SR 45 & Pete Ellis Dr./Discovery Pkwy.
Intersection Improvements and Added Lanes
CE Level 4

APPENDIX E: RED FLAG INVESTIGATIONS

INDIANA DEPARTMENT OF TRANSPORTATION

100 North Senate Avenue
Room N642
Indianapolis, Indiana 46204

PHONE: (317) 232-5113
FAX: (317) 233-4929

Eric Holcomb, Governor
Joe McGuinness, Commissioner

Date: October 2, 2019

To: Site Assessment & Management
Environmental Policy Office - Environmental Services Division
Indiana Department of Transportation
100 N Senate Avenue, Room N642
Indianapolis, IN 46204

From: Ellen Hogrebe
Crawford, Murphy & Tilly, Inc.
8790 Purdue Road
Indianapolis, IN 46268
ehogrebe@cmtengr.com

Re: RED FLAG INVESTIGATION
DES No. 1800199, State Project
Intersection Improvement
State Road 45 and Pete Ellis Drive/North Range Road
Bloomington, Monroe County, Indiana

PROJECT DESCRIPTION

Brief Description of Project:
The proposed project consists of improvements at the intersection of State Road 45 (SR 45) and Pete Ellis Drive/Range Road in Bloomington, Monroe County, Indiana. The project is located in Section 35, Township 9 North, Range 1 West of the U.S. Geological Survey (USGS) Unionville, Indiana Quadrangle.

SR 45 is an Urban Minor Arterial within the project area, with an annual average daily traffic (AADT, 2018) of 7,100 (eastbound leg) and 5,300 (westbound leg) per day. Pete Ellis Drive, the south leg of the intersection, is a Minor Collector within the project area, with an AADT (2018) of 3,300 vehicles per day. North Range Road, the north leg of the intersection, is a Local Road within the project area, with an AADT (2018) of 1,900 vehicles per day.

The proposed intersection improvements will consist of reconfiguring and widening portions of SR 45 and Pete Ellis Drive/Range Road and replacing the existing traffic signal to improve capacity and safety at the intersection.

Bridge and/or Culvert Project: Yes ☐ No ☒ Structure # _____
If this is a bridge project, is the bridge Historical? Yes ☐ No ☐ , Select ☐ Non-Select ☐
(Note: If the project involves a historical bridge, please include the bridge information in the Recommendations Section of the report).

Proposed right of way: Temporary ☒ # Acres 0.2 Permanent ☒ # Acres 1.2 , Not Applicable ☐

Type of excavation: The maximum depth of excavation would be approximately 20 feet for traffic signal pole foundations. Excavation for storm sewers will also be needed at a depth of approximately 5 feet.

Maintenance of traffic: One of two options will be implemented for maintenance of traffic. The first option is phased construction along SR 45 with a detour route for Pete Ellis Drive/North Range Road. The second option is phased construction along SR 45 and Pete Ellis Drive/North Range Road, which would maintain one lane of traffic in each direction. The preferred method of maintenance of traffic will need to be coordinated with the City of Bloomington.

Work in waterway: Yes ☐ No ☒ Below ordinary high water mark: Yes ☐ No ☐

State Project: ☒ LPA: ☐

Any other factors influencing recommendations: N/A

INFRASTRUCTURE TABLE AND SUMMARY

Infrastructure Indicate the number of items of concern found within the 0.5 mile search radius. If there are no items, please indicate N/A:			
Religious Facilities	**1**	Recreational Facilities	**4**
Airports[1]	**N/A**	Pipelines	**N/A**
Cemeteries	**N/A**	Railroads	**1**
Hospitals	**N/A**	Trails	**9**
Schools	**2***	Managed Lands	**1**

[1]In order to complete the required airport review, a review of public airports within 3.8 miles (20,000 feet) is required.

Explanation:
Religious Facilities: One (1) religious facility is located within the 0.5 mile search radius. Saint Mark's United Methodist Church is located 0.23 mile southwest of the project area. No impact is expected.

Schools*: Two (2) unmapped schools are located within the 0.5 mile search radius. The Indiana University Bloomington campus is located within the project area in the northwest corner of the intersection. Coordination with the school will occur.

Recreational Facilities: Four (4) recreational facilities are located within the 0.5 mile search radius. The nearest recreational facility, Putt-Putt Golf and Games, is located 0.29 mile south of the project area. No impact is expected.

Railroads: One (1) railroad is located within the 0.5 mile search radius. The railroad, The Indiana Rail Road Company, is located 0.04 mile south of the project area. Coordination with INDOT Utilities and Railroads should occur.

Trails: Nine (9) trail segments are located within the 0.5 mile search radius. Three (3) trail segments are located within the project area. One (1) trail segment, the Bloomington Northwest Sidepaths trail (along 10th Street from Pete Ellis Drive east to Russell Road), is a planned urban trail within the eastern portion the project area. One (1) trail segment, the Bloomington North Sidepaths trail (along 10th Street from Jefferson Street east to Pete Ellis Drive), is an urban trail located within the western portion of the project area. One (1) trail segment, the Bloomington Northeast Sidepaths trail (along Pete Ellis Drive) is an urban trail located within the southern portion of the project area. Coordination with the City of Bloomington and Bloomington Parks & Recreation will occur.

Managed Lands: One (1) managed land is located within the 0.5 mile search radius. Park Ridge West Park is located 0.28 mile southeast of the project area. No impact is expected.

WATER RESOURCES TABLE AND SUMMARY

Water Resources Indicate the number of items of concern found within the 0.5 mile search radius. If there are no items, please indicate N/A:			
NWI - Points	**N/A**	Canal Routes - Historic	**N/A**
Karst Springs	**N/A**	NWI - Wetlands	**5**
Canal Structures – Historic	**N/A**	Lakes	**1**
NPS NRI Listed	**N/A**	Floodplain - DFIRM	**N/A**
NWI-Lines	**N/A**	Cave Entrance Density	**N/A**
IDEM 303d Listed Streams and Lakes (Impaired)	**N/A**	Sinkhole Areas	**2**
Rivers and Streams	**3**	Sinking-Stream Basins	**N/A**

Explanation:
Rivers and Streams: Three (3) river and stream segments are located within the 0.5 mile search radius. The nearest stream, an unnamed tributary, is located 0.12 mile north of the project area. No impact is expected.

NWI – Wetlands: Five (5) NWI wetlands are located within the 0.5 mile search radius. The nearest wetland is located approximately 0.01 mile north of the project area. A Waters of the US Report will be prepared and coordination with INDOT Ecology and Waterway Permitting will occur.

Lakes: One (1) lake is located within the 0.5 mile search radius. The lake is located approximately 0.01 mile north of the project area. No impact is expected.

Sinkhole Areas: Two (2) sinkhole areas are located within the 0.5 mile search radius. The nearest sinkhole area is located 0.09 mile north of the project area. No impact is expected.

URBANIZED AREA BOUNDARY SUMMARY

Explanation: This project lies within the Bloomington (Monroe County) and City of Bloomington UAB. Post construction Storm Water Quality Best Management Practices (BMPs) may need to be considered. An early coordination letter with topographic and aerial maps showing the project area will be sent to the City of Bloomington MS4 Coordinator at PO Box 1216, Bloomington, IN 47402 and the Indiana University Bloomington MS4 Coordinator at 1514 E Third St., Bloomington, IN 47401.

MINING AND MINERAL EXPLORATION TABLE AND SUMMARY

Mining/Mineral Exploration Indicate the number of items of concern found within the 0.5 mile search radius. If there are no items, please indicate N/A:			
Petroleum Wells	**N/A**	Mineral Resources	**N/A**
Mines – Surface	**N/A**	Mines – Underground	**N/A**

Explanation: N/A

HAZARDOUS MATERIAL CONCERNS TABLE AND SUMMARY

Hazardous Material Concerns Indicate the number of items of concern found within the 0.5 mile search radius. If there are no items, please indicate N/A:			
Superfund	**N/A**	Manufactured Gas Plant Sites	**N/A**
RCRA Generator/ TSD	**N/A**	Open Dump Waste Sites	**N/A**
RCRA Corrective Action Sites	**N/A**	Restricted Waste Sites	**N/A**
State Cleanup Sites	**2**	Waste Transfer Stations	**N/A**
Septage Waste Sites	**N/A**	Tire Waste Sites	**N/A**
Underground Storage Tank (UST) Sites	**4**	Confined Feeding Operations (CFO)	**N/A**
Voluntary Remediation Program	**1**	Brownfields	**1**
Construction Demolition Waste	**N/A**	Institutional Controls	**4**
Solid Waste Landfill	**N/A**	NPDES Facilities	**2**
Infectious/Medical Waste Sites	**N/A**	NPDES Pipe Locations	**N/A**
Leaking Underground Storage (LUST) Sites	**13**	Notice of Contamination Sites	**N/A**

Explanation:
State Cleanup Site: Two (2) State Cleanup Sites are located within the 0.5 mile search radius. The nearest site, the former Courtesy Cleaners (2604 East 10th Street, Bloomington, IN, AI ID 40433) is located 0.20 mile west of the project area. Based on the review of the Indiana Department of Environmental Management (IDEM) Virtual File Cabinet (VFC) IDEM issued a No Further Action letter, dated July 29, 2013, following the recording of an environmental restrictive covenant (ERC) on the deed of the property. Residual contamination associated with a chlorinated solvent release does not appear to extend into the project area. No impact is expected.

Underground Storage Tank (UST) Site: Four (4) UST sites are located within the 0.5 mile search radius. The nearest UST, at Indiana University Motor Pool (801 North Range Road, Bloomington, IN 47408, AI ID 45804) is located 0.09 mile northwest of the project area. IDEM conducted an Underground Storage Tank Inspection on February 23, 2016, and the facility was found to be in compliance with equipment, operating, and maintenance requirements set forth in Indiana's UST Rule 329 IAC 9. No impact is expected.

Voluntary Remediation Program: One (1) Voluntary Remediation Program (VRP) site is located within the 0.5 mile search radius. The site, Range Road Site (North Range Road, Bloomington, IN 47408, AI ID 45917) is mapped 0.22 mile north of the project area. Based on the review of the IDEM VFC for the site, the site is located 0.35 mile north of where the VRP symbol is mapped in the RFI database and is located outside the 0.5 mile search radius. No impact is expected.

Leaking Underground Storage Tank (LUST) Site: Thirteen (13) LUST sites are located within the 0.5 mile search radius. The nearest site, the United States Postal Service Woodbridge Station (3210 East 10th Street, Bloomington, IN 47480, AI ID 10961) is located adjacent to the project area. IDEM issued an NFA determination letter on August 17, 2017 since soil, groundwater, and vapor intrusion screening levels were not exceeded at the site. No impact is expected.

Brownfield: One (1) brownfield site is located within the 0.5 mile search radius. The site, proposed Chick-fil-A (3020 East 3rd Street, Bloomington, IN, AI ID 105697) is located 0.42 mile south of the project area. IDEM issued an NFA determination letter on March 28, 2013. No impact is expected.

Institutional Controls: Four (4) Institutional Control sites are located within the 0.5 mile search radius. The nearest site, the former Courtesy Cleaners (2604 East 10th Street, Bloomington, IN, AI ID 40433) is located 0.20 mile west of the project area. This site is discussed under State Cleanup Sites. No impact is expected.

NPDES Facilities: Two (2) NPDES facilities are located within the 0.5 mile search radius. The nearest facility, Indiana University Auxiliary Library Facility Expansion 3 (851 North Range Road, Bloomington, IN, NPDES ID INR10P454), is located 0.20 mile northwest of the project area. No documents regarding the NPDES facility's permit were found on the IDEM VFC. No impact is expected.

ECOLOGICAL INFORMATION SUMMARY

The Monroe County listing of the Indiana Natural Heritage Data Center information on endangered, threatened, or rare (ETR) species and high quality natural communities is attached with ETR species highlighted. A preliminary review of the Indiana Natural Heritage Database by INDOT Environmental Services did not indicate the presence of ETR species within the 0.5 mile search radius. Coordination with USFWS and IDNR will occur.

A review of the USFWS database did not indicate the presence of endangered bat species in or within 0.5 mile of the project area. The rangewide programmatic consultation for the Indiana Bat and Northern Long-eared Bat will be completed according to the most recent "Using the USFWS's IPaC System for Listed Bat Consultation for INDOT Projects".

An inquiry using the USFWS Information for Planning and Consultation (IPaC) website did not indicate the presence of the federally endangered species, the Rusty Patched Bumble Bee, in or within 0.5 mile of the project area. No impact is expected.

RECOMMENDATIONS SECTION

Include recommendations from each section. If there are no recommendations, please indicate N/A:

INFRASTRUCTURE:
Schools: One (1) unmapped school, the Indiana University Bloomington campus, is located within the project area in the northwest corner of the intersection. Coordination with the school will occur.

Railroads: One (1) railroad, The Indiana Rail Road Company, is located 0.04 mile south of the project area. Coordination with INDOT Utilities and Railroads should occur.

Trails: Three (3) trail segments are located within the project area. The Bloomington Northwest Sidepaths trail (along 10th Street from Pete Ellis Drive east to Russell Road) is a planned urban trail within eastern portion the project area. The Bloomington North Sidepaths trail (along 10th Street from Jefferson Street east to Pete Ellis Drive) is an urban trail located within the western portion of the project area. The Bloomington Northeast Sidepaths trail (along Pete Ellis Drive) is an urban trail located within the southern portion of the project area. Coordination with the City of Bloomington and Bloomington Parks & Recreation will occur.

WATER RESOURCES: One (1) wetland is located approximately 0.01 mile north of the project area. A Waters of the US Report will be prepared and coordination with INDOT Ecology and Waterway Permitting will occur.

URBANIZED AREA BOUNDARY: This project lies within the Bloomington (Monroe County) and City of Bloomington UAB. Post construction Storm Water Quality BMPs may need to be considered. An early coordination letter with topographic and aerial maps showing the project area will be sent to the City of Bloomington MS4 Coordinator at PO Box 1216, Bloomington, IN 47402 and the Indiana University Bloomington MS4 Coordinator at 1514 E Third St., Bloomington, IN 47401.

MINING/MINERAL EXPLORATION: N/A

HAZMAT CONCERNS: N/A

ECOLOGICAL INFORMATION: Coordination with USFWS and IDNR will occur. The range-wide programmatic consultation for the Indiana Bat and Northern Long-eared Bat will be completed according to the most recent "Using the USFWS's IPaC System for Listed Bat Consultation for INDOT Projects".

INDOT Environmental Services concurrence: Aaron Aldred Digitally signed by Aaron Aldred Date: 2019.12.11 10:50:55 -05'00' (Signature)

Prepared by:
Ellen Hogrebe
Environmental Scientist
Crawford, Murphy & Tilly, Inc.

Graphics:

A map for each report section with a 0.5 mile search radius buffer around all project area(s) showing all items identified as possible items of concern is attached. If there is not a section map included, please change the YES to N/A:

SITE LOCATION: YES

INFRASTRUCTURE: YES

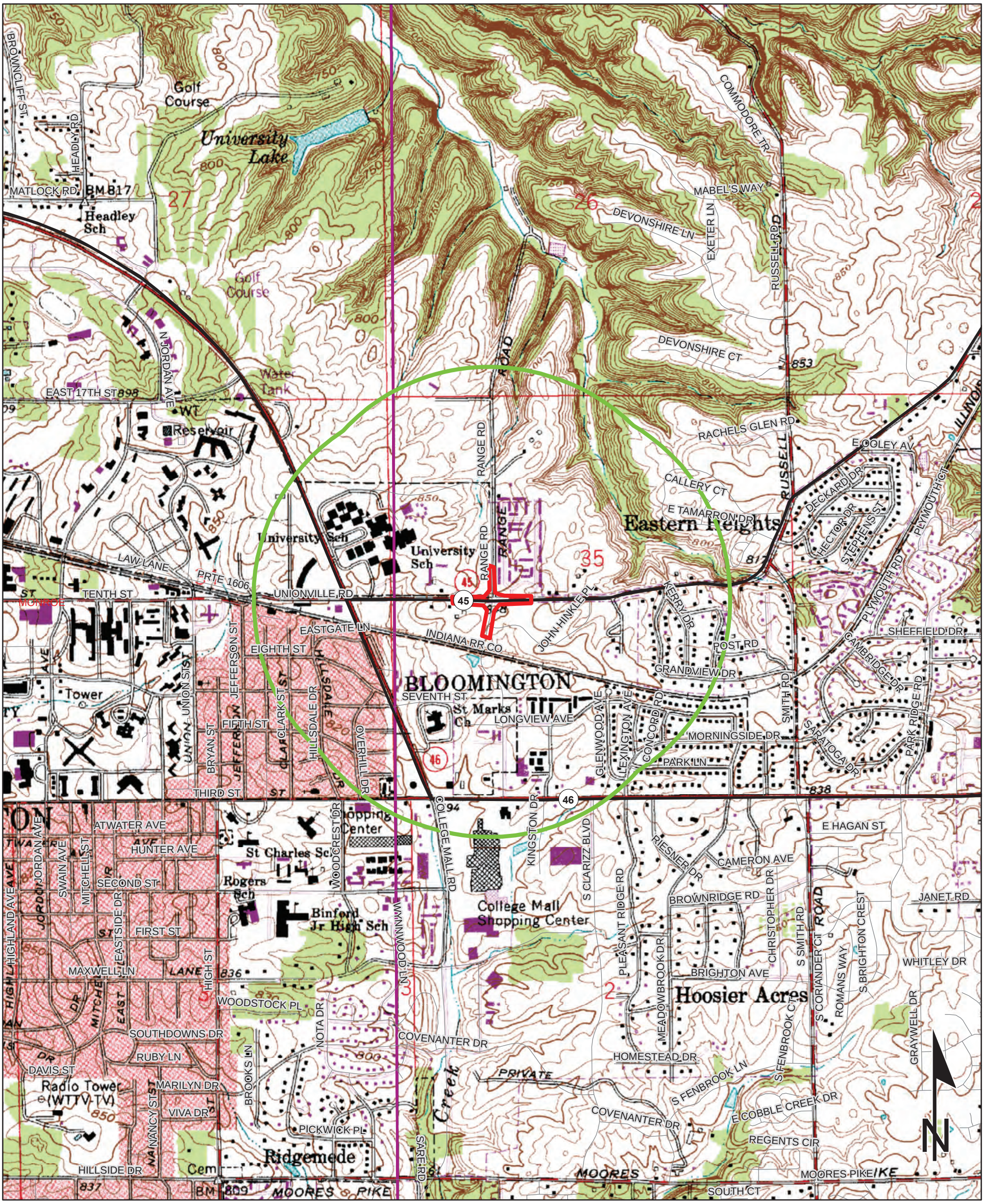
WATER RESOURCES: YES

URBANIZED AREA BOUNDARY: YES

MINING/MINERAL EXPLORATION: N/A

HAZMAT CONCERNS: YES

Red Flag Investigation - Site Location
State Road 45 and Pete Ellis Drive/North Range Road Intersection Improvement
Des. No. 1800199
Bloomington, Monroe County, Indiana



0.3 0.15 0 0.3 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.

UNIONVILLE QUADRANGLE
INDIANA
7.5 MINUTE SERIES
(TOPOGRAPHIC)

Red Flag Investigation - Infrastructure
State Road 45 and Pete Ellis Drive/North Range Road Intersection Improvement
Des. No. 1800199
Bloomington, Monroe County, Indiana

0.15 0.075 0 0.15 Miles

Sources:

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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
State Road 45 and Pete Ellis Drive/North Range Road Intersection
Improvement Des. No. 1800199
Bloomington, Monroe 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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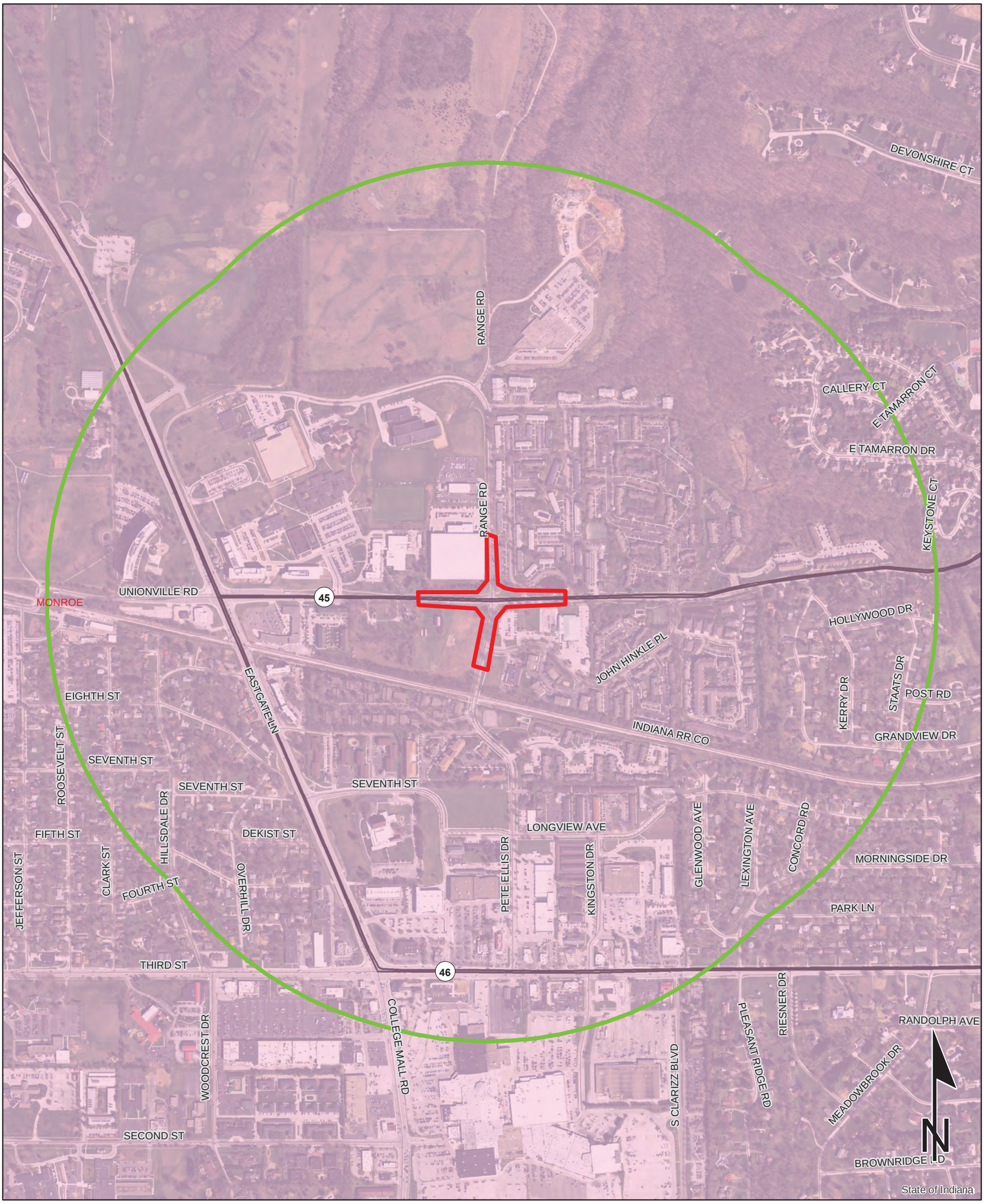
- NWI - Point
- Karst Spring
- NWI- Line
- Impaired_Stream_Lake
- NPS NRI listed
- River
- Canal Structure - Historic
- Canal Route - Historic
- Wetlands
- Lake
- Floodplain - DFIRM
- Cave Entrance Density
- Sinkhole Area
- Sinking-Stream Basin
- County Boundary
- Project Area
- Half Mile Radius
- Toll
- Interstate
- State Route
- US Route
- Local Road

