

**Appendix A – Geological Resources-Related Supporting
Information**

This page intentionally left blank



Phase I Environmental Site Assessment Update



Silicon Ranch Corporation:
SR Ripley II, LLC

Ripley, Lauderdale County, Tennessee
April 20, 2023



This page intentionally left blank.



Contents

Acronyms and Abbreviations	iii
Executive Summary	1
Findings.....	1
Opinions	3
Conclusions.....	4
Recommendations.....	4
1 Purpose.....	1
1.1 Report Users.....	2
1.2 Scope of Services, Significant Assumptions, and Limitations	2
2 Site Description	5
2.1 Location and Legal Description	5
2.2 Site and Vicinity Characteristics	5
2.3 Description of Structures, Roads, and Other Site Improvements.....	5
2.4 Area Geology and Hydrogeology	5
3 User-Provided Information	10
4 Environmental Records Review	11
4.1 Additional Regulatory Information	11
5 Historical Use Information	13
5.1 Environmental Liens, Activity Use Limitations (AULs) and Additional Information	13
5.2 Summary of Previous Environmental Investigations.....	13
6 Interviews.....	14
6.1 Site Interviews	14
6.2 Offsite Interviews	14
7 Site Reconnaissance.....	16
7.1 Subject Property Observations	16
7.2 Utilities and PCBs	17
7.3 Vapor Intrusion Potential.....	17
8 Data Gap Analysis	18
9 Findings, Opinions, and Conclusions.....	19
9.1 Findings	19
9.2 Opinions	21
9.3 Conclusions	22
10 Recommendations	23



11	Qualifications of Environmental Professionals	24
11.1	Signatures and Qualifications	24
12	References	25

Figures

Figure 1	Project Vicinity	7
Figure 2	Project Aerial.....	8
Figure 3	USGS Topographic Quadrangles.....	9

Tables

Table 1.	Phase I Component and Dates	4
----------	-----------------------------------	---

Appendices

- Appendix A – Governmental Database Search Results & Environmental Lien Search
- Appendix B – Historical Aerial Photographs
- Appendix C – Historical Topographic Map Report
- Appendix D – City Directory
- Appendix E – User Questionnaire and Landowner Interviews
- Appendix F – Site Photographs

Acronyms and Abbreviations

AAI	All-Appropriate Inquiry
AST	aboveground storage tank
ASTM	ASTM International (formerly American Society for Testing and Materials)
AUL	activity use limitation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EDR	Environmental Data Resources, Inc.
ESA	Environmental Site Assessment
ESAU	Environmental Site Assessment Update
FOIA	Freedom of Information Act
HDR	HDR Engineering, Inc.
HIST UST	historical underground storage tank
LUST	leaking underground storage tank
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PCB	Polychlorinated biphenyls
PVC	Polyvinyl chloride
REC	Recognized Environmental Condition
SRC	Silicon Ranch Corporation
TDEC	Tennessee Department of Environment & Conservation
USEPA	Environmental Protection Agency
USGS	United States Geological Survey
UST	underground storage tank
VOC	volatile organic compounds

*Note: A more complete acronym list is located in the Governmental Database Report, **Appendix A**.*



This page intentionally left blank.

Executive Summary

HDR Engineering, Inc. (HDR) has conducted a Phase I Environmental Site Assessment Update (Phase I ESAU) of the SR Ripley II site (Subject Property), located in Ripley, Lauderdale County, Tennessee. This Phase I ESA has been prepared for Silicon Ranch Corporation (SRC) in support of property acquisition.

The Subject Property consists of two primarily agricultural parcels totaling approximately 434 acres, identified on the Tennessee Property Viewer GIS website as follows:

- PN 095 021.00: approximately 98 acres
- PN 100 003.00: approximately 336 acres

The surrounding area was primarily occupied by agricultural fields, residential properties, a retail petroleum facility, and a natural gas metering station. The location, property boundaries, and property usage in the vicinity of the Subject Property are shown on **Figure 1** and **Figure 2**.

This Phase I ESAU was completed to evaluate the potential presence of Recognized Environmental Conditions (RECs) that may adversely affect the Subject Property and was conducted in accordance with the scope and limitations of the ASTM International (ASTM) Practice E 1527-21. This report includes a review of environmental databases; a summary of the previous historical document review in 2022; updated interviews with those knowledgeable about usage of the Subject Property; and a summary of the site reconnaissance conducted on April 3, 2023. Per the ASTM Practice E 1527-21, a review of historical data sources is not required for a Phase I ESAU. Any exceptions to or deletions from these ASTM practices are described later in this report.

Findings

General findings of this assessment include the following:

- The Subject Property has consisted of undeveloped agricultural land since at least 1947.
- Nearby surrounding properties consisted of agricultural fields, residential properties, a retail petroleum facility, and a natural gas metering station.
- The Subject Property is located in the Coastal Plain Physiographic Province of Tennessee, which is characterized by low rolling hills and wide stream valleys consisting of loess deposited during the Quaternary age (Greene and Wolfe, 2000). Soils underlying the Subject Property consist solely of silt loam, which are moderately well drained, and moderately permeable soils.
- Based on a review of the soil survey description, the estimated depth to groundwater is less than five feet below ground surface. Shallow groundwater is expected to follow local topography, and flow south/southeast toward Hyde Creek and its tributaries.
- The Subject Property was not identified in environmental databases searched during this Phase I ESA. However, three sites located within the ASTM search buffer were identified in databases searched.

- *Craig Clifford Grocery, 312 and 314 Eastland Avenue*: listed in the historical underground storage tank (HIST UST), underground storage tank (UST), and Historical Auto (EDR Hist Auto) databases for two 1,000-gallon gasoline USTs installed in May 1964 and permanently out of use since December 1995. This commercial property is located adjacent to the northern boundary of the Subject Property and was closed at the time of site reconnaissance.
- *L and M Market/Lynnwood's Market, 310 Eastland Avenue*: listed in the UST, HIST UST, EDR Hist Auto, and Leaking Underground Storage Tank (LUST) databases. Three USTs were listed as closed in 2011, while two were listed as temporarily out of use as of October 16, 2020.
 - HDR requested addition information from TDEC pertaining to the LUST at L and M Market, Lynnwood's Market, 310 Eastland Avenue, and confirmed that three of the five tanks associated with the facility were permanently closed in place in 2011. The two remaining USTs were reported to be temporarily out of service since October 16, 2020.
- *Sadler Corrine & Jeffery, 306 Eastland Avenue*: listed in the EDR Hist Auto database as a grocery store from 1969 to 1971. No further information was provided.
- Thirty orphan sites were identified in the environmental database report, but were deemed to be located beyond the ASTM search buffer.
- The Subject Property was occupied by cotton, corn, and soybean fields, a farm pond, agricultural structures, farm equipment, and wooded areas at the time of site reconnaissance.
 - The majority of parcel 095 021 was occupied by a soybean field.
 - Brick, concrete, and other construction and demolition (C&D) debris was found in the northern portion of the parcel, in the former location of a residential structure.
 - A north/south underground natural gas line crossed parcel 095 021. This natural gas line connected to a natural gas metering station operated by Texas Gas Transmission, LLC. The gas metering facility was located adjacent to the northeast corner of the Subject Property.
 - An abandoned grain silo was located in the wooded area south of Highway 19 E.
 - Parcel 100 003 was primarily occupied by agricultural fields, unpaved access roads, and a farm pond.
 - Three grain silos and a partially dilapidated storage building for farm equipment were located on the north central portion of the parcel. Farm equipment, herbicide, and various unlabeled containers were scattered throughout the storage building. Wood pallets, tires, scrap plastic, abandoned farm equipment, empty hydraulic fluid containers, and aluminum trash were located adjacent to the storage building. A semi-trailer was located adjacent to the unused silos.
 - A mobile diesel AST was located in the vicinity of the agricultural structures on parcel 100 003. The AST was minorly rusted with no signs of pitting, holes, stressed vegetation or staining on the surrounding soil.

- Two water spigots and an empty plastic AST were located immediately north of the storage building in the vicinity of the agricultural structures. According to the property farmer, Mr. Simpson, these were municipal water supply spigots.
 - Red brick, concrete, and various other C&D debris were located south of the agricultural structures along the west side of the unpaved road.
 - Concrete barriers were observed in the stream along the unpaved road.
 - An approximately 4-inch diameter PVC pipe with holes extended from the ground in the agricultural field in the northern portion of the parcel.
- On September 19, 2022, the farmer of parcel 100 003, Mr. Mike Simpson, stated he has farmed the southern portion of the Subject Property for approximately 14 years. Mr. Simpson stated that he has farmed corn and cotton and that the typical pesticides, herbicides, and insecticides have been used during farming. He stated that there was a dairy farm on the Subject Property years ago before he farmed the land. He was not aware of USTs, AULs, spills, releases or environmental concerns associated with the Subject Property.
 - Mr. Allen, owner of parcel 100 003, was interviewed via telephone on April 14, 2023. He stated that he was not aware of USTs, AULs, spills, releases, or environmental concerns associated with the Subject Property during his 17 year ownership.
 - On September 20, 2022, the property owner of parcel 095 021, Mr. Dana Freeman, stated he has owned the northern portion of the Subject Property for approximately 8 to 10 years. Mr. Freeman stated that the property has been used to grow corn, cotton, and soybeans over the years and that the typical pesticides, herbicides, and insecticides have been used during farming. He stated that he has not used the portion of his parcel south of Highway 19. He stated that there used to be a house in the northeast corner of the property. He was not aware of USTs, AULs, spills, releases or environmental concerns associated with the Subject Property. Mr. Freeman was interviewed a second time on April 14, 2023. He mentioned that SRC had purchased the property days prior to the interview and that he plans to farm the property this upcoming season. He stated that no significant changes to the property have occurred since site reconnaissance during the November 2022 Phase I ESA.

Opinions

HDR has reviewed the stated data sources, which are part of the ASTM E 1527-21 assessment protocol. Based upon the review of the data, HDR has developed the following professional opinions:

- Based upon statements by the Subject Property owners, pesticides, fungicides, herbicides, and insecticides have been used in agricultural fields within the Subject Property. HDR considers there to be a potential for residual herbicides and/or pesticides in the soil due to the historical land use. Historical agricultural use is considered a *de minimis* condition.
- Based on the environmental databases searched during this Phase I ESA, Craig Clifford Grocery, L and M Market, and Sadler Corrine and Jeffrey sites were located within the ASTM search buffer, but none are considered RECs based on database listing and regulatory status.



- The C&D debris found in the vicinity of dilapidated/former buildings on parcels 100 003 and 095 021 are not considered RECs, as no indications of a release or contamination associated with the materials was noted during the site reconnaissance.
- No industrial uses were documented on the Subject Property. No indications or documentation of contamination were found in association with the Subject Property. Therefore, no RECs have been identified.

Conclusions

Based upon the above-detailed Findings and Opinions, HDR concludes that RECs have not been identified in association with the SR Ripley II site. The following statement is required by ASTM E 1527-21 as a declaration of whether RECs were found:

HDR has performed a Phase I ESAU in conformance with the scope and limitations of ASTM E 1527-21 of the approximately 434-acre Subject Property located in Ripley, Lauderdale County, Tennessee. Any exceptions to or deletions from these practices are described in previous sections of this report. This report has revealed no indications of RECs in connection with the Subject Property.

Recommendations

Recommendations included in this report were developed through the investigative procedures described in the Scope of Services, Significant Assumptions, and Limitations sections of this report (See **Section 1.2**). These recommendations should be reviewed within the context of the limitations provided in the Limitations section.

Based upon the absence of RECs identified in conjunction with the Subject Property, HDR makes the following recommendation:

- HDR recommends that SRC consider the shelf life of Phase I documents in determining risk. ASTM E 1527-21 states that a conforming Phase I report is valid for a period of 180 days and may be updated during the 180 days to a 1-year timeframe. The report is valid for use in any of the CERCLA defenses only if it is updated within this time frame. If greater than one year passes from the final report date, the Phase I effort would need to be repeated to remain in compliance with ASTM and the All-Appropriate Inquiry (AAI) protections.

Table 1. Phase I Component and Dates

Phase I ESA Component	Date Collected
Database Search	April 4, 2023
Interview(s) (User and Landowner)	April 14, 2023
Site Reconnaissance	April 3, 2023
Environmental Professional Declaration	April 20, 2023
AUL and Environmental Lien Search	April 4, 2023
Report Expiration	September 30, 2023
*calculated from earliest collection date	

Appendix B – Water Resources-Related Supporting Information

This page intentionally left blank



Aquatic Ecology and Wetlands Assessment

SR Ripley II Solar

Lauderdale County, Tennessee

March 22, 2024

This page intentionally left blank.



Contents

Acronyms and Abbreviations.....	iii
1 Introduction and Scope of Work.....	1
1.1 Project Site.....	1
2 Preliminary Wetland Review.....	4
2.1 Desktop Review.....	4
2.2 Qualifications.....	4
3 Waters and Wetlands Determination Methods.....	5
3.1 Regulatory Guidance.....	5
3.2 Field Methods.....	5
4 Waters and Wetlands Descriptions.....	6
4.1 Streams.....	6
4.2 Wetlands.....	10
4.3 Open Waters.....	13
4.4 Non-relatively Permanent Waters.....	13
4.5 Potential Waters of the U.S.....	18
5 Regulatory.....	18
6 Results Summary.....	18
7 References.....	19

Tables

Table 1. Summary of USDA NRCS Soils within the Project Site.....	2
Table 2. Summary of Streams within the Project Site.....	9
Table 3. Summary of Wetlands within the Project Site.....	12
Table 4. Summary of Open Waters within the Project Site.....	13
Table 5. Summary of Non-Jurisdictional Features within the Project Site.....	15

Appendices

Appendix A – Figures

Appendix B – Wetland and Stream Data Forms

Appendix C – Weather Conditions

Appendix D – Site Photographs

Appendix E – USDA NRCS Soil Report



This page intentionally left blank.

Acronyms and Abbreviations

AOI	Area of Interest
ARAP	Aquatic Resource Alteration Permit
CWA	Clean Water Act
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
HD	Hydrological Determination
HDR	HDR Engineering, Inc.
HUC	Hydrologic Unit Code
JD	Jurisdictional Determination
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NWI	National Wetland Inventory
NWP	Nationwide Permit
OHWM	Ordinary High-Water Mark
PEM	Palustrine Emergent Wetland
PFO	Forested Wetland
PUBHh	Palustrine Unconsolidated Bottom, Permanently Flooded, Diked/Impounded
Project	SR Ripley II solar site
Project Site	SR Ripley II Project Site
PSS	Shrub/Scrub Wetland
SRC	Silicon Ranch Corporation
TDEC	Tennessee Department of Environment & Conservation
TN-QHP	Tennessee Qualified Hydrologic Professional
TN-QHP-IT	Tennessee Qualified Hydrologic Professional in Training
TRAM	Tennessee Rapid Assessment Method
TVA	Tennessee Valley Authority
USACE	U.S. Army Corps of Engineers
USDA NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WOTUS	Waters of the U.S.
WWC	Wet Weather Conveyance



This page intentionally left blank.

