May 2, 2022

Tennessee Department of Environment & Conservation
Division of Water Pollution Control
Attn: Ms. Katie Murphy
711 R.S. Gass Boulevard
Nashville, Tennessee 37243

Subject: Hydrologic Determinations
2700 Murfreesboro Pike & 2749 Anderson Road
Antioch, Davidson County, Tennessee

Dear Ms. Murphy:

Attached please find materials supporting a recent Hydrologic Determinations (HD) conducted on the watercourse for the referenced properties at 2700 Murfreesboro Pike & 2749 Anderson Road in Antioch, Davidson County, Tennessee (Site). We are forwarding the accompanying Hydrologic Determination Field Data Sheets, figures, and photographs, which are provided in support of our determination that indicate the assessed watercourses are wet weather conveyances, as defined by Tennessee statute and associated administrative regulations.[1,2]

This report is submitted with the knowledge of the property owner and developer.[3]

Per TDEC Rule 0400-40-17-.04, the writer of this report is **"seeking to qualify for the treatment provided in §69-3-108(r)".** The purpose of this report is to obtain TDEC's concurrence with this hydrologic determination to inform site planning for a proposed development on the property.

Construction and use of the proposed development may require watercourse alterations to accommodate property development and associated infrastructure. The owner and prospective site developer will consider practicable alteration alternatives pending determination of jurisdiction.

PROJECT SITE

KSWA conducted a site visit to identify and evaluate natural resource features on the Site (**Figure 1**). One (1) unnamed tributary was identified on the approximately 23-acre site (**Figure 2**). Because of changes in physical characteristics and Site boundaries, three distinct reaches of the watercourse were assessed and evaluated as part of the determinations (WC-1a, WC-1b, and WC-1c). Site land-use in the watershed is a mix of commercial and residential development with dense mobile trailer development in the area immediately surrounding the channel in the area of the assessment.

[1] Tennessee Code Annotated §69-3-103 (43) (A-D)
[2] TDEC Rules of the Tennessee Water Quality Control Board 1200-04-03-.04(25)
[3] Jones Estates Suburban TN LLC, 2310 S. Miami Blvd., Ste. 238, Durham, NC, 27703,

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615.255.9702 phone | 615.256.5873 fax | info@kswarellc.com

The Site is bordered by Anderson Road to the north, Murfreesboro Pike to the south, commercial development along Bell Road to the west, multi-unit residential to the east. The assessed portions of the watercourse traverse maintained yards within the mobile trailer community along WC-1a and WC-1b, and within a wooded area along WC-1c with a dense understory composed primary of Honeysuckle and Privet and a canopy composed of Hackberry, Red Maple and American Elm. The surface area of the watershed associated with the assessed watercourse is approximately 29 acres. The assessed watercourse is located within the Stones River Middle Watershed 12-digit hydrologic unit code (HUC) boundary (051302030308) and is an unnamed tributary to the East Fork Hamilton Creek.

Representative photographs of the assessed watercourses are provided in Appendix A. A depiction of assessed reaches and delineated wetlands is provided in Figure 2, and locations of photographs are provided in Figure 3.

HYDROLOGIC DETERMINATION FINDINGS & REQUEST FOR CONCURRENCE

The drainages were evaluated on May 2, 2022, under fair weather conditions, with 7-day antecedent precipitation totaling 0.79 inches of rainfall and 0.29 inches of rainfall during the 48 hours preceding the site visit. A full climate analysis is included in Appendix B, with above-average precipitation this season versus expected normal conditions.

For the purposes of this hydrologic determination, assessed portions of the drainages were scored using TDEC's Hydrologic Determination Protocols. No Primary Field indicators were observed, but Secondary Field Indicators were determinative of the reaches as Wet Weather Conveyances, as documented on the accompanying Hydrologic Determination Field Data Sheets (Appendix C).

WC-1a: The channel is a poorly defined, low-slope feature, with visible slab rock and dense vegetation in some places, consisting of a mix of clover (*Species specious)*, buttercup (*Ranunculus sardous*), ragweed (*Ambrosia artemisifolia*), and dandelion (*Taraxacum officinale*). No flow was observed in the watercourse despite 0.29 inches of rain in the preceding 48-hour period and above-average seasonal precipitation. The bed and bank were consistent over the reach with a mix of soils, bedrock, cobble, gravel, and debris substrate. No standing water was observed. Secondary Field Indicator Evaluation resulted in a 12.75 score. with few geomorphic, hydrologic, or biological indicators. The geologic map indicates a sinkhole in the area of the channel, and adjacent manholes indicate a sewer line adjacent to the channel. If there is a any hydrology other than immediate response to precipitation, it is likely subsurface.

WC-1b: The channel is a deeply incised and entrenched wet weather conveyance in the central portion of the property, following a generally south to north path through the site. No flow was observed in the watercourse despite 0.29 inches of rain in the preceding 48-hour period and above-average seasonal precipitation. WC-1b reach is a high-slope incised gulley-like feature with large rock and rip-rap with upland vegetation emergent in available soil between rocks. Adjacent manholes indicate a sewer line adjacent to the channel. If there is any hydrology other than immediate response to precipitation, it is likely subsurface. The bed and bank were consistent over the reach with a mix of boulder, cobble, gravel and debris substrate. No standing water was observed.

WC-1c: WC-1c reach is a low-slope channel with areas that are more defined in the lower portion of the reach. Adjacent manholes upstream indicate a sewer line adjacent to the channel. If there is any hydrology other than immediate response to precipitation, it is likely subsurface. Few interruptions were observed along most of the mostly straight reach. No active or relic floodplain, depositional bars or benches, braided channel, natural levees were observed with one or two minor headcuts. Root and rock grade controls were present. Soils were brown (10Y/R 4/4) with no redox.

