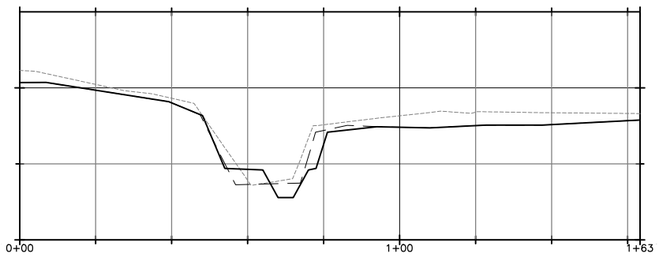
- LIDAR DATA
- SURVEYED DATA
- PROPOSED CROSS SECTION



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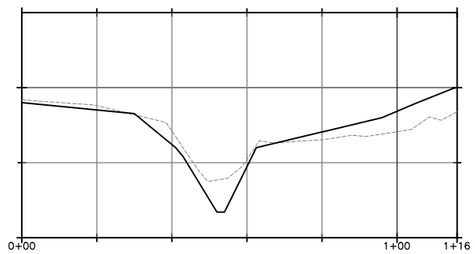

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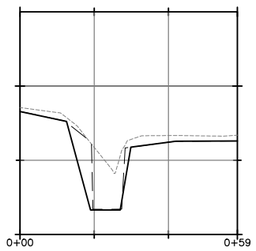

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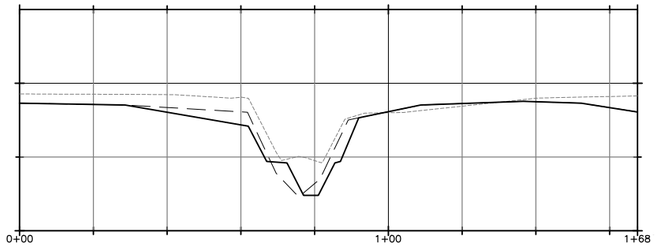

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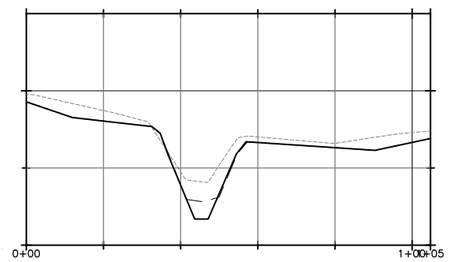

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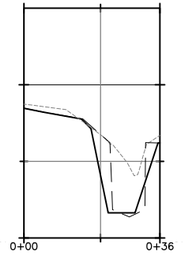

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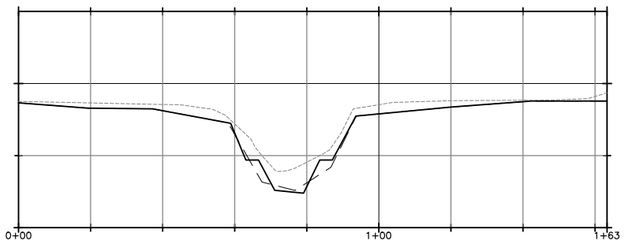

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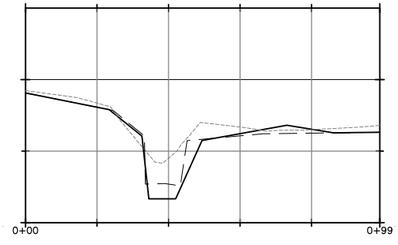

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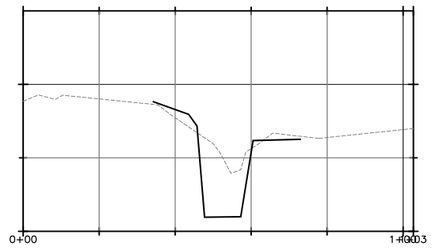
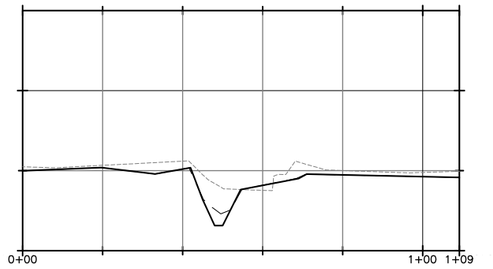


CROSS SECTION 12

SPRINGFIELD LAKE OUTLET STRUCTURE & CHANNEL STUDY	SCALE : NOT TO SCALE
TYPICAL CROSS SECTIONS I	FIGURE 7 OF 8



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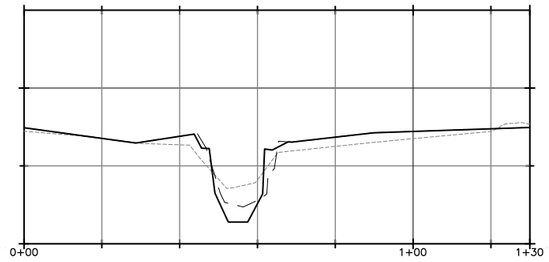

CROSS SECTION 17

LEGEND:

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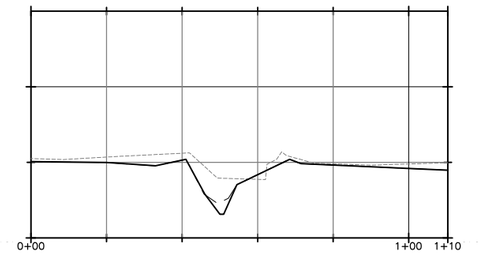
- SURVEYED DATA
- PROPOSED CROSS SECTION



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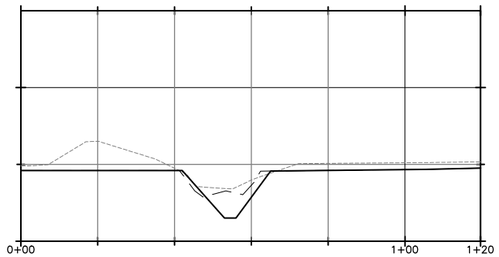

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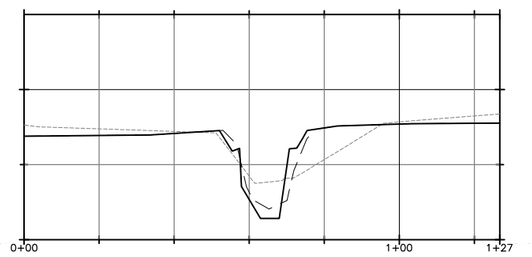


CROSS SECTION 16

SPRINGFIELD LAKE OUTLET STRUCTURE & CHANNEL STUDY	SCALE : NOT TO SCALE
TYPICAL CROSS SECTIONS II	FIGURE 8 OF 8

APPENDIX B – Field Walk Photo Log – August 1, 2023

Photograph No. 1
STA 0+50 Upstream photo of start of stream

Photograph No. 2
STA 3+00 Downstream photo

Photograph No. 3
STA 3+00 Upstream photo

Photograph No. 4
STA 5+50 Downstream photo

Photograph No. 5
STA 5+50 Upstream photo

Photograph No. 6
STA 8+00 Downstream photo

Photograph No. 7
STA 8+00 Upstream photo

Photograph No. 8
STA 9+50 Pipe crossing

Photograph No. 9
STA 10+50 18” CMP on East side of creek

Photograph No. 10
STA 10+50 Downstream photo

Photograph No. 11
STA 10+50 Upstream photo

Photograph No. 12
STA 11+00 Downstream photo of 8ft CMP

Photograph No. 13
STA 11+50 Upstream photo of 48” RCP with twin pipe next to it

Photograph No. 14
STA 13+00 Downstream photo: 3 RPCs

Photograph No. 15
STA 13+00 Upstream photo

Photograph No. 16
STA 13+00 3 pipes

Photograph No. 17
STA 14+00 Downstream photo of bridge (16ft wide by 34” tall)

Photograph No. 18
STA 14+00 Upstream photo of bridge (16ft wide by 34” tall)

There is 1 steel pipe between the bridges at STA 14+00 and 14+75 and the channel is 8ft wide concrete walls.

Photograph No. 19
STA 14+75 Downstream photo of bridge

Photograph No. 20
STA 14+75 Upstream photo of bridge

Photograph No. 21
STA 15+50 Downstream photo of bridge

Photograph No. 22
STA 15+50 Upstream photo of bridge

Photograph No. 23
STA 17+00 Upstream photo of fence across creek

Photograph No. 24
STA 17+50 Downstream photo of bridge (12.5 ft wide)

Photograph No. 25
STA 17+50 Upstream photo of bridge (12.5 ft wide)

Photograph No. 26
STA 20+00 Downstream photo

Photograph No. 27
STA 20+00 Upstream photo

Photograph No. 28
STA 21+25 24” CMP

There is a 6” PVC pipe at STA 20+50

Photograph No. 29
STA 22+25 36”-42” CMP

Photograph No. 30
STA 22+50 Downstream photo

Photograph No. 31
STA 22+50 Upstream photo

Photograph No. 32
STA 25+00 Downstream photo

Photograph No. 33
STA 25+00 Upstream photo

Photograph No. 34
STA 25+50 Downstream photo

Photograph No. 35
STA 25+50 Upstream photo

Photograph No. 36
STA 25+50 Inlet on the east side of the creek

Photograph No. 37
STA 26+50 12” CMP

Photograph No. 38
STA 27+00 15” CCP

Photograph No. 39
STA 28+00 Downstream photo

Photograph No. 40
STA 28+00 Upstream photo

Photograph No. 41
STA 29+50 12” PVC

Photograph No. 42
STA 30+50 Downstream photo

Photograph No. 43
STA 30+50 Upstream photo

Photograph No. 44
STA 30+75 18” CPP

Photograph No. 45
STA 33+00 Downstream photo

Photograph No. 46
STA 33+00 Upstream photo

Photograph No. 47
STA 33+75 Downstream photo

Photograph No. 48
STA 33+75 Upstream photo

Photograph No. 49
STA 33+75 Inlet

Photograph No. 50
STA 34+00 8” PVC on East side of creek

Photograph No. 51
STA 36+00 Downstream photo

Photograph No. 52
STA 36+00 Upstream photo

Photograph No. 53
STA 38+50 Downstream photo

Photograph No. 54
STA 38+50 Upstream photo

Photograph No. 55
STA 41+00 Downstream photo

Photograph No. 56
STA 41+00 Upstream photo

Photograph No. 57
STA 43+50 Downstream photo

Photograph No. 58
STA 43+50 Upstream photo

Photograph No. 59
STA 44+00 Downstream photo of buildup in creek

Photograph No. 60
41°2’24” N 81°26’6” W Downstream photo of buildup in creek

Photograph No. 61
STA 46+00 Downstream photo

Photograph No. 62
STA 46+00 Upstream photo

Photograph No. 63
STA 48+50 Downstream photo

Photograph No. 64
STA 48+50 Upstream photo

Photograph No. 65
STA 48+50 72” RCP on East side of creek

Photograph No. 66
STA 51+00 Downstream photo (11.5ft wide by 7’4” tall road crossing)

Photograph No. 67
STA 51+00 Upstream photo

Photograph No. 68
STA 51+50 Downstream photo

Photograph No. 69
STA 51+50 Upstream photo (11.5ft wide by 7’4” tall road crossing)

Photograph No. 70
Starting at STA 52+00 downspout outlets run into the creek

Photograph No. 71
STA 54+00 Downstream photo

Photograph No. 72
STA 54+00 Upstream photo

After road crossing at STA 51+00 creek is 12ft wide lined with concrete

Photograph No. 73
STA 56+00 Downstream photo

Photograph No. 74
STA 56+00 Upstream photo

Photograph No. 75
STA 56+00 12” metal pipe just past county line

APPENDIX C – Preliminary Waters Investigation Figures

FEMA Village of Lakemore Flood Risk Map

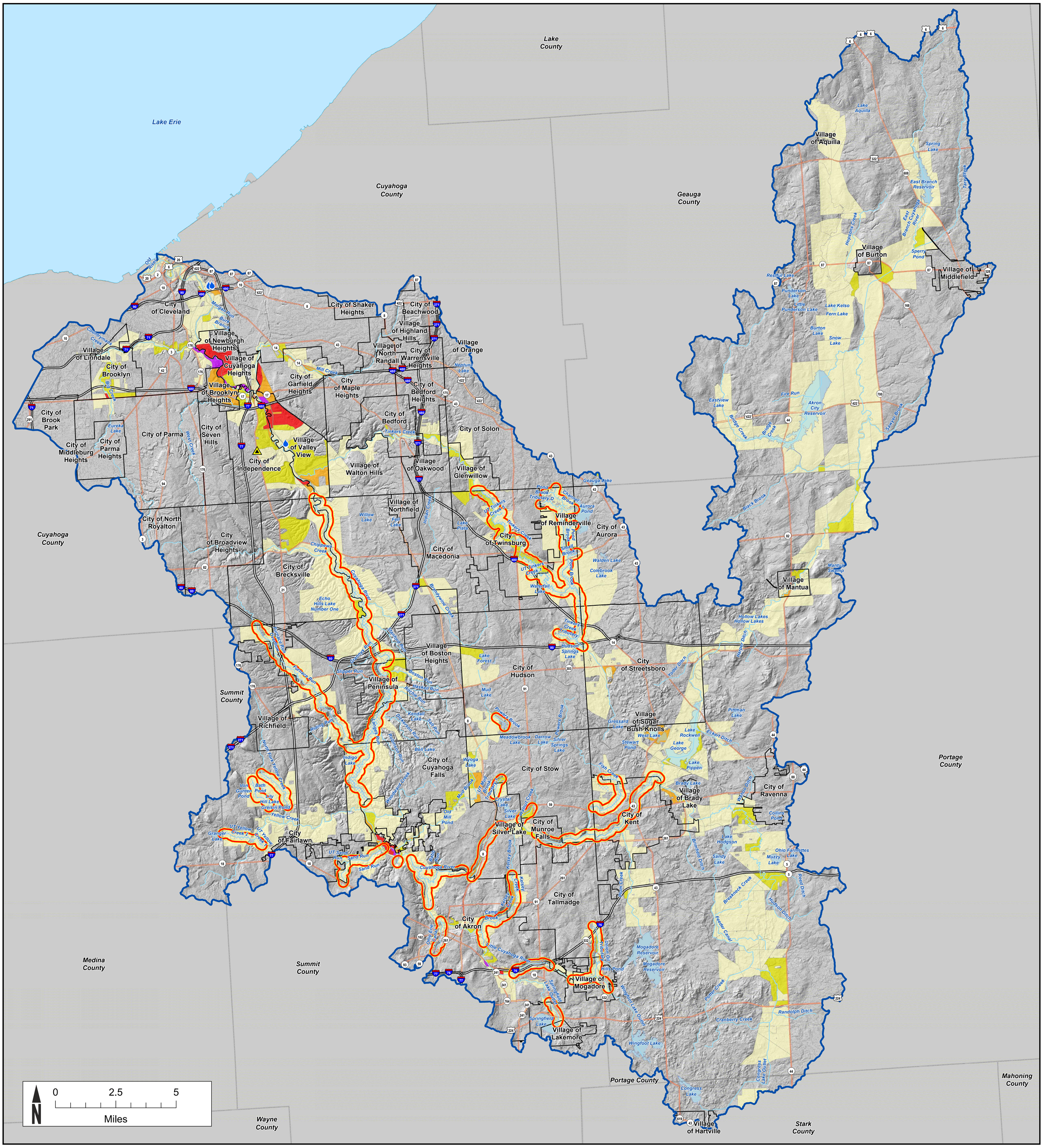
National Wetlands Inventory Map

Natural Resources Conservation Service – Custom Soil Resource Report Soil Map

Site Visit Photo Log

Figure 1 – Springfield Lake Possible WOTUS

Flood Risk Map: *Cuyahoga River Watershed*



MAP SYMBOLOGY

Base Data

- Corporate Limits
- Counties
- Major Roads
- Interstates
- HUC-8 Watershed Boundary
- HUC-10 Watershed Boundary

Flood Data

- Rivers and Streams
- Restudy Area
- New SFHA

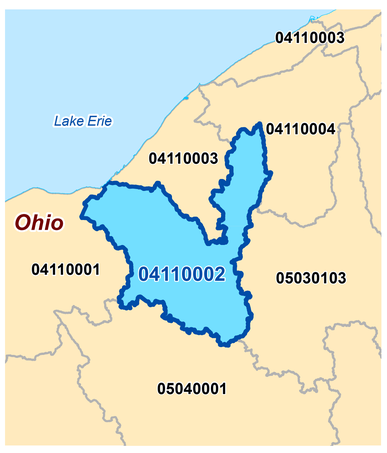
Flood Risk

- Very Low
- Low
- Medium
- High
- Very High

Areas of Mitigation Interest

- Areas of Significant Riverine or Coastal Erosion
- Other Flood Risk Areas

WATERSHED LOCATOR



Risk Mapping, Assessment, and Planning (Risk MAP)

FRM FLOOD RISK MAP

CUYAHOGA RIVER WATERSHED

FEMA

04110002

For more information of data used for this non-regulatory map, please consult the Cuyahoga River Watershed Flood Risk Database and Flood Risk Report.

RELEASE DATE
5/5/2017

Custom Soil Resource Report
Soil Map

Photograph No. 1
Culverts along Main Channel Stream

Photograph No. 2
Culverts along Main Channel Stream

Photograph No. 3
Main Channel Stream

Photograph No. 4
Fence Obstruction along Main Channel Stream

Photograph No. 5
HHEI Site to the north

Photograph No. 6
HHEI Site to the north

Photograph No. 7
Southern Most HHEI Site

Photograph No. 8
Southern HHEI site

Photograph No. 9
Water Control Structure

Photograph No. 10
Wetland to Main Channel

U.S. Fish and Wildlife Service
National Wetlands Inventory

Springfield Lake

August 1, 2023

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

DLZ

ARCHITECTURE • ENGINEERING • PLANNING
SURVEYING • CONSTRUCTION SERVICES

APPENDIX D – List of Threatened and Endangered Species

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ohio Ecological Services Field Office
4625 Morse Road, Suite 104
Columbus, OH 43230-8355
Phone: (614) 416-8993 Fax: (614) 416-8994

In Reply Refer To:
Project Code: 2024-0029472
Project Name: Springfield Lake

December 21, 2023

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Ohio Ecological Services Field Office
4625 Morse Road, Suite 104
Columbus, OH 43230-8355
(614) 416-8993

PROJECT SUMMARY

Project Code: 2024-0029472
Project Name: Springfield Lake
Project Type: Stream/Waterbody - Channel/Diversion Structures
Project Description: Improvements at the Springfield Lake outlet structure and channel need to be completed. This is due to Summit County (the client) having to dredge the channel to clear debris and allow the stream to flow. These improvements will prevent dredging in the future.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.0338114,-81.43134181308452,14z

Counties: Summit County, Ohio

ENDANGERED SPECIES ACT SPECIES

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency: County of Clinton
Name: Alex Frankila
Address: 1425 Keystone Avenue
City: Lansing
State: MI
Zip: 48911
Email afrankila@dlz.com
Phone: 5173500014

APPENDIX E – Ohio State Historical Preservation Office Response Letter

In replies, please use
2024-SUM-60408

March 6, 2024

Natalie Dingledine
Environmental Scientist/Ecologist
DLZ
1425 Keystone Ave
Lansing, MI 4891

Re: Section 106—Springfield Lake Outlet Study, Springfield Township, Summit County, Ohio

Dear Ms. Dingledine:

This letter is in response to your correspondence, received on February 8, 2024, regarding the proposed Springfield Lake Outlet Study project. We appreciate the opportunity to comment on this project. The comments of Ohio's State Historic Preservation Office (SHPO) are made pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, and the associated regulations at 36 CFR Part 800 and Ohio Revised Code 149.53.

