# Red Flag Investigation - Site Location
# US 41 between Hillsdale Road and Radio Avenue
# Des. No. 1400005, Intersection Improvement
# Vanderburgh County, Indiana


0.6 0.3 0 0.6 Miles

**Sources:**
**Non Orthophotography Data** - Obtained from the State of Indiana Geographical Information Office Library
**Orthophotography** - Obtained from Indiana Map Framework Data (www.indianamap.org)
**Map Projection:** UTM Zone 16 N **Map Datum:** NAD83

**This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.**

EVANSVILLE NORTH
QUADRANGLE
INDIANA
7.5 MINUTE SERIES

# Red Flag Investigation - Infrastructure
# US 41 between Hillsdale Road and Radio Avenue
# Des. No. 1400005, Intersection Improvement
# Vanderburgh County, Indiana


0.15 0.075 0 0.15 Miles

**Sources:**
**Non Orthophotography Data** - Obtained from the State of Indiana Geographical Information Office Library
**Orthophotography** - Obtained from Indiana Map Framework Data (www.indianamap.org)
**Map Projection:** UTM Zone 16 N **Map Datum:** NAD83

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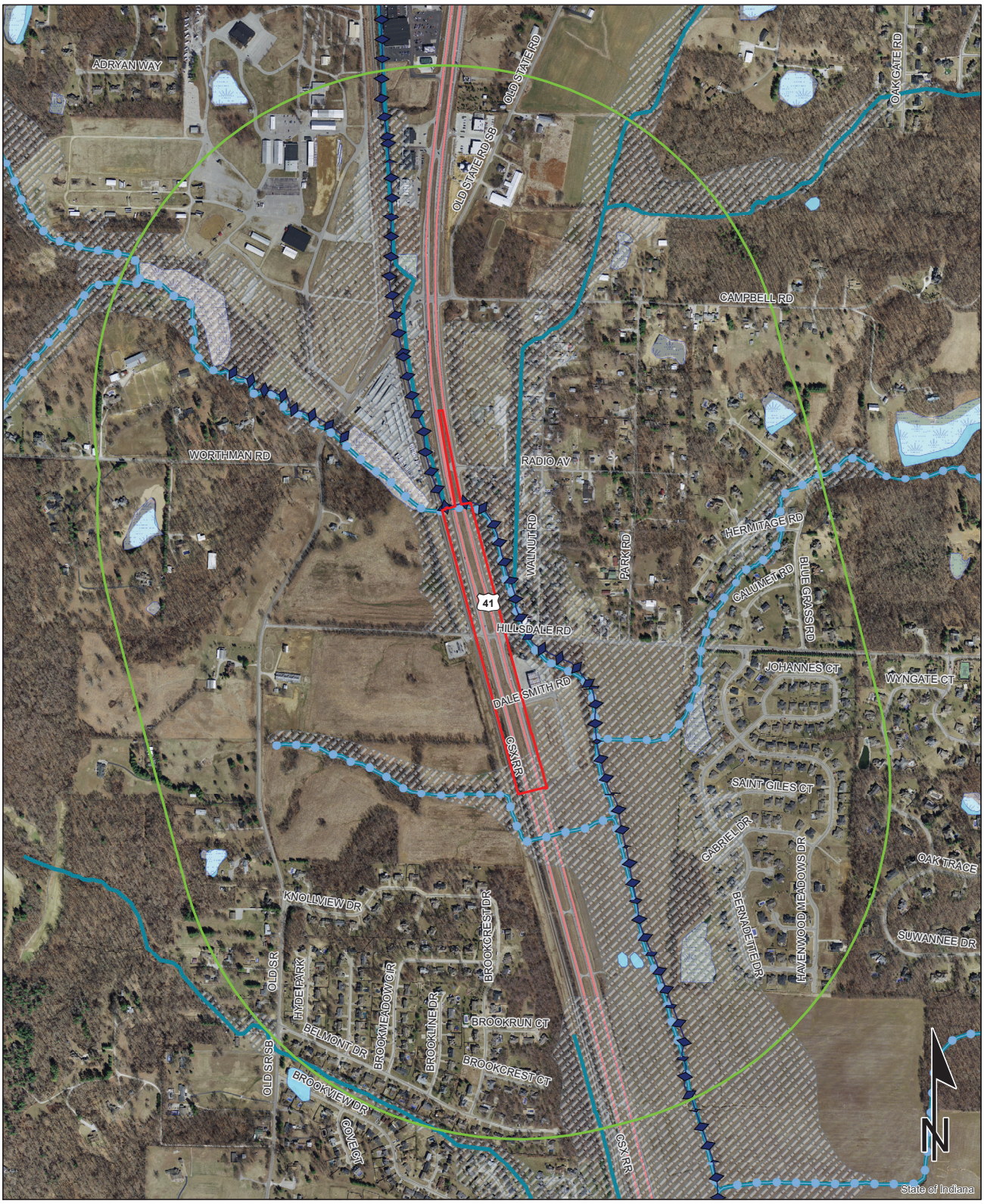
- Religious Facility
- Airport
- Cemeteries
- Hospital
- School
- Recreation Facility
- Pipeline
- Railroad
- Trails
- Managed Lands
- County Boundary
- Project Area
- Half Mile Radius
- Toll
- Interstate
- State Route
- US Route
- Local Road

# Red Flag Investigation - Water Resources
# US 41 between Hillsdale Road and Radio Avenue
# Des. No. 1400005, Intersection Improvement
# Vanderburgh County, Indiana



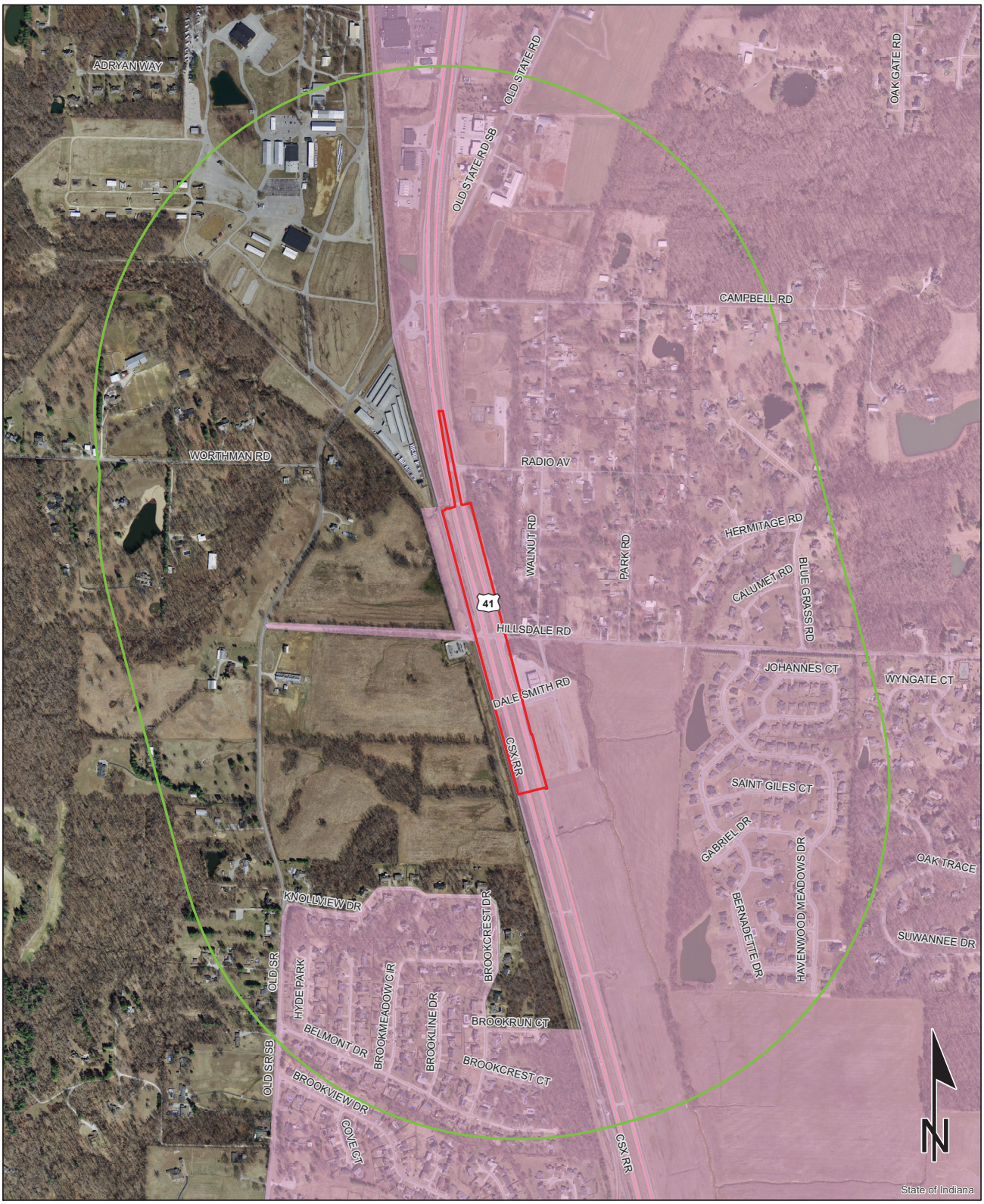

0.15 0.075 0 0.15 Miles

**Sources:**
**Non Orthophotography Data** - Obtained from the State of Indiana Geographical Information Office Library
**Orthophotography** - Obtained from Indiana Map Framework Data (www.indianamap.org)
**Map Projection:** UTM Zone 16 N **Map Datum:** NAD83

