

**WATER RESOURCES INVENTORY  
FOR  
NORTH ETOWAH INDUSTRIAL PARK  
ETOWAH, TENNESSEE**

Prepared For:  
Mr. Mayor John Gentry  
McMinn County Government  
6 East Madison Avenue  
Athens, Tennessee 37303

Prepared by:



June 03, 2022

GEOServices Project # 24-22451



June 03, 2022

McMinn County Government  
6 East Madison Avenue  
Athens, Tennessee 37303

Attention: Mr. Mayor John Gentry  
[jgentry@mcminncountyttn.gov](mailto:jgentry@mcminncountyttn.gov)

Subject: **Water Resource Inventory**  
**North Etowah Industrial Park**  
Etowah, Tennessee  
GEOServices Project No. 24-22451

Dear Mayor Gentry:

GEOServices, LLC has completed a Water Resource Inventory to assess the jurisdictional status of hydrologic features at the referenced project, located on at Jack King Drive and North Industrial Drive in Etowah, Tennessee. Please see our findings in the attached report.

GEOServices appreciates the opportunity to continue providing services to you and looks forward to working with you in the future. If you have any questions, please do not hesitate to contact us at your convenience.

Sincerely,  
**GEOServices, LLC**

Clayton Biden  
Environmental Scientist

Jason Mann, PE, TN-QHP # 1042-TN10  
Senior Project Manager

## 1.0 INTRODUCTION

GEOServices, LLC (GEOServices) performed a Water Resource Inventory on multiple hydrologic features located in the Chestuee Creek Lower Watershed, located on multiple parcels west of North Industrial Drive in Etowah, Tennessee. The site investigation and hydrologic assessment was conducted on June 01, 2022, by staff of GEOServices.

## 2.0 SITE DESCRIPTION

The subject project location is described as Map 097, Parcel 018.00 and Map 087, Parcel 206.00 according to the State of Tennessee Property Data Viewer website. The approximate coordinates for the area of concern are Latitude: North 35.3755°, Longitude West -84.5294°. The overall parcel footprint is approximately 280 acres in size; **Figure 1 in Appendix A** provides an overview of the subject location. The site comprises of pasture areas and strands of forest. The site is surrounded by undeveloped, agricultural, and residential properties.

**Figure 2 in Appendix A** illustrates the location of the hydrologic resources evaluated on site. The two (2) channels on site are identified as Channel 1 and Channel 2. The two (2) potential wetlands found on site are identified as Wetland A and Wetland B. Channel 2 shows evidence of weak hydrology, biology, and geomorphology characteristics. Channel 1 shows evidence of strong hydrology, biology, and geomorphology characteristics.

Based on the current Topographic Maps (**Figure 3 in Appendix A**), Channel 1 is designated as "blue line" feature, but Channel 2 is not designated as a "blue line" feature. Additionally, the topography of the property has an approximate elevation range between approximately 860 and 920 feet above mean sea level.

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The soils map associated with this site are shown as **Figure 4** in **Appendix A**. There are multiple soil types found on site. One of the soils on site have a hydric rating component, however, more hydric soils were found during the site investigation.

The entire project lies in the Chestuee Creek Lower Watershed (HUC 060200021003), which is nested within the Hiwassee River Watershed (HUC 06020002). The site drains to Blair Branch which is listed as impaired for habitat alteration in stream-side or littoral vegetative covers and *Escherichia Coli* (*E. Coli*).

### **3.0 RESOURCE DESCRIPTION**

Channel 1 is an unnamed tributary to Blair Branch that lies in the southeast of the property. The channel displays strong characteristics of geomorphology, hydrology, and biology. The channel is sinuous, shows some flow, and no benthic organisms, amphibians were found.

Channel 2 is an unnamed tributary to Blair Branch and ties into Channel 1 in the southeastern corner of the property. The channel displays weak characteristics of geomorphology, hydrology, and biology. The channel has no flow, no active floodplain, and no benthic organisms, crayfish, or amphibians were found.

Wetland indicators such as hydric soils, wetland vegetation, and hydrologic features were observed upon site investigation. There was evidence of hydric soils, hydrophytic vegetation and hydrology on site in combination at two observed locations. The individual data points were reviewed using guidance from the 1987 Corps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1) and the applicable regional supplement. A delineation of those data



points is included in **Figure 2**. Photographs taken during the site investigation are included in **Appendix B**. The data collected during the site investigation can be found in **Appendix C**.

In total one (1) pond feature were discovered in the central portion of the property. This hydrologic feature was observed to not have flowing water entering and/or leaving the pond. The elevation of the shallow pond, coupled with its geomorphic position of nearby hillslopes indicate complete segregation from the underlying groundwater table.

#### 4.0 SOIL SURVEY

As shown in **Figure 4**, the site's hydrologic features are predominantly underlain by soils listed in **Table I**. One of the soils mapped on site is listed as hydric by the USDA Web Soil Survey, Hydric Rating by Map Unit.

**Table I: Potential Soils Located on the Subject Location**

Symbol	Soil Name	Description	Hydric
Rk	Rockdell gravelly loam	0 to 3 percent slopes, gravelly alluvium derived from cherty limestone	No
Bm	Bloomington silty clay loam	0 to 2 percent slopes, occasional flooding, Gravelly alluvium derived from limestone and shale	Yes
TaC	Tasso loam	5 to 12 percent slopes, loamy colluvium and/or alluvium over residuum weathered from limestone	No
Ha	Hamblen silt loam	0 to 3 percent slopes, occasional flooding, loamy alluvium derived from limestone, sandstone, and shale	No

Source: USDA, Web Soil Survey, Hydric Rating by Map Unit

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## 5.0 NATIONAL WETLANDS INVENTORY MAP

The National Wetlands Inventory (NWI) map was reviewed to identify any potential wetlands within the boundaries or adjacent to the site. The NWI map is included as **Figure 5** in **Appendix A** of this report. The NWI map has identified potential Freshwater and Forested wetland features along Channels 1.

## 6.0 METHODS

The channels were evaluated using the most current Tennessee Department of Environment and Conservation Hydrologic Determination Field Data form. Weather calculations, field data sheets, photos, and a copy of QHP Certification 1042-TN10 is provided in the attached appendices. Potential wetland areas were analyzed following the routine three parameter approach to wetland delineations as published by the U.S. Army Corps of Engineers (USACE), 1987 edition (Technical Report Y-87-1), and the Regional Supplement for Eastern Mountains and Piedmont Region. Photographs taken during the investigation are included in **Appendix B**. Field data sheets were completed during the determination and are provided in **Appendix C**.

## 7.0 RESULTS

**Channel 1, Unnamed Tributary to Blair Branch – Stream** due to primary and secondary stream indicators; a secondary indicator score of 22.5 was calculated using a rigorous and reasonable amount of effort.

**Channel 2, Unnamed Tributary to Blair Branch – Wet Weather Conveyance (WWC)** due to primary and secondary stream indicators; a secondary indicator score of 6.5 was calculated using a rigorous and reasonable amount of effort.

**Wetland A** – An approximately 2.22-acre wetland was delineated during this investigation. The jurisdictional feature is hydrologically connected to a stream (Channel 1) on site.