The proposed undertaking plans to perform structural improvements to the existing Springfield Lake (the Lake) outlet channel in Summit Township from its point of origin in the Lake to the City of Akron Corp limit. The improvements are anticipated to provide adequate capacity, eliminate bank erosion, remove encroachments, and provide maintenance access and easements as required. This project will include ground-disturbing activities. The existing lake outlet structure and channel flows north through Akron, through commercial and residential areas. Based on GIS mapping, the channel passes through approximately 30 property parcels. The project corridor length is approximately 5,500-ft, with an approximate distance of 4,000-ft and an average width of 30-ft to be disturbed. There are seven (7) existing culverts or bridges in the outlet channel within the project limits.

A review of the SHPO GIS database reveals that there are no archaeological sites or archaeological surveys within the APE. A few small isolated finds have been documented during several previous surveys within the vicinity of the project area; however, none of the site yielded significant data to warrant additional work or eligibility for listing on the NRHP. The proposed project area has not been previously surveyed. We are unable to determine whether any properties in the area of potential effect (APE) are eligible for the National Register of Historic Places. The SHPO office does not recommend a Phase I archaeological survey for this project.

Additionally, eight historic properties (older than 50 years old) are located within the indirect APE. None of the properties are listed nor are they eligible for listing on the National Register of Historic Places.

Based on the information submitted, the SHPO agrees that the proposed project will not affect historic properties. No further coordination is necessary unless the project changes or new or additional historic properties are discovered during the implementation of the project. In such a situation, the SHPO should be contacted as per 36 CFR 800.13. Please be advised that this is a Section 106 decision. This review decision may not extend to other SHPO programs.

If you have any questions, please contact me by email at dgagliano@ohiohistory.org. Thank you for your cooperation.

Sincerely,

Dawn Walter Gagliano
Project Reviews Manager, Archaeology
Resource Protection and Review

RPR Ser. No. 1101786

APPENDIX F – Waters of the US Determination Report

INNOVATIVE IDEAS
EXCEPTIONAL DESIGN
UNMATCHED CLIENT SERVICE

DRAFT **WATERS OF THE US DETERMINATION REPORT**

Springfield Lake – Outlet Structure and Channel Study

Springfield Township, Summit County OH

Prepared For:

Office of the Engineer
County of Summit
538 E. South Street
Akron, OH 44311

Prepared By:

DLZ OHIO

DLZ Job No. 2322-6015-00

April 19, 2024

Table of Contents

FIGURES

INTRODUCTION

DLZ was contracted by the City of Springfield to conduct a Waters of the U.S. (WOTUS) Determination for the Spring Lake Outlet Structure and Channel project. Springfield Lake is located just south of the City of Akron in Springfield Township, Summit County, Ohio. The existing lake outlet and channel structure flows from Springfield Lake north to the City of Akron limits, through commercial and residential areas. The scope of the project includes replacing the existing outlet structure at Springfield Lake and reconstructing the channel north to the Akron city limit. Three temporary access drives will be installed along the Springfield Lake Outlet stream to allow access for channel reconstruction. (see **Figure 1** for project location overview).

WATERS OF THE US DETERMINATION

DLZ performed a WOTUS Determination for surface waters and wetlands in April of 2024 based on the Preliminary Design prepared for the outlet replacement and channel reconstruction. The determination included a review of available background mapping. The WOTUS was based on DLZ's best judgment utilizing the guidelines set forth by the U.S. Army Corps of Engineers (USACE) for determining the jurisdictional status of surface waters and wetlands. The final determination of jurisdictional waters is ultimately made by the USACE. The results of the WOTUS investigation are presented below.

REGULATORY IMPORTANCE

The USACE administers Section 404 of the Clean Water Act (CWA) and has authority to regulate the discharge of fill or dredged material into all "waters of the United States." WOTUS include traditional navigable waters (e.g., certain large rivers and lakes) and tributaries to these waters that are relatively permanent, standing or continuously flowing bodies of water; and wetlands adjacent to these waters. WOTUS are regulated by the USACE, and permits are required for work within wetlands or below the OHWM. In addition, the Ohio Environmental Protection Agency (OEPA) is responsible for issuing Water Quality Certification (WQC) under Section 401 of the Clean Water Act. WQC is required in conjunction with the USACE Section 404 permits.

Jurisdictional wetlands are identified in accordance with the USACE 1987 Wetland Delineation Manual (Department of the Army Technical Report Y-87-1) and the Regional Supplement to the USACE Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0). For an area to be defined as a jurisdictional wetland, it must be dominated by wetland plants, contain hydric soils, and have wetland hydrology.

Isolated wetlands are not connected to other surface waters and for this reason they are not classified as waters of the United States by the USACE. However, they are waters of the State of Ohio and are therefore regulated by the OEPA, Division of Surface Water, Section 401 Wetlands and Streams Permitting Section. OEPA's authority to regulate discharges of fill to isolated wetlands is provided in Ohio Revised Code 6111.02 through 6111.028. Functional assessments will be completed for any delineated isolated wetland areas using the Ohio Rapid Assessment Method Protocol (ORAM).

REVIEW OF AVAILABLE DATA

The U.S. Geological Service Akron Ohio Quadrangle map (https://viewer.nationalmap.gov/basic/) and StreamStats (https://streamstats.usgs.gov/ss/) were reviewed to determine the extent of streams and ditches in the study area that may be potentially jurisdictional waters (see **Figure 3**). Any ditches that are a Relatively Permanent Water (RPW) with an OHWM may be considered jurisdictional waters. Ditches draining into jurisdictional waters are also potentially jurisdictional features, as well as ditches that have extended beyond their original configuration and have formed wetlands.

National Wetlands Inventory (NWI) maps were reviewed using the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory - Wetland Mapper (http://www.fws.gov/wetlands/Data/Mapper.html). NWI maps only identify *potential* wetlands. Due to the lack of field verification, NWI classified wetlands are sometimes erroneously identified, missed, or misidentified. Additionally, the criteria used in identifying these wetlands, as established by USFWS, are different from those currently used by the USACE. NWI maps best serve as an indicator of potential jurisdictional wetlands. The NWI map identified Riverine habitat associated with the outlet stream channel and a Freshwater Emergent (PEM) Wetland near the outlet from Springfield Lake (see **Figure 4**).

Soil Survey Data for Summit County, Ohio was accessed from the United States Department of Agriculture WebSoil Survey 2.0 (USDA; http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx). Soil Surveys were developed from actual field investigations by soil scientists from the Natural Resources Conservation Service (formerly Soil Conservation Service), but they address only one of the three required wetland criteria and may reflect historical conditions rather than current site conditions. The Soil Survey identified three hydric soil units within the project area identified as Carlisle muck, Fitchville-Urban land complex, and Olmstead loam (see **Figure 5**). The soil in the outlet area is entirely comprised of Carlisle muck which is defined as a "very poorly drained soil with frequent flooding and ponding".

The Federal Emergency Management Agency (FEMA) website (https://www.fema.gov/flood-maps) was accessed to obtain mapping depicting the 100-year floodplain boundaries (see **Figure 6**). The study site is within the 100-year floodplain boundary and is an area of high flood risk.

FIELD INVESTIGATION

On April 16th and 17th, 2024, the site was visited by DLZ biologists to perform a field inspection to determine if the site contained WOTUS. Five wetlands, the Springfield Lake Outlet stream and its tributaries, and a ditch were identified within the project area that may be considered WOTUS. Four of the five wetlands are located within the riparian zone of the Springfield Lake Outlet stream. The fifth wetland surrounds the outlet from Springfield Lake. The wetland and ditch boundaries were demarcated with pink wetland flagging and surveyed using an D2 GPS unit (see **Figures 2A and 2B** for wetland locations and acreage). Site photographs are provided in **Appendix I**. Wetland delineation data forms are provided in **Appendix II**. All five wetlands and the identified stream and ditch are outlined below.

WETLANDS

- **Wetlands A, B, C, and D –** These palustrine forested (PFO) wetlands are similar in functionality, contain similar plant communities, and are all located within the riparian zone along the Springfield Lake Outlet stream. The wetlands are seasonally flooded and standing water was observed at the time of the field visit. Hydrophytic vegetation, including silver maple (*Acer saccharinum*, FACW), American elm (*Ulmus americana*, FACW) pin oak (*Quercus palustris*, FACW), skunk cabbage (*Symplocarpus foetidus*, OBL), and jewelweed (*Impatiens capense*, FACW) was noted along the riparian zone of the stream. The NRCS Soil Survey identified soils in this area as Jimtown-Urban land complex, 2-6% slopes, somewhat poorly drained. The soils identified on site did not match this description, as they appeared to be very poorly drained, displaying hydric characteristics.
- **Wetland E –** Wetland E is a palustrine forested (PFO) wetland complex that includes herbaceous PEM habitat surrounding the outlet from Springfield Lake. An upland path from Canfield Road is regularly mowed and maintained providing access to the outlet structure. The path separates the PFO wetland to the east and the Springfield Lake Outlet stream to the west. Two small depressions cross the path and connect the PFO wetland to the outlet stream. Hydrophytic vegetation was identified and dominated by trembling aspen (*Populus tremuloides*, FAC), silver maple (*Acer sachharinum*, FACW), reed canary grass (*Phalaris arundinacea*, FACW), phragmites (*Phragmites australis*, FACW), and common rush (*Juncus effusus*, OBL). The vegetation surrounding the outlet and stream channel was dominated by invasive narrowleaf cattail (*Typha angustifolia, FACW*) and phragmites. Primary and secondary hydrology indicators, including standing water, are present throughout the wetland. The NRCS Soil Survey identified soils in this area as Carlisle muck, 0-2% slopes, frequently flooded. The soils identified in the PEM wetland area near the outlet and surrounding PFO wetland area matched this description.

WETLAND ORAM RESULTS

The quality of the wetlands identified within the project area were evaluated using the ORAM. Wetlands are scored based on factors such as vegetation communities, hydrology, upland buffer, and habitat alteration and disturbance, and are assigned a score ranging from 0 (low quality) to 100 (high quality). Wetlands scoring 0 to

29.9 are considered "Category 1", wetlands scoring 30 to 59.9 are considered "Category 2", and wetlands scoring 60 to 100 are considered "Category 3".

All four PFO Wetlands (A, B, C, and D) located within the riparian zone of Springfield Lake Outlet stream were identified as Category 2 based on an ORAM score of 49. Wetland E, a PEM/PFO wetland surrounding the outlet, was identified as a Category 2 wetland based on an ORAM score of 38. Wetland E was assigned a lower ORAM score primarily due to extensive coverage (>75%) of invasive narrowleaf cattail and phragmites. No Category 3 wetlands were identified within the project area. ORAM data forms are provided as **Appendix III**.

STREAMS AND DITCHES

- **Springfield Lake Outlet Stream and Tributaries –** DLZ observed the length of the Springfield Lake Outlet stream from the outlet heading north to its crossing location under Shadybrook Drive. The stream is wide (>4 meters) in most areas with moderate to heavy flow. The stream was extremely turbid at the time of the field visit. Substrate consisted primarily of sand with interspersed gravel where the bottom was visible. Deep pools were observed at bends and the stream was generally deep (>1 foot) in most of the observed areas. No fauna was observed during the site visit.
- **Ditch 1 –** This vegetation filled roadside ditch is located east of Shadybrook Drive and flows north to the Springfield Lake Outlet stream. The ditch lacks an OHWM, and it originates entirely within the right-of-way of the road, both indicators that this feature is a roadside ditch, and not a regulated water feature. The ditch had standing water at the time of the field visit but was not flowing.

CONCLUSIONS AND RECOMMENDED FURTHER ACTIONS

DLZ identified five jurisdictional wetlands and the Springfield Lake Outlet stream within the project area and all features will potentially be considered WOTUS. The USACE will determine the final jurisdictional status of any features in the project area.

The next steps for USACE coordination will include having a preliminary jurisdictional determination (PJD) made on the wetlands and stream and to have a pre-permit application meeting with USACE to discuss the project scope, alternatives analysis, permit application, and mitigation requirements. Depending on final stream and wetland impacts, this project may meet the conditions for a Nationwide Permit (NWP) under Section 404 of the Clean Water Act. Conditions for each type of NWP permit can vary but typically all require wetland impacts to be less than ½- acre.

Care should be taken to minimize erosion and control sediment runoff into riparian wetlands during stream channel reconstruction. Sediment control barriers, such as silt fencing, should be installed prior to the commencement of work at each location. This temporary measure will prohibit sediment and debris runoff into the stream and adjacent wetlands. Additionally, construction and installation equipment should be staged away from the stream channel reconstruction locations to prevent erosion into the stream. Implementing

these steps will significantly reduce impacts to the respective stream reconstruction locations and adjacent wetlands.

This report is a summary of our findings for wetlands within the project area, in a form intended to provide easily understood information. Due to the dynamic nature of wetland resources, this report reflects the site conditions as they existed during the time the field review was completed. Please be advised this regulatory delineation represents our professional opinion based on application of established regulatory methodologies. Plant species reported represent observations on the date of the field inspection. The plant listing is provided to identify dominant species in accordance with the USACE North Central Northeast Regional supplement and should not be considered complete or verified by detailed inventory. Regulatory agencies with jurisdiction over protected resources have the final determination of wetland boundaries and jurisdictional status.

FIGURES

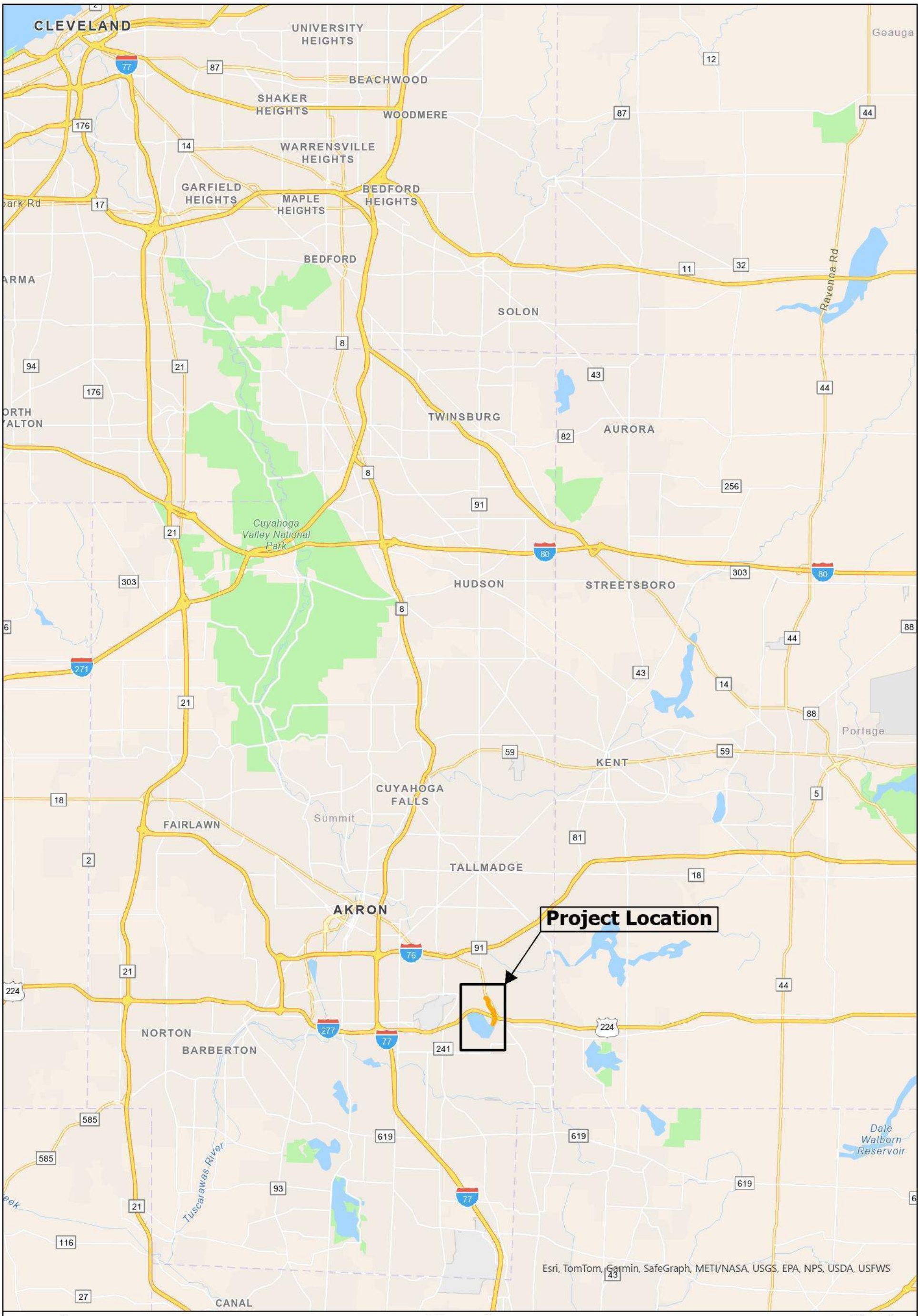


Fig: 1

Figure 1
Project Location Map
Office of the Engineer
County of Summit
538 E. South Street, Akron, OH 44311

DLZ
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SURVEYING • CONSTRUCTION SERVICES

2322-6015-00 Author: AF Date: 4/23/2024

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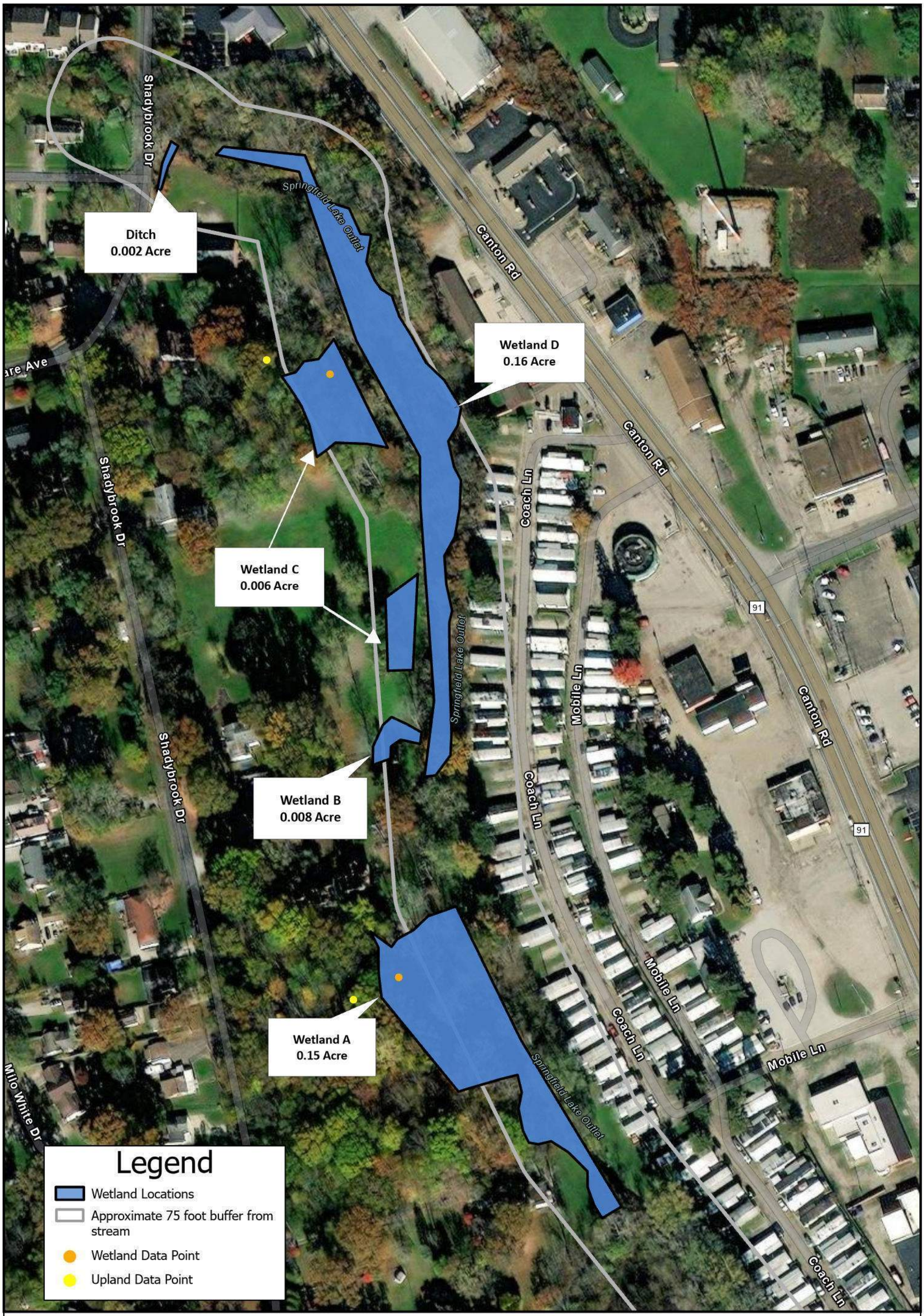