Landowner access is approved and authorized via a letter included in Appendix D. Soils and geology information relied on for the reporting and completion of data forms is included in Appendix E.

I attest that all information submitted herein and in the accompanying attachments is true, accurate, and complete. I appreciate your review of this information and request your concurrence of our jurisdictional determinations. Please contact us at (615) 255-9702 if we may provide additional information or address your questions regarding our findings.

Sincerely,
K. S. Ware and Associates, LLC

Dave Cour, QHP
Vice President – Ecological Services
QHP#1113-TN13

Chelsea Williams, PG, PMP
Director of Environmental Services

TABLE 1: Identified Resources, 2700 Murfreesboro Pike, Antioch, TN						
	From		To			
Name	Latitude	Longitude	Latitude	Longitude	Length (ft)	Determination
WC-1a	36.07153	-86.63441	36.07243	-86.63288	705	Wet Weather Conveyance
WC-1b	36.07243	-86.63288	36.07352	-86.63221	550	Wet Weather Conveyance
WC-1c	36.07364	-86.63201	36.07456	-86.63156	380	Wet Weather Conveyance

FIGURES

KSWA
[KS WARE & ASSOCIATES]

N

0 250 500 1,000 Feet

Site Location

2700 Murfreesboro Pike
Antioch, Davidson County, TN

Figure 1

PROJECT NO:	100-22-003X
DATE:	5/3/2022
DRAWN BY:	DAC
REVIEWED BY:	AMK

KSWA
[KS WARE & ASSOCIATES]

0 70 140 280 Feet

N

Identified Resources

2700 Murfreesboro Pike
Antioch, Davidson, Tennessee

Figure 2

PROJECT NO:	100-22-003X
DATE:	5/4/2022
DRAWN BY:	AMK
REVIEWED BY:	DAC

KSWA
[KS WARE & ASSOCIATES]

0 70 140 280 Feet

N

Photo Locations

2700 Murfreesboro Pike
Antioch, Davidson, Tennessee

Figure 3

PROJECT NO:	100-22-003X
DATE:	5/4/2022
DRAWN BY:	AMK
REVIEWED BY:	DAC

Appendix A:
Site Photographs

Photo 1: *Trifolium repens* and *Ranunculus repens* in the upper reach of WC-1a facing downstream.

Photo 2: Upper reach of WC-1a soil sample

Photo 3: Watercourse 1a facing downstream.

Photo 4: Upland plants growing in the upper reaches of Watercourse 1a facing upstream.

Photo 5: Watercourse 1a facing downstream.

Photo 6: Lower reach of Watercourse 1a facing downstream.

Photo 7: Upland vegetation in the upper reach of Watercourse 1a facing downstream.

Photo 8: Lower reach of Watercourse 1a facing downstream.

Photo 9: Upper reach of Watercourse 1b facing downstream.

Photo 10: *Ambrosia artemisifolia* in the upper reach of Watercourse 1b facing downstream.

Photo 11: Upper-middle reach of Watercourse 1b facing downstream.

Photo 12: Culvert in the middle reach of Watercourse 1b facing downstream.

Photo 13: Sewer maintenance hole cover adjacent to Watercourse 1b in the middle reach facing downstream.

Photo 14: Lower reach of Watercourse 1b facing downstream.

Photo 15: Upper reach of Watercourse 1c facing downstream.

Photo 16: Upper reach of Watercourse 1c facing downstream.

Photo 17: Drainage feature vertex in the middle reach of Watercourse 1b facing downstream.

Photo 18: Lower reach of Watercourse 1c facing downstream.

Photo 19: Lower reach of Watercourse 1c facing downstream towards Anderson Road.

Photo 20: Sewer vent box adjacent to the lower reach of Watercourse 1c at the edge of the boundary line facing downstream.

Photo 21: Subject channel off site downstream of Watercourse 1c.

Appendix B:
Climate Summary

Name of Site: **Gander- JE Moss Murfreesboro Pike**
Date of Site Visit: **2-May-22**
Previous 7 Day Rainfall Total: **0.79** inches
Previous 48-hr Rainfall Total: **0.29** inches
Weather Station Norms from https://www.ncei.noaa.gov/access/us-climate-normals/
Actual Rainfall from https://w2.weather.gov
Monthly Standard Deviation obtained online at NOAA Earth System Research Laboratory, Physical Sciences (http://www.esrl.noaa.gov)

Calculation Based on Nashville Rainfall Amounts with Nashville Normals and Nashville Std. Deviations

Calculation of Normal Weather Conditions

		Long-Term Rainfall Records								
	Month	Minus one Std. Dev. (dry)	Normal (mean inches)	Plus One Std. Dev. (wet)	Actual Rainfall	Condition (Low, Average, Elevated)	Condition Value*	Month Weight Value	Condition Value Calculation	Std. Deviation
1st Month Prior	April	1.928434	4.02	6.111566	6.08	Elevated	3	x 3	9	2.091566
2nd Month Prior	March	2.53182159	4.07	5.608178	3.80	Average	2	x2	4	1.53817841
3rd Month Prior	February	2.07195881	3.84	5.608041	8.63	Elevated	3	x1	3	1.76804119
								Sum=	16	

If sum is:	
6 to 9	then prior period has been abnormally dry
10 to 14	then prior period has been normal (average)
15 to 18	then prior period has been abnormally wet