**This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.**

- NWI - Point
- Karst Spring
- NWI- Line
- Impaired_Stream_Lake
- NPS NRI listed
- River
- Canal Structure - Historic
- Canal Route - Historic
- Wetlands
- Lake
- Floodplain - DFIRM
- Cave Entrance Density
- Sinkhole Area
- Sinking-Stream Basin
- County Boundary
- Project Area
- Half Mile Radius
- Toll
- Interstate
- State Route
- US Route
- Local Road

# Red Flag Investigation - Urbanized Area Boundary
# US 41 between Hillsdale Road and Radio Avenue
# Des. No. 1400005, Intersection Improvement
# Vanderburgh County, Indiana



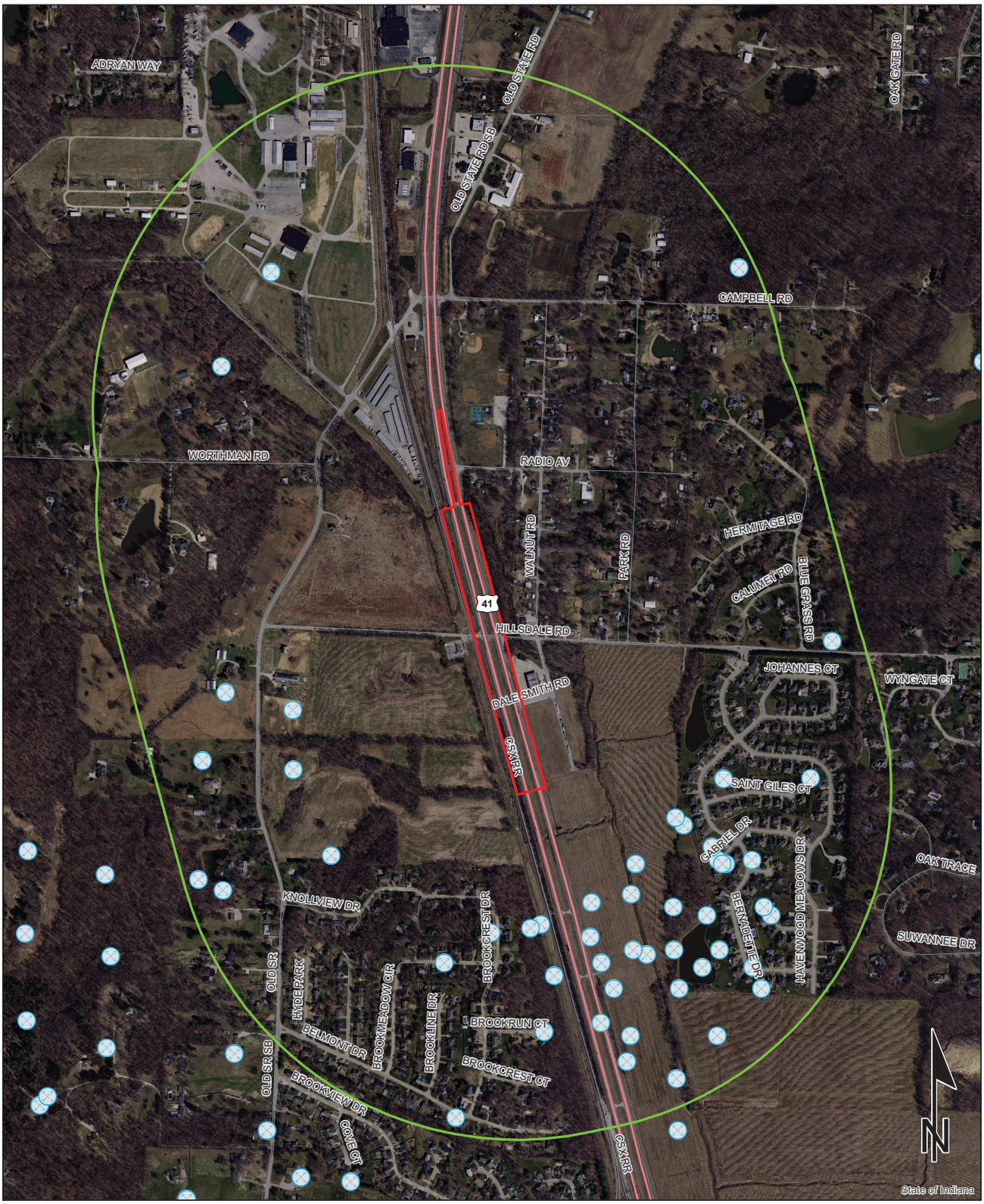

0.15 0.075 0 0.15 Miles

**Sources:**
**Non Orthophotography Data** - Obtained from the State of Indiana Geographical Information Office Library
**Orthophotography** - Obtained from Indiana Map Framework Data (www.indianamap.org)
**Map Projection:** UTM Zone 16 N **Map Datum:** NAD83

**This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.**

UAB
County Boundary
Project Area
Half Mile Radius
Toll
Interstate
State Route
US Route
Local Road

# Red Flag Investigation - Mining/Mineral Exploration
# US 41Hillsdale Road and Radio Avenue
# Des. No. 1400005, Intersection Improvement
# Vanderburgh County, Indiana




0.15 0.075 0 0.15 Miles

**Sources:**

**Non Orthophotography**

**Data** - Obtained from the State of Indiana Geographical Information Office Library

**Orthophotography** - Obtained from Indiana Map Framework Data (www.indianamap.org)

**Map Projection:** UTM Zone 16 N **Map Datum:** NAD83

**This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.**

- Oil and Gas Wells
- Mineral Resources
- Mine - Surface
- Mine - Underground
- County Boundary
- Project Area
- Half Mile Radius
- Toll
- Interstate
- State Route
- US Route
- Local Road

# Red Flag Investigation - Hazardous Material Concerns
# US 41 between Hillsdale Road and Radio Avenue
# Des. No. 1400005, Intersection Improvement
# Vanderburgh County, Indiana


- Brownfield
- RCRA Corrective Action Sites
- Confined Feeding Operation
- Notice_Of_Contamination
- Construction/Demolition Site
- Infectious/Medical Waste Site
- Leaking Underground Storage Tank
- Manufactured Gas Plant
- NPDES Facilites
- NPDES Pipe Locations
- Open Dump Waste Site
- RCRA Generator/TSD
- Restricted Waste Site
- Septage Waste Site
- Solid Waste Landfill
- State Cleanup Site
- Superfund
- Tire Waste Site
- Underground Storage Tank
- Voluntary Remediation Program
- Waste Transfer Station
- Institutional Controls
- County Boundary
- Project Area
- Half Mile Radius
- Toll
- Interstate
- State Route
- US Route
- Local Road

0.2 0.1 0 0.2 Miles

This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.