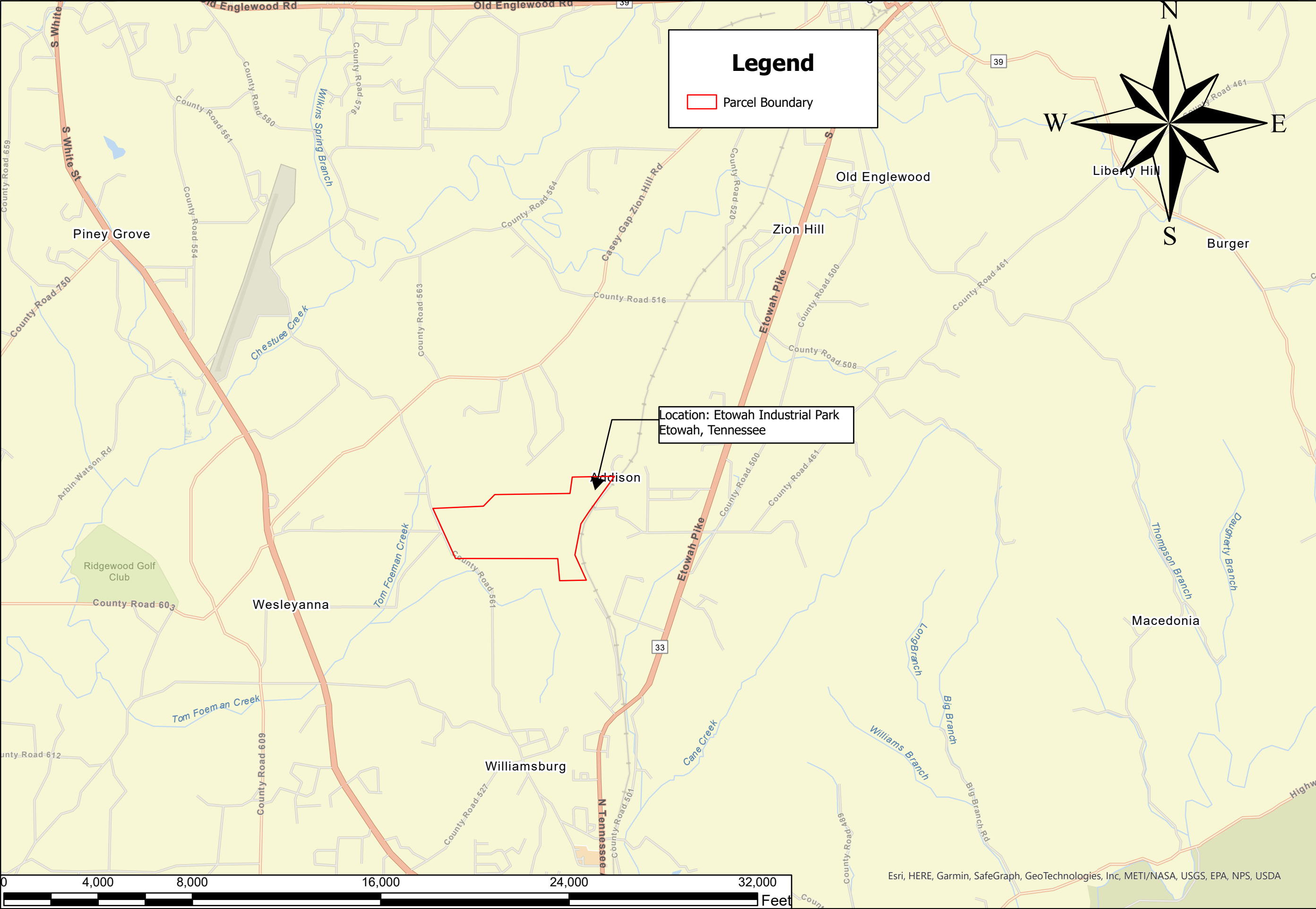
**Wetland B** – An approximately 0.10-acre wetland was delineated during this investigation. The jurisdictional feature is hydrologically connected to a stream (Channel 1) on site.

**Pond 1 – Non-Jurisdictional Feature** due to lack of flowing channels entering or leaving the pond, geomorphic position, and elevation.

**Figure 2** illustrates the georeferenced locations of the water resources in question, and is included in **Appendix A**.