Condition Value:*	
Low=	1
Average=	2
Elevated=	3

Climatological Data for Nashville Area, TN (ThreadEx) - February 2022

Date	Temperature				HDD	CDD	Precipitation	New Snow	Snow Depth
	Maximum	Minimum	Average	Departure					
2022-02-01	67	32	49.5	9.1	15	0	T	0.0	0
2022-02-02	52	47	49.5	8.9	15	0	1.20	0.0	0
2022-02-03	52	32	42.0	1.2	23	0	1.14	0.0	0
2022-02-04	32	25	28.5	-12.4	36	0	0.02	0.0	0
2022-02-05	37	**20**	28.5	-12.6	36	0	0.00	0.0	0
2022-02-06	52	21	36.5	-4.8	28	0	0.00	0.0	0
2022-02-07	51	23	37.0	-4.5	28	0	0.00	0.0	0
2022-02-08	58	24	41.0	-0.7	24	0	0.00	0.0	0
2022-02-09	63	41	52.0	10.0	13	0	0.00	0.0	0
2022-02-10	62	35	48.5	6.3	16	0	T	0.0	0
2022-02-11	**72**	36	54.0	11.6	11	0	T	0.0	0
2022-02-12	51	24	37.5	-5.1	27	0	T	0.0	0
2022-02-13	43	**20**	31.5	-11.4	33	0	0.00	0.0	0
2022-02-14	51	23	37.0	-6.1	28	0	0.00	0.0	0
2022-02-15	69	28	48.5	5.1	16	0	0.00	0.0	0
2022-02-16	70	50	60.0	16.4	5	0	0.00	0.0	0
2022-02-17	70	34	52.0	8.1	13	0	2.03	0.0	0
2022-02-18	42	28	35.0	-9.2	30	0	0.00	0.0	0
2022-02-19	50	25	37.5	-6.9	27	0	0.00	0.0	0
2022-02-20	64	25	44.5	-0.2	20	0	0.00	0.0	0
2022-02-21	69	44	56.5	11.5	8	0	0.11	0.0	0
2022-02-22	66	57	61.5	16.3	3	0	**2.06**	0.0	0
2022-02-23	60	34	47.0	1.5	18	0	0.37	0.0	0
2022-02-24	48	35	41.5	-4.3	23	0	1.62	0.0	0
2022-02-25	43	32	37.5	-8.5	27	0	0.04	**T**	0
2022-02-26	40	31	35.5	-10.8	29	0	0.00	0.0	0
2022-02-27	56	37	46.5	-0.1	18	0	0.04	0.0	0
2022-02-28	60	27	43.5	-3.4	21	0	0.00	0.0	0
Sum	1550	890	-	-	591	0	8.63	T	-
Average	55.4	31.8	43.6	0.2	-	-	-	-	0.0
Normal	53.8	33.0	43.4	-	606	1	4.47	1.5	-

Observations for each day cover the 24 hours ending at the time given below (Local Standard Time).
Max Temperature : midnight
Min Temperature : midnight
Precipitation : midnight
Snowfall : midnight
Snow Depth : 6am

Climatological Data for Nashville Area, TN (ThreadEx) - March 2022

Date	Temperature				HDD	CDD	Precipitation	New Snow	Snow Depth
	Maximum	Minimum	Average	Departure					
2022-03-01	73	32	52.5	5.3	12	0	0.00	0.0	0
2022-03-02	80	43	61.5	14.1	3	0	0.00	0.0	0
2022-03-03	76	50	63.0	15.3	2	0	0.00	0.0	0
2022-03-04	79	43	61.0	13.0	4	0	0.00	0.0	0
2022-03-05	77	57	67.0	18.7	0	2	0.00	0.0	0
2022-03-06	80	67	73.5	24.9	0	9	0.00	0.0	0
2022-03-07	71	40	55.5	6.7	9	0	0.47	0.0	0
2022-03-08	49	38	43.5	-5.6	21	0	0.10	0.0	0
2022-03-09	55	38	46.5	-2.9	18	0	0.14	0.0	0
2022-03-10	62	39	50.5	0.8	14	0	0.00	0.0	0
2022-03-11	67	27	47.0	-3.0	18	0	0.18	**2.0**	2
2022-03-12	32	22	27.0	-23.3	38	0	0.07	0.8	**3**
2022-03-13	58	**20**	39.0	-11.5	26	0	0.00	0.0	0
2022-03-14	68	36	52.0	1.2	13	0	0.00	0.0	0
2022-03-15	70	51	60.5	9.4	4	0	T	0.0	0
2022-03-16	63	50	56.5	5.1	8	0	0.11	0.0	0
2022-03-17	73	47	60.0	8.3	5	0	0.00	0.0	0
2022-03-18	69	51	60.0	8.0	5	0	0.39	0.0	0
2022-03-19	57	40	48.5	-3.8	16	0	T	0.0	0
2022-03-20	70	35	52.5	-0.1	12	0	0.00	0.0	0
2022-03-21	75	41	58.0	5.1	7	0	0.00	0.0	0
2022-03-22	79	61	70.0	16.8	0	5	**1.45**	0.0	0
2022-03-23	66	48	57.0	3.5	8	0	0.00	0.0	0
2022-03-24	62	40	51.0	-2.8	14	0	0.00	0.0	0
2022-03-25	53	44	48.5	-5.6	16	0	T	0.0	0
2022-03-26	61	41	51.0	-3.4	14	0	0.00	0.0	0
2022-03-27	55	35	45.0	-9.7	20	0	0.00	0.0	0
2022-03-28	57	40	48.5	-6.5	16	0	0.00	0.0	0
2022-03-29	76	43	59.5	4.2	5	0	0.00	0.0	0
2022-03-30	**83**	60	71.5	15.9	0	7	0.88	0.0	0
2022-03-31	60	44	52.0	-3.9	13	0	0.01	0.0	0
Sum	2056	1323	-	-	341	23	3.80	2.8	-
Average	66.3	42.7	54.5	3.0	-	-	-	-	0.2
Normal	62.7	40.2	51.5	-	431	11	4.52	0.7	-