**Sources:**
**Non Orthophotography**
**Data** - Obtained from the State of Indiana Geographical Information Office Library
**Orthophotography** - Obtained from Indiana Map Framework Data (www.indianamap.org)
**Map Projection:** UTM Zone 16 N **Map Datum:** NAD83

# Indiana County Endangered, Threatened and Rare Species List

## County: Vanderburgh

| Species Name | Common Name | FED | STATE | GRANK | SRANK |
|---|---|---|---|---|---|
| **Crustacean: Malacostraca** | | | | | |
| Orconectes indianensis | Indiana Crayfish | | SR | G3 | S2 |
| **Mollusk: Bivalvia (Mussels)** | | | | | |
| Arcidens confragosus | Rock Pocketbook | | | G4 | S2 |
| Lampsilis ovata | Pocketbook | | | G5 | S2 |
| Ligumia recta | Black Sandshell | | | G4G5 | S2 |
| Plethobasus cyphyus | Sheepnose | LE | SE | G3 | S1 |
| Pleurobema coccineum | Round Pigtoe | | | G4G5 | S3 |
| Pleurobema cordatum | Ohio Pigtoe | | SSC | G4 | S2 |
| **Insect: Coleoptera (Beetles)** | | | | | |
| Nicrophorus americanus | American Burying Beetle | LE | SX | G2G3 | SX |
| **Insect: Lepidoptera (Butterflies & Moths)** | | | | | |
| Catocala marmorata | Marbled Underwing Moth | | SE | G3G4 | S1 |
| **Fish** | | | | | |
| Etheostoma squamiceps | Spottail Darter | | | G4G5 | S2S3 |
| **Amphibian** | | | | | |
| Cryptobranchus alleganiensis alleganiensis | Eastern Hellbender | C | SE | G3G4T3T4 | S1 |
| **Reptile** | | | | | |
| Kinosternon subrubrum subrubrum | Eastern Mud Turtle | | SE | G5T5 | S2 |
| Nerodia erythrogaster neglecta | Copperbelly Water Snake | PS:LT | SE | G5T3 | S2 |
| Opheodrys aestivus | Rough Green Snake | | SSC | G5 | S3 |
| **Bird** | | | | | |
| Ardea alba | Great Egret | | SSC | G5 | S1B |
| Bartramia longicauda | Upland Sandpiper | | SE | G5 | S3B |
| Cistothorus platensis | Sedge Wren | | SE | G5 | S3B |
| Falco peregrinus | Peregrine Falcon | | SSC | G4 | S2B |
| Haliaeetus leucocephalus | Bald Eagle | | SSC | G5 | S2 |
| Lanius ludovicianus | Loggerhead Shrike | | SE | G4 | S3B |
| Lophodytes cucullatus | Hooded Merganser | | | G5 | S2S3B |
| **Mammal** | | | | | |
| Nycticeius humeralis | Evening Bat | | SE | G5 | S1 |
| Sylvilagus aquaticus | Swamp Rabbit | | SE | G5 | S1 |
| Taxidea taxus | American Badger | | SSC | G5 | S2 |
| **Vascular Plant** | | | | | |
| Acalypha deamii | Mercury | | WL | G4? | S3 |
| Carex socialis | Social Sedge | | ST | G4 | S2 |
| Catalpa speciosa | Northern Catalpa | | SR | G4? | S3 |
| Chamaelirium luteum | Devil's-bit | | SE | G5 | S1 |
| Crataegus viridis var. viridis | Green Hawthorn | | ST | G5T5 | S2 |

Indiana Natural Heritage Data Center
Division of Nature Preserves
Indiana Department of Natural Resources
This data is not the result of comprehensive county surveys.

Fed: LE = Endangered; LT = Threatened; C = candidate; PDL = proposed for delisting

State: SE = state endangered; ST = state threatened; SR = state rare; SSC = state species of special concern; SX = state extirpated; SG = state significant; WL = watch list

GRANK: Global Heritage Rank: G1 = critically imperiled globally; G2 = imperiled globally; G3 = rare or uncommon globally; G4 = widespread and abundant globally but with long term concerns; G5 = widespread and abundant globally; G? = unranked; GX = extinct; Q = uncertain rank; T = taxonomic subunit rank

SRANK: State Heritage Rank: S1 = critically imperiled in state; S2 = imperiled in state; S3 = rare or uncommon in state; G4 = widespread and abundant in state but with long term concern; SG = state significant; SH = historical in state; SX = state extirpated; B = breeding status; S? = unranked; SNR = unranked; SNA = nonbreeding status unranked

# Indiana County Endangered, Threatened and Rare Species List

## County: Vanderburgh

| Species Name | Common Name | FED | STATE | GRANK | SRANK |
|---|---|---|---|---|---|
| Didiplis diandra | Water-purslane | | SE | G5 | S1 |
| Hottonia inflata | Featherfoil | | ST | G4 | S2 |
| Isoetes melanopoda | Blackfoot Quillwort | | ST | G5 | S2 |
| Orobanche riparia | Bottomland Broomrape | | SE | G4? | S1 |
| Passiflora incarnata | Purple Passion-flower | | WL | G5 | S3 |
| Phacelia ranunculacea | Blue Scorpion-weed | | SE | G4 | S1 |
| Phoradendron serotinum | American Mistletoe | | WL | G5 | S3 |
| Rhexia mariana var. mariana | Maryland Meadow Beauty | | ST | G5T5 | S1 |
| Silene ovata | Ovate Catchfly | | SE | G3 | S1 |
| Taxodium distichum var. distichum | Bald Cypress | | ST | G5 | S2 |
| Vitis palmata | Catbird Grape | | SR | G4 | S3 |
| **High Quality Natural Community** | | | | | |
| Forest - floodplain wet | Wet Floodplain Forest | | SG | G3? | S3 |
| Forest - floodplain wet-mesic | Wet-mesic Floodplain Forest | | SG | G3? | S3 |
| Forest - upland dry-mesic Southwestern Lowlands | Southwestern Lowlands Dry-mesic Upland Forest | | SG | GNR | S1 |
| Forest - upland mesic Southern Bottomlands | Southern Bottomlands Mesic Upland Forest | | SG | GNR | S1 |
| Forest - upland mesic Southwestern Lowlands | Southwestern Lowlands Mesic Upland Forest | | SG | GNR | S1 |
| **Other Significant Feature** | | | | | |
| Freshwater Mussel Concentration Area | Mussel Bed | | SG | G3 | SNR |

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SRANK: State Heritage Rank: S1 = critically imperiled in state; S2 = imperiled in state; S3 = rare or uncommon in state; G4 = widespread and abundant in state but with long term concern; SG = state significant; SH = historical in state; SX = state extirpated; B = breeding status; S? = unranked; SNR = unranked; SNA = nonbreeding status unranked

# APPENDIX F:
# Water Resources

# WATERS DETERMINATION REPORT

## HILLSDALE ROAD AT U.S. 41 INTERSECTION IMPROVEMENTS
## DES. NO. 1400005
## SCOTT AND CENTER TOWNSHIPS, VANDERBURGH COUNTY, INDIANA

**Prepared for:**
First Group Engineering, Inc.

January 21, 2020

Prepared by:


**Metric Environmental, LLC**

**Complex Environment. Creative Solutions.**
6971 Hillsdale Court
Indianapolis, IN 46256
Telephone: 317.207.4286
www.metricenv.com

## Contents

# WATERS OF THE U.S. DETERMINATION REPORT
# Hillsdale Road at U.S. 41 Intersection Improvements
# Scott and Center Townships, Vanderburgh County, Indiana
# Des. No. 1400005
# Prepared By: Cory Shumate, Metric Environmental, LLC
# January 21, 2020

**Date of Waters Field Investigation:** October 15, 2019

**Location:**
Sections 17 and 20; Township 5 South; Range 10 West
Evansville North, IN 7.5-minute USGS Topographic Quadrangles (**Exhibit 2**)
Scott and Center Townships, Vanderburgh County, Indiana
12-Digit HUC Watershed: 051402020303
Latitude: 38.07948 Longitude: -87.55493

**National Wetlands Inventory (NWI) Information:**
Two mapped NWI polygon are located within the project study limits (PSL), listed in the table below. The NWI map is provided as **Exhibit 4**.

| Symbol | Wetland Type | Location Within PSL | Corresponding Feature |
|---|---|---|---|
| R5UBH | Riverine, Ephemeral, Unconsolidated Bottom, Permanently Flooded | North | Little Pigeon Creek |
| PFO1A | Palustrine, Forested, Broad-Leaved Deciduous, Temporarily Flooded | North | Little Pigeon Creek |

**Karst Feature Information:**
No mapped karst features were found within 0.5 mi. of the PSL during the desktop review.

**USGS National Hydrography Dataset (NHD) Information:**
Two mapped NHD flowlines are located within the PSL, listed by occurrence from north to south in the table below. The NHD map is provided in **Exhibit 4**.

| Corresponding Feature | NDH Flowline Classification | NHD Flowline FCODE | Photo Nos. | USGS Blue line |
|---|---|---|---|---|
| Little Pigeon Creek | Stream/River | 46006 | 5-14 | Yes |
| Culvert 6, Wetland B, RSD 8 | Canal/Ditch | 33600 | 42, 44-46, 49, 50, 55, 56, 62 | No |

**FEMA Flood Insurance Rate Map (FIRM):**
Four mapped floodplains are located within the PSL. These mapped floodplains were identified as Zone A and Zone AE, areas subject to inundation by the 1 percent annual chance of flood. These mapped floodplain units were associated with Little Pigeon Creek. The FIRM map for this area is provided as **Exhibit 4**.