Red Flag Investigation - Urbanized Area Boundary
State Road 45 and Pete Ellis Drive/North Range Road Intersection
Improvement Des. No. 1800199
Bloomington, Monroe 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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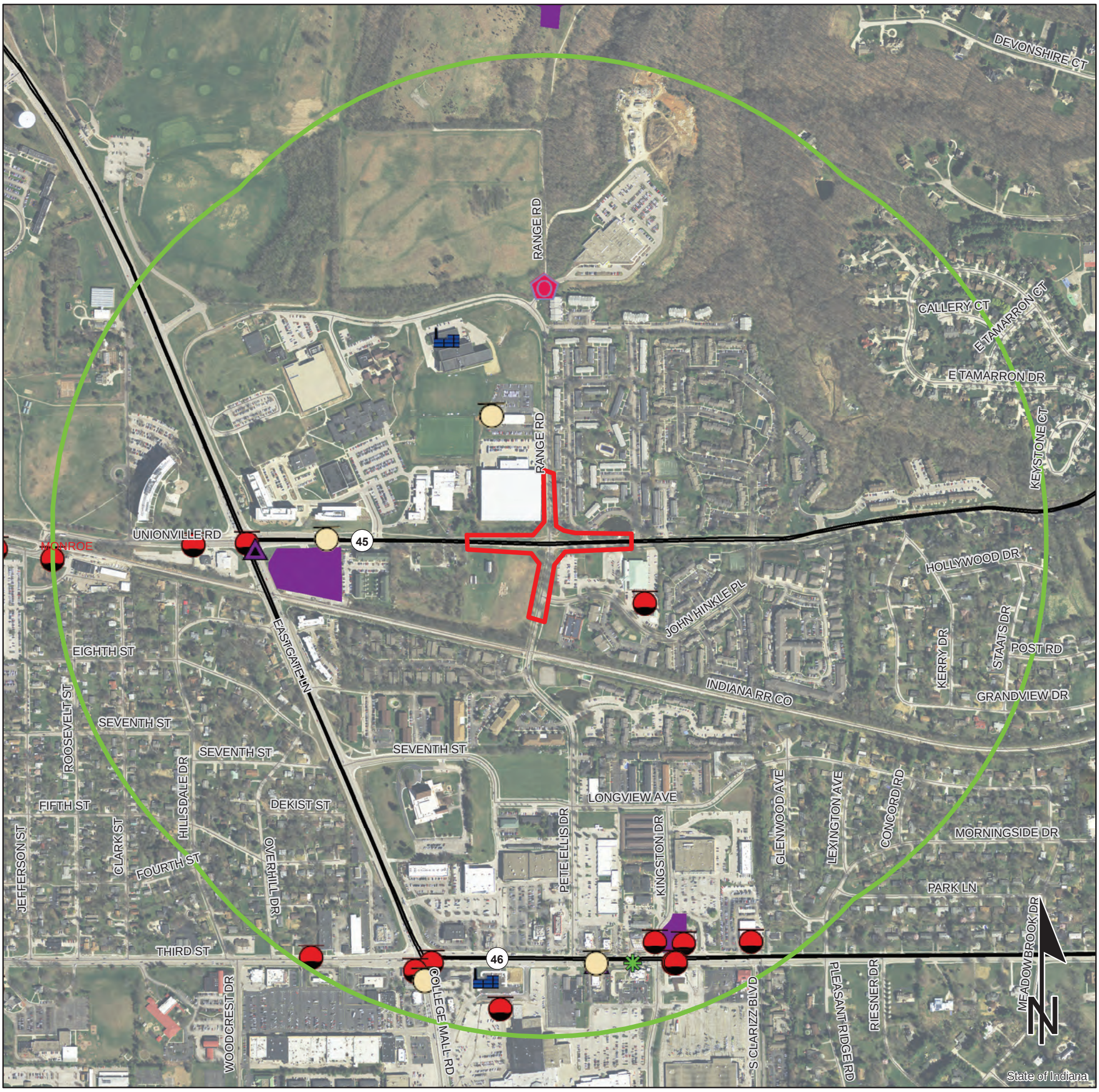
- UAB
- County Boundary
- Project Area
- Half Mile Radius
- Toll
- Interstate
- State Route
- US Route
- Local Road

Red Flag Investigation - Hazardous Material Concerns
State Road 45 and Pete Ellis Drive/North Range Road Intersection Improvement
Des. No. 1800199
Bloomington, Monroe 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

0.15 0.075 0 0.15 Miles

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

Indiana County Endangered, Threatened and Rare Species List

County: Monroe

Species Name	Common Name	FED	STATE	GRANK	SRANK
Diplopoda					
Conotyla bollmani	Bollman's Cave Milliped		WL	G5	S3
Crustacean: Malacostraca					
Caecidotea jordani	Jordan's groundwater isopod		SE	G2G3	S1
Crangonyx packardi	Packard's Cave Amphipod		WL	G4	S3
Orconectes inermis testii	Troglobitic Crayfish		SR	G5T3	S3
Crustacean: Ostracoda					
Pseudocandona jeanneli	Jeannel's Cave Ostracod		SE	G2	S1
Sagittocythere barri	Barr's Commensal Cave Ostracod		WL	G5	S3S4
Mollusk: Bivalvia (Mussels)					
Cyprogenia stegaria	Eastern Fanshell Pearlymussel	LE	SE	G1Q	S1
Epioblasma torulosa torulosa	Tubercled Blossom	LE	SE	G2TX	SX
Fusconaia subrotunda	Longsolid	C	SE	G3	SX
Obovaria subrotunda	Round Hickorynut	C	SE	G4	S1
Pleurobema clava	Clubshell	LE	SE	G1G2	S1
Quadrula cylindrica cylindrica	Rabbitsfoot	LT	SE	G3G4T3	S1
Villosa lienosa	Little Spectaclecase		SSC	G5	S3
Mollusk: Gastropoda					
Fontigens cryptica	Hidden Springs Snail		SE	G1	S1
Punctum minutissimum	Small Spot			G5	S2
Ellipluran: Collembola					
Hypogastrura gibbosus	Humped Springtail		WL	GNR	SNR
Isotoma anglicana	A Springtail		WL	GNR	SNR
Pseudosinella argentea	A Springtail		SE	GNR	S1
Pseudosinella collina	Hilly Springtail		SR	GNR	S2?
Pseudosinella fonsa	Fountain Cave Springtail		ST	G3G4	S2
Sinella alata	Springtail		WL	G5	S4
Insect: Coleoptera (Beetles)					
Aleochara lucifuga	Rove beetle		WL	GNR	S4
Atheta annexa	Rove beetle		WL	G4	S4
Dynastes tityus	Unicorn Beetle		SR	GNR	S2
Nicrophorus americanus	American Burying Beetle	LE	SX	G2G3	SX
Pseudanophthalmus shilohensis mayfieldensis	Monroe cave ground beetle		SE	G1G2T1T2	S1S2
Pseudanophthalmus stricticollis	Marengo Cave Ground Beetle		WL	G4	S3
Insect: Lepidoptera (Butterflies & Moths)					
Artogeia virginiensis	West Virginia White		SR	G3?	S3
Celastrina nigra	Dusky Azure		ST	G4	S2
Insect: Odonata (Dragonflies & Damselflies)					
Rhionaeschna mutata	Spatterdock Darner		ST	G4	S2S3

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: Monroe

Species Name	Common Name	FED	STATE	GRANK	SRANK
Tachopteryx thoreyi	Gray Petaltail		wl	G4	S3
Insect: Tricoptera (Caddisflies)					
Agapetus gelbae	An Agapetus Caddisfly		ST	G3	S2
Diplectrona metaqui	A Diplectronan Caddisfly		ST	G4G5	S2
Goera stylata	A Northern Casemaker Caddisfly		SE	G5	S1
Homoplectra doringa	A Homoplectran Caddisfly		SE	G5	S1
Arachnida					
Dolomedes scriptus	Lined Nursery Web Spider			G5	S1?
Nesticus carteri	Carter's Cave Spider			GNR	S1
Fish					
Amblyopsis hoosieri	Hoosier cavefish	C	SE	G2	S1
Amphibian					
Acris blanchardi	Northern Cricket Frog		SSC	G5	S4
Hemidactylium scutatum	Four-toed Salamander		SSC	G5	S2
Lithobates areolatus circulosus	Northern Crawfish Frog		SE	G4T4	S2
Necturus maculosus	Common mudpuppy		SSC	G5	S2
Reptile					
Clonophis kirtlandii	Kirtland's Snake	C	SE	G2	S2
Crotalus horridus	Timber Rattlesnake		SE	G4	S2
Opheodrys aestivus	Rough Green Snake		SSC	G5	S3
Terrapene carolina carolina	Eastern Box Turtle		SSC	G5T5	S3
Thamnophis proximus proximus	Western Ribbon Snake		SSC	G5T5	S3
Bird					
Accipiter striatus	Sharp-shinned Hawk		SSC	G5	S2B
Aimophila aestivalis	Bachman's Sparrow			G3	SXB
Ardea alba	Great Egret		SSC	G5	S1B
Bartramia longicauda	Upland Sandpiper		SE	G5	S3B
Buteo lineatus	Red-shouldered Hawk		SSC	G5	S3
Buteo platypterus	Broad-winged Hawk		SSC	G5	S3B
Coragyps atratus	Black Vulture			G5	S1N,S2B
Dendroica virens	Black-throated Green Warbler			G5	S2B
Haliaeetus leucocephalus	Bald Eagle		SSC	G5	S2
Helmitheros vermivorus	Worm-eating Warbler		SSC	G5	S3B
Ixobrychus exilis	Least Bittern		SE	G5	S3B
Mniotilta varia	Black-and-white Warbler		SSC	G5	S1S2B
Setophaga cerulea	Cerulean Warbler		SE	G4	S3B
Vermivora chrysoptera	Golden-winged Warbler	C	SE	G4	S1B
Wilsonia citrina	Hooded Warbler		SSC	G5	S3B
Mammal					

Indiana Natural Heritage Data Center
Division of Nature Preserves
Indiana Department of Natural Resources
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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

Indiana County Endangered, Threatened and Rare Species List

County: Monroe

Species Name	Common Name	FED	STATE	GRANK	SRANK
Lasiurus borealis	Eastern Red Bat		SSC	G3G4	S4
Lasiurus cinereus	Hoary Bat		SSC	G3G4	S4
Mustela nivalis	Least Weasel		SSC	G5	S2?
Myotis lucifugus	Little Brown Bat	C	SSC	G3	S2
Myotis septentrionalis	Northern Long Eared Bat	LT	SSC	G1G2	S2S3
Myotis sodalis	Indiana Bat or Social Myotis	LE	SE	G2	S1
Neotoma magister	Allegheny Woodrat		SE	G3G4	S2
Perimyotis subflavus	Tricolored Bat		SSC	G2G3	S2S3
Sorex fumeus	Smoky Shrew		SSC	G5	S2
Sorex hoyi	Pygmy Shrew		SSC	G5	S2
Taxidea taxus	American Badger		SSC	G5	S2
Vascular Plant					
Acalypha deamii	Mercury		SR	G4?	S2
Armoracia aquatica	Lake Cress		SE	G4?	S1
Carex timida	Timid Sedge		SE	G2G4	S1
Castanea dentata	American Chestnut		WL	G4	S3
Catalpa speciosa	Northern Catalpa		SR	G4?	S2
Cypripedium parviflorum var. pubescens	Large Yellow Lady's-slipper		WL	G5T5	S3
Epigaea repens	Trailing Arbutus		WL	G5	S3
Hydrastis canadensis	Golden Seal		WL	G3G4	S3
Juglans cinerea	Butternut		WL	G4	S3
Linum striatum	Ridged Yellow Flax		WL	G5	S3
Liparis loeselii	Loesel's Twayblade		WL	G5	S3
Lithospermum incisum	Narrow-leaved Puccoon		SE	G5	S1
Malaxis unifolia	Green Adder's-mouth Orchid		SE	G5	S1
Oryzopsis racemosa	Black-fruit Mountain-ricegrass		SR	G5	S2
Oxalis illinoensis	Illinois Woodsorrel		WL	G4Q	S2
Panax quinquefolius	American Ginseng		WL	G3G4	S3
Platanthera flava var. herbiola	Pale Green Orchis		WL	G4?T4Q	S3
Potamogeton pusillus	Slender Pondweed		WL	G5	S2
Rubus centralis	Illinois Blackberry		SE	G2?Q	S1
Zannichellia palustris	Horned Pondweed		SR	G5	S2
Zizia aptera	Golden Alexanders		SR	G5	S2
High Quality Natural Community					
Forest - floodplain mesic	Mesic Floodplain Forest		SG	G3?	S1
Forest - upland dry Highland Rim	Highland Rim Dry Upland Forest			GNR	S3
Forest - upland dry-mesic Highland Rim	Highland Rim Dry-mesic Upland Forest			GNR	S3
Forest - upland mesic Highland Rim	Highland Rim Mesic Upland Forest			GNR	S3

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: Monroe

Species Name	Common Name	FED	STATE	GRANK	SRANK
Primary - cave aquatic	Aquatic Cave		SG	GNR	SNR
Primary - cliff limestone	Limestone Cliff		SG	GU	S1
Other Significant Feature					
Geomorphic - Nonglacial Erosional Feature - Water Fall and Cascade	Water Fall and Cascade			GNR	SNR

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

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INDIANA DEPARTMENT OF TRANSPORTATION

100 North Senate Avenue
Room N642
Indianapolis, Indiana 46204

PHONE: (317) 232-5113
FAX: (317) 233-4929

Eric Holcomb, Governor
Joe McGuinness, Commissioner

Date: March 17, 2021

To: Site Assessment & Management
Environmental Policy Office - Environmental Services Division (ESD)
Indiana Department of Transportation
100 N Senate Avenue, Room N642
Indianapolis, IN 46204

From: Ellen Hogrebe
Crawford, Murphy & Tilly, Inc.
8790 Purdue Road
Indianapolis, IN 46268
ehogrebe@cmtengr.com

Re: RED FLAG INVESTIGATION
DES No. 1800086, State Project
Added Travel Lane
State Road 45, from State Road 46 to 700 feet west of Pete Ellis Drive
Bloomington, Monroe County, Indiana

PROJECT DESCRIPTION

Brief Description of Project:

The proposed project is located along State Road 45 (SR 45) from SR 46 to approximately 1,000 feet west of Pete Ellis Drive in Bloomington, Monroe County, Indiana. The project is located in Section 34, Township 9 North, Range 1 West of the U.S. Geological Survey (USGS) Bloomington and Unionville, Indiana Quadrangles. The proposed project will widen SR 45 to the north in order to add one, 12-foot travel lane in each direction along SR 45. The project will also add a striped 5-foot bike lane along the south side of SR 45 and reconstruct an existing 8-foot paved multi-use path along the north side of SR 45. New traffic signals will be installed in the northeast corner of the SR 45 and SR 46 intersection and new storm sewers will be installed along the north side of SR 45. The east leg of the SR 45 and SR 46 intersection will be restriped to accommodate the added bike line and roadway widening.

Bridge and/or Culvert Project: Yes ☐ No ☒ Structure # _____

If this is a bridge project, is the bridge Historical? Yes ☐ No ☐ , Select ☐ Non-Select ☐

(Note: If the project involves a historical bridge, please include the bridge information in the Recommendations Section of the report).

Proposed right of way: Temporary ☒ # Acres 0.5 Permanent ☒ # Acres 2.0 Not Applicable ☐

Type of excavation: The maximum depth of excavation is anticipated to be approximately 20 feet for traffic signal pole foundations in the northeast corner of the SR 45 and SR 46 intersection. Excavation for storm sewers and additional roadway will also be needed at a depth of approximately 5 feet along the north side of SR 45.

Maintenance of traffic: Improvements at the intersection of SR 45 at SR 46 will be phased, such that the intersection remains open at all times. One of two options will be implemented for maintenance of traffic along SR 45 east of SR 46. The first option is phased construction along SR 45. The second option is construction along SR 45 with flagger conditions and a detour for westbound or eastbound SR 45. Access will be provided for local traffic.

Work in waterway: Yes ☐ No ☒ Below ordinary high water mark: Yes ☐ No ☐

State Project: ☒ LPA: ☐

Any other factors influencing recommendations: N/A

INFRASTRUCTURE TABLE AND SUMMARY

Infrastructure Indicate the number of items of concern found within the 0.5 mile search radius. If there are no items, please indicate N/A:			
Religious Facilities	**2**	Recreational Facilities	**4**
Airports[1]	**N/A**	Pipelines	**N/A**
Cemeteries	**N/A**	Railroads	**1**
Hospitals	**1***	Trails	**6**
Schools	**3***	Managed Lands	**1**

[1]In order to complete the required airport review, a review of public airports within 3.8 miles (20,000 feet) is required.

Explanation:
Religious Facilities: Two (2) religious facilities are located within the 0.5 mile search radius. The nearest religious facility, Saint Mark's United Methodist Church, is located approximately 0.26 mile south of the project area. No impact is expected.

Hospitals*: Although not mapped on the GIS layer, one (1) hospital is located within the 0.5 mile search radius. The Indiana University Health Bloomington Hospital is located approximately 0.25 mile north of the project area. The hospital is currently under construction and is scheduled to open in 2021. Coordination with the hospital will occur.

Schools*: Although not mapped on the GIS layer, three (3) schools were identified within the 0.5 mile search radius. The Indiana University Bloomington campus is located within the project area along the north side of SR 45. Coordination with the school will occur.

Recreational Facilities: Four (4) recreational facilities are located within the 0.5 mile search radius. The nearest recreational facility, Old IU Elementary School, is located approximately 0.13 mile north of the project area. No impact is expected.

Railroads: One (1) railroad segment is located within the 0.5 mile search radius. The railroad, the Indiana Rail Road Company, is located approximately 0.02 mile south of the project area. Coordination with INDOT Utilities and Railroads will occur.

Trails: Six (6) trail segments are located within the 0.5 mile search radius. Two (2) trail segments are located within the project area. One (1) trail segment, the Bloomington North Sidepaths trail (along 10th Street from Jefferson Street east to Pete Ellis Drive), is an urban trail located along SR 45. One (1) trail segment, the SR 45/46 Bypass and College Mall Road trail (from Walnut Street to 3rd Street), is a park/forest trail located along the east side of SR 46. Coordination with the City of Bloomington will occur.

Managed Lands: One (1) managed land is located within the 0.5 mile search radius. Park Ridge West Park is located 0.44 mile southeast of the project area. No impact is expected.

WATER RESOURCES TABLE AND SUMMARY

Water Resources Indicate the number of items of concern found within the 0.5 mile search radius. If there are no items, please indicate N/A:			
NWI - Points	**N/A**	Canal Routes - Historic	**N/A**
Karst Springs	**N/A**	NWI - Wetlands	**4**
Canal Structures – Historic	**N/A**	Lakes	**1**
NPS NRI Listed	**N/A**	Floodplain - DFIRM	**N/A**
NWI-Lines	**N/A**	Cave Entrance Density	**N/A**
IDEM 303d Listed Streams and Lakes (Impaired)	**N/A**	Sinkhole Areas	**1**
Rivers and Streams	**4**	Sinking-Stream Basins	**N/A**

Explanation:
Rivers and Streams: Four (4) river and stream segments are located within the 0.5 mile search radius. The nearest stream, an unnamed tributary, is located approximately 0.21 mile northeast of the project area. No impact is expected.

NWI – Wetlands: Four (4) NWI wetlands are located within the 0.5 mile search radius. The nearest wetland is located 0.20 mile east of the project area. No impact is expected.

Lakes: One (1) lake is located within the 0.5 mile search radius. The lake is located 0.20 mile east of the project area. No impact is expected.

Sinkhole Areas: One (1) sinkhole area is located within the 0.5 mile search radius. The sinkhole area is located approximately 0.18 mile northeast of the project area. No impact is expected.

MINING AND MINERAL EXPLORATION TABLE AND SUMMARY

Mining/Mineral Exploration Indicate the number of items of concern found within the 0.5 mile search radius. If there are no items, please indicate N/A:			
Petroleum Wells	**N/A**	Mineral Resources	**N/A**
Mines – Surface	**N/A**	Mines – Underground	**N/A**

Explanation: No Mining and Mineral Exploration features were identified within the 0.5 mile search radius.

HAZARDOUS MATERIAL CONCERNS TABLE AND SUMMARY

Hazardous Material Concerns Indicate the number of items of concern found within the 0.5 mile search radius. If there are no items, please indicate N/A:			
Superfund	**N/A**	Manufactured Gas Plant Sites	**N/A**
RCRA Generator/ TSD	**N/A**	Open Dump Waste Sites	**N/A**
RCRA Corrective Action Sites	**N/A**	Restricted Waste Sites	**N/A**
State Cleanup Sites	**1**	Waste Transfer Stations	**N/A**
Septage Waste Sites	**N/A**	Tire Waste Sites	**N/A**
Underground Storage Tank (UST) Sites	**4**	Confined Feeding Operations (CFO)	**N/A**
Voluntary Remediation Program	**1**	Brownfields	**N/A**
Construction Demolition Waste	**N/A**	Institutional Controls	**3**
Solid Waste Landfill	**N/A**	NPDES Facilities	**1**
Infectious/Medical Waste Sites	**N/A**	NPDES Pipe Locations	**N/A**
Leaking Underground Storage (LUST) Sites	**8**	Notice of Contamination Sites	**N/A**

Unless otherwise noted, site specific details presented in this section were obtained from documents reviewed on the Indiana Department of Environmental Management (IDEM) Virtual File Cabinet (VFC).

Explanation:
State Cleanup Site: One (1) State Cleanup Site is located within the 0.5 mile search radius. The former Courtesy Cleaners (2604 East 10th Street, Bloomington, IN, AI ID 40433) is located within the project area in the southeast corner of the SR 45 and SR 46 intersection. A No Further Action (NFA) determination letter was issued by IDEM on July 29, 2013. Low levels of soil and groundwater contamination remain on site. An environmental restrictive covenant (ERC) was placed on the property on May 13, 2013. The ERC prohibits the use of groundwater for the entire property, but not soil; use of soil is restricted in a smaller area located behind the existing building, adjacent north of the existing railroad tracks. It does not appear as though residual dissolved chlorinated solvents extend into the project area; however, if the scope of work or extents of excavation should change, coordination with INDOT SAM will occur.

Institutional Controls: Three (3) Institutional Control sites are located within the 0.5 mile search radius. The former Courtesy Cleaners (2604 East 10th Street, Bloomington, IN, AI ID 40433) is located within the project area in the southeast corner of the SR 45 and SR 46 intersection. Coordination will be conducted with the IDEM Project Manager (Ms. Hartman, nhartman@idem.in.gov) identified in the VFC documentation before further site activities occur.

Underground Storage Tank (UST) Site: Four (4) UST sites are located within the 0.5 mile search radius. The IU UOEHS (2735 East 10th Street, Bloomington, IN 47408, AI ID 12651) is located within the project area. In addition to petroleum contamination, it is likely that lead would be in the soil/groundwater. If excavation occurs in this area, it is likely that petroleum contamination will be encountered. Before proper removal and disposal of soil and/or groundwater, analysis for lead will be necessary.

Voluntary Remediation Program: One (1) Voluntary Remediation Program (VRP) site is located within the 0.5 mile search radius. The site, Range Road Site (North Range Road, Bloomington, IN 47408, AI ID 45917) is mapped 0.31 mile northeast of the project area. The site is located an additional 0.35 mile north of where the VRP symbol is mapped in the RFI database and is located outside the 0.5 mile search radius. No impact is expected.

Leaking Underground Storage Tank (LUST) Site: Eight (8) LUST sites are located within the 0.5 mile search radius. The nearest site, the Indiana University Wrubel Computing Center (SR 46 Bypass and 10th Street intersection, Bloomington, IN, FID 18506, AI ID 42451), is mapped within the western end of the project area; however, the icon is not mapped and the site is located an additional 0.16 mile northeast of where the LUST symbol is mapped in the RFI database. IDEM issued an NFA determination letter on August 27, 1999 and appears to have been a clean closure. No impact is expected.

NPDES Facilities: One (1) NPDES facility is located within the 0.5 mile search radius. The Indiana University Auxiliary Library Facility Expansion 3 (851 North Range Road, Bloomington, IN, NPDES ID INR10P454) is located approximately 0.20 mile northwest of the project area. The stormwater permit is in effect until 2022. No impact is expected.

ECOLOGICAL INFORMATION SUMMARY

The Monroe County listing of the Indiana Natural Heritage Data Center information on endangered, threatened, or rare (ETR) species and high quality natural communities is provided at https://www.in.gov/dnr/naturepreserve/files/np_monroe.pdf. A preliminary review of the Indiana Natural Heritage Database by INDOT ESD did not indicate the presence of ETR species within the 0.5 mile search radius. Coordination with USFWS and IDNR will occur.

A review of the USFWS database did not indicate the presence of endangered bat species in or within 0.5 mile of the project area. The range-wide programmatic consultation for the Indiana Bat and Northern Long-eared Bat will be completed according to the most recent "Using the USFWS's IPaC System for Listed Bat Consultation for INDOT Projects".

RECOMMENDATIONS SECTION

Include recommendations from each section. If there are no recommendations, please indicate N/A:

INFRASTRUCTURE:
Hospitals: One (1) unmapped hospital, the Indiana University Health Bloomington Hospital, is located approximately 0.25 mile north of the project area. The hospital is currently under construction and is scheduled to open in 2021. Coordination with the hospital will occur to identify any potential issues arising with emergency services.

Schools: One (1) unmapped school, the Indiana University Bloomington campus, is located within the project area along the north side of SR 45. Coordination with the school will occur.

Trails: Two (2) trail segments are located within the project area. The Bloomington North Sidepaths trail (along 10th Street from Jefferson Street east to Pete Ellis Drive) is an urban trail located along SR 45. The SR 45/46 Bypass and College Mall Road trail (from Walnut Street to 3rd Street) is a park/forest trail located along the east side of SR 46. Coordination with the City of Bloomington will occur.

