

AQUATIC RESOURCES DELINEATION AND HYDROLOGIC DETERMINATION REPORT

CENTRAL VALLEY ROAD (±36.7-ACRES)
PARCEL NUMBERS 047-06703 & 047-06712
MURFREESBORO, RUTHERFORD COUNTY, TENNESSEE

Georgia Capital, LLC
400 Galleria Pkwy #1130
Atlanta, Georgia 30339

Prepared by:

TTL, Inc.
5010 Linbar Drive, Suite 153
Nashville, Tennessee 37211

Project No. 000220800898.00

April 28, 2022



SIGNATURE OF ENVIRONMENTAL PROFESSIONALS

TTL, Inc. has performed an investigation for hydrologic and aquatic resources at a 36.7-acre undeveloped tract of land in Murfreesboro, Rutherford County, Tennessee. Components of our investigation were performed in general conformance with the *U. S. Army Corps of Engineers Wetland Delineation Manual, 1987 Edition*; the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountain and Piedmont Region* (2012); and the *Tennessee Department of Environment and Conservation (TDEC), Division of Water Pollution Control: Guidance for Making Hydrologic Determinations (Version 1.5, 2020)*.



Zachary Blair
Project Professional



Jonathan P. Hopkins, TN QHP
Senior Environmental Scientist

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1.0 INTRODUCTION

TTL, Inc. (TTL) was contracted by Georgia Capital, LLC to perform an investigation for Hydrologic and Aquatic Resources within the limits of 36.7±acre undeveloped tract of land located in Murfreesboro, Rutherford County, Tennessee. TTL conducted a site visit on April 12, 2022. Activities within jurisdictional Waters of the U.S. (WOTUS) are regulated by the U.S. Army Corps of Engineers (USACE) and the Tennessee Department of Environment and Conservation Division of Water Resources (TDEC DWR). Authority to permit discharges (fill) within jurisdictional wetlands or non-navigable WOTUS is granted under Section 404 of the Clean Water Act (CWA) of 1972. Authority to permit work and placement of structures in navigable WOTUS is granted under Sections 9 and 10 of the Rivers and Harbors Act of 1899. For regulatory purposes under the CWA, wetlands are defined by the USACE as:

Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

The purpose of the Hydrologic Determination Study is to differentiate watercourses as either streams or wet weather conveyances for TDEC DWR jurisdictional purposes. Per Tennessee Code Annotated, Section 69-3-103:

"Wet weather conveyance" means, notwithstanding any other law or rule to the contrary, man-made or natural watercourses, including natural watercourses that have been modified by channelization: (1) That flow only in direct response to precipitation runoff in their immediate locality; (2) Whose channels are at all times above the groundwater table; (3) That are not suitable for drinking water supplies; and (4) In which hydrological and biological analyses indicate that, under normal weather conditions, due to naturally occurring ephemeral or low flow there is not sufficient water to support fish, or multiple populations of obligate lotic aquatic organisms whose life cycle includes an aquatic phase of at least two months; "Stream" means a surface water that is not a wet weather conveyance.

2.0 SITE DESCRIPTION

The subject property (hereafter referred to as the “review area” or “site”) is a +36.7-acre irregular-shaped tract of land located in the Murfreesboro, Rutherford County, Tennessee. The subject property is presently an agricultural crop field owned by the Constitutional Investments, LLC. The site is located southwest of the intersection of Highway 231 and Central Valley Road in Murfreesboro, Tennessee. The surrounding area is characterized by agricultural and residential development. Single family residences are located to the north and south of the site. Agricultural land is located to the west. The Middle Point Landfill and East Fork Stones River are located to the east beyond Highway 231. According to Rutherford County Property Assessment information, the site is listed as Parcel Numbers 047-06703 & 047-06712 and is categorized as agricultural land.

Based on our site observations, the majority of the subject property slopes toward the north with an elevation change of approximately 30 feet. The ground surface of the subject property is covered with agricultural crops and upland grasses with some rock outcrops along the western property boundary. An unimproved access driveway extends onto the southeast property margin from Highway 231. From Highway 231 the driveway extends in a westerly direction throughout the south half of the site.

A Site Location and Topographic Map derived from a portion of the Walterhill, Tennessee United States Geological Survey (USGS) 7.5-minute topographic quadrangle (dated 1998, revised 1999) that depict the site location and surrounding topographic features depicted on **Figure 1**. A Site Location and Aerial Photograph is included as **Figure 2**.

3.0 LITERATURE AND RECORDS REVIEW

Prior to conducting the field effort, TTL performed a literature and records review to develop an understanding of the potential presence of wetlands and/or watercourses that could fall within the jurisdiction of the USACE and/or be regulated by TDEC. These data sources and the review findings are described below.

3.1 U.S.G.S. Topographic Maps

As part of our investigation, TTL reviewed USGS 7.5-minute series topographic maps to evaluate mapped surface water features within the limits of the review area. Topographic maps depict named

linear watercourses such as rivers and perennial streams as well as unnamed blue-line tributaries. The maps also depict open water features (lakes, ponds) and include symbology for other aquatic features such as wetlands. A copy of the USGS topographic map reviewed is included as **Figure 1**.

Based on our review of the topographic maps, the subject property generally slopes downward to the north. Higher elevations ranging from 570 to 575 feet above mean sea level (amsl) are mapped along the southern property margin. From this side of the property, the site slopes gently downgradient to the north where an elevation of approximately 545 feet amsl is mapped along the northern boundary. A blue-line tributary is shown to the west and the East Fork Stones River is shown to the east.

In addition to USGS topographic maps, surrounding elevation data was obtained from the USGS 3D Elevation Program, which is presented in an Elevation and Hillshade map included as **Figure 3**. Based on our review of Figures 1 & 3, surface drainage in the vicinity of the review area drains to the northeast and northwest.

3.2 Hydric Soils

The U.S.D.A. Natural Resource Conservation Service (NRCS) maintains a database of soil types (map units) for most of the U.S. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit which represents a large area dominated by one or more major kinds of soil. Map units are further classified with a rating of hydric, predominantly non-hydric, or non-hydric. Map units are useful for planning purposes to provide an overall understanding of the soils that occur in a general area. However, due to the natural variability of the landscape, direct observation of the soils profile is necessary to identify hydric soil indicators.

A classification of “hydric” mean that 100 percent of the soil components are considered hydric. A classification of “predominantly non-hydric” means that more than 0 percent and less than 34 percent of soil components are hydric. "Not hydric" means that all soil components are rated as not hydric. A USDA NRCS map showing map units within the limits of the site along with their associated hydric rating is presented in **Figure 4** and summarized in **Table 1** below.

Table 1: Soil Map Unit Classifications

Map Unit Symbol	Description	Hydric Percentage	Hydric Description
Ar	Arrington silt loam, 0 to 2 percent slopes, occasionally flooded	0	Nonhydric
BrB	Bradyville silt loam, 2 to 5 percent slopes	0	Nonhydric
BrC2	Bradyville silt loam, 5 to 12 percent slopes	0	Nonhydric
CuB	Cumberland silt loam, 2 to 5 percent slopes	0	Nonhydric
HcA	Harpeth silt loam, 0 to 2 percent slopes	0	Nonhydric
HcB	Harpeth silt loam, 2 to 5 percent slopes	0	Nonhydric
LoB	Lomond silt loam, 2 to 5 percent slopes	0	Nonhydric
TaB2	Talbott silt loam, 2 to 5 percent slopes	0	Nonhydric
TrC	Talbott-Barfield-Rock outcrop complex, 2 to 12 percent slopes	0	Nonhydric

Based on our review of soil types presented in Table 1 and shown in Figure 4, no hydric soils are mapped within the limits of the review area.