**Soils:**
According to the Natural Resources Conservation Service (NRCS) Soil Survey Geographic (SSURGO) Database for Vanderburgh County, Indiana, the PSL contained three mapped soil units, listed in the table below. The NRCS soil map is provided as **Exhibit 4**.

| Symbol | Map Unit Name | Hydric Rating (%) |
|---|---|---|
| Ba | Bartle silt loam | Hydric (3) |
| St | Stendal silt loam | Hydric (3) |
| Wm | Wilbur silt loam | Not Hydric (0) |

**Attached Documents:**
Maps of the project area (**Exhibits 1-5**)
Photo Location Map (**Exhibit 5**)
Site Photographs
Wetland Determination Data Form(s)
Preliminary Jurisdictional Determination Form

**Project Description:**
The proposed project (Des. 1400005) includes the intersection improvement project on US 41 between Hillsdale Rd. and Radio Ave. situated at the southeast corner of the Town of Darmstadt, Indiana. The two-way stop-controlled intersection of U.S. 41 at Hillsdale Rd. will be converted to a J-turn intersection. The median access for Radio Ave. will be closed, making Radio Ave. a right-in/right-out roadway approach. In addition, street lighting will be installed. No impacts to Little Pigeon Creek are anticipated as a result of this project. This project is located in Sections 17 and 20, Township 5 South, Range 10 West on the Evansville North, Indiana 7.5-minute United States Geological Survey topographic quadrangle.

**Field Reconnaissance:**
The wetland determination field visit was conducted on October 15, 2019 by Cory Shumate of Metric Environmental, LLC. The project study limits consist of the area that has the potential to be impacted, based on the provided design scenario. This area was evaluated for the presence of wetlands and Waters of the United States. This investigation was conducted in accordance with the *1987 U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual* and the *August 2010 Midwest Regional Supplement (version 2.0) Manual*.

A Location Map showing the project location is provided as **Exhibit 1**. The proposed project is located in central Vanderburgh County, Indiana, on U.S. 41. The PSL extended along U.S. 41 for approximately 3,000 ft. total. The PSL limits south of Little Pigeon Creek extended approximately 2,260 ft. southeast and approximately 110 ft. east and west from the center of the U.S. 41 median. The PSL north of Little Pigeon Creek included only the U.S. 41 median and extended approximately 740 ft. northwest. An aerial map of sampling points and water features is provided as **Exhibit 5**. A photo location map is provided as **Exhibit 5** and site photographs are attached.

The site was investigated for evidence of hydrophytic vegetation, hydric soil, and wetland hydrology to determine if the project impacts wetlands and other Waters of U.S. The sampling point (SP) locations were chosen in possible wetland areas within the PSL. The upland areas consisted of road right-of-way. Upland areas where sampling points were not taken, were investigated and determined to be upland due to upward sloping topography and presence of dominant upland vegetation. The sampling points, recorded on the USACE Wetland Determination Data Forms and shown on **Exhibit 5,** provided the following information:

**Sampling Plot Data Summary Table**

| Plot # | Photo #s | Lat/Long | Hydrophytic Vegetation | Hydric Soils | Wetland Hydrology | Within Wetland |
|---|---|---|---|---|---|---|
| SP-A1 | 26-28 | 38.08036 -87.55554 | Yes | Yes | Yes | Yes, Wetland A |
| SP-A2 | 30-32 | 38.07971 -87.55535 | No | Yes | No | No, Wetland A Upland |
| SP-B1 | 43-45 | 38.07909 -87.55508 | Yes | Yes | Yes | Yes, Wetland B |
| SP-B2 | 48-50 | 38.07834 -87.55482 | No | Yes | No | No, Wetland B Upland |
| SP-1 | 15-17 | 38.08226 -87.5556 | Yes | No | No | No |
| SP-2 | 18-20 | 38.08217 -87.55612 | Yes | No | No | No |
| SP-3 | 58-60 | 38.07675 -87.55433 | No | No | No | No |

**Wetlands:**

Two wetlands were observed within the PSL. Descriptions of the wetland and corresponding sampling points are provided below.

**Wetland Summary Table**

| Wetland Name | Photo #s | Lat/Long | Cowardin Class | Total Area | Quality | Likely Water of the U.S. |
|---|---|---|---|---|---|---|
| | | | | acres | | |
| **Wetland A** | 27, 28, 31 | 38.08013 -87.55548 | PSS1A | 0.068 | Poor | Yes |
| **Wetland B** | 42, 44-46, 49, 50 | 38.07872 -87.55493 | PEM1A | 0.061 | Poor | Yes |

**Wetland A (0.068 ac.) – PSS1A**

Wetland A was classified as Palustrine, Scrub-shrub, Broad-Leaved Deciduous, Temporarily Flooded (PSS1A) wetland. This wetland is located in a concave depression northwest of the intersection U.S. 41 and Hillsdale Rd., south of Little Pigeon Creek. The boundaries of Wetland A were delineated by the lack of wetland vegetation and increased elevation. Based on topography, it can be deduced that water drains northwest from Wetland A into Little Pigeon Creek. Little Pigeon Creek then flows south into Pigeon Creek, a Section 10 Traditional Navigable Water (TNW). Therefore, Wetland A should be considered a jurisdictional Water of the U.S. Wetland A was not associated with a mapped NWI unit and was formed within the St mapped soil unit, which as listed as 3 percent hydric. Wetland A is located between railroad and road and likely receives run-off from the adjacent paved road. The wetland exhibited average plant species diversity, no wildlife was observed, and is surrounded by railroad and paved road. These factors contribute to the conclusion that Wetland A likely supports a low amount of wildlife or aquatic habitat, and therefore should be considered to be of poor quality.

Sampling Point A1 (SP-A1) – Wetland A

SP-A1 was located within a concave depression, northwest of the intersection of U.S. 41 and Hillsdale Rd. The dominant vegetation at this sampling point was black willow (*Salix nigra*, OBL) and green ash (*Fraxinus pennsylvanica*, FACW) in the sapling/shrub stratum and lamp rush (*Juncus effusus*, OBL) and Kentucky blue grass (*Poa pratensis*, FAC) in the herb stratum. This met the criteria for hydrophytic vegetation with a prevalence index (1.65) and a dominance test (100 percent). To a depth of 20 in., the soils in the test pit were a silt loam. From 0 to 5 in., the soil exhibited a mixed matrix colors of 10YR 4/2 (45 percent) and 10YR 6/2 (45 percent) with 5YR 4/6 (10 percent) prominent redox concentrations in the matrix. From 5 to 10 in., the soil exhibited mixed matrix colors of 10YR 5/2 (40 percent) and 10YR 7/1 (40 percent) with 5YR 4/6 (20 percent) prominent redox concentrations in the matrix. From 10 to 20 in., the soil exhibited a matrix color of 10YR 5/2 (75 percent) with 7.5YR 5/8 (25 percent) prominent redox concentrations in the matrix. This met the hydric soil indicator of depleted matrix (F3). No primary indicators of wetland hydrology were observed during the field reconnaissance. Two secondary indicators of wetland hydrology were observed: geomorphic position (D2) due to the sampling point's location within

a concave depression, and FAC-neutral test (D5). Therefore, the criteria for wetland hydrology was met. Since all three required wetland criteria were met, this area qualified as a wetland.

Sampling Point A2 (SP-A2) – Wetland A upland

SP-A2 was located on a hillslope south of Wetland A. The dominant vegetation at this sampling point was tall false rye grass (*Schedonorus arundinaceus*, FACU) in the herb stratum. This did not meet any of the indicators of hydrophytic vegetation. To a depth of 12 in., the soils in the test pit were a silt loam. A layer of gravel prevented further excavation in the test pit. From 0 to 5 in., the soil exhibited a matrix color of 10YR 4/2 (98 percent) with 10YR 6/4 (2 percent) distinct redox concentrations in the matrix. From 5 to 12 in., the soil exhibited a matrix color of 10YR 4/2 (80 percent) with 10YR 2/1 (10 percent) faint redox concentrations and 10YR 6/4 (10 percent) distinct redox concentrations in the matrix. This met the hydric soil indicator of depleted matrix (F3). No primary indicators of wetland hydrology were observed. One secondary indicator of wetland hydrology, geomorphic position (D2), was observed due to the area surrounding the sampling point having concave local relief. This did not satisfy the criteria for wetland hydrology. Since only one of the three required wetland criteria were met, this area did not qualify as a wetland.