1 Introduction and Scope of Work

On behalf of Silicon Ranch Corporation (SRC), HDR Engineering, Inc (HDR) conducted a wetlands and waters delineation for the proposed SR Ripley II solar site (Project) located on approximately 490 acres in Lauderdale County, Tennessee (Project Site).

Wetlands are protected under Section 404 and 401 of the Clean Water Act (CWA) and by Executive Order 11990. The goal of the wetlands field delineation is to identify surface water and wetland resources within the Project Site likely to be considered jurisdictional by the U.S. Army Corps of Engineers (USACE) under Section 404 of the CWA. The CWA defines jurisdictional waters to include navigable waters, intermittent and ephemeral tributaries of truly navigable waters, and adjacent wetlands. The 1987 USACE Wetland Delineation Manual defines wetlands as areas that have positive indicators for hydrophytic vegetation, wetland hydrology, and hydric soils or as “areas that are inundated or saturated by surface water 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,” with special exceptions.

In accordance with TVA’s *Guidelines for Conducting Biological and Cultural Surveys and Impact Analyses* (TVA 2023), which are intended to prescribe the content of wetland reports for use in analysis and preparation of National Environmental Policy Act (NEPA) documents, HDR conducted field surveys to identify wetland resources on the Project Site, determine impacts, and recommend suitable mitigation measures. The results of this assessment are presented herein. Supporting figures and maps are provided in **Appendix A**, wetland and stream data forms are provided in **Appendix B**, weather conditions are provided in **Appendix C**, site photos are provided in **Appendix D**, and the soil report is provided in **Appendix E**.

1.1 Project Site

The Project is proposed to be located approximately 2 miles southeast of the city of Ripley on a Project Site of approximately 490 acres in extent in Lauderdale County, Tennessee (**Appendix A, Figure 1**). The approximate center coordinates for the Project Site are latitude 35.723829°, longitude -89.517959°. Hyde Creek runs along the southern border of the Project Site, flowing towards the northwest. Two transmission lines, one in the central portion of the site and one in the northwest, transect the Project Site from northeast to southwest. Highway 19, running east to west, bisects the Project Site (see **Appendix A, Figure 2**).

1.1.1 Geology, Topography, and Land Use

Based on a review of Google Earth Imagery, historic land use within the Project Site has been undeveloped agricultural property since approximately 1947, consisting mostly of active agriculture fields of cotton, corn, and soybeans. The surrounding properties consist of agricultural fields, residential properties, a retail petroleum facility, and a natural gas metering station. The Project Site is in the Coastal Plain Physiographic Province of Tennessee, which is characterized by low rolling hills and wide stream valleys. The landscape generally slopes towards the south/southwest direction leading to Hyde Creek and its tributaries. The terrain is moderately flat with elevations ranging from 350 feet in the south-central region of the Project



Site to approximately 460 feet in the north portion (**Appendix A, Figure 3**). The Project Site is located within the Upper Cane Creek Watershed (Hydrologic Unit Code [HUC] 10: 0801020807) (**Appendix A, Figure 6**).

1.1.2 Soils

Soils depicted within the Project Site by the U.S. Department of Agriculture Natural Resources Conservation Service (USDA NRCS) soils map of Lauderdale County were identified as prime farmland, prime farmland if drained, and not prime farmland. Approximately 42 percent of the Project Site is classified as prime farmland, with approximately one percent being classified as prime farmland if drained (**Appendix A, Figure 4**). There are 15 different NRCS soil series present on site; however, only approximately 2 percent of the soils found throughout the Site are hydric or have hydric inclusions. These soils are Center silt loam, 0 to 3 percent slopes (Ce) and Convent silt loam, occasionally flooded (Ct), both of which are listed as hydric on the USDA Hydric Soils List. These soils are not associated with areas mapped in the National Wetland Inventory (NWI) and National Hydrography Dataset (NHD) data or floodplain areas of Hyde Creek (**Appendix A, Figure 4**). The full USDA NRCS Soil Report can be found in **Appendix E**.

Table 1. Summary of USDA NRCS Soils within the Project Site

Map Unit Symbol	Map Unit Name	Farmland Classification	Hydric	Acres of AOI	Percent of AOI
Ad	Adler silt loam, 0 to 2 percent slopes, occasionally flooded	All areas are prime farmland	Non-hydric	133.0	32.53%
Ce	Center silt loam, 0 to 3 percent slopes	All areas are prime farmland	Hydric	2.4	0.58%
Ct	Convent silt loam, occasionally flooded	Prime farmland if drained	Hydric	5.6	1.38%
GrC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded	Not prime farmland	Non-hydric	6.1	1.48%
LoB2	Loring silt loam, 2 to 5 percent slopes, moderately eroded	All areas are prime farmland	Non-hydric	4.0	0.98%
LoB3	Loring silt loam, 2 to 5 percent slopes, severely eroded	Not prime farmland	Non-hydric	31.8	7.78%
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded	Not prime farmland	Non-hydric	7.6	1.85%
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded	Not prime farmland	Non-hydric	25.5	6.23%
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded	Not prime farmland	Non-hydric	10.9	2.68%
MeB2	Memphis silt loam, 2 to 5 percent slopes, moderately eroded, northern phase	All areas are prime farmland	Non-hydric	12.4	3.03%
MeC2	Memphis silt loam, 5 to 8 percent slopes,	Not prime farmland	Non-hydric	112.5	27.49%



Map Unit Symbol	Map Unit Name	Farmland Classification	Hydric	Acres of AOI	Percent of AOI
MeD3	moderately eroded, northern phase Memphis silt loam, 8 to 12 percent slopes, severely eroded, northern phase	Not prime farmland	Non-hydric	27.2	6.66%
MeE3	Memphis silt loam, 12 to 20 percent slopes, severely eroded, northern phase	Not prime farmland	Predominately non-hydric	99.4	24.31%
MeF	Memphis silt loam, 20 to 40 percent slopes, northern phase	Not prime farmland	Non-hydric	6.5	1.58%
Mo	Morganfield silt loam, occasionally flooded	All areas are prime farmland	Non-hydric	4.8	1.19%

1.1.3 Floodplain

Based on Lauderdale County Flood Insurance Rate Map Panels 47097C0357D and 47097C0359D, the areas immediately adjacent to Hyde Creek consist of 51.88 acres of Federal Emergency Management Agency (FEMA) 100-year Floodplain, of which 7.3 acres are considered to be an active floodway (**Appendix A, Figure 5**). The 100-year Floodplain is defined as areas subject to inundation by the 1-percent-annual-chance flood event.

1.1.4 Vegetation

The Project Site is located within the Mississippi Valley Loess Plains Ecoregion of Tennessee (Level III; EPA 2013). Typical vegetation within this ecoregion includes oak-hickory forests and southern bottomland hardwood forests. This region is also characterized by having areas of cultivated cropland typically of corn, soybeans, cotton, and grain sorghum.

Based on site visits conducted on September 19-23, 2022, and November 1, 2023, vegetation within the Project Site consisted primarily of cultivated soybean, corn, and cotton fields with stands of mixed deciduous forests and herbaceous wetlands. Vegetation within the delineated wetlands consisted primarily of sweetgum (*Liquidambar styraciflua*), black willow (*Salix nigra*), and American sycamore (*Platanus occidentalis*). Vegetation within the emergent wetlands consisted primarily of proso millet (*Panicum miliaceum*). Vegetation within the surrounding uplands consisted of soybean fields, (*Glycine max*), corn fields (*Zea mays*), and cotton fields (*Gossypium hirsutum*).

2 Preliminary Wetland Review

2.1 Desktop Review

Prior to conducting field investigations, HDR environmental scientists reviewed available background information including:

- Aerial imagery via ESRI and Google Earth software (**Appendix A, Figure 2**),
- United States Geological Survey (USGS) 7.5-minute quadrangle map (**Appendix A, Figure 3**),
- USDA NRCS Web Soil Survey (**Appendix A, Figure 4**),
- USGS NHD mapped streams (**Appendix A, Figure 5**),
- U.S. Fish and Wildlife Service (USFWS) NWI mapped wetlands (**Appendix A, Figure 5**), and
- FEMA floodplains (**Appendix A, Figure 5**).
- Hydrologic Unit Code (HUC) 10 Cane Creek Upper Watershed Map (**Appendix A, Figure 6**).

According to the NWI, there are 3.0 acres of ponds (palustrine unconsolidated bottom, permanently flooded, diked/impounded [PUBHh]) and 0.9 acre of palustrine emergent wetlands (PEM) on the Project Site. The NHD depicted 17,639 feet of stream and tributaries located on site, including Hyde Creek, which is located along the southern property boundary. The USGS topographic quadrangles of Ripley South, TN (1983) and Durhamville, TN (1981) depicts the ponds and tributaries indicated in the NWI and NHD datasets. Aerial imagery does not correspond to the NWI findings. The 3.0 acres of ponds shown in the NWI are associated with nine separate ponds. Only one of these ponds is visible in the aerial imagery with the remaining eight NWI PUBHh features appearing to be actively maintained agricultural fields.

The Project Site was reviewed for the presence of Exceptional Tennessee Waters and impaired waters. No Exceptional Tennessee Waters were found on the Project Site; however, on-site Hyde Creek is listed as an impaired water on Tennessee's Division of Water Resources Water Quality Assessment and Permits Data Mapper for channelization; sedimentation and siltation due to crop production and urban activity; and the bacterial presence of *Escherichia coli* due to grazing and sewer overflows.

2.2 Qualifications

Qualified scientists conducted all wetlands surveys. Surveys were carried out by Benjamin Burdette (Tennessee Qualified Hydrologic Professional [TN-QHP]), Ivan Madonado (TN-QHP), Lyranda Thiem (Tennessee Qualified Hydrologic Professional in Training [TN-QHP-IT]), and Jake Irvin (Professional Wetland Scientist [PWS]). These scientists have advanced degrees, training, and experience in accurate identification and assessment of wetland and upland vegetation species, soil profile and morphology, and hydrologic indicators influencing wetland occurrence. HDR staff also have experience in federal, state, and local wetland regulatory compliance obligations and NEPA processes, as well as mitigation measures.

3 Waters and Wetlands Determination Methods

3.1 Regulatory Guidance

On August 29, 2023, the U.S. Environmental Protection Agency (EPA) and the USACE issued a final rule to amend the final “Revised Definition of ‘Waters of the United States’” rule, that became effective January 18, 2023. The August 2023 final amended rule conforms the definition of “Waters of the United States” to the Supreme Court’s May 25, 2023, decision in the *Sackett v. EPA* case, altering previous definitions of WOTUS. However, since parts of the January 2023 Rule are invalid under the Supreme Court’s interpretation of the CWA in the May 2023 *Sackett* ruling, the EPA and USACE revised the regulatory text to make it consistent with the *Sackett* ruling; thus, the “Revised Definition of ‘Waters of the United States’; Conforming” became effective September 8, 2023. Currently, the January 2023 Rule as Amended (final conforming rule) is prohibited from being used in Tennessee, including 26 other states; therefore, EPA/USACE is interpreting WOTUS definitions consistent with the pre-2015 regulatory regime and the ruling in the *Sackett v. EPA* case for the states enjoined from the January 2023 Rule as Amended.

The prior definitions and regulatory guidance to identify WOTUS in Tennessee included significant nexus evaluations for adjacent wetlands, as described in the USACE 2008 Rapanos Guidance (e.g., pre-2015 regulatory regime). The Supreme Court ruling in *Sackett v. EPA* effectively nullifies the use of the Rapanos significant-nexus evaluation in jurisdictional determinations. Guidance has not yet been issued to aid in determining the limits of federal jurisdiction for some aquatic resources under *Sackett*, such as seasonally flowing tributaries and how to define which wetlands have a sufficient “continuous surface connection” to be considered adjoining and “indistinguishable” to other WOTUS.

Since agency jurisdictional determination guidance in response to *Sackett v. EPA* has not been issued to date, the potential for federal jurisdiction was evaluated based on the pre-2015 regulatory regime as well as the current understanding of the *Sackett v. EPA* ruling (e.g., identifying relatively permanent waters that are indistinguishable from other relatively permanent waters).

3.2 Field Methods

Following a background study and desktop review, a field survey was conducted within the Project Site by HDR environmental staff conducted on September 19-23, 2022, and November 1, 2023. HDR used the pedestrian survey method to survey the 490-acre survey area for potential jurisdictional features and examine potential jurisdictional Waters of the U.S. (WOTUS) including wetlands. According to the EPA Antecedent Precipitation Tool, though weather conditions were generally wetter than normal during the field survey, the Project Site was in incipient drought (**Appendix C**).

Potential waters and wetlands were delineated according to the methodology and guidance described in the U.S. Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual and the USACE *Atlantic and Gulf Coastal Plain Region (Version 2.0)* (Regional Supplement)

(USACE 2012). Wetland features were classified according to the Cowardian naming convention (Cowardin et al. 1979). Streams were determined utilizing the methodology and guidance provided in *Regulatory Guidance Letter 05-05 – Ordinary High-Water Mark (OHWM) Identification* (USACE 2005) and, per TVA guidance for project sites in the TVA power service area, the Tennessee Department of Environment and Conservation (TDEC) Division of Water Resources *Guidance for Making Hydrologic Determinations (Version 1.5)* (TDEC 2020).

When applying Tennessee Rapid Assessment Method (TRAM) methodology, wetlands are scored into three categories of wetland function, condition, and quality: low (scores 0-29), good/moderate (30-59), and superior (60-100). When applying Hydrologic Determination (HD) methodology, watercourses are scored based on primary and secondary field indicators. Primary indicators are individual or combinations of field characteristics that, under normal circumstances and in the absence of any directly contradictory evidence, are considered to be definitive for jurisdictional purposes. Secondary indicators are evaluated if none of the primary indicators are present at the time of survey.

Potential jurisdictional WOTUS were flagged in the field and ESRI Field Maps was employed to map WOTUS boundaries via a mobile device. The mobile device's integrated GPS receiver was used to collect wetland data in the field with sub-meter accuracy. Geographic Information System (GIS) software was used to analyze collected features, calculate areas, and generate figures. All point, line, and polygon data collected using the GPS receiver and displayed on subsequent figures are for review purposes only and do not represent a professional civil survey.

The USACE has the regulatory authority to issue preliminary and/or approved jurisdictional determinations based on the regulations in place at the time of their assessment. Therefore, the potential jurisdictional status of features identified in this delineation and proposed jurisdictional determination reflect that of the pre-2015 regulatory regime consistent with the Supreme Court's decision in *Sackett v. Environmental Protection Agency* (EPA) in effect at the time of this report.

The WOTUS determinations within this report are subject to review and approval by the USACE Memphis District, and the final WOTUS determination is within the regulatory authority of both USACE and EPA.