Observations for each day cover the 24 hours ending at the time given below (Local Standard Time).
Max Temperature : midnight
Min Temperature : midnight
Precipitation : midnight
Snowfall : midnight

Climatological Data for Nashville Area, TN (ThreadEx) - April 2022

Date	Temperature				HDD	CDD	Precipitation	New Snow	Snow Depth
	Maximum	Minimum	Average	Departure					
2022-04-01	57	41	49.0	-7.2	16	0	0.00	0.0	0
2022-04-02	64	35	49.5	-7.0	15	0	0.00	0.0	0
2022-04-03	65	41	53.0	-3.9	12	0	0.00	0.0	0
2022-04-04	75	40	57.5	0.3	7	0	0.00	0.0	0
2022-04-05	59	50	54.5	-3.0	10	0	0.40	0.0	0
2022-04-06	72	50	61.0	3.2	4	0	0.24	0.0	0
2022-04-07	62	45	53.5	-4.6	11	0	0.00	0.0	0
2022-04-08	49	40	44.5	-13.9	20	0	0.03	0.0	0
2022-04-09	59	39	49.0	-9.8	16	0	0.00	0.0	0
2022-04-10	79	36	57.5	-1.6	7	0	0.00	0.0	0
2022-04-11	67	60	63.5	4.1	1	0	0.40	0.0	0
2022-04-12	79	61	70.0	10.3	0	5	1.79	0.0	0
2022-04-13	85	61	73.0	13.0	0	8	1.11	0.0	0
2022-04-14	69	47	58.0	-2.3	7	0	0.03	0.0	0
2022-04-15	73	40	56.5	-4.1	8	0	0.30	0.0	0
2022-04-16	71	54	62.5	1.5	2	0	0.22	0.0	0
2022-04-17	62	46	54.0	-7.3	11	0	0.05	0.0	0
2022-04-18	57	42	49.5	-12.1	15	0	0.90	0.0	0
2022-04-19	61	38	49.5	-12.4	15	0	0.00	0.0	0
2022-04-20	75	42	58.5	-3.7	6	0	T	0.0	0
2022-04-21	80	59	69.5	7.0	0	5	0.11	0.0	0
2022-04-22	84	58	71.0	8.2	0	6	0.00	0.0	0
2022-04-23	84	62	73.0	9.9	0	8	0.00	0.0	0
2022-04-24	84	62	73.0	9.6	0	8	0.00	0.0	0
2022-04-25	78	59	68.5	4.8	0	4	0.50	0.0	0
2022-04-26	65	47	56.0	-8.0	9	0	0.00	0.0	0
2022-04-27	72	40	56.0	-8.2	9	0	0.00	0.0	0
2022-04-28	79	47	63.0	-1.5	2	0	0.00	0.0	M
2022-04-29	82	58	70.0	5.2	0	5	0.00	0.0	M
2022-04-30	82	62	72.0	6.9	0	7	0.00	0.0	M
Sum	2130	1462	-	-	203	56	6.08	0.0	-
Average	71.0	48.7	59.9	-0.9	-	-	-	-	0.0
Normal	72.6	48.9	60.8	-	180	52	4.72	0.0	-

Observations for each day cover the 24 hours ending at the time given below (Local Standard Time).
Max Temperature : midnight
Min Temperature : midnight
Precipitation : midnight
Snowfall : midnight

Climatological Data for Nashville Area, TN (ThreadEx) - May 2022

Date	Temperature				HDD	CDD	Precipitation	New Snow	Snow Depth
	Maximum	Minimum	Average	Departure					
2022-05-01	81	57	69.0	3.6	0	4	0.29	0.0	M
2022-05-02	86	52	69.0	3.4	0	4	T	0.0	0
2022-05-03	M	M	M	M	M	M	M	M	M
2022-05-04	M	M	M	M	M	M	M	M	M
2022-05-05	M	M	M	M	M	M	M	M	M
2022-05-06	M	M	M	M	M	M	M	M	M
2022-05-07	M	M	M	M	M	M	M	M	M
2022-05-08	M	M	M	M	M	M	M	M	M
2022-05-09	M	M	M	M	M	M	M	M	M
2022-05-10	M	M	M	M	M	M	M	M	M
2022-05-11	M	M	M	M	M	M	M	M	M
2022-05-12	M	M	M	M	M	M	M	M	M
2022-05-13	M	M	M	M	M	M	M	M	M
2022-05-14	M	M	M	M	M	M	M	M	M
2022-05-15	M	M	M	M	M	M	M	M	M
2022-05-16	M	M	M	M	M	M	M	M	M
2022-05-17	M	M	M	M	M	M	M	M	M
2022-05-18	M	M	M	M	M	M	M	M	M
2022-05-19	M	M	M	M	M	M	M	M	M
2022-05-20	M	M	M	M	M	M	M	M	M
2022-05-21	M	M	M	M	M	M	M	M	M
2022-05-22	M	M	M	M	M	M	M	M	M
2022-05-23	M	M	M	M	M	M	M	M	M
2022-05-24	M	M	M	M	M	M	M	M	M
2022-05-25	M	M	M	M	M	M	M	M	M
2022-05-26	M	M	M	M	M	M	M	M	M
2022-05-27	M	M	M	M	M	M	M	M	M
2022-05-28	M	M	M	M	M	M	M	M	M
2022-05-29	M	M	M	M	M	M	M	M	M
2022-05-30	M	M	M	M	M	M	M	M	M
2022-05-31	M	M	M	M	M	M	M	M	M
Sum	167	109	-	-	0	8	0.29	0.0	-
Average	83.5	54.5	69.0	3.5	-	-	-	-	0.0
Normal	77.0	54.1	65.5	-	5	6	0.38	0.0	-

Above Normals represent the month through 2022-05-02.