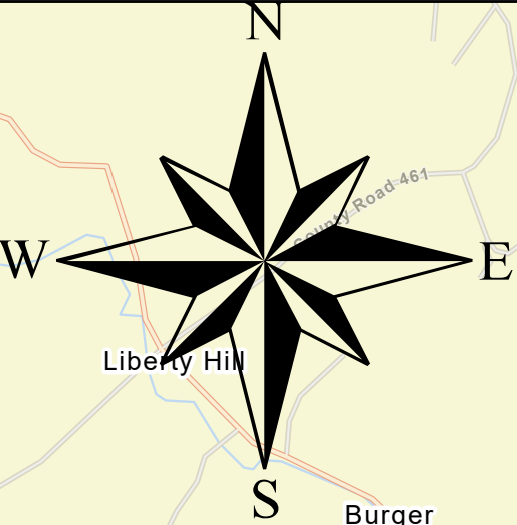
## **Appendix A**

### **Figures**



Legend

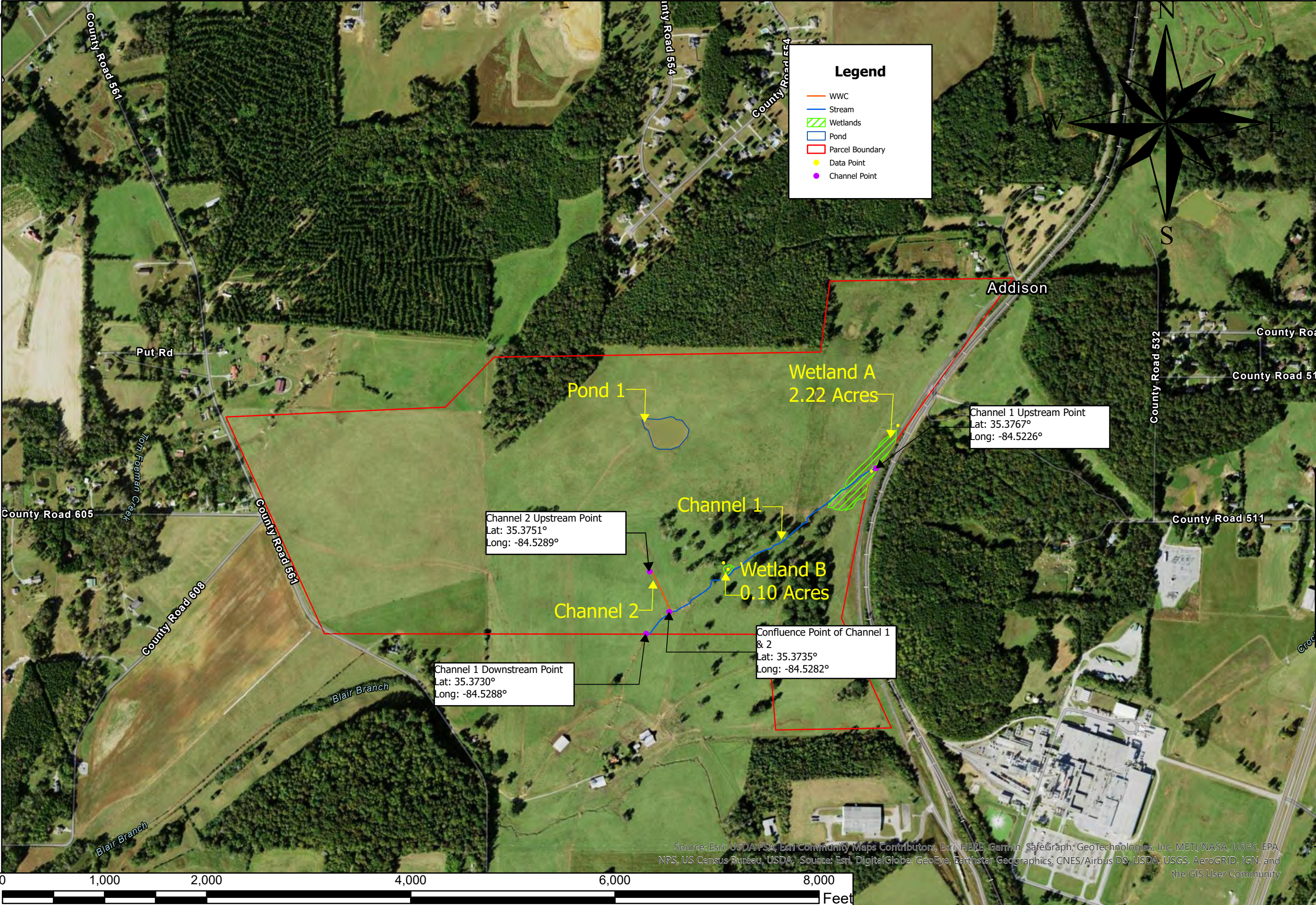
Parcel Boundary



Location: Etowah Industrial Park  
Etowah, Tennessee

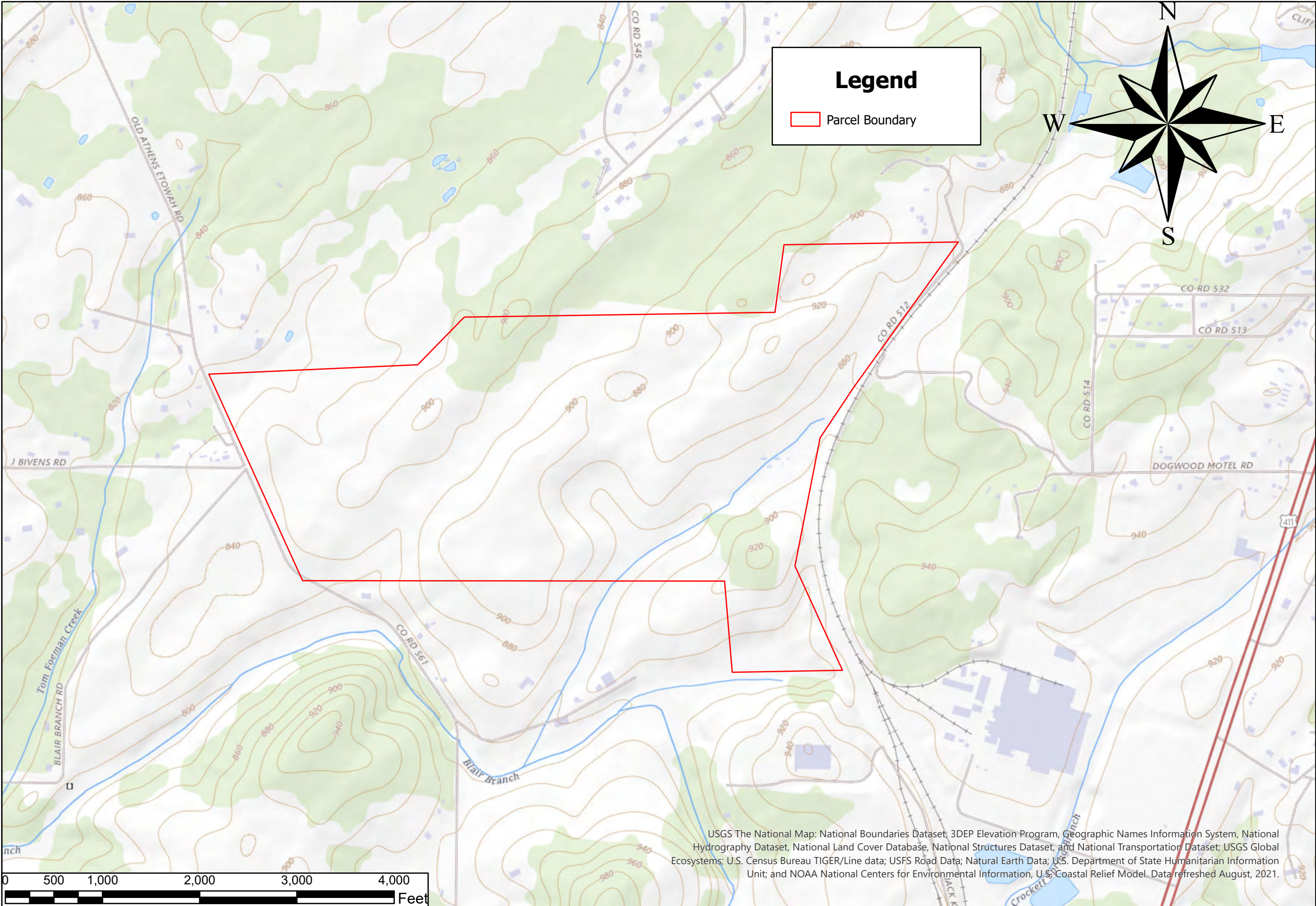
<div><div><div><div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div><div>GEOS</div><div>Universal Engineering Sciences Geotechnical, Environmental and Materials Engineers</div></div></div><div>FIGURE 1</div></div>	DRAWN BY:	CB	FINDINGS MAP	NOTES:
	REVIEWED BY:	JM		
	SCALE:	AS SHOWN		
	JOB NO.:	24-22451		
	DATE:	6/2/22		
	WATER RESOURCE INVENTORY ETOWAH INDUSTRIAL PARK ETOWAH, TENNESSEE			





NOTES:		FINDINGS MAP		WATER RESOURCE INVENTORY ETOWAH INDUSTRIAL PARK ETOWAH, TENNESSEE	
DRAWN BY:		CB	JM	AS SHOWN	24-22451
REVIEWED BY:					6/2/22
SCALE:					
JOB NO.:					
DATE:					
<div>Universal Engineering Sciences</div> <div>GEOS</div> <div>Geotechnical, Environmental and Materials Engineers / Scientists</div>					
FIGURE 2					



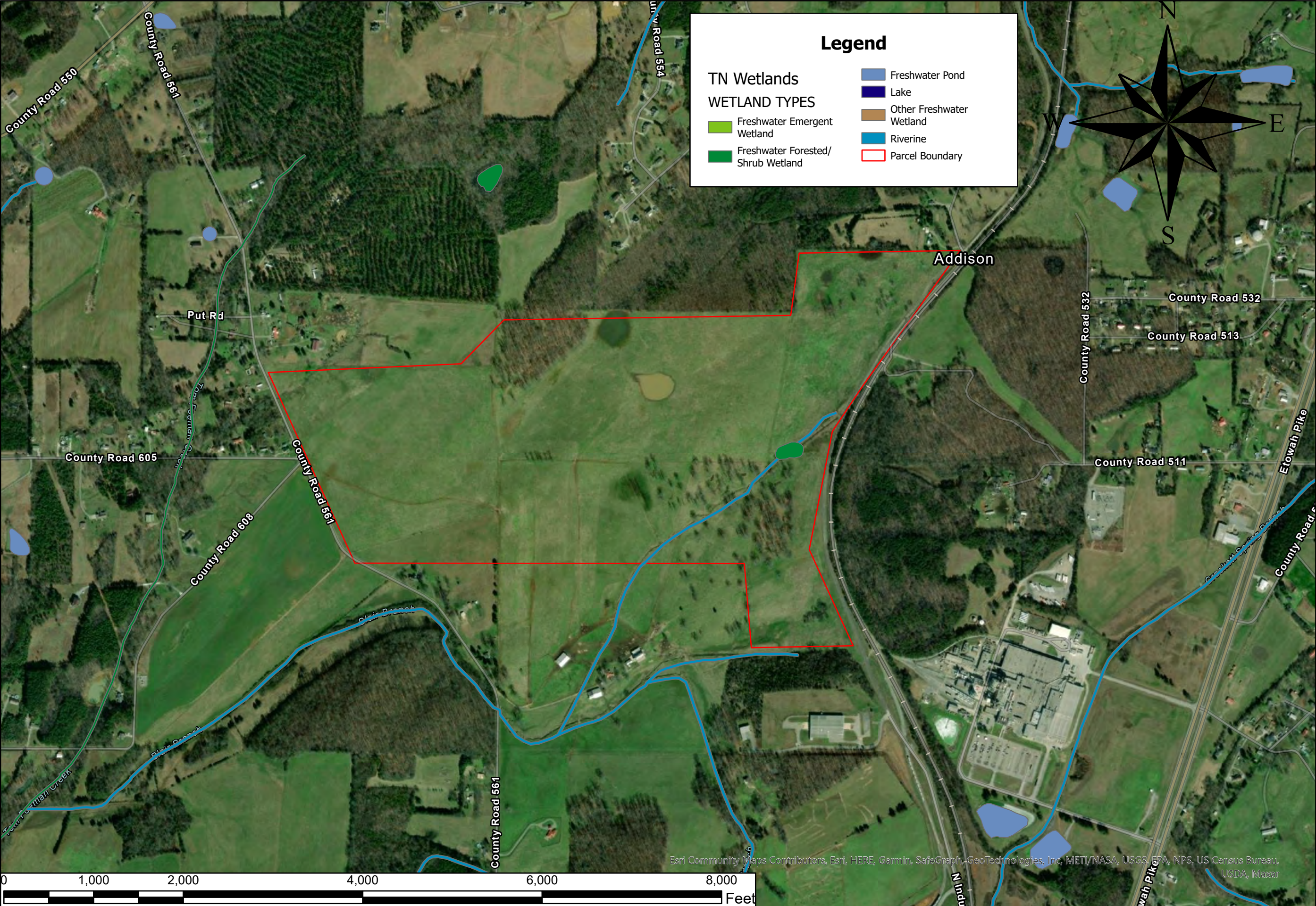


NOTES:		TOPO MAP		WATER RESOURCE INVENTORY ETOWAH INDUSTRIAL PARK ETOWAH, TENNESSEE		
DRAWN BY:	CB	REVIEWED BY:	JM	SCALE:	AS SHOWN	
JOB NO.:	24-22451	DATE:	6/2/22			
				FIGURE 3		









TN Wetlands

WETLAND TYPES

Freshwater Emergent Wetland

Freshwater Forested/Shrub Wetland

Freshwater Pond

Lake

Other Freshwater Wetland

Riverine

Parcel Boundary



<div><div><div>GEOS</div><div>Universal Engineering Sciences</div><div>Geotechnical, Environmental and Materials Engineers</div></div></div>	DRAWN BY:	CB	NW I MAP	NOTES:
	REVIEWED BY:	JM		
	SCALE:	AS SHOWN	WATER RESOURCE INVENTORY ETOWAH INDUSTRIAL PARK ETOWAH, TENNESSEE	
	JOB NO.:	24-22451		
	DATE:	6/2/22		
FIGURE 5				