3.3 National Wetland Inventory

The U.S. Fish and Wildlife Service (USFWS) maintains the National Wetland Inventory (NWI) database which contains information on the characteristics, extent, and status of the wetlands and deepwater habitats within the U.S. This information is useful for planning purposes to provide an overall understanding of wetland habitats that may be present in or around the site. The NWI classifies habitat types as marine, estuarine, riverine, lacustrine, or palustrine with additional modifiers as appropriate to identify the water regime, water chemistry, soil, or other characteristics based on *Classification of Wetlands and Deepwater Habitats of the U.S.* (Cowardin, 1979).

TTL reviewed the NWI data for the site using the USFWS NWI Wetlands Mapper web-based tool to determine the potential for wetlands to exist on the site. A copy of the NWI map is included as **Figure 5**. Based on our review of the USFWS-NWI Mapper, no aquatic features are shown within the limits of the review area.

3.4 Hydrologic Unit Code (HUC)

Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of 2 to 12 digits based on the six levels of classification in the hydrologic system (USGS & USDA 2013). The U.S. is divided and sub-divided into successively smaller hydrologic units which are classified into six levels: region, sub-region, basin, sub-basin, watershed, and sub-watershed. The site is located within the Wades Branch-East Fork Stones River 12-digit HUC subwatershed (051302030107). This

subwatershed is located within the Stones River 8-digit HUC sub basin (05130203). A copy of the HUC Map is included as **Figure 6**.

3.5 Normal Weather Conditions

As part of this project TTL evaluated the normal weather conditions of the review area to understand whether aquatic features in the landscape may exhibit certain characteristics related to current and past hydrologic regimes. TTL utilized the USACE Antecedent Precipitation Tool (APT) Version 1.0 to evaluate climatological parameters and determine whether precipitation and other climatic variables are within the north periodic range (i.e., seasonally and annually) for the review area. Included with the APT data output are the Palmer Drought Severity Index (PDSI) and the WebWIMP Climatic Water Balance. Based on our review of information obtained from the APT data tool, prior to our site visit on April 12, 2022, the area had experienced “normal” conditions. Additionally, climatological data for the Murfreesboro 5.5 NNW weather station was evaluated to understand the previous 7 days rainfall. The data indicates that 0.85-inches of rain occurred within 7 days prior to our site visit. The APT output and climatological data are included in **Appendix A**.

4.0 WETLAND DELINEATION AND HYDROLOGIC DETERMINATION

4.1 Wetland Identification Methodology

TTL utilized the *U.S. Army Corps of Engineers Wetland Delineation Manual* (USACE, 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountain and Piedmont Region* (USACE, 2012) technical guidelines for determining the presence of wetlands. This determination requires a positive wetland indicator be present for each of the three parameters (hydrology, soil, and vegetation), with the exception of areas altered by recent human activities or natural events. TTL investigated the review area for the presence of hydrophytic vegetation and used a hand-held spade (“sharp shooter”) to evaluate for the presence of hydric soils. TTL examined the soil for hydric soil indicators as identified in the *Field Indicators of Hydric Soils in the United States*, V. 8.2 (NRCS, 2018). Additionally, TTL observed the project area for indications of inundated or saturated soils, water marks, drift lines, crayfish burrows, sediment deposits, and other wetland hydrology indicators. TTL used *USACE Wetland Determination Data Forms – Eastern Mountain and Piedmont Region* (2012) to record field conditions of soils, vegetation, and hydrology in areas investigated for wetlands.

On April 12, 2022, TTL personnel performed a walking reconnaissance of the site to look for indications of wetlands or other aquatic resources within the limits of the review area.

4.2 Wetland Findings

TTL did not observe indications of hydrology or hydrophytic vegetation during the site reconnaissance. The average depth of soil on the site is about 3-5 ft. to refusal based on USDA soil survey data. According to Munsell Soil Color Charts, soil chroma within the review area was observed as either 10YR 5/4 or 10YR 6/4 (non-hydric). During fieldwork, TTL completed USACE Wetland Determination Data Forms (v.1.2.3) to document hydrology, soils, and vegetation within the northeast portion of the review area. A data point was collected on one of the lowest portions of the review area at the northeast quadrant. The data point (DP-1) was collected at lat/long 35.937642, -86.37939 and the location is shown on **Figure 7**. Copies of the USACE data forms are included in **Appendix B**. Based on our site observations and data recorded in the field, none of the three wetland criteria (hydrology, soil, and vegetation) were observed throughout the site. No wetlands or other surface water features were observed during our site visit. Areas of pooled water were sporadically observed at the site primarily due to rainfall that occurred prior to our site visit. Photographs taken during the site visit are included in **Appendix C**.

4.3 Stream/Watercourse Identification and Methodology

TTL used the *Tennessee Department of Environment and Conservation, Division of Water Pollution Control – Guidance for Making Hydrologic Determinations v. 1.5, April 2020*, technical guideline to determine the appropriate classification of watercourses within the review area as wet weather conveyances (WWC) or streams. This technical guideline for stream identification is the preferred methodology for distinguishing between WWCs and streams in the State of Tennessee. The guidance requires evaluation of 9 primary attributes and 28 secondary attributes of the watercourse and assigning a numeric score to each secondary attribute on the *Hydrologic Determination Field Data Sheet*. A four-tiered, weighted scale is utilized for evaluating and scoring the features categorized in sets of geomorphic, hydrologic, and biological attributes. Additionally, TTL utilized the *Regulatory Guidance Letter No. 05-05: Ordinary High-Water Mark Identification* (USACE, 2005) as the basis for the delineation, mapping, and linear footage/areal estimations of on-site streams/watercourses.

TDEC Hydrologic Determination Field Data Sheets (v. 1.5) were used to classify watercourses as either a stream or a wet weather conveyance (WWC) for TDEC jurisdiction purposes. Furthermore, the TDEC Hydrologic Determination Field Data Sheets were used to classify watercourses as

perennial, intermittent, or ephemeral for USACE jurisdiction purposes. TTL traversed watercourses on foot and placed flagging labeled with data point identifications near ordinary high-water marks (OHWMs). Locations of identified watercourses were mapped using LiDAR imagery (Figure 3) and GPS data collected in the field.

4.4 Stream/Watercourse Findings

TTL observed a drainage ditch (S-1) that runs parallel to the access road on the southern half of the property for approximately 645 linear feet. Flowing water was observed throughout the S-1 channel which was primarily attributed to rainfall that occurred the day of our site visit. S-1 appears to be a manmade ditch which has been incised through erosion. The entire channel has a reddish-brown silty clay bottom with very little diversity or sinuosity. The S-1 channel directs surface water runoff from the surrounding crop fields towards the western property boundary. As S-1 approaches the western property boundary, the channel definition dissipates. No macroinvertebrates or other biological indicators were observed in the channel. Based on our site observations, S-1 appears to be a wwc/ephemeral channel.

5.0 CONCLUSIONS/OPINIONS

TTL makes the following conclusions and opinions with regard to the ±36.7-acre review area:

- Based on evaluation of the drainage ditch that runs parallel to the access road on the south half of the review area, ***the subject watercourse is considered a “wet weather conveyance”***. A total score of “12.5” was revealed following evaluation of the secondary indicators for the watercourse. A copy of the completed TDEC Hydrologic Determination Field Data Sheet is included as **Appendix D**.
- No wetlands, ponds, or other aquatic resources were observed within the limits of the review area during our site visit.

In our opinion, no other investigations of aquatic resources are warranted for the review area.

Upon approval, TTL will submit our report to the TDEC DWR for concurrence.