4 Waters and Wetlands Descriptions

4.1 Streams

During the site visit, 18 jurisdictional streams were identified (**Table 2**). These included one named perennial stream (Hyde Creek) and 17 unnamed intermittent tributaries to Hyde Creek. All streams identified would be regulated by the USACE under Section 404 and by TDEC under Section 401 of the CWA.

4.1.1 Relatively Permanent Waters with Perennial Flow

Stream S001 was identified as Relatively Permanent Waters (RPWs) that exhibit perennial surface water flow. S001 is identified as Hyde Creek (**Appendix A, Figure 7.5 and Figure 7.6**).

According to the Cowardian Classification hierarchical structure (Cowardian et al. 1979), S001 is classified as a riverine, lower perennial feature (R2). Ordinary high-water mark (OHWM) indicators observed during the field assessment include a well-defined natural line impressed on the bank, shelving, absence of vegetation, disturbed and/or washed away leaf litter, sediment deposition, sediment sorting, and scour.

Stream S001 (Hyde Creek) is the only named stream located in the Project Site (Hyde Creek) and is 2,525 linear feet in extent. Hyde Creek shows evidence of having been straightened and deepened in the past based on spoil piles directly adjacent to the streambanks. Because of this alteration and other impacts from agricultural activities in the area, S001 is not expected to provide high-quality habitat for aquatic species. The banks are forested with various hardwood species for the entire length in the Project Site.

4.1.2 Relatively Permanent Waters with Seasonal Flow

Streams S002 through S018 were identified as RPWs that exhibit continuous seasonal surface flow to other RPWs on and off-site, all of which appear to drain to Hyde Creek (**Appendix A, Figure 7.1 - Figure 7.6**). According to the Cowardin Classification hierarchical structure (Cowardin et al. 1979), these streams are classified as riverine, intermittent features (R4). OHWM indicators observed during the field assessment include a well-defined natural line impressed on the bank, disturbed or washed away leaf litter, absence of vegetation, sediment deposition, and scour.

There are 19,932 linear feet of intermittent streams (R4). Most of the intermittent streams are in the open and show indication that they have been straightened for drainage or irrigation purposes traversing the agricultural fields. The majority of intermittent streams that are not transecting the agricultural fields have been straightened and follow property lines. All of the streams on the Project Site have been impacted by sedimentation and physical alteration as a result of agricultural activities. As a result, they provide poor quality habitat for aquatic species.

S002 through S018 are briefly described below. All features are shown on **Figure 7.1 - Figure 7.6 of Appendix A**.

S002 is an intermittent stream found on the southwestern side of the Project Site. S002 flows south to Hyde Creek and off-site.

S003 and S004 are intermittent streams found in the southeastern corner of the Project Site and flow south into Hyde Creek and drains off-site.

S005 and S006 are an intermittent stream that runs across the southern side (S005) and the eastern side (S006) of the Project Site, is interrupted by the Project boundary, and flows south into Hyde Creek and drains off-site. S005 connects to S006 through a culvert offsite.

S007 is an intermittent stream that runs on the eastern side of the Project Site, connects to S006, and drains off-site.

S008 is an intermittent stream that runs on the western side of the Project Site and flows south off-site.

S009 is an intermittent stream found in the center of the Project Site and flows into W008 and P001.

S010 is an intermittent stream on the western side of the Project Site and flows from a culvert in P001 and south into W008. From there, it flows off-site.

S011 is an intermittent stream on the northern boundary south of Highway 19 and flows north off-site.

S012 and S016 are an intermittent stream that runs across the northern boundary south of Highway 19 (S012) and across the southern boundary north of Highway 19 (S016). The streams are connected via a culvert located offsite underneath Highway 19. S016 connects to S015 and flows off-site.

S013 is an intermittent stream on the western side of the parcel north of Highway 19. S013 flows through the northern parcel and off-site. S014 connects to S013 and flows north off-site.

S015 is an intermittent stream on the south side of parcel north of Highway 19. S015 flows east off-site.

S017 is an intermittent stream on the east side of the northern parcel north of Highway 19 and flows east off-site.

S018 is an intermittent stream on the east side of the northern parcel north of Highway 19 and flows east off-site.



Table 2. Summary of Streams within the Project Site

Feature Identifier	Flow Regime	Cowardin Classification ¹	TDEC HD Determination (Score)	TVA Streamside Management Category	Midpoint Coordinates		Presumed Jurisdiction		Average OHWM ² (ft)	Linear Feet within Project Site
					Latitude	Longitude	Section 404	Section 401		
S001	Perennial	R5UB	Stream [24]	Standard	35.711322	-89.524010	Yes	Yes	12	819
S002	Intermittent	R4SB5	Stream [21.5]	Standard	35.715422	-89.519524	Yes	Yes	4	4,083
S003	Intermittent	R4SB5	Stream [16]	Standard	35.708672	-89.515496	Yes	Yes	8	473
S004	Intermittent	R4SB5	Stream [15]	Standard	35.709985	-89.517876	Yes	Yes	5	1,565
S005	Intermittent	R4SB5	Stream [20]	Standard	35.711740	-89.519376	Yes	Yes	5	2,779
S006	Intermittent	R4SB5	Stream [23]	Standard	35.715528	-89.512725	Yes	Yes	6	1,748
S007	Intermittent	R4SB5	Stream [19.5]	Standard	35.716158	-89.511653	Yes	Yes	6	701
S008	Intermittent	R4SB5	Stream [19.25]	Standard	35.717919	-89.522032	Yes	Yes	4	1,105
S009	Intermittent	R4SB5	Stream [19]	Standard	35.720356	-89.517988	Yes	Yes	5	488
S010	Intermittent	R4SB5	Stream [21]	Standard	35.718891	-89.522130	Yes	Yes	6	1,565
S011	Intermittent	R4SB5	Stream [19.5]	Standard	35.724442	-89.518678	Yes	Yes	4	356
S012	Intermittent	R4SB5	Stream [20]	Standard	35.724384	-89.516055	Yes	Yes	4	218
S013	Intermittent	R4SB5	Stream [20]	Standard	35.727325	-89.522208	Yes	Yes	4	2,147
S014	Intermittent	R4SB5	Stream [22.5]	Standard	35.728916	-89.521473	Yes	Yes	3	340
S015	Intermittent	R4SB5	Stream [19]	Standard	35.726227	-89.519601	Yes	Yes	5	1,204
S016	Intermittent	R4SB5	Stream [23.5]	Standard	35.725510	-89.518098	Yes	Yes	3	944
S017	Intermittent	R4SB3	Stream [23]	Standard	35.727963	-89.517540	Yes	Yes	18	98
S018	Intermittent	R4SB5	Stream [21.5]	Standard	35.728543	-89.517259	Yes	Yes	6	118
Streams Total:										20,751

1. R4SB3: Riverine Intermittent, Cobble-Gravel Streambed
R4SB5: Riverine Intermittent, Mud Streambed
R5UB: Riverine Unknown Perennial, Unconsolidated Bottom
2. OHWM: Width of stream at ordinary high-water mark

4.2 Wetlands

Twelve wetlands were identified during the site visit comprising a total of 4.06 acres (**Table 3**). Of these, there were seven emergent wetlands (PEM), three forested wetlands (PFO), one wetland split between PFO and shrub/scrub wetland (PSS), and one wetland split between PFO and PEM. Three of the wetlands, W007-W009, were associated with relatively permanent waters and are presumed to be jurisdictional under Section 404 of the CWA. Wetlands 001 through 006 and 010 through 012, were isolated wetlands and are presumed non-jurisdictional under Section 404 of the CWA. All wetlands identified would be regulated by TDEC under Section 401 of the CWA.

4.2.1 Emergent Wetlands

The seven PEM wetlands were associated with agricultural fields and were heavily disturbed, often showing signs of soil disturbances from planting and harvesting, lack of biodiversity due to agricultural practices, and nutrient loading from fertilizer uses. PEM wetlands comprise 0.99 acre within the Project Site.

W001 and W002 are PEM wetlands in cotton fields. The hydrology indicators at both wetlands are surface water with a depth of one-inch, algal mats, and drainage patterns. Vegetation found in the herb stratum of W001 includes proso millet, yellowseed false pimpernel (*Lindernia dubia*), and scarlet toothcup (*Ammannia coccinea*). Vegetation found in the herb stratum of W002 includes proso millet, yellowseed false pimpernel, and scarlet toothcup. The soils of both wetlands are a loamy-clay texture with prominent redox concentrations in the matrix. The hydric soil indicator includes a depleted matrix. Within both wetlands, the vegetation and the soils have been disturbed by plowing and other agriculture activities. The Tennessee Rapid Assessment Method (TRAM) score for both W001 and W002 is 16, ranking them as low resource value wetlands.

W003 is a PEM wetland in a cotton field. The hydrology indicators at W003 are surface water with a depth of one-inch, algal mats, surface soil cracks, and drainage patterns. Vegetation in the herb stratum includes panicgrass (*Panicum* sp.). The sample area was noted as very disturbed due to agricultural activity. The soils are a loamy clay texture with prominent redox concentrations in the matrix. The hydric soil indicator includes a depleted matrix. Both the vegetation and the soils have been disturbed by plowing and other agriculture activities. The TRAM score for W003 is 12, ranking it a low resource value wetland.

W006 is a PEM wetland in a corn field. The hydrology indicators at W006 are sediment deposits, sparsely vegetated concave surface, and drainage patterns. Vegetation in the herb stratum includes proso millet. The sample area was noted as very disturbed due to agricultural activity. The soils are a silty loam texture with a hydric soil indicator of a depleted matrix. Both vegetation and soils have been disturbed by plowing and other agriculture activities. The TRAM score for W006 is 15, ranking it a low resource value wetland.

W010 and W011 are PEM wetlands in soybean fields. The hydrology indicators at both wetlands are surface soil cracks, sparsely vegetated concave surface, drainage patterns, and geomorphic position. Vegetation in the herb stratum includes purple nutsedge (*Cyperus*

rotundus), redtop panicgrass (*Coleataenia rigidula*), and soybeans. The soils are fine silt texture and no hydric soil indicators were observed due to disruption by plowing. The TRAM score for both W010 and W011 is 9, ranking them as low resource value wetlands.

W012 is a PEM wetland in a soybean field. The hydrology indicators at W012 are algal mats, surface soil cracks, sparsely vegetated concave soil, and drainage patterns. Vegetation in the herb stratum includes purple nutsedge, redtop panicgrass, and carpetweed (*Mollugo verticillata*). The soils are a silt loam texture and have a hydric soil indicator of a depleted matrix. Both the vegetation and the soils have been disturbed by plowing and other agriculture activities. The TRAM score for W012 is 12, ranking it a low resource value wetland.

4.2.2 Forested/Scrub and Shrub Wetlands

W009 is a joint PFO/PSS wetland located between agricultural fields and a road. The hydrology indicators at W009 are water-stained leaves, oxidized rhizospheres on living roots, and drainage patterns. Vegetation found in the shrub layer includes black willow and sweetgum. Vegetation in the herb stratum includes common rush (*Juncus effusus*) and nodding smartweed (*Persicaria lapathifolia*). The soils are silt loam texture with a hydric soil indicator of a depleted matrix. The TRAM score for W009 is 27, ranking it a low resource value wetland.

4.2.3 Forested Wetlands

The two forested wetlands are located on terraces that are above the agricultural fields and comprise 1.42 acres within the Project Site.

W004 is a PFO wetland adjacent to a cotton field. The hydrology indicators at W004 are drift deposits, oxidized rhizospheres on living roots, and drainage patterns. Vegetation found in the tree stratum includes American sycamore, black willow, and sweetgum. Vegetation found in the shrub layer includes mockernut hickory (*Carya tomentosa*), American sycamore, and white sassafras (*Sassafras albidum*). Vegetation in the herb layer includes poison ivy (*Toxicodendron radicans*) and Japanese siltgrass (*Microstegium vimineum*). The soils are a loamy-clay texture with prominent redox concentrations in the matrix. A hydric soil indicator in the soil is a depleted matrix. The TRAM score for W004 is 29, ranking it a low resource value wetland.

W005 is a PFO wetland adjacent to a cotton field. The hydrology indicators at W005 are sediment deposits, drift deposits, water-stained leaves, and crayfish burrows. Vegetation in the overstory stratum includes tulip poplar (*Liriodendron tulipifera*), American elm (*Ulmus americana*), black oak (*Quercus nigra*), and black willow. Vegetation in the shrub layer includes American elm and northern catalpa (*Catalpa speciosa*). Vegetation found in the herb stratum includes Japanese siltgrass and poison ivy. The soils are silty loam texture with a hydric soil indicator of a depleted matrix. The TRAM score for W005 is 32, ranking it a low resource value wetland.

W008 is a PFO fringe wetland located around P001. The hydrology indicators at W008 are water-stained leaves, drainage patterns, and geomorphic position. Vegetation in the tree/overstory stratum includes black willow and sweetgum. Vegetation in the shrub stratum includes black willow and American elm. Vegetation found in the herb stratum includes crossvine (*Bignonia capreolata*), Virginia creeper (*Parthenocissus quinquefolia*), and poison ivy.



The soils are silty texture with a hydric soil indicator of a depleted matrix. The TRAM score for W008 is 37, ranking it a low resource value wetland. W008 is connected to S010 via a culvert that flows out of P001.

4.2.4 Emergent/Forested Wetlands

W007 is a joint PEM/PFO and located on the edge of a cotton field in the floodplain of Hyde Creek. The PEM portion of the wetland has hydrology indicators including algal mats, surface soil cracks, and drainage patterns. Vegetation in the herb stratum includes panicgrass. The vegetation in this area is highly disturbed due to agriculture activity. The soil in this wetland is a loamy-clay texture with prominent redox concentrations in the matrix. A hydric soil indicator includes a depleted matrix.

The PFO portion of W007 consists of a hardwood forested area that is directly connected to a wetland located in an agricultural field. The hydrology indicators at W007 are water marks, water-stained leaves, drainage patterns, and moss trim lines. Vegetation in the overstory includes sweetgum, American elm, and hackberry (*Celtis* sp.). Vegetation found in the shrub stratum includes sweetgum, American elm, and laurel oak (*Quercus laurifolia*). Vegetation found in the herb stratum includes poison ivy, trumpet vine (*Campsis radicans*), and Japanese stiltgrass. The soils are silty loam texture with a hydric soil indicator of a depleted matrix. The TRAM score for W007 is 58, ranking it a moderate resource value wetland.