**Appendix B**  
**Photographs**



Photo 1: Wetland A



Photo 2: Wetland A vegetation (common rush and rice cutgrass)





Photo 3: Hydric soil sample from Wetland A



Photo 4: Upstream point of Channel 1 within Wetland A with culvert





Photo 5: Wetland A hydrology



Photo 6: Upper section of Channel 1 showing wetland plants in the channel bed





Photo 7: Typical representation of Channel 1



Photo 8: Lower section of Channel 1





Photo 9: Pool in Channel 1 where multiple species of tadpoles were discovered



Photo 10: Lower section of Channel 1 culvert





Photo 11: Confluence point of Channel 1 and 2



Photo 12: Lower section of Channel 2





Photo 13: Typical representation of Channel 2



Photo 14: Upper Section of Channel 2





Photo 15: Pond 1



Photo 16: Wetland B





Photo 17: Hydric soil from Wetland B



Photo 18: Wetland B vegetation (common rush and rice cutgrass)

**Appendix C**  
**Field Data Sheets**

<b>U.S. Army Corps of Engineers</b> <b>WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region</b> See ERDC/EL TR-12-9; 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: <u>North Etowah Industrial Park</u> City/County: <u>McMinn</u> Sampling Date: <u>6/1/22</u>				
Applicant/Owner: _____ State: <u>TN</u> Sampling Point: <u>DP 1</u>				
Investigator(s): <u>Jason Mann, Clayton Biden, Cierra Homic</u> Section, Township, Range: _____				
Landform (hillside, terrace, etc.): <u>hillside</u> Local relief (concave, convex, none): <u>none</u> Slope (%): _____				
Subregion (LRR or MLRA): <u>N 126</u> Lat: <u>35.3767 °</u> Long: <u>-84.5226 °</u> Datum: _____				
Soil Map Unit Name: <u>BM - Bloomingdale silty clay loam</u> NWI classification: <u>Freshwater Forested</u>				
Are climatic / hydrologic conditions on the site typical for this time of year? Yes <u>X</u> No _____ (If no, explain in Remarks.)				
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes <u>X</u> No _____				
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)				
<b>SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.</b>				
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 40%; padding: 5px;">           Hydrophytic Vegetation Present? Yes <u>X</u> No _____            Hydric Soil Present? Yes <u>X</u> No _____            Wetland Hydrology Present? Yes <u>X</u> No _____         </td> <td style="width: 60%; padding: 5px;"> <b>Is the Sampled Area within a Wetland?</b> Yes <u>X</u> No _____         </td> </tr> </table>			Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	<b>Is the Sampled Area within a Wetland?</b> Yes <u>X</u> No _____
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Remarks:				
<b>HYDROLOGY</b>				
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 60%; padding: 5px;"> <b>Wetland Hydrology Indicators:</b>  <u>Primary Indicators (minimum of one is required; check all that apply)</u>  <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14)  <input checked="" type="checkbox"/> High Water Table (A2) _____ Hydrogen Sulfide Odor (C1)  <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3)            _____ Water Marks (B1) _____ Presence of Reduced Iron (C4)            _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6)            _____ Drift Deposits (B3) _____ Thin Muck Surface (C7)            _____ Algal Mat or Crust (B4) _____ Other (Explain in Remarks)            _____ Iron Deposits (B5)            _____ Inundation Visible on Aerial Imagery (B7)            _____ Water-Stained Leaves (B9)            _____ Aquatic Fauna (B13)         </td> <td style="width: 40%; padding: 5px;"> <u>Secondary Indicators (minimum of two required)</u>            _____ Surface Soil Cracks (B6)  <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)  <input checked="" type="checkbox"/> 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)  <input checked="" type="checkbox"/> Geomorphic Position (D2)            _____ Shallow Aquitard (D3)  <input checked="" type="checkbox"/> Microtopographic Relief (D4)            _____ FAC-Neutral Test (D5)         </td> </tr> </table>			<b>Wetland Hydrology Indicators:</b> <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Water Marks (B1) _____ Presence of Reduced Iron (C4) _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Drift Deposits (B3) _____ Thin Muck Surface (C7) _____ Algal Mat or Crust (B4) _____ Other (Explain in Remarks) _____ Iron Deposits (B5) _____ Inundation Visible on Aerial Imagery (B7) _____ Water-Stained Leaves (B9) _____ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> _____ Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> 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) <input checked="" type="checkbox"/> Geomorphic Position (D2) _____ Shallow Aquitard (D3) <input checked="" type="checkbox"/> Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
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<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 55%; padding: 5px;"> <b>Field Observations:</b>            Surface Water Present? Yes <u>X</u> No _____ Depth (inches): <u>4</u>            Water Table Present? Yes <u>X</u> No _____ Depth (inches): <u>3</u>            Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>3</u>            (includes capillary fringe)         </td> <td style="width: 45%; padding: 5px;"> <b>Wetland Hydrology Present?</b> Yes <u>X</u> No _____         </td> </tr> </table>			<b>Field Observations:</b> Surface Water Present? Yes <u>X</u> No _____ Depth (inches): <u>4</u> Water Table Present? Yes <u>X</u> No _____ Depth (inches): <u>3</u> Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>3</u> (includes capillary fringe)	<b>Wetland Hydrology Present?</b> Yes <u>X</u> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:				
Remarks:				

ENG FORM 6116-4, JUL 2018

Eastern Mountains and Piedmont – Version 2.0



**VEGETATION (Four Strata) – Use scientific names of plants.**

 Sampling Point: **DP1**

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. <u>Salix nigra</u>	5	Y	OBL	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A) Total Number of Dominant Species Across All Strata: _____ (B) Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)																
2. _____																				
3. _____																				
4. _____																				
5. _____																				
6. _____																				
7. _____																				
	5	=Total Cover		<b>Prevalence Index worksheet:</b> <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>44</u></td> <td>x 1 = <u>44</u></td> </tr> <tr> <td>FACW species <u>30</u></td> <td>x 2 = <u>60</u></td> </tr> <tr> <td>FAC species _____</td> <td>x 3 = _____</td> </tr> <tr> <td>FACU species <u>15</u></td> <td>x 4 = <u>60</u></td> </tr> <tr> <td>UPL species <u>5</u></td> <td>x 5 = <u>25</u></td> </tr> <tr> <td>Column Totals: <u>100</u> (A)</td> <td><u>189</u> (B)</td> </tr> <tr> <td colspan="2" style="text-align: center;">Prevalence Index = B/A = <u>1.89</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>44</u>	x 1 = <u>44</u>	FACW species <u>30</u>	x 2 = <u>60</u>	FAC species _____	x 3 = _____	FACU species <u>15</u>	x 4 = <u>60</u>	UPL species <u>5</u>	x 5 = <u>25</u>	Column Totals: <u>100</u> (A)	<u>189</u> (B)	Prevalence Index = B/A = <u>1.89</u>	
Total % Cover of:	Multiply by:																			
OBL species <u>44</u>	x 1 = <u>44</u>																			
FACW species <u>30</u>	x 2 = <u>60</u>																			
FAC species _____	x 3 = _____																			
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Column Totals: <u>100</u> (A)	<u>189</u> (B)																			
Prevalence Index = B/A = <u>1.89</u>																				
50% of total cover: _____ 20% of total cover: _____																				
Sapling/Shrub Stratum (Plot size: _____)				<b>Hydrophytic Vegetation Indicators:</b> _____ 1 - Rapid Test for Hydrophytic Vegetation _____ 2 - Dominance Test is >50% <u>X</u> 3 - Prevalence Index is ≤3.0 <sup>1</sup> _____ 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) _____ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)																
1. _____																				
2. _____																				
3. _____																				
4. _____																				
5. _____																				
6. _____																				
50% of total cover: _____ 20% of total cover: _____																				
Herb Stratum (Plot size: _____)				<b>Definitions of Four Vegetation Strata:</b> <b>Tree</b> – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. <b>Sapling/Shrub</b> – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. <b>Herb</b> – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. <b>Woody Vine</b> – All woody vines greater than 3.28 ft in height.																
1. <u>Juncus effusus</u>	30	Y	FACW																	
2. <u>Carex lurida</u>	10	N	OBL																	
3. <u>Solanum carolinense</u>	2	N	FACU																	
4. <u>Verbascum thapsus</u>	2	N	FACU																	
5. <u>Carduus nutans</u>	5	N	UPL																	
6. <u>Juniperus virginiana</u>	2	N	FACU																	
7. <u>Ligustrum sinense</u>	15	N	FACU																	
8. <u>Murdannia keisak</u>	25	N	OBL																	
9. <u>Alisma triviale</u>	4	N	OBL																	
10. _____																				
11. _____				<b>B/A = 1.89</b>																
	95	=Total Cover																		
50% of total cover: <u>X</u> 20% of total cover: _____				<b>Hydrophytic Vegetation Present?</b> Yes <u>X</u> No _____																
Woody Vine Stratum (Plot size: _____)																				
1. _____																				
2. _____																				
3. _____																				
4. _____																				
5. _____																				
50% of total cover: _____ 20% of total cover: _____																				
Remarks: (Include photo numbers here or on a separate sheet.)																				