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Fig: 2A

Figure 2A
Project Area Map
Office of the Engineer
County of Summit
538 E. South Street, Akron, OH 44311

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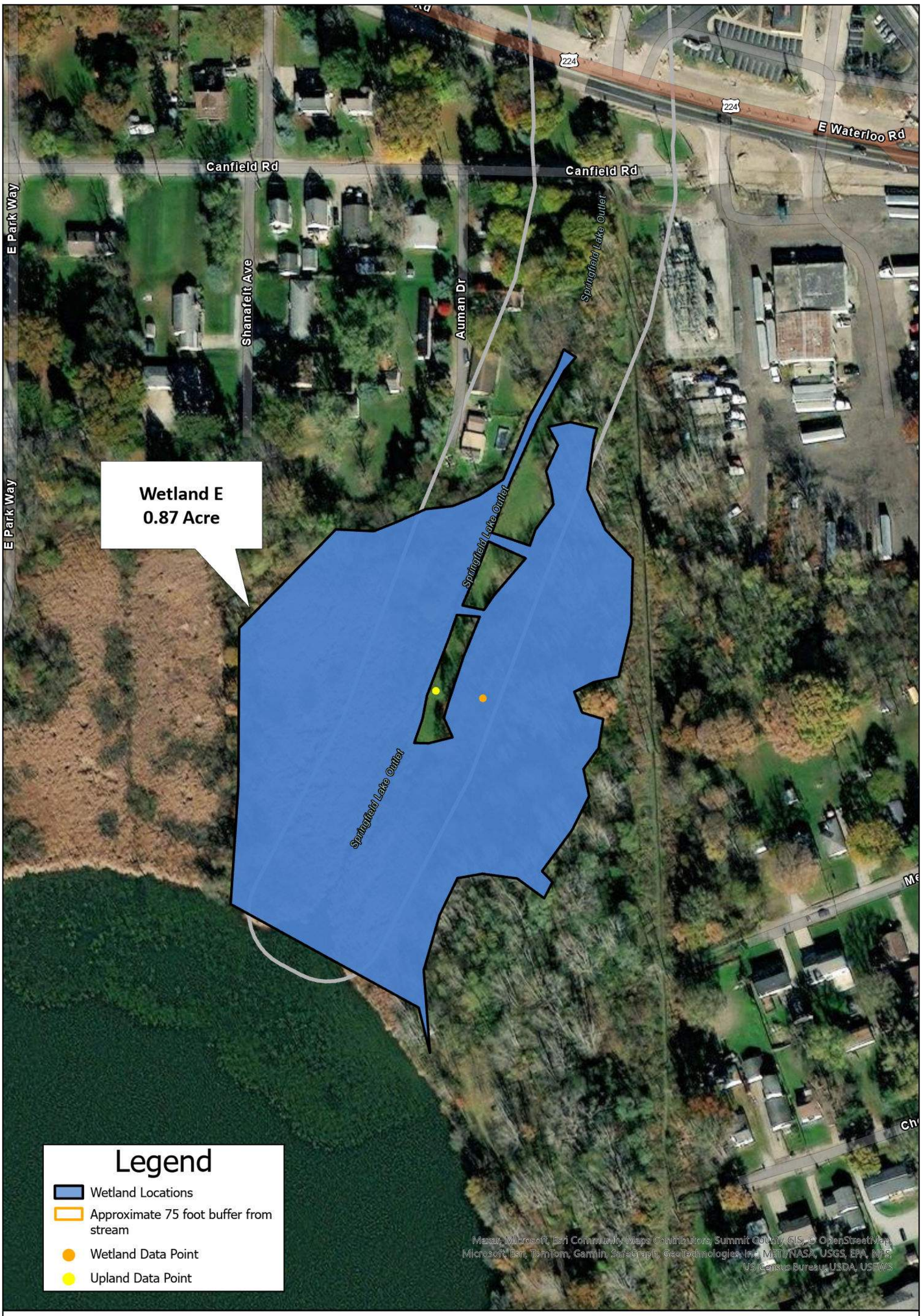
SURVEYING • CONSTRUCTION SERVICES

2322-6015-00 Author: AF Date: 4/30/2024



Path: X:\Projects\2023\2322\601500 Summit County Spr\08_Environmental\GIS\GIS\Figures\Figures.aprx

Fig: 2B

Figure 2B
Project Area Map
Office of the Engineer
County of Summit
538 E. South Street, Akron, OH 44311

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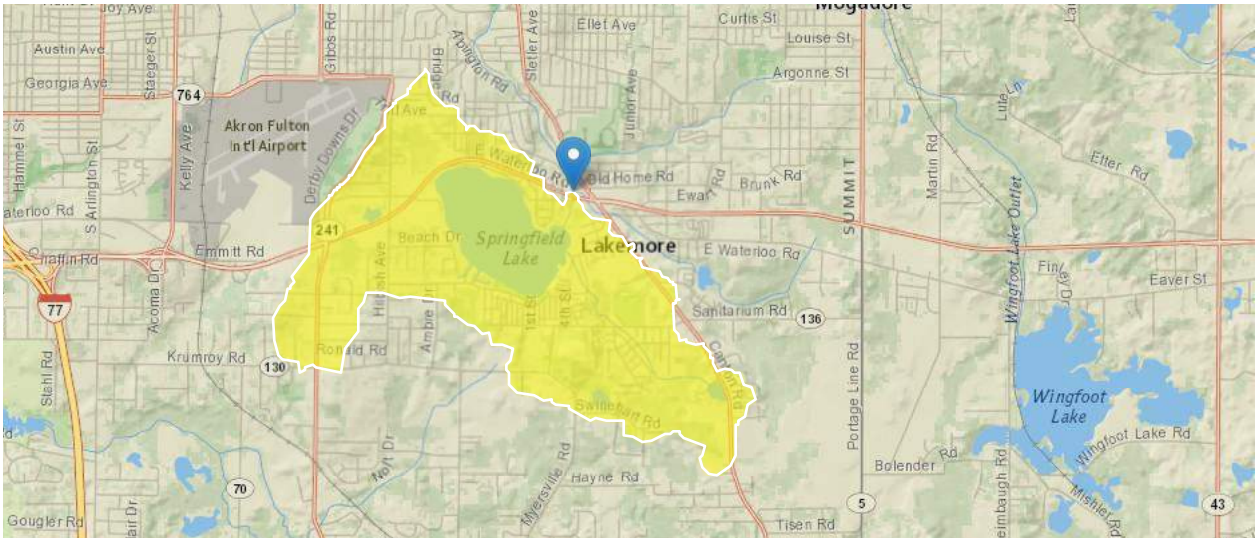
SURVEYING • CONSTRUCTION SERVICES

2322-6015-00 Author: AF Date: 4/30/2024

Springfield Lake StreamStats Report

Fig: 3

Region ID: OH
Workspace ID: OH20240415183915106000
Clicked Point (Latitude, Longitude): 41.03217, -81.43047
Time: 2024-04-15 14:39:38 -0400



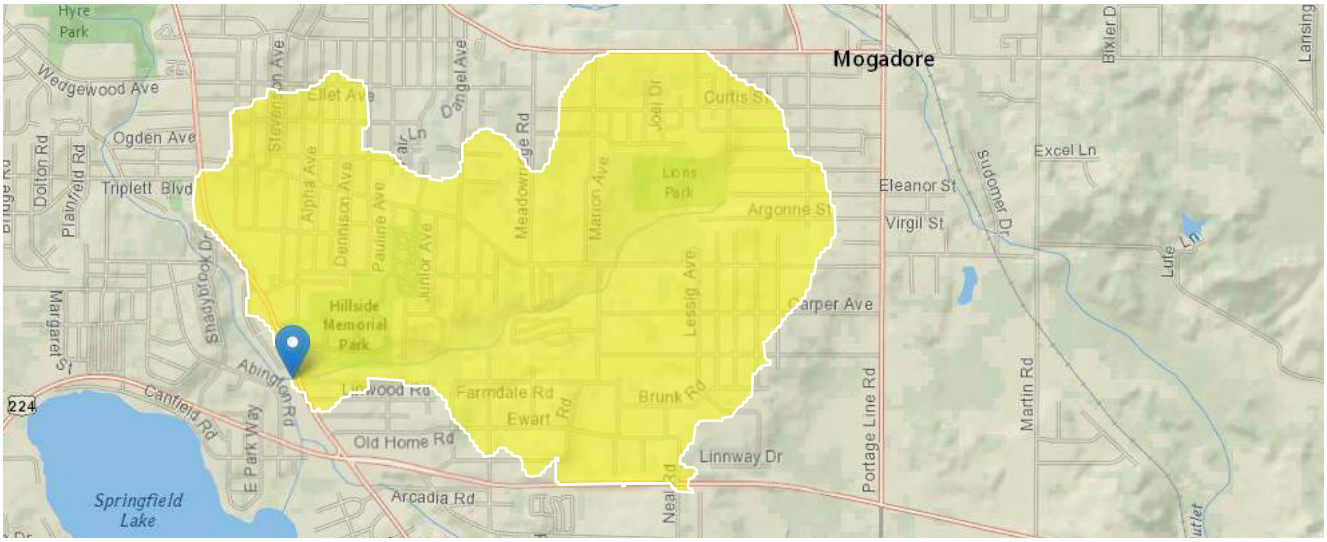
Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	3.62	square miles
FOREST	Percentage of area covered by forest	19.1	percent
LAT_CENT	Latitude of Basin Centroid	41.0236	decimal degrees
LC92STOR	Percentage of water bodies and wetlands determined from the NLCD	19.7	percent
PRECIPCENT	Mean Annual Precip at Basin Centroid	35.9	inches
STREAM_VARG	Streamflow variability index as defined in WRIR 02-4068, computed from regional grid	0.58	dimensionless

StreamStats Report

Region ID: OH
Workspace ID: OH20240415184406668000
Clicked Point (Latitude, Longitude): 41.03520, -81.43116
Time: 2024-04-15 14:44:30 -0400



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	2.05	square miles
FOREST	Percentage of area covered by forest	8.98	percent
LAT_CENT	Latitude of Basin Centroid	41.0409	decimal degrees
LC92STOR	Percentage of water bodies and wetlands determined from the NLCD	2.35	percent
PRECIPCENT	Mean Annual Precip at Basin Centroid	35.9	inches
STREAM_VARG	Streamflow variability index as defined in WRIR 02-4068, computed from regional grid	0.58	dimensionless

U.S. Fish and Wildlife Service
National Wetlands Inventory

Springfield Lake

Fig: 4

August 1, 2023

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Custom Soil Resource Report
Soil Map

Fig: 5

Map Scale: 1:9,590 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 100 200 400 600

Feet
0 450 900 1800 2700

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

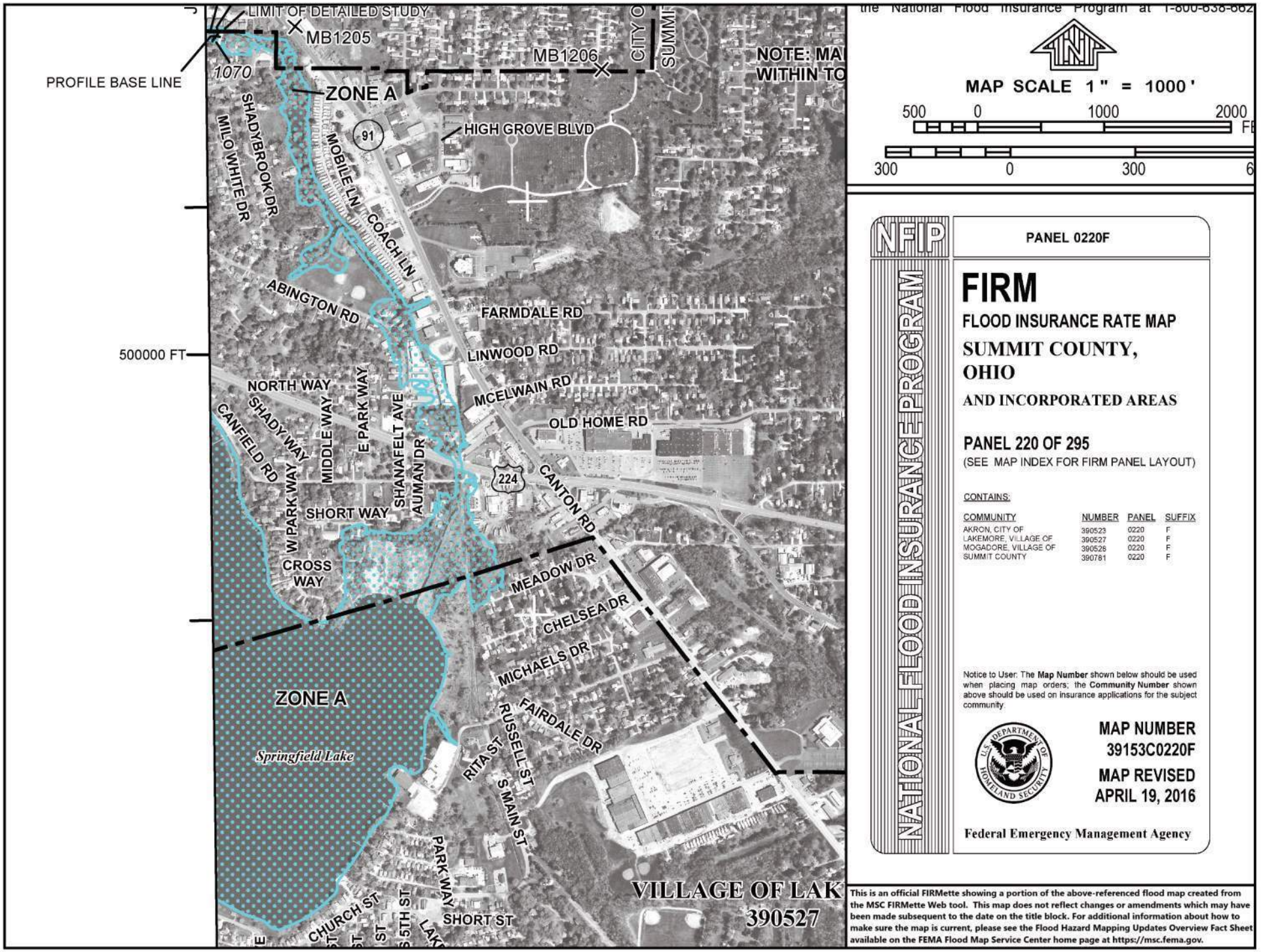
Soil Survey Area: Summit County, Ohio
Survey Area Data: Version 20, Sep 11, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 10, 2020—Sep 21, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Fig: 6


LIMIT OF DETAILED STUDY
MB1205
MB1206
PROFILE BASE LINE
1070
ZONE A
NOTE: MA
WITHIN TO
HIGH GROVE BLVD
91
SHADYBROOK DR
MILO WHITE DR
MOBILE LN
COACH LN
ABINGTON RD
FARMDALE RD
LINWOOD RD
MCELWAIN RD
OLD HOME RD
500000 FT
NORTH WAY
SHADY WAY
CANFIELD RD
MIDDLE WAY
E PARK WAY
SHANAFELT AVE
AUMAN DR
224
CANTON RD
W PARK WAY
SHORT WAY
CROSS WAY
MEADOW DR
CHELSEA DR
MICHAELS DR
FAIRDALE DR
RUSSELL ST
RITA ST
S MAIN ST
ZONE A
Springfield Lake
PARK WAY
SHORT ST
CHURCH ST
VILLAGE OF LAK
390527
MAP SCALE 1" = 1000'
500 0 1000 2000
300 0 300
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0220F
FIRM
FLOOD INSURANCE RATE MAP
SUMMIT COUNTY, OHIO
AND INCORPORATED AREAS
PANEL 220 OF 295
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
AKRON, CITY OF 390523 0220 F
LAKEMORE, VILLAGE OF 390527 0220 F
MOGADORE, VILLAGE OF 390526 0220 F
SUMMIT COUNTY 390781 0220 F
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
MAP NUMBER
39153C0220F
MAP REVISED
APRIL 19, 2016
Federal Emergency Management Agency
This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at https://msc.fema.gov.

APPENDIX I – Site Photographs

Photo 1 - View of Wetland A. Typical habitat present in Wetlands A, B, C, and D.

Photo 2 – View of Wetland C facing north along outlet stream.

Photo 3 – View of maintained access road facing south towards Springfield Lake and outlet.

Photo 4 – View of forested portion of Wetland E.

Photo 5 – Additional view of forested portion of Wetland E

Photo 6 – View of access path crossing between forested portion of Wetland E and outlet stream.

Photo 7 – View of Springfield Lake Outlet stream and structure.

Photo 8 – View of emergent portion of Wetland E around outlet structure.

Photo 9 – View of Springfield Lake Outlet stream facing south towards lake.

Photo 10 – Additional view of outlet stream.

Photo 11 – View of Springfield Lake Outlet stream near Wetlands C and D facing north.

Photo 12 – Additional view of outlet stream facing south.

APPENDIX II – Wetland Data Forms

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Springfield Lake City/County: Springfield/Summitt Sampling Date: 4-17-24

Applicant/Owner: Summitt County State: OH Sampling Point: Up 1

Investigator(s): Ethan Morris, Alex Frankila Section, Township, Range:

Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope %: 6-8

Subregion (LRR or MLRA): LRR L Lat: 41.0376347 Long: -81.4349600 Datum: NAD 83

Soil Map Unit Name: Jimtown-Urban land complex 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 within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____
Wetland Hydrology Present?	Yes ____	No X	

Remarks: (Explain alternative procedures here or in a separate report.)
Near flag A16.

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:

VEGETATION – Use scientific names of plants.

Sampling Point: Up 1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Prunus serotina*	20	Yes	FACU
2. *Quercus rubra*	10	Yes	FACU
3. *Carya glabra*	10	Yes	FACU
4.			
5.			
6.			
7.			
	40	=Total Cover	
Sapling/Shrub Stratum (Plot size: 5)			
1. *Sassafras albidum*	5	Yes	FACU
2. *Lindera benzoin*	5	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	10	=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Lonicera morrowii*	10	Yes	FACU
2. *Rosa multiflora*	10	Yes	FACU
3. *Rubus allegheniensis*	5	Yes	FACU
4. *Viola sororia*	5	Yes	FAC
5. *Geum canadense*	5	Yes	FAC
6. *Alliaria petiolata*	5	Yes	FACU
7.			
8.			
9.			
10.			
11.			
12.			
	40	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 11 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 27.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	10	x 3 =	30
FACU species	75	x 4 =	300
UPL species	0	x 5 =	0
Column Totals	90 (A)		340 (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 supportir 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 diameter 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.)