Table 3. Summary of Wetlands within the Project Site

Feature Identifier	Cowardin Classification ¹	TRAM Functional Capacity (Score) ²	Center Coordinates		Presumed Jurisdiction		Acreage within Project Site
			Latitude	Longitude	Section 404	Section 401	
W001	PEM	Low [16]	35.709154	-89.515669	No	Yes	0.04
W002	PEM	Low [16]	35.708572	-89.515786	No	Yes	0.13
W003	PEM	Low [12]	35.713486	-89.517898	No	Yes	0.06
W004	PFO	Low [29]	35.715684	-89.511766	No	Yes	0.30
W005	PFO	Low [32]	35.714398	-89.512650	No	Yes	0.04
W006	PEM	Low [15]	35.716970	-89.520437	No	Yes	0.14
W007	PEM/PFO	Moderate [58]	35.714583	-89.525608	Yes	Yes	PEM: 0.35 PFO: 1.08
W008	PFO	Low [37]	35.720748	-89.519357	Yes	Yes	0.74
W009	PFO/PSS	Low [27]	35.724463	-89.521438	Yes	Yes	PFO: 0.3 PSS: 0.6
W010	PEM	Low [9]	35.731357	-89.517265	No	Yes	0.20
W011	PEM	Low [9]	35.730898	-89.518274	No	Yes	0.05
W012	PEM	Low [12]	35.727292	-89.521797	No	Yes	0.03
Presumed Jurisdictional under Section 404 Total:							3.07
Presumed Non-Jurisdictional under Section 404 Total:							0.99
Wetlands Total:							4.06

1. PEM: Palustrine Emergent Wetland
PSS: Palustrine Scrub/Shrub Wetland
PFO: Palustrine Forested Wetland



4.3 Open Waters

P001 was the only open water pond identified in the Project Site and is palustrine, unconsolidated bottom, permanently flooded, diked/impounded (PUBHh) according to the Cowardian Classification hierarchical structure (Cowardian et al. 1979) (**Table 4 and Appendix A, Figure 7.4**). P001 is an impoundment of S010. This feature is considered jurisdictional under Section 404 of the CWA and regulated by TDEC under Section 401 of the CWA.

Table 4. Summary of Open Waters within the Project Site

Feature Identifier	Cowardian Classification ¹	Center Coordinates		Presumed Jurisdiction		Acreage within Project Site
		Latitude	Longitude	Section 404	Section 401	
P001	PUBHh	35.720654	-89.519437	Yes	Yes	2.9
Open Waters Total:						2.9

1. PUBH: Palustrine Unconsolidated Bottom, Permanently Flooded, Diked/Impounded

4.4 Non-relatively Permanent Waters

Multiple ephemeral features were identified which are not considered to be RPWs and are not expected to carry federal jurisdiction (**Appendix A, Figure 7.1 - Figure 7.6**). The features include Ephemeral Features 001 through 065. These features were dry, did not exhibit an OHWM or a defined bed and bank, and may have had upland rooted plants growing in the bottom of the channel. These features only flow during wet weather events but can provide a hydrological connection between features and downstream waters. These features are also considered wet weather conveyances (WWCs) as evaluated utilizing TDEC’s Guidance for Making Hydrologic Determinations.

WWCs do not have OHWMs, defined bed and bank, and do not support the biota of streams; and are therefore differentiated from jurisdictional ephemeral features. Sixty-five of these features were identified comprising a total of 23,250 linear feet. The majority of these features are located in agricultural fields, are erosional features, and result from both natural hydrology flows and irrigation practices. A summary of non-RPW WWC features is included in **Table 3**.



Table 5. Summary of Non-Jurisdictional Features within the Project Site

Feature Identifier	Cowardin Classification ¹	TDEC HD Determination (Score)	TVA Streamside Management Zone	Midpoint Coordinates		Presumed Jurisdiction		Average Width	Linear Feet within Project Site
				Latitude	Longitude	Section 404	Section 401		
E001	R6	WWC [15]	BMPs	35.709924	-89.520605	No	No	4	105
E002	R6	WWC [12]	BMPs	35.711223	-89.523571	No	No	2	57
E003	R6	WWC [14]	BMPs	35.713216	-89.525092	No	No	2	64
E004	R6	WWC [13.5]	BMPs	35.715370	-89.520989	No	No	2	624
E005	R6	WWC [13.5]	BMPs	35.717196	-89.518162	No	No	2	867
E006	R6	WWC [10]	BMPs	35.717218	-89.517955	No	No	2	194
E007	R6	WWC [14.5]	BMPs	35.716154	-89.519039	No	No	3	126
E008	R6	WWC [13]	BMPs	35.712675	-89.515205	No	No	2	29
E009	R6	WWC [18.5]	BMPs	35.712876	-89.515855	No	No	3	278
E010	R6	WWC [12]	BMPs	35.714782	-89.517625	No	No	2	341
E011	R6	WWC [18]	BMPs	35.715359	-89.517650	No	No	4	831
E012	R6	WWC [12]	BMPs	35.716242	-89.515891	No	No	2	231
E013	R6	WWC [9.5]	BMPs	35.716242	-89.515891	No	No	2	57
E014	R6	WWC [15.5]	BMPs	35.717311	-89.514327	No	No	5	904
E015	R6	WWC [11.5]	BMPs	35.713700	-89.513679	No	No	2	173
E016	R6	WWC [17.5]	BMPs	35.716159	-89.511344	No	No	4	255
E017	R6	WWC [8.5]	BMPs	35.720482	-89.515210	No	No	1	307
E018	R6	WWC [14]	BMPs	35.717794	-89.516490	No	No	2	879
E019	R6	WWC [13]	BMPs	35.717852	-89.516404	No	No	2	867
E020	R6	WWC [12]	BMPs	35.717357	-89.516884	No	No	2	400
E021	R6	WWC [10.5]	BMPs	35.718172	-89.520148	No	No	3	205
E022	R6	WWC [11]	BMPs	35.717742	-89.521587	No	No	2	295
E023	R6	WWC [11.5]	BMPs	35.717467	-89.522079	No	No	2	311
E024	R6	WWC [11]	BMPs	35.720443	-89.516906	No	No	2	187
E025	R6	WWC [11]	BMPs	35.720584	-89.517063	No	No	4	133



Feature Identifier	Cowardin Classification ¹	TDEC HD Determination (Score)	TVA Streamside Management Zone	Midpoint Coordinates		Presumed Jurisdiction		Average Width	Linear Feet within Project Site
				Latitude	Longitude	Section 404	Section 401		
E026	R6	WWC [11.5]	BMPs	35.720213	-89.517847	No	No	1	121
E027	R6	WWC [12]	BMPs	35.719638	-89.520228	No	No	2	409
E028	R6	WWC [18]	BMPs	35.718907	-89.523555	No	No	3	587
E029	R6	WWC [11]	BMPs	35.720418	-89.522807	No	No	2	131
E030	R6	WWC [13.5]	BMPs	35.720179	-89.520752	No	No	2	134
E031	R6	WWC [15]	BMPs	35.721569	-89.517535	No	No	2	871
E032	R6	WWC [12]	BMPs	35.723375	-89.517904	No	No	1	778
E033	R6	WWC [15.5]	BMPs	35.724046	-89.518866	No	No	2	306
E034	R6	WWC [15.5]	BMPs	35.724006	-89.521134	No	No	2	210
E035	R6	WWC [13]	BMPs	35.723981	-89.515304	No	No	2	321
E036	R6	WWC [11.5]	BMPs	35.723695	-89.515526	No	No	2	396
E037	R6	WWC [7.5]	BMPs	35.721390	-89.516020	No	No	1	1,004
E038	R6	WWC [9]	BMPs	35.730936	-89.516852	No	No	2	207
E039	R6	WWC [10]	BMPs	35.731598	-89.516586	No	No	2	321
E040	R6	WWC [14]	BMPs	35.731527	-89.518220	No	No	2	456
E041	R6	WWC [11]	BMPs	35.731030	-89.517967	No	No	2	188
E042	R6	WWC [10]	BMPs	35.730267	-89.518726	No	No	1	330
E043	R6	WWC [14.5]	BMPs	35.729351	-89.519240	No	No	2	76
E044	R6	WWC [15.5]	BMPs	35.728892	-89.520356	No	No	2	438
E045	R6	WWC [18]	BMPs	35.728741	-89.520728	No	No	2	161
E046	R6	WWC [17]	BMPs	35.728899	-89.520924	No	No	2	105
E047	R6	WWC [13.5]	BMPs	35.728639	-89.521219	No	No	3	50
E048	R6	WWC [11.5]	BMPs	35.727108	-89.521515	No	No	2	626
E049	R6	WWC [16]	BMPs	35.725794	-89.519283	No	No	1	150
E050	R6	WWC [50]	BMPs	35.725740	-89.517412	No	No	1	330
E051	R6	WWC [10.5]	BMPs	35.725762	-89.518059	No	No	1	163
E052	R6	WWC [17.5]	BMPs	35.725452	-89.516866	No	No	5	135



Feature Identifier	Cowardin Classification ¹	TDEC HD Determination (Score)	TVA Streamside Management Zone	Midpoint Coordinates		Presumed Jurisdiction		Average Width	Linear Feet within Project Site
				Latitude	Longitude	Section 404	Section 401		
E053	R6	WWC [17.5]	BMPs	35.728259	-89.517443	No	No	2	85
E054	R6	WWC [15.5]	BMPs	35.729117	-89.516992	No	No	2	336
E055	R6	WWC [12.5]	BMPs	35.729018	-89.517226	No	No	2	75
E056	R6	WWC [13]	BMPs	35.725412	-89.526711	No	No	2	583
E057	R6	WWC [13]	BMPs	35.724816	-89.526045	No	No	2	192
E058	R6	WWC [13]	BMPs	35.725236	-89.525047	No	No	2	93
E059	R6	WWC [14]	BMPs	35.725393	-89.523865	No	No	5	224
E060	R6	WWC [13]	BMPs	35.727369	-89.524532	No	No	2	1,216
E061	R6	WWC [13]	BMPs	35.729403	-89.525295	No	No	2	156
E062	R6	WWC [13]	BMPs	35.730983	-89.524365	No	No	2	571
E063	R6	WWC [13]	BMPs	35.729783	-89.523903	No	No	2	160
E064	R6	WWC [13]	BMPs	35.728400	-89.524810	No	No	2	423
E065	R6	WWC [13]	BMPs	35.727597	-89.526482	No	No	2	1,517
Total:									23,250

1. R6: A wetland, spring, stream, river, pond, or lake that exists for a short period

4.5 Potential Waters of the U.S.

A total of 22 potential WOTUS, including 18 streams, 3 wetlands, and one pond were identified within the Project Site, totaling approximately 20,751 linear feet of stream channel, 4.06 acres of wetlands, and 2.9 acres of ponds (**Appendix A, Figure 7.1 - Figure 7.6**). A summary of potential WOTUS within the Project Site is included in **Table 2 through Table 4**. Wetland Determination Forms are included in **Appendix B**, and a photographic log with representative photos of Project Site and delineated features is included in **Appendix D**.

5 Regulatory

The Project Site is within the USACE Mississippi Valley Division Memphis District, and the Jackson TDEC Field Office covers Lauderdale County. Due to the number of wetlands and tributaries located on site, it is possible that the proposed Project may result in impacts to jurisdictional waters requiring CWA Section 404/401 permitting. For a Section 404 permit, impacts of less than 0.5 acre of jurisdictional waters can typically be permitted using a Nationwide Permit (NWP). NWPs are usually issued within 45 days of submittal. Solar sites can be permitted under NWP 51 for Land-Based Renewable Energy Generation Facilities or NWP 12 for Linear Transportation Project if impacts are the result of impacts to jurisdictional waters for access roads. Impacts to greater than 0.5 acre of jurisdictional WOTUS would require an CWA Section 404 Individual Permit. Timeframes for issuance of CWA Section 404 Individual Permits are typically 9 to 12 months.

Additionally, application for a General Aquatic Resource Alteration Permit (ARAP) (Tennessee's Section 401 permit) may be required from TDEC Division of Water Resources. General ARAP permits are triggered by specific types of impacts (e.g., road crossings or utility crossings) or by feature impacted (e.g., wetland alterations) and each General ARAP has different impact thresholds for triggering an Individual ARAP.

The TDEC Erosion and Sediment Control Handbook requires an average of 30-foot vegetated buffers applied to all streams not considered Exceptional Tennessee Waters during the construction phase. The impaired waters found on-site require an average of 60-foot vegetated buffers during construction. The 2022 TVA Best Management Practices Guide recommends a minimum Streamside Management Zone Width of 50 feet (TVA 2022). Lauderdale County and the City of Ripley, Tennessee do not have stream or riparian buffer regulations.

6 Results Summary

HDR delineated 18 stream channels, 12 wetlands, one pond, and 65 WWC/ephemeral features within the Project Site. It is the professional judgment of HDR that the 20,751 linear feet of streams, 3.07 acres of wetlands, and 2.9 acres of pond features within the Project Site (**Table 2 and Table 4**) are potentially WOTUS features under Section 404 of the CWA. These features would likely be jurisdictional because they are associated with a relatively permanent water under the pre-2015 regulatory regime currently in place at the time of this report in the state of Tennessee. The approximately 23,250 linear feet of WWC/ephemeral features and 0.99 acres

of isolated wetlands are not anticipated to be jurisdictional. The USACE Memphis District can officially render a final jurisdictional determination for Section 404 requirements through the formal review process. Submittal of a Jurisdictional Determination (JD) and coordination with the USACE Memphis District is recommended to verify that delineated drainage features are not jurisdictional WOTUS and to determine if Project activities would require a Section 404 permit.

Additionally, the 18 stream channels, 12 wetlands, and one pond identified within the Project Site are potentially regulated by TDEC and subject to Section 401 of the CWA. Submittal of a Hydrological Determination (HD) and coordination with the TDEC Jackson Field District is recommended and required for the ARAP permit process.

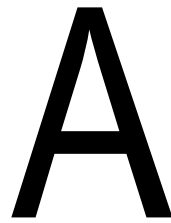
The Site consists mostly of active agriculture fields. Wetland, stream, and pond features depicted on the NHD, NWI data, and topographic map datasets are not necessarily consistent with HDR's field investigation findings due to the historical and current agricultural land use. The majority of onsite wetlands and streams have been modified or affected by the surrounding agricultural land uses. The exact acreage of developable land cannot be confirmed until the JD is verified by the USACE and the HD is verified by TDEC. Impacts to jurisdictional waters and wetlands will trigger CWA Section 404/401 permitting. Certain activities such as installation of pilings may be permissible within wetlands that are currently being farmed without triggering Section 404 permitting, but still may trigger an ARAP.