## SOIL

Sampling Point: DP1**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-10	10YR 6/1	100					Clay loam	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.<sup>2</sup>Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (MLRA 136)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input checked="" type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input checked="" type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 122, 136)
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147, 148)
<input type="checkbox"/> Dark Surface (S7)	

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)
<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)
<input type="checkbox"/> Red Parent Material (F21) (outside MLRA 127, 147, 148)
<input type="checkbox"/> Very Shallow Dark Surface (F22)
<input type="checkbox"/> Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if observed):**Type: \_\_\_\_\_  
Depth (inches): \_\_\_\_\_Hydric Soil Present? Yes ☒ No ☐

Remarks:

# WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: North Etowah Industrial Park City/County: McMinn Sampling Date: 6/1/22  
 Applicant/Owner: \_\_\_\_\_ State: TN Sampling Point: DP2  
 Investigator(s): Jason Mann, Clayton Biden, Cierra Homic Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): Hillside Local relief (concave, convex, none): None Slope (%): \_\_\_\_\_  
 Subregion (LRR or MLRA): N 126 Lat: 35.3763 ° Long: -84.5234 ° Datum: \_\_\_\_\_  
 Soil Map Unit Name: Rk - Rockdell gravelly loam NWI classification: NA  
 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 \_\_\_\_\_ No x  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <u>x</u> Hydric Soil Present? Yes _____ No <u>x</u> Wetland Hydrology Present? Yes _____ No <u>x</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>x</u>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1)      ___ True Aquatic Plants (B14) ___ High Water Table (A2)      ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3)      ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1)      ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2)      ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3)      ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4)      ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) ___ Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ 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)
<b>Field Observations:</b> Surface Water Present? Yes _____ No <u>x</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>x</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>x</u> Depth (inches): _____ (includes capillary fringe)	<b>Wetland Hydrology Present?</b> Yes _____ No <u>x</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		



Sampling Point: DP2

Eastern Mountains and Piedmont – Version 2.0

## SOIL

Sampling Point: DP2[illegible]

# WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: North Etowah Industrial Park City/County: McMinn Sampling Date: 6/1/22  
 Applicant/Owner: \_\_\_\_\_ State: TN Sampling Point: DP3  
 Investigator(s): Jason Mann, Clayton Biden, Cierra Homic Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): Hillside Local relief (concave, convex, none): None Slope (%): \_\_\_\_\_  
 Subregion (LRR or MLRA): N 126 Lat: 35.3740 ° Long: -84.5258 ° Datum: \_\_\_\_\_  
 Soil Map Unit Name: TaC - Tasso Loam NWI classification: NA  
 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 <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1)      ___ True Aquatic Plants (B14) ___ High Water Table (A2)      ___ Hydrogen Sulfide Odor (C1) <u>X</u> Saturation (A3)      ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1)      ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2)      ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3)      ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4)      ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) ___ Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) <u>X</u> Sparsely Vegetated Concave Surface (B8) <u>X</u> 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) <u>X</u> Geomorphic Position (D2) ___ Shallow Aquitard (D3) <u>X</u> Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
<b>Field Observations:</b> Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>3</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

Sampling Point: DP3

US Army Corps of Engineers Eastern Mountains and Piedmont – Version 2.0

## SOIL

Sampling Point: DP3[illegible]

# WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: North Etowah Industrial Park City/County: McMinn Sampling Date: 6/1/22  
Applicant/Owner: \_\_\_\_\_ State: TN Sampling Point: DP4  
Investigator(s): Jason Mann, Clayton Biden, Cierra Homic Section, Township, Range: \_\_\_\_\_  
Landform (hillslope, terrace, etc.): Hillside Local relief (concave, convex, none): None Slope (%): \_\_\_\_\_  
Subregion (LRR or MLRA): N 126 Lat: 35.3740 ° Long: -84.5258 ° Datum: \_\_\_\_\_  
Soil Map Unit Name: TaC - Tasso Loam NWI classification: NA

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 <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present? Yes _____ No <u>X</u>	
Wetland Hydrology Present? Yes _____ No <u>X</u>	
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b>		<b>Secondary Indicators (minimum of two required)</b>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)
<b>Field Observations:</b>		
Surface Water Present? Yes _____ No <u>X</u>	Depth (inches): _____	Wetland Hydrology Present? Yes _____ No <u>X</u>
Water Table Present? Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present? Yes _____ No <u>X</u>	Depth (inches): _____ (includes capillary fringe)	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

**VEGETATION (Five Strata) – Use scientific names of plants.**

Sampling Point: DP4

Tree Stratum (Plot size: _____ )				Absolute % Cover	Dominant Species?	Indicator Status
1.	_____	_____	_____	_____	_____	_____
2.	_____	_____	_____	_____	_____	_____
3.	_____	_____	_____	_____	_____	_____
4.	_____	_____	_____	_____	_____	_____
5.	_____	_____	_____	_____	_____	_____
6.	_____	_____	_____	_____	_____	_____
				_____ = Total Cover		
50% of total cover: _____ 20% of total cover: _____						
Sapling Stratum (Plot size: _____ )				Absolute % Cover	Dominant Species?	Indicator Status
1.	_____	_____	_____	_____	_____	_____
2.	_____	_____	_____	_____	_____	_____
3.	_____	_____	_____	_____	_____	_____
4.	_____	_____	_____	_____	_____	_____
5.	_____	_____	_____	_____	_____	_____
6.	_____	_____	_____	_____	_____	_____
				_____ = Total Cover		
50% of total cover: _____ 20% of total cover: _____						
Shrub Stratum (Plot size: _____ )				Absolute % Cover	Dominant Species?	Indicator Status
1.	_____	_____	_____	_____	_____	_____
2.	_____	_____	_____	_____	_____	_____
3.	_____	_____	_____	_____	_____	_____
4.	_____	_____	_____	_____	_____	_____
5.	_____	_____	_____	_____	_____	_____
6.	_____	_____	_____	_____	_____	_____
				_____ = Total Cover		
50% of total cover: _____ 20% of total cover: _____						
Herb Stratum (Plot size: _____ )				Absolute % Cover	Dominant Species?	Indicator Status
1.	<u>Festuca spp.</u>	<u>100</u>	<u>Y</u>	<u>FAC</u>		
2.	_____	_____	_____	_____		
3.	_____	_____	_____	_____		
4.	_____	_____	_____	_____		
5.	_____	_____	_____	_____		
6.	_____	_____	_____	_____		
7.	_____	_____	_____	_____		
8.	_____	_____	_____	_____		
9.	_____	_____	_____	_____		
10.	_____	_____	_____	_____		
11.	_____	_____	_____	_____		
				<u>100</u> = Total Cover		
50% of total cover: <u>X</u> 20% of total cover: _____						
Woody Vine Stratum (Plot size: _____ )				Absolute % Cover	Dominant Species?	Indicator Status
1.	_____	_____	_____	_____	_____	_____
2.	_____	_____	_____	_____	_____	_____
3.	_____	_____	_____	_____	_____	_____
4.	_____	_____	_____	_____	_____	_____
5.	_____	_____	_____	_____	_____	_____
				_____ = Total Cover		
50% of total cover: _____ 20% of total cover: _____						
Remarks: (Include photo numbers here or on a separate sheet.)						