**Wetland B (0.061 ac.) – PEM1A**

Wetland B was classified as Palustrine, Emergent, Broad-Leaved Deciduous, Temporarily Flooded (PEM1A) wetland. This wetland is located in a concave depression southwest of the intersection of U.S. 41 and Hillsdale Rd. The boundaries of Wetland B were delineated by the lack of wetland vegetation and increased elevation. Based on topography, it can be deduced that water drains northwest from Wetland B, through Culvert 6 and Wetland A and into Little Pigeon Creek. Little Pigeon Creek then flows south into Pigeon Creek, a Section 10 TNW. Therefore, Wetland B should be considered a jurisdictional Water of the U.S. Wetland B was not associated with a mapped NWI unit and was formed within the St mapped soil unit, which as listed as 3 percent hydric. Wetland B is located adjacent to road and likely receives run-off from the adjacent paved road. The wetland exhibited poor plant species diversity and no wildlife was observed. These factors contribute to the conclusion that Wetland B can support a poor amount of wildlife or aquatic habitat, and therefore should be considered to be of poor quality.

Sampling Point B1 (SP-B1) – Wetland B

SP-B1 was located within a concave depression, southwest of the intersection of U.S. 41 and Hillsdale Rd. The dominant vegetation at this sampling point was lamp rush (*Juncus effusus*, OBL), Kentucky blue grass (*Poa pratensis*, FAC), straw-color flat sedge (*Cyperus strigosus*, FACW) in the herb stratum. This met the criteria for hydrophytic vegetation with a prevalence index (2.00) and a dominance test (100 percent). From 0 to 1 in., the soil in the test pit was a silt loam. From 1 to 20 in., the soil in test pit was a silty clay loam. From 0 to 1 in. the soil exhibited a matrix color of 10YR 4/3 (100 percent). From 1 to 20 in., the soil exhibited a matrix color of N 5/ (70 percent) with 2.5YR 2.5/4 (15 percent) and 5YR 3/4 (15 percent) prominent redox concentrations along pore linings. This met the hydric soil indicator of loamy gleyed matrix (F2). Indicators of wetland

hydrology observed included oxidized rhizospheres on living roots (C3), crayfish burrows (C8), geomorphic position (D2) due to sampling point's location within a concave depression, and FAC-neutral test (D5). Since all three required wetland criteria were met, this area qualified as a wetland.

Sampling Point B2 (SP-B2) – Wetland B Upland

SP-B2 was located just west of Wetland B on a hillslope. The dominant vegetation at this sampling point included sugar maple (*Acer saccharum*, FACU) in the sapling/shrub stratum tall false rye grass (*Schedonorus arundinaceus*, FACU) and yellow bristle grass (*Setaria pumila*, FAC) in the herb stratum; and rambler rose (*Rosa multiflora*, FACU) and Japanese honeysuckle (*Lonicera japonica*, FACU) in the woody vine stratum. This did not meet the criteria for hydrophytic vegetation. To a depth of 20 in., the soil in the test pit was a silty clay loam. From 0 to 12 in., the soil exhibited mixed matrix colors of 10YR 4/2 (47.5 percent) and 10YR 7/2 (47.5 percent) with 7.5YR 5/8 (5 percent) prominent redox concentrations in the matrix. From 12 to 20 in., the soil exhibited a matrix color of 10YR 7/2 (60 percent) with 7.5YR 5/8 (5 percent) prominent redox concentrations and 10YR 4/2 (35 percent) distinct redox concentrations in the matrix. This met the hydric soil indicator of depleted matrix (F3). No indicators of wetland hydrology were observed. Since only one of the three required wetland criteria was met, this area did not qualify as a wetland.

**Additional Sampling Points:**

Three additional sampling points were taken areas where a wetland was suspected but did not meet the three wetland criteria. Descriptions of these sampling points are included below.

Sampling Point 1 (SP-1)

SP-1 was located on a hillslope east of U.S. 41 and south of Little Pigeon Creek. The dominant vegetation at this sampling point included ash-leaf maple (*Acer negundo*, FAC) and black locust (*Robinia pseudoacacia*, FACU) in the tree stratum and Virginia wild rye (*Elymus virginicus*, FACW) and spotted lady's thumb (*Persicaria* maculosa, FACW) in the herb stratum. This met the criteria for hydrophytic vegetation with a prevalence index (2.73) and dominance test (75 percent). To a depth of 17 in., the soils in the test pit were a silt loam. A layer of gravel at 17 in. depth prevented further excavation. From 0 to 5 in., the soil exhibited a matrix color of 10YR 4/3 (100 percent). From 5 to 9 in., the soil exhibited mixed matrix colors of 10YR 4/3 (50 percent) and 10YR 5/4 (50 percent). From 9 to 17 in., the soil exhibited a matrix color of 10YR 5/4 (100 percent). This did not meet the criteria for hydric soil. No primary indicators of wetland hydrology were observed. Only one secondary indicator of wetland hydrology, FAC-neutral test (D5), was observed. Therefore, the criteria for wetland hydrology was not met. Since only one of the three required wetland criteria were met, this area did not qualify as a wetland.

Sampling Point 2 (SP-2)

SP-2 was located on a hillslope west of U.S. 41 and south of Little Pigeon Creek. The dominant vegetation at this sampling point was black walnut (*Juglans nigra*, FACU), fragrant sumac (*Rhus*

*aromatica*, UPL), and gray dogwood (*Cornus racemosa*, UPL) in the sapling/shrub stratum; reed canary grass (*Phalaris arundinacea*, FACW) in the herb stratum; and rambler rose (*Rosa multiflora*, FACU) in the woody vine stratum. This met the hydrophytic vegetation indicator of prevalence index (2.38). To a depth of 20 in., the soil in the test pit was a silt loam. From 0 to 10 in., the soil exhibited a matrix color of 10YR 4/2 (75 percent) with 10YR 5/3 (25 percent) faint redox concentrations in the matrix. From 10 to 20 in., the soil exhibited mixed matrix colors of 10YR 4/2 (50 percent) and 10YR 4/6 (50 percent). This did not meet the criteria for hydric soil. No indicators of wetland hydrology were observed during the field reconnaissance. In order to pass the criteria for hydrophytic vegetation, the prevalence index indicator requires that the criteria for hydric soil and wetland hydrology be met. Since neither of these criteria were met, the criteria for hydrophytic vegetation was also not met. Since none of the three required wetland criteria were met, this area did not qualify as a wetland.

Sampling Point 3 (SP-3)

SP-3 was located within a depression west of U.S. 41 and south of Wetland B. The dominant vegetation at this sampling point was sugar maple (*Acer saccharum*, FACU) and American elm (*Ulmus americana*, FACW) in the tree stratum; sugar maple (*Acer saccharum*, FACU) and gray dogwood (*Cornus racemosa*, UPL) in the sapling/shrub stratum; Canadian goldenrod (*Solidago canadensis*, FACU) and Asiatic dayflower (*Commelina communis,* FACU) in the herb stratum; and fox grape (*Vitis labrusca*, FACU) in the woody vine stratum. This did not meet the criteria for hydrophytic vegetation. To a depth of 20 in., the soil in the test pit was a silt loam. From 0 to 12 in., the soil exhibited mixed matrix colors of 10YR 4/2 (45 percent) and 10YR 6/2 (45 percent) with 7.5YR 6/8 (5 percent) and 5YR 3/4 (5 percent) prominent redox concentrations in the matrix. From 12 to 20 in., the soil exhibited mixed matrix colors of 10YR 5/2 (40 percent) and 10YR 6/2 (40 percent) with 10YR 7/3 (5 percent) faint redox concentrations in the matrix and 5YR 3/4 (5 percent) prominent redox concentrations in the matrix. This met the hydric soil indicator of depleted matrix (F3). No primary indicators of wetland hydrology were observed and only one secondary indicator of wetland hydrology, geomorphic position (D2) due to the sampling point's location within a concave depression, was observed. This did not meet the criteria for wetland hydrology. Since only one of the three required wetland criteria were met, this area did not qualify as a wetland.

**Streams:**

Two streams, Little Pigeon Creek and Unnamed tributary (UNT) to Little Pigeon Creek (UNT 1), were observed within the PSL during the field reconnaissance. No impacts to Little Pigeon Creek are anticipated as a result of this project. Descriptions of the streams are provided below.