MINING/MINERAL EXPLORATION: N/A

HAZARDOUS MATERIAL CONCERNS:

State cleanup and Institutional Controls: The former Courtesy Cleaners (2604 East 10th Street, Bloomington, IN, AI ID 40433) is located within the project area in the southeast corner of the SR 45 and SR 46 intersection. A NFA determination letter was issued by IDEM on July 29, 2013. Low levels of soil and groundwater contamination remain on site. An ERC was placed on the property on May 13, 2013. The ERC prohibits the use of groundwater for the entire property, but not soil; use of soil is restricted in a smaller area located behind the existing building, adjacent north of the existing railroad tracks. It does not appear as though residual dissolved chlorinated solvents extend into the project area; however, if the scope of work or extents of excavation should change, coordination with INDOT SAM will occur. In addition, due to the ERC, coordination will be conducted with the IDEM Project Manager (Ms. Hartman, nhartman@idem.in.gov) identified in the VFC documentation before further site activities occur.

Underground Storage Tanks: The IU UOEHS (2735 East 10th Street, Bloomington, IN 47408, AI ID 12651) is located within the project area. In addition to petroleum contamination, it is likely that lead would be in the soil/ groundwater. If excavation occurs in this area, it is likely that petroleum contamination will be encountered. Before proper removal and disposal of soil and/or groundwater, analysis for lead will be necessary.

ECOLOGICAL INFORMATION: Coordination with USFWS and IDNR will occur. The range-wide programmatic consultation for the Indiana Bat and Northern Long-eared Bat will be completed according to the most recent "Using the USFWS's IPaC System for Listed Bat Consultation for INDOT Projects".

INDOT ESD concurrence: Nicole Fohey-Breting Digitally signed by Nicole Fohey-Breting Date: 2021.03.18 09:55:53 -04'00' (Signature)

Prepared by:
Ellen Hogrebe
Environmental Scientist
Crawford, Murphy & Tilly, Inc.

Graphics:

A map for each report section with a 0.5 mile search radius buffer around all project area(s) showing all items identified as possible items of concern is attached. If there is not a section map included, please change the YES to N/A:

SITE LOCATION: YES

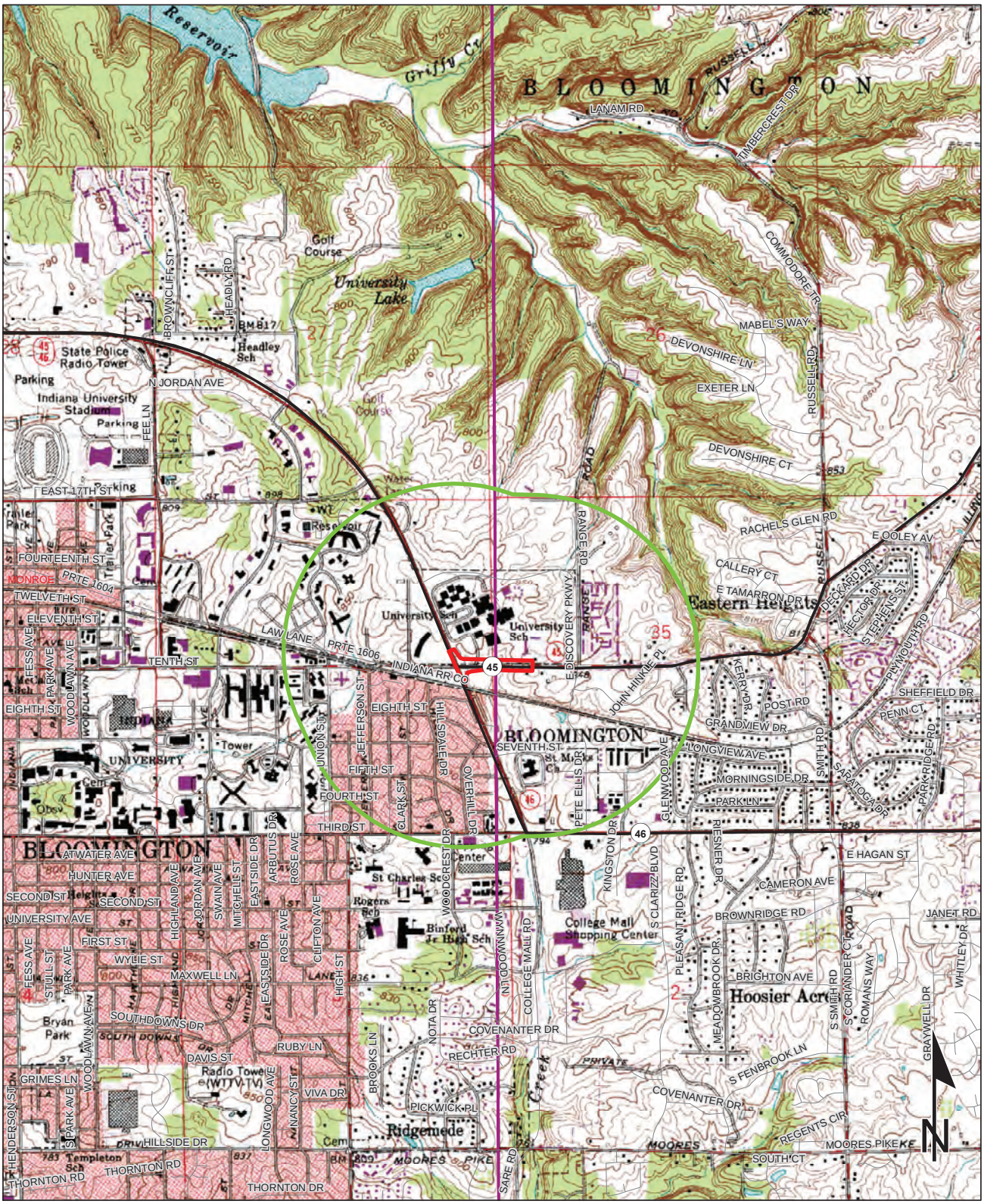
INFRASTRUCTURE: YES

WATER RESOURCES: YES

MINING/MINERAL EXPLORATION: N/A

HAZARDOUS MATERIAL CONCERNS: YES

Red Flag Investigation - Site Location
SR 45 Added Travel Lanes
Des. No. 1800086
Monroe County, Indiana



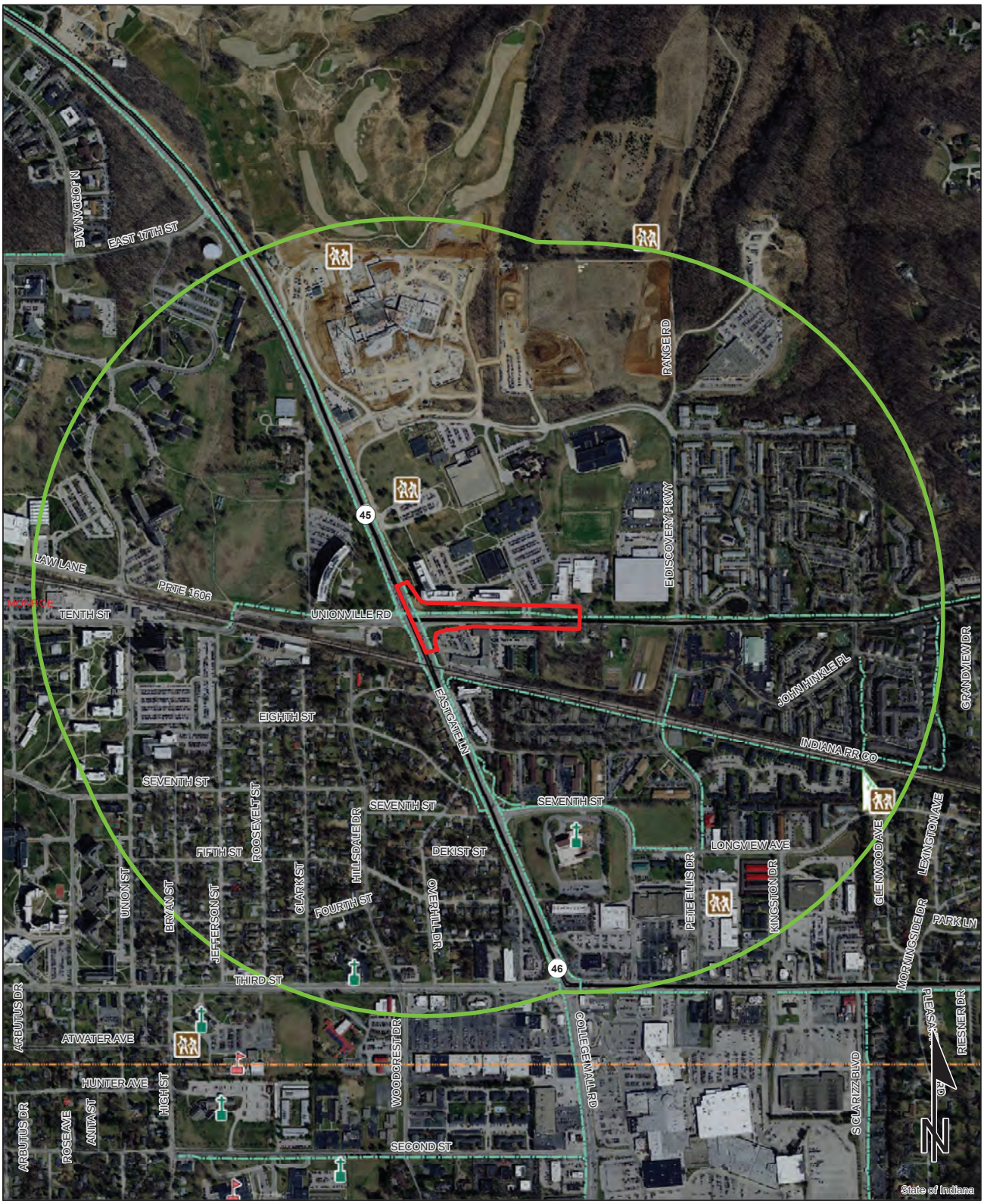
0.35 0.175 0 0.35 Miles

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.

BLOOMINGTON & UNIONVILLE
QUADRANGLES
INDIANA
7.5 MINUTE SERIES
(TOPOGRAPHIC)

Red Flag Investigation - Infrastructure
SR 45 Added Travel Lanes
Des. No. 1800086
Monroe 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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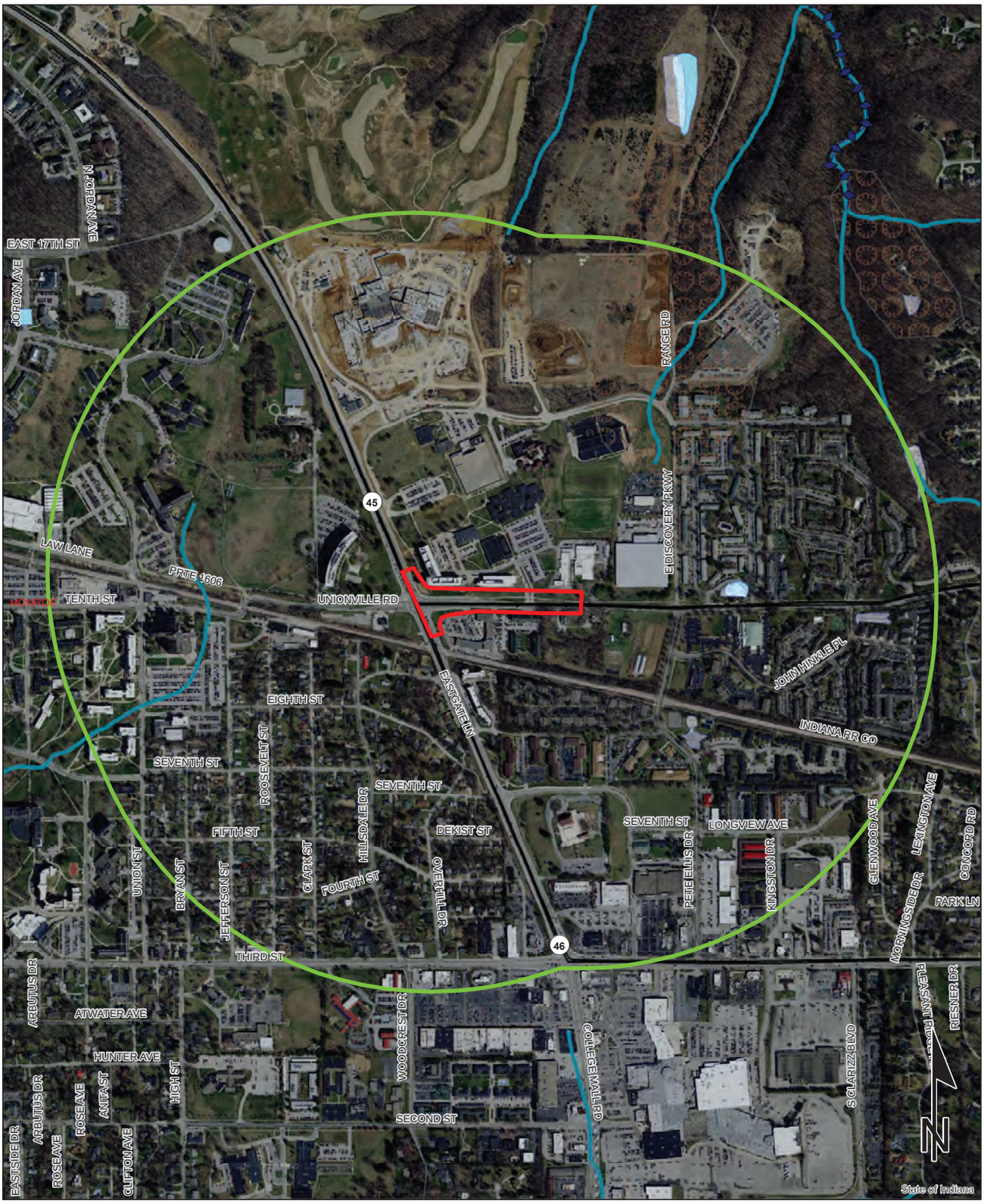
- Religious Facility
- Airport
- Cemeteries
- Hospital
- School
- Recreation Facility
- Pipeline
- Railroad
- Trails
- Managed Lands
- County Boundary
- Project Area
- Half Mile Radius
- Toll
- Interstate
- State Route
- US Route
- Local Road

Red Flag Investigation - Water Resources
SR 45 Added Travel Lane
Des. No. 1800086
Monroe 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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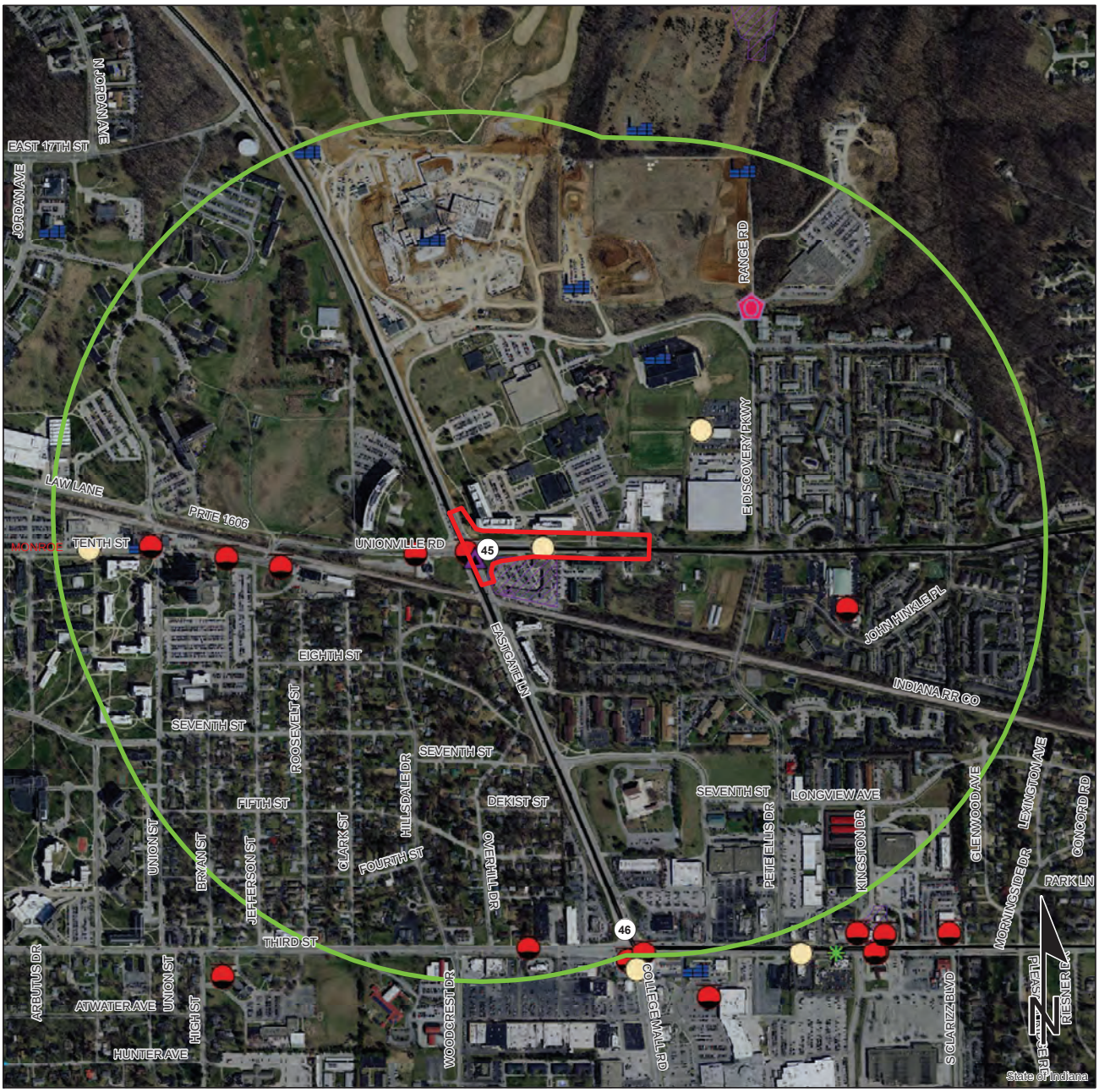
- NWI - Point
- Karst Spring
- NWI- Line
- Impaired_Stream_Lake
- NPS NRI listed
- River
- Canal Structure - Historic
- Canal Route - Historic
- Wetlands
- Lake
- Floodplain - DFIRM
- Cave Entrance Density
- Sinkhole Area
- Sinking-Stream Basin
- County Boundary
- Project Area
- Half Mile Radius
- Toll
- Interstate
- State Route
- US Route
- Local Road

Red Flag Investigation - Hazardous Material Concerns
SR 45 Added Travel Lanes
Des. No. 1800086
Monroe 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

0.15 0.075 0 0.15 Miles

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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 DEPARTMENT OF TRANSPORTATION

100 North Senate Avenue
Room N642
Indianapolis, Indiana 46204

Eric Holcomb, Governor
Joe McGuinness, Commissioner

April 27, 2021

Nicolette Hartman
Office of Land Quality, State Cleanup Program
Indiana Department of Environmental Management
100 North Senate Avenue
Indianapolis, IN 46204-2251

Re: State Road 45 Added Lane Project
Bloomington, Monroe County, Indiana
INDOT Des No.: 1800086
CMT Project No.: 18070904-14

Dear Ms. Hartman:

The Indiana Department of Transportation (INDOT) and Federal Highway Administration (FHWA) intend to proceed with a project involving State Road (SR) 45 in Bloomington, Monroe County, Indiana. This letter is part of the early coordination phase of the environmental review process. We are requesting comments from your area of expertise regarding any possible environmental effects associated with this project. During the INDOT Red Flag Investigation of the project, we identified that the project is located adjacent to the former Courtesy Cleaners (2604 East 10th Street, Bloomington, IN, AI ID 40433, IDEM Incident #200710157), an Institutional Control and State Cleanup Site which is located in the southeast corner of the SR 45 (E 10th Street) and SR 46 intersection. **Please use the above designation numbers and description in your reply.** We will incorporate your comments into a study of the project's environmental impacts. This is a state-sponsored project receiving federal funds.

Project Description
This project is located along SR 45 (10th Street), east of the SR 46 intersection in Bloomington, Monroe County, Indiana. The project area extends along SR 45 from the intersection with SR 46 to approximately 600 feet west of the SR 45 and Pete Ellis Drive/Discovery Parkway intersection. The project is located in Sections 34 and 35, Township 9 North, and Range 1 West of the U.S. Geological Survey (USGS) Bloomington and Unionville, Indiana Quadrangles.

SR 45 is classified by INDOT as a Major Collector and is a FHWA National Highway System (NHS) route. This 0.3-mile segment of SR 45 runs east-west and includes one thru lane in each direction with exclusive right and left-turn lanes at the SR 46 intersection. A multi-use path is located along the north side of SR 45 and a sidewalk is located along portions of the south side of SR 45.

The current proposed project would include adding one lane in each direction along SR 45. Additional improvements include reconstructing driveway approaches, installing new ADA compliant curb ramps, and providing stormwater drainage improvements. To construct the additional pavement for the new lanes on SR 45 between SR 46 and Pete Ellis Dr/Discovery Parkway, SR 45 will be widened to the north throughout the corridor and to the south at portions of the corridor. The project will also add an eastbound, striped bike lane along the south side of SR 45 and reconstruct the existing multi-use path along the north side of SR 45. A mast arm with signage located on the north side of SR 45 will be removed and replaced in the northeast corner of the SR 45 and SR 46 intersection, new storm sewers will be installed along the north side of SR 45, and storm sewer inlets will be

replaced along both the north and south sides of SR 45. The east leg of the SR 45 and SR 46 intersection will be restriped to accommodate the added bike line and roadway widening. This project is being coordinated with the east-adjacent SR 45 and Pete Ellis Drive/Discovery Parkway intersection improvement project (Des. No. 1800199), which will provide exclusive left- and right-turn lanes at all intersection approaches within the SR 45 and Pete Ellis Drive/Discovery Parkway project area and includes extending the added lanes up to Pete Ellis Drive/Discovery Parkway and the bike lane and multi-use path to the eastern end of the project area near the John Hinkle Place/Woodbridge Court intersection.

The project is anticipated to require approximately 2.0 acres of permanent right-of-way and approximately 0.5 acre of temporary right-of-way from two parcels along the north side of SR 45 and approximately 0.2 acre of permanent right-of-way from two parcels and 0.1 acre of temporary right-of-way from one parcel along the south side of SR 45. The project is not anticipated to have extensive excavation occurring on the former Courtesy Cleaners State Cleanup Site since work along the southeast corner of the intersection will be limited to restriping within the existing right-of-way and some sidewalk and additional pavement installation on the south side of SR 45 beginning 350 feet east of SR 46. This is approximately 50 feet east of the commercial entrance to the existing building on the parcel in the southeast corner of the intersection. Approximately 0.1 acre of permanent right-of-way and 0.1 acre of temporary right-of-way will be needed from the parcel owned by the Indiana University Foundation. Please see the attached plan sheet for current proposed work near the site.

If you have any questions or concerns regarding this matter, please feel free to contact Greg Prince at gprince@indot.in.gov or contact me at 317-492-9166 or via email at creiter@cmtengr.com. Thank you in advance for your input.

Sincerely,

Crawford, Murphy & Tilly, Inc.

Cassie Reiter

Cassie Reiter
Project Manager

Attachments-
Maps (Location, Aerial)
Plan Sheet

Ellen Hogrebe

From: Ellen Hogrebe
Sent: Thursday, April 29, 2021 1:22 PM
To: IDEM SCP
Cc: Cassie Reiter; Kristin Timmons; Greg Prince
Subject: RE: Institutional Control/State Cleanup Site project manager contact

Hi Joshua,
Thank you for looking into this. We will let you know if any additional information is needed as the project progresses.

Thanks,

ELLEN HOGREBE | Crawford, Murphy & Tilly | w 314.571.9103
Environmental Scientist

From: IDEM SCP <scp@idem.IN.gov>
Sent: Thursday, April 29, 2021 1:11 PM
To: Ellen Hogrebe <ehogrebe@cmtengr.com>
Subject: FW: Institutional Control/State Cleanup Site project manager contact

Hi Ellen,

I was able to research the site in question more in-depth this afternoon. From reviewing the outline of the future INDOT project and the most recent document for the site, there does not appear to be any potential risks associated. The chlorinated impacts were detected in the rear portion of where the former dry cleaning facility was located. The chlorinated impacted groundwater plume was monitoring and was determined to be stable and not migrating with the groundwater flow direction (southeasterly).

I hope this information is helpful.