Dominance Test worksheet:	
Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)	
Total Number of Dominant Species Across All Strata: _____ (B)	
Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)	
Prevalence Index worksheet:	
Total % Cover of: _____	Multiply by: _____
OBL species _____ x 1 = _____	
FACW species _____ x 2 = _____	
FAC species <u>100</u> x 3 = <u>300</u>	
FACU species _____ x 4 = _____	
UPL species _____ x 5 = _____	
Column Totals: _____ (A)	_____ (B)
Prevalence Index = B/A = <u>3.0</u>	
Hydrophytic Vegetation Indicators:	
___ 1 - Rapid Test for Hydrophytic Vegetation	
___ 2 - Dominance Test is >50%	
<u>X</u> 3 - Prevalence Index is ≤3.0 <sup>1</sup>	
___ 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
Definitions of Five Vegetation Strata:	
<b>Tree</b> – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).	
<b>Sapling</b> – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.	
<b>Shrub</b> – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.	
<b>Herb</b> – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.	
<b>Woody vine</b> – All woody vines, regardless of height.	
B/A = 3.0	
Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>

## SOIL

Sampling Point: DP4

[illegible]



# Hydrologic Determination Field Data Sheet

## Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Channel 1		Date/Time: 6/1/22 10:00
Assessors/Affiliation: Jason Mann, PE, TN-QHP # 1042-TN10, Cierra Homic, & Clayton Biden		Project ID : 24-22451
Site Name/Description: Etowah Industrial Park		
Site Location: Map 097, Parcel 018.00 and Map 087, Parcel 206.00		
HUC (12 digit): 060200021003		Lat/Long: Lat: 35.3767° Long: -84.5226°
Previous Rainfall (7-days) : 1.24"		
Precipitation this Season vs. Normal : abnormally wet    elevated <b>average</b> low    abnormally dry    unknown Source of recent & seasonal precip data : NOAA		
Watershed Size : 179.2 acres	County: McMinn	
Soil Type(s) / Geology : Bm-Bloomingdale silty clay loam, TaC-Tasso loam, Ha-Hamblen silt loam		Source: WSS
Surrounding Land Use : Agricultural, Residential, and Commerical		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe <b>Moderate</b> 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	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except <i>Gambusia</i> )	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 = Stream**

**Secondary Indicator Score (if applicable) = 22.5**

#### Justification / Notes :

Channel 1 Upstream Point - Lat: 35.3767°, Long: -84.5226°

Channel 1 Downstream Point - Lat: 35.3730°, Long: -84.5288°

Multiple culverts found in conjunction with the Channel

## Secondary Field Indicator Evaluation

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

<b>B. Hydrology</b> (Subtotal = 5 )	<b>Absent</b>	<b>Weak</b>	<b>Moderate</b>	<b>Strong</b>
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

<b>C. Biology</b> (Subtotal = 8.5 )	<b>Absent</b>	<b>Weak</b>	<b>Moderate</b>	<b>Strong</b>
20. Fibrous roots in <b>channel bed</b> <sub>1</sub>	3	2	1	0
21. Rooted plants in <b>the thalweg</b> <sub>1</sub>	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in <b>channel bed</b> <sub>2</sub>	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 = 22.5

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

### Notes :

[illegible]

# Hydrologic Determination Field Data Sheet

## Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Channel 2		Date/Time: 6/1/22 10:30
Assessors/Affiliation: Jason Mann, PE, TN-QHP # 1042-TN10, Cierra Homic, & Clayton Biden		Project ID : 24-22451
Site Name/Description: Etowah Industrial Park		
Site Location: Map 097, Parcel 018.00 and Map 087, Parcel 206.00		
HUC (12 digit): 060200021003		Lat/Long: Lat: 35.3730° Long: -84.5288°
Previous Rainfall (7-days) : 1.24"		
Precipitation this Season vs. Normal : abnormally wet    elevated <b>average</b> low    abnormally dry    unknown Source of recent & seasonal precip data : NOAA		
Watershed Size : 25.6 acres	County: McMinn	
Soil Type(s) / Geology : Bm-Bloomingdale silty clay loam, TaC-Tasso loam, Ha-Hamblen silt loam		Source: WSS
Surrounding Land Use : Agricultural, Residential, and Commerical		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe                      Moderate                      Slight <b>Absent</b>		

### 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	x	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	x	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	x	Stream
6. Presence of fish (except <i>Gambusia</i> )	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*

<b>Overall Hydrologic Determination =</b> WWC
<b>Secondary Indicator Score (if applicable) =</b> 6.5

#### Justification / Notes :

Channel 2 Upstream Point - Lat: 35.3751°, Long: -84.5289°
Channel 2 Downstream Point - Lat: 35.3735°, Long: -84.5282°

## Secondary Field Indicator Evaluation

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

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

<b>C. Biology</b> (Subtotal = 2 )	<b>Absent</b>	<b>Weak</b>	<b>Moderate</b>	<b>Strong</b>
20. Fibrous roots in <b>channel bed</b> <sub>1</sub>	3	2	1	0
21. Rooted plants in <b>the thalweg</b> <sub>1</sub>	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in <b>channel bed</b> <sub>2</sub>	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 = 6.5

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

### Notes :

[illegible]

**Appendix D**  
**Weather Data**

# Normal Weather Conditions

## Calculations Table

### Knoxville –2022

Long-term rainfall records										
	Month	Standard Deviation	Minus One Std. Dev. (DRY)	Normal (Mean inches)	Plus One Std. Dev. (WET)	Actual Rainfall	Condition (elevated, low, average)	Condition value	Month weight value	Product of previous two columns
1 <sup>st</sup> prior month*	MAY	1.96	1.84	3.80	5.76	4.77	AVE	2	3	6
2 <sup>nd</sup> prior month*	APR	1.83	1.92	3.75	5.58	3.68	AVE	2	2	4
3 <sup>rd</sup> prior month*	MAR	2.18	2.61	4.79	6.97	3.69	AVE	2	1	2
									Sum =	12

Note:

If sum is:	13 - Average
6-9	then prior period has been <b>abnormally dry</b>
10-14	then prior period has been normal ( <b>average</b> )
15-18	Then prior period has been <b>abnormally wet</b>

Condition value:	
<b>Low</b> =	1
<b>Average</b> =	2
<b>Elevated</b> =	3

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CXUS54 KMRX 021332

CLMTYS

CLIMATE REPORT

NATIONAL WEATHER SERVICE MORRISTOWN, TN

932 AM EDT THU JUN 02 2022

.....

...THE KNOXVILLE MCGHEE TYSON AIRPORT CLIMATE SUMMARY FOR THE MONTH OF **MAY** 2022...

CLIMATE NORMAL PERIOD: 1991 TO 2020

CLIMATE RECORD PERIOD: 1871 TO 2022

WEATHER	OBSERVED VALUE	DATE(S)	NORMAL VALUE	DEPART FROM NORMAL
---------	-------------------	---------	-----------------	--------------------------

.....

TEMPERATURE (F)

HIGHEST	90	05/20		
		05/21		
LOWEST	52	05/09		
AVG. MAXIMUM	81.2		78.9	2.3
AVG. MINIMUM	60.5		56.9	3.6
MEAN	70.9		67.9	3.0
DAYS MAX >= 90	2			
DAYS MAX <= 32	0			
DAYS MIN <= 32	0			
DAYS MIN <= 0	0			

PRECIPITATION (INCHES)

RECORD

MAXIMUM	10.98	1974		
MINIMUM	0.71	1941		
TOTALS	<b>4.77</b>		4.13	0.64
DAYS >= .01	10			
DAYS >= .10	7			
DAYS >= .50	4			
DAYS >= 1.00	2			
GREATEST				
24 HR. TOTAL	1.90	05/22 TO 05/23		

SNOWFALL (INCHES)

TOTALS	0.0		0.0	0.0
SINCE 7/1	10.7			
SNOWDEPTH AVG.	0			
DAYS >= TRACE	0			
GREATEST				
SNOW DEPTH	0			

DEGREE DAYS

HEATING TOTAL	9		53	-44
SINCE 7/1	3153		3525	-372
COOLING TOTAL	202		143	59
SINCE 1/1	241		184	57

.....

WEATHER CONDITIONS. NUMBER OF DAYS WITH

THUNDERSTORM	6	RAIN	7
SNOW	0	FOG	14

FOG W/VIS <= 1/4 MILE 1

- INDICATES NEGATIVE NUMBERS.  
R INDICATES RECORD WAS SET OR TIED.  
MM INDICATES DATA IS MISSING.  
T INDICATES TRACE AMOUNT.

\$\$



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CXUS54 KMRX 021904

CLMCHA

CLIMATE REPORT

NATIONAL WEATHER SERVICE MORRISTOWN, TN

304 PM EDT MON MAY 02 2022

.....

...THE CHATTANOOGA AIRPORT CLIMATE SUMMARY FOR THE MONTH OF **APRIL** 2022...

CLIMATE NORMAL PERIOD: 1991 TO 2020

CLIMATE RECORD PERIOD: 1879 TO 2022

WEATHER	OBSERVED VALUE	DATE(S)	NORMAL VALUE	DEPART FROM NORMAL
---------	-------------------	---------	-----------------	--------------------------

.....