6.0 REFERENCES

- Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. *Classification of wetlands and deepwater habitats of the United States*. U. S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <http://www.npwrc.usgs.gov/resource/1998/classwet/classwet.htm> (Version 04DEC98).
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- National Oceanic and Atmospheric Administration (NOAA). Accessed at <http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/palmer.html>. Accessed April 2022.
- Tennessee Department of Environment and Conservation Division of Water Pollution Control, April 2020, *Guidance for Making Hydrologic Determinations*, Version 1.5. Chapter 1200-4-3 General Water Quality Criteria.
- U.S. Army Corps of Engineers. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Eastern Mountain and Piedmont Region (Version 2.0)*.
- U.S. Army Corps of Engineers. *Eastern Mountains and Piedmont 2017 Regional Wetland Plant List*. Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List: 2016 wetland ratings*. Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X <http://wetland-plants.usace.army.mil/>.
- U.S. Department of Agriculture, Natural Resources Conservation Service. 2018. *Field Indicators of Hydric Soils in the United States*, Version 8.2. L.M. Vasilas, G.W. Hurt, and J.F. Berkowitz (eds.). USDA, NRCS in cooperation with the National Technical Committee for Hydric Soils.
- U.S. Department of Agriculture, Natural Resources Conservation Service. Web Soil Survey. Accessed at: <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>. Accessed on April 2022.
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- U.S. Fish and Wildlife. National Wetland Inventory Mapper. Accessed at www.fws.gov/wetlands/Data/Mapper.html. Accessed on April 2022.

FIGURES

Figure 1	Site Location and Topographic Map
Figure 2	Site Location and Aerial Photograph Map
Figure 3	Elevation and Hillshade Map
Figure 4	Natural Resources Conservation Services (NRCS) Map with Hydric Rating
Figure 5	National Wetland Inventory (NWI) Map
Figure 6	Hydrologic Unit Code (HUC) Map
Figure 7	Aquatic Resource Delineation Map

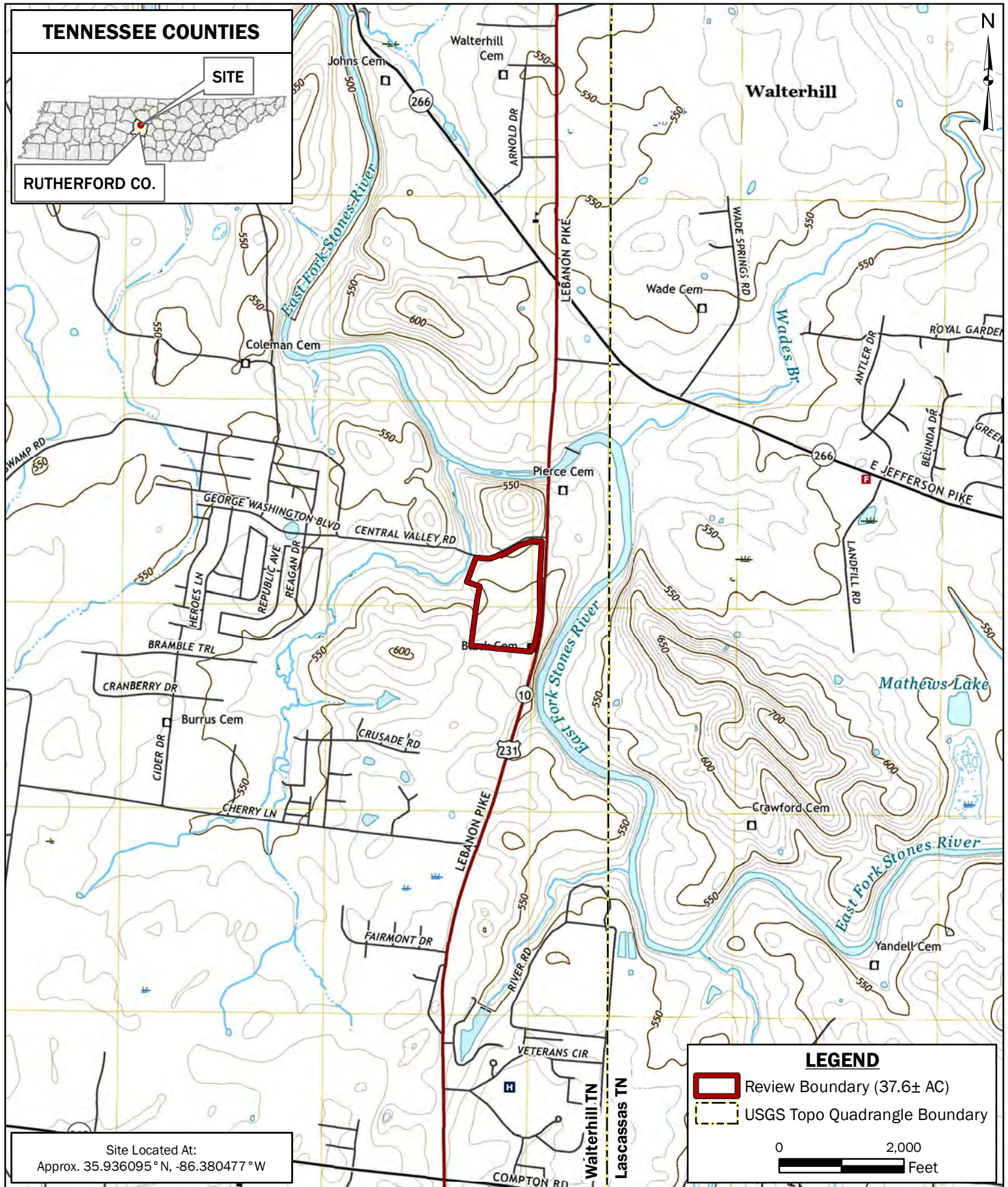


FIGURE 1: SITE LOCATION & TOPOGRAPHIC MAP
 GEORGIA CAPITAL, LLC - CENTRAL VALLEY ROAD PROPERTY
 AQUATIC RESOURCES DELINEATION
 MURFREESBORO, RUTHERFORD COUNTY, TENNESSEE
BASEMAP: Walterhill, Tennessee, USGS 7.5 Minute Quadrangle Map, 2019 (100-ft Contour Interval).

DRAWN BY: DEK
CHECKED BY: ZBB
DRAWING DATE: 4/18/2022
REVISION DATE: N/A
TTL JOB NO.: 22-08-00898.00
APPROX. SCALE: 1 in = 2,000 ft

Site Located At:
 Approx. 35.936095° N, -86.380477° W



FIGURE 2: SITE LOCATION & AERIAL PHOTOGRAPH

GEORGIA CAPITAL, LLC - CENTRAL VALLEY ROAD PROPERTY

AQUATIC RESOURCES DELINEATION

MURFREESBORO, RUTHERFORD COUNTY, TENNESSEE

BASEMAP: Rutherford County Orthoimagery, 2/25/2021 (0.0762 m Resolution).