SOIL

Sampling Point: Up 1

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 3/2	100					Sandy	
4-16	10YR 4/4	100					Sandy	

[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)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ 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**)
- ___ Red Parent Material (F21) **(MLRA 145)**

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**)
- ___ Red Parent Material (F21) **(outside MLRA 145**
- ___ 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:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Springfield Lake City/County: Springfield/Summitt Sampling Date: 4-17-24

Applicant/Owner: Summitt County State: OH Sampling Point: Wet 1

Investigator(s): Ethan Morris, Alex Frankila Section, Township, Range:

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

Subregion (LRR or MLRA): LRR L Lat: 41.0377159 Long: -81.4349150 Datum: NAD 83

Soil Map Unit Name: Jimtown-Urban land complex NWI classification: none [PEM, PFO obs.]

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.)
For Wetlands A and B. All functionally similar, contain similar plant communities and hydrology. Near flag A16.

HYDROLOGY

Wetland Hydrology Indicators:

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

- X 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)
- X 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)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 0
Water Table Present?	Yes X	No ____	Depth (inches): 0
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: Wet 1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharinum*	20	Yes	FACW
2. *Quercus palustris*	15	Yes	FACW
3. *Quercus rubra*	10	Yes	FACU
4.			
5.			
6.			
7.			
	45	=Total Cover	
Sapling/Shrub Stratum (Plot size: 5)			
1. *Fraxinus pennsylvanica*	10	Yes	FACW
2. *Prunus virginiana*	10	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	20	=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Symplocarpus foetidus*	45	Yes	OBL
2. *Impatiens capensis*	25	Yes	FACW
3. *Geum canadense*	10	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 71.4% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	45	x 1 =	45
FACW species	70	x 2 =	140
FAC species	10	x 3 =	30
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals	145 (A)		295 (B)

Prevalence Index = B/A = 2.03

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 supportir 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 diameter 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: Wet 1

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
0-14	10YR 2/1	100					Muck	
14-16	10YR 4/1	50	10YR 5/6	50	C	M	Mucky Loam/Clay	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)
- X Histic Epipedon (A2)
- X Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ 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**)
- ___ Red Parent Material (F21) **(MLRA 145)**

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**)
- ___ Red Parent Material (F21) **(outside MLRA 145**
- ___ 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:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Springfield Lake City/County: Springfield/Summitt Sampling Date: 4-17-24

Applicant/Owner: Summitt County State: OH Sampling Point: Up 2

Investigator(s): Ethan Morris, Alex Frankila Section, Township, Range:

Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope %: 8-10

Subregion (LRR or MLRA): LRR L Lat: 41.0400915 Long: -81.4355306 Datum: NAD 83

Soil Map Unit Name: Jimtown-Urban land complex 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 within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____
Wetland Hydrology Present?	Yes ____	No X	

Remarks: (Explain alternative procedures here or in a separate report.)
Near flag C18.

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:

VEGETATION – Use scientific names of plants.

Sampling Point: Up 2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Picea abies*	20	Yes	UPL
2. *Quercus palustris*	15	Yes	FACW
3. *Quercus rubra*	10	No	FACU
4. *Fagus grandifolia*	10	No	FACU
5. *Prunus serotina*	5	No	FACU
6.			
7.			
	60	=Total Cover	
Sapling/Shrub Stratum (Plot size: 5)			
1. *Elaeagnus umbellata*	10	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
	10	=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Reynoutria japonica*	25	Yes	FACU
2. *Narcissus pseudonarcissus*	25	Yes	UPL
3. *Scilla luciliae*	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	55	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
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: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 20.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	5	x 3 =	15
FACU species	50	x 4 =	200
UPL species	55	x 5 =	275
Column Totals	125 (A)		520 (B)

Prevalence Index = B/A = 4.16

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 supportir 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 diameter 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.)

SOIL

Sampling Point: Up 2

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
0-16	10YR 2/2	100					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)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ 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**)
- ___ Red Parent Material (F21) **(MLRA 145)**

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**)
- ___ Red Parent Material (F21) **(outside MLRA 145**
- ___ 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:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Springfield Lake City/County: Springfield/Summitt Sampling Date: 4-17-24

Applicant/Owner: Summitt County State: OH Sampling Point: Wet 2

Investigator(s): Ethan Morris, Alex Frankila Section, Township, Range:

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

Subregion (LRR or MLRA): LRR L Lat: 41.0401940 Long: -81.4349878 Datum: NAD 83

Soil Map Unit Name: Jimtown-Urban land complex NWI classification: none [PEM, PFO obs.]

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.)
For Wetlands C and D. All functionally similar, contain same plant communities and hydrology. Near flag C18

HYDROLOGY

Wetland Hydrology Indicators:

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

- X 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)
- X 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)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 0
Water Table Present?	Yes X	No ____	Depth (inches): 0
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: Wet 2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharinum*	50	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	50	=Total Cover	
Sapling/Shrub Stratum (Plot size: 5)			
1. *Cornus sericea*	15	Yes	FACW
2. *Ribes nigrum*	10	Yes	UPL
3. *Lonicera morrowii*	5	No	FACU
4.			
5.			
6.			
7.			
	30	=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Symplocarpus foetidus*	30	Yes	OBL
2. *Impatiens capensis*	30	Yes	FACW
3. *Floerkea proserpinacoides*	20	Yes	FAC
4. *Carex blanda*	5	No	FAC
5. *Ranunculus repens*	5	No	FAC
6. *Lysimachia nummularia*	5	No	FACW
7.			
8.			
9.			
10.			
11.			
12.			
	95	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	100	x 2 =	200
FAC species	30	x 3 =	90
FACU species	5	x 4 =	20
UPL species	10	x 5 =	50
Column Totals	175 (A)		390 (B)

Prevalence Index = B/A = 2.23

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 supportir 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 diameter 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: Wet 2

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 3/1	100					Muck	
4-16	10YR 3/1	80	10YR 5/4	20	C	M	Mucky Loam/Clay	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)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ 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)**
- X 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**)
- ___ Red Parent Material (F21) **(MLRA 145)**

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**)
- ___ Red Parent Material (F21) **(outside MLRA 145**
- ___ 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:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Springfield Lake City/County: Springfield/Summitt Sampling Date: 4-17-24

Applicant/Owner: Summitt County State: OH Sampling Point: Up 3

Investigator(s): Ethan Morris, Alex Frankila Section, Township, Range:

Landform (hillside, terrace, etc.): slope Local relief (concave, convex, none): none Slope %: 4-6

Subregion (LRR or MLRA): LRR L Lat: 41.0400915 Long: -81.4355306 Datum: NAD 83

Soil Map Unit Name: Carlisle muck 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.)
Near flag E39. Located on access road.

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:

VEGETATION – Use scientific names of plants.

Sampling Point: Up 3

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Sapling/Shrub Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Lolium arundinaceum*	80	Yes	FACU
2. *Taraxacum officinale*	15	No	FACU
3. *Trifolium repens*	10	No	FACU
4. *Plantago major*	10	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	115	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	115	x 4 =	460
UPL species	0	x 5 =	0
Column Totals	115 (A)		460 (B)

Prevalence Index = B/A = 4.00

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 supportir 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 diameter 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.)

SOIL

Sampling Point: Up 3

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
0-16	10YR 3/2	100					Sandy	

[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)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ 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**)
- ___ Red Parent Material (F21) **(MLRA 145)**

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**)
- ___ Red Parent Material (F21) **(outside MLRA 145**
- ___ 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:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Springfield Lake City/County: Springfield/Summitt Sampling Date: 4-17-24

Applicant/Owner: Summitt County State: OH Sampling Point: Wet 3

Investigator(s): Ethan Morris, Alex Frankila Section, Township, Range:

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

Subregion (LRR or MLRA): LRR L Lat: 41.0294785 Long: -81.4308877 Datum: NAD 83

Soil Map Unit Name: Carlisle muck NWI classification: PEM [PEM, PFO obs.]

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.)
For Wetland E. Near flag E39.

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)
- X 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)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 5
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: Wet 3

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus tremuloides*	40	Yes	FAC
2. *Acer saccharinum*	25	Yes	FACW
3. *Platanus occidentalis*	10	No	FACW
4.			
5.			
6.			
7.			
	75	=Total Cover	
Sapling/Shrub Stratum (Plot size: 5)			
1. *Cornus sericea*	15	Yes	FACW
2. *Rosa multiflora*	10	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	25	=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Phalaris arundinacea*	30	Yes	FACW
2. *Phragmites australis*	30	Yes	FACW
3. *Juncus effusus*	20	Yes	OBL
4. *Rumex obtusifolius*	5	No	FAC
5. *Solidago sempervirens*	5	No	FACW
6. *Rumex obtusifolius*	5	No	FAC
7.			
8.			
9.			
10.			
11.			
12.			
	95	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 85.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	115	x 2 =	230
FAC species	50	x 3 =	150
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals	195 (A)		440 (B)

Prevalence Index = B/A = 2.26

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 supportir 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 diameter 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: Wet 3

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
0-16	10YR 2/1	100					Mucky Loam/Clay	

[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)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ 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)**
- X 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**)
- ___ Red Parent Material (F21) **(MLRA 145)**

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**)
- ___ Red Parent Material (F21) **(outside MLRA 145**
- ___ 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:

APPENDIX III – ORAM Data Sheets

Version 5.0	**Ohio Rapid Assessment Method for Wetlands** **10 Page Form for Wetland Categorization**	
	Background Information **Scoring Boundary Worksheet** **Narrative Rating** **Field Form Quantitative Rating** **ORAM Summary Worksheet** **Wetland Categorization Worksheet**	Ohio EPA, Division of Surface Water Final: February 1, 2001

Instructions

The investigator is *STRONGLY URGED* to read the Manual for Using the Ohio Rapid Assessment Method for Wetlands for further elaboration and discussion of the questions below prior to using the rating forms.

The Narrative Rating is designed to categorize a wetland or to provide alerts to the Rater based on the presence or possible presence of threatened or endangered species. The presence or proximity of such species is often an indicator of the quality and lack of disturbance of the wetland being evaluated. In addition, it is designed to categorize certain wetlands as very low quality (Category 1) or very high quality (Category 3) regardless of the wetland's score on the Quantitative Rating. In addition, the Narrative Rating also alerts the investigator that a particular wetland *may* be a Category 3 wetland, again, regardless of the wetland's score on the Quantitative Rating.

It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the ORAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to Scoring Boundary worksheet and the User's Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

Refer to the most recent ORAM Score Calibration Report for the scoring breakpoints between wetland categories. The most recent version of this document is posted on Ohio EPA's Division of Surface Water web page at: http://www.epa.ohio.gov/dsw/wetlands/WetlandEcologySection.aspx

Background Information

Name: Ethan Morris
Date: 4-17-24
Affiliation: DLZ Lansing
Address: 1425 Keystone Avenue, Lansing, Michigan 48910
Phone Number: 616-894-0043
e-mail address: emorris@dlz.com
Name of Wetland: Wetlands A, B, C, D
Vegetation Communit(ies):
HGM Class(es):
Location of Wetland: include map, address, north arrow, landmarks, distances, roads, etc. Please refer to Figure 2.

Lat/Long or UTM Coordinate	Refer to data sheets
USGS Quad Name	Akron West
County	Summit
Township	Springfield
Section and Subsection	
Hydrologic Unit Code	
Site Visit	4/17/24
National Wetland Inventory Map	X
Ohio Wetland Inventory Map	X
Soil Survey	X
Delineation report/map	X

Name of Wetland: Wetlands A, B, C, and D	
Wetland Size (acres, hectares):	>1 acre each

Sketch: Include north arrow, relationship with other surface waters, vegetation zones, etc.

Please refer to Figure 2.

Comments, Narrative Discussion, Justification of Category Changes:

Wetlands A, B, C, and D are functionally similar wetlands located along the riparian zone of the Springfield Lake Outlet stream. All share identical hydrology, habitat quality, and plant communities.

Final score : 49	**Category:**	2

Scoring Boundary Worksheet

INSTRUCTIONS. The initial step in completing the ORAM is to identify the "scoring boundaries" of the wetland being rated. In many instances this determination will be relatively easy and the scoring boundaries will coincide with the "jurisdictional boundaries." For example, the scoring boundary of an isolated cattail marsh located in the middle of a farm field will likely be the same as that wetland's jurisdictional boundaries. In other instances, however, the scoring boundary will not be as easily determined. Wetlands that are small or isolated from other surface waters often form large contiguous areas or heterogeneous complexes of wetland and upland. In separating wetlands for scoring purposes, the hydrologic regime of the wetland is the main criterion that should be used. Boundaries between contiguous or connected wetlands should be established where the volume, flow, or velocity of water moving through the wetland changes significantly. *Areas with a high degree of hydrologic interaction should be scored as a single wetland*. In determining a wetland's scoring boundaries, use the guidelines in the ORAM Manual Section 5.0. In certain instances, it may be difficult to establish the scoring boundary for the wetland being rated. These problem situations include wetlands that form a patchwork on the landscape, wetlands divided by artificial boundaries like property fences, roads, or railroad embankments, wetlands that are contiguous with streams, lakes, or rivers, and estuarine or coastal wetlands. These situations are discussed below, however, it is recommended that Rater contact Ohio EPA, Division of Surface Water, 401/Wetlands Section if there are additional questions or a need for further clarification of the appropriate scoring boundaries of a particular wetland.

#	Steps in properly establishing scoring boundaries	done?	not applicable
Step 1	Identify the wetland area of interest. This may be the site of a proposed impact, a reference site, conservation site, etc.	X	
Step 2	Identify the locations where there is physical evidence that hydrology changes rapidly. Such evidence includes both natural and human-induced changes including, constrictions caused by berms or dikes, points where the water velocity changes rapidly at rapids or falls, points where significant inflows occur at the confluence of rivers, or other factors that may restrict hydrologic interaction between the wetlands or parts of a single wetland.	X	
Step 3	Delineate the boundary of the wetland to be rated such that all areas of interest that are contiguous to and within the areas where the hydrology does not change significantly, i.e. areas that have a high degree of hydrologic interaction are included within the scoring boundary.	X	
Step 4	Determine if artificial boundaries, such as property lines, state lines, roads, railroad embankments, etc., are present. These should not be used to establish scoring boundaries unless they coincide with areas where the hydrologic regime changes.	X	
Step 5	In all instances, the Rater may enlarge the minimum scoring boundaries discussed here to score together wetlands that could be scored separately.	X	
Step 6	Consult ORAM Manual Section 5.0 for how to establish scoring boundaries for wetlands that form a patchwork on the landscape, divided by artificial boundaries, contiguous to streams, lakes or rivers, or for dual classifications.	X	

End of Scoring Boundary Determination. Begin Narrative Rating on next page.

Narrative Rating

INSTRUCTIONS. Answer each of the following questions. Questions 1, 2, 3 and 4 should be answered based on information obtained from the site visit or the literature *and* by submitting a Data Services Request to the Ohio Department of Natural Resources, Division of Natural Areas and Preserves, Natural Heritage Data Services, 1889 Fountain Square Court, Building F-1, Columbus, Ohio 43224, 614-265-6453 (phone), 614-265-3096 (fax), http://www.dnr.state.oh.us/dnap . The remaining questions are designed to be answered primarily by the results of the site visit. Refer to the User's Manual for descriptions of these wetland types. Note: "Critical habitat" is legally defined in the Endangered Species Act and is the geographic area containing physical or biological features essential to the conservation of a listed species or as an area that may require special management considerations or protection. The Rater should contact the Region 3 Headquarters or the Columbus Ecological Services Office for updates as to whether critical habitat has been designated for other federally listed threatened or endangered species. "Documented" means the wetland is listed in the appropriate State of Ohio database.

#	Question	Circle one	
1	**Critical Habitat.** Is the wetland in a township, section, or subsection of a United States Geological Survey 7.5 minute Quadrangle that has been designated by the U.S. Fish and Wildlife Service as "critical habitat" for any threatened or endangered plant or animal species? Note: as of January 1, 2001, of the federally listed endangered or threatened species which can be found in Ohio, the Indiana Bat has had critical habitat designated (50 CFR 17.95(a)) and the piping plover has had critical habitat proposed (65 FR 41812 July 6, 2000).	YES Wetland should be evaluated for possible Category 3 status Go to Question 2	(NO) Go to Question 2
2	**Threatened or Endangered Species.** Is the wetland known to contain an individual of, or documented occurrences of federal or state-listed threatened or endangered plant or animal species?	YES Wetland is a Category 3 wetland. Go to Question 3	(NO) Go to Question 3
3	**Documented High Quality Wetland.** Is the wetland on record in Natural Heritage Database as a high quality wetland?	YES Wetland is a Category 3 wetland Go to Question 4	(NO) Go to Question 4
4	**Significant Breeding or Concentration Area.** Does the wetland contain documented regionally significant breeding or nonbreeding waterfowl, neotropical songbird, or shorebird concentration areas?	YES Wetland is a Category 3 wetland Go to Question 5	(NO) Go to Question 5
5	**Category 1 Wetlands.** Is the wetland less than 0.5 hectares (1 acre) in size and **hydrologically isolated** and either 1) comprised of vegetation that is dominated (greater than eighty per cent areal cover) by *Phalaris arundinacea, Lythrum salicaria,* or *Phragmites australis*, or 2) an acidic pond created or excavated on mined lands that has little or no vegetation?	YES Wetland is a Category 1 wetland Go to Question 6	(NO) Go to Question 6
6	**Bogs.** Is the wetland a peat-accumulating wetland that 1) has no significant inflows or outflows, 2) supports acidophilic mosses, particularly *Sphagnum* spp., 3) the acidophilic mosses have >30% cover, 4) at least one species from Table 1 is present, and 5) the cover of invasive species (see Table 1) is <25%?	YES Wetland is a Category 3 wetland Go to Question 7	(NO) Go to Question 7
7	**Fens.** Is the wetland a carbon accumulating (peat, muck) wetland that is saturated during most of the year, primarily by a discharge of free flowing, mineral rich, ground water with a circumneutral ph (5.5-9.0) and with one or more plant species listed in Table 1 and the cover of invasive species listed in Table 1 is <25%?	YES Wetland is a Category 3 wetland Go to Question 8a	(NO) Go to Question 8a
8a	**"Old Growth Forest."** Is the wetland a forested wetland and is the forest characterized by, but not limited to, the following characteristics: overstory canopy trees of great age (exceeding at least 50% of a projected maximum attainable age for a species); little or no evidence of human-caused understory disturbance during the past 80 to 100 years; an all-aged structure and multilayered canopies; aggregations of canopy trees interspersed with canopy gaps; and significant numbers of standing dead snags and downed logs?	YES Wetland is a Category 3 wetland. Go to Question 8b	(NO) Go to Question 8b

8b	**Mature forested wetlands**. Is the wetland a forested wetland with 50% or more of the cover of upper forest canopy consisting of deciduous trees with large diameters at breast height (dbh), generally diameters greater than 45cm (17.7in) dbh?	YES Wetland should be evaluated for possible Category 3 status. Go to Question 9a	(NO) Go to Question 9a
9a	**Lake Erie coastal and tributary wetlands**. Is the wetland located at an elevation less than 575 feet on the USGS map, adjacent to this elevation, or along a tributary to Lake Erie that is accessible to fish?	YES Go to Question 9b	(NO) Go to Question 10
9b	Does the wetland's hydrology result from measures designed to prevent erosion and the loss of aquatic plants, i.e. the wetland is partially hydrologically restricted from Lake Erie due to lakeward or landward dikes or other hydrological controls?	YES Wetland should be evaluated for possible Category 3 status Go to Question 10	(NO) Go to Question 9c
9c	Are Lake Erie water levels the wetland's primary hydrological influence, i.e. the wetland is hydrologically unrestricted (no lakeward or upland border alterations), or the wetland can be characterized as an "estuarine" wetland with lake and river influenced hydrology. These include sandbar deposition wetlands, estuarine wetlands, river mouth wetlands, or those dominated by submersed aquatic vegetation.	YES Go to Question 9d	(NO) Go to Question 10
9d	Does the wetland have a predominance of native species within its vegetation communities, although non-native or disturbance tolerant native species can also be present?	YES Wetland is a Category 3 wetland Go to Question 10	(NO) Go to Question 9e
9e	Does the wetland have a predominance of non-native or disturbance tolerant native plant species within its vegetation communities?	YES Wetland should be evaluated for possible Category 3 status Go to Question 10	(NO) Go to Question 10
10	**Lake Plain Sand Prairies (Oak Openings)** Is the wetland located in Lucas, Fulton, Henry, or Wood Counties and can the wetland be characterized by the following description: the wetland has a sandy substrate with interspersed organic matter, a water table often within several inches of the surface, and often with a dominance of the gramineous vegetation listed in Table 1 (woody species may also be present). The Ohio Department of Natural Resources Division of Natural Areas and Preserves can provide assistance in confirming this type of wetland and its quality.	YES Wetland is a Category 3 wetland. Go to Question 11	(NO) Go to Question 11
11	**Relict Wet Prairies**. Is the wetland a relict wet prairie community dominated by some or all of the species in Table 1. Extensive prairies were formerly located in the Darby Plains (Madison and Union Counties), Sandusky Plains (Wyandot, Crawford, and Marion Counties), northwest Ohio (e.g. Erie, Huron, Lucas, Wood Counties), and portions of western Ohio Counties (e.g. Darke, Mercer, Miami, Montgomery, Van Wert etc.).	YES Wetland should be evaluated for possible Category 3 status Complete Quantitative Rating	(NO) Complete Quantitative Rating