TEMPERATURE (F)

HIGHEST	85	04/25		
LOWEST	33	04/10		
AVG. MAXIMUM	73.2		73.6	-0.4
AVG. MINIMUM	48.9		49.9	-1.0
MEAN	61.0		61.7	-0.7
DAYS MAX >= 90	0			
DAYS MAX <= 32	0			
DAYS MIN <= 32	0			
DAYS MIN <= 0	0			

PRECIPITATION (INCHES)

RECORD

MAXIMUM	15.29	1911		
MINIMUM	0.44	1942		
TOTALS	<b>3.26</b>		4.87	-1.61
DAYS >= .01	8			
DAYS >= .10	6			
DAYS >= .50	3			
DAYS >= 1.00	0			
GREATEST				
24 HR. TOTAL	1.13	04/13 TO 04/14		

SNOWFALL (INCHES)

TOTALS	0.0		0.0	0.0
SINCE 7/1	1.0			
SNOWDEPTH AVG.	0			
DAYS >= TRACE	0			
GREATEST				
SNOW DEPTH	0			

DEGREE DAYS

HEATING TOTAL	158		147	11
SINCE 7/1	2649		2996	-347
COOLING TOTAL	48		50	-2
SINCE 1/1	61		61	0

.....

WEATHER CONDITIONS. NUMBER OF DAYS WITH

THUNDERSTORM	5	RAIN	6
SNOW	0	FOG	8
FOG W/VIS <= 1/4 MILE	0		

- INDICATES NEGATIVE NUMBERS.  
R INDICATES RECORD WAS SET OR TIED.  
MM INDICATES DATA IS MISSING.  
T INDICATES TRACE AMOUNT.

\$\$

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CXUS54 KMRX 011345

CLMCHA

CLIMATE REPORT

NATIONAL WEATHER SERVICE MORRISTOWN, TN

945 AM EDT FRI APR 01 2022

.....

...THE CHATTANOOGA AIRPORT CLIMATE SUMMARY FOR THE MONTH OF **MARCH** 2022...

CLIMATE NORMAL PERIOD: 1991 TO 2020

CLIMATE RECORD PERIOD: 1879 TO 2022

WEATHER	OBSERVED VALUE	DATE(S)	NORMAL VALUE	DEPART FROM NORMAL
---------	-------------------	---------	-----------------	--------------------------

.....

TEMPERATURE (F)

HIGHEST	83	03/30		
LOWEST	22	03/13		
AVG. MAXIMUM	68.1		64.1	4.0
AVG. MINIMUM	43.1		42.2	0.9
MEAN	55.6		53.2	2.4
DAYS MAX >= 90	0			
DAYS MAX <= 32	0			
DAYS MIN <= 32	3			
DAYS MIN <= 0	0			

PRECIPITATION (INCHES)

RECORD

MAXIMUM	16.32	1980		
MINIMUM	0.93	1910		
TOTALS	<b>5.91</b>		5.34	0.57
DAYS >= .01	11			
DAYS >= .10	10			
DAYS >= .50	5			
DAYS >= 1.00	2			
GREATEST				
24 HR. TOTAL	1.88	03/08 TO 03/09		

SNOWFALL (INCHES)

TOTALS	1.0		1.1	-0.1
SINCE 7/1	1.0			
SNOWDEPTH AVG.	0			
DAYS >= TRACE	1			
GREATEST				
SNOW DEPTH	1	03/12		

DEGREE DAYS

HEATING TOTAL	292		377	-85
SINCE 7/1	2491		2848	-357
COOLING TOTAL	8		10	-2
SINCE 1/1	13		11	2

.....

WEATHER CONDITIONS. NUMBER OF DAYS WITH

THUNDERSTORM	4	RAIN	10
SNOW	0	FOG	13
FOG W/VIS <= 1/4 MILE	0		

- INDICATES NEGATIVE NUMBERS.  
R INDICATES RECORD WAS SET OR TIED.  
MM INDICATES DATA IS MISSING.  
T INDICATES TRACE AMOUNT.

\$\$

# WFO Monthly/Daily Climate Data

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[40](#) [41](#) [42](#) [43](#) [44](#) [45](#) [46](#) [47](#) [48](#) [49](#) [50](#)

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CXUS54 KMRX 011030

CF6TYS

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

7-Day Rainfall  
1.24"

STATION: KNOXVILLE MCGHEE TYSON AIRPORT  
MONTH: MAY  
YEAR: 2022  
LATITUDE: 35 49 N  
LONGITUDE: 83 59 W

TEMPERATURE IN F:										:PCPN:		SNOW:		WIND		:SUNSHINE:		SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18			
										12Z	AVG	MX	2MIN								
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR			
1	78	65	72	8	0	7	0.45	0.0	0	12.1	23	220	M	M	6	13	30	220			
2	81	59	70	6	0	5	0.00	0.0	0	3.9	13	210	M	M	7	1	17	210			
3	83	57	70	5	0	5	0.00	0.0	0	11.7	30	230	M	M	6		41	220			
4	81	62	72	7	0	7	0.01	0.0	0	9.5	17	240	M	M	8	13	28	240			
5	82	55	69	4	0	4	0.26	0.0	0	3.9	15	320	M	M	8	13	19	320			
6	76	57	67	2	0	2	0.72	0.0	0	10.3	47	240	M	M	9	135	64	250			
7	63	55	59	-7	6	0	0.15	0.0	0	8.9	17	260	M	M	10	1	23	250			
8	69	54	62	-4	3	0	0.00	0.0	0	6.6	14	30	M	M	9		17	30			
9	78	52	65	-1	0	0	0.00	0.0	0	3.0	9	40	M	M	4		16	20			
10	82	55	69	3	0	4	0.00	0.0	0	2.9	9	350	M	M	3	1	13	360			
11	84	57	71	4	0	6	0.00	0.0	0	2.6	10	240	M	M	4		14	250			
12	83	58	71	4	0	6	0.00	0.0	0	5.1	16	40	M	M	3	1	21	20			
13	82	63	73	6	0	8	0.04	0.0	0	4.9	18	140	M	M	6	3	25	130			
14	82	60	71	4	0	6	0.00	0.0	0	3.6	10	290	M	M	7	12	15	310			
15	82	63	73	5	0	8	0.00	0.0	0	4.7	14	270	M	M	4		19	280			
16	81	58	70	2	0	5	0.00	0.0	0	6.9	15	230	M	M	5		20	230			
17	82	54	68	0	0	3	0.00	0.0	0	2.1	10	320	M	M	3		14	20			
18	86	54	70	2	0	5	0.00	0.0	0	8.0	22	220	M	M	7		29	240			
19	89	70	80	11	0	15	0.00	0.0	0	11.8	22	210	M	M	8		29	200			
20	90	72	81	12	0	16	0.00	0.0	0	14.3	29	230	M	M	5		38	230			
21	90	70	80	11	0	15	T	0.0	0	7.9	20	240	M	M	4		29	240			
22	86	67	77	8	0	12	0.58	0.0	0	9.2	24	230	M	M	5	13	29	220			
23	70	61	66	-4	0	1	1.32	0.0	0	6.8	17	20	M	M	10	1	24	40			
24	77	62	70	0	0	5	T	0.0	0	4.5	10	30	M	M	10	1	14	40			
25	86	65	76	6	0	11	T	0.0	0	7.0	21	180	M	M	9		28	190			
26	79	66	73	3	0	8	1.18	0.0	0	5.8	21	170	M	M	10	1	28	160			
27	77	62	70	-1	0	5	0.06	0.0	0	9.1	23	260	M	M	7	1	30	240			
28	77	57	67	-4	0	2	0.00	0.0	0	4.3	9	10	M	M	6		13	360			
29	85	58	72	1	0	7	0.00	0.0	0	2.9	9	290	M	M	3		13	310			
30	88	63	76	4	0	11	T	0.0	0	4.2	16	80	M	M	3		23	70			
31	89	66	78	6	0	13	0.00	0.0	0	3.5	12	270	M	M	2		14	260			
SM	2518	1877			9	202	4.77	0.0		202.0			M		191						
AV	81.2	60.5								6.5	FASTST		M	M	6		MAX(MPH)				
										47	240						64	250			

NOTES:

# LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: KNOXVILLE MCGHEE TYSON AIRPORT  
 MONTH: MAY  
 YEAR: 2022  
 LATITUDE: 35 49 N  
 LONGITUDE: 83 59 W

[TEMPERATURE DATA]

[PRECIPITATION DATA]