7 References

- Cowardin et al. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service. FWS/OBS-79/31. Washington, DC.
- Environmental Protection Agency (EPA). 2013. Descriptions of the Level III and IV Ecoregions. Available online: <https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states>. Accessed July 2023.
- Federal Emergency Management Agency (FEMA). 2019. Flood Zones. Available online: hazards.fema.gov/femaportal/resources/flood_map_svc.htm. Accessed July 2023.
- National Resources Conservation Service (NRCS). 2023. U.S. Department of Agriculture. Available online: <https://websoilsurvey.nrcs.usda.gov/app/>. Accessed July 2023.
- Tennessee Department of Environment and Conservation (TDEC). 2020. Guidance for Making Hydrologic Determinations Version 1.5. Division of Water Resources. Available online: <https://www.tnhdt.org/PDF/HD%20Guidance.pdf>. Accessed March 2024.
- Tennessee Valley Authority (TVA). 2022. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities. 2022.
- _____. 2023. Guidelines for Conducting Biological and Cultural Surveys and Impact Analyses. November 2023.
- United States Army Corps of Engineers (USACE). 1987. Corps of Engineers Wetlands Delineation Manual. Prepared by the USACE Environmental Laboratory, Waters Experiment Station. Technical Report Y-87-1, January 1987. Available at [URL]: <https://www.lrh.usace.army.mil/Portals/38/docs/USACE%2087%20Wetland%20Delineation%20Manual.pdf>. Accessed: May 2023.
- _____. 2005. Regulatory Guidance Letter – Ordinary High Water Mark Identification. USACE, Regulatory guidance letter No. 05-05, Dated: December 7, 2005. Available at [URL]: <https://usace.contentdm.oclc.org/utis/getfile/collection/p16021coll9/id/1253>. Accessed: May 2023.
- _____. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0). ed. J.F. Berkowitz, J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-12-9. Vicksburg, MS. Available at [URL]: <https://usace.contentdm.oclc.org/utis/getfile/collection/p266001coll1/id/7607>. Accessed: May 2023.



This page intentionally left blank.

A large, bold, black letter 'A' centered on the page.

Appendix A – Figures

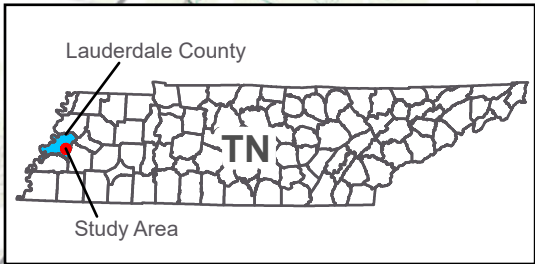
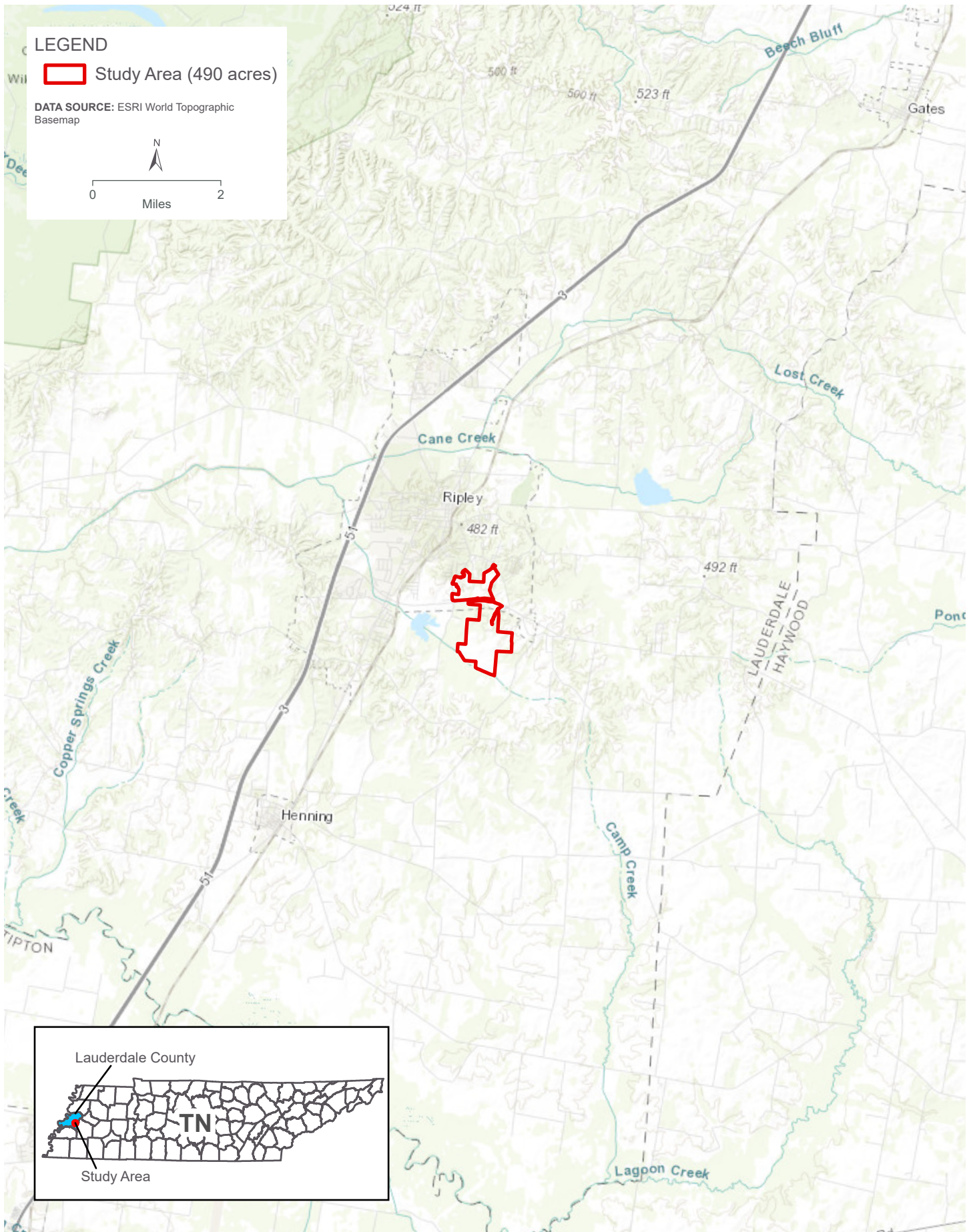


This page intentionally left blank.

LEGEND

 Study Area (490 acres)

DATA SOURCE: ESRI World Topographic Basemap

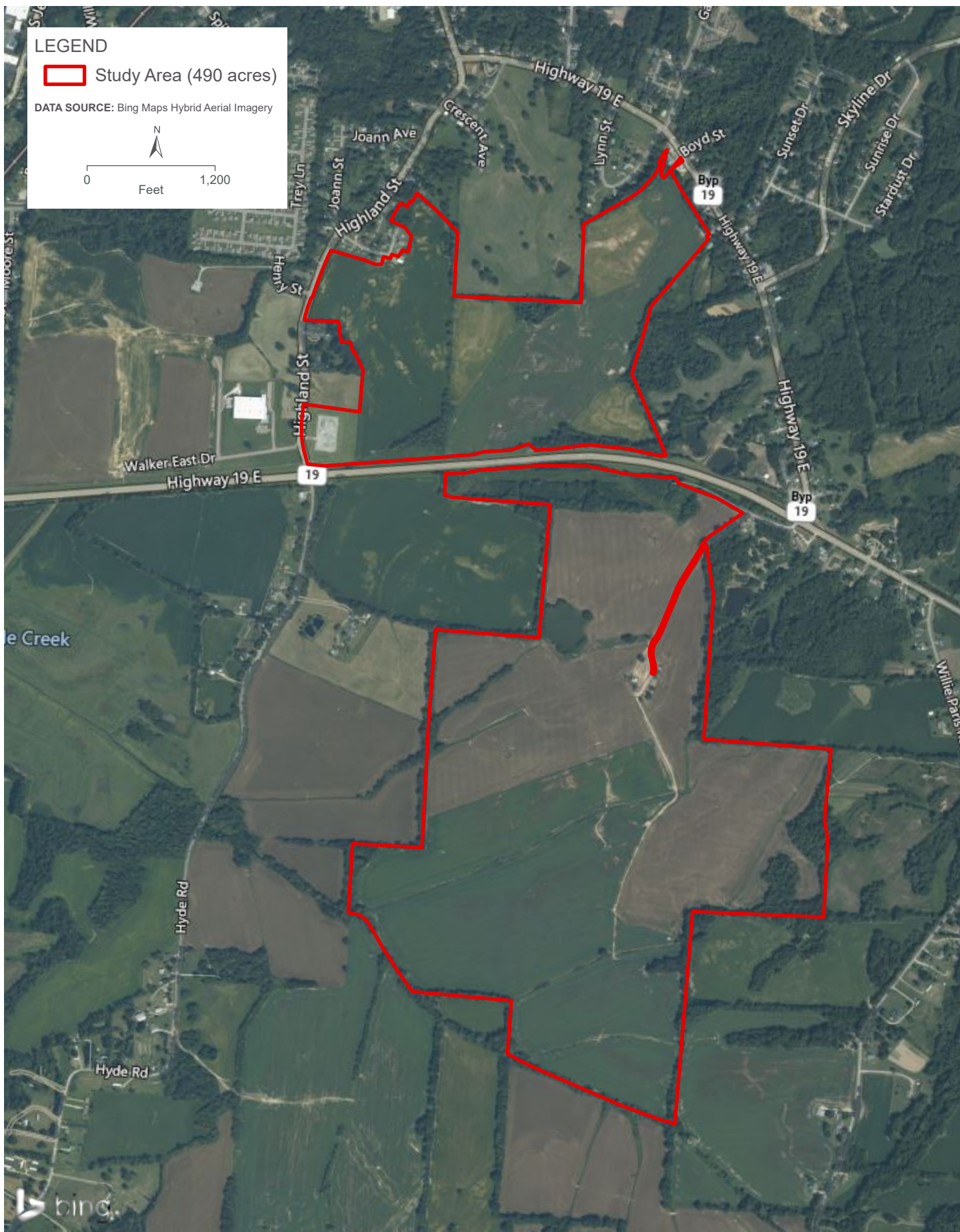


**SR RIPLEY II
PROJECT VICINITY
FIGURE 1**

LEGEND



 Study Area (490 acres)

DATA SOURCE: Bing Maps Hybrid Aerial Imagery

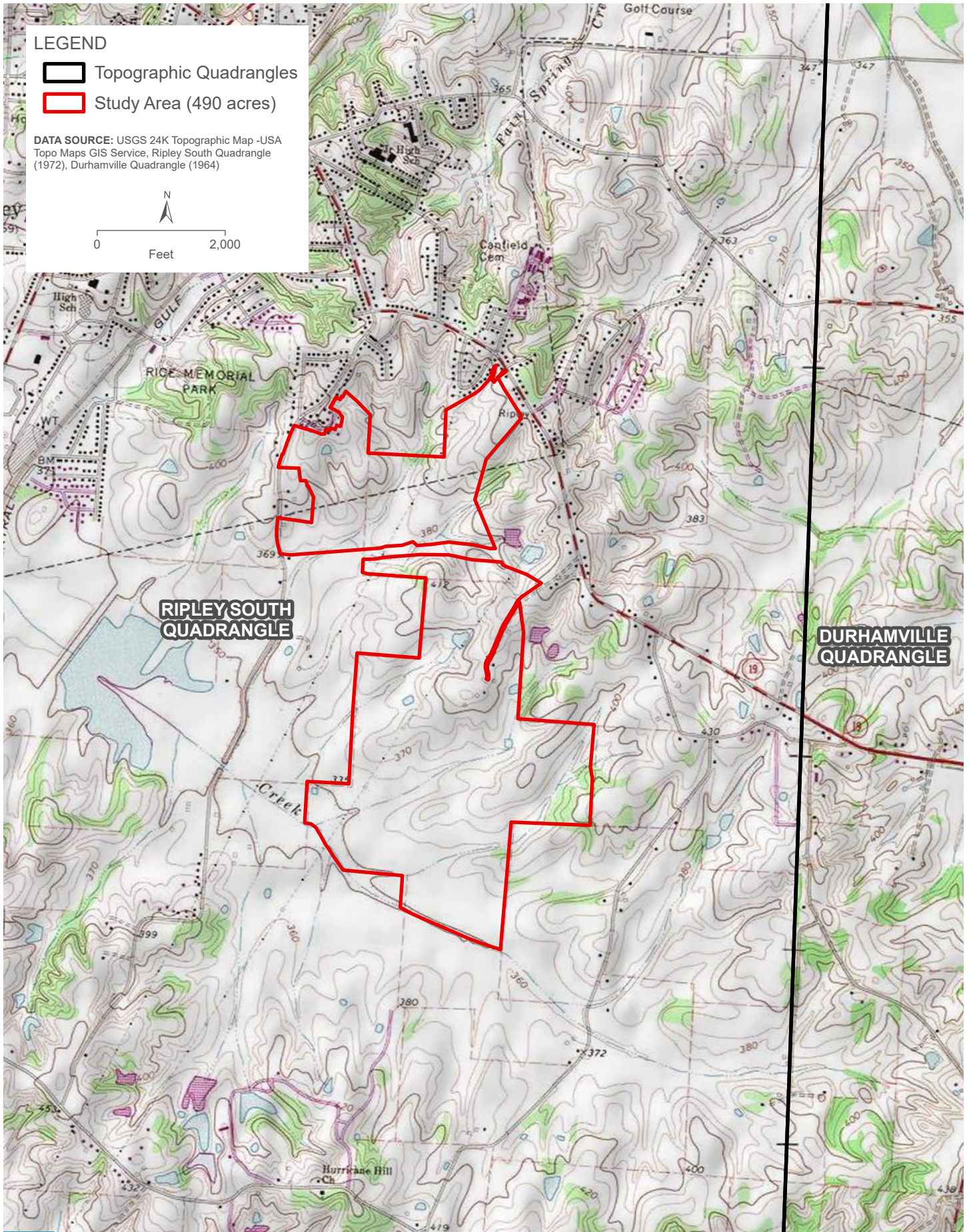
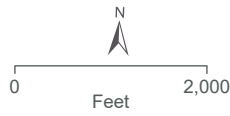


SR RIPLEY II
PROJECT AERIAL
FIGURE 2

LEGEND

-  Topographic Quadrangles
-  Study Area (490 acres)

DATA SOURCE: USGS 24K Topographic Map -USA
Topo Maps GIS Service, Ripley South Quadrangle (1972), Durhamville Quadrangle (1964)