DRAWN BY: DEK

CHECKED BY: ZBB

DRAWING DATE: 4/18/2022

REVISION DATE: N/A

TTL JOB NO.: 22-08-00898.00

APPROX. SCALE: 1 in = 300 ft

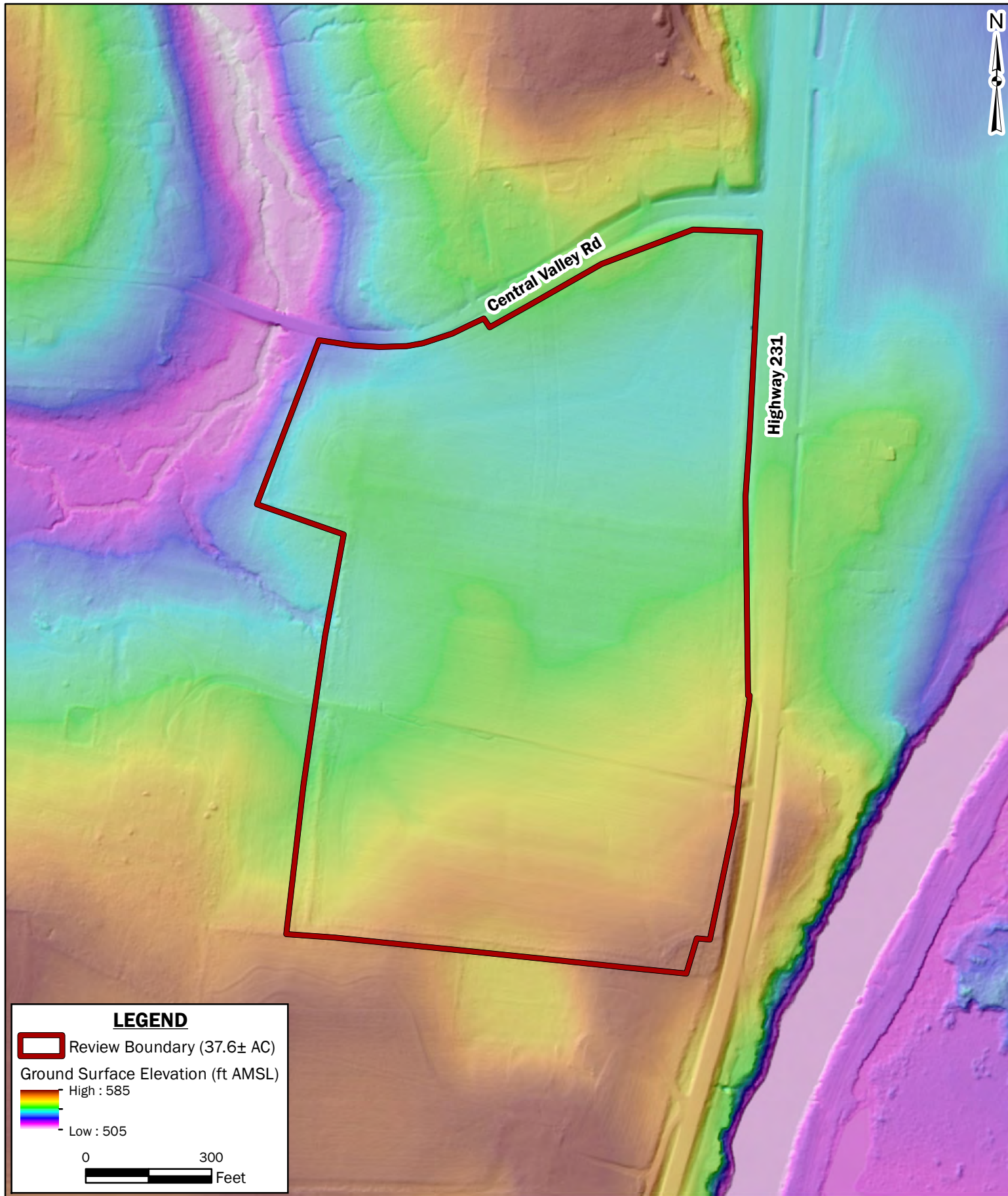
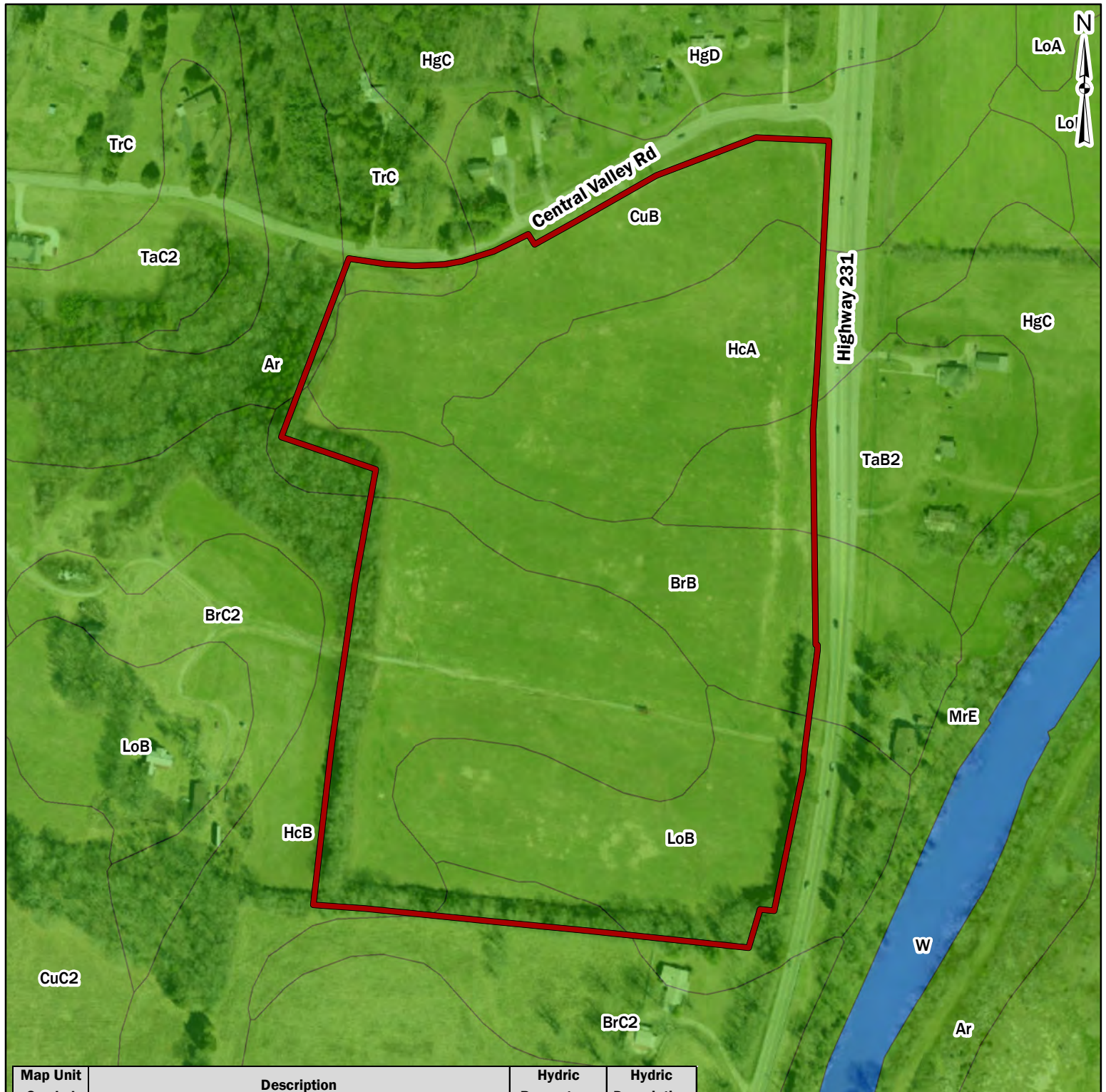


FIGURE 3: LIDAR ELEVATION & HILLSHADE MAP
GEORGIA CAPITAL, LLC - CENTRAL VALLEY ROAD PROPERTY
AQUATIC RESOURCES DELINEATION
MURFREESBORO, RUTHERFORD COUNTY, TENNESSEE

BASEMAP: USGS 3-D Elevation Program (3DEP) LiDAR Elevations & Hillshade Derivative, 2018 (1 m Resolution).