Table 1. Characteristic plant species.

invasive/exotic spp	fen species	bog species	0ak Opening species	wet prairie species
Lythrum salicaria	*Zygadenus elegans var. glaucus*	*Calla palustris*	*Carex cryptolepis*	*Calamagrostis canadensis*
Myriophyllum spicatum	*Cacalia plantaginea*	*Carex atlantica var. capillacea*	*Carex lasiocarpa*	*Calamogrostis stricta*
Najas minor	*Carex flava*	*Carex echinata*	*Carex stricta*	*Carex atherodes*
Phalaris arundinacea	*Carex sterilis*	*Carex oligosperma*	*Cladium mariscoides*	*Carex buxbaumii*
Phragmites australis	*Carex stricta*	*Carex trisperma*	*Calamagrostis stricta*	*Carex pellita*
Potamogeton crispus	*Deschampsia caespitosa*	*Chamaedaphne calyculata*	*Calamagrostis canadensis*	*Carex sartwellii*
Ranunculus ficaria	*Eleocharis rostellata*	*Decodon verticillatus*	*Quercus palustris*	*Gentiana andrewsii*
Rhamnus frangula	*Eriophorum viridicarinatum*	*Eriophorum virginicum*		*Helianthus grosseserratus*
Typha angustifolia	*Gentianopsis spp.*	*Larix laricina*		*Liatris spicata*
Typha xglauca	*Lobelia kalmii*	*Nemopanthus mucronatus*		*Lysimachia quadriflora*
	Parnassia glauca	*Schechzeria palustris*		*Lythrum alatum*
	Potentilla fruticosa	*Sphagnum spp.*		*Pycnanthemum virginianum*
	Rhamnus alnifolia	*Vaccinium macrocarpon*		*Silphium terebinthinaceum*
	Rhynchospora capillacea	*Vaccinium corymbosum*		*Sorghastrum nutans*
	Salix candida	*Vaccinium oxycoccos*		*Spartina pectinata*
	Salix myricoides	*Woodwardia virginica*		*Solidago riddellii*
	Salix serissima	*Xyris difformis*		
	Solidago ohioensis			
	Tofieldia glutinosa			
	Triglochin maritimum			
	Triglochin palustre			

End of Narrative Rating. Begin Quantitative Rating on next page.

Site: Wetlands A, B, C, and D	**Rater(s):** Ethan Morris	**Date:** 4-17-24

Metric 1. Wetland Area (size).

1	1
max 6 pts.	subtotal

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [ ] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [X] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

Metric 2. Upland buffers and surrounding land use.

4	5
max 14 pts.	subtotal

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- [ ] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [X] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- [ ] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrub land, young second growth forest. (5)
- [X] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

Metric 3. Hydrology.

25	30
max 30 pts.	subtotal

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [ ] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [X] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [X] 100 year floodplain (1)
- [X] Between stream/lake and other human use (1)
- [ ] Part of wetland/upland (e.g. forest), complex (1)
- [X] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only one and assign score.

- [ ] >0.7 (27.6in) (3)
- [X] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [ ] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation. Score one or dbl check.

- [ ] Semi- to permanently inundated/saturated (4)
- [X] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- [X] None or none apparent (12)
- [ ] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] tile
- [ ] dike
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [ ] road bed/RR track
- [ ] dredging
- [ ] other_____

Metric 4. Habitat Alteration and Development.

16	46
max 20 pts.	subtotal

4a. Substrate disturbance. Score one or double check and average.

- [X] None or none apparent (4)
- [ ] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- [ ] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [X] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [X] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient enrichment

46
subtotal this page

last revised 1 February 2001 jjm

Site: Wetlands A, B, C, and D	**Rater(s):** Ethan Morris	**Date:** 4-17-24

46
subtotal first page

0 (max 10 pts.) | 46 (subtotal)

Metric 5. Special Wetlands.

Check all that apply and score as indicated.

- [ ] Bog (10)
- [ ] Fen (10)
- [ ] Old growth forest (10)
- [ ] Mature forested wetland (5)
- [ ] Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
- [ ] Lake Erie coastal/tributary wetland-restricted hydrology (5)
- [ ] Lake Plain Sand Prairies (Oak Openings) (10)
- [ ] Relict Wet Prairies (10)
- [ ] Known occurrence state/federal threatened or endangered species (10)
- [ ] Significant migratory songbird/water fowl habitat or usage (10)
- [ ] Category 1 Wetland. See Question 1 Qualitative Rating (-10)

3 (max 20 pts.) | 49 (subtotal)

Metric 6. Plant communities, interspersion, microtopography.

6a. Wetland Vegetation Communities.
Score all present using 0 to 3 scale.

- [ ] Aquatic bed
- [1] Emergent
- [ ] Shrub
- [1] Forest
- [ ] Mudflats
- [ ] Open water
- [ ] Other_____

6b. horizontal (plan view) Interspersion.
Select only one.

- [ ] High (5)
- [ ] Moderately high(4)
- [ ] Moderate (3)
- [ ] Moderately low (2)
- [ ] Low (1)
- [0] None (0)

6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

- [ ] Extensive >75% cover (-5)
- [ ] Moderate 25-75% cover (-3)
- [-1] Sparse 5-25% cover (-1)
- [ ] Nearly absent <5% cover (0)
- [ ] Absent (1)

6d. Microtopography.
Score all present using 0 to 3 scale.

- [ ] Vegetated hummucks/tussucks
- [ ] Coarse woody debris >15cm (6in)
- [ ] Standing dead >25cm (10in) dbh
- [2] Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

49

End of Quantitative Rating. Complete Categorization Worksheets.

ORAM Summary Worksheet

		circle answer or insert score	Result
Narrative Rating	Question 1 Critical Habitat	YES (NO)	If yes, Category 3.
	Question 2. Threatened or Endangered Species	YES (NO)	If yes, Category 3.
	Question 3. High Quality Natural Wetland	YES (NO)	If yes, Category 3.
	Question 4. Significant bird habitat	YES (NO)	If yes, Category 3.
	Question 5. Category 1 Wetlands	YES (NO)	If yes, Category 1.
	Question 6. Bogs	YES (NO)	If yes, Category 3.
	Question 7. Fens	YES (NO)	If yes, Category 3.
	Question 8a. Old Growth Forest	YES (NO)	If yes, Category 3.
	Question 8b. Mature Forested Wetland	YES (NO)	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 9b. Lake Erie Wetlands - Restricted	YES (NO)	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 9d. Lake Erie Wetlands – Unrestricted with native plants	YES (NO)	If yes, Category 3
	Question 9e. Lake Erie Wetlands - Unrestricted with invasive plants	YES (NO)	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 10. Oak Openings	YES (NO)	If yes, Category 3
	Question 11. Relict Wet Prairies	YES (NO)	If yes, evaluate for Category 3; may also be 1 or 2.
Quantitative Rating	Metric 1. Size		1
	Metric 2. Buffers and surrounding land use		4
	Metric 3. Hydrology		25
	Metric 4. Habitat		16
	Metric 5. Special Wetland Communities		0
	Metric 6. Plant communities, interspersion, microtopography		3
	TOTAL SCORE	49	Category based on score breakpoints

Complete Wetland Categorization Worksheet.

Wetland Categorization Worksheet

Choices	Circle one		Evaluation of Categorization Result of ORAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 2, 3, 4, 6, 7, 8a, 9d, 10	YES Wetland is categorized as a Category 3 wetland	(NO)	Is quantitative rating score *less* than the Category 2 scoring threshold (*excluding* gray zone)? If yes, reevaluate the category of the wetland using the narrative criteria in OAC Rule 3745-1-54(C) and biological and/or functional assessments to determine if the wetland has been over-categorized by the ORAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 1, 8b, 9b, 9e, 11	YES Wetland should be evaluated for possible Category 3 status	(NO)	Evaluate the wetland using the 1) narrative criteria in OAC Rule 3745-1-54(C) and 2) the quantitative rating score. If the wetland is determined to be a Category 3 wetland using either of these, it should be categorized as a Category 3 wetland. Detailed biological and/or functional assessments may also be used to determine the wetland's category.
Did you answer "Yes" to Narrative Rating No. 5	YES Wetland is categorized as a Category 1 wetland	(NO)	Is quantitative rating score *greater* than the Category 2 scoring threshold *(including* any gray zone)? If yes, reevaluate the category of the wetland using the narrative criteria in OAC Rule 3745-1-54(C) and biological and/or functional assessments to determine if the wetland has been under-categorized by the ORAM
Does the quantitative score fall within the scoring range of a Category 1, 2, or 3 wetland?	(YES) Wetland is assigned to the appropriate category based on the scoring range	NO	If the score of the wetland is located within the scoring range for a particular category, the wetland should be assigned to that category. In all instances however, the narrative criteria described in OAC Rule 3745-1-54(C) can be used to clarify or change a categorization based on a quantitative score.
Does the quantitative score fall with the *"gray zone"* for Category 1 or 2 or Category 2 or 3 wetlands?	YES Wetland is assigned to the higher of the two categories or assigned to a category based on detailed assessments and the narrative criteria	(NO)	Rater has the option of assigning the wetland to the higher of the two categories or to assign a category based on the results of a nonrapid wetland assessment method, e.g. functional assessment, biological assessment, etc, and a consideration of the narrative criteria in OAC rule 3745-1-54(C).
Does the wetland otherwise exhibit *moderate OR superior* hydrologic OR habitat, OR recreational functions AND the wetland was *not* categorized as a Category 2 wetland (in the case of moderate functions) or a Category 3 wetland (in the case of superior functions) by this method?	YES Wetland was undercategorized by this method. A written justification for recategorization should be provided on Background Information Form	(NO) Wetland is assigned to category as determined by the ORAM.	A wetland may be undercategorized using this method, but still exhibit one or more superior functions, e.g. a wetland's biotic communities may be degraded by human activities, but the wetland may still exhibit superior hydrologic functions because of its type, landscape position, size, local or regional significance, etc. In this circumstance, the narrative criteria in OAC Rule 3745-1-54(C)(2) and (3) are controlling, and the under-categorization should be corrected. A written justification with supporting reasons or information for this determination should be provided.

Final Category

Choose one	Category 1	(Category 2)	Category 3

End of Ohio Rapid Assessment Method for Wetlands.

Version 5.0	**Ohio Rapid Assessment Method for Wetlands** **10 Page Form for Wetland Categorization**	
	Background Information **Scoring Boundary Worksheet** **Narrative Rating** **Field Form Quantitative Rating** **ORAM Summary Worksheet** **Wetland Categorization Worksheet**	Ohio EPA, Division of Surface Water Final: February 1, 2001

Instructions

The investigator is *STRONGLY URGED* to read the Manual for Using the Ohio Rapid Assessment Method for Wetlands for further elaboration and discussion of the questions below prior to using the rating forms.

The Narrative Rating is designed to categorize a wetland or to provide alerts to the Rater based on the presence or possible presence of threatened or endangered species. The presence or proximity of such species is often an indicator of the quality and lack of disturbance of the wetland being evaluated. In addition, it is designed to categorize certain wetlands as very low quality (Category 1) or very high quality (Category 3) regardless of the wetland's score on the Quantitative Rating. In addition, the Narrative Rating also alerts the investigator that a particular wetland *may* be a Category 3 wetland, again, regardless of the wetland's score on the Quantitative Rating.

It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the ORAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to Scoring Boundary worksheet and the User's Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

Refer to the most recent ORAM Score Calibration Report for the scoring breakpoints between wetland categories. The most recent version of this document is posted on Ohio EPA's Division of Surface Water web page at: http://www.epa.ohio.gov/dsw/wetlands/WetlandEcologySection.aspx

Background Information

Name: Ethan Morris
Date: 4-17-24
Affiliation: DLZ Lansing
Address: 1425 Keystone Avenue, Lansing, Michigan 48910
Phone Number: 616-894-0043
e-mail address: emorris@dlz.com
Name of Wetland: Wetland E
Vegetation Communit(ies):
HGM Class(es):
Location of Wetland: include map, address, north arrow, landmarks, distances, roads, etc. Please refer to Figure 2.

Lat/Long or UTM Coordinate	Refer to data sheets
USGS Quad Name	Akron West
County	Summit
Township	Springfield
Section and Subsection	
Hydrologic Unit Code	
Site Visit	4/17/24
National Wetland Inventory Map	X
Ohio Wetland Inventory Map	X
Soil Survey	X
Delineation report/map	X

Name of Wetland: Wetland E	
Wetland Size (acres, hectares):	5-10 Acres

Sketch: Include north arrow, relationship with other surface waters, vegetation zones, etc.

Please refer to Figure 2.

Comments, Narrative Discussion, Justification of Category Changes:

Final score : 38	**Category:** 2

Scoring Boundary Worksheet

INSTRUCTIONS. The initial step in completing the ORAM is to identify the "scoring boundaries" of the wetland being rated. In many instances this determination will be relatively easy and the scoring boundaries will coincide with the "jurisdictional boundaries." For example, the scoring boundary of an isolated cattail marsh located in the middle of a farm field will likely be the same as that wetland's jurisdictional boundaries. In other instances, however, the scoring boundary will not be as easily determined. Wetlands that are small or isolated from other surface waters often form large contiguous areas or heterogeneous complexes of wetland and upland. In separating wetlands for scoring purposes, the hydrologic regime of the wetland is the main criterion that should be used. Boundaries between contiguous or connected wetlands should be established where the volume, flow, or velocity of water moving through the wetland changes significantly. *Areas with a high degree of hydrologic interaction should be scored as a single wetland*. In determining a wetland's scoring boundaries, use the guidelines in the ORAM Manual Section 5.0. In certain instances, it may be difficult to establish the scoring boundary for the wetland being rated. These problem situations include wetlands that form a patchwork on the landscape, wetlands divided by artificial boundaries like property fences, roads, or railroad embankments, wetlands that are contiguous with streams, lakes, or rivers, and estuarine or coastal wetlands. These situations are discussed below, however, it is recommended that Rater contact Ohio EPA, Division of Surface Water, 401/Wetlands Section if there are additional questions or a need for further clarification of the appropriate scoring boundaries of a particular wetland.

#	Steps in properly establishing scoring boundaries	done?	not applicable
Step 1	Identify the wetland area of interest. This may be the site of a proposed impact, a reference site, conservation site, etc.	X	
Step 2	Identify the locations where there is physical evidence that hydrology changes rapidly. Such evidence includes both natural and human-induced changes including, constrictions caused by berms or dikes, points where the water velocity changes rapidly at rapids or falls, points where significant inflows occur at the confluence of rivers, or other factors that may restrict hydrologic interaction between the wetlands or parts of a single wetland.	X	
Step 3	Delineate the boundary of the wetland to be rated such that all areas of interest that are contiguous to and within the areas where the hydrology does not change significantly, i.e. areas that have a high degree of hydrologic interaction are included within the scoring boundary.	X	
Step 4	Determine if artificial boundaries, such as property lines, state lines, roads, railroad embankments, etc., are present. These should not be used to establish scoring boundaries unless they coincide with areas where the hydrologic regime changes.	X	
Step 5	In all instances, the Rater may enlarge the minimum scoring boundaries discussed here to score together wetlands that could be scored separately.		X
Step 6	Consult ORAM Manual Section 5.0 for how to establish scoring boundaries for wetlands that form a patchwork on the landscape, divided by artificial boundaries, contiguous to streams, lakes or rivers, or for dual classifications.		X

End of Scoring Boundary Determination. Begin Narrative Rating on next page.

Narrative Rating

INSTRUCTIONS. Answer each of the following questions. Questions 1, 2, 3 and 4 should be answered based on information obtained from the site visit or the literature *and* by submitting a Data Services Request to the Ohio Department of Natural Resources, Division of Natural Areas and Preserves, Natural Heritage Data Services, 1889 Fountain Square Court, Building F-1, Columbus, Ohio 43224, 614-265-6453 (phone), 614-265-3096 (fax), http://www.dnr.state.oh.us/dnap . The remaining questions are designed to be answered primarily by the results of the site visit. Refer to the User's Manual for descriptions of these wetland types. Note: "Critical habitat" is legally defined in the Endangered Species Act and is the geographic area containing physical or biological features essential to the conservation of a listed species or as an area that may require special management considerations or protection. The Rater should contact the Region 3 Headquarters or the Columbus Ecological Services Office for updates as to whether critical habitat has been designated for other federally listed threatened or endangered species. "Documented" means the wetland is listed in the appropriate State of Ohio database.