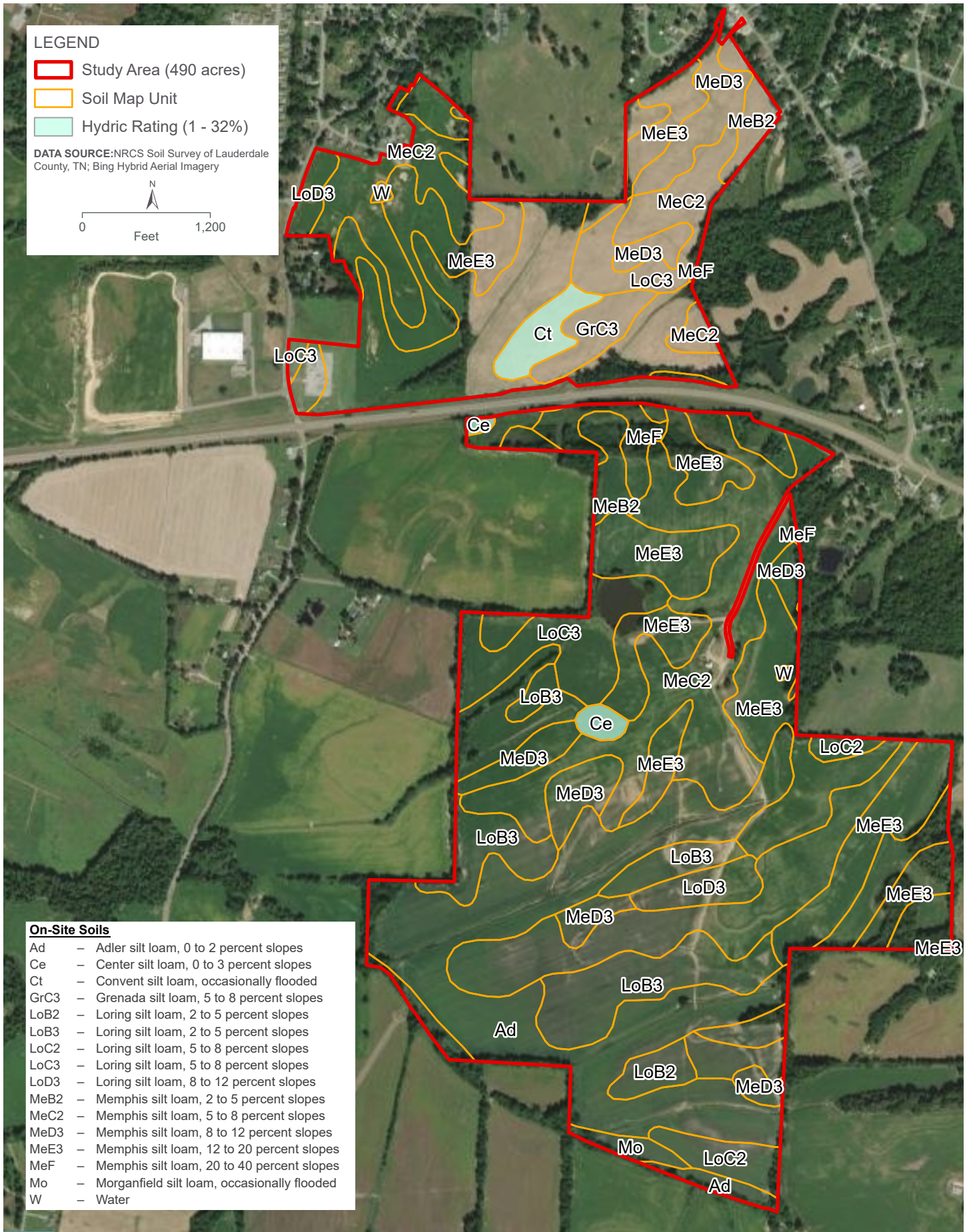
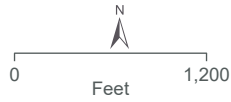
**SR RIPLEY II
USGS TOPOGRAPHIC QUADRANGLES**

FIGURE 3

LEGEND

- Study Area (490 acres)
- Soil Map Unit
- Hydric Rating (1 - 32%)

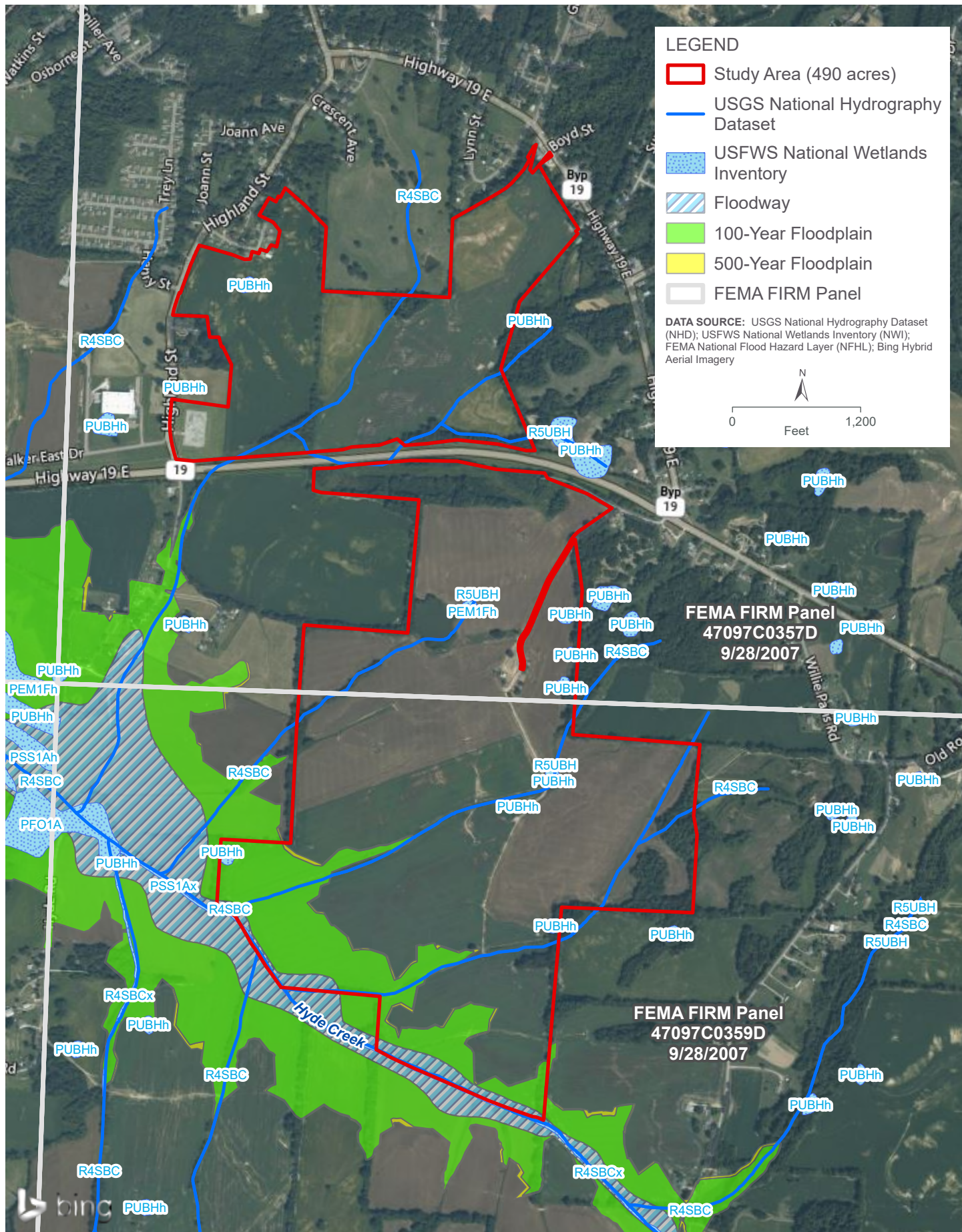
DATA SOURCE: NRCS Soil Survey of Lauderdale County, TN; Bing Hybrid Aerial Imagery



On-Site Soils

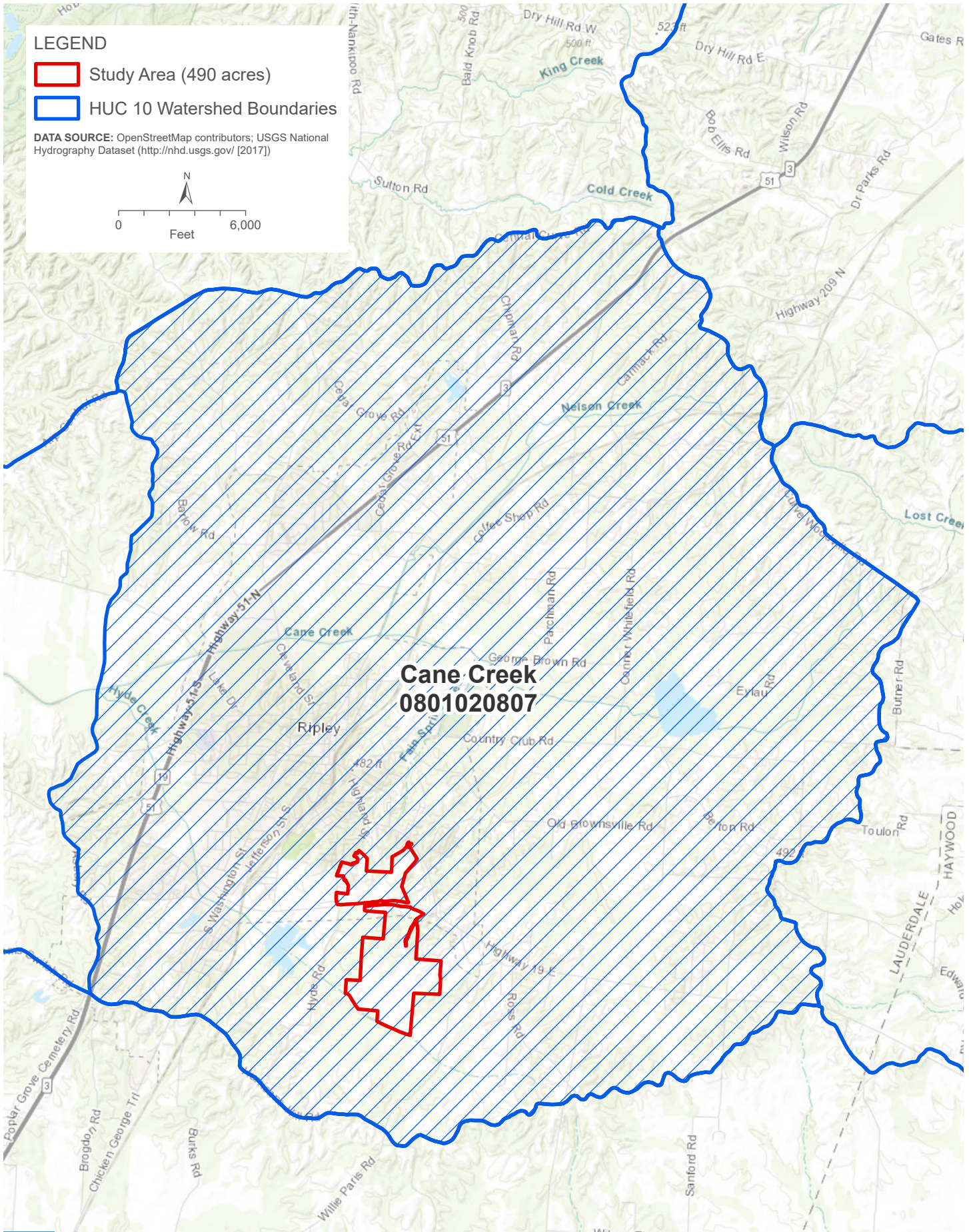
- Ad – Adler silt loam, 0 to 2 percent slopes
- Ce – Center silt loam, 0 to 3 percent slopes
- Ct – Convent silt loam, occasionally flooded
- GrC3 – Grenada silt loam, 5 to 8 percent slopes
- LoB2 – Loring silt loam, 2 to 5 percent slopes
- LoB3 – Loring silt loam, 2 to 5 percent slopes
- LoC2 – Loring silt loam, 5 to 8 percent slopes
- LoC3 – Loring silt loam, 5 to 8 percent slopes
- LoD3 – Loring silt loam, 8 to 12 percent slopes
- MeB2 – Memphis silt loam, 2 to 5 percent slopes
- MeC2 – Memphis silt loam, 5 to 8 percent slopes
- MeD3 – Memphis silt loam, 8 to 12 percent slopes
- MeE3 – Memphis silt loam, 12 to 20 percent slopes
- MeF – Memphis silt loam, 20 to 40 percent slopes
- Mo – Morganfield silt loam, occasionally flooded
- W – Water





**SR RIPLEY II
NHD, NWI, AND FEMA FLOOD HAZARD DATA**

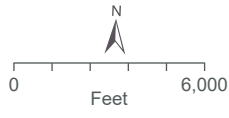
FIGURE 5



LEGEND

- Study Area (490 acres)
- HUC 10 Watershed Boundaries

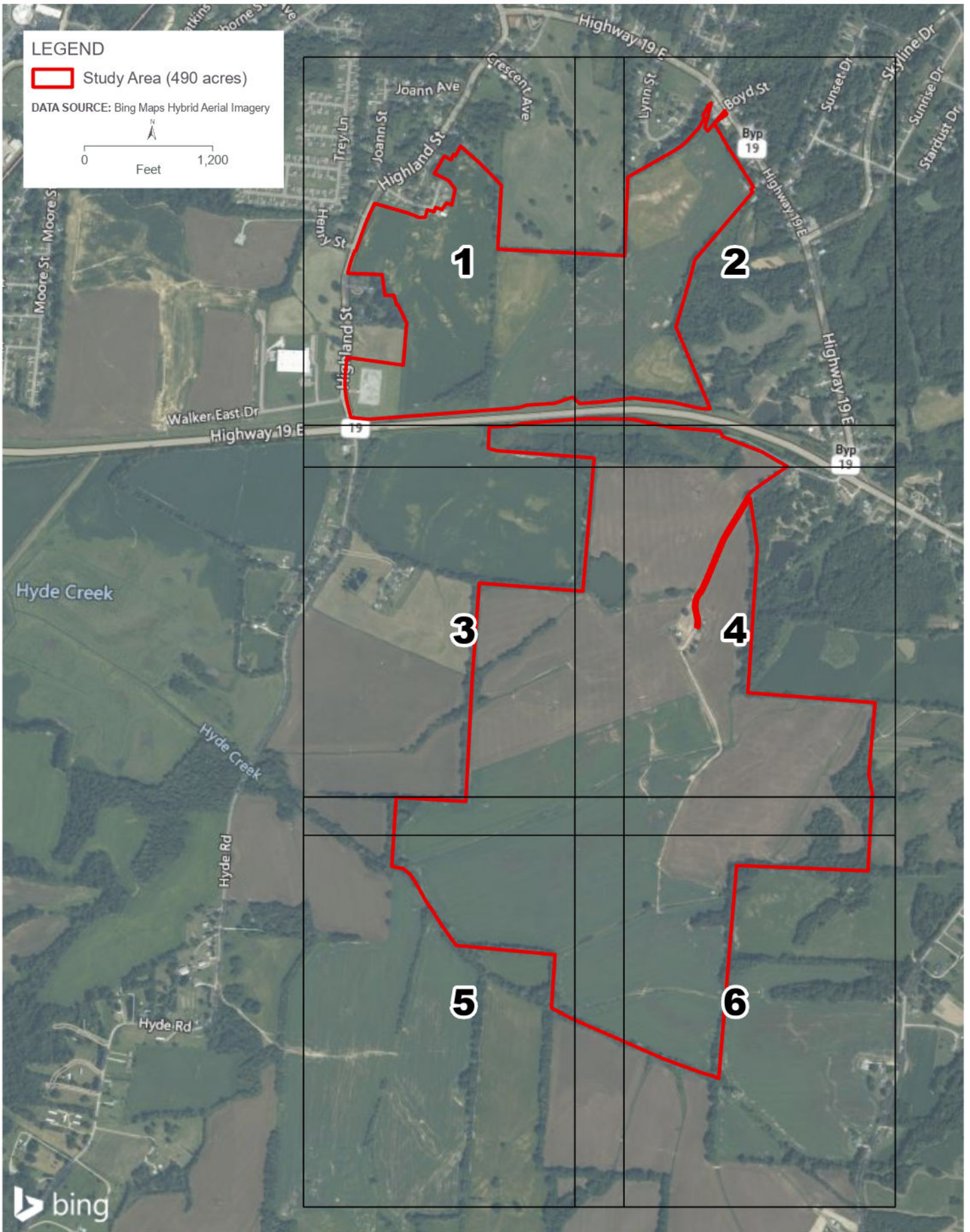
DATA SOURCE: OpenStreetMap contributors; USGS National Hydrography Dataset (<http://nhd.usgs.gov/> [2017])