Observations for each day cover the 24 hours ending at the time given below (Local Standard Time).
Max Temperature : midnight
Min Temperature : midnight
Precipitation : midnight

Appendix C:
Hydrologic Determination Data Sheets

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: East Fork of Hamilton Creek	Date/Time: 5/2/2022 13:00
Assessors/Affiliation: Dave Cour (QHP#1113-TN13)/ KSWA	Project ID :
Site Name/Description: 2700 Murfreesboro Pike & 2749 Anderson Road (WC-1a)	
Site Location: 2700 Murfreesboro Pike & 2749 Anderson Road	
HUC (12 digit): 051302030308	Lat/Long: 36.0715, -86.6344
Previous Rainfall (7-days) : 0.79	
Precipitation this Season vs. Normal : [ ] abnormally wet [X] elevated [ ] average [ ] low [ ] abnormally dry [ ] unknown Source of recent & seasonal precip data : National Weather Service/ NOAA U.S. Climate Normals	
Watershed Size : 13 acres	County: Davidson
Soil Type(s) / Geology : Talbot Silt Loam/ Carters Limestone	Source: Web Soils Survey/ USGS National Geology Map
Surrounding Land Use : Dense Commerical and Residential Development	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : [X] Severe [ ] Moderate [ ] Slight [ ] Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES	
1. Hydrologic feature exists solely due to a process discharge	[X]	[ ] WWC	
2. Defined bed and bank absent, vegetation composed of upland and FACU species	[X]	[ ] WWC	
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	[ ]	[ ] WWC	[X] N/A
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	[ ]	[ ] WWC	[X] N/A
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	[X]	[ ] Stream	
6. Presence of fish (except *Gambusia*)	[X]	[ ] Stream	
7. Presence of naturally occurring ground water table connection	[X]	[ ] Stream	
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	[X]	[ ] Stream	
9. Evidence watercourse has been used as a supply of drinking water	[X]	[ ] Stream	

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather Conveyance

Secondary Indicator Score (if applicable) = 12.75 OR N/A

Justification / Notes :

WC-1a reach is a low-slope channel with few geomorphic, hydrologic, or biological indicators. The geologic map indicates a sinkhole in the area of the channel, and adjacent manholes indicate a sewer line adjacent to the channel. If there is a any hydrology other than immediate response to precipitation, it is likely subsurface.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal = 7.5)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	X 1	2	3
2. Sinuous channel	0	1 X	2	3
3. In-channel structure: riffle-pool sequences	0	X 1	2	3
4. Sorting of soil textures or other substrate	0	1 X	2	3
5. Active/relic floodplain	X 0	0.5	1	1.5
6. Depositional bars or benches	X 0	1	2	3
7. Braided channel	X 0	1	2	3
8. Recent alluvial deposits	0	0.5	X 1	1.5
9. Natural levees	X 0	1	2	3
10. Headcuts	X 0	1	2	3
11. Grade controls	0	0.5	X 1	1.5
12. Natural valley or drainageway	0	X 0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 X		Yes = 3	

B. **Hydrology** (Subtotal = 3.75)	Absent	Weak	Moderate	Strong	
14. Subsurface flow/discharge into channel	X 0	1	2	3	
15. Water in channel and >48 hours since sig. rain	X 0	1	2	3	N/A
16. Leaf litter in channel (January – September)	1.5	1	0.5	0	N/A
17. Sediment on plants or on debris	0	0.5	X 1	1.5	
18. Organic debris lines or piles (wrack lines)	0	X 0.5	1	1.5	
19. Hydric soils in channel bed or sides of channel	No = 0	X	Yes = 1.5		

C. **Biology** (Subtotal = 1.5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	2	1 X	0
21. Rooted plants in the thalweg [1]	3	2	1 X	0
22. Crayfish in stream (exclude in floodplain)	X 0	1	2	3
23. Bivalves/mussels	X 0	1	2	3
24. Amphibians	X 0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	X 0	1	2	3
26. Filamentous algae; periphyton	X 0	1	2	3
27. Iron oxidizing bacteria/fungus	X 0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	X 0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 12.75

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Obvious interruptions along most of the reach (1). Sinuosity consists mostly of 90-degree bends around structures (2). Occasional hydraulic diversity, but limited by bedrock substrate (3). Channel is incised through soil profile to bedrock (although shallow) (4). No active or relic floodplain, depositional bars or benches, braided channel, natural levees or headcuts (5,6,7,9,10). Moderate amount of gravel deposition along upper reach (8). No clearly defined valley (11), and not identified on topographic map (12). No flow or standing water observed in channel with elevated seasonal precipitation and 0.29 inches of rain in the preceding 48-hour period (14-15). No leaf litter in channel (16 - but not a lot of canopy trees, either). Trash and debris in channel, ranging from heavy (tires) to light (cups, plastic bottles, bags). Sediment observed on plants and along channel margins sporadically along reach (17). Debris collected in various areas and roots, rocks, bricks, etc. (18). Soils were brown (10Y/R 4/4), but some areas with thinly-bedded, cracking soils were observed in various places (19). Dense vegetation and root throughout reach unless rock was present (20-21). No other biological indicators observed, except some FAC Ranunculus sardous was observed mixed with FACU dandelion, clover, ragweed, etc. (22-28).