#	Question	Circle one	
1	**Critical Habitat.** Is the wetland in a township, section, or subsection of a United States Geological Survey 7.5 minute Quadrangle that has been designated by the U.S. Fish and Wildlife Service as "critical habitat" for any threatened or endangered plant or animal species? Note: as of January 1, 2001, of the federally listed endangered or threatened species which can be found in Ohio, the Indiana Bat has had critical habitat designated (50 CFR 17.95(a)) and the piping plover has had critical habitat proposed (65 FR 41812 July 6, 2000).	YES Wetland should be evaluated for possible Category 3 status Go to Question 2	(NO) Go to Question 2
2	**Threatened or Endangered Species.** Is the wetland known to contain an individual of, or documented occurrences of federal or state-listed threatened or endangered plant or animal species?	YES Wetland is a Category 3 wetland. Go to Question 3	(NO) Go to Question 3
3	**Documented High Quality Wetland.** Is the wetland on record in Natural Heritage Database as a high quality wetland?	YES Wetland is a Category 3 wetland Go to Question 4	(NO) Go to Question 4
4	**Significant Breeding or Concentration Area.** Does the wetland contain documented regionally significant breeding or nonbreeding waterfowl, neotropical songbird, or shorebird concentration areas?	YES Wetland is a Category 3 wetland Go to Question 5	(NO) Go to Question 5
5	**Category 1 Wetlands.** Is the wetland less than 0.5 hectares (1 acre) in size and **hydrologically isolated** and either 1) comprised of vegetation that is dominated (greater than eighty per cent areal cover) by *Phalaris arundinacea, Lythrum salicaria,* or *Phragmites australis*, or 2) an acidic pond created or excavated on mined lands that has little or no vegetation?	YES Wetland is a Category 1 wetland Go to Question 6	(NO) Go to Question 6
6	**Bogs.** Is the wetland a peat-accumulating wetland that 1) has no significant inflows or outflows, 2) supports acidophilic mosses, particularly *Sphagnum* spp., 3) the acidophilic mosses have >30% cover, 4) at least one species from Table 1 is present, and 5) the cover of invasive species (see Table 1) is <25%?	YES Wetland is a Category 3 wetland Go to Question 7	(NO) Go to Question 7
7	**Fens.** Is the wetland a carbon accumulating (peat, muck) wetland that is saturated during most of the year, primarily by a discharge of free flowing, mineral rich, ground water with a circumneutral ph (5.5-9.0) and with one or more plant species listed in Table 1 and the cover of invasive species listed in Table 1 is <25%?	YES Wetland is a Category 3 wetland Go to Question 8a	(NO) Go to Question 8a
8a	**"Old Growth Forest."** Is the wetland a forested wetland and is the forest characterized by, but not limited to, the following characteristics: overstory canopy trees of great age (exceeding at least 50% of a projected maximum attainable age for a species); little or no evidence of human-caused understory disturbance during the past 80 to 100 years; an all-aged structure and multilayered canopies; aggregations of canopy trees interspersed with canopy gaps; and significant numbers of standing dead snags and downed logs?	YES Wetland is a Category 3 wetland. Go to Question 8b	(NO) Go to Question 8b

8b	**Mature forested wetlands**. Is the wetland a forested wetland with 50% or more of the cover of upper forest canopy consisting of deciduous trees with large diameters at breast height (dbh), generally diameters greater than 45cm (17.7in) dbh?	YES Wetland should be evaluated for possible Category 3 status. Go to Question 9a	(NO) Go to Question 9a
9a	**Lake Erie coastal and tributary wetlands**. Is the wetland located at an elevation less than 575 feet on the USGS map, adjacent to this elevation, or along a tributary to Lake Erie that is accessible to fish?	YES Go to Question 9b	(NO) Go to Question 10
9b	Does the wetland's hydrology result from measures designed to prevent erosion and the loss of aquatic plants, i.e. the wetland is partially hydrologically restricted from Lake Erie due to lakeward or landward dikes or other hydrological controls?	YES Wetland should be evaluated for possible Category 3 status Go to Question 10	(NO) Go to Question 9c
9c	Are Lake Erie water levels the wetland's primary hydrological influence, i.e. the wetland is hydrologically unrestricted (no lakeward or upland border alterations), or the wetland can be characterized as an "estuarine" wetland with lake and river influenced hydrology. These include sandbar deposition wetlands, estuarine wetlands, river mouth wetlands, or those dominated by submersed aquatic vegetation.	YES Go to Question 9d	(NO) Go to Question 10
9d	Does the wetland have a predominance of native species within its vegetation communities, although non-native or disturbance tolerant native species can also be present?	YES Wetland is a Category 3 wetland Go to Question 10	(NO) Go to Question 9e
9e	Does the wetland have a predominance of non-native or disturbance tolerant native plant species within its vegetation communities?	YES Wetland should be evaluated for possible Category 3 status Go to Question 10	(NO) Go to Question 10
10	**Lake Plain Sand Prairies (Oak Openings)** Is the wetland located in Lucas, Fulton, Henry, or Wood Counties and can the wetland be characterized by the following description: the wetland has a sandy substrate with interspersed organic matter, a water table often within several inches of the surface, and often with a dominance of the gramineous vegetation listed in Table 1 (woody species may also be present). The Ohio Department of Natural Resources Division of Natural Areas and Preserves can provide assistance in confirming this type of wetland and its quality.	YES Wetland is a Category 3 wetland. Go to Question 11	(NO) Go to Question 11
11	**Relict Wet Prairies**. Is the wetland a relict wet prairie community dominated by some or all of the species in Table 1. Extensive prairies were formerly located in the Darby Plains (Madison and Union Counties), Sandusky Plains (Wyandot, Crawford, and Marion Counties), northwest Ohio (e.g. Erie, Huron, Lucas, Wood Counties), and portions of western Ohio Counties (e.g. Darke, Mercer, Miami, Montgomery, Van Wert etc.).	YES Wetland should be evaluated for possible Category 3 status Complete Quantitative Rating	(NO) Complete Quantitative Rating

Table 1. Characteristic plant species.

invasive/exotic spp	fen species	bog species	0ak Opening species	wet prairie species
Lythrum salicaria	*Zygadenus elegans var. glaucus*	*Calla palustris*	*Carex cryptolepis*	*Calamagrostis canadensis*
Myriophyllum spicatum	*Cacalia plantaginea*	*Carex atlantica var. capillacea*	*Carex lasiocarpa*	*Calamogrostis stricta*
Najas minor	*Carex flava*	*Carex echinata*	*Carex stricta*	*Carex atherodes*
Phalaris arundinacea	*Carex sterilis*	*Carex oligosperma*	*Cladium mariscoides*	*Carex buxbaumii*
Phragmites australis	*Carex stricta*	*Carex trisperma*	*Calamagrostis stricta*	*Carex pellita*
Potamogeton crispus	*Deschampsia caespitosa*	*Chamaedaphne calyculata*	*Calamagrostis canadensis*	*Carex sartwellii*
Ranunculus ficaria	*Eleocharis rostellata*	*Decodon verticillatus*	*Quercus palustris*	*Gentiana andrewsii*
Rhamnus frangula	*Eriophorum viridicarinatum*	*Eriophorum virginicum*		*Helianthus grosseserratus*
Typha angustifolia	*Gentianopsis spp.*	*Larix laricina*		*Liatris spicata*
Typha xglauca	*Lobelia kalmii*	*Nemopanthus mucronatus*		*Lysimachia quadriflora*
	Parnassia glauca	*Schechzeria palustris*		*Lythrum alatum*
	Potentilla fruticosa	*Sphagnum spp.*		*Pycnanthemum virginianum*
	Rhamnus alnifolia	*Vaccinium macrocarpon*		*Silphium terebinthinaceum*
	Rhynchospora capillacea	*Vaccinium corymbosum*		*Sorghastrum nutans*
	Salix candida	*Vaccinium oxycoccos*		*Spartina pectinata*
	Salix myricoides	*Woodwardia virginica*		*Solidago riddellii*
	Salix serissima	*Xyris difformis*		
	Solidago ohioensis			
	Tofieldia glutinosa			
	Triglochin maritimum			
	Triglochin palustre			

End of Narrative Rating. Begin Quantitative Rating on next page.

Site: Wetland E	**Rater(s):** Ethan Morris	**Date:** 4-17-24

Metric 1. Wetland Area (size).

3	3
max 6 pts.	subtotal

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [X] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [ ] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

Metric 2. Upland buffers and surrounding land use.

4	7
max 14 pts.	subtotal

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- [ ] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [X] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- [ ] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrub land, young second growth forest. (5)
- [X] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

Metric 3. Hydrology.

24	31
max 30 pts.	subtotal

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [ ] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [X] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [X] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [ ] Part of wetland/upland (e.g. forest), complex (1)
- [X] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only one and assign score.

- [ ] >0.7 (27.6in) (3)
- [X] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [ ] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation. Score one or dbl check.

- [ ] Semi- to permanently inundated/saturated (4)
- [X] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- [X] None or none apparent (12)
- [ ] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] tile
- [ ] dike
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [ ] road bed/RR track
- [ ] dredging
- [ ] other_____

Metric 4. Habitat Alteration and Development.

16	47
max 20 pts.	subtotal

4a. Substrate disturbance. Score one or double check and average.

- [X] None or none apparent (4)
- [ ] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- [ ] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [X] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [X] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient enrichment

47
subtotal this page

last revised 1 February 2001 jjm

Site: Wetland E	**Rater(s):** Ethan Morris	**Date:** 4-17-24

47
subtotal first page

Metric 5. Special Wetlands.

-10 max 10 pts. | 37 subtotal

Check all that apply and score as indicated.

	Bog (10)
	Fen (10)
	Old growth forest (10)
	Mature forested wetland (5)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
	Lake Erie coastal/tributary wetland-restricted hydrology (5)
	Lake Plain Sand Prairies (Oak Openings) (10)
	Relict Wet Prairies (10)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migratory songbird/water fowl habitat or usage (10)
X	Category 1 Wetland. See Question 1 Qualitative Rating (-10)

Metric 6. Plant communities, interspersion, microtopography.

1 max 20 pts. | 38 subtotal

6a. Wetland Vegetation Communities.
Score all present using 0 to 3 scale.

	Aquatic bed
1	Emergent
	Shrub
1	Forest
	Mudflats
	Open water
	Other_____

6b. horizontal (plan view) Interspersion.
Select only one.

	High (5)
	Moderately high(4)
	Moderate (3)
	Moderately low (2)
	Low (1)
0	None (0)

6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

-5	Extensive >75% cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly absent <5% cover (0)
	Absent (1)

6d. Microtopography.
Score all present using 0 to 3 scale.

	Vegetated hummucks/tussucks
	Coarse woody debris >15cm (6in)
	Standing dead >25cm (10in) dbh
2	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

38

End of Quantitative Rating. Complete Categorization Worksheets.

ORAM Summary Worksheet

		circle answer or insert score	Result
Narrative Rating	Question 1 Critical Habitat	YES (NO)	If yes, Category 3.
	Question 2. Threatened or Endangered Species	YES (NO)	If yes, Category 3.
	Question 3. High Quality Natural Wetland	YES (NO)	If yes, Category 3.
	Question 4. Significant bird habitat	YES (NO)	If yes, Category 3.
	Question 5. Category 1 Wetlands	YES (NO)	If yes, Category 1.
	Question 6. Bogs	YES (NO)	If yes, Category 3.
	Question 7. Fens	YES (NO)	If yes, Category 3.
	Question 8a. Old Growth Forest	YES (NO)	If yes, Category 3.
	Question 8b. Mature Forested Wetland	YES (NO)	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 9b. Lake Erie Wetlands - Restricted	YES (NO)	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 9d. Lake Erie Wetlands – Unrestricted with native plants	YES (NO)	If yes, Category 3
	Question 9e. Lake Erie Wetlands - Unrestricted with invasive plants	YES (NO)	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 10. Oak Openings	YES (NO)	If yes, Category 3
	Question 11. Relict Wet Prairies	YES (NO)	If yes, evaluate for Category 3; may also be 1 or 2.
Quantitative Rating	Metric 1. Size		3
	Metric 2. Buffers and surrounding land use		4
	Metric 3. Hydrology		24
	Metric 4. Habitat		16
	Metric 5. Special Wetland Communities		-10
	Metric 6. Plant communities, interspersion, microtopography		1
	TOTAL SCORE	38	Category based on score breakpoints

Complete Wetland Categorization Worksheet.

Wetland Categorization Worksheet

Choices	Circle one		Evaluation of Categorization Result of ORAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 2, 3, 4, 6, 7, 8a, 9d, 10	YES Wetland is categorized as a Category 3 wetland	(NO)	Is quantitative rating score *less* than the Category 2 scoring threshold (*excluding* gray zone)? If yes, reevaluate the category of the wetland using the narrative criteria in OAC Rule 3745-1-54(C) and biological and/or functional assessments to determine if the wetland has been over-categorized by the ORAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 1, 8b, 9b, 9e, 11	YES Wetland should be evaluated for possible Category 3 status	(NO)	Evaluate the wetland using the 1) narrative criteria in OAC Rule 3745-1-54(C) and 2) the quantitative rating score. If the wetland is determined to be a Category 3 wetland using either of these, it should be categorized as a Category 3 wetland. Detailed biological and/or functional assessments may also be used to determine the wetland's category.
Did you answer "Yes" to Narrative Rating No. 5	YES Wetland is categorized as a Category 1 wetland	(NO)	Is quantitative rating score *greater* than the Category 2 scoring threshold *(including* any gray zone)? If yes, reevaluate the category of the wetland using the narrative criteria in OAC Rule 3745-1-54(C) and biological and/or functional assessments to determine if the wetland has been under-categorized by the ORAM
Does the quantitative score fall within the scoring range of a Category 1, 2, or 3 wetland?	(YES) Wetland is assigned to the appropriate category based on the scoring range	NO	If the score of the wetland is located within the scoring range for a particular category, the wetland should be assigned to that category. In all instances however, the narrative criteria described in OAC Rule 3745-1-54(C) can be used to clarify or change a categorization based on a quantitative score.
Does the quantitative score fall with the *"gray zone"* for Category 1 or 2 or Category 2 or 3 wetlands?	YES Wetland is assigned to the higher of the two categories or assigned to a category based on detailed assessments and the narrative criteria	(NO)	Rater has the option of assigning the wetland to the higher of the two categories or to assign a category based on the results of a nonrapid wetland assessment method, e.g. functional assessment, biological assessment, etc, and a consideration of the narrative criteria in OAC rule 3745-1-54(C).
Does the wetland otherwise exhibit *moderate OR superior* hydrologic OR habitat, OR recreational functions AND the wetland was *not* categorized as a Category 2 wetland (in the case of moderate functions) or a Category 3 wetland (in the case of superior functions) by this method?	YES Wetland was undercategorized by this method. A written justification for recategorization should be provided on Background Information Form	(NO) Wetland is assigned to category as determined by the ORAM.	A wetland may be undercategorized using this method, but still exhibit one or more superior functions, e.g. a wetland's biotic communities may be degraded by human activities, but the wetland may still exhibit superior hydrologic functions because of its type, landscape position, size, local or regional significance, etc. In this circumstance, the narrative criteria in OAC Rule 3745-1-54(C)(2) and (3) are controlling, and the under-categorization should be corrected. A written justification with supporting reasons or information for this determination should be provided.

Final Category

Choose one	Category 1	(Category 2)	Category 3

End of Ohio Rapid Assessment Method for Wetlands.

APPENDIX G – Outlet Elevations Study

Springfield Lake Outlet Elevations

Report of Survey, May 15, 2015, by Walt Schostak, P.S.

On April 29, 2015 at a meeting with Bob Warren and Walt Schostak of the Summit County Engineer's Office, Debbie Davis, Springfield Township Trustee, asked if we could set a mark on or near the Springfield Lake Outlet that would reference the maximum lake elevation. After consulting with our Administration it was decided to comply with the request.

Field work:

On May 14, 2015, the Summit County Engineer's Survey crew, led by Walt Schostak, commenced work on this project. First a "MAG" nail was set in each of the tops of the East and West concrete abutments to the Springfield Lake Outlet Control Structure. Next the benchmarks listed in the Summit Engineer's Report of Survey, dated December 2, 1997 (attached), were found. Levels were then run from monument "Carrie" through monument "Carrie Az Mark", BM 3, BM 2, to BM "Square". The elevations determined from these measurements compared very well to those determined in the 1997 survey. From BM "square" levels were run to the nails set on the Outlet Structure and back. The first run failed to close within an acceptable tolerance, so the levels were repeated until a satisfactory closure was obtained

The field notes were analyzed and elevations determined for the various points on the Outlet Structure (see attached detail). On May 15, 2015, the maximum lake elevation was marked upon each abutment with a "permanent marker."

Results of Survey:

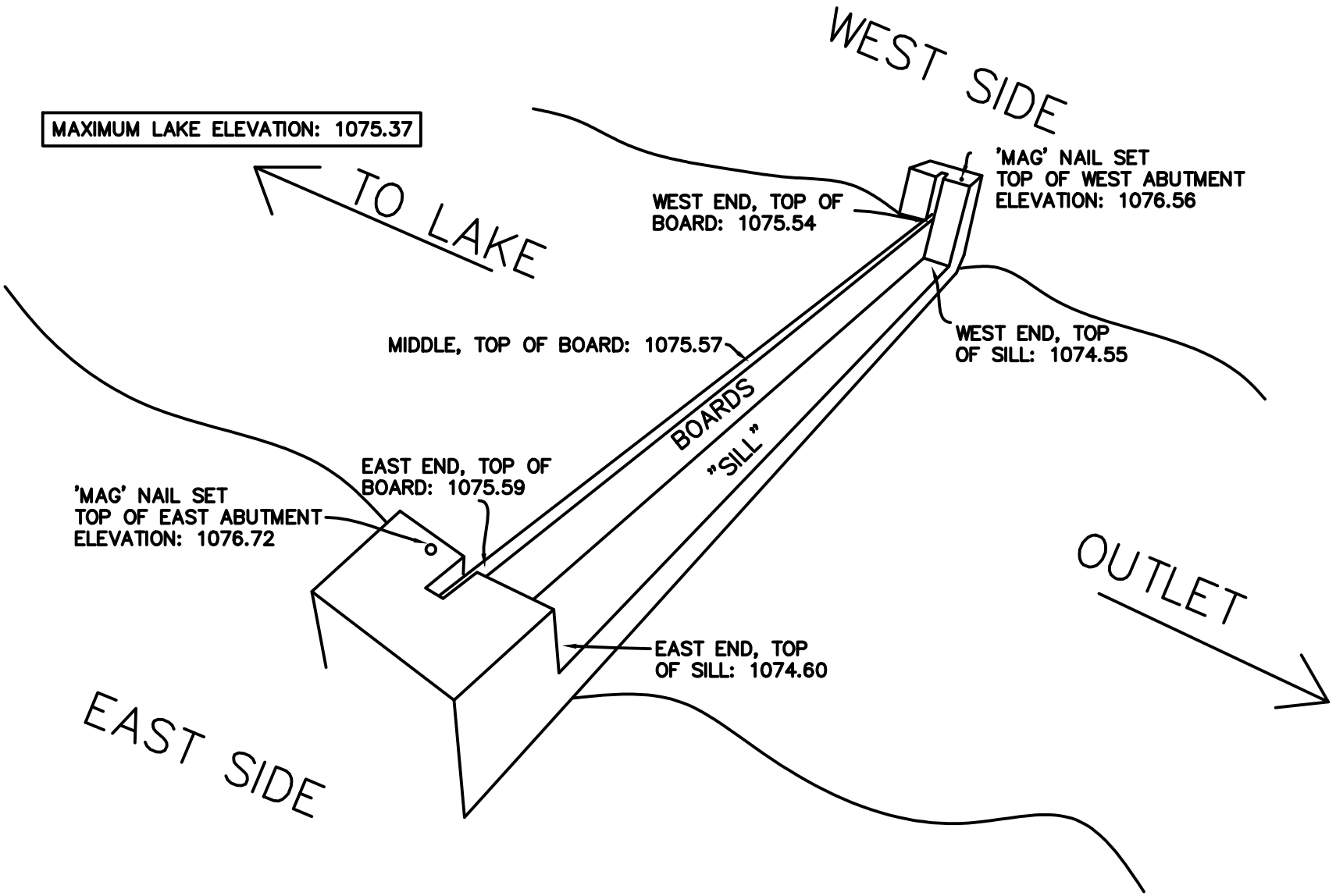
The Maximum Lake Elevation is 1075.37' ***
"MAG" nail in East Abutment: 1076.72': (1.35' or 16 ¼" above max. lake)
"MAG" nail in West Abutment: 1076.56': (1.19' or 14 ¼" above max. lake)
Top of Board at east end: 1075.59' which is 0.22' (2 5/8") too high
Top of Board in center: 1075.57' which is 0.20' (2 3/8") too high
Top of Board at west end: 1075.54' which if 0.17' (2") too high

***Maximum Lake Elevation as determined by Summit County Court of Common Pleas, Case 33676, and adjusted to NGVD29 by the Summit County Engineer, December 3, 1937, as recorded in Ditch Book 2 pages 725-726 (attached).

Outlet Structure

Maximum Lake Elevation marked on west abutment

Maximum Lake Elevation marked on east abutment



SPRINGFIELD LAKE
SKETCH OF OUTLET STRUCTURE
MAY 14, 2015

NO SCALE

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OVERVIEW: SPRINGFIELD LAKE VERTICAL CONTROL

INVERT OF CULVERT
ELEVATION: 1075.44

INVERT OF CULVERT
ELEVATION: 1075.71

GEODETIC MONUMENT
"CARRIE"
ELEVATION:1079.65

GEODETIC MONUMENT
"CARRIE AZIMUTH MARK"
ELEVATION: 1077.73

BM 3
ELEVATION: 1082.92

MAXIMUM LAKE
ELEVATION: 1075.37

BM 'SQUARE'
ELEVATION: 1082.14

BM 2
ELEVATION: 1088.18

OUTLET
STRUCTURE

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December 2, 1997 W. Schostak PS

SPRINGFIELD LAKE BENCHMARKS

REPORT OF SURVEY

In a letter dated October 23, 1997, the Springfield Township Road Superintendent requested the County Engineer to "establish a permanent benchmark to be set at our lake front park stamped with the elevation above sea level." In response, we have done the following:

REVIEW OF RECORDS

In Surveyor's Record Book 8 page 151 (also Ditch Record Book 2 page 725), dated December 3, 1937, the county surveyor explains that Benchmark Stone #1 (set April 20, 1903 Surveyor's Record Book 7 page 142) was recovered and an elevation referenced to the City of Akron survey established. This adjustment to N.G.V.D. 29 datum resulted in a **maximum lake elevation of 1075.37** above sea level. In reviewing the field notes for this work, we find that the surveyor established another benchmark: a chiseled 'x' on the NW corner of the S headwall of a culvert 300'+- W of Canton Rd (Nov. 30, 1937, county FB 197 P 87). Forty-five years later, (July 13, 1972 FB197 P 103) the same chiseled 'x' was recovered and from that, three more benchmarks were set, all "boat spikes in poles".