DRAWN BY: DEK
CHECKED BY: ZBB
DRAWING DATE: 4/18/2022
REVISION DATE: N/A
TTL JOB NO.: 22-08-00898.00
APPROX. SCALE: 1 in = 300 ft



Map Unit Symbol	Description	Hydric Percentage	Hydric Description
Ar	Arrington silt loam, 0 to 2 percent slopes, occasionally flooded	0	Nonhydric
BrB	Bradyville silt loam, 2 to 5 percent slopes	0	Nonhydric
BrC2	Bradyville silt loam, 5 to 12 percent slopes	0	Nonhydric
CuB	Cumberland silt loam, 2 to 5 percent slopes	0	Nonhydric
HcA	Harpeth silt loam, 0 to 2 percent slopes	0	Nonhydric
HcB	Harpeth silt loam, 2 to 5 percent slopes	0	Nonhydric
LoB	Lomond silt loam 2 to 5 percent slopes	0	Nonhydric
TaB2	Talbott silt loam, 2 to 5 percent slopes, eroded	0	Nonhydric
TrC	Talbott-Barfield-Rock outcrop complex, 2 to 12 percent slopes	0	Nonhydric

LEGEND

Review Boundary (37.6± AC)

NRCS Hydric Rating

Nonhydric

Water

0 300 Feet



FIGURE 4: NRCS HYDRIC SOIL RATING MAP
GEORGIA CAPITAL, LLC - CENTRAL VALLEY ROAD PROPERTY
 AQUATIC RESOURCES DELINEATION
 MURFREESBORO, RUTHERFORD COUNTY, TENNESSEE
BASEMAP: Rutherford County Orthoimagery, 2/25/2021 (0.0762 m Resolution).

DRAWN BY: DEK
CHECKED BY: ZBB
DRAWING DATE: 4/18/2022
REVISION DATE: N/A
TTL JOB NO.: 22-08-00898.00
APPROX. SCALE: 1 in = 300 ft



FIGURE 5: NATIONAL WETLAND INVENTORY (NWI) MAP

GEORGIA CAPITAL, LLC - CENTRAL VALLEY ROAD PROPERTY

AQUATIC RESOURCES DELINEATION

MURFREESBORO, RUTHERFORD COUNTY, TENNESSEE

BASEMAP: Rutherford County Orthoimagery, 2/25/2021 (0.0762 m Resolution).

DRAWN BY: DEK

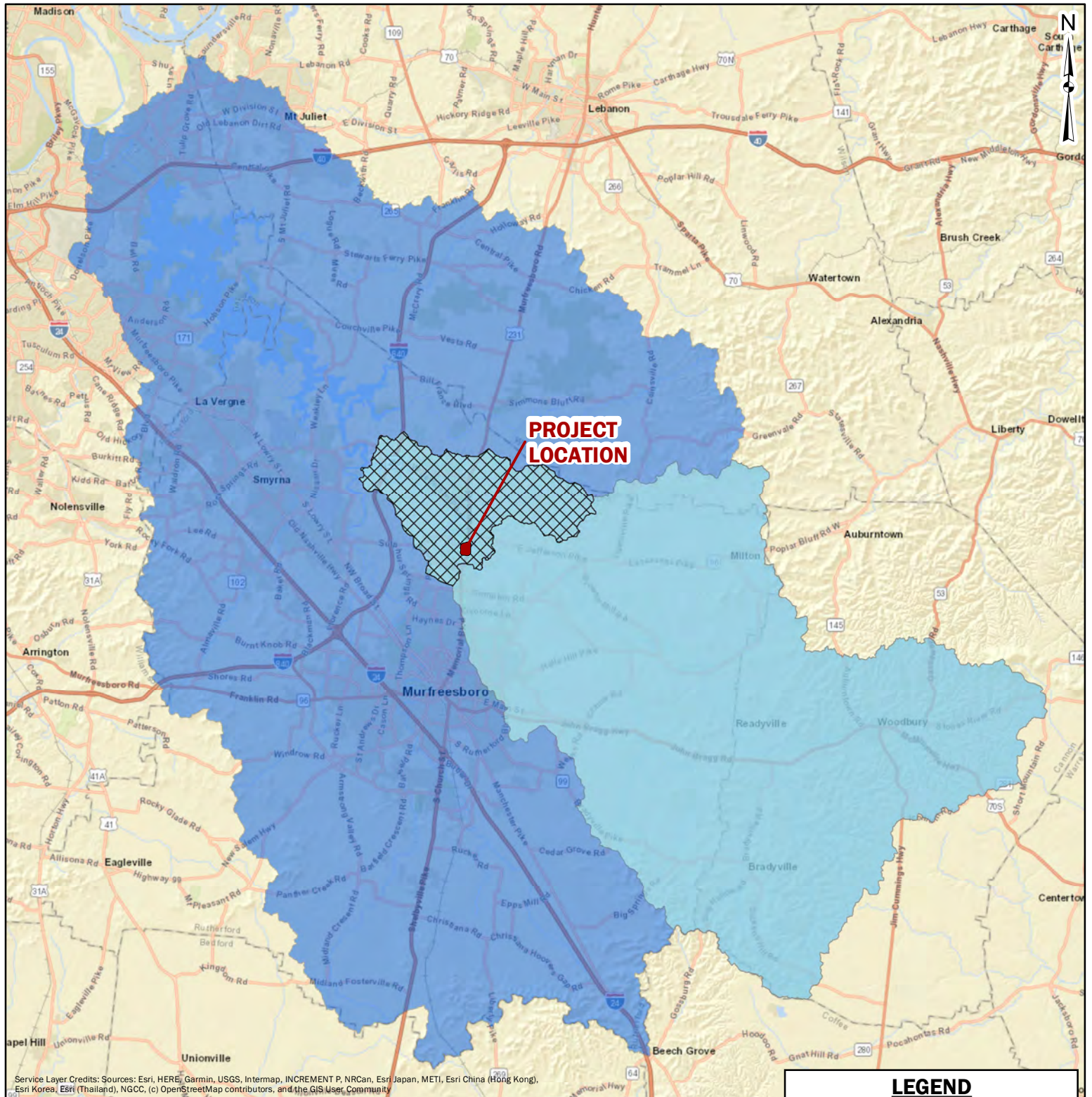
CHECKED BY: ZBB

DRAWING DATE: 4/18/2022

REVISION DATE: N/A

TTL JOB NO.: 22-08-00898.00

APPROX. SCALE: 1 in = 300 ft



Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

	LEVEL	HUC	NAME
REGION	1	05	Ohio Region
SUBREGION	2	0513	Cumberland
BASIN	3	051302	Lower Cumberland
SUBBASIN	4	05130203	Stones
WATERSHED	5	0513020301	East Fork Stones River
SUBWATERSHED	6	051302030107	Wades Branch-East Fork Stones River

LEGEND

- Review Boundary (37.6± AC)
 - HUC12 (Level 6)
 - HUC10 (Level 5)
 - HUC8 (Level 4)
- 0 30,000
Feet



FIGURE 6: HYDROLOGIC UNIT CODE (HUC) MAP
GEORGIA CAPITAL, LLC - CENTRAL VALLEY ROAD PROPERTY
 AQUATIC RESOURCES DELINEATION
 MURFREESBORO, RUTHERFORD COUNTY, TENNESSEE
 BASEMAP: ESRI World Street Map (See Service Layer Credits).

DRAWN BY: DEK
CHECKED BY: ZBB
DRAWING DATE: 4/18/2022
REVISION DATE: N/A
TTL JOB NO.: 22-08-00898.00
APPROX. SCALE: 1 in = 30,000 ft



FIGURE 7: AQUATIC RESOURCE DELINEATION MAP

GEORGIA CAPITAL, LLC - CENTRAL VALLEY ROAD PROPERTY

AQUATIC RESOURCES DELINEATION

MURFREESBORO, RUTHERFORD COUNTY, TENNESSEE

BASEMAP: Rutherford County Orthoimagery, 2/25/2021 (0.0762 m Resolution).