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: East Fork of Hamilton Creek	Date/Time: 5/2/2022 13:20
Assessors/Affiliation: Dave Cour (QHP#1113-TN13)/ KSWA	Project ID :
Site Name/Description: 2700 Murfreesboro Pike & 2749 Anderson Road (WC-1b)	
Site Location: 2700 Murfreesboro Pike & 2749 Anderson Road	
HUC (12 digit): 051302030308	Lat/Long: 36.0735, -86.6322
Previous Rainfall (7-days) : 0.79	
Precipitation this Season vs. Normal : [ ] abnormally wet [X] elevated [ ] average [ ] low [ ] abnormally dry [ ] unknown Source of recent & seasonal precip data : National Weather Service/ NOAA U.S. Climate Normals	
Watershed Size : 22 acres	County: Davidson
Soil Type(s) / Geology : Talbot-Rock Complex/ Carters Limestone	Source: Web Soils Survey/ USGS National Geology Map
Surrounding Land Use : Dense Residential Development	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : [X] Severe [ ] Moderate [ ] Slight [ ] Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES	
1. Hydrologic feature exists solely due to a process discharge	[X]	[ ] WWC	
2. Defined bed and bank absent, vegetation composed of upland and FACU species	[X]	[ ] WWC	
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	[ ]	[ ] WWC	[X] N/A
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	[ ]	[ ] WWC	[X] N/A
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	[X]	[ ] Stream	
6. Presence of fish (except *Gambusia*)	[X]	[ ] Stream	
7. Presence of naturally occurring ground water table connection	[X]	[ ] Stream	
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	[X]	[ ] Stream	
9. Evidence watercourse has been used as a supply of drinking water	[X]	[ ] Stream	

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather Conveyance

Secondary Indicator Score (if applicable) = 14 OR N/A

Justification / Notes :

WC-1b reach is a high-slope incised gulley-like feature with large rock and rip-rap with upland vegetation emergent in available soil between rocks. Adjacent manholes indicate a sewer line adjacent to the channel. If there is any hydrology other than immediate response to precipitation, it is likely subsurface.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal = 8.5)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	X 2	3
2. Sinuous channel	0	X 1	2	3
3. In-channel structure: riffle-pool sequences	0	X 1	2	3
4. Sorting of soil textures or other substrate	0	1	X 2	3
5. Active/relic floodplain	X 0	0.5	1	1.5
6. Depositional bars or benches	X 0	1	2	3
7. Braided channel	X 0	1	2	3
8. Recent alluvial deposits	0	X 0.5	1	1.5
9. Natural levees	X 0	1	2	3
10. Headcuts	0	X 1	2	3
11. Grade controls	0	0.5	X 1	1.5
12. Natural valley or drainageway	0	X 0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 X		Yes = 3	

B. **Hydrology** (Subtotal = 2.5)	Absent	Weak	Moderate	Strong	
14. Subsurface flow/discharge into channel	X 0	1	2	3	
15. Water in channel and >48 hours since sig. rain	X 0	1	2	3	N/A
16. Leaf litter in channel (January – September)	1.5	1	0.5	0	N/A
17. Sediment on plants or on debris	0	X 0.5	1	1.5	
18. Organic debris lines or piles (wrack lines)	0	X 0.5	1	1.5	
19. Hydric soils in channel bed or sides of channel	No = 0 X		Yes = 1.5		

C. **Biology** (Subtotal = 3)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	2 X	1	0
21. Rooted plants in the thalweg [1]	3	2	X 1	0
22. Crayfish in stream (exclude in floodplain)	X 0	1	2	3
23. Bivalves/mussels	X 0	1	2	3
24. Amphibians	X 0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	X 0	1	2	3
26. Filamentous algae; periphyton	X 0	1	2	3
27. Iron oxidizing bacteria/fungus	X 0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	X 0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 14

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Few interruptions along most of the reach (1). Mostly straight reach with few bends (2). Occasional hydraulic diversity, but limited by rock (3). Channel is incised through soil profile in a gully-like way (4). No active or relic floodplain, depositional bars or benches, braided channel, natural levees (5,6,7,9). One or two minor headcuts (one at beginnning of reach) (10). Small amounts of gravel deposition in reach (8). No clearly defined valley (11), and not identified on topographic map (12). No flow or standing water observed in channel with elevated seasonal precipitation and 0.29 inches of rain in the preceding 48-hour period (14-15). No leaf litter in channel (16 - but not a lot of canopy trees, either). Trash and debris in channel, ranging from heavy (tires) to light (cups, feathers, bags). Sediment observed on plants and along channel margins sporadically along reach (17). Debris collected in various areas and roots, rocks, bricks, etc. (18). No hydric soils observed in this reach (19). Vegetation observed throughout reach where rooting was available and root throughout reach unless rock was present (20-21). No other biological indicators observed, except some FAC Ranunculus sardous was observed mixed with FACU dandelion, clover, ragweed, etc. (22-28).

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: East Fork of Hamilton Creek	Date/Time: 5/2/2022 13:40
Assessors/Affiliation: Dave Cour (QHP#1113-TN13)/ KSWA	Project ID :
Site Name/Description: 2700 Murfreesboro Pike & 2749 Anderson Road (WC-1c)	
Site Location: 2700 Murfreesboro Pike & 2749 Anderson Road	
HUC (12 digit): 051302030308	Lat/Long: 36.0736, -86.632
Previous Rainfall (7-days) : 0.79	
Precipitation this Season vs. Normal : abnormally wet / elevated / average / low / abnormally dry / unknown Source of recent & seasonal precip data : National Weather Service/ NOAA U.S. Climate Normals	
Watershed Size : 29 acres	County: Davidson
Soil Type(s) / Geology : Lindell Silt Loam/Carters Limestone	Source: Web Soils Survey/ USGS National Geology Map
Surrounding Land Use : Residential Development/ Wooded	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe / Moderate / Slight / Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES	
1. Hydrologic feature exists solely due to a process discharge	X	WWC	
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC	
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		WWC	X N/A
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC	X N/A
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream	
6. Presence of fish (except *Gambusia*)	X	Stream	
7. Presence of naturally occurring ground water table connection	X	Stream	
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream	
9. Evidence watercourse has been used as a supply of drinking water	X	Stream	