**Stream Summary Table**

| Stream Name | Photos | Lat/Long | OHWM Width | OHWM Depth | USGS Blue-line | Riffles Pools | Quality | Likely Water of the U.S. | Dominant Substrate | Potential Stream Impact |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ft. | ft. | | | | | | ft. |
| **Little Pigeon Creek** | 5-14 | 38.08227 -87.55583 | 6.42 | 0.17 | Yes (Perennial) | Riffles & Pools | Poor | Yes | Artificial | 48.3 |
| **UNT 1** | 36, 37 | 38.07964 -87.55461 | 1 | 0.33 | No (Ephemeral) | No | Poor | Yes | Silt | 12.4 |

**Little Pigeon Creek (48.3 LFT)**

Little Pigeon Creek flows from west to east through the PSL and is approximately 48.3 linear feet (LFT) (0.007 ac.) long. Little Pigeon Creek then flows south into Pigeon Creek, a Section 10 TNW. Therefore, Little Pigeon Creek should be considered a jurisdictional Water of the U.S. The stream is associated with a solid blue line on the USGS topographic map, indicating that it is perennial. UNT 1 was associated with two mapped NWI units: R5UBH and PFO1A. The dominant substrate of the stream within the PSL was artificial. Measurements of the Ordinary High-Water Mark (OHWM) were taken approximately 50 ft. downstream, east of the PSL outside the influence of the structure carrying U.S. 41 over Little Pigeon Creek. The OHWM was not measured to the west of the PSL due to the combined influence of the structure carrying U.S. 41 over Little Pigeon Creek and the railroad tracks over Little Pigeon Creek. No instream cover was present within the PSL. Instream cover present outside of the PSL included overhanging vegetation, root wads, and logs or woody debris. No sinuosity was present and water velocity was slow. The floodplain consisted of mowed road right-of-way (ROW) west of U.S. 41 and forest on the east side of U.S. 41. No aquatic organisms were present within the PSL, but fish were observed upstream near the train tracks. According to USGS *Indiana StreamStats*, the drainage area upstream of Little Pigeon Creek at the PSL is 2.786 square miles. Qualities of the stream contribute to this stream being classified as poor quality. No impacts to Little Pigeon Creek are anticipated as a result of this project.

**UNT to Little Pigeon Creek (UNT 1) (12.4 LFT)**

UNT 1 flows from west to east and is approximately 12.4 linear LFT long (0.0003 ac.) within the PSL. Based on topography and aerial imagery, UNT 1 flows east into Little Pigeon Creek, which flows south into Pigeon Creek, a Section 10 TNW. Therefore, UNT 1 should be considered a jurisdictional Water of the U.S. UNT 1 is not associated with a blue line on the USGS topographic map, indicating it is ephemeral. This stream is not associated with a mapped NWI unit but, based on field observations, it could be classified as a Riverine, Ephemeral stream, Corps designation R6. At the time of the site visit, the stream was dry. The OHWM was an average of 1 ft. wide and

0.33 ft. deep. The OHWM was averaged near the eastern boundary of the PSL. The stream substrate consisted predominantly of silt with a riparian area of immature forest and mowed road ROW. Overhanging vegetation was the in-stream cover present. Sinuosity was low and the stream was dry. No riffles or pools were observed, and no aquatic organisms were detected in the stream. UNT 1 was not associated with a blue line on USGS *Indiana StreamStats*. Therefore, the drainage area upstream of the PSL is assumed to be less than 1 sq. mi. Qualities of the stream contribute to this stream being classified as poor quality.

**Roadside Ditches and Drainage Features:**
Nine roadside ditches (RSD) and one drainage feature (DF) were identified within the PSL. No OHWM was observed in these features, so they are likely non-jurisdictional. Information on these features can be found below:

**Roadside Ditch and Drainage Feature Summary Table**

| Name | Photo #s | Lat/Long | Linear Length (ft) | Location | Description |
|---|---|---|---|---|---|
| **RSD 1** | 1, 2 | 38.08376 -87.55621 | 343.1 | Northern PSL | Vegetated Swale |
| **RSD 2** | 3, 4 | 38.08258 -87.55594 | 147.4 | Northern PSL | Vegetated Swale |
| **RSD 3** | 21, 22 | 38.08151 -87.5556 | 493.9 | North Central PSL | Vegetated Swale |
| **RSD 4** | 23, 33, | 38.08023 -87.55516 | 431.8 | North Central PSL | Vegetated Swale |
| **RSD 5** | 31, 32 | 38.07975 -87.55534 | 107.0 | West Central PSL | Vegetated Swale |
| **RSD 6** | 41, 47 | 38.07898 -87.55474 | 277.9 | South Central PSL | Vegetated Swale |
| **RSD 7** | 51, 54, 63 | 38.07733 -87.55412 | 751.7 | South Central PSL | Vegetated Swale |
| **RSD 8** | 55, 56, 62 | 38.07706 -87.55431 | 644.8 | Southwestern PSL | Vegetated Swale |
| **RSD 9** | 57, 65 | 38.07686 -87.55364 | 416.7 | Southeastern PSL | Vegetated Swale |
| **DF 1** | 25 | 38.0809 -87.55506 | 25.2 | East Central PSL | Vegetated Swale |

**Culverts and Drains:**
Thirteen culverts were identified within the PSL. The culverts varied in material including concrete, corrugated metal pipe (CMP), and high-density polyethylene (HDPE). The culverts served to aid roadside drainage. One culvert, Culvert 8, carried a jurisdictional water, UNT 1.

Culvert 4 drained into DF 1. Locations of these culverts are shown on **Exhibit 5** and attached photosheet.

**Culverts and Drains Summary Table**

| Culvert and Drain Number | Type | Diameter (in) | Photo #s | Purpose |
|---|---|---|---|---|
| 1, 2, 3, 7 | Honeycomb Culvert | N/A | 2, 3, 22, 33, 34, | Roadside Drainage |
| 4, 8 | Concrete Culvert | 16 | 24, 35 | Roadside Drainage |
| 5 | CMP | 36 | 29 | Roadside Drainage |
| 6 | Concrete Culvert | 45 | 32, 44 | Roadside Drainage |
| 9 | Concrete Culvert | 12 | 46 | Roadside Drainage |
| 10, 11, 12 | Grated Concrete Culvert | 12 | 47, 54, 63 | Roadside Drainage |
| 13 | HDPE Culvert | 24 | 64 | Roadside Drainage |

**Conclusion:**

Two wetlands, one PSS1A and one PEM1A, totaling 0.129 ac., were identified within the PSL. Two streams, Little Pigeon Creek and UNT 1, totaling 60.7 linear feet, were identified within the PSL. These waterways are likely Waters of the U.S. Every effort should be taken to avoid or minimize impacts to these waterways. If impacts are necessary, mitigation might be required. The INDOT Environmental Services Division should be contacted immediately if impacts will occur. The final determination of jurisdictional waters is ultimately made by the USACE. This report is our best judgment based on the guidelines set forth by USACE.

**Acknowledgements:**

This waters determination has been prepared based on the best available information, interpreted in light of the investigator's training, experience and professional judgement in conformance with the 1987 Corps of engineers Wetlands Delineation Manual, the appropriate regional supplement, the USACE Jurisdictional Determination Form Instructional Guidebook, and other appropriate agency guidelines.

| Metric Environmental Staff | Position | Contributing Effort | Signature/Date |
|---|---|---|---|
| Amy Noel Smith | Natural Resources Project Manager II | Project Manager | Amy Noel Smith 1/21/2020 |
| Alex Gray | Natural Resources Project Manager I | QAQC | Alex M. Gray 1/21/2020 |
| Cory Shumate | Environmental Scientist 2 | Report Preparation, Field Data Collection | CShumate 1/21/2020 |