DRAWN BY: DEK

CHECKED BY: ZBB

DRAWING DATE: 4/21/2022

REVISION DATE: N/A

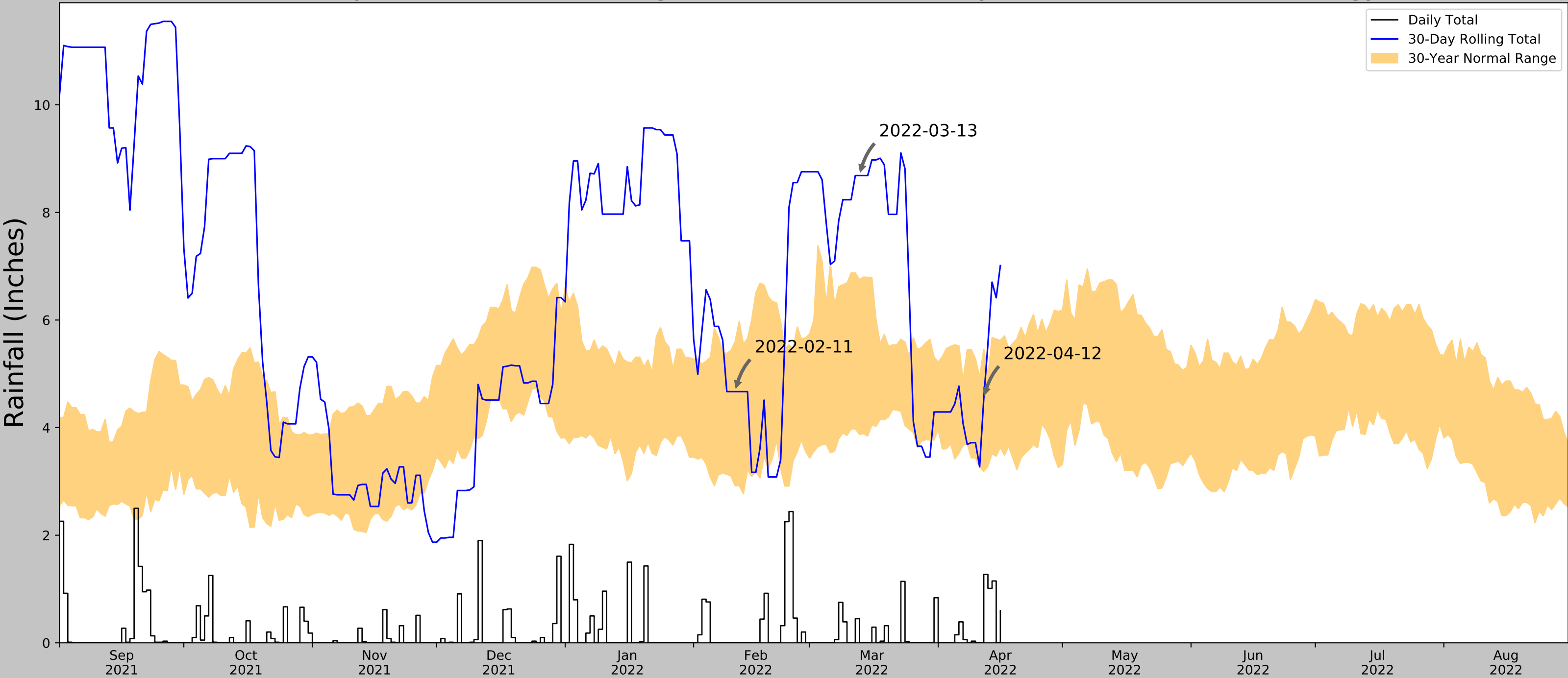
TTL JOB NO.: 22-08-00898.00

APPROX. SCALE: 1 in = 300 ft

APPENDIX A

Antecedent Precipitation Tool Output & Climatological Data

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	35.936095, -86.380477
Observation Date	2022-04-12
Elevation (ft)	552.83
Drought Index (PDSI)	Severe wetness (2022-03)
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2022-04-12	3.186614	5.45748	4.543307	Normal	2	3	6
2022-03-13	3.876378	6.750394	8.68504	Wet	3	2	6
2022-02-11	2.920079	5.598425	4.669291	Normal	2	1	2
Result							Normal Conditions - 14



Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days (Normal)	Days (Antecedent)
MURFREESBORO 5 N	35.9203, -86.3728	535.105	1.173	17.725	0.549	11332	78
MURFREESBORO 4.6 NNE	35.9106, -86.3524	550.853	2.36	1.977	1.067	2	0
MURFREESBORO 5.5 NNW	35.9247, -86.4367	550.853	3.243	1.977	1.466	14	12
GLADEVILLE	36.065, -86.4175	600.066	9.144	47.236	4.547	1	0
SMYRNA 6S	35.9106, -86.5578	549.869	10.077	2.961	4.564	1	0
NASHVILLE BERRY FLD	36.1136, -86.6781	560.039	20.664	7.209	9.448	1	0
STATESVILLE	36.0314, -86.1253	723.097	15.713	170.267	9.746	2	0

Climatological Data for MURFREESBORO 5.5 NNW, TN (CoCoRaHS) - April 2022

Date	Max Temperature	Min Temperature	Avg Temperature	GDD Base 40	GDD Base 50	Precipitation	Snowfall	Snow Depth
2022-04-01	M	M	M	M	M	0.02	M	M
2022-04-02	M	M	M	M	M	0.00	0.0	M
2022-04-03	M	M	M	M	M	0.00	0.0	M
2022-04-04	M	M	M	M	M	0.00	0.0	M
2022-04-05	M	M	M	M	M	0.00	0.0	M
2022-04-06	M	M				0.39	M	M
2022-04-07	M	M				0.10	M	M
2022-04-08	M	M				T	M	M
2022-04-09	M	M				0.03	M	M
2022-04-10	M	M				0.00	0.0	M
2022-04-11	M	M				0.00	0.0	M
2022-04-12	M	Site visit occurred on 4/12/22				0.33	M	M
2022-04-13	M					1.01	M	M
2022-04-14	M				M	1.06	M	M
2022-04-15	M	M	M	M	M	0.00	0.0	M
2022-04-16	M	M	M	M	M	0.64	M	M
2022-04-17	M	M	M	M	M	0.00	0.0	M
2022-04-18	M	M	M	M	M	0.92	M	M
2022-04-19	M	M	M	M	M	0.00	0.0	M
2022-04-20	M	M	M	M	M	0.00	0.0	M
2022-04-21	M	M	M	M	M	0.07	M	M
2022-04-22	M	M	M	M	M	0.00	0.0	M
2022-04-23	M	M	M	M	M	0.00	0.0	M
2022-04-24	M	M	M	M	M	M	M	M
2022-04-25	M	M	M	M	M	M	M	M
2022-04-26	M	M	M	M	M	M	M	M
2022-04-27	M	M	M	M	M	M	M	M
2022-04-28	M	M	M	M	M	M	M	M
2022-04-29	M	M	M	M	M	M	M	M
2022-04-30	M	M	M	M	M	M	M	M
Average Sum	M	M	M	M	M	4.57	0.0	M

APPENDIX B

U.S. Army Corps of Engineers Wetland Determination Data Forms

U.S. Army Corps of Engineers WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region 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)
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Project/Site: Central Valley City/County: Murfreesboro/Rutherford Sampling Date: 4/12/2022

Applicant/Owner: Georgia Capital, LLC State: TN Sampling Point: UDP

Investigator(s): Z, Blair, (TTL, Inc.) Section, Township, Range: _____

Landform (hillside, terrace, etc.): Crop Field level Local relief (concave, convex, none): level Slope (%): 2-12

Subregion (LRR or MLRA): LRR N, MLRA 123 Lat: 35.937642 Long: -86.37939 Datum: _____

Soil Map Unit Name: Talbott-Barfield-Rock outcrop complex, 2 to 12 percent slopes (non-hydric) NWI classification: none

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

Are Vegetation X, Soil X, or Hydrology X 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> Hydric Soil Present? Yes _____ No <u>X</u> Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Remarks: The site has a history of being an agricultural crop field.	