SYMBOLS USED IN COLUMN 16

AVERAGE MONTHLY: 70.9	TOTAL FOR MONTH: 4.77	1 = FOG OR MIST
DPTR FM NORMAL: 3.0	DPTR FM NORMAL: 0.64	2 = FOG REDUCING VISIBILITY
HIGHEST: 90 ON 21,20	GRTST 24HR 1.90 ON 22-23	TO 1/4 MILE OR LESS
LOWEST: 52 ON 9		3 = THUNDER
	SNOW, ICE PELLETS, HAIL	4 = ICE PELLETS
	TOTAL MONTH: 0.0 INCH	5 = HAIL
	GRTST 24HR 0.0	6 = FREEZING RAIN OR DRIZZLE
	GRTST DEPTH: 0	7 = DUSTSTORM OR SANDSTORM:
		VSBY 1/2 MILE OR LESS

[NO. OF DAYS WITH]

[WEATHER - DAYS WITH]

8 = SMOKE OR HAZE  
 9 = BLOWING SNOW  
 X = TORNADO

MAX 32 OR BELOW: 0	0.01 INCH OR MORE: 10
MAX 90 OR ABOVE: 2	0.10 INCH OR MORE: 7
MIN 32 OR BELOW: 0	0.50 INCH OR MORE: 4
MIN 0 OR BELOW: 0	1.00 INCH OR MORE: 2

[HDD (BASE 65) ]

TOTAL THIS MO. 9	CLEAR (SCALE 0-3) 3
DPTR FM NORMAL -44	PTCLDY (SCALE 4-7) 20
TOTAL FM JUL 1 3153	CLOUDY (SCALE 8-10) 8
DPTR FM NORMAL -372	

[CDD (BASE 65) ]

TOTAL THIS MO. 202	
DPTR FM NORMAL 59	[PRESSURE DATA]
TOTAL FM JAN 1 241	HIGHEST SLP 30.28 ON 10
DPTR FM NORMAL 57	LOWEST SLP 29.49 ON 6

[REMARKS]

#FINAL-05-22#

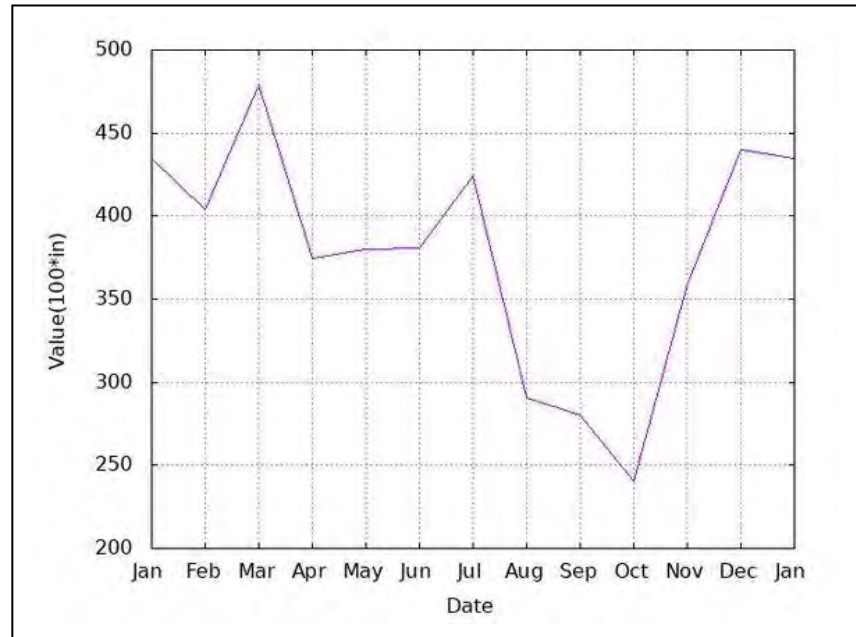


## Knoxville Normal Weather Data

1991-2020

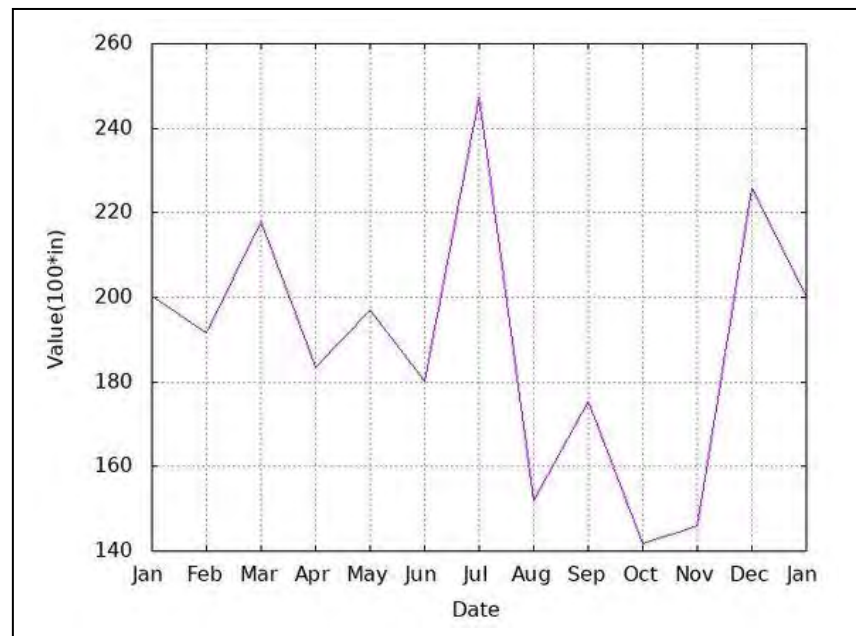
Mean (in.)

- 1) 4.346
- 2) 4.037
- 3) 4.790
- 4) 3.750
- 5) 3.802
- 6) 3.807
- 7) 4.239
- 8) 2.906
- 9) 2.803
- 10) 2.404
- 11) 3.586
- 12) 4.401



Standard Deviation (in.)

- 1) 2.002
- 2) 1.915
- 3) 2.180
- 4) 1.835
- 5) 1.969
- 6) 1.800
- 7) 2.474
- 8) 1.519
- 9) 1.754
- 10) 1.419
- 11) 1.459
- 12) 2.256



## **Appendix E**

### **Certifications**



11/1/10

Jason Mann  
TDEC  
3711 Middlebrook Pike  
Knoxville, TN 37921

RE: Tennessee Qualified Hydrologic Professional Certification

Dear Mr. Mann

Congratulations, you have successfully completed the Tennessee Hydrologic Determination course. By completing the TN-HDT course, you have also earned 20 Professional Development Hours (PDH). You have now met all the requirements to become a certificated Tennessee Qualified Hydrologic Professional (TN-QHP). Your TN-QHP certification card is attached below.

The TN-QHP certification is valid for three years. You must complete a refresher course within that three year period and submit evidence of course completion along with a renewal application at least 90 days before expiration of your certificate. Should you allow your certification to lapse after 3 years, you will be required to retake the TN-HDT course and submit a new application in order to become a certified TN-QHP.

Please refer to the TDEC website, <http://tn.gov/environment/wpc> or the TN-HDT training website, [www.tnhdt.org](http://www.tnhdt.org) for refresher course details and application forms.

Sincerely,

Paul E. Davis, Director  
Water Pollution Control

Cc: Timothy Gangaware  
TN-HDT Training Program  
Coordinator



Tennessee Qualified  
Hydrologic Professional



This card certifies that:

**Jason Mann**

has successfully completed the 3-day TN HDT course and is a  
Tennessee Qualified Hydrologic Professional

Certification number **1042-TN10**

Expires: **12/31/2014**

  
Paul E. Davis, P.E.  
Director, TDEC-WPC  
Timothy Gangaware, AICP  
Director, TNWRRC-UT



# Tennessee Department of Environment & Conservation



This is to certify that

**Jason Mann**

has successfully completed the three day course to become a  
**Tennessee Qualified Hydrologic Professional**

TN QHP Number 1042-TN10

*Paul E. Davis*

Paul E. Davis, P.E.

*Timothy Gangaware*

Timothy Gangaware, A.I.C.P



*This certifies that the recipient has earned 20  
Professional Development Hours*





# Tennessee Department of Environment & Conservation

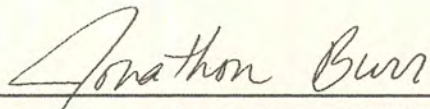


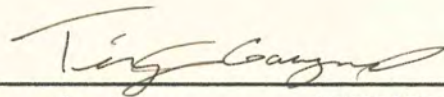
This is to certify that

**Jason Mann**

successfully completed the one-day  
**Tennessee Hydrologic Determination Refresher Course**

September 22, 2020

  
\_\_\_\_\_  
Jonathon Burr, DWR

  
\_\_\_\_\_  
Timothy Gangaware, TNWRRC



*This certifies that the recipient has earned 6  
Professional Development Hours*