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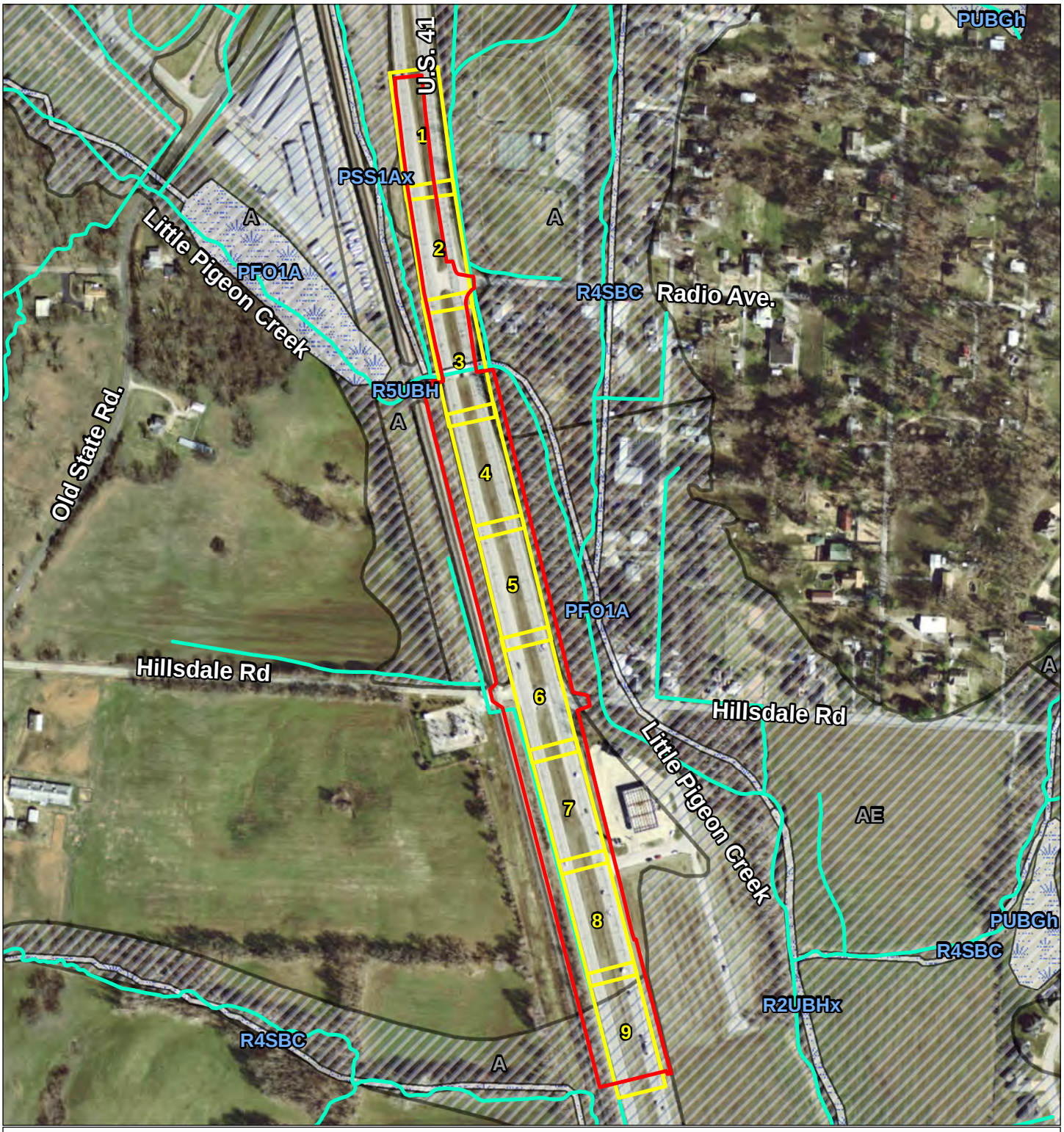
The duplicate maps and photographs have been intentionally omitted. Please refer to Appendix B in the CE document.




Project Study Limits (PSL)
Page Reference
NHD Flowline
NWI Wetland
Floodplain - Zone A/AE - 1% Annual Chance

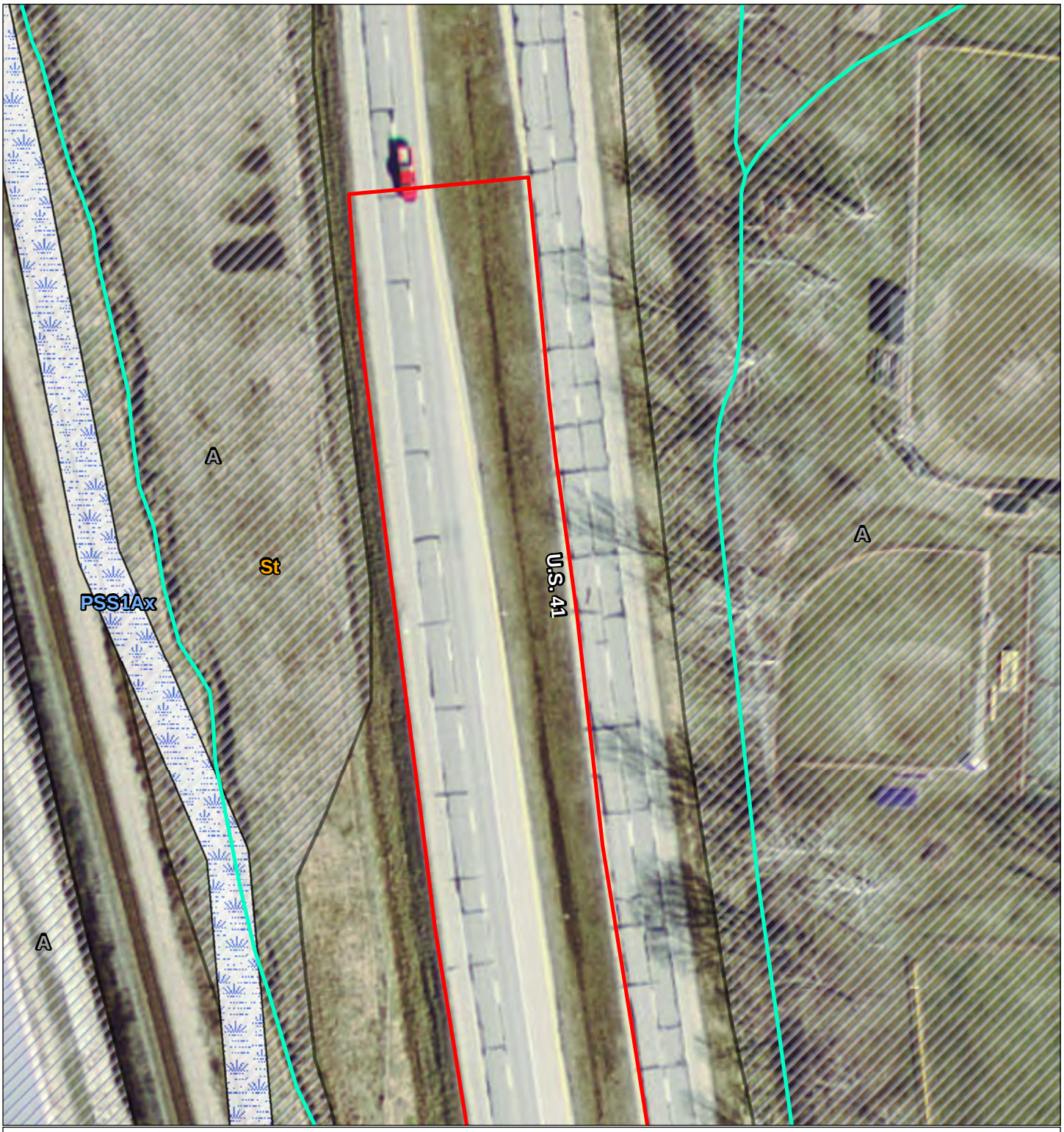
Exhibit 3 - Page Reference, NWI Wetland, NHD Flowline and FEMA Flood Insurance Rate Map (FIRM)
Hillsdale Rd. at U.S. 41 Intersection Improvements
Scott & Center Townships, Vanderburgh County, Indiana
Des. No. 1400005
Metric Project No. 19-0123
Map Date: 11/12/2019
Map Author: Cory Shumate

All locations approximate
Source: Indiana Spatial Data Portal (2013)

N
0 200 400 800
Feet

METRIC ENVIRONMENTAL

Exh. 3




Project Study Limits (PSL)
NWI Wetland
Floodplain - Zone A/AE - 1% Annual Chance
NHD Flowline
DNR Approved Floodway
NRCS Soil Survey