HYDROLOGY

Wetland Hydrology Indicators: <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) _____ 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)
Field Observations: Surface Water Present? Yes _____ No _____ Depth (inches): _____ Water Table Present? Yes _____ No _____ Depth (inches): _____ Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>0</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: Saturation present due to a rain event that occurred the morning of the site visit.	

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

 Sampling Point: UDP

Tree Stratum (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
		=Total Cover	
50% of total cover: _____		20% of total cover: _____	

Sapling/Shrub Stratum (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
		=Total Cover	
50% of total cover: _____		20% of total cover: _____	

Herb Stratum (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Lamium purpureum</u>	<u>80</u>	<u>Yes</u>	<u>UPL</u>
2. <u>Allium canadense</u>	<u>10</u>	<u>No</u>	<u>FAC\CU</u>
3. <u>Taraxacum officinale</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
		<u>100</u> =Total Cover	
50% of total cover: <u>50</u>		20% of total cover: <u>20</u>	

Woody Vine Stratum (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
		=Total Cover	
50% of total cover: _____		20% of total cover: _____	

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>20</u>	x 4 = <u>80</u>
UPL species <u>80</u>	x 5 = <u>400</u>
Column Totals: <u>100</u> (A)	<u>480</u> (B)
Prevalence Index = B/A = <u>4.80</u>	

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
 - 2 - Dominance Test is >50%
 - 3 - Prevalence Index is ≤3.0¹
 - 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation¹ (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation

Present? Yes _____ No X

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

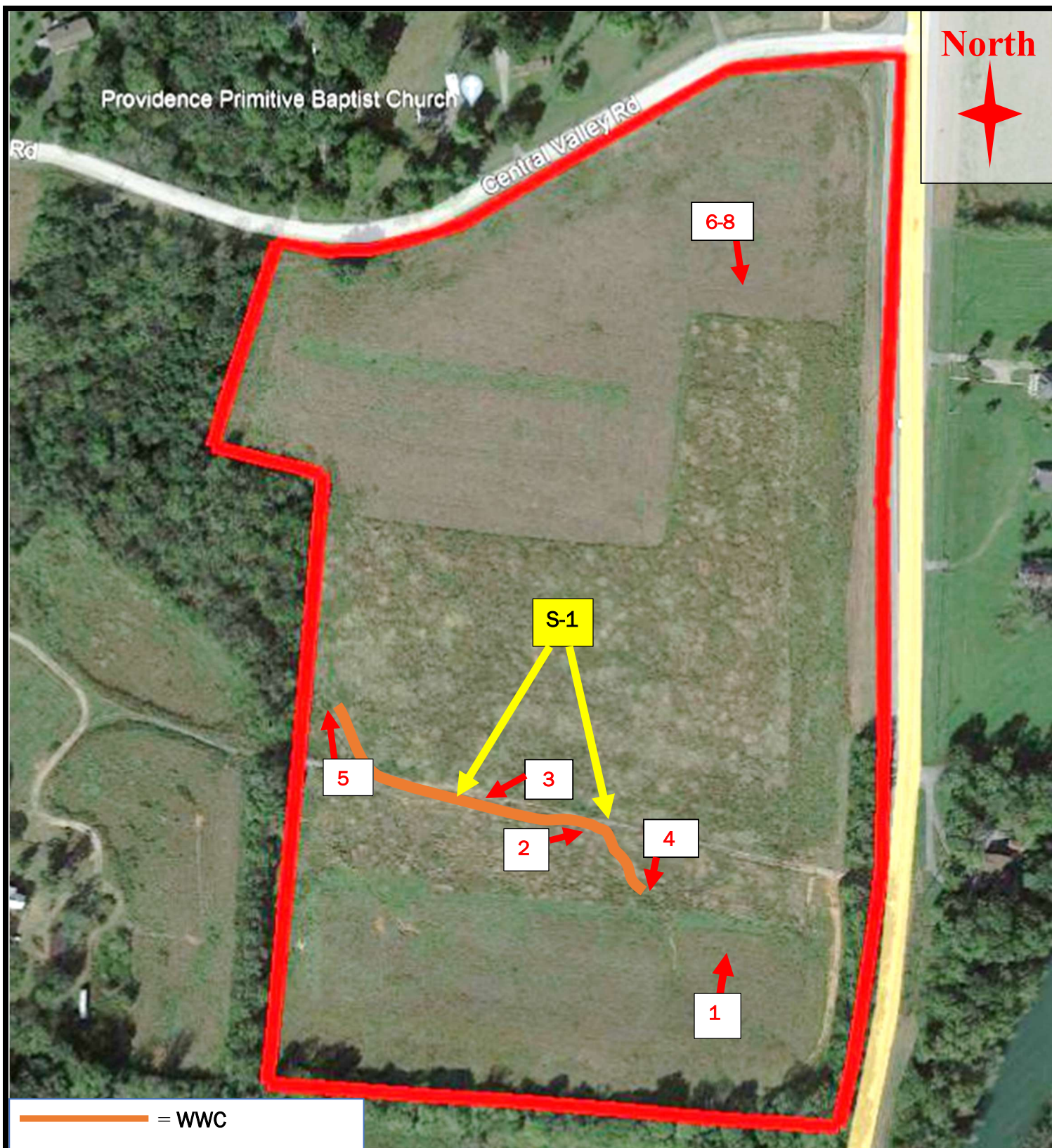
SOIL

Sampling Point: UDP

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 ¹	Loc ²		
0-24	10YR 6/4						Loamy/Clayey	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.							² Location: PL=Pore Lining, M=Matrix.	
Hydric Soil Indicators:							Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)			<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)				<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)			<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)				<input type="checkbox"/> Coast Prairie Redox (A16)	
<input type="checkbox"/> Black Histic (A3)			<input type="checkbox"/> Loamy Mucky Mineral (F1) (MLRA 136)				<input type="checkbox"/> (MLRA 147, 148)	
<input type="checkbox"/> Hydrogen Sulfide (A4)			<input type="checkbox"/> Loamy Gleyed Matrix (F2)				<input type="checkbox"/> Piedmont Floodplain Soils (F19)	
<input type="checkbox"/> Stratified Layers (A5)			<input type="checkbox"/> Depleted Matrix (F3)				<input type="checkbox"/> (MLRA 136, 147)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)			<input type="checkbox"/> Redox Dark Surface (F6)				<input type="checkbox"/> Red Parent Material (F21)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)			<input type="checkbox"/> Depleted Dark Surface (F7)				<input type="checkbox"/> (outside MLRA 127, 147, 148)	
<input type="checkbox"/> Thick Dark Surface (A12)			<input type="checkbox"/> Redox Depressions (F8)				<input type="checkbox"/> Very Shallow Dark Surface (F22)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)			<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N,				<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)			<input type="checkbox"/> MLRA 136)					
<input type="checkbox"/> Sandy Redox (S5)			<input type="checkbox"/> Umbric Surface (F13) (MLRA 122, 136)				³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.	
<input type="checkbox"/> Stripped Matrix (S6)			<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)					
<input type="checkbox"/> Dark Surface (S7)			<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147, 148)					
Restrictive Layer (if observed):								
Type: _____						Hydric Soil Present? Yes ____ No <u>X</u>		
Depth (inches): _____								
Remarks:								

APPENDIX C

Photograph Location Map & Site Photographs



Source: Google Earth--Image date (4/2022). Photos taken April 12, 2022

App. scale 1-inch= 200 feet

TTL

Hydrologic Determination

Parcel #s 047-06703 & 047-06712 (36.7-acres)
Central Valley Road
Murfreesboro, Rutherford County, Tennessee

TTL Project # 000220800898.00

Wet Weather Conveyance

Photograph location map—
Red numbers and **arrows** correspond with
photographs on the following pages.