Thank you,

Joshua A. Keller
Senior Environmental Manager | State Cleanup Program
Remediation Branch | Office of Land Quality
Indiana Department of Environmental Management

(317) 234-8674 | jkeller@idem.IN.gov

From: Ellen Hogrebe <ehogrebe@cmtengr.com>
Sent: Wednesday, April 28, 2021 1:49 PM
To: IDEM SCP <scp@idem.IN.gov>
Cc: Cassie Reiter <creiter@cmtengr.com>; Prince, Greg <gprince@indot.IN.gov>; Kristin Timmons

<ktimmons@cmtengr.com>
Subject: RE: Institutional Control/State Cleanup Site project manager contact

**** This is an EXTERNAL email. Exercise caution. DO NOT open attachments or click links from unknown senders or unexpected email. ****

Hi Joshua,

Thank you for responding, and that is what we had suspected but wanted to confirm. INDOT intends to proceed with a project involving adding a lane in both directions along SR 45 (10th Street), east of the SR 46 intersection in Bloomington, Monroe County, Indiana (INDOT Des No. 1800086). During the INDOT Red Flag Investigation of the project, we identified that the project is located adjacent to the former Courtesy Cleaners site. Please see the attached letter, which is part of the coordination phase of the environmental review process. We are requesting comments from IDEM regarding any possible environmental effects associated with this project and to determine if any further steps need to take place in regards to the Institutional Control/State Cleanup site. We will incorporate your comments into a study of the project's environmental impacts.

Thank you,

ELLEN HOGREBE | Crawford, Murphy & Tilly | w 314.571.9103
Environmental Scientist

From: IDEM SCP <scp@idem.IN.gov>
Sent: Wednesday, April 28, 2021 12:18 PM
To: Ellen Hogrebe <ehogrebe@cmtengr.com>
Subject: RE: Institutional Control/State Cleanup Site project manager contact

External Message: *This email was sent from someone outside of CMT. Please use caution with links and attachments from unknown senders or receiving unexpected emails.*

Hi Ellen,

Nicollet Morris was the IDEM State Cleanup Project Manager but is no longer with the agency. Is there any specific site information I may be able to assist you with?

Thank you,

Joshua A. Keller
Senior Environmental Manager | State Cleanup Program
Remediation Branch | Office of Land Quality
Indiana Department of Environmental Management

(317) 234-8674 | jkeller@idem.IN.gov

IDEM values your feedback.

From: Ellen Hogrebe <ehogrebe@cmtengr.com>
Sent: Wednesday, April 28, 2021 12:14 PM

To: IDEM SCP <scp@idem.IN.gov>
Subject: Institutional Control/State Cleanup Site project manager contact

**** This is an EXTERNAL email. Exercise caution. DO NOT open attachments or click links from unknown senders or unexpected email. ****

Good afternoon,
I am looking for the project manager and contact information for an Institutional Control/State Cleanup Site. The site is the former Courtesy Cleaners (2604 East 10th Street, Bloomington, IN, AI ID 40433, IDEM Incident #200710157), which is located in the southeast corner of the SR 45 (E 10th Street) and SR 46 intersection.

Thank you,

ELLEN HOGREBE | Environmental Scientist

Crawford, Murphy & Tilly | **Engineers & Consultants**
8790 Purdue Road| Indianapolis, IN 46268
w 314.571.9103 | ehogrebe@cmtengr.com

Centered in Value

SR 45 & Pete Ellis Dr./Discovery Pkwy.
Intersection Improvements and Added Lanes
CE Level 4

APPENDIX F: WATER RESOURCES

Note: Duplicate mapping and photographs were included in the Waters Report, but were intentionally removed. Please see Appendix B for maps and photographs.

APPROVED: Stephen C. Sperry 6:58 pm, 06/16/2020
Environmental Waterway Permitting Office
Indiana Department of Transportation

Waters Report

State Road 45 Intersection at Pete Ellis Drive/Discovery Parkway
City of Bloomington, Monroe County, Indiana
Intersection Improvement

DES No: 1800199

Completed Date: MAY 28, 2020
INDOT EWPO Approval Date: JUNE 22, 2020

PREPARED BY:

CRAWFORD, MURPHY & TILLY, INC.
8790 PURDUE ROAD
INDIANAPOLIS, INDIANA 46268

PREPARED FOR:

INDIANA DEPARTMENT
OF TRANSPORTATION
SEYMOUR DISTRICT OFFICE

Waters Report
State Road 45 (SR 45) & Pete Ellis Drive/Discovery Parkway
in Bloomington, Monroe County, Indiana
Intersection Improvement
DES No: 1800199

Prepared by: Ellen Hogrebe
Contact Information: ehogrebe@cmtengr.com, 314-571-9103
Company: Crawford, Murphy & Tilly, Inc.
Completed Date: May 28, 2020

PROJECT INFORMATION

Dates of Field Reconnaissance: July 24, 2019 and May 4, 2020

Location:
Section 35, Township 9 North, Range 1 West
Unionville Indiana, Quadrangle
Monroe County, Indiana
39.171430 Latitude, -86.495450 Longitude

PROJECT DESCRIPTION

This project is located at the State Road 45 (SR 45) (10th Street) and Pete Ellis Drive/Discovery Parkway intersection in Bloomington, Monroe County, Indiana. The study area includes SR 45 from 0.1 mile east of the intersection to 0.1 mile west of the intersection and also includes Pete Ellis Drive from 0.1 mile south of the intersection and Discovery Parkway from 0.1 mile north of the intersection. Per the USGS Unionville, IN Quadrangle Map, the study area is situated within Section 35, Township 9 North, and Range 1 West.

The proposed improvements would include providing exclusive left-turn and right-turn lanes on all approaches at the intersection. The improvements would involve widening portions of SR 45, Pete Ellis Drive, and Discovery Parkway. Sidewalk and multi-use path reconstruction around the intersection may also be necessary.

Land use in the vicinity of the project is residential and commercial.

The project has been programmed by INDOT as SR 45 and Pete Ellis Drive Intersection Improvement, DES No: 1800199.

The study area was established using the anticipated project footprint to construct the proposed improvements. The location of the project within Monroe County and the study area are shown on the attached mapping.

DESKTOP RECONNAISSANCE

SOILS

According to the Soil Survey Geographic (SSURGO) Database for Monroe County, Indiana, the study area does not contain soil areas with nationally listed hydric soils.

Soil Name	Map Abbreviation	Hydric Range
CrB	Crider silt loam, 2 to 6 percent slopes	Not Hydric (0%)
CrC	Crider silt loam, 6 to 12 percent slopes	Not Hydric (0%)
CtB	Crider-Urban land complex, 2 to 6 percent slopes	Not Hydric (0%)

NATIONAL WETLAND INVENTORY (NWI) INFORMATION

There is one (1) wetland, a freshwater pond, identified near the study area.

Wetland Type	Location
Freshwater Pond (PUBGh)	A pond is mapped adjacent to the eastern portion of the study area.

12 DIGIT HUC

051202020105 – Buck Creek – Beanblossom Creek
051202080801 – Jackson Creek – Clear Creek

USGS NATIONAL HYDROGRAPHY DATASET (NHD)

According to the USGS National Hydrography Dataset (NHD layer), one (1) NHD layer stream flowline, one (1) NHD layer artificial path flowline, and one (1) NHD layer pond are identified within or near the study area. The stream flowline starts within the center of the study area, flowing northeast through the pond as an artificial path; the stream was not identified during the on-site investigation.

FEMA FLOOD INSURANCE RATE MAP (FIRM)

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), the study area is not located within or adjacent to a floodplain.

ATTACHED DOCUMENTS

- Project Mapping (Project Location, Aerial, Topographic, NRCS Soils, NWI, USGS NHD, 12 Digit HUC, and Floodplain)
- Photographs with Photo Location Map

FIELD RECONNAISSANCE

No aquatic resources, including wetlands, streams, roadside ditches, or drainage swales were identified within the study area during the onsite investigation for the presence of wetlands and other Waters of the United States (WOTUS) by Crawford, Murphy and Tilly, Inc (CMT).

The investigation for wetlands 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*. Representative photographs of the study area are provided.

STREAMS

No streams were observed within or adjacent to the study area.

WETLANDS

No wetlands were observed within the study area. Within the study area, no hydrology indicators were observed and the area was dominated by upland vegetation including Kentucky blue grass (*Poa pratensis,* FAC), English plantain (*Plantago lanceolata*, FACU), and white clover (*Trifolium repens,* FACU). The three wetland criteria were not met; therefore, no wetlands were present.

OPEN WATER

No open water areas were observed within the study area.

OTHER FEATURES

ROADSIDE DITCHES

No roadside ditches were observed within or adjacent to the study area.

DRAINAGE FEATURES WITHOUT OHWM

No drainage features without an OHWM were observed within or adjacent to the study area.

CONCLUSIONS

No Waters of the United States (WOTUS), including wetlands, streams, open water features, or roadside ditches, were identified within the study area.

ACKNOWLEDGEMENT

This waters determination has been prepared based on the best available information, interpreted in the 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.

Ellen Hogrebe
Environmental Scientist
Crawford, Murphy & Tilly, Inc.

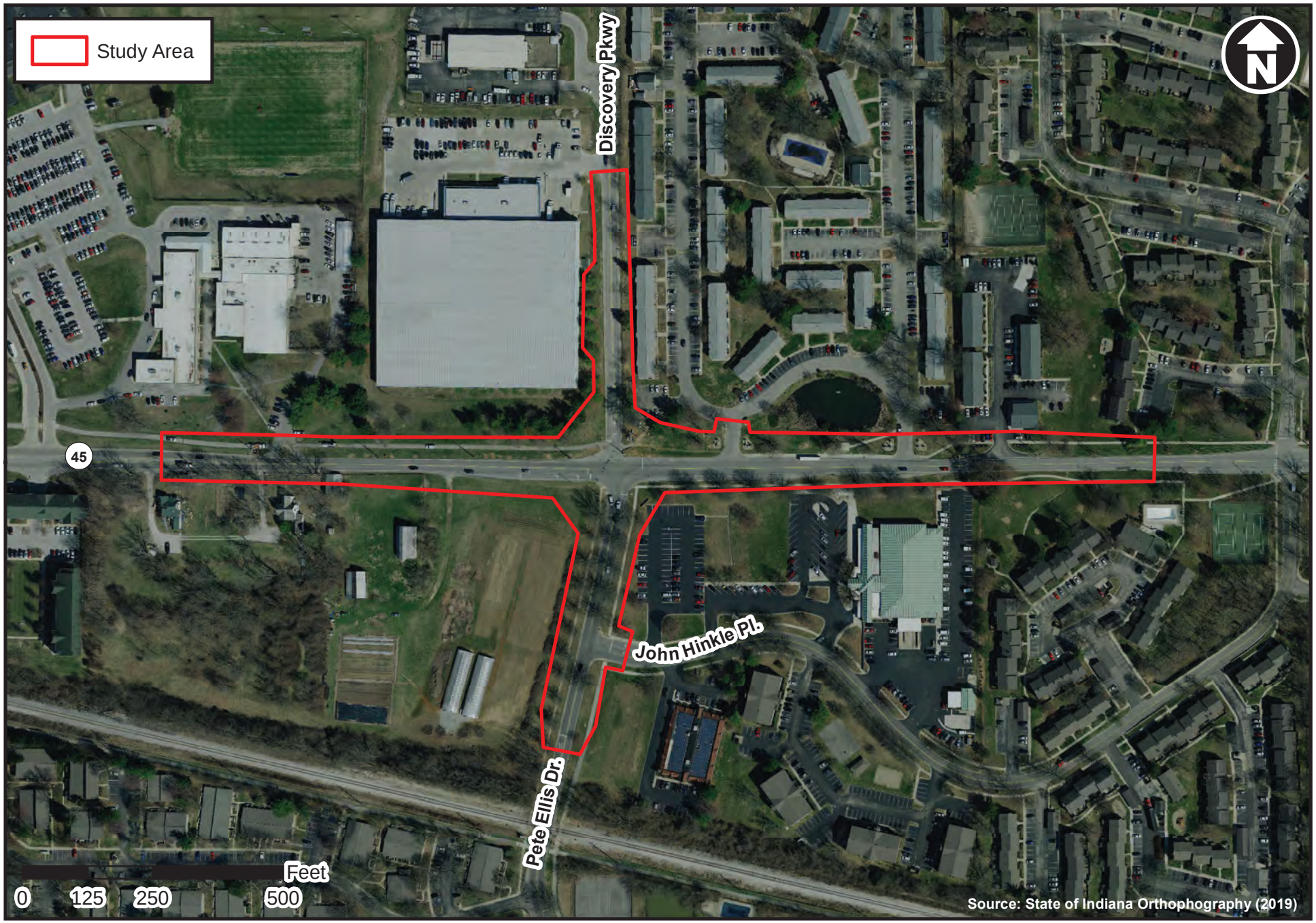
Date: May 28, 2020

Marion Wells - Reviewer
Environmental Scientist
Crawford, Murphy & Tilly, Inc.