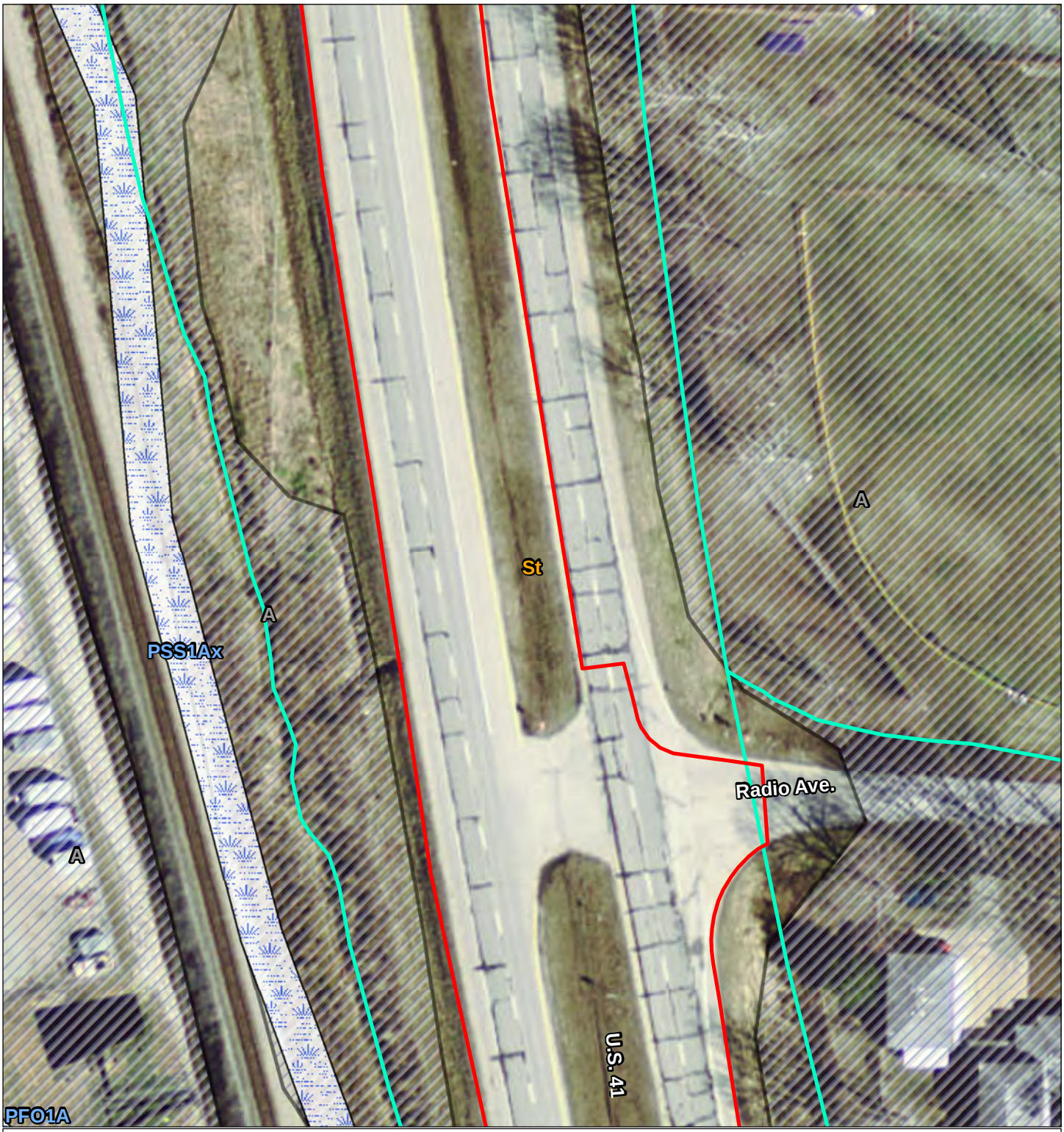
Exhibit 4 - NWI Wetland, NHD Flowline, NRCS Soil Survey, DNR Approved Floodway, and FEMA Flood Insurance Rate Map (FIRM)
Hillsdale Road at U.S. 41 Intersection Improvements
Scott & Center Townships, Vanderburgh County, Indiana
Des. No. 1400005
Metric Project No. 19-0123
Map Date: 11/12/2019
Map Author: Cory Shumate

All locations approximate
Source: Indiana Spatial Data Portal (2013)

N

0 20 40 80
Feet

METRIC ENVIRONMENTAL




Project Study Limits (PSL)
NWI Wetland
Floodplain - Zone A/AE - 1% Annual Chance
NHD Flowline
DNR Approved Floodway
NRCS Soil Survey

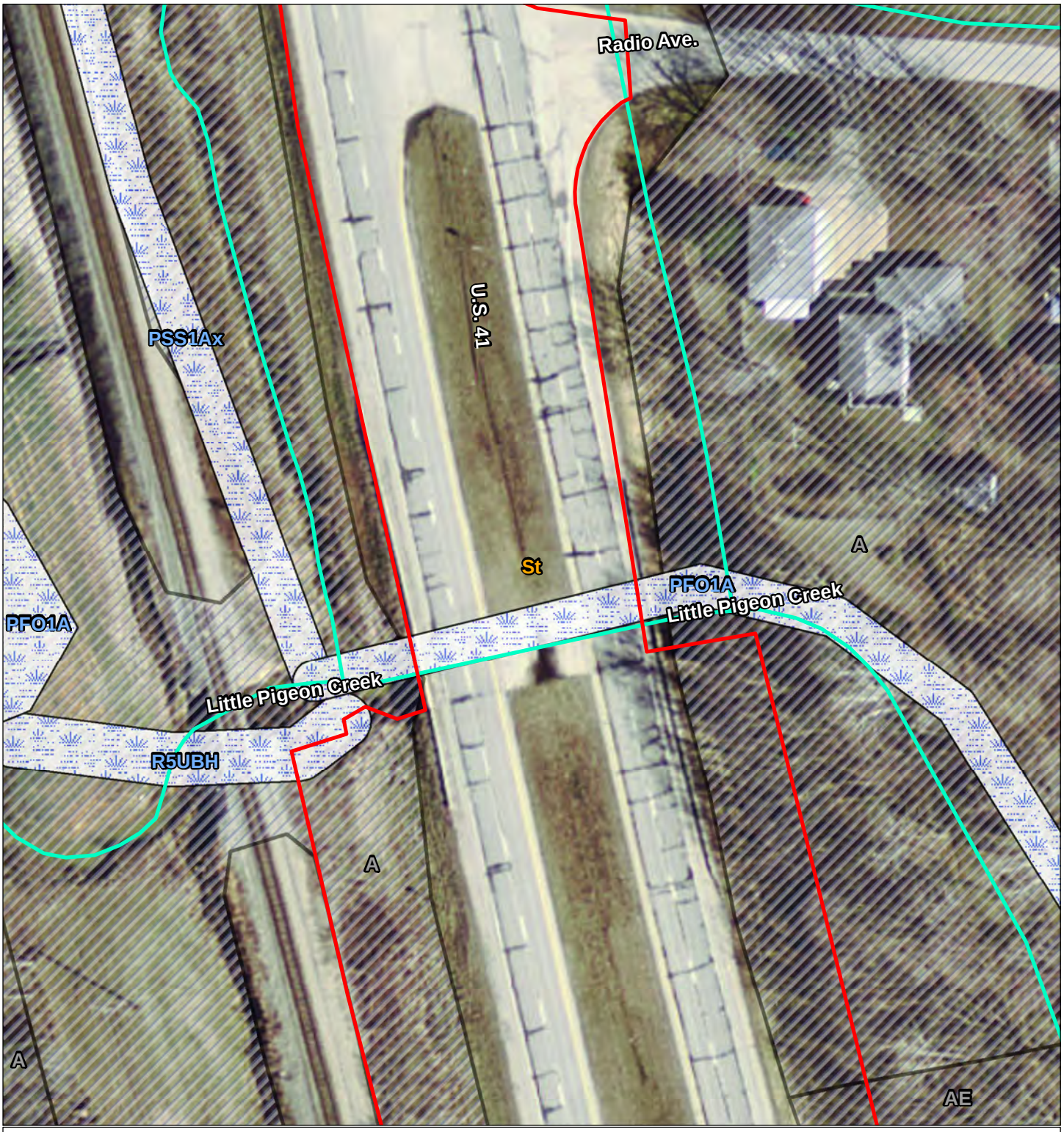
Exhibit 4 - NWI Wetland, NHD Flowline, NRCS Soil Survey, DNR Approved Floodway, and FEMA Flood Insurance Rate Map (FIRM)
Hillsdale Road at U.S. 41 Intersection Improvements
Scott & Center Townships, Vanderburgh County, Indiana
Des. No. 1400005
Metric Project No. 19-0123
Map Date: 11/12/2019
Map Author: Cory Shumate

All locations approximate
Source: Indiana Spatial Data Portal (2013)

N

0 20 40 80
Feet

METRIC ENVIRONMENTAL




Project Study Limits (PSL)
NHD Flowline
NWI Wetland
DNR Approved Floodway
Floodplain - Zone A/AE - 1% Annual Chance
NRCS Soil Survey

Exhibit 4 - NWI Wetland, NHD Flowline, NRCS Soil Survey, DNR Approved Floodway, and FEMA Flood Insurance Rate Map (FIRM)
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N

0 20 40 80
Feet

METRIC ENVIRONMENTAL