Site Photographs

TTL Project No. 000220801006.00
Central Valley Road • Murfreesboro, Rutherford County, Tennessee
Photos taken April 12, 2022



Photo 1 – View of the subject property, facing north. 35.934505,-86.379413



Photo 2 – View of S-1 facing upstream (facing east). 35.935269,-86.380461

TTL

Site Photographs

TTL Project No. 000220801006.00
Central Valley Road • Murfreesboro, Rutherford County, Tennessee
Photos taken April 12, 2022



Photo 3 – View of S-1 facing downstream (west). 35.935271,-86.380576



Photo 4 – View of the starting point of S-1 (facing south). 35.934990,-86.380109

TTL

Site Photographs

TTL Project No. 000220801006.00
Central Valley Road • Murfreesboro, Rutherford County, Tennessee
Photos taken April 12, 2022



Photo 5 – View of the ending point of S-1 (facing northwest). 35.935599,-86.381753



Photo 6 – View of the subject property, facing south. 35.937642,-86.37939

TTL

Site Photographs

TTL Project No. 000220801006.00
Central Valley Road • Murfreesboro, Rutherford County, Tennessee
Photos taken April 12, 2022

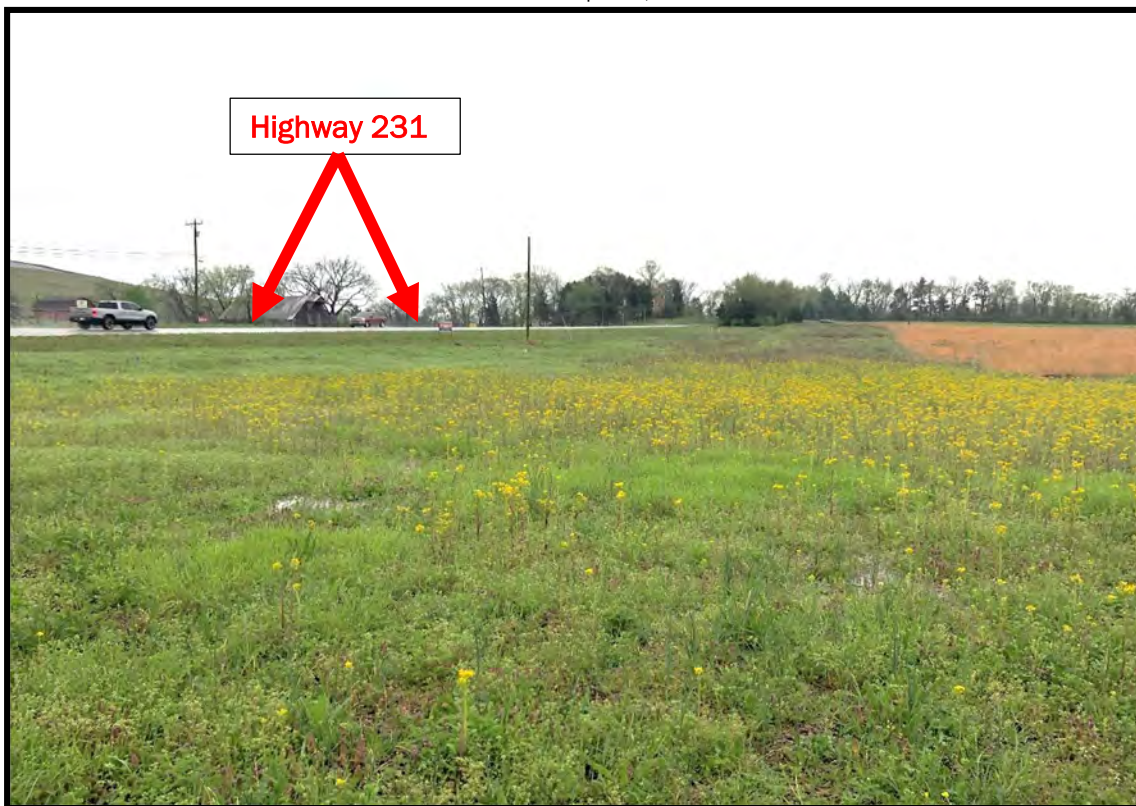


Photo 7 – View of the area in which DP-1 was collected. 35.937642,-86.37939



Photo 8 – View of soil from DP-1. 35.937642,-86.37939

TTL

APPENDIX D

TDEC DWR Hydrologic Determination Field Data Sheet (V. 1.5)

Hydrologic Determination Field Data Sheet S-1
Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: East Fork Stones River		Date/Time: 4/12/2022
Assessors/Affiliation: Zachary Blair (TTL, Inc.)		Project ID :TTL project # 000220800898.00
Site Name/Description: Central Valley Road (36.7±acres)		
Site Location: Southwest of the intersection of Highway 231 and Central Valley Road, Murfreesboro, TN		
HUC (12 digit): 051302030107 (Wades Branch-East Fork Stones River)		Lat/Long: 35.935305, -86.380908
Previous Rainfall (7-days) : 0.85-inches		
Precipitation this Season vs. Normal : abnormally wet elevated <u>average</u> low abnormally dry unknown Source of recent & seasonal precip data : Murfreesboro 5.5 NNW, TN Weather station (April 2022) and APT based on NOAA Climatology network USACE APT Tool shows "normal" conditions prior to 4/12/22 site visit.		
Watershed Size : app 19.2±acres		County: Rutherford
Soil Type(s) / Geology: Upper portion= Harpeth silt loam (HcB), 2 to 5 percent slopes (non-hydric) Source: NRCS Web Soil Survey. Ridley Limestone (Geologic Map-Walter Hill Quadrangle, 1:24,000 scale)		
Surrounding Land Use: Agricultural		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): Severe <u>Moderate</u> Slight Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	No	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	No	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	N/A	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	No	Stream
6. Presence of fish (except <i>Gambusia</i>)	No	Stream
7. Presence of naturally occurring ground water table connection	No	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	No	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 = WWC
Secondary Indicator Score (if applicable) = 12.5

Justification / Notes: S-1 appears to be a manmade ditch that carries surface water runoff from the surrounding cropfields. S-1 is incised through erosion. Very little diversity or sinuosity observed. No macroinvertebrates observed within the channel.

Secondary Field Indicator Evaluation S-1 cont'd

A. Geomorphology (Subtotal = <u>7</u>)				
	Absent	Weak	Moderate	Strong
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. Hydrology (Subtotal = <u>2.5</u>)				
	Absent	Weak	Moderate	Strong
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)	0 (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	

C. Biology (Subtotal = <u>3</u>)				
	Absent	Weak	Moderate	Strong
20. Fibrous roots in <u>channel bed</u> ¹	3	2	(1)	0
21. Rooted plants in <u>the thalweg</u> ¹	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. Macroinvertebrates (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 <u>channel bed</u> ²	(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 = 12.5

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

Notes:

The S-1 channel appears to have been created along an access road on the southern portion of the site.

* No leaf litter is attributed to no tree cover. Site is an agriculture field

TTL