Date: May 29, 2020

SUPPORTING DOCUMENTATION

- Maps
- Photos

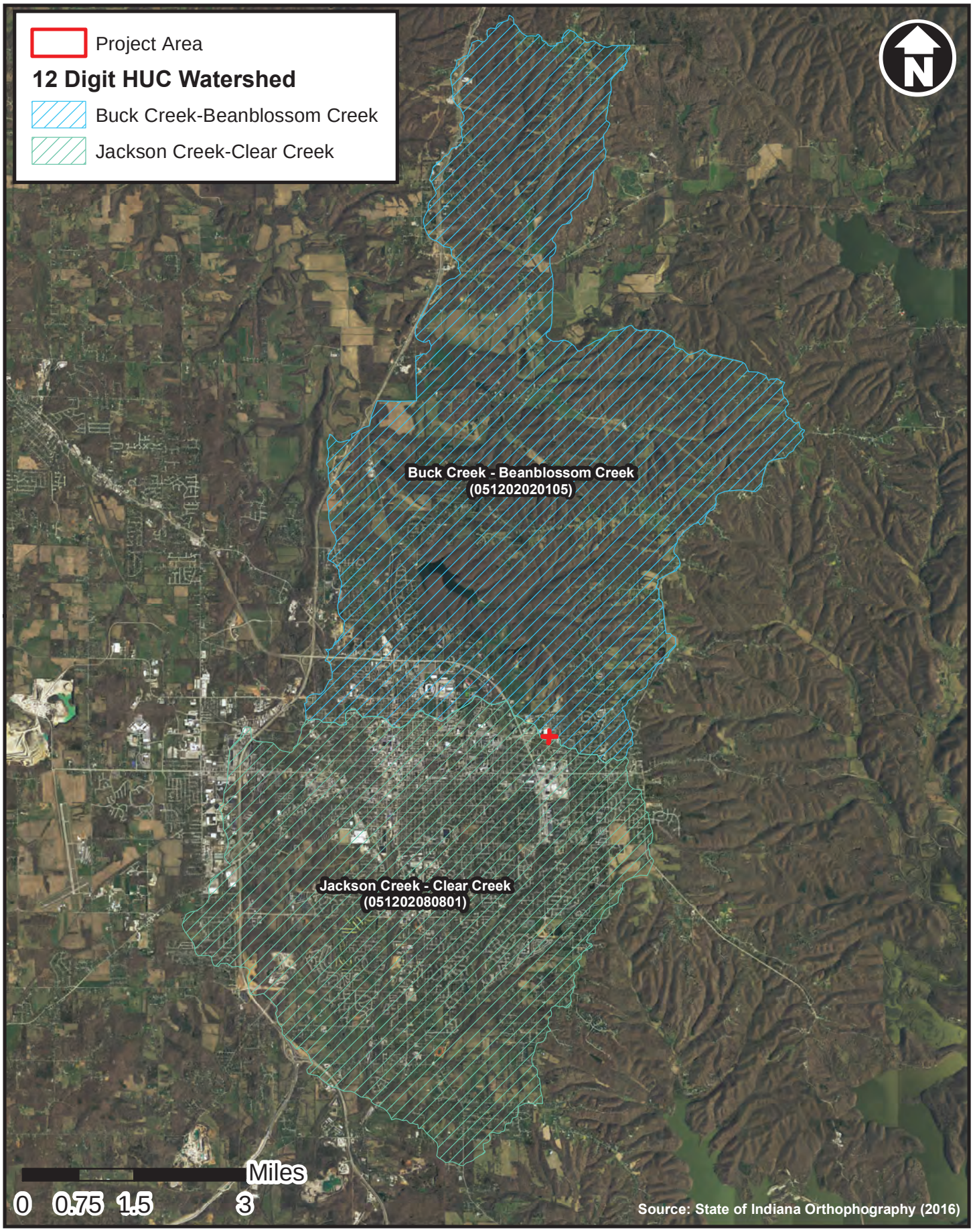


SR 45 & Pete Ellis Dr./Discovery Pkwy. (Des No 1800199) - Monroe Co., IN

Aerial Map

Ellen Hogrebe 5/28/2020

CMT
Crawford, Murphy & Tilly

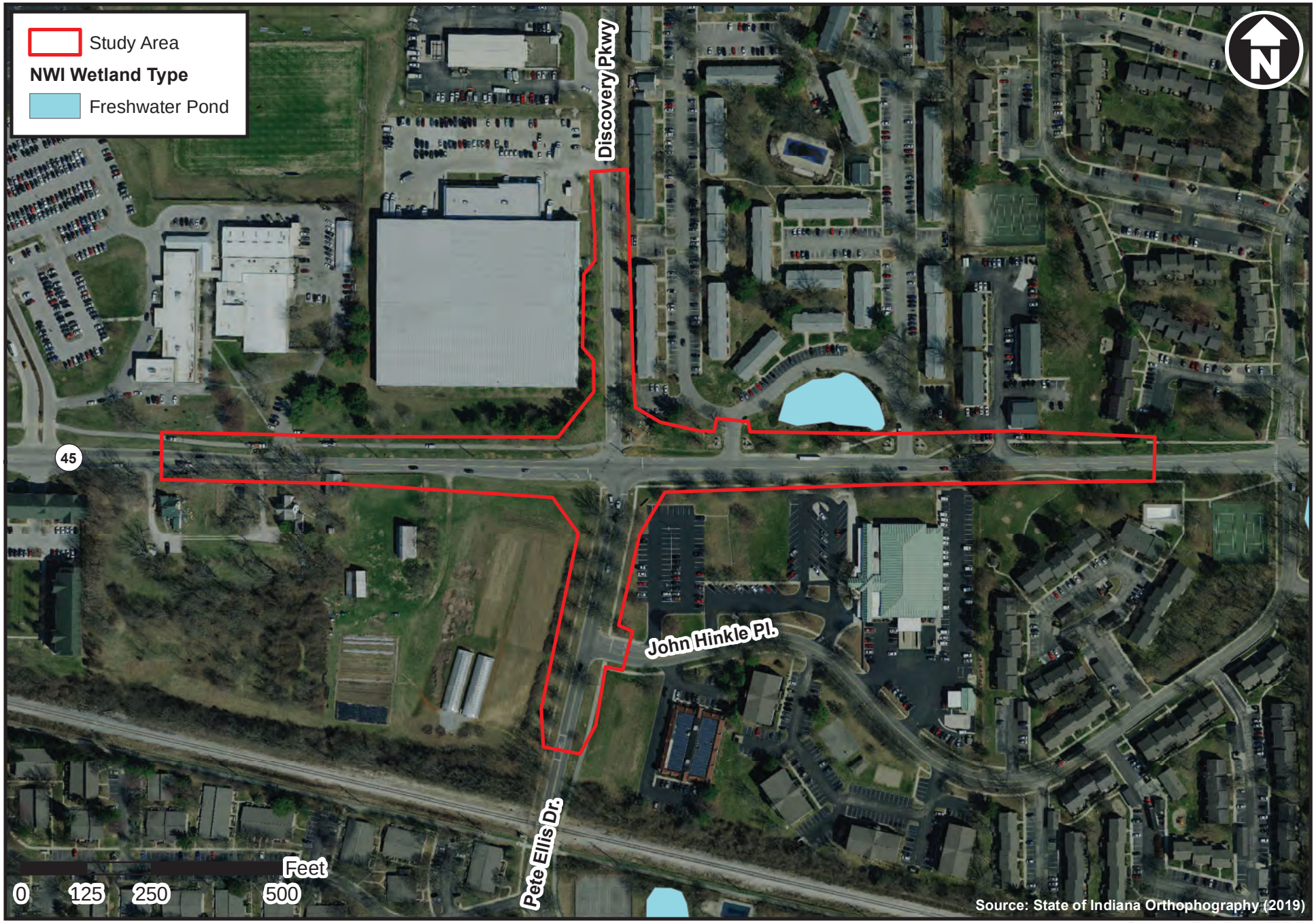


SR 45 & Pete Ellis Dr./Discovery Pkwy (Des No 1800199) - Monroe Co., IN

12 Digit Hydrologic Unit Code (HUC) Watershed Map

Ellen Hogrebe 6/14/2019

CMT
Crawford, Murphy & Tilly

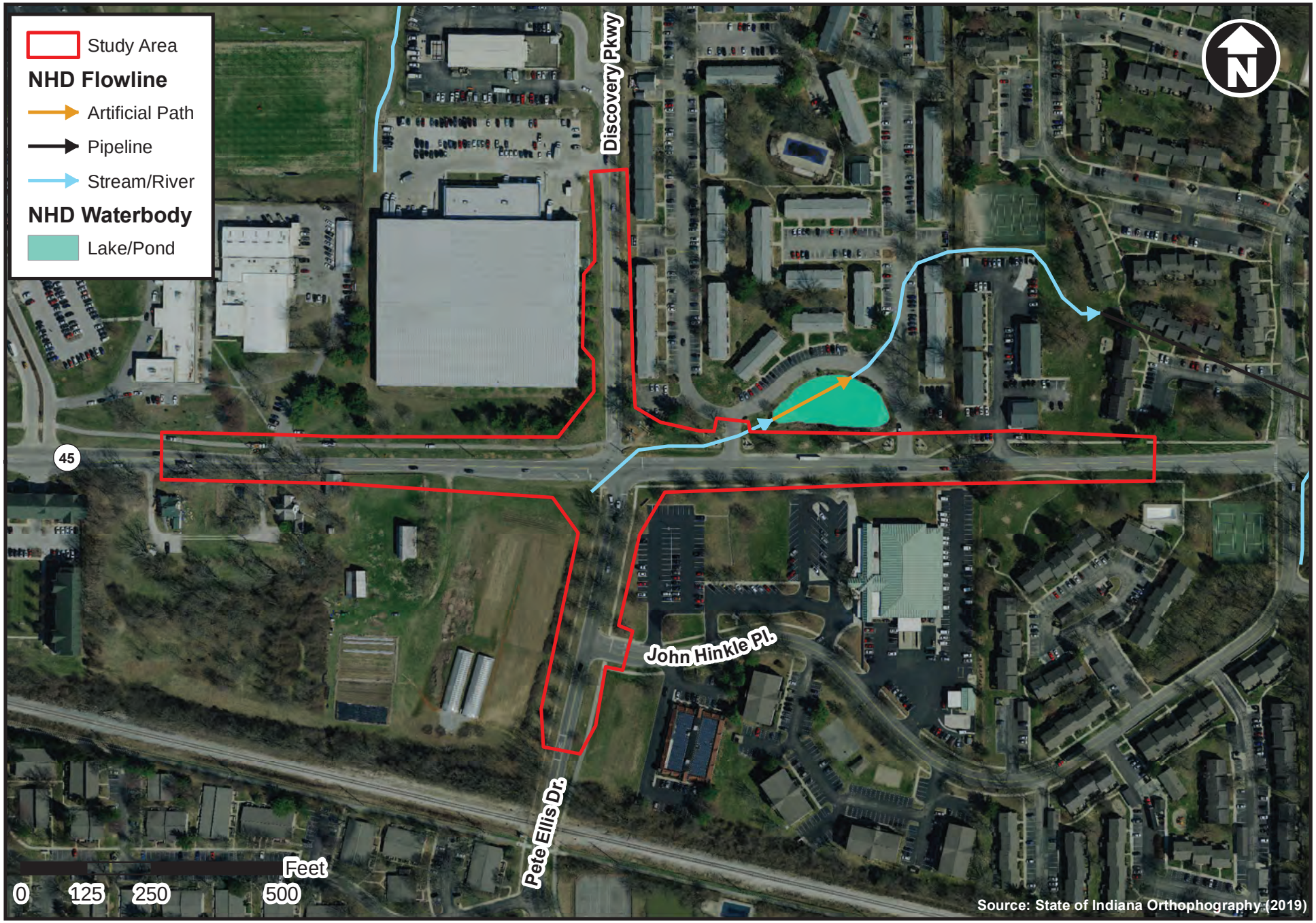


SR 45 & Pete Ellis Dr./Discovery Pkwy. (Des No 1800199) - Monroe Co., IN

National Wetland Inventory Map

Ellen Hogrebe 3/14/2019

CMT
Crawford, Murphy & Tilly



SR 45 & Pete Ellis Dr./Discovery Pkwy. (Des No 1800199) - Monroe Co., IN

USGS National Hydrography Dataset Map

Ellen Hogrebe 5/28/2020

Crawford, Murphy & Tilly

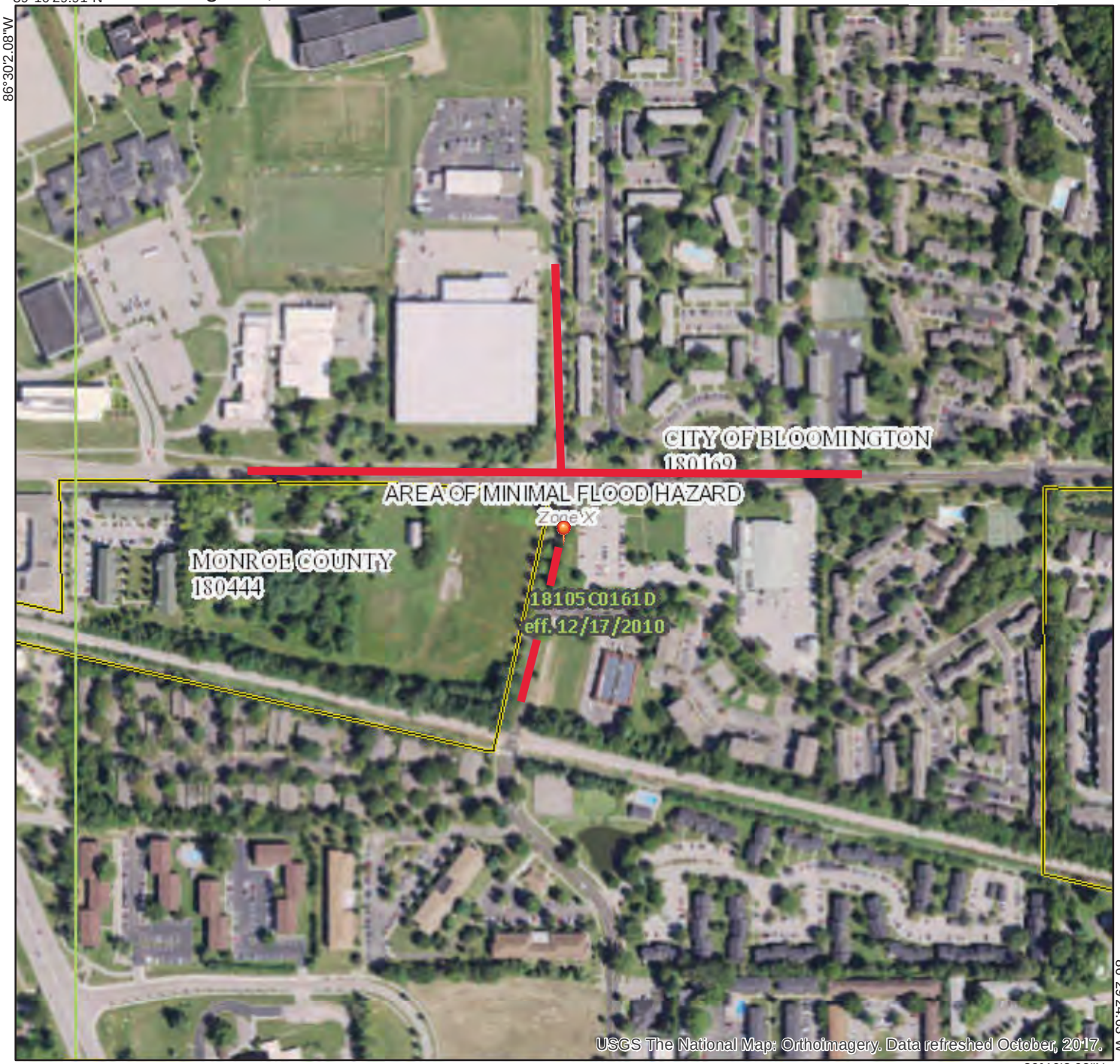
SR 45 & Pete Ellis Dr./Discovery Pkwy. (Des No 1800199) - Monroe Co., IN

National Flood Hazard Layer FIRMette

Ellen Hogrebe; 5/13/2019

39°10'29.91"N

86°30'2.08"W



86°29'24.63"W

39°10'2.02"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

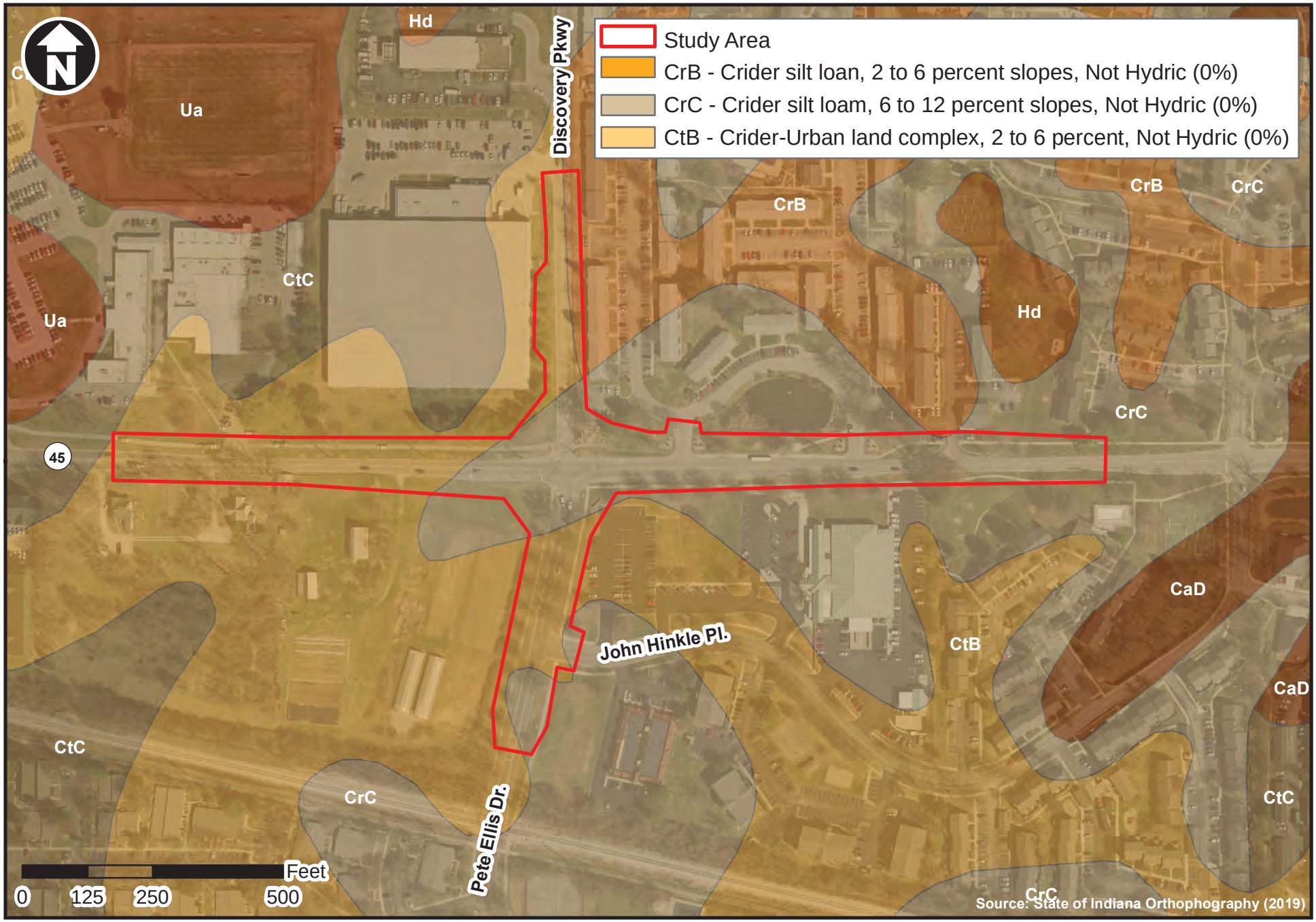
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

Project Area

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/14/2019 at 4:36:17 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



SR 45 & Pete Ellis Dr./Discovery Pkwy. (Des No 1800199) - Monroe Co., IN

NRCS SSURGO Soil Survey Map

Ellen Hogrebe 5/28/2020

CMT
Crawford, Murphy & Tilly

Map Unit Description (Brief, Generated)

Monroe County, Indiana

[Minor map unit components are excluded from this report]

Map unit: CrB - Crider silt loam, 2 to 6 percent slopes

Component: Crider (75%)

The Crider component makes up 75 percent of the map unit. Slopes are 2 to 6 percent. This component is on hills on karst uplands. The parent material consists of fine-silty noncalcareous loess over clayey residuum weathered from limestone. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Map unit: CrC - Crider silt loam, 6 to 12 percent slopes

Component: Crider (80%)

The Crider component makes up 80 percent of the map unit. Slopes are 6 to 12 percent. This component is on hills on karst uplands. The parent material consists of fine-silty noncalcareous loess over clayey residuum weathered from limestone. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

Map unit: CtB - Crider-Urban land complex, 2 to 6 percent slopes

Component: Crider (60%)

The Crider component makes up 60 percent of the map unit. Slopes are 2 to 6 percent. This component is on hills. The parent material consists of loess over clayey residuum. Depth to a root restrictive layer, bedrock, lithic, is 60 to 120 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Component: Urban land (40%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Ellen Hogrebe

From: Sperry, Steve <SSPERRY@indot.IN.gov>
Sent: Tuesday, June 16, 2020 6:27 PM
To: Metcalf, Karlei A; Ellen Hogrebe
Cc: Curry, Jennifer; Cassie Reiter
Subject: APPROVED: 5/28/200 WOTUS Report, Des. 1800199, SR 45 Intersect. Improv. W/ Added Turn Lanes, At the intersection of Pete Ellis Dr, Monroe Co
Attachments: pg1 1800199 Waters Report Approved 6.16.2020.pdf

Ellen
Thank you for submitting the waters 5/28/2020 report for the above referenced project. This report is to supersede the 9/19/2019 WOTUS report that was previously approved by this office on 9/19/2019 Please remove the existing cover page on the 5/28/2020 document that was submitted and replace it with the 6/16/2020 stamped approval page (attached)

Karlei,
The full report has been posted to ProjectWise and can be found in the following location, Link: 1800199 Waters Report Approved 6.16.2020.pdf It is the responsibility of the Project Manager to forward a copy of this report to the Project Designer.

The information in this report should be used by the Project Designer to determine if Waters of the U.S. will be impacted by the project. If it appears that impacts will occur and the designer is unable to implement measures to avoid them then action will need to be taken to minimize these impacts to the maximum practical extent. These steps must be taken before any mitigation can be considered. If it is determined that mitigation will be required the Project Manager or Project Designer will need to coordinate with the Ecology and Waterway Permitting Office in order to discuss how this will be provided.

The Project Manager or designer should notify the Ecology and Waterway Permitting Office if there is any change to the project footprint presented in the approved report. Changes may require additional fieldwork and a new report to cover areas not previously investigated.

The **6/16/2020** report is only valid for a period of five years from the date of the earliest fieldwork. If this approved report expires, prior to submittal of the waterway permit applications, a new report would need to be generated.

Should you have any questions or need additional information please contact me.

Thanks
Steve

Stephen C. Sperry
Ecology and Permits Coordinator
Multidistrict East Team
INDOT, *Division of Environmental Services*
IGCN Room 642
100 N. Senate Ave.
Indianapolis, IN 46204

Note: Duplicate mapping and photographs were included in the Waters Report, but were intentionally removed. Please see Appendix B for maps and photographs.

Li Kang 01-12-2021

Waters Report

State Road 45
City of Bloomington, Monroe County, Indiana
Added Travel Lane Project

DES No: 1800086

Completed Date: DECEMBER 7, 2020
INDOT EWPO Approval Date: JANUARY 12, 2021

PREPARED BY:

CRAWFORD, MURPHY & TILLY, INC.
8790 PURDUE ROAD
INDIANAPOLIS, INDIANA 46268

PREPARED FOR:

INDIANA DEPARTMENT
OF TRANSPORTATION
SEYMOUR DISTRICT OFFICE

Waters Report
State Road 45 in Bloomington, Monroe County, Indiana
Added Travel Lane Project
DES No: 1800086

Prepared by: Ellen Hogrebe
Contact Information: ehogrebe@cmtengr.com, 314-571-9103
Company: Crawford, Murphy & Tilly, Inc.
Completed Date: December 7, 2020

PROJECT INFORMATION

Date of Field Reconnaissance: May 4, 2020

Location:
Sections 34 and 35, Township 9 North, Range 1 West
Bloomington and Unionville Indiana, Quadrangles
Bloomington, Monroe County, Indiana
39.171610 Latitude, -86.501108 Longitude

PROJECT DESCRIPTION

The study area for the added travel lane project includes State Road (SR) 45 from the intersection with SR 46 to approximately 700 feet west of the SR 45 and Pete Ellis Drive/Discovery Parkway intersection.

Proposed improvements include adding one travel lane in each direction along SR 45, and modifications to the SR 45 and SR 46 intersection east approach to accommodate the added travel lanes. The project will also add a striped bike lane along the south side of SR 45 and reconstruct the existing paved multi-use path along the north side of SR 45. Land use in the vicinity of the project is commercial and residential.

The project has been programmed by INDOT as SR 45 Added Travel Lane, DES No: 1800086.

The study area was established using the anticipated project footprint to construct the proposed improvements. The location of the project and the study area are shown on the attached mapping.

DESKTOP RECONNAISSANCE

SOILS

According to the Soil Survey Geographic (SSURGO) Database for Monroe County, Indiana, the study area does not contain soil areas with nationally listed hydric soils.

Soil Name	Map Abbreviation	Hydric Range
CtB	Crider-Urban land complex, 2 to 6 percent slopes	0% (Not Hydric)
CtC	Crider-Urban land complex, 6 to 12 percent slopes	0% (Not Hydric)
Ua	Udorthents, loamy	0% (Not Hydric)

NATIONAL WETLAND INVENTORY (NWI) INFORMATION

There are no NWI features identified within the study area. There are two (2) NWI features, including one (1) stream and one (1) freshwater pond, identified near the study area.

Wetland Type	Location
Riverine (R4SBC)	A stream is mapped approximately 0.21 mile northeast of the study area.
Freshwater Pond (PUBGx)	A freshwater pond is mapped approximately 0.21 mile southeast of the study area.

12 DIGIT HUC

051202080801 – Jackson Creek – Clear Creek

USGS NATIONAL HYDROGRAPHY DATASET (NHD)

According to the USGS National Hydrography Dataset (NHD layer), one (1) NHD pipeline flowline is identified within the study area, crossing SR 45. The pipeline flowline was not observed during the onsite investigation.

FEMA FLOOD INSURANCE RATE MAP (FIRM)

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), the study area is not located within or adjacent to a floodplain.

ATTACHED DOCUMENTS

- Project Mapping (Project Location, Aerial, Topographic, NRCS Soils, NWI, USGS NHD, 12 Digit HUC, and Floodplain)
- Photographs with Photo Location Map

FIELD RECONNAISSANCE

No aquatic resources, including wetlands, streams, roadside ditches, and drainage swales were identified within the study area during the onsite investigation for the presence of wetlands and other Waters of the United States (WOTUS) by Crawford, Murphy and Tilly, Inc (CMT).

The investigation for wetlands 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*. Representative photographs of the study area are provided.

STREAMS

No streams were observed within the study area.

WETLANDS

No wetlands were observed within the study area. Within the study area, no hydrology indicators were observed and the area was dominated by upland vegetation including Kentucky blue grass (*Poa pratensis*, FAC), English plantain (*Plantago lanceolata*, FACU), and white clover (*Trifolium repens*, FACU). The three wetland criteria were not met; therefore, no wetlands were present.

OPEN WATER

No open water areas were observed within the study area.

OTHER FEATURES

ROADSIDE DITCHES

No roadside ditches were observed within the study area.

DRAINAGE FEATURES WITHOUT OHWM

No drainage features without an OHWM were observed within the study area.

CONCLUSIONS

No Waters of the United States (WOTUS), including wetlands, streams, open water features, and roadside ditches, were identified within the study area.

ACKNOWLEDGEMENT

This waters determination has been prepared based on the best available information, interpreted in the 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.

Ellen Hogrebe
Environmental Scientist
Crawford, Murphy & Tilly, Inc.

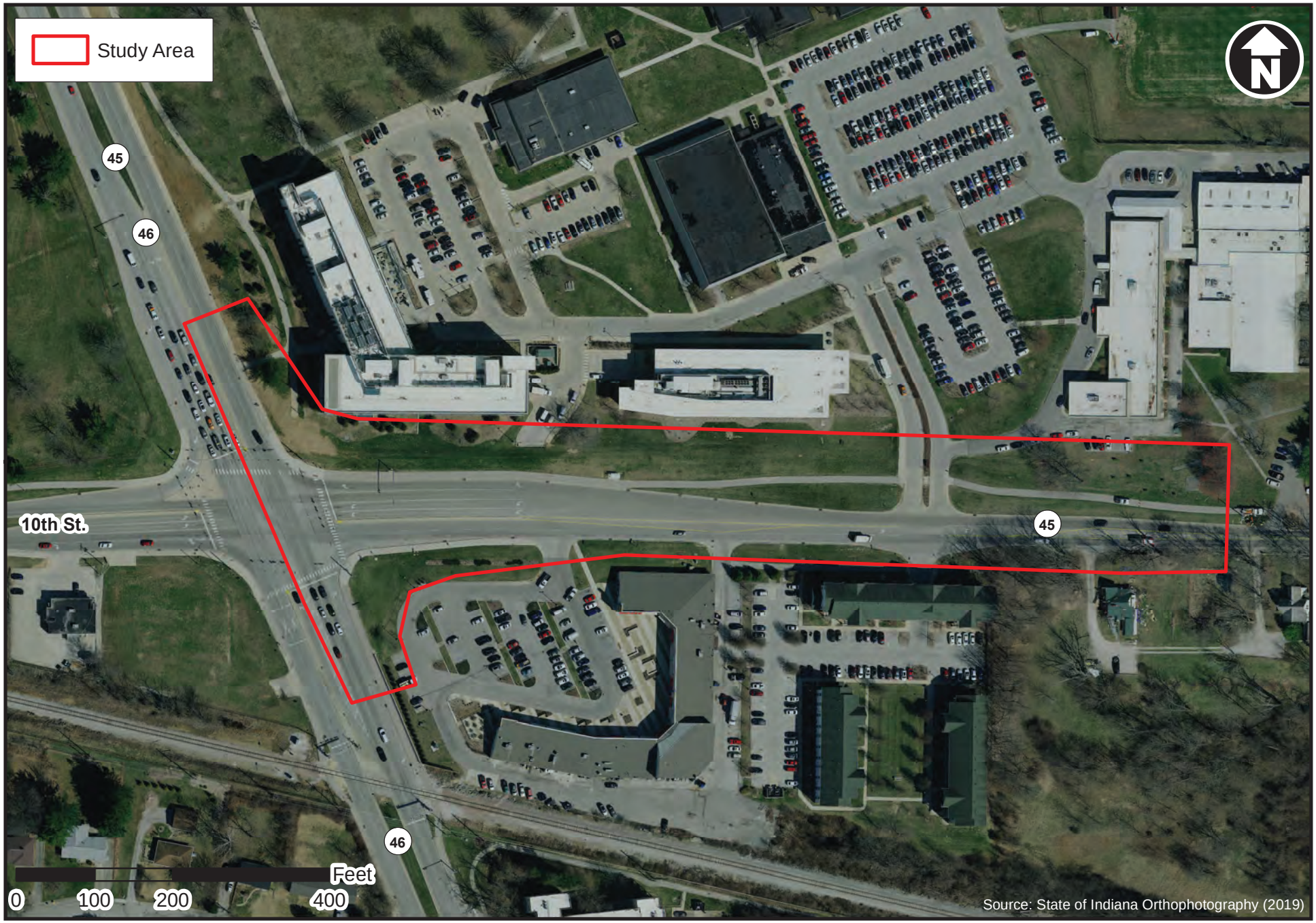
Date: December 7, 2020

Alexandra Zelles - Reviewer
Environmental Scientist
Crawford, Murphy & Tilly, Inc.