FIELD WORK

On November 18, 1997 a COSE survey crew located Benchmarks 2 and 3 as described on page 103 of FB 197. Although these were "boat spikes in poles", the numbers associated with the poles are now different. Therefore to validate these benchmarks, a tie to the City of Akron survey was necessary. The closest benchmark referenced to the City of Akron was BM 'E' as described in FB 1028 P 48 near the intersection of Canton and Old Home roads. Differential levels were run from this benchmark, establishing a new BM near Canfield Parkway and Springfield Lake Outlet, through recovered BM's 2 and 3, through N.G.S. monument Carrie AZ MK, to N.G.S. monument Carrie located in the lakefront park. An elevation check on the lake level was also made. Elevations determined for BM's 2 and 3 were within 0.03 and 0.04 feet respectively of the 1972 elevations. With the elevations for BM's 2 and 3 matching very well with the elevations determined in 1972, we are confident that we have a good relation to the maximum lake elevation.

Although stamping the elevations in the monuments would perhaps alleviate concerns over the lake elevation, we are unable to comply with that request because the monuments set by the lake (CARRIE, CARRIE AZ MK) serve as geodetic horizontal control points and modifying the stampings in the disk would cast doubt on their reliability.

BENCHMARK DESCRIPTIONS

BM □, ELEVATION: 1082.14

A square cut in the concrete base of light pole #1 SA 10 near Springfield Lake Outlet and Canfield Parkway.

BM 2, ELEVATION: 1088.18

A boat spike north side pole #SP-3588 163'± east of Middleway on Canfield Parkway.

BM 3, ELEVATION: 1082.92

A boat spike northeast side electric pole 320'± west of Parkway on Canfield Parkway.

BM CARRIE AZ MK, ELEVATION: 1077.73

A standard National Geodetic Survey azimuth mark disk stamped CARRIE 1983 set in the top of a 12-inch round concrete post set flush with the ground. It is 42 feet NE from the NE corner of house #2614 Canfield Parkway, 4 feet NE of an electric pole #4268, and 20 feet SW of the center of the road. About 1300 feet southeast of station CARRIE.

BM CARRIE, ELEVATION: 1079.65

A standard National Geodetic Survey disk stamped CARRIE 1983 set in the top of a 12 inch round concrete post set flush with the ground in the grass covered area between the parking lot and the lake shore in Springfield Township's lake front park. It is 139 feet ESE from the SE corner of picnic pavilion, 277 feet SW from the SE corner of township building #2465, 66 feet S from the south edge of parking lot, 22 feet N of shore line, and 39 feet SE of an ash tree.

WATER LEVEL NOVEMBER 18, 1997: 1075.00

Water level at lake front park (maximum elevation: 1075.37).

WHEREAS, a complaint dated November 9, 1937, having been filed by Minnie Acker, a tax payer and assessed party in the aforesaid improvement, demanding that the outlet to Springfield Lake be cleared of all obstructions so that the level of the Lake may be lowered to the maximum height as established by Common Pleas Court in 1903, in Case No. 33676; and

WHEREAS, it appears that the order of Common Pleas Court herein referred to, established the maximum level of the Lake at 1072.25 feet above sea level, and it is claimed that due to the placing on the outlet of flash boards the present height is estimated at 1074 feet; and

WHEREAS, it is desired to make further investigation of the allegations contained herein, now

THEREFORE BE IT RESOLVED, that this hearing be and the same is hereby adjourned until the 3rd day of December, A. D. 1937, at 1:30 P. M., Eastern Standard Time, in the office of the Board of County Commissioners; and

BE IT FURTHER RESOLVED, that the County Ditch Supervisor be and he is hereby directed to run new levels on Springfield Lake; investigate on the matter of the illegal placing of flash boards on said outlet; and report his findings to this Board on or before the time set for the adjourned hearing on December 3, 1937.

Mr. Kibler seconded the resolution, and the roll being called upon its adoption, the vote resulted as follows:

Ayes; Bixler, Kibler, Looker - Nays, None.

November 26, 1937.

I, Clerk of the Board of County Commissioners, of Summit County Ohio, hereby certify that the foregoing is a true and correct copy of Resolution adopted by said Board on November 26, 1937.

W. B. Wynne
CLERK

Office of the County Engineer,
Court House, Akron, Ohio,
December 3, 1937.

The Board of County Commissioners,
Summit County, Ohio.

Gentlemen:

Re: Maximum level of Springfield Lake, as fixed by Common Pleas Court, Case #33676

In compliance with your order of November 26, 1937, I proceeded to check the present level of Springfield Lake to ascertain if the level was exceeding the maximum as set by law. My findings in this matter is as follows:

The above named Court Case #33676 fixes the maximum level of the lake at 1072.25 feet above sea level as shown in the County Surveyor's report of April 20, 1903 and recorded in County Surveyor's record of surveys, Book 7, Page 142. This record shows that at the time this maximum level was fixed, the County Surveyor set three sandstone benches at various places on the shore of the lake to permanently mark the maximum elevation. These benches were described as benches number 1, 2, and 3, and were described as sandstone monuments 9 x 9 inches square, 3½ feet in length, and resting upon a sandstone of similar size laid horizontally. The elevation of bench No. 1 being 1076.13 feet above sea level or 3.88 feet above the maximum level of the lake. The elevation of Bench No. 2 being 1074.00 feet above sea level or 1.75 feet above the maximum level of the lake. Bench No. 3 being 1074.66 feet above sea level or 2.41 feet above the maximum level of the lake.

We were unable to find bench stones number 2 and 3, but found bench stone number 1. This stone was in a perfect state of preservation and showed no evidence of ever having been disturbed. We therefore did our checking from this monument.

I wish to call attention to the fact that the sea level datum plane used in this locality in the year 1903 when the sandstone bench was set and the level of Springfield was fixed varies from the sea level datum used in this locality at the present time by an elevation of 3.12 feet. Thus the elevation of the bench fixed at 1076.13 in the year 1903 is now known as 1079.25 feet above sea level; likewise the maximum level of the lake fixed at 1072.25 in 1903 is now known as 1075.37 above sea level. This change in the manner of reckoning does not in any way change the fixed level of Springfield Lake.

Having made the above explanation of the difference of sea level datum, I shall now report my findings, all of which are based on the present datum adopted by the City of Akron, State Highway Department, and Summit County Engineering Department.

ELEVATIONS AT SPRINGFIELD LAKE
(as of December 1, 1937)

Maximum level of the lake as set by Common Pleas Court	1075.37
Elevation of Bench Stone #1 set April 20, 1903	1079.25
Elevation top of concrete spillway at natural outlet	1074.76
Elevation top of first flash board at natural outlet	1075.59
Elevation top of second flash board at natural outlet	1076.42
level of lake December 1, 1937	1073.95

We found that the flash boards had been recently removed and that the gate at the artificial outlet had been opened two days prior to this investigation, hence the level of the lake was 1.42 feet below normal.

We find that one flash board not exceeding seven (7) inches in height can be used on top of the concrete spillway at the natural outlet and not raise the waters of the lake above the maximum set by law, but any flash boards in excess of seven inches would hold the level of the lake above the maximum permitted.

We find that the outlet to said lake, known as Springfield Lake Outlet, Ditch #45 should be cleaned to its original grade for a distance of approximately 4000 feet downstream from the dam.

- - - - - - -

Regarding the construction of the proposed Pontius Ditch #65, which is a feeder into said lake. It would be impossible to get the desired results in the construction of this ditch if the maximum level of Springfield Lake is maintained. However if flash boards were not permitted on the spillway at the outlet of the lake, then Pontius ditch would drain all the land which it is to serve.

Respectfully submitted,

W. F. Bowers
Surveyor in charge
of investigation.

Arthur F. Ranney
COUNTY ENGINEER

County Surveyor's Office,
Summit County, Ohio.

I hereby certify the foregoing survey, Plat and Calculations to be correct.

W. F. Bowers, Deputy Surveyor

Approved and Countersigned by me, December 3, 1937. A. F. Ranney, County Surveyor

(The foregoing report was transcribed from Surveyor's Record #8 Page 151)

SPRINGFIELD LAKE OUTLET DITCH #45

Court House, Akron, Ohio,
June 6, 1938.

REQUEST FOR RELEASE OF DRAINAGE PROJECT UNDER COUNTY WIDE BLANKET No. 16657

Springfield Lake Outlet Ditch No.45 located in Springfield Township, Length 4,000 lineal feet.

Bottom width 6 to 8 feet. Slopes 1½ To One. Width of Right of Way 16½ feet each side of center line of ditch.

Date Release requested June 9, 1938. Location of Upper Terminus Dam at Outlet of Springfield Lake.

Location of Lower Terminus Akron City Limits.

INSTRUCTIONS FOR ASSIGNED MEN (where to report) 75 men each shift about 500 feet west of intersection of State Route 8, and U. S. Route 224.

Note: See that foremen are instructed to remove all trees and brush within four feet of each bank of the ditch. All valuable trees, fences, etc standing between the right of way limits and a point four feet back from the finished slopes are to be left standing unless ordered removed by the County Engineer.

W. F. Bowers
Drainage Engineer

Arthur F. Ranney
County Engineer.

AGREEMENT

This agreement made and concluded at Akron, Ohio this 16th day of June 1938, by and between John L. Shanafelt owner of property on Springfield Outlet Ditch No.45 located in Springfield Township, known as the First Party, and Arthur F. Ranney, Engineer for Summit County, Ohio, known as the Second Party.

ARTICLE OF THE FIRST PARTY:

The First Party, being the owner of lands abutting on Springfield Outlet Ditch No. 45, does hereby grant permission to enter upon said premises for the purpose of placing dirt excavated from the said ditch.

ARTICLE OF THE SECOND PARTY:

The Second Party, duly empowered by his office as County Engineer to enter into this agreement, hereby covenant and agrees that rights granted shall be strictly observed as described in the above "Article of the First Party". The Second Party agrees to leave the property in a satisfactory manner agreeable to both parties.

Witness the hand of both parties, this 16th day of June 1938.

John L. Shanafelt
FIRST PARTY

W. F. Bowers
H. J. Saunders
WITNESSES

Arthur F. Ranney
County Engineer, SECOND PARTY

By- W. F. Bowers, Deputy

AGREEMENT

This agreement made and concluded at Akron, Ohio this 20th day of June 1938, by and between A. O. Hotchkiss owner of property on Shanafelt Ave., located in Shanafelt Allot. R.D.1, E. Akron known as the First Party, and Arthur F. Ranney, Engineer for Summit County, Ohio, known as the Second Party.

ARTICLE OF THE FIRST PARTY:

The First Party, being the owner of lands abutting on Springfield Lake Outlet Ditch No. 45, does hereby grant permission to enter upon said premises for the purpose of SPREADING SURPLUS DIRT EXCAVATED FROM SAID DITCH #45.

ARTICLE OF THE SECOND PARTY:

The Second Party, duly empowered by his office as County Engineer to enter into this agreement, hereby covenant and agrees that rights granted shall be strictly observed as described in the above "Article of the First Party." The Second Party agrees to leave the property in a satisfactory manner agreeable to both parties.

Witness the hand of both parties, this 20th day of June 1938.

C. R. Hougland
John L. Shanafelt
WITNESSES

A. O. Hotchkiss
FIRST PARTY

A. F. Ranney, County Eng'r
SECOND PARTY

APPENDIX H – Breakdown of Longest Flow Path

Lake subbasin

Segment	Length (ft)	Slope (ft/ft)	Time of concentration (min)
Sheet flow	20	0.00333	13.93
Shallow concentrated flow	1304	0.04175	6.60
Shallow concentrated flow	9926	0.0045	152.89
Channel flow	1089	0.00014	78.90

NW subbasin

Segment	Length (ft)	Slope (ft/ft)	Time of concentration (min)
Sheet flow	20	0.03319	5.55
Shallow concentrated flow	8220	0.00497	120.49
Channel flow	10	0.00494	0.12

S subbasin

Segment	Length (ft)	Slope (ft/ft)	Time of concentration (min)
Sheet flow	20	0.063	4.3
Shallow concentrated flow	859	0.036	4.66
Shallow concentrated flow	4124	0.005	60.27
Channel flow	10	0.014	0.07

SE subbasin

Segment	Length (ft)	Slope (ft/ft)	Time of concentration (min)
Sheet flow	20	0.09531	3.64
Shallow concentrated flow	11674	0.00844	131.30
Channel flow	10	0.00188	0.20

APPENDIX I – Vertical Datum Conversion Methodology

Source 1: FIS report for Summit County

3.3 Vertical Datum

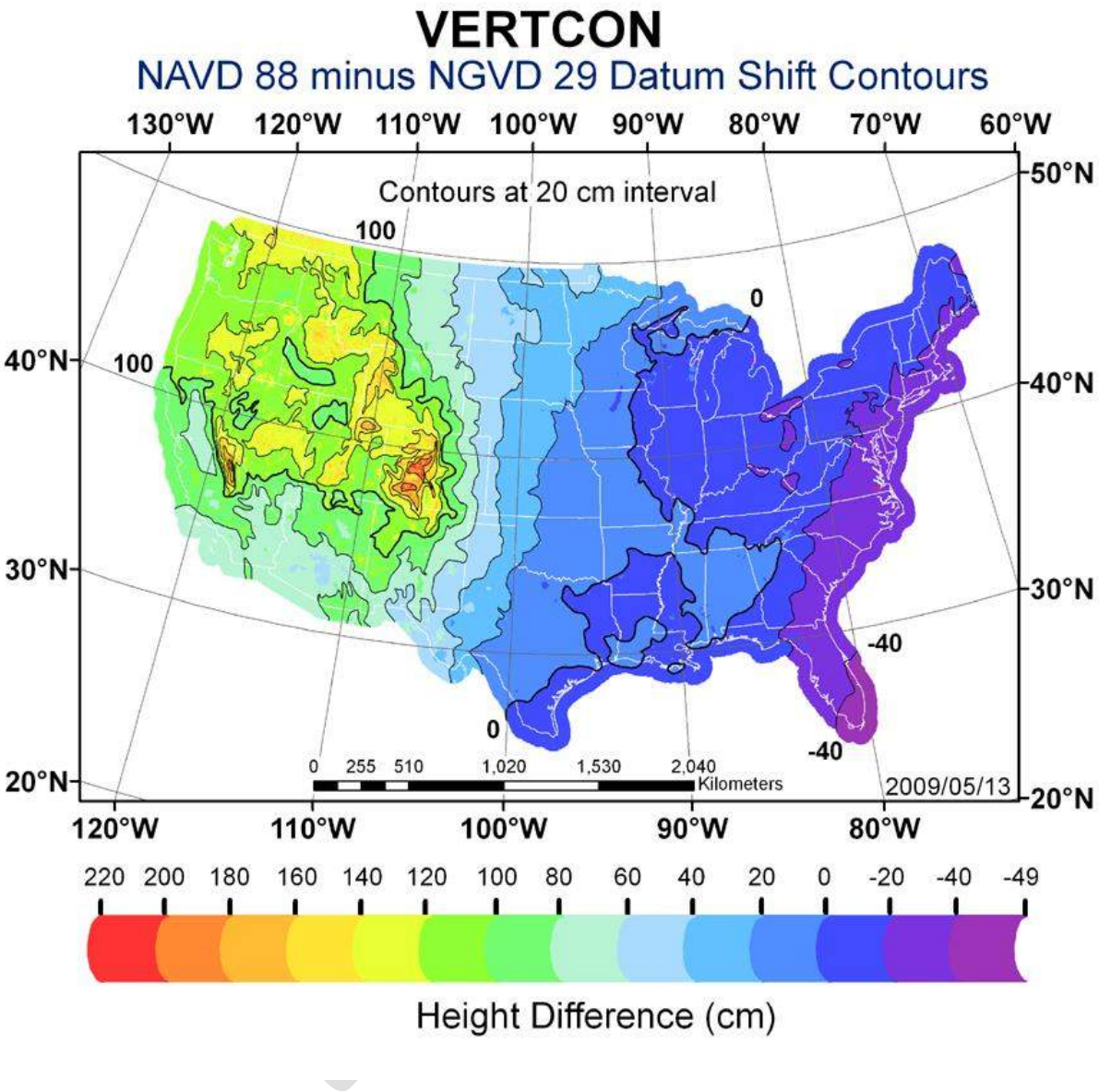
All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the finalization of the North American Vertical Datum (NAVD88), many FIS reports and FIRMs are being prepared using NAVD88 as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD88. Structure and ground elevations in the community must, therefore, be referenced to NAVD88. It is important to note that adjacent communities may be referenced to NGVD29. This may result in differences in Base Flood Elevations (BFEs) across the corporate limits between the communities. Effective information for this FIS was converted from NGVD29 to NAVD88. An average conversion of -0.6 feet (NGVD29-0.6=NAVD88) was applied uniformly across the county to convert all effective BFEs and other profile elevations.

For more information on NAVD88, see the FEMA publication entitled *Converting the National Flood Insurance Program to the North American Vertical Datum of 1988 (FEMA, June 1992),* or contact the Vertical Network Branch, National Geodetic Survey, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration, Rockville, Maryland 20910 (Internet address http://www.ngs.noaa.gov).

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the TSDN associated with the FIS report and FIRM for this community. Interested individuals may contact FEMA to access these data.