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather Conveyance

Secondary Indicator Score (if applicable) = 18 OR N/A

Justification / Notes :

WC-1c reach is a low-slope channel with areas that are more defined in the lower portion of the reach. Adjacent manholes upstream indicate a sewer line adjacent to the channel. If there is any hydrology other than immediate response to precipitation, it is likely subsurface.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal = 10)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2 X	3
2. Sinuous channel	0	X 1	2	3
3. In-channel structure: riffle-pool sequences	0	1 X	2	3
4. Sorting of soil textures or other substrate	0	1 X	2	3
5. Active/relic floodplain	X 0	0.5	1	1.5
6. Depositional bars or benches	X 0	1	2	3
7. Braided channel	X 0	1	2	3
8. Recent alluvial deposits	0	0.5 X	1	1.5
9. Natural levees	X 0	1	2	3
10. Headcuts	0	X 1	2	3
11. Grade controls	0	0.5	1 X	1.5
12. Natural valley or drainageway	0	0.5	X 1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 X		Yes = 3	

B. **Hydrology** (Subtotal = 3)	Absent	Weak	Moderate	Strong	
14. Subsurface flow/discharge into channel	X 0	1	2	3	
15. Water in channel and >48 hours since sig. rain	X 0	1	2	3	N/A
16. Leaf litter in channel (January – September)	1.5 X	1	0.5	0	N/A
17. Sediment on plants or on debris	0	0.5 X	1	1.5	
18. Organic debris lines or piles (wrack lines)	0	0.5	X 1	1.5	
19. Hydric soils in channel bed or sides of channel	No = 0 X		Yes = 1.5		

C. **Biology** (Subtotal = 4.5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	X 2	1	0
21. Rooted plants in the thalweg [1]	3 X	2	1	0
22. Crayfish in stream (exclude in floodplain)	X 0	1	2	3
23. Bivalves/mussels	X 0	1	2	3
24. Amphibians	X 0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	X 0	1	2	3
26. Filamentous algae; periphyton	X 0	1	2	3
27. Iron oxidizing bacteria/fungus	X 0	0.5	1	1.5
28.Wetland plants in channel bed [2]	X 0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 18

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Few interruptions along most of the reach (1). Mostly straight reach with few bends, especially in lower portion (2). Occasional hydraulic diversity, but limited by rock (3). Channel is incised through soil profile in a gully-like way(4). No active or relic floodplain, depositional bars or benches, braided channel, natural levees (5,6,7,9). One or two minor headcuts (10). Small amounts of gravel deposition in reach (8). Root and rock grade controls (11). No clearly defined valley (12), and not identified on topographic map (13). No flow or standing water observed in channel with elevated seasonal precipitation and 0.29 inches of rain in the preceding 48-hour period (14-15). Little leaf litter in channel (16). Trash and debris in channel, ranging from heavy (tires) to light (cups, feathers, bags). Sediment observed on plants and along channel margins sporadically along reach (17). Debris collected in various areas and roots, rocks, bricks, etc. (18). Soils were brown (10Y/R 4/4) with no redox (19). Vegetation observed throughout reach where rooting was available and root throughout reach unless rock was present (20-21). No other biological indicators observed.

Appendix D: Landowner Access Letter

Stackhouse Development LLC
2310 S. Miami Blvd, Ste 238
Durham, NC 27703

April 28, 2022

To whom it may concern,

Jones Estates Suburban TN LLC grants the Tennessee Department of Environment and Conservation and/ or U.S. Army Corps of Engineers permission to access the property at 2749 Anderson Road, Nashville, TN 37217 to verify the Hydrologic Determination information submitted by KSWA.

Please contact Dave Cour at KSWA to schedule a site visit (615-258-3600).

Sincerely,

Jonathan Gindes

Appendix E: Soils and Geology

United States Department of Agriculture

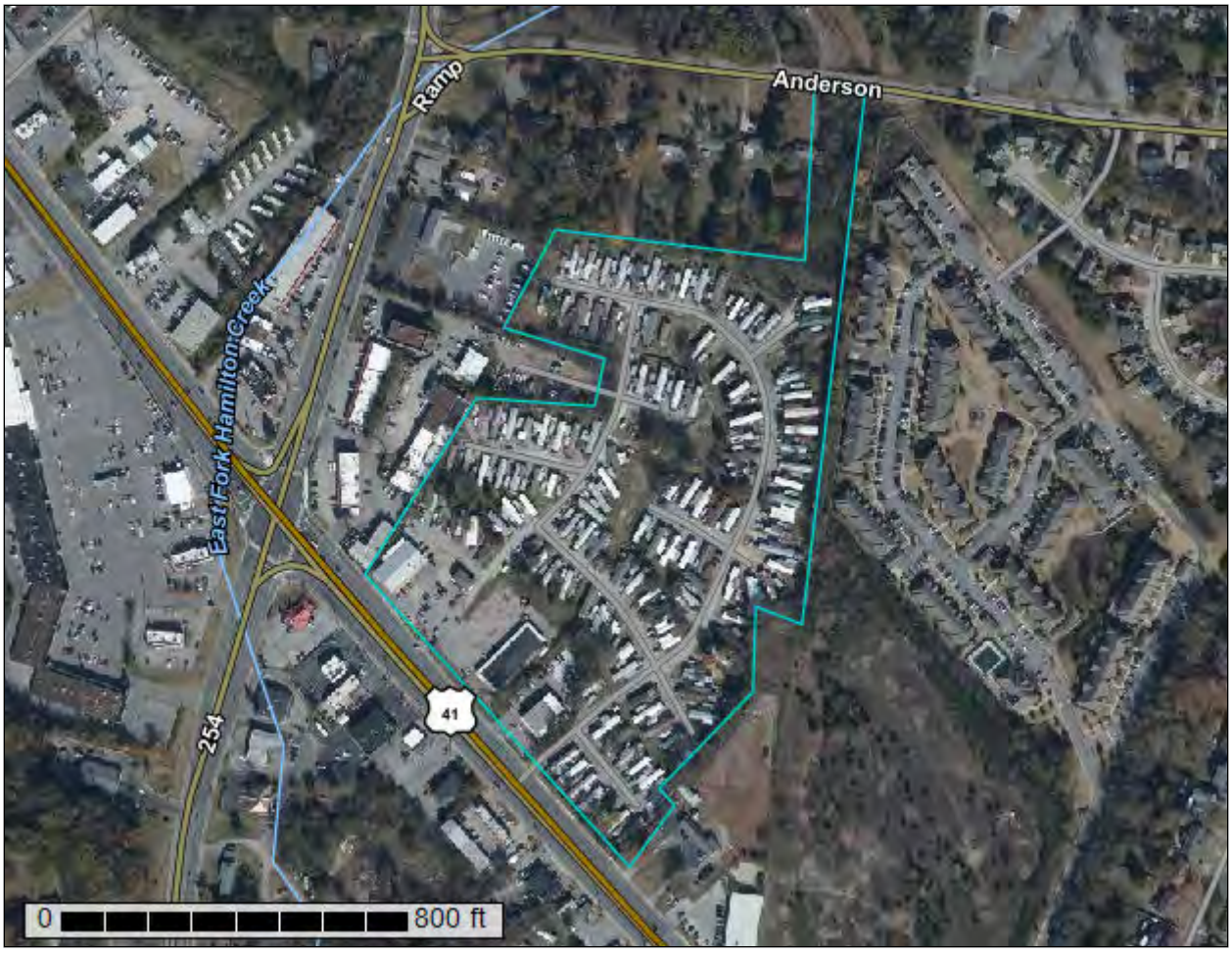
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Davidson County, Tennessee