Date: December 7, 2020

SUPPORTING DOCUMENTATION

- Maps
- Photos

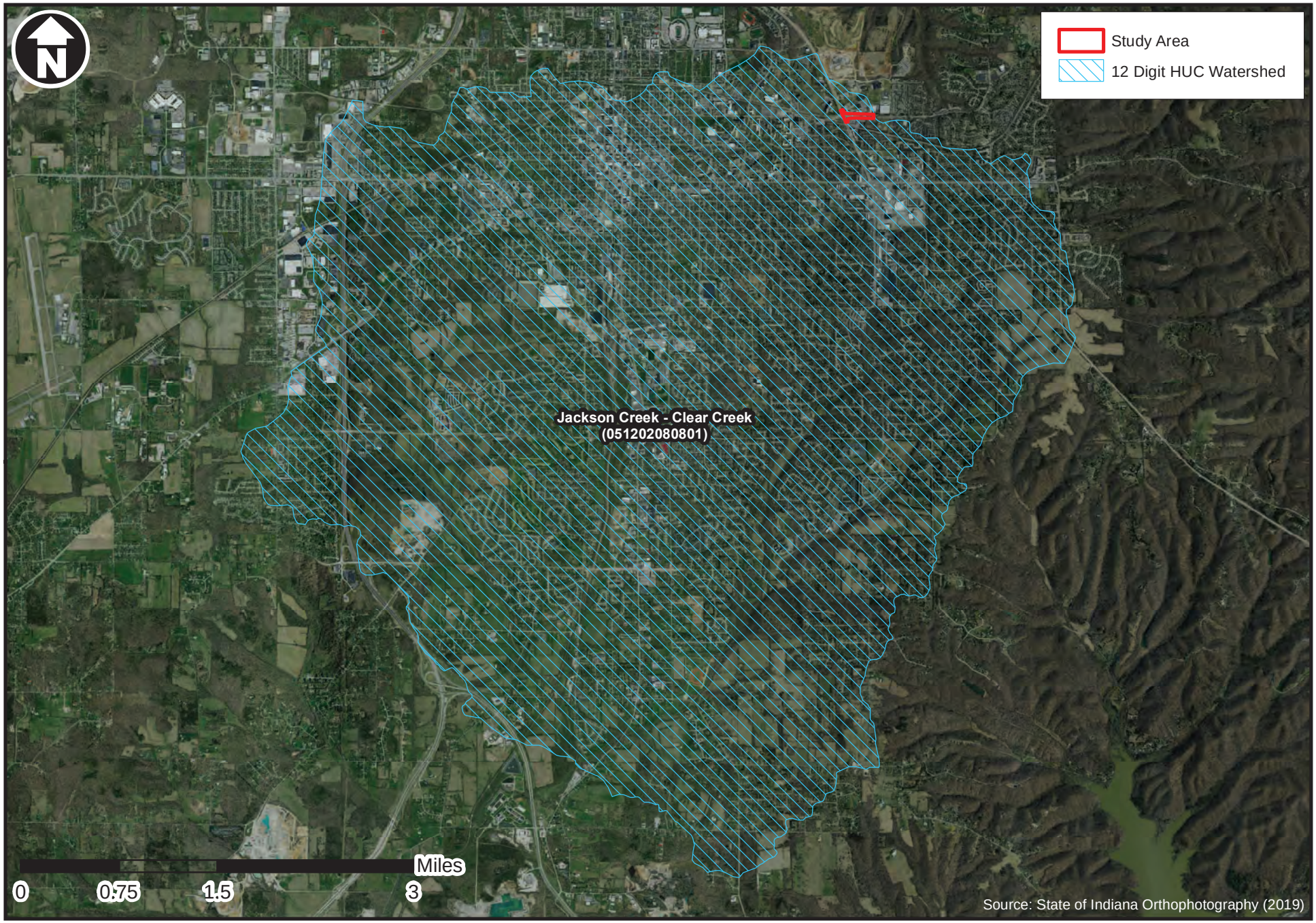


SR 45 Added Travel Lane (Des No 1800086) - Bloomington, Monroe Co., IN

Aerial Map

CMT
Crawford, Murphy & Tilly

Author: Ellen Hogrebe, 4/29/2020

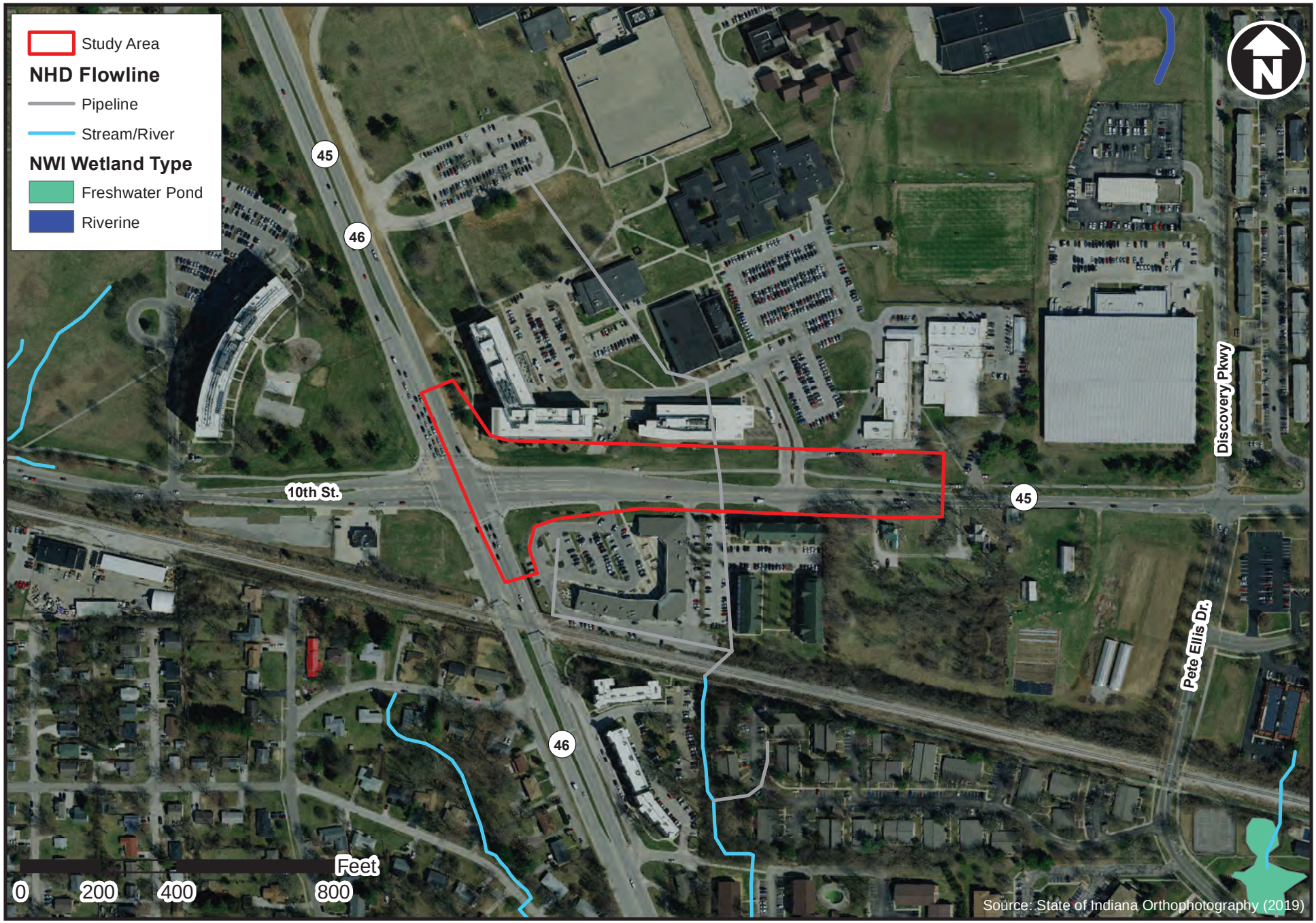


SR 45 Added Travel Lane (Des No 1800086) - Bloomington, Monroe Co., IN

12 Digit Hydrologic Unit Code (HUC) Watershed Map

CMT
Crawford, Murphy & Tilly

Author: Ellen Hogrebe, 12/3/2020



SR 45 Added Travel Lane (Des No 1800086) - Bloomington, Monroe Co., IN

National Wetland Inventory and National Hydrography Dataset Map

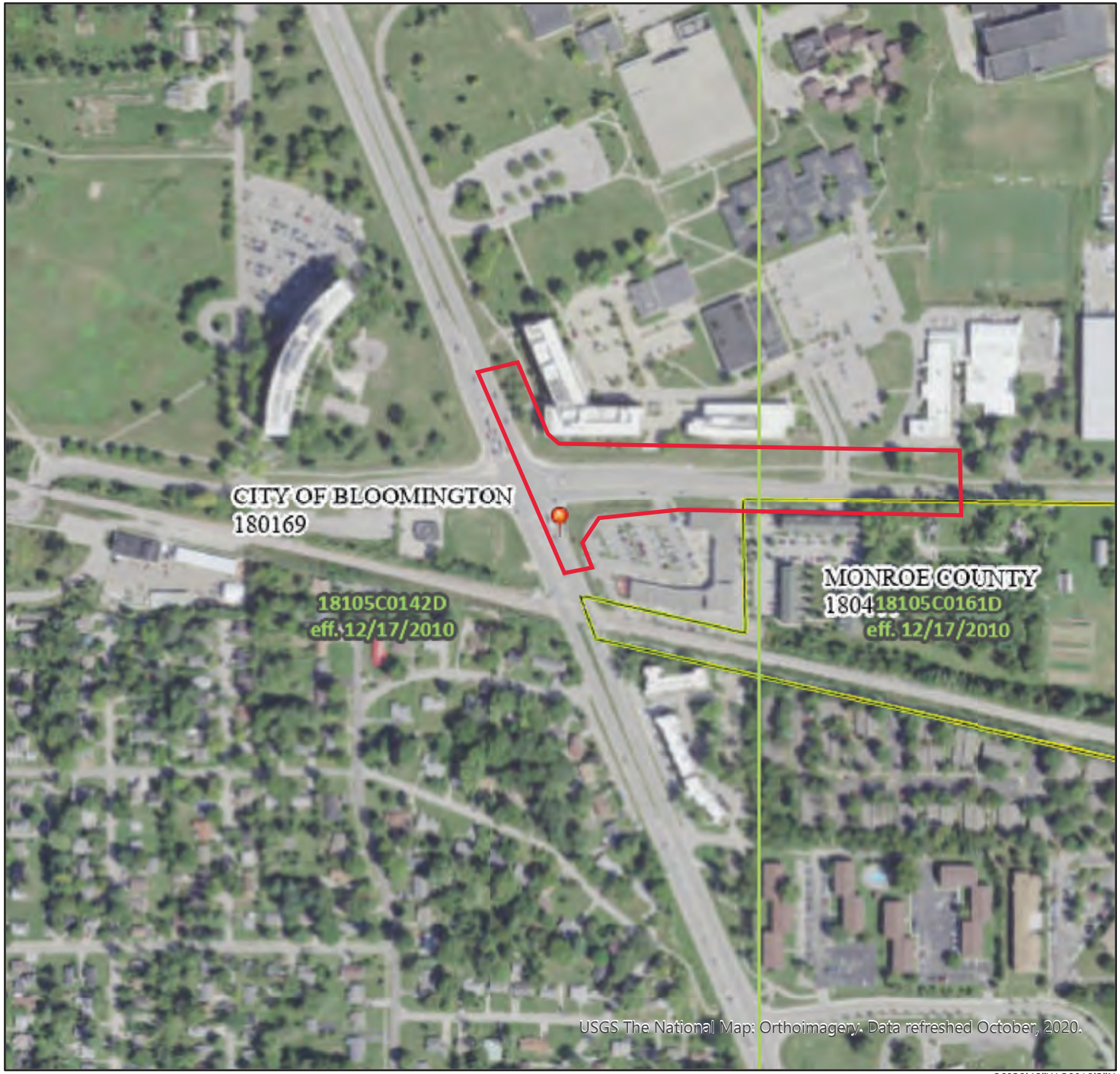
CMT
Crawford, Murphy & Tilly

Author: Ellen Hogrebe, 12/3/2020

National Flood Hazard Layer FIRMette

86°30'25"W 39°10'30"N SR 45 Added Travel Lane (Des No 1800086) - Bloomington, Monroe Co., IN

FEMA



0 250 500 1,000 1,500 2,000 Feet

1:6,000

86°29'48"W 39°10'2"N

F - 22

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

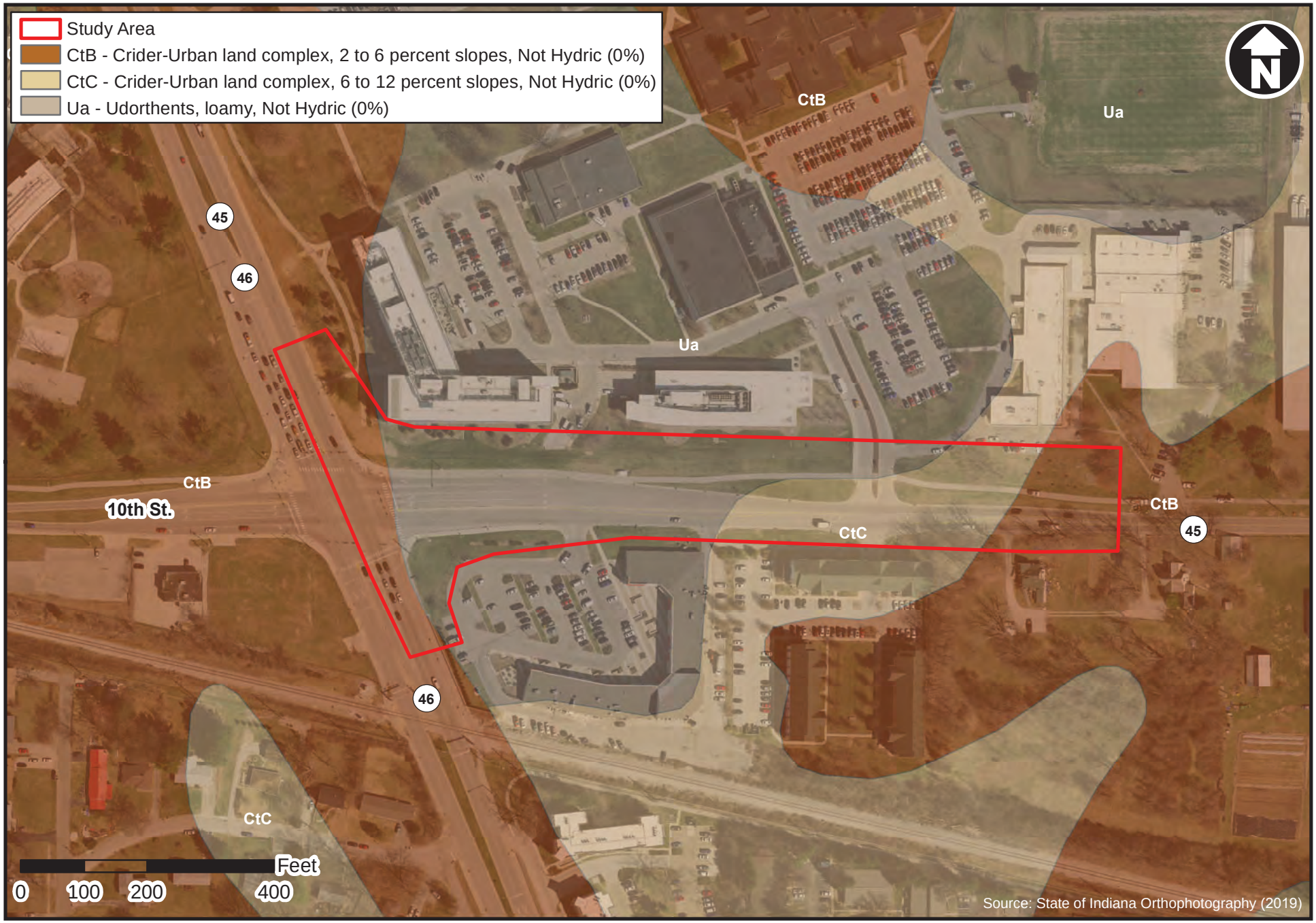
Study Area

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/3/2020 at 5:36 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Author: Ellen Hogrebe, 12/2/2020



SR 45 Added Travel Lane (Des No 1800086) - Bloomington, Monroe Co., IN

NRCS SSURGO Soil Survey Map

Author: Ellen Hogrebe, 4/29/2020

CMT
Crawford, Murphy & Tilly

Map Unit Description (Brief, Generated)

Monroe County, Indiana

[Minor map unit components are excluded from this report]

Map unit: CtB - Crider-Urban land complex, 2 to 6 percent slopes

Component: Crider (60%)

The Crider component makes up 60 percent of the map unit. Slopes are 2 to 6 percent. This component is on hills. The parent material consists of loess over clayey residuum. Depth to a root restrictive layer, bedrock, lithic, is 60 to 120 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Component: Urban land (40%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Map unit: CtC - Crider-Urban land complex, 6 to 12 percent slopes

Component: Crider (60%)

The Crider component makes up 60 percent of the map unit. Slopes are 6 to 12 percent. This component is on hills. The parent material consists of Thin loess, slope alluvium and clayey residuum. Depth to a root restrictive layer, bedrock, lithic, is 60 to 120 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

Component: Urban land (40%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Map unit: Ua - Udorthents, loamy

Component: Udorthents, loamy (100%)

The Udorthents, loamy component makes up 100 percent of the map unit. Slopes are This component is on fills. Depth to a root restrictive layer is greater than 60 inches. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Nonirrigated land capability classification is 8.

Ellen Hogrebe

From: Kang, Li <LKANG@indot.IN.gov>
Sent: Tuesday, January 12, 2021 9:16 AM
To: Ellen Hogrebe
Cc: Metcalf, Karlei A
Subject: Final approval SR45 Des1800086 WOTUS report
Attachments: Final WaterReportSR45_1800086 1.pdf

Ellen,
The above referenced waters report has been reviewed and approved. If you have any questions please let me know.

Thanks,

Li Kang
INDOT/Ecology & Waterway Permitting Office
100 N. Senate Ave., N758-Environmental Services
cell: 317-694-7134

Indiana Floodplain Information Portal Report

Point of Interest

Approximate Address:
3182 State Rd 45
BLOOMINGTON, IN 47408
Effective Flood Zone:
X
Preliminary Flood Zone:
N/A
Best Available Flood Zone:
X
Approximate Flood Elevation:
772.3ft NAVD88
Source:
Zone AE Profile Delineation
Nearest Stream:
JACKSON CREEK

Map Legend

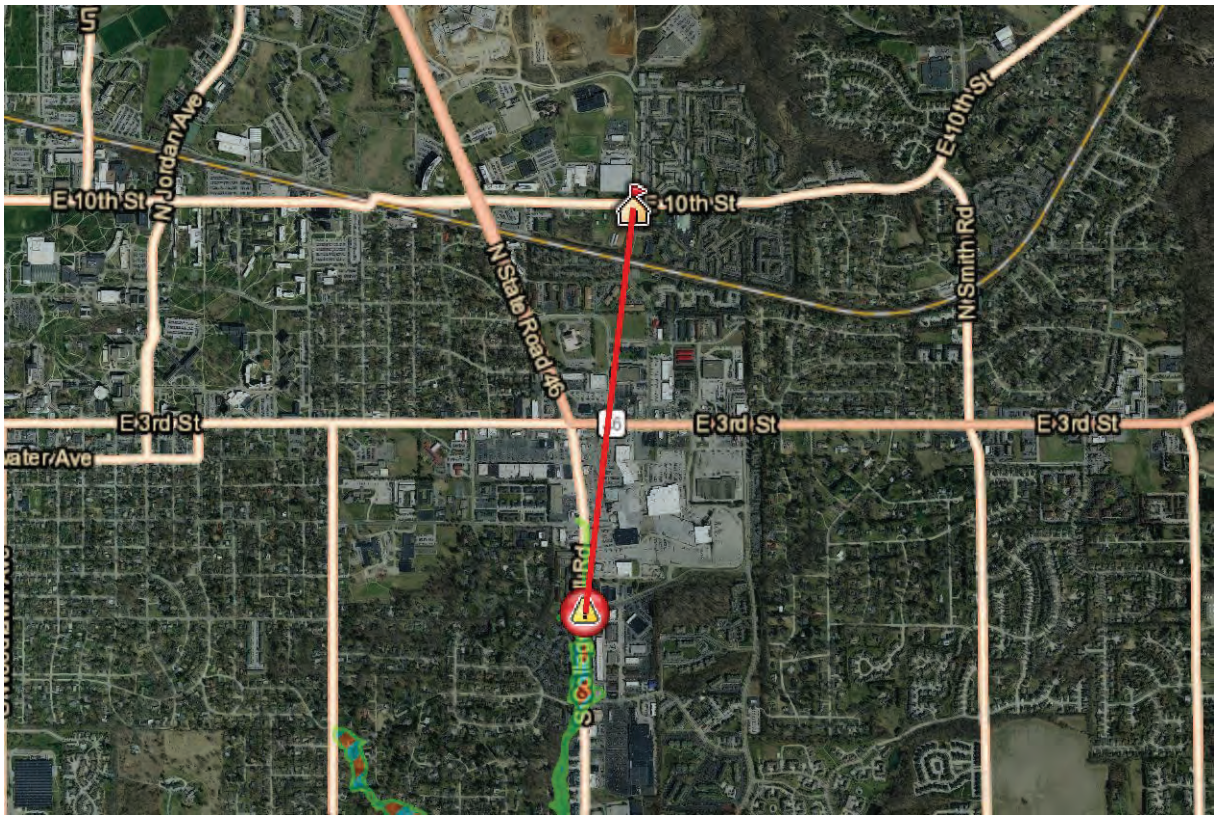
Point of Interest

Nearest Point on Stream

Best Available Flood Zone

FEMA Zone AE Floodway
DNR Detailed Floodway
DNR Approximate Floodway
FEMA Zone A
FEMA Zone AE
DNR Detailed Fringe
DNR Approximate Fringe
Additional Floodplain Area
FEMA Protected by Levee
FEMA Floodplain - Ponding (Depth)
FEMA Floodplain - Sheet Flow (Depth)

Site Map with Best Available Flood Zone



Approximate scale 1:36,000

Disclaimer

Generated on Friday June 19th 2020 at 09:22:29am

The data shown on this map represents FEMA floodplain data enhanced with additional studies that have been reviewed and approved by the Division of Water. While this data has not yet been submitted to FEMA for inclusion in the Flood Insurance Rate

SR 45 & Pete Ellis Dr./Discovery Pkwy.
Intersection Improvements and Added Lanes
CE Level 4

APPENDIX G: PUBLIC INVOLVEMENT

NOTICE OF SURVEY LETTER

Etica GROUP

Indianapolis Headquarters | Avon | Fishers | New Haven | WBE & DBE Certified

Notice of Survey

March 5, 2019

SUBJECT: SR45 and Pete Ellis Drive Intersection Improvement
Des. No. 1800199

Dear Property Owner:

Our information indicates that you own or occupy property near the above referenced project. Our employees will be performing a survey of the project area in the near future. It may be necessary for them the come onto your property to complete this work. This is permitted by law per Indiana Code IC 8-23-7-26. They will show you their identification, if you are available, before coming onto your property. If you have sold this property, or it is occupied by someone else, please let us know the name and address of the new owner or current occupant so we can contact them about the survey.

At this stage, we generally do not know what effect, if any, our project may eventually have on your property. If we determine later that your property is involved, you will be contacted with additional information.

The survey work will include mapping the location of features such as trees, fences, watercourses, culverts, hardscapes, roadways/drives, utility markings, utility and sewer appurtenances, and obtaining ground elevations. This information is needed to perform a topographic survey of the corresponding roadway intersection. Please be assured of our sincere desire to cause you as little inconvenience as possible during this survey. Please feel free to contact me with any questions you may have concerning this project.

Sincerely,

Nickolas M. Schmitt, PE, PS
Project Manager
Etica Group
317-268-1853

Cc: File: (Etica No.: 180097.06)

CERTIFIED
engineering

April 22, 2020

Notice of Survey

RE: S.R. 45 from Bloomington Bypass to Pete Ellis Drive, Des. No. 1800086 in Monroe County

Dear Property Owner,

Certified Engineering, Inc. has been selected by INDOT for field survey of the above referenced project. Our information indicates that you own property near the above proposed roadway project. Certified Engineering, Inc. will be performing a survey of the project area in the near future. It may be necessary for representatives from Certified Engineering, Inc. to enter your property to complete this work. This is permitted by law per Indiana Code (IC) 8-23-7-26. Anyone performing this type of work has been instructed to identify him or herself, if you are available, before they enter your property. If you no longer own this property or it is currently occupied by someone else, please let us know the name of the new owner or occupant so that we can contact them about the survey.

At this stage, we generally do not know what effect, if any, the project may eventually have on your property. If we later determine that your property is involved, you will be contacted with additional information.

The survey is needed for this roadway project. Please be assured of our sincere desire to cause you as little inconvenience as possible during this survey.

If any problems do occur, please contact Jason Hesler of Certified Engineering, Inc. at (317) 546-1599 or at 3939 Millersville Road, Indianapolis, Indiana 46205. Thank you in advance for your cooperation.

Sincerely,

Certified Engineering, Inc.

Jason R. Hesler, PE, PLS

3939 Millersville Road, Indianapolis, IN 46205
phone 317.546.1599 : fax 317.546.2599
www.certifiedengineering.com

SR 45 & Pete Ellis Dr./Discovery Pkwy.
Intersection Improvements and Added Lanes
CE Level 4

APPENDIX H: AIR QUALITY

The information in this section will be updated as needed following public involvement activities.

SPONSOR	CONTRACT # / LEAD DES	STIP NAME	ROUTE	WORK TYPE	DISTRICT	MILES	FEDERAL CATEGORY	Total Cost of Project*	PROGRAM	PHASE	FEDERAL	MATCH	2022	2023	2024	2025	2026
Indiana Department of Transportation	42231 / 1900098	M 27	SR 46	Replace Superstructure	Seymour	0	NHPP	$2,993,905.00	Bridge ROW	RW	$44,000.00	$11,000.00		$55,000.00			
Performance Measure Impacted: Bridge Condition																	
Location: 06.04 miles W of SR 37 @ Jacks Defeat Creek WBL																	
Comments:Include Des: 1900098 (lead) and 2000311. Move RW to FY23. BMCMPO TIP Modification October 2022.																	
Indiana Department of Transportation	42414 / 1800371	Init.	SR 37	Intersect. Improv. W/ Added Turn Lanes	Seymour	0	NHPP	$1,711,789.00	Safety Construction	CN	$1,209,431.20	$302,357.80			$1,511,789.00		
Performance Measure Impacted: Safety																	
Location: At intersection of Dillman Road in Bloomington																	
Comments:Include DES 1800371																	
Indiana Department of Transportation	42426 / 1700198	Init.	SR 45	Intersect. Improv. W/ Added Turn Lanes	Seymour	.821	NHPP	$9,188,484.00	Mobility Construction	CN	$4,720,000.00	$1,180,000.00			$5,900,000.00		
Performance Measure Impacted: Safety																	
Location: From 0.2 mi E of I-69 (Arlington) to 0.93 mi E of I-69 (Kinser)																	
Comments:Include DES 1700198																	
Indiana Department of Transportation	42595 / 1800086	Init.	SR 45	Added Travel Lanes	Seymour	.37	STBG	$3,350,000.00	District Other Construction	CN	$2,120,000.00	$530,000.00					$2,650,000.00
									District Other ROW	RW	$200,000.00	$50,000.00		$250,000.00			
Performance Measure Impacted: Pavement Condition																	
Location: From the Bloomington bypass to the intersection of Pete Ellis																	
Comments:Include DES 1800086																	
Indiana Department of Transportation	42595 / 1800199	M 38	SR 45	Intersect. Improv. W/ Added Turn Lanes	Seymour	0	STBG	$8,930,013.00	District Other Construction	CN	$1,478,110.40	$369,527.60				$1,847,638.00	
									Safety Construction	CN	$4,229,208.80	$1,057,302.20				$5,286,511.00	
Performance Measure Impacted: Safety																	
Location: From the Bloomington bypass to the intersection of Pete Ellis																	
Comments:Move $7,134,149 CN funds to FY 25 No MPO includes des 1800086																	
Indiana Department of Transportation	42867 / 2000365	Init.	SR 45	Bridge Deck Overlay	Seymour	0	STBG	$1,750,529.24	Bridge Construction	CN	$1,160,255.20	$290,063.80			$1,450,319.00		
Performance Measure Impacted: Bridge Condition																	
Location: bridge over BR Indian Creek, 03.62 mile S SR 37																	
Comments:Include DES 2000359, 2000365																	
Indiana Department of Transportation	43153 / 1801171	Init.	SR 37	Bridge Thin Deck Overlay	Seymour	0	NHPP	$412,318.00	Bridge Construction	CN	$329,854.40	$82,463.60			$412,318.00		

*Estimated Costs left to Complete Project column is for costs that may extend beyond the four years of a STIP. This column is not fiscally constrained and is for information purposes.