**Cane Creek
0801020807**



**SR RIPLEY II
HUC 10 WATERSHED
FIGURE 6**



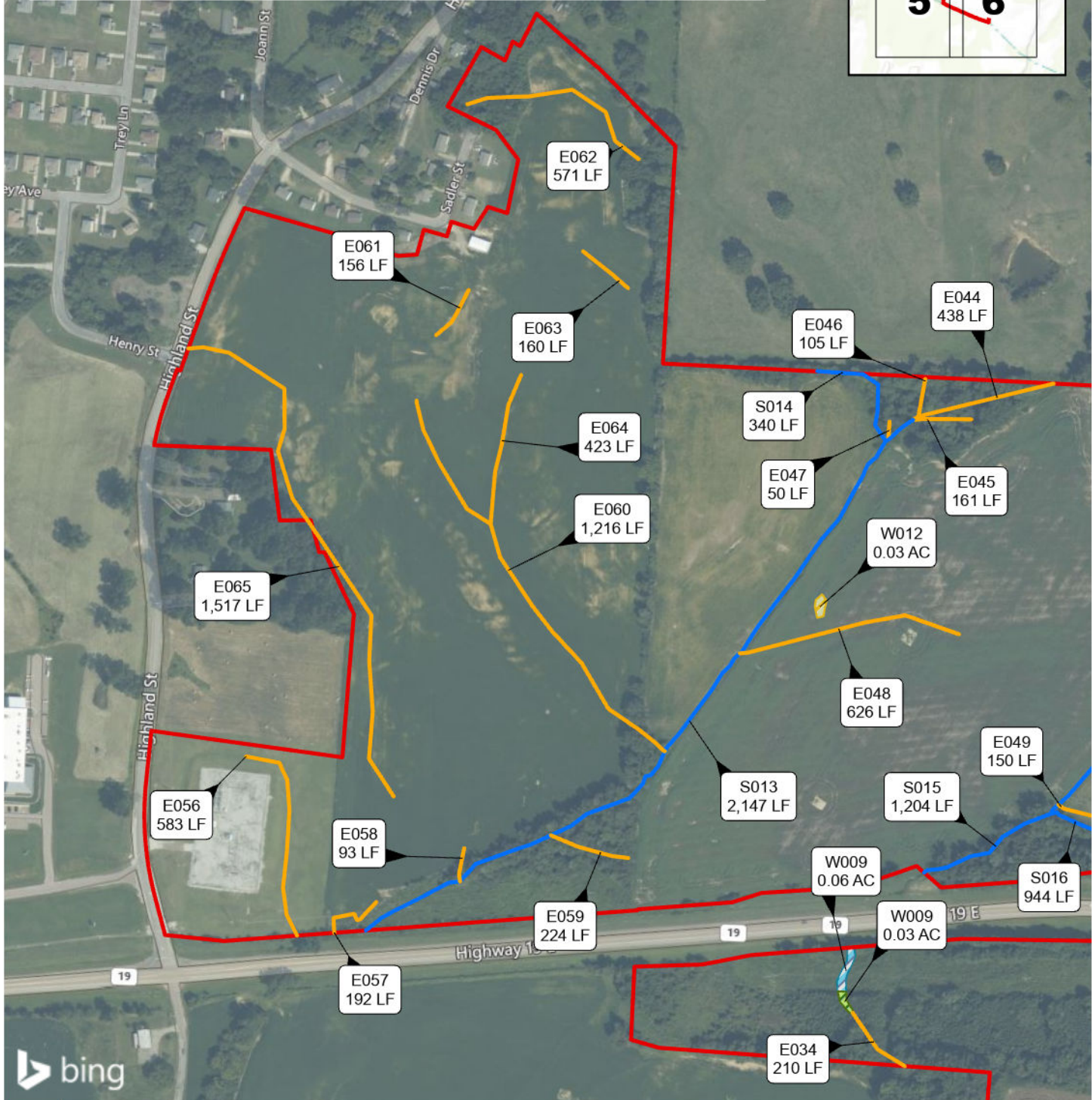
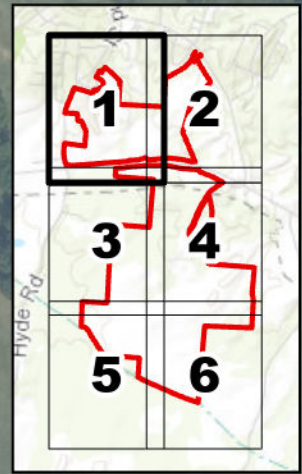
**SR RIPLEY II
DELINEATED FEATURES - OVERVIEW**

FIGURE 7

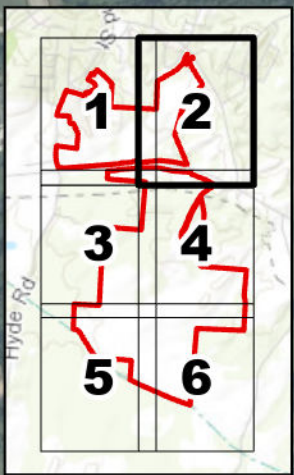
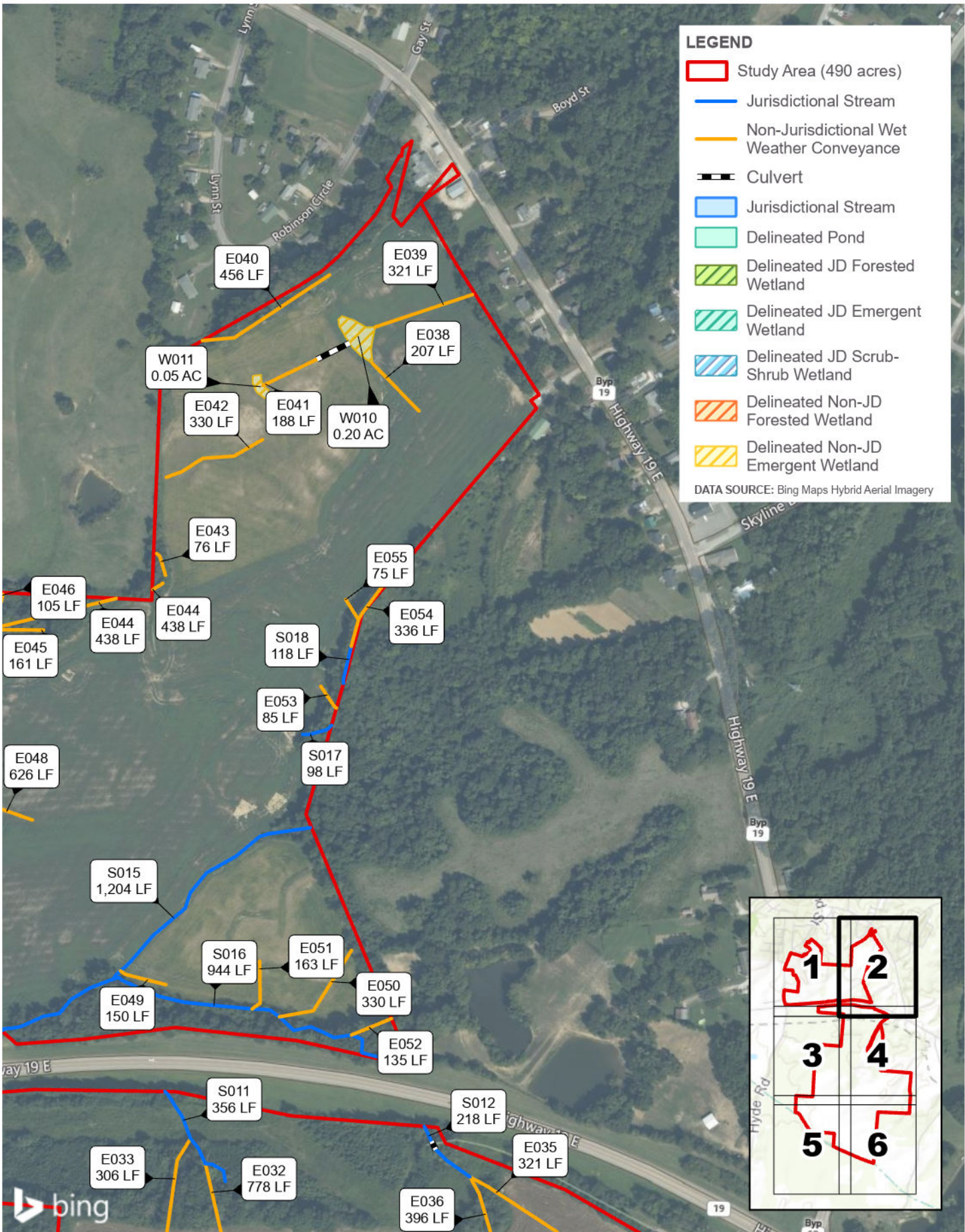
LEGEND

- Study Area (490 acres)
- Jurisdictional Stream
- Non-Jurisdictional Wet Weather Conveyance
- Culvert
- Jurisdictional Stream
- Delineated JD Forested Wetland
- Delineated JD Emergent Wetland
- Delineated JD Scrub-Shrub Wetland
- Delineated Non-JD Forested Wetland
- Delineated Non-JD Emergent Wetland
- Delineated Pond

DATA SOURCE: Bing Maps Hybrid Aerial Imagery



**SR RIPLEY II
DELINEATED FEATURES
FIGURE 7.1**



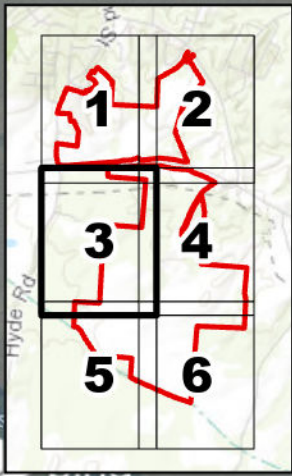
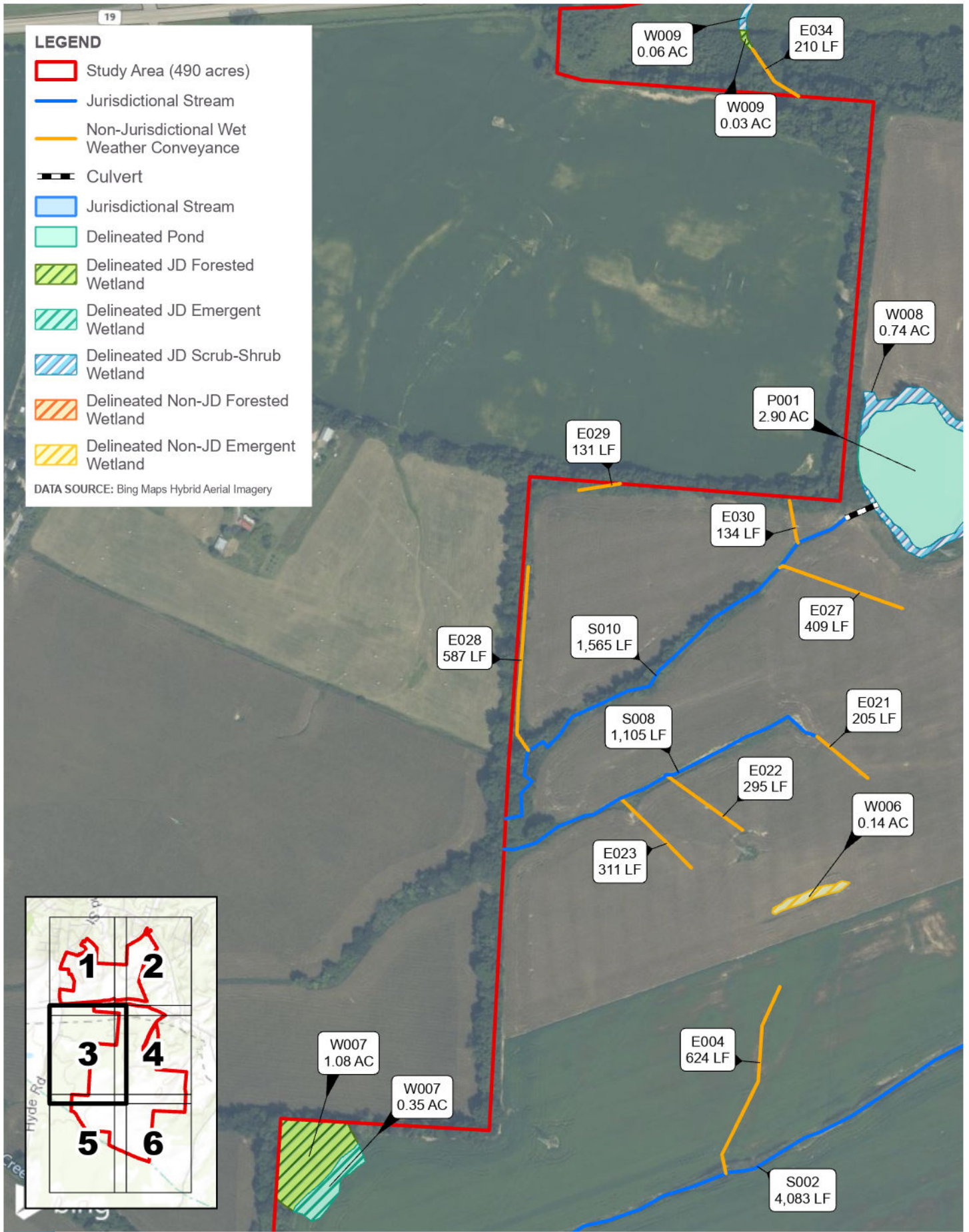
**SR RIPLEY II
DELINEATED FEATURES**