Gander 2700 Murfreesboro Pike



May 3, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (Gander 2700 Murfreesboro Pike)

Map Scale: 1:3,210 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N 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 1:15,800.

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: Davidson County, Tennessee
Survey Area Data: Version 19, Sep 10, 2021

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

Date(s) aerial images were photographed: Nov 2, 2019—Nov 16, 2019

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.

Map Unit Legend (Gander 2700 Murfreesboro Pike)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ld	Lindell silt loam, 0 to 2 percent slopes, occasionally flooded	0.7	2.9%
TbC	Talbott silt loam, 2 to 10 percent slopes	13.5	59.6%
TrC	Talbott-Rock outcrop complex, 5 to 15 percent slopes	8.5	37.5%
Totals for Area of Interest		**22.6**	**100.0%**

Map Unit Descriptions (Gander 2700 Murfreesboro Pike)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Davidson County, Tennessee

Ld—Lindell silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2td2y
Elevation: 500 to 850 feet
Mean annual precipitation: 48 to 58 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 230 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Lindell and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lindell

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy alluvium derived from limestone and siltstone

Typical profile

Ap - 0 to 7 inches: silt loam
Bw - 7 to 15 inches: silt loam
Bg - 15 to 52 inches: silt loam
Cg - 52 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 12 to 16 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.2 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Arrington

Percent of map unit: 4 percent

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Norene

Percent of map unit: 4 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Armour

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

TbC—Talbott silt loam, 2 to 10 percent slopes

Map Unit Setting

National map unit symbol: kkp9
Elevation: 460 to 1,400 feet
Mean annual precipitation: 45 to 55 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Talbott and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Talbott

Setting

Landform: Hillslopes
Landform position (three-dimensional): Crest
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 32 inches: clay
R - 32 to 42 inches: bedrock

Properties and qualities

Slope: 2 to 10 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

TrC—Talbott-Rock outcrop complex, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: kkpc
Elevation: 460 to 4,000 feet
Mean annual precipitation: 8 to 55 inches
Mean annual air temperature: 45 to 63 degrees F
Frost-free period: 110 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Talbott and similar soils: 45 percent
Rock outcrop: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Talbott

Setting

Landform: Hillslopes
Landform position (three-dimensional): Crest
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 32 inches: clay
R - 32 to 42 inches: bedrock

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Rock Outcrop

Typical profile

R - 0 to 10 inches: bedrock

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Minor components

Percent of map unit: 20 percent
Hydric soil rating: No

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Rating by Map Unit (Gander 2700 Murfreesboro Pike)

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Custom Soil Resource Report
Map—Hydric Rating by Map Unit (Gander 2700 Murfreesboro Pike)

Map Scale: 1:3,210 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

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

Soils

Soil Rating Polygons
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

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 1:15,800.

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

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Soil Survey Area: Davidson County, Tennessee
Survey Area Data: Version 19, Sep 10, 2021

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

Date(s) aerial images were photographed: Nov 2, 2019—Nov 16, 2019

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Table—Hydric Rating by Map Unit (Gander 2700 Murfreesboro Pike)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ld	Lindell silt loam, 0 to 2 percent slopes, occasionally flooded	4	0.7	2.9%
TbC	Talbott silt loam, 2 to 10 percent slopes	0	13.5	59.6%
TrC	Talbott-Rock outcrop complex, 5 to 15 percent slopes	0	8.5	37.5%
Totals for Area of Interest			**22.6**	**100.0%**

Rating Options—Hydric Rating by Map Unit (Gander 2700 Murfreesboro Pike)

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

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Map Preview (Click image to enlarge)

Downloads

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NOTE: Images show
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Publication Order Number: GQ 311 SW

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Appendix F:

National Wetland Inventory Map

U.S. Fish and Wildlife Service

National Wetlands Inventory

2700 Murfreesboro Pike

May 4, 2022

Wetlands

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