Source 2: NOAA North American Vertical Datum Conversion



NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
UNITED STATES DEPARTMENT OF COMMERCE

ONLINE VERTICAL DATUM TRANSFORMATION

INTEGRATING AMERICA'S ELEVATION DATA

Home | About VDatum | Download | Docs & Support | Contact Us

Regional Information

* Region : Contiguous United States

Horizontal Information

	Source	Target
Reference Frame:	NAD 1927	NAD83(2011)
Coor. System:	Geographic (Longitude, Latitude)	Geographic (Longitude, Latitude)
Unit:	meter (m)	meter (m)
Zone:	ALE - 0101	ALE - 0101

Vertical Information

	Source	Target
Reference Frame:	NGVD 1929	NAVD 88
Unit:	foot (International) (ft)	foot (International) (ft)
	Height / Sounding	Height / Sounding
	GEOID model:	GEOID model:

Point Conversion | ASCII File Conversion

Input		Transform	Output	
Latitude:	41.028841 (e.g. 33.7586 or 33 45 30.9600)		Latitude:	41.0288954222
Longitude:	-81.431588 (e.g. -118.7691 or -118 46 8.7600)	Reset	Longitude:	-81.4314212967
Height:	1075.37 (e.g. 3.037)	DMS	Height:	1074.692
	Drive to on map / Reset Map			Drive to on map / Reset Map

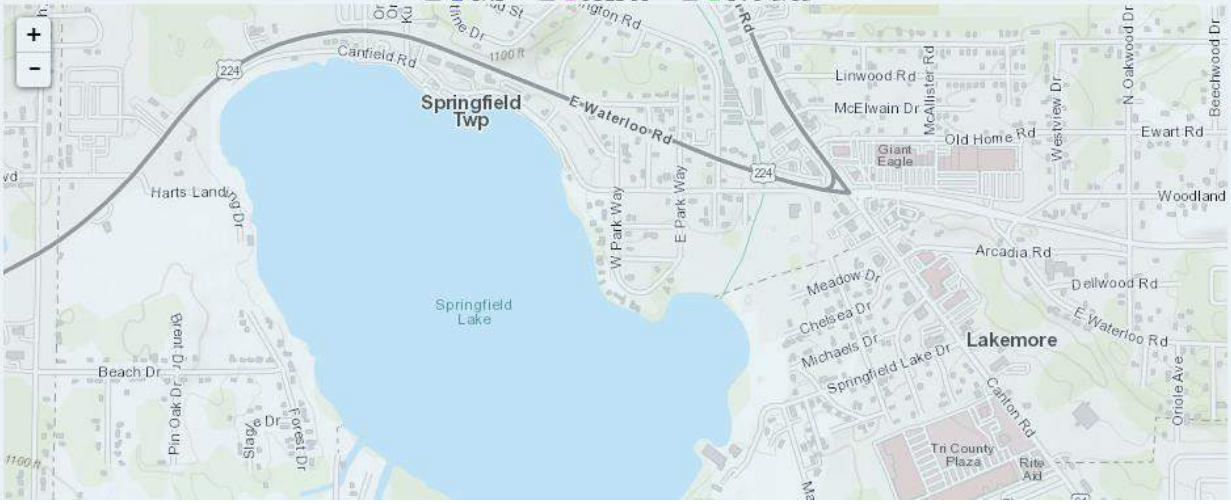
to DMS

Vertical Uncertainty: 1 sigma / 95% Confidence — Vertical Uncertainty (+/-): 0.164 ft

Add Observation Vertical Uncertainty

Vertical_Area: null

Valid Tidal area | Non-Tidal area | Non-Valid area | CRD | IGLD85 | SVU area



APPENDIX J – FIS Report for Summit County

FLOOD INSURANCE STUDY

VOLUME 1 of 3

SUMMIT COUNTY, OHIO
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
AKRON, CITY OF	390523
BARBERTON, CITY OF	390524
BOSTON HEIGHTS, VILLAGE OF	390749
CLINTON, VILLAGE OF	390525
CUYAHOGA FALLS, CITY OF	390526
FAIRLAWN, CITY OF	390657
GREEN, CITY OF	390927
HUDSON, CITY OF	390660
LAKEMORE, VILLAGE OF	390527
MACEDONIA, CITY OF	390750
MOGADORE, VILLAGE OF	390528
MUNROE FALLS, CITY OF	390843
NEW FRANKLIN, CITY OF	390993
* NORTHFIELD, VILLAGE OF	390726
NORTON, CITY OF	390529
PENINSULA, VILLAGE OF	390530
REMINDERVILLE, VILLAGE OF	390855
RICHFIELD, VILLAGE OF	390083
SILVER LAKE, VILLAGE OF	390531
STOW, CITY OF	390532
SUMMIT COUNTY (UNINCORPORATED AREAS)	390781
TALLMADGE, CITY OF	390533
TWINSBURG, CITY OF	390534

* NO SPECIAL FLOOD HAZARD AREAS IDENTIFIED

Revised: April 19, 2016

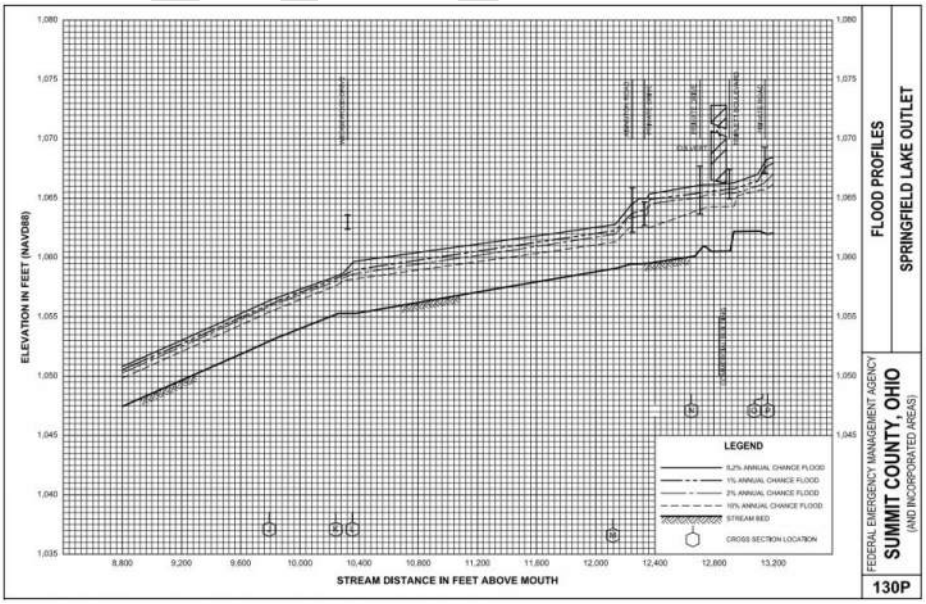
Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
39153CV001B

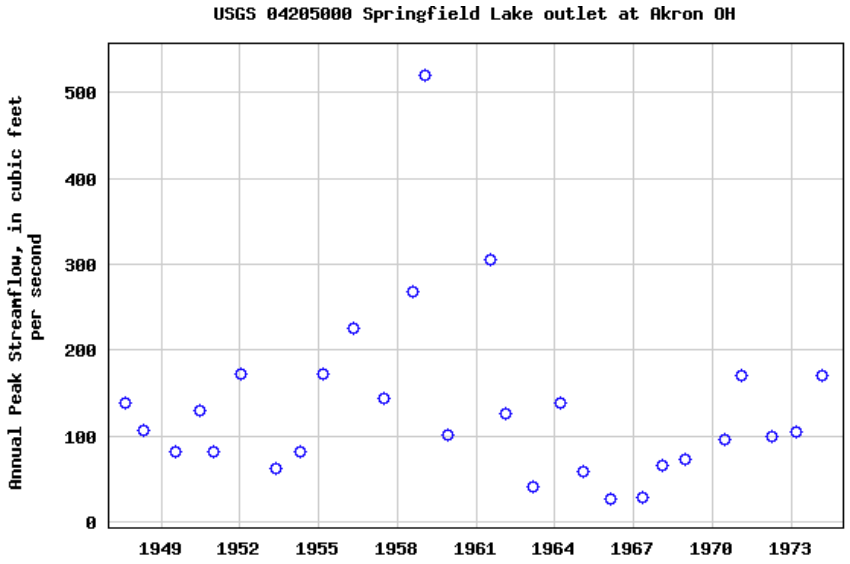
Hydrology on the Cuyahoga River, the Little Cuyahoga River and Springfield lake outlet was done by development of a drainage area-discharge curve using straight line extrapolation of gage calculations in the study area. This method was reviewed by the Buffalo District USACE and verbal concurrence of acceptability has been received. Hydrology on Tinkers Creek was provided by the USGS. The magnitude of the discharges for the different frequencies were determined primarily by methods of regional analysis outlined by Webber and Bartlett (Reference 11) and adjusted by previous studies and flood frequency techniques.

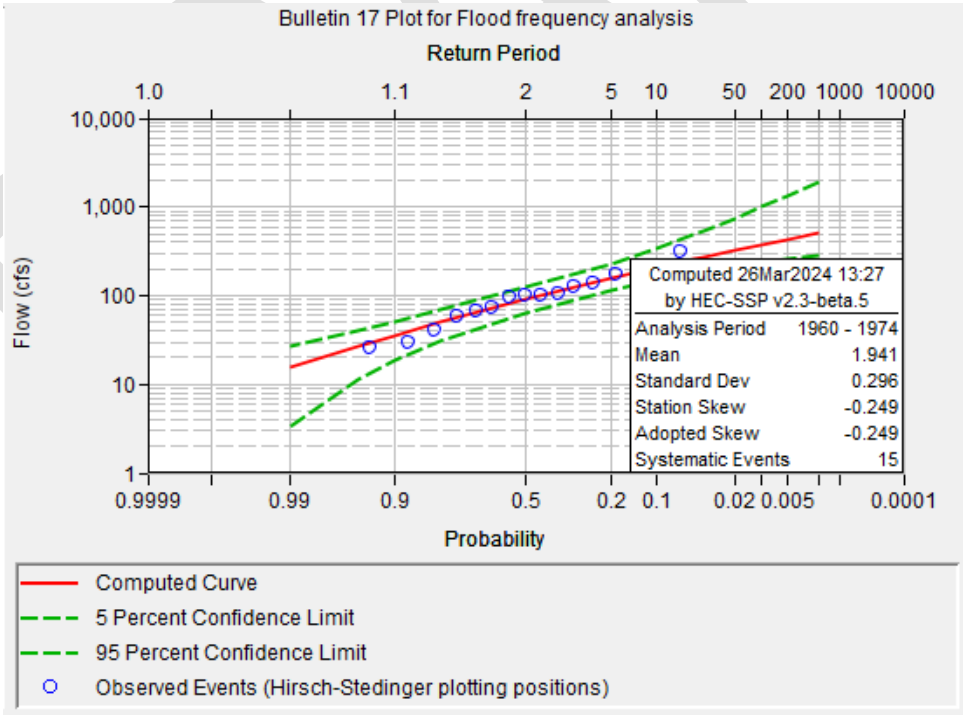
Table 7. Summary of Discharges

Flooding Source and Location	Drainage Area (sq. mi.)	Peak Discharges (cubic feet per second)			
		10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Roosevelt Ditch					
At Little Cuyahoga River	2.2	609	882	998	1,278
DS of SW corporate limit	2.0	553	804	911	1,168
At Newton Street	1.9	553	804	911	1,168
At Coolidge Avenue	1.2	409	598	684	887
At Eastwood Avenue	0.9	329	485	552	713
100 feet US of SE Ave Bridge	0.2	93	154	183	256
Schocalog Run					
At mouth (confluence with Pigeon Creek)	8.1	769	976	1,070	1,270
Upstream of Hands Lateral	4.5	447	574	635	767
At streamgage 03115973	3.6	403	527	590	731
Upstream of tributary near Elgin Road	1.6	298	373	405	471
Springfield Lake Outlet					
At Little Cuyahoga River	10.7	254	403	472	642
At south corporate limit	6.8	186	297	348	476



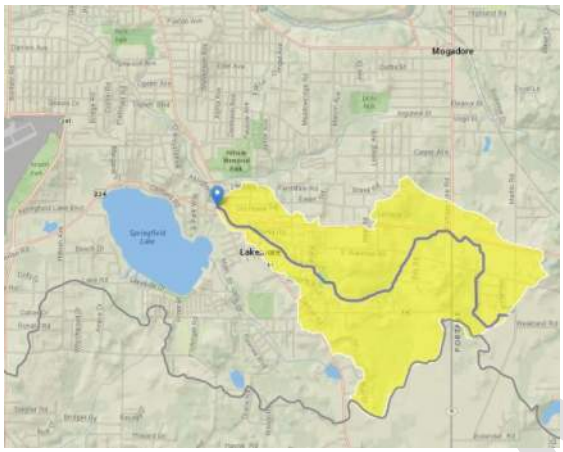
APPENDIX K – Flood Frequency Analysis on the Gage Flow Data





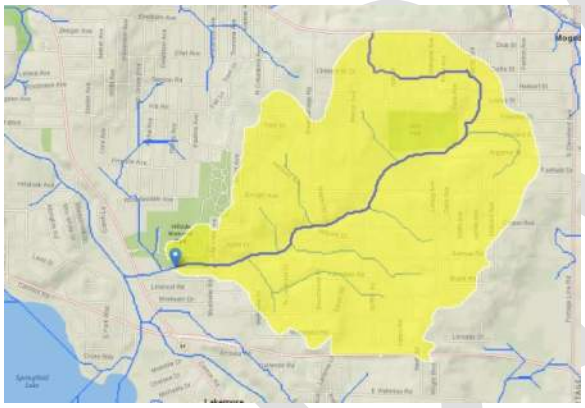
APPENDIX L – StreamStats Peak Flow Estimate

StreamStats analysis on the tributary watershed at Location 2.



Statistic	Value	Unit
50-percent AEP flood	154	ft^3/s
20-percent AEP flood	243	ft^3/s
10-percent AEP flood	309	ft^3/s
4-percent AEP flood	400	ft^3/s
2-percent AEP flood	473	ft^3/s
1-percent AEP flood	550	ft^3/s
0.2-percent AEP flood	746	ft^3/s

StreamStats analysis on the tributary watershed at Location 3.

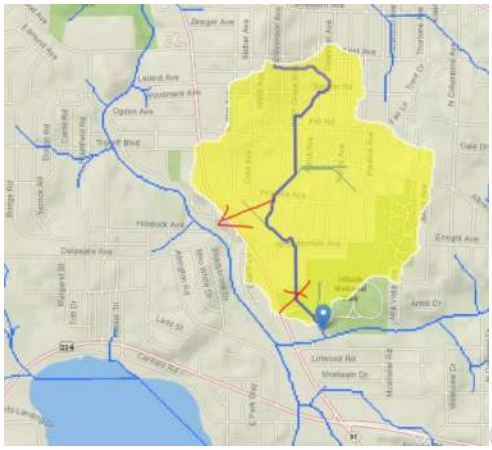


Peak-Flow Statistics Flow Report [Peak Flow Full Model Reg A SIR2019 5018]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction,

Statistic	Value	Unit
50-percent AEP flood	128	ft^3/s
20-percent AEP flood	216	ft^3/s
10-percent AEP flood	285	ft^3/s
4-percent AEP flood	382	ft^3/s
2-percent AEP flood	463	ft^3/s
1-percent AEP flood	548	ft^3/s
0.2-percent AEP flood	770	ft^3/s

StreamStats analysis on the tributary watershed at Location 4. Note that StreamStats is unable to capture the outlet location of this tributary stream. See the red arrow where the tributary flow enters the outlet channel as per the existing plan.



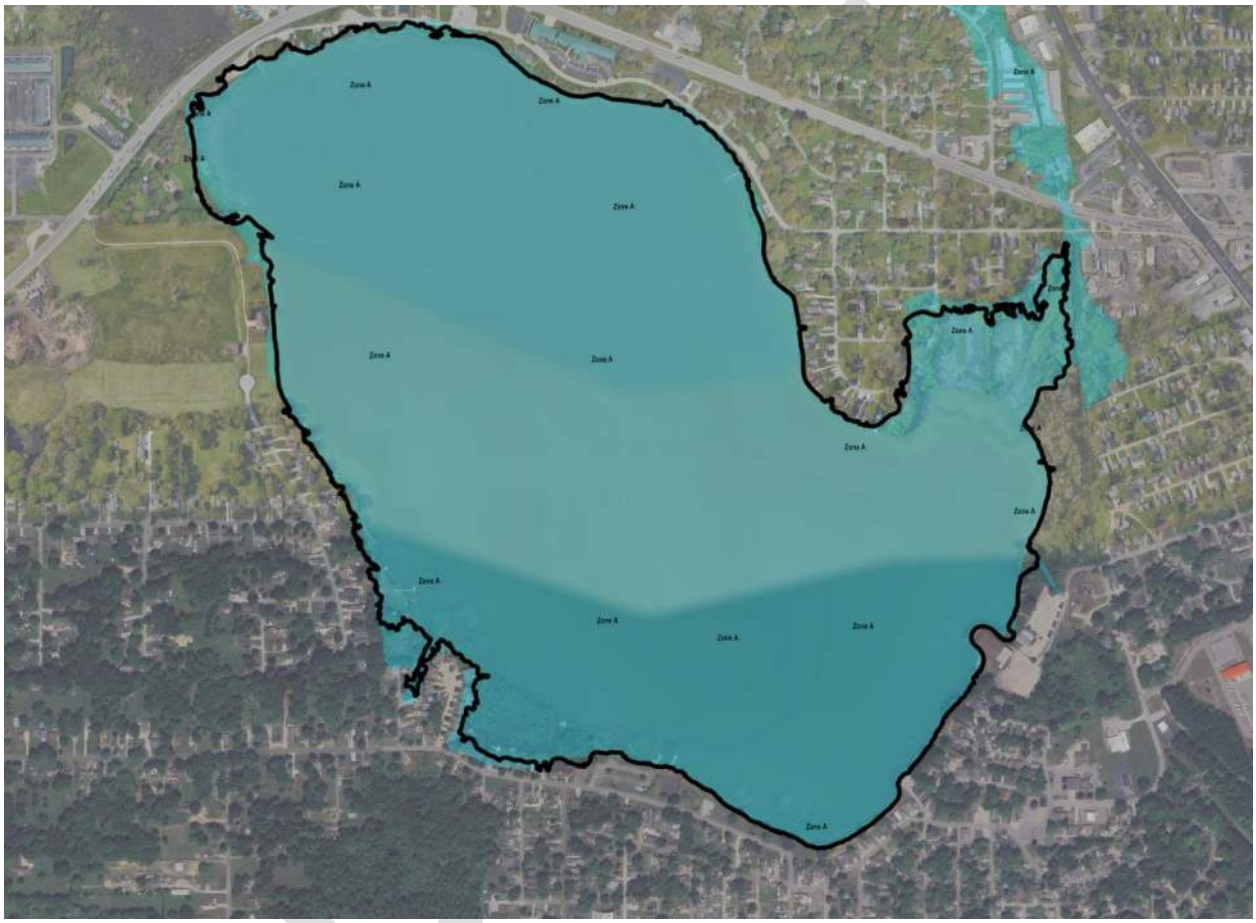
Peak-Flow Statistics Flow Report [Peak Flow Full Model Reg A SIR2019 5018]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE:

Statistic	Value	Unit
50-percent AEP flood	55.2	ft^3/s
20-percent AEP flood	96.8	ft^3/s
10-percent AEP flood	131	ft^3/s
4-percent AEP flood	180	ft^3/s
2-percent AEP flood	222	ft^3/s
1-percent AEP flood	267	ft^3/s
0.2-percent AEP flood	388	ft^3/s

APPENDIX M – 100-Year Flood Map

Flood map of the lake. The black solid line represents the flood extents as predicted by the HEC-HMS model. The filled area denotes FEMA Zone A.



Flood map of the lake outlet channel. The black solid line represents the flood extents as predicted by the existing condition HEC-RAS model, and the red dashed line represents the flood extents as predicted by the proposed condition HEC-RAS model. The filled area denotes FEMA Zone A.

Flood map of the lake outlet channel illustrating the impact of tributary flow detention. The red dashed line represents the flood extents as predicted by the proposed condition HEC-RAS model, and the white solid line represents the flood extents as predicted by the same HEC-RAS model but with the reduced tributary flows. The filled area denotes FEMA Zone A.

APPENDIX N – Structural Evaluation

4/25/24

To: Mike Evans, PE

From: Sunit Jain, PE

Subject: Springfield Lake, Mogadore, Report of Visual Inspection of Existing Outfall Structure

DLZ's Sunit Jain, Senior Structural Engineer, along with Akhil Konuru, Structural Engineer I, visited the Outfall Structure on 4/10/24 and visually inspected its condition from the east bank of the Channel. The concrete abutment on the east bank of the Channel was tapped with a hammer. The sound produced indicated that the concrete of this abutment was in fair condition. The water was flowing a few inches over the weir at the time of this visit. The condition of the weir was not readily evident due to water flowing over it; however, its functioning appeared to be as intended. The west abutment was only visually inspected from the east bank and appeared to be in similar condition as the abutment on the east bank. See a few selected photos below:

East Abutment

West Abutment

Outfall Structure (East abutment on the left side)

Record drawings of the Outfall Structure were not made available to DLZ.

The overall condition of the Outfall Structure, based on this limited visual inspection, appears to be satisfactory. It is the professional opinion of this inspecting engineer that the Outfall Structure will continue to likely perform satisfactorily over the next 10 years or so. However, should some surface spalling occur in the meantime, it should be repaired as part of County's maintenance program. Thereafter, the condition of the Outfall Structure should be reassessed every 5 years.