FIGURE 7.2

LEGEND

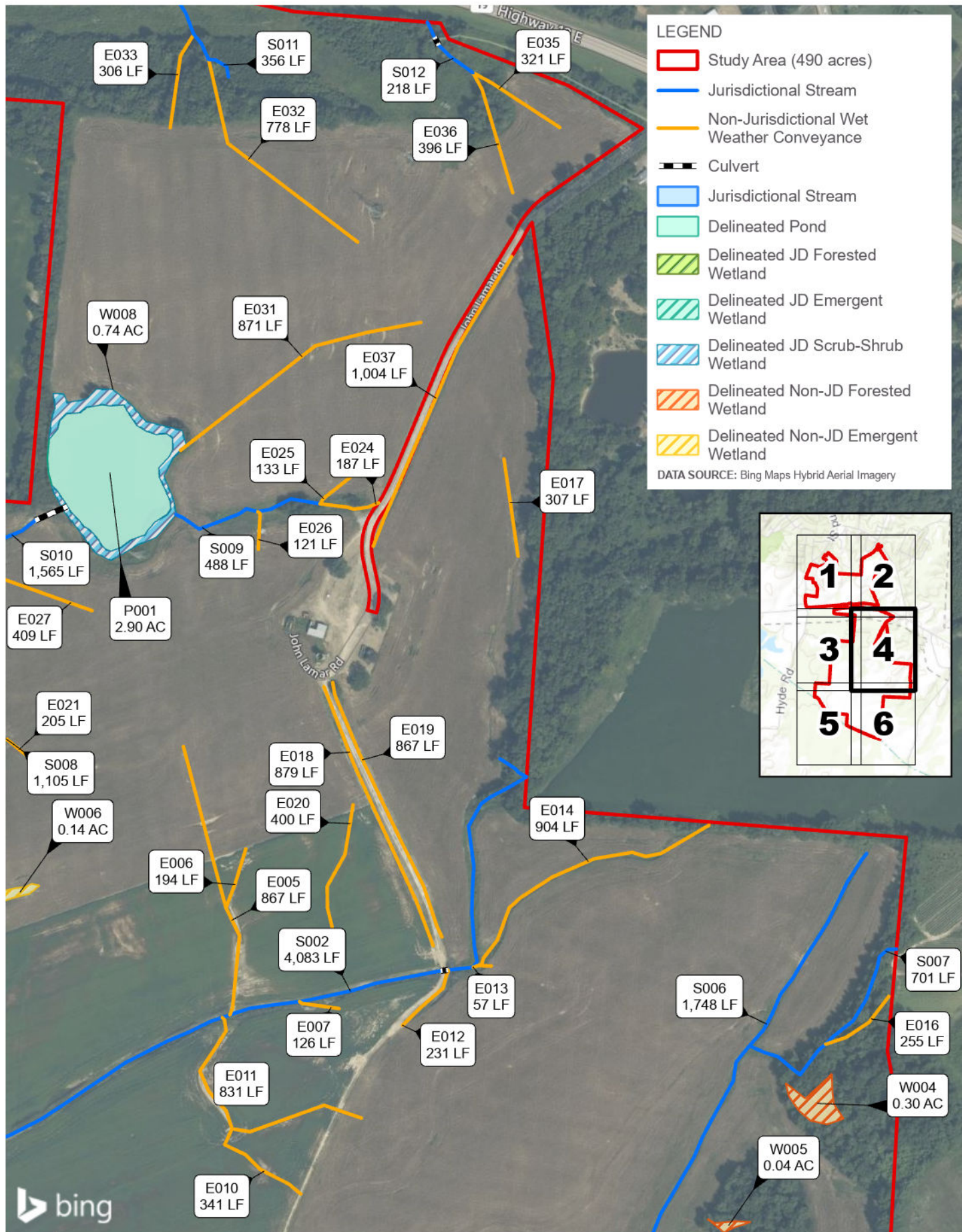
- Study Area (490 acres)
- Jurisdictional Stream
- Non-Jurisdictional Wet Weather Conveyance
- Culvert
- Jurisdictional Stream
- Delineated Pond
- Delineated JD Forested Wetland
- Delineated JD Emergent Wetland
- Delineated JD Scrub-Shrub Wetland
- Delineated Non-JD Forested Wetland
- Delineated Non-JD Emergent Wetland

DATA SOURCE: Bing Maps Hybrid Aerial Imagery



**SR RIPLEY II
DELINEATED FEATURES**

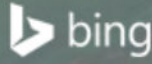
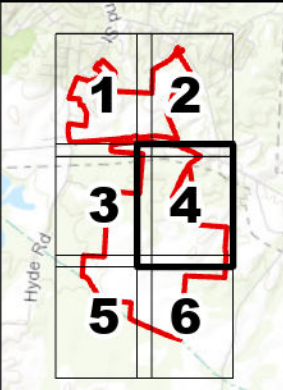
FIGURE 7.3



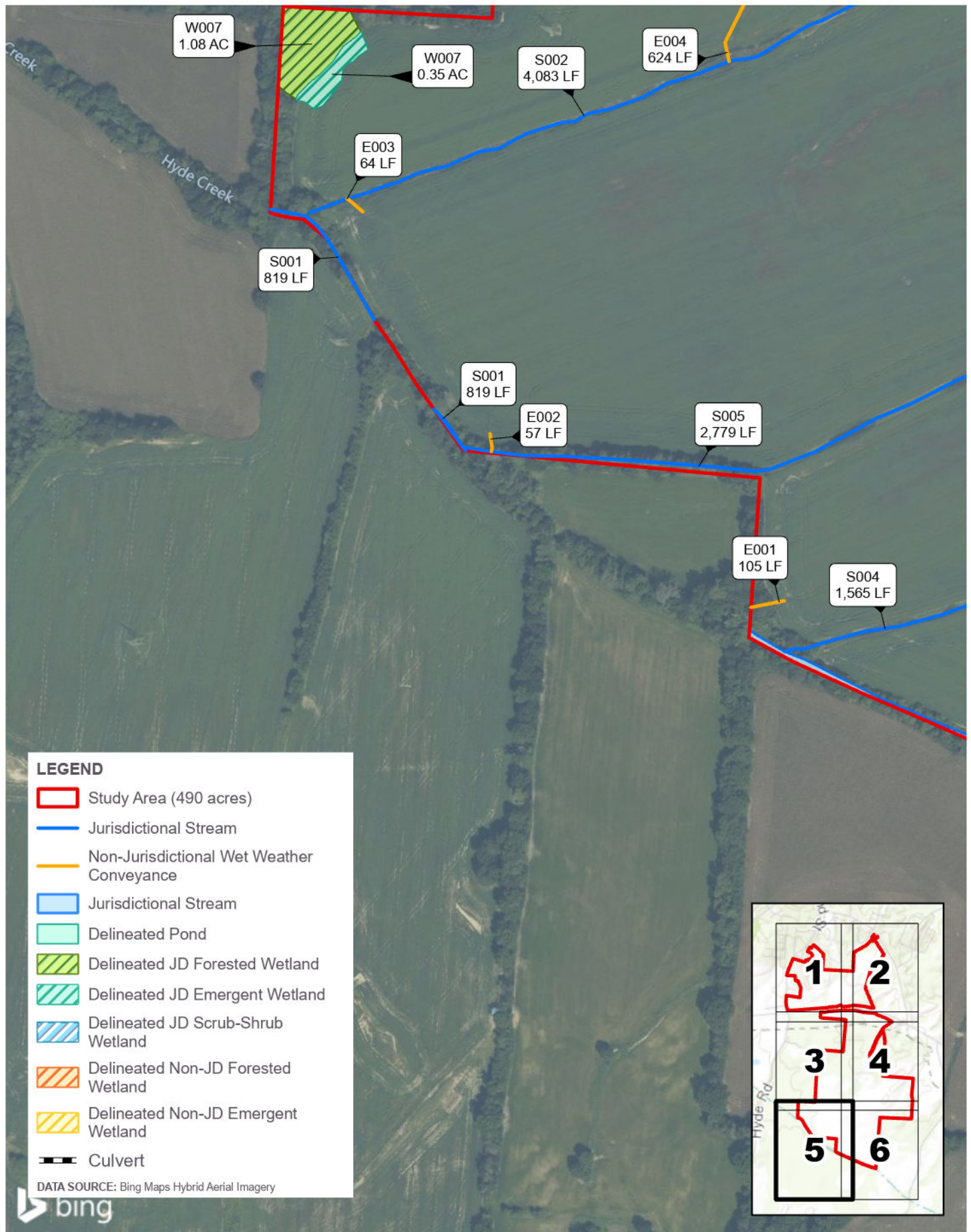
LEGEND

- Study Area (490 acres)
- Jurisdictional Stream
- Non-Jurisdictional Wet Weather Conveyance
- Culvert
- Jurisdictional Stream
- Delineated Pond
- Delineated JD Forested Wetland
- Delineated JD Emergent Wetland
- Delineated JD Scrub-Shrub Wetland
- Delineated Non-JD Forested Wetland
- Delineated Non-JD Emergent Wetland

DATA SOURCE: Bing Maps Hybrid Aerial Imagery



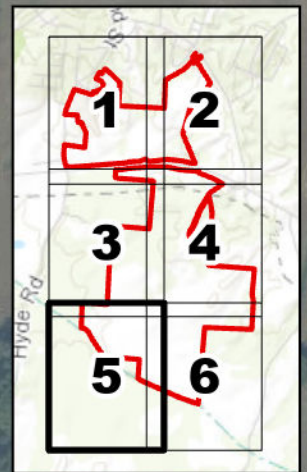
**SR RIPLEY II
DELINEATED FEATURES**
FIGURE 7.4



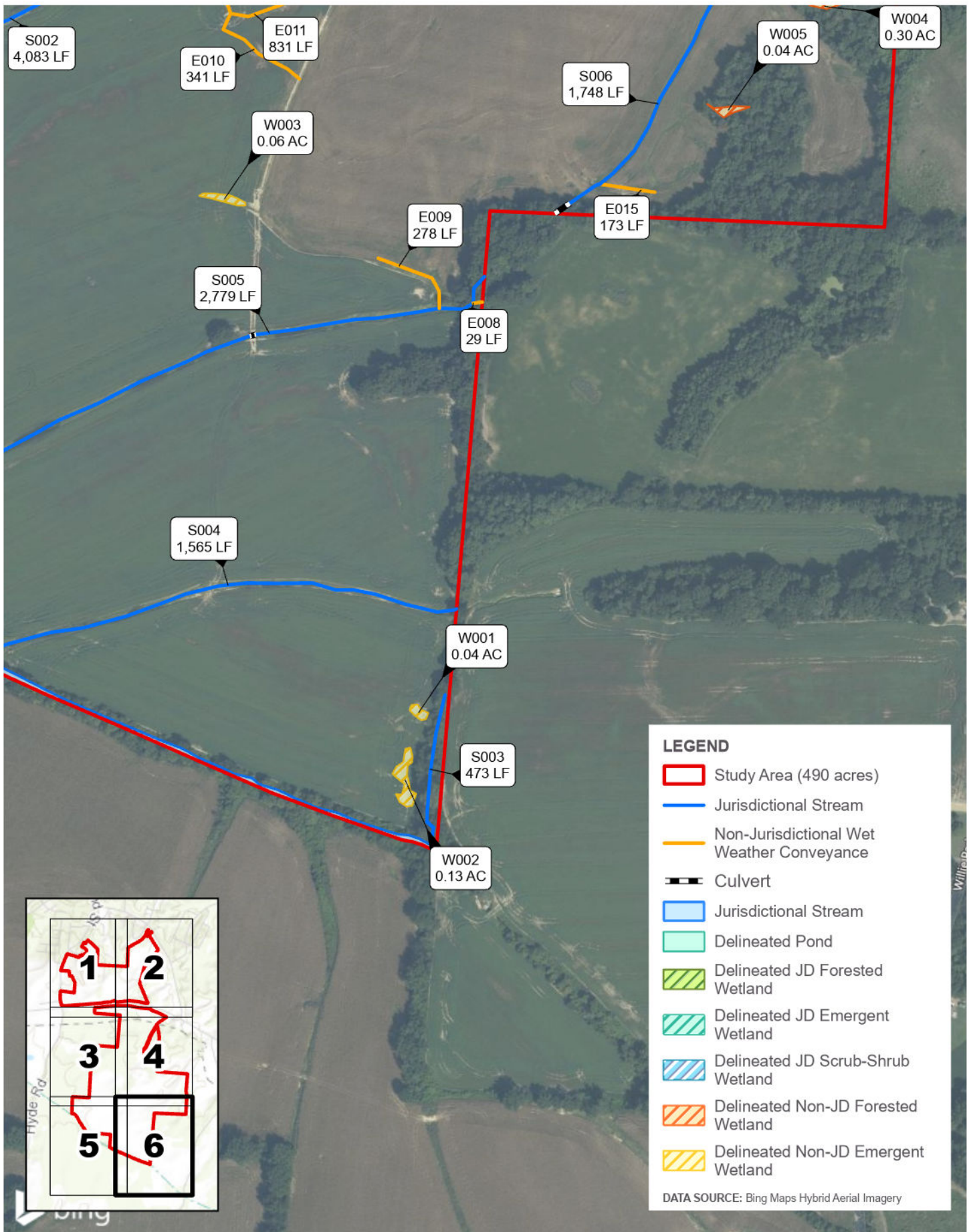
LEGEND

- Study Area (490 acres)
- Jurisdictional Stream
- Non-Jurisdictional Wet Weather Conveyance
- Jurisdictional Stream
- Delineated Pond
- Delineated JD Forested Wetland
- Delineated JD Emergent Wetland
- Delineated JD Scrub-Shrub Wetland
- Delineated Non-JD Forested Wetland
- Delineated Non-JD Emergent Wetland
- Culvert

DATA SOURCE: Bing Maps Hybrid Aerial Imagery



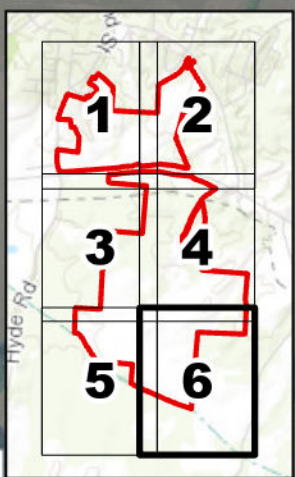
**SR RIPLEY II
DELINEATED FEATURES
FIGURE 7.5**



LEGEND

- Study Area (490 acres)
- Jurisdictional Stream
- Non-Jurisdictional Wet Weather Conveyance
- Culvert
- Jurisdictional Stream
- Delineated Pond
- Delineated JD Forested Wetland
- Delineated JD Emergent Wetland
- Delineated JD Scrub-Shrub Wetland
- Delineated Non-JD Forested Wetland
- Delineated Non-JD Emergent Wetland

DATA SOURCE: Bing Maps Hybrid Aerial Imagery



**SR RIPLEY II
DELINEATED FEATURES
FIGURE 7.6**

This page intentionally left blank.