Indiana Department of Transportation (INDOT)

State Preservation and Local Initiated Projects FY 2022 - 2026

SPONSOR	CONTRACT # / LEAD DES	STIP NAME	ROUTE	WORK TYPE	DISTRICT	MILES	FEDERAL CATEGORY	Total Cost of Project*	PROGRAM	PHASE	FEDERAL	MATCH	2022	2023	2024	2025	2026
Monroe County																	
Indiana Department of Transportation	42595 / 1800199	M 38	SR 45	Intersect. Improv. W/ Added Turn Lanes	Seymour	0	STBG	$8,930,013.00	District Other Construction	CN	$1,478,110.40	$369,527.60				$1,847,638.00	
									Safety Construction	CN	$4,229,208.80	$1,057,302.20				$5,286,511.00	
Performance Measure Impacted: Safety																	
Location: From the Bloomington bypass to the intersection of Pete Ellis																	
Comments:Move $7,134,149 CN funds to FY 25 No MPO includes des 1800086																	

Monroe County Total

Federal: $5,707,319.20 Match :$1,426,829.80 2022: 2023: 2024: 2025: $7,134,149.00 2026:

*Estimated Costs left to Complete Project column is for costs that may extend beyond the four years of a STIP. This column is not fiscally constrained and is for information purposes.

Project List FY 2022-2026

Indiana Department of Transportation

SR 45/46, 0.20 Miles E of I-69 (Arlington Road) to 0.93 Miles E of I-69 (Kinser Pike) [1700198]					
Project Phase	Fiscal Year	Federal Source	Federal Funding	State Match	Total*
RW	2023	NHPP	$12,000	$3,000	$15,000
	2024	NHPP	$240,000	$60,000	$300,000
CN	2024	NHPP	$6,287,275	$1,571,819	$7,859,094
Totals			$6,539,275	$1,634,819	$8,174,094

*Estimated Total Project Cost (23 CFR 450.218(i)(2); 23 CFR 450.326(g)(2)). FY2026 is illustrative.

SR 45 at the Intersection of Pete Ellis Drive [1800199]					
Project Phase	Fiscal Year	Federal Source	Federal Funding	State Match	Total*
RW	2022	STBG	$320,000	$80,000	$400,000
CN	2023	STBG	$1,833,913	$458,478	$2,292,391
Totals			$2,153,913	$538,478	$2,692,391

*Estimated Total Project Cost (23 CFR 450.218(i)(2); 23 CFR 450.326(g)(2)). FY2026 is illustrative.

SR 46 at the Intersection of Smith Road [1800208]					
Project Phase	Fiscal Year	Federal Source	Federal Funding	State Match	Total*
CN	2023	NHPP	$1,637,076	$409,269	$2,046,345
Totals			$1,637,076	$409,269	$2,046,345

*Estimated Total Project Cost (23 CFR 450.218(i)(2); 23 CFR 450.326(g)(2)). FY2026 is illustrative.

SR 37 at Intersection with Dillman Road [1800371]					
Project Phase	Fiscal Year	Federal Source	Federal Funding	State Match	Total*
CN	2024	NHPP	$1,209,431	$302,358	$1,511,789
Totals			$1,209,431	$302,358	$1,511,789

*Estimated Total Project Cost (23 CFR 450.218(i)(2); 23 CFR 450.326(g)(2)). FY2026 is illustrative.

SR 37 - 3.65 Miles South of SR 45 over Abandoned Railroad Northbound Lane [1801171]					
Project Phase	Fiscal Year	Federal Source	Federal Funding	State Match	Total*
CN	2024	NHPP	$329,854	$82,464	$412,318
Totals			$329,854	$82,464	$412,318

*Estimated Total Project Cost (23 CFR 450.218(i)(2); 23 CFR 450.326(g)(2)). FY2026 is illustrative.

Statewide Highway/Railroad Grade Crossing Safety Action Plan [2100287]					
Project Phase	Fiscal Year	Federal Source	Federal Funding	State Match	Total*
PE	2022	HSIP	$6,430	$700	$7,130
Totals			$6,430	$700	$7,130

*Estimated Total Project Cost (23 CFR 450.218(i)(2); 23 CFR 450.326(g)(2)). FY2026 is illustrative.

Kinser Pike Bridge over I-69 NB/SB, 2.47 Miles N of SR 46 [2101024]					
Project Phase	Fiscal Year	Federal Source	Federal Funding	State Match	Total*
CN	2023	NHPP	$99,000	$11,000	$110,000
Totals			$99,000	$11,000	$110,000

*Estimated Total Project Cost (23 CFR 450.218(i)(2); 23 CFR 450.326(g)(2)). FY2026 is illustrative.

Added Travel Lane on SR 45 from the Bloomington Bypass to the Intersection of Pete Ellis Drive [1800086]					
Project Phase	Fiscal Year	Federal Source	Federal Funding	State Match	Total*
RW	2023	STBG	$200,000	$50,000	$250,000
CN	2025	STBG	$2,120,000	$530,000	$2,650,000
Totals			$2,320,000	$580,000	$2,900,000

*Estimated Total Project Cost (23 CFR 450.218(i)(2); 23 CFR 450.326(g)(2)). FY2026 is illustrative.

ADA Sidewalk Ramp Construction on SR 46 (3rd Street) and College Mall Road [2001522]					
Project Phase	Fiscal Year	Federal Source	Federal Funding	State Match	Total*
CN	2022	NHPP	$256,919	$64,230	$321,149
Totals			$256,919	$64,230	$321,149

*Estimated Total Project Cost (23 CFR 450.218(i)(2); 23 CFR 450.326(g)(2)). FY2026 is illustrative.

ADA Sidewalk Ramp Construction on SR 46 in Bartholomew County & Monroe County [2100055]					
Project Phase	Fiscal Year	Federal Source	Federal Funding	State Match	Total*
CN	2023	STBG	$332,800	$83,200	$416,000
Totals			$332,800	$83,200	$416,000

*Estimated Total Project Cost (23 CFR 450.218(i)(2); 23 CFR 450.326(g)(2)). FY2026 is illustrative.

Traffic Signal Visibility Improvements at Various Intersections in Monroe County [1902020]					
Project Phase	Fiscal Year	Federal Source	Federal Funding	State Match	Total*
CN	2023	STBG	$904,039	$226,010	$1,130,049
Totals			$904,039	$226,010	$1,130,049

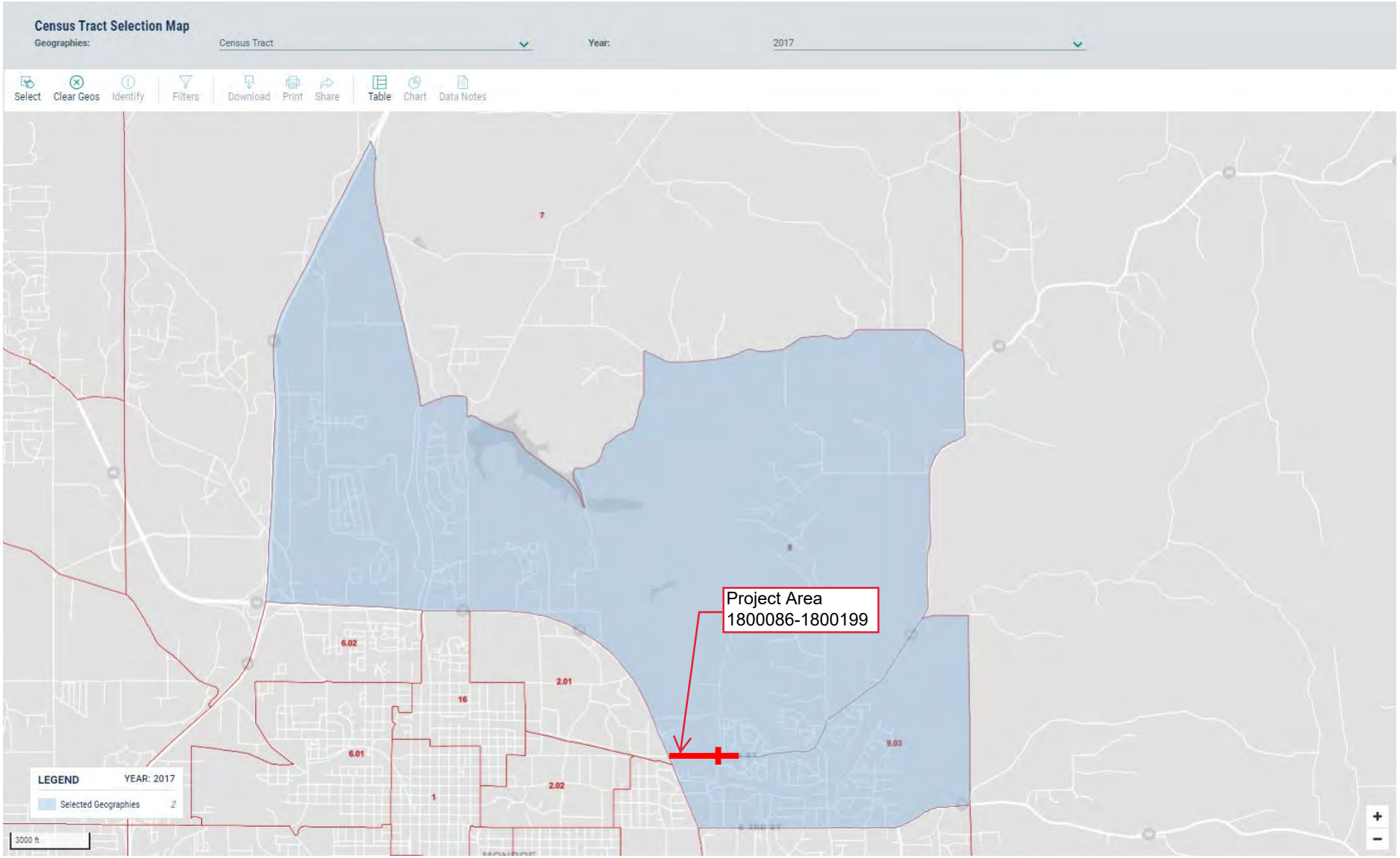
*Estimated Total Project Cost (23 CFR 450.218(i)(2); 23 CFR 450.326(g)(2)). FY2026 is illustrative.

SR 45 & Pete Ellis Dr./Discovery Pkwy.
Intersection Improvements and Added Lanes
CE Level 4

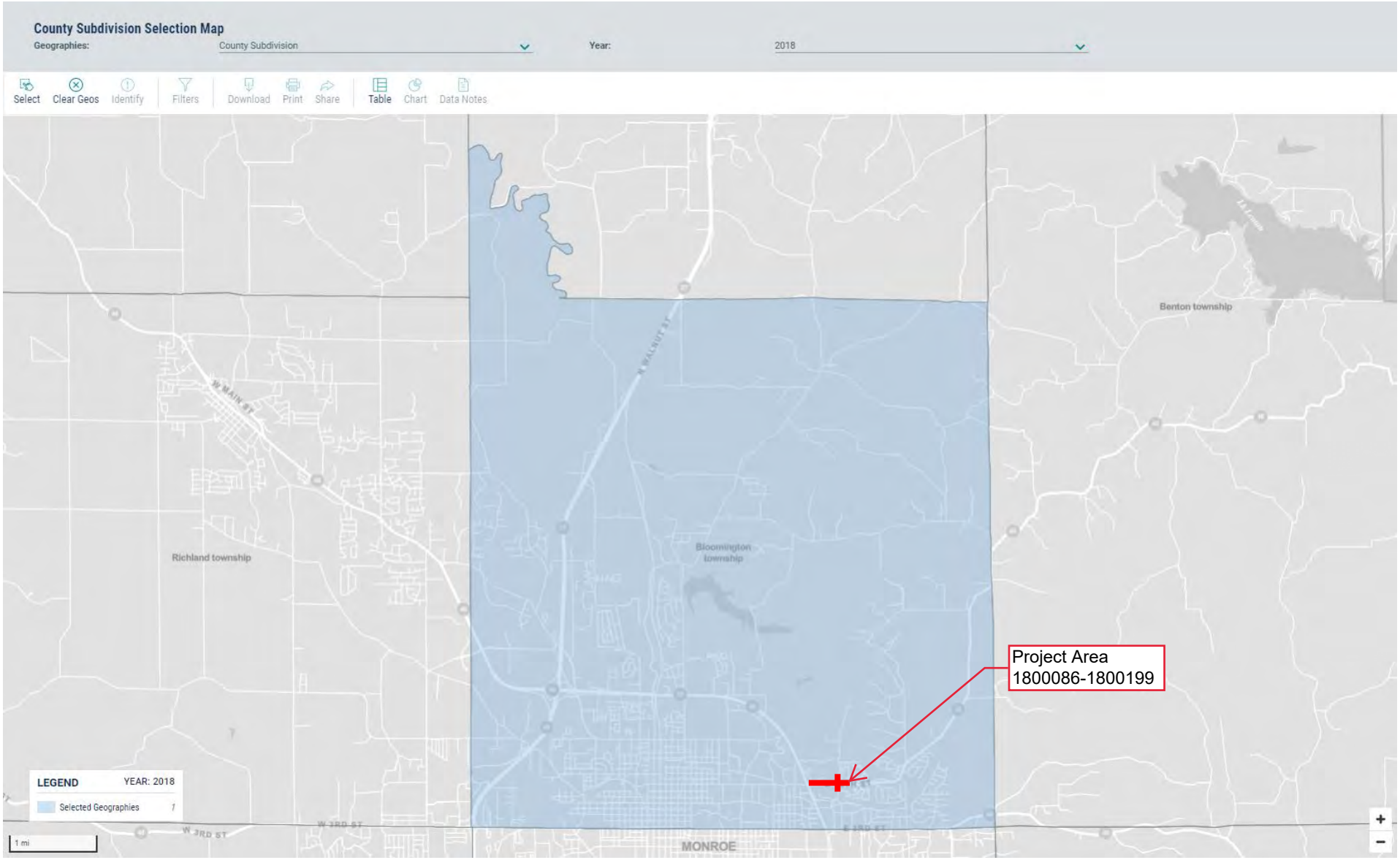
APPENDIX I: ENVIRONMENTAL JUSTICE ANALYSIS

EJ Analysis of Bloomington Township, IN and Census Tract 8 and 9.03 in Monroe County, IN
SR 45 & Pete Ellis Dr./Discovery Pkwy. Intersection Improvements and Added Lanes (Des No 1800199/1800086)

Census Table		COC	AC1	AC2
		Bloomington Township, Monroe County, Indiana	**Census Tract 8, Monroe County, Indiana**	**Census Tract 9.03, Monroe County, Indiana**
	LOW INCOME			
	Population for whom poverty status is determined:			
B17001	Total	32,280	5,799	5,271
B17001	Income in the past 12 months below poverty level:	14,266	1,386	1,341
	Percent Low Income	**44.2%**	**23.9%**	**25.4%**
	AC > 50%?		No	No
	125 Percent of COC	**55.2%**	**AC < 125% COC**	**AC < 125% COC**
	Potential Low-income EJ Impact? (AC > 125% COC?)		**No**	**No**
	MINORITY			
B03002	Total Population:			
B03002	Total	46,349	5,909	5,344
B03002	Not Hispanic or Latino:	44,435	5,584	5,215
B03002	White alone	36,492	4,785	4,180
B03002	Black or African American alone	1,550	68	244
B03002	American Indian and Alaska Native alone	64	0	21
B03002	Asian alone	4,410	540	432
B03002	Native Hawaiian and Other Pacific Islander alone	15	0	0
B03002	Some other race alone	39	0	0
B03002	Two or more races:	1,865	191	338
B03002	Hispanic or Latino:	1,914	325	129
B03002	White alone	1,605	308	119
B03002	Black or African American alone	21	0	0
B03002	American Indian and Alaska Native alone	0	0	0
B03002	Asian alone	0	0	0
B03002	Native Hawaiian and Other Pacific Islander alone	0	0	0
B03002	Some other race alone	167	17	10
B03002	Two or more races:	121	0	0
	Number non-white/minority	**9,857**	**1,124**	**1,164**
	Percent non-white/minority	**21.3%**	**19.0%**	**21.8%**
	AC > 50%?		No	No
	125 Percent of COC	**26.6%**	**AC < 125% COC**	**AC < 125% COC**
	Potential Minority EJ Impact? (AC > 125% COC?)		**No**	**No**



Affected Communities: Census Tracts 8 and 9.03



Community of Comparison: Bloomington Township, IN

American Community Survey

B03002 | HISPANIC OR LATINO ORIGIN BY RACE

2019: ACS 5-Year Estimates Detailed Tables | Universe: Total population

Notes | 4 Geos | Years | Topics | Surveys | Codes | Hide | Transpose | Margin of Error | Restore | Excel | Download | Print | Map

	Bloomington township, Monroe County, Indiana		Census Tract 8, Monroe County, Indiana		Census Tract 9.03, Monroe County, Indiana	
Label	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	46,349	±37	5,909	±466	5,344	±513
Not Hispanic or Latino:	44,435	±275	5,584	±458	5,215	±500
White alone	36,492	±631	4,785	±485	4,180	±474
Black or African American alone	1,550	±303	68	±57	244	±174
American Indian and Alaska Native alone	64	±60	0	±17	21	±25
Asian alone	4,410	±421	540	±252	432	±211
Native Hawaiian and Other Pacific Islander alone	15	±21	0	±17	0	±17
Some other race alone	39	±34	0	±17	0	±17
Two or more races:	1,865	±385	191	±176	338	±173
Two races including Some other race	30	±38	9	±17	0	±17
Two races excluding Some other race, and three or more races	1,835	±385	182	±174	338	±173
Hispanic or Latino:	1,914	±268	325	±167	129	±128
White alone	1,605	±271	308	±163	119	±126
Black or African American alone	21	±33	0	±17	0	±17
American Indian and Alaska Native alone	0	±25	0	±17	0	±17
Asian alone	0	±25	0	±17	0	±17
Native Hawaiian and Other Pacific Islander alone	0	±25	0	±17	0	±17
Some other race alone	167	±78	17	±27	10	±16
Two or more races:	121	±78	0	±17	0	±17
Two races including Some other race	0	±25	0	±17	0	±17
Two races excluding Some other race, and three or more races	121	±78	0	±17	0	±17

Minority Population Data

American Community Survey

B17001 | POVERTY STATUS IN THE PAST 12 MONTHS BY SEX BY AGE

2019: ACS 5-Year Estimates Detailed Tables | Universe: Population for whom poverty status is determined

Notes | 3 Geos | Years | Topics | Surveys | Codes | Hide | Transpose | Margin of Error | Restore | Excel | Download | Print | Map

	Bloomington township, Monroe County, Indiana		Census Tract 8, Monroe County, Indiana		Census Tract 9.03, Monroe County, Indiana	
Label	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	32,280	±853	5,799	±455	5,271	±506
Income in the past 12 months below poverty level:	14,266	±994	1,386	±381	1,341	±429
Male:	7,478	±775	501	±237	756	±321
Female:	6,788	±671	885	±316	585	±201
Income in the past 12 months at or above poverty level:	18,014	±953	4,413	±459	3,930	±495
Male:	9,293	±639	2,049	±254	2,059	±320
Female:	8,721	±577	2,364	±320	1,871	±300

Low Income Population Data

SR 45 & Pete Ellis Dr./Discovery Pkwy.
Intersection Improvements and Added Lanes
CE Level 4

APPENDIX J: ADDITIONAL STUDIES

Land and Water Conservation Fund (LWCF) County Property List for Indiana (Last Updated July 2020)

ProjectNumber	SubProjectCode	County	Property
1800026	1800026	Monroe	Fairfax Beach & SRA - Monroe Reservoir
1800033	1800033	Monroe	Paynetown SRA - Monroe Reservoir
1800039	1800039	Monroe	Fairfax Beach & State Recreation Area, Monroe Reservoir
1800084	1800084	Monroe	Moore's Creek State Recreation Area, Monroe Reservoir
1800118	1800118E	Monroe	Fairfax SRA
1800129	1800129	Monroe	Karst Farm Park
1800157	1800157	Monroe	Southeast Park
1800158	1800158	Monroe	Crestmont Park
1800160	1800160	Monroe	Park Square Park (Highland Village Park)
1800171	1800171W	Monroe	Paynetown SRA
1800190	1800190A	Monroe	Cascades Community Park
1800190	1800190B	Monroe	Park Ridge East Park
1800190	1800190C	Monroe	Park Ridge West Park
1800190	1800190D	Monroe	Winslow Sports Complex
1800232	1800232	Monroe	Allens Creek State Recreation Area, Monroe Reservoir
1800363	1800363T	Monroe	Allens Creek SRA
1800423	1800423	Monroe	Bryan Park & Pool
1800487	1800487	Monroe	Thomson Park
1800490	1800490	Monroe	Jackson Creek County Park
1800504	1800504	Monroe	Thomson Park
1800509	1800509	Monroe	Thomson Park
1800572	1800572	Monroe	Will Detmer Park

*Park names may have changed. If acquisition of publically owned land or impacts to publically owned land is anticipated, coordination with IDNR, Division of Outdoor Recreation, should occur.

SR 45 at Pete Ellis Drive
Engineer's Assessment

Des Number: 1800199

MONROE COUNTY, INDIANA

September 3, 2019

8790 Purdue Road, Indianapolis, IN 46268

Report excerpted for purposes of environmental document

PROJECT DESCRIPTION

1.1 REPORT PURPOSE

This report will outline the recommended alternative for an intersection improvement at State Road 45 with Pete Ellis Drive and document the engineering assessment phase of the project. The report will provide a framework to set the project scope and the design approach for the project. The engineering assessment will begin to identify potential design constraints and project obstacles, all of which will be recorded in this document.

1.2 PROJECT LOCATION

The project study area is located at the intersection of SR 45 (10th Street) with Pete Ellis Drive within Monroe County, Indiana. The project study area falls within INDOT's Seymour District limits. The study area for the intersection improvement begins approximately 1,00 feet in advance on each leg of SR 45 and 500 feet in advance of each leg of the Pete Ellis Drive at the intersection of SR 45 and Pete Ellis Drive. The project length is 0.4 miles. The latitude and longitude location of the intersection are 39°10'17"N and 86°29'42"W which corresponds with reference post 41+0.84. SR 45 is a minor urban arterial that provides east-west access in Monroe County. The south leg of Pete Ellis Drive is classified as a minor collector and the north leg, also known as North Range Road, is classified as a local road. Location maps for the proposed project area can be found in ***Appendix A – Project Graphics***.

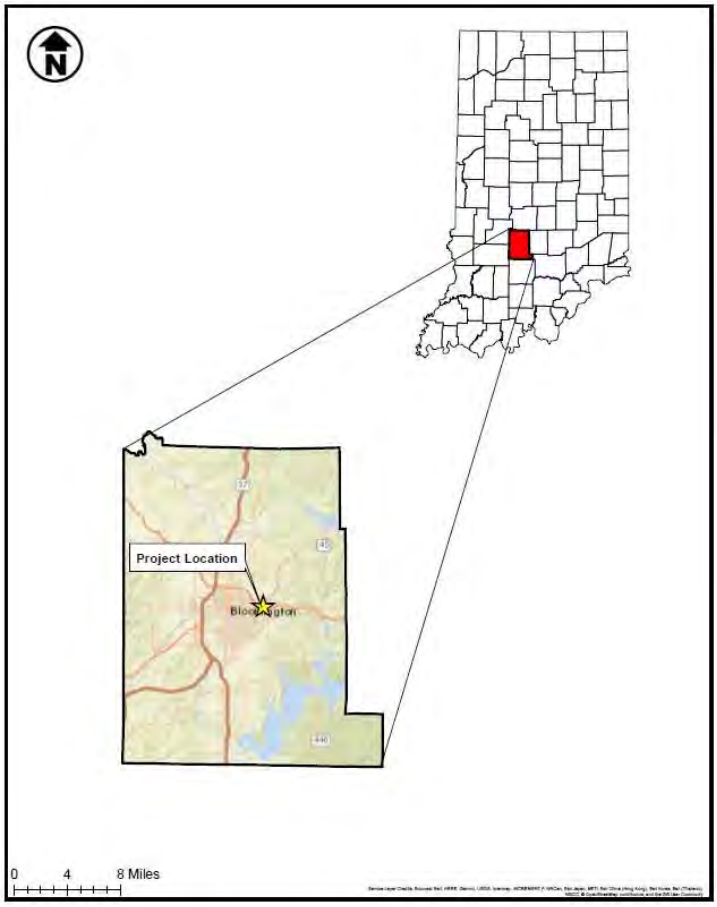


FIGURE 1 – COUNTY LOCATION MAP

1.3 PROJECT NEED AND PURPOSE

The purpose of this analysis is to determine the alternative that best reduces congestion, improves safety, and accommodates future growth at the intersection of SR 45 and Pete Ellis Drive. The existing configuration of shared left turn/through lanes, with exclusive right turn lanes at the project intersection, causes confusion for drivers and results

in safety and mobility concerns. With the existing Indiana University facilities to the north and west and the proposed development of the hospital to the north of the intersection, there is expected to be significant traffic volume growth and changes in traffic patterns at the intersection. Looking at the future traffic volumes, the existing intersection configuration will operate at LOS F by the design year. The need for this project is to further supplement INDOT's goal to improve safety while improving local and regional transportation needs. The design of this intersection will be completed in a manner that best meets the needs of INDOT, Monroe County, the City of Bloomington and the traveling public. The formal need and purpose for the project will be determined through the NEPA process, but initial components of the need and purpose utilized for this study will include:

- Reduce **congestion** at the intersection of SR 45 and Pete Ellis Drive.
- Improve **safety** throughout the project limits.
- Minimize **impacts** to environmentally and historically sensitive areas whenever feasible.
- Support opportunities and accommodate growth for the planned and future **economic development** in the area surrounding the intersection of SR 45 and Pete Ellis Drive.

1.4 PRIOR STUDIES

A traffic impact study was completed by American StructurePoint Inc. for IU Health Bloomington and the Regional Academic Health Campus in the City of Bloomington, Indiana. The purpose of the traffic study was to determine the operational impacts of the proposed IU Health Bloomington Regional Academic Campus (RAC) development on the neighboring roadway network in Bloomington, Indiana. The proposed IU Health Bloomington RAC development is located north of the project intersection on Range Road and is expected to open in 2021 with full build-out by 2031. The project intersection, SR 45 at Pete Ellis Drive, is included in the impacted roadway network and evaluated as part of this study. This traffic impact study is referenced and utilized throughout the capacity study of this report. The full report is included in ***Appendix C – Traffic Analysis***.

1.5 ENVIRONMENTAL PROCESS

The results and recommendations in this report will be based on traffic and safety analyses. Any recommendations from the corridor evaluation would still need to be evaluated for environmental impacts through the NEPA process. A Red Flag Investigation will be conducted with the traffic study of the area to identify environmentally sensitive areas that should be considered in future phases of the project.

- **AT&T-Distribution** reports a large underground duct run (4' X 8' X 6') with at least 9 ducts. On the northeast corner of the intersection there is a five-cabinet facility with cross boxes located in an easement. If relocation of these facilities if required it will be a one-year relocation and will be a significant cost. AT&T also reports conduit duct to the east side of Pete Ellis Drive the runs to a box at the back of the post office.
- **AT&T-Transmission** reports a duct run from the AT&T Distribution easement that continues south on Pete Ellis Drive into the northbound lane with an existing handhole in the intersection.
- **Bloomington Utilities** reports 12" water main on the north side of SR 45, on the west side of North Range Road north of SR 45, and on the east side of Pete Ellis Drive south of SR 45. A proposed 12" force main is planned to be installed in March/April of 2019. The proposed depth for the force-main is 5 feet.
- **Comcast** is known to be in the area but has not reported the locations of the facilities at this time.
- **Duke Energy** reports underground facilities located in the northwest, northeast, and southeast corners of the intersection. There are buried facilities on the AT&T easement. Aerial distribution facilities exist east and west of the intersection on SR 45.
- **Indiana University** has a future Duke Energy Service connection to serve as a backup service to the hospital at this location. The hospital is planned to open in the year 2021. There are no IU Fiber facilities at this location.
- **Lightbound** reports two 1 ¼" conduits with fiber on the west side continuing south down Pete Ellis Drive. These facilities contain the IU data line.
- **Smithville** reports two 1 ¼" conduits on the north side of SR 45. The access points are further away from the intersection. This facility was placed in the year 2016.
- **Vectren** reports a 2" gas main on the west side of North Range Road north of SR 45 and a 6" gas main on the south side of SR 45 and on the west side of Pete Ellis Drive south of SR 45.
- **Zayo Bandwidth** reports an underground facility from the west, on the south side of SR 45, that turns to the south along the east side of Pete Ellis Drive.

All responses from utility companies, the received facility location maps, and the meeting minutes from the early coordination meetings are included in ***Appendix F – Early Utility Coordination***.

3.0 TRAFFIC DATA AND CAPACITY ANALYSIS

3.1 TRAFFIC DATA

Traffic data used for the study was compiled from a 24-hour count conducted by Quality Counts Transportation Data Collection Services. The existing intersection turning movement counts were collected at the same time as the roadway AADT

counts for the study intersection, which were completed in 2018. These volumes were used to analyze the existing conditions. Because of the proposed IU Hospital north of the intersection, additional considerations went in to determining the projected design year traffic volumes. Simple growth factors were not adequate to predict design year turning movements because the development of the hospital will result in significant changes to turning movements at the intersection of SR 45 and Pete Ellis Drive, as well as greater than anticipated traffic growth. The approved IU Health Bloomington Traffic Impact Study (included in ***Appendix C – Traffic Analysis***) was used to provide base traffic volumes and turning percentages for the year 2031, when the hospital site is planned to be fully built out. These base volumes from the Traffic Impact Study were then projected to calculate the 2043 design year volumes. Based on the growth rate utilized for the hospital development and the potential for additional development to the east of the hospital, an annual growth rate of 1.15% was applied to SR 45 and to Pete Ellis Drive. The table below summarizes the traffic count results and projections.

TABLE 4 - SR 45 AND PETE ELLIS DR/NORTH RANGE RD AADT

	Average Annual Daily Traffic		
	Count Year 2018	Design Year 2043	Commercial % AADT
SR 45 (Eastbound)	7,125	10,265	5.0%
SR 45 (Westbound)	5,327	5,848	4.5%
Pete Ellis Rd (Northbound)	3,116	5,011	2.0%
North Range Rd (Southbound)	1,780	2,918	3.5%

3.2 CAPACITY ANALYSIS

The operational analysis associated with this report includes an analysis of the existing conditions and design year traffic volumes. Synchro 10 was used to analyze the added turn lanes alternative and SIDRA was used to analyze the roundabout alternative. Highway Capacity Manual (HCM) 2010 default values were used for modeling traffic behavior.

With the current and planned development in the area, it is anticipated that this intersection will continue to see increases in delay as traffic volumes rise. The results of the existing conditions analysis are presented in ***Table 5***.

TABLE 5 - 2018 EXISTING CONDITIONS

Criteria	AM		PM	
	LOS	Delay	LOS	Delay
SR 45 Eastbound	A	8.0	A	8.6
SR 45 Westbound	B	11.4	A	9.9
Pete Ellis Dr Northbound	C	26.4	C	25.0
North Range Rd Southbound	A	8.3	B	15.6

The results in ***Table 5*** suggests that congestion is beginning to increase at the intersection, specifically on northbound Pete Ellis Drive. Although the intersection operates at an acceptable level-of-service (LOS) during both the morning and evening peak, notable queues are forming eastbound and westbound approaches on SR 45 which can contribute to crashes occurring at the nearby driveway entrances.

Intersection performance was analyzed as a mobility measure of effectiveness. The performance criteria set forth in the HCM 2010 for signalized, unsignalized and roundabout intersections were used to analyze intersection delay and provide a level-of-service (LOS) for the results of the Synchro analyses. The design year intersection approaches' LOS and delay for each alternative is shown in ***Table 6***.

TABLE 6 - LEVEL OF SERVICE SUMMARY

Alternative		Eastbound SR 45		Westbound SR 45		Northbound Pete Ellis Dr		Southbound N. Range Rd		OVERALL INTERSECTION	
		LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
2043 No Build	AM	F	82.4	E	78.8	F	143.5	C	31.5	**F**	**89.0**
	PM	C	29.5	F	562.1	E	61.6	C	33.0	**F**	**179.8**
2043 Added Turn Lanes	AM	A	10.0	C	22.4	D	40.8	C	20.7	**C**	**23.8**
	PM	B	14.3	B	14.9	D	38.3	D	35.3	**C**	**22.4**
2043 Dual Lane Roundabout	AM	A	5.3	B	12.6	A	9.3	B	10.8	**B**	**10.0**
	PM	C	21.8	A	8.7	C	16.5	C	20.0	**C**	**17.0**

The intersection performance results in ***Table 6*** shows that for the No Build scenario if no alignment, capacity or intersection control changes are implemented, congestion issues will worsen significantly as traffic volumes increase. With the added hospital trips and increased traffic volumes, the intersection degrades to LOS F, which is defined in the HCM as unstable flow, in which conditions exist within queues forming behind bottle necks and breakdowns are occurring. According to the

Indiana Design Manual, the minimum acceptable level of service for both an urban arterial and an urban collector road is LOS D.

With the added turn lanes, the 2043 design year intersection LOS improves from LOS F to LOS C in both the AM and PM peak hours. Every approach LOS also improves. When evaluating the capacity of the roundabout alternative, the first configuration analyzed was a single lane roundabout. This geometry resulted in failing capacity in both the AM and PM peak hour. A dual lane roundabout configuration was also analyzed. As shown in the table, the dual lane roundabout can handle the increased traffic volumes from development and improves the intersection LOS from LOS F to LOS B in the AM peak hour and LOS C in the PM peak hour.

4.0 CRASH DATA AND SAFETY ANALYSIS

This project analyzed traffic movements and crash history in the area surrounding the proposed project area. The extent of the analysis encompassed the impacts of the proposed improvements on the study intersection.

To effectively measure the proposed improvements, the identified alternatives were evaluated for operational and safety impacts to the roadway. The analyses include the existing conditions based upon counts conducted in 2018. Future analyses include the construction year (2023) and design year (2043).

Four alternatives were developed for analysis, including a No Build alternative. Descriptions of the alternatives will be provided in ***Section 5.0***.

4.1 CRASH DATA

A safety analysis was performed to evaluate historic crash data as well as to compare build and No Build alternatives. The analysis was done only for the study intersection.

Historic crash data were reviewed at the intersection of SR 45 and Pete Ellis Drive. The crash data were provided by INDOT. Within a total 4-year period between January 2015 to November 2018, 27 crashes were reported within the study area. There were no fatalities reported during the study period and two severe injury crashes. A breakdown of the crashes by type and location is provided ***Table 7***. The influence area of crashes included in the intersection study area extends 500 feet for each approach as some queues can form at the intersection during the peak hours. The longest queue for the 95% queue length experienced at this intersection according to the Synchro results is 230 feet during the AM peak hour and 220 feet during the PM peak hour.

TABLE 7 - HISTORICAL CRASH SEVERITY DATA (2015-2018)

	Rear-End			Head on Collision			Right Angle / Turning			Ran Off Road			Same Direction Sideswipe			Total
	PDO	NIC	F/IC	PDO	NIC	F/IC	PDO	NIC	F/IC	PDO	NIC	F/IC	PDO	NIC	F/IC	
2015	5	2	0	0	2	0	0	0	0	0	0	0	0	0	0	**9**
2016	4	1	0	0	0	0	1	0	0	0	0	0	1	0	0	**7**
2017	1	0	1	0	0	0	3	1	0	0	0	0	0	0	0	**6**
2018	3	0	0	0	0	0	0	0	1	1	0	0	0	0	0	**5**
Total	**13**	**3**	**1**	**0**	**2**	**0**	**4**	**1**	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**27**
Percentage	**63%**			**7%**			**22%**			**4%**			**4%**			

PDO = Property Damage Only
NIC = Not Incapacitating Injury
F/IC = Fatality/Incapacitating Injury

The data shows that approximately 63% of the crashes at the intersection are rear end crashes. The other predominate crash type was right angle/turning crashes at 22%. Based on the primary causes reported for these crashes, some analysis can be made on the crashes that were observed.

- Rear-end crashes commonly can be caused by congested traffic. The recurring primary factor in these crashes was “following too closely”. Out of the 17 rear-end crashes, 14 of them had the reported cause of “following too closely”. It is assumed most of these occurred due to driver inattentiveness in queues at the traffic signal.
- Construction occurred in 2016 that required a lane closure, only one rear end crash occurred during this time period.
- There were no apparent crashes that were caused due to the vertical profile of North Range Road.

4.2 SAFETY ANALYSIS

The crash history for the study intersection was input into INDOT’s RoadHAT 3.0 project to compare intersections to similar locations statewide. Indices of crash frequency (ICF) and crash cost (ICC) are calculated to determine how many standard deviations away from average an intersection’s crash history and severity are compared to other similar intersections across Indiana. The RoadHAT results for the current year (2018) traffic volumes and crash history from 2015-2018 can be found in ***Table 8.***

TABLE 8 - ROADHAT RESULTS

Intersection	2015-2018	
	Icf	Icc
SR 45 at Pete Ellis Dr	0.26	1.10

The Road HAT results do not flag this intersection as a safety concern. The index of crash frequency is less than similar intersections in the state. However, the index of crash cost is more than one standard deviation higher than similar intersections.

To improve safety at the intersection of SR 45 with Pete Ellis Drive, crash modification factors (CMFs) were reviewed for possible intersection improvements. CMFs were found on FHWA's Crash Modification Factor Clearinghouse website. The existing geometry of SR 45, an exclusive right turn lane with a shared left/through lane is not common and driver unfamiliarity can cause confusion resulting in crashes. In order to make the intersection more conventional, CMFs for exclusive left turn lanes (on SR 45 and North Range Road) and exclusive right turn lanes (on Pete Ellis Drive) were reviewed. The CMF for installing a left turn lane has a value of 0.75 which indicates a reduction in crashes. The CMF for installing a right turn lane has a value of 0.99, which indicates a safety improvement. However, since this CMF is just under 1.0, the value does not reduce the predicted crashes at the intersection as shown in the table below. In addition to the added turn lanes, the alternative of converting the intersection into a dual lane roundabout was also considered. The CMF for converting an intersection into a multi-lane roundabout, has a value of 0.37, indicating some reduction in crashes. These CMFs can be found in ***Appendix C – Traffic Analysis***. The table below summarizes how the crash modification factors could reduce predicted crashes at the intersection.

TABLE 9 – CRASH REDUCTION SUMMARY TABLE

	CMF Value	PDO Crashes	F/I Crashes	% Crash Reduction
Existing Conditions	--	25	2	--
Installing a Left Turn Lane	0.75	19	2	22.2%
Installing a Right Turn Lane	0.99	25	2	0.0%
Converting into a Multi-Lane Roundabout	0.37	9	1	63.0%

The table shows both improvements; the addition of the left turn lanes on SR 45 and the conversion to a multi-lane roundabout could provide a significant reduction in crashes at the intersection of SR 45 and Pete Ellis Drive.

CMT
Engineers and Consultants

Appendix B

Design Criteria Memo

SR 45 (10th St)/PETE ELLIS RD INTERSECTION
MONROE COUNTY, IN

Indiana Department of Transportation

Design Criteria

Technical Memorandum

February 2019

CMT
Engineers and Consultants

8790 Purdue Road
Indianapolis, IN 46268

Assumptions / Notes:

1. SR 45 (10th St) is assumed to be a minor arterial two-lane facility.
2. Pete Ellis Road is assumed to be a minor collector two-lane facility.
3. North Range Rd is assumed to be a local road two-lane facility.
4. SR 45 posted speed limit is 40 mph through the project area.
5. Pete Ellis Road posted speed limit is 30 mph through the project area.
6. North Range Road posted speed limit is 35 mph through the project area.
7. This intersection improvement will be a 3R Project, Non-freeway as stated in section 40-6.01(06) of the INDOT Design Manual.
8. Traffic numbers provided by a 24 hour traffic count by Quality Counts.

ROADWAY DESIGN CRITERIA
Urban Minor Arterial, 3R Project
SR 45 (10th St)

IDM = Indiana Design Manual

Functional Classification		Minor Arterial (Urban)	INDOT Classification Map
DESIGN CONTROL ELEMENTS			
2043 AADT (Design Year)		16,000	
Design Speed (MPH)		40 mph	IDM Figure 55-3F
Posted Speed (MPH)		40 mph	
Level of Service		Desirable: C, Minimum: D	IDM Figure 55-3F
ALIGNMENT ELEMENTS			
Min. Radius (ft)		535ft / The existing radius will be retained	IDM Figure 43-2B / IDM Section 55-4.03(01)
Min. Curve Length (ft)		The minimum length of curve on a low-speed urban street will be determined as required.	IDM Section 43-2.05
Stopping Sight Distance (ft)		305 ft	IDM Figure 42-1A
Decision Sight Distance (ft)	Stop Maneuver	690 ft	IDM Figure 42-2A
	Speed/Path/Direction Change	715 ft	
Intersection Sight Distance (ft)	P	440 ft	IDM Figure 46-10G
	SUT	560 ft	
Superelevation Rate		e_{max} = 4%	IDM Section 43-3.01(02)
Design Vehicle for Turning		WB-50	IDM Figure 46-1E
Max. Grade (±%)		9% (Level)	IDM Figure 55-3F
Min. Grade (±%)		Curbed 0.5%	
Vertical Curvature, K Value	**Crest**	Des: 61, Min: 44 / retain existing vertical curve	IDM Figure 44-3A / IDM Section 55-4.04(03)
	Sag	64 / retain existing vertical curve	IDM Figure 44-3C / IDM Section 55-4.04(03)
Min. Stopping Sight Distance	**Crest Curve (ft) (Min/ Desirable)**	305 ft / 360 ft	IDM Figure 44-3A
	Sag Curve (ft)	305 ft	IDM Figure 44-3C
Min. Curve Length	**Crest Curve (ft)**	3*(Design Speed) = 120 ft	IDM Section 44-3.01(01)
	Sag Curve (ft)	3.2*(Design Speed) = 128 ft	IDM Section 44-3.02(01)
VERTICAL CLEARENCE ELEMENTS			
Traffic Signal Clearance (ft)		17 ft	IDM Figure 44-4A
Overhead Signs (ft)		17.5 ft	
CROSS SECTION ELEMENTS			
Travel Lane Width (ft)		Des:12 ft Min: 11 ft	IDM Figure 55-3F
Curb Offset		Des: 2 ft Min: 1 ft	
Shoulder Width (ft)		Des: 8 ft Min: 4 ft	
Auxiliary Lane Width (ft)		Des: 12 ft, Min: 11 ft	
Cross Section Slopes (Travel Lane)		2-3%	
Cross Section Slopes (Shoulder)		4-6%	

Clear Zone Width (ft)[1]	For an urban arterial, collector, or local street with vertical curbs at either the edge of the travel lane or the edge of shoulder, the minimum clear-zone width is 10 ft from the edge of the travel lane or to the right-of-way line, whichever is less	IDM Section 49-2.03(03)
Obstruction-Free Zone	Where the design speed is 45 mph or lower, and curbs are at least 6 in. in height, the minimum obstruction-free-zone width from the face of the curb should be 1.5 ft. However, where traffic-signal supports are present, the minimum obstruction-free-zone width should be 2.5 ft.	IDM 55-5.02
Side Slopes Cut	Use of 3:1 should be considered Foreslope: 2:1 or flatter Ditch width: If R/W is available existing ditch line should be moved, and slopes flattened as much as practical. Backslope: 2:1 or flatter	IDM Figure 55-3F / IDM Section 55-4.05(09)
Side Slopes Fill	2:1 or flatter.	
Sidewalk Width	Des: 6 ft; Min: 4 ft	IDM Figure 55-3F

[1] See Chapter 49 of the IDM for clear zone adjustments due to curves, culverts and additional factors.

ROADWAY DESIGN CRITERIA
Urban Minor Collector, 3R Project
Pete Ellis Road

IDM = Indiana Design Manual

Functional Classification		Minor Collector (Urban)	INDOT Classification Map
DESIGN CONTROL ELEMENTS			
2043 AADT (Design Year)		7,000	
Design Speed (MPH)		30 mph	IDM Section 55-4.01(2)
Posted Speed (MPH)		30 mph	
Level of Service		Desirable: C, Minimum: D	IDM Figure 55-3G
ALIGNMENT ELEMENTS			
Min. Radius (ft)		230 ft / The existing radius shall be retained	IDM Figure 43-2B / IDM Section 55-4.03
Min. Curve Length (ft)		15*(Design Speed) = 450 ft	IDM Section 43-2.05
Stopping Sight Distance (ft)		200 ft	IDM Figure 42-1A
Decision Sight Distance (ft)	Stop Maneuver	490 ft	IDM Figure 55-3G IDM Figure 42-1A IDM Figure 42-2A
	Speed/Path/Direction Change	620 ft	
Intersection Sight Distance (ft)	P	330 ft	IDM Figure 55-3G IDM
	SUT	420 ft	
Superelevation Rate		e_{max} = 4%	IDM Section 43-3.02 IDM Figure 43-2B/43-3C
Design Vehicle for Turning		WB-50	IDM Figure 46-1E
Max. Grade (±%)		5%	IDM Figure 55-3G
Min. Grade (±%)		Curbed Des: 0.5% Min: 0.3%	
Vertical Curvature, K Value	**Crest**	Des: 29 Min: 19	IDM Figure 44-3A
	Sag	37	IDM Figure 44-3C
Min. Stopping Sight Distance	**Crest Curve (ft) (Min/ Desirable)**	250 ft / 200 ft	IDM Figure 44-3A
	Sag Curve (ft)	200 ft	IDM Figure 44-3C
Min. Curve Length	**Crest Curve (ft)**	3*(Design Speed) = 90 ft	IDM Section 44-3.01(01)
	Sag Curve (ft)	3.2*(Design Speed) = 96 ft	IDM Section 44-3.02(01)
VERTICAL CLEARENCE ELEMENTS			
Traffic Signal Clearance (ft)		17 ft	IDM Figure 44-4A
Overhead Signs (ft)		17.5 ft	
CROSS SECTION ELEMENTS			
Travel Lane Width (ft)		Des: 12 ft Min: 10 ft	IDM Figure 55-3G
Curb Offset		Des: 2 ft Min: 1 ft	
Shoulder Width (ft)		Des: 6 ft Min: 1 ft	
Auxiliary Lane Width (ft)		Des: 12 ft, Min: 10 ft	
Cross Section Slopes (Travel Lane)		2-3%	
Cross Section Slopes (Shoulder)		2-3%	
TWLTL Width		Des: 14 ft Min: 11 ft	
Clear Zone Width (ft)[2]		For an urban arterial, collector, or local street with vertical curbs at either the edge of the travel lane or the edge of shoulder, the minimum clear-zone width is 10 ft from	IDM Section 49-2.03(03)

[2] See Chapter 49 of the IDM for clear zone adjustments due to curves, culverts and additional factors.

	the edge of the travel lane or to the right-of-way line, whichever is less	
Obstruction-Free Zone	Where the design speed is 45 mph or lower, and curbs are at least 6 in. in height, the minimum obstruction-free-zone width from the face of the curb should be 1.5 ft. However, where traffic-signal supports are present, the minimum obstruction-free-zone width should be 2.5 ft.	IDM 55-5.02
Side Slopes Cut, Foreslope	2:1 or Flatter	IDM Figure 55-3H / IDM Section 55-4.05
Side Slopes Cut, Ditch Width	If right of way is available, the existing ditch line should be moved, and slopes flattened as much as practical.	
Side Slopes Cut, Backslope	2:1 or Flatter	IDM Figure 55-3G
Side Slopes Fill	2:1 or Flatter	
Sidewalk Width	Des: 6 ft; Min: 4 ft	IDM Figure 55-3G

ROADWAY DESIGN CRITERIA
Urban Local Road, 3R Project
North Range Road

IDM = Indiana Design Manual

Functional Classification		Local Road (Urban)	INDOT Classification Map
DESIGN CONTROL ELEMENTS			
2044 AADT (Design Year)		5,000	
Design Speed (MPH)		35 mph	IDM Section 55-4.01(2)
Posted Speed (MPH)		35 mph	
Level of Service		Desirable: C, Minimum: D	IDM Figure 55-3H
ALIGNMENT ELEMENTS			
Min. Radius (ft)		340 ft / The existing radius shall be retained	IDM Figure 43-2B / IDM Section 55-4.03
Min. Curve Length (ft)		15*(Design Speed) = 525ft	IDM Section 43-2.05
Stopping Sight Distance (ft)		250 ft	IDM Figure 42-1A
Decision Sight Distance (ft)	Stop Maneuver	590 ft	IDM Figure 55-3H IDM Figure 42-1A IDM Figure 42-2A
	Speed/Path/Direction Change	625 ft	
Intersection Sight Distance (ft)	P	390 ft	IDM Section 46-10.0 IDM Figure 46-10G
	SUT	490 ft	
Superelevation Rate		e_{max} = 4%	IDM Section 43-3.02 IDM Figure 43-2B/43-3C
Design Vehicle for Turning		WB-50	IDM Figure 46-1E
Max. Grade (±%)		In a residential area, the max grade should not exceed 15%. In a commercial area, the max grade should not exceed 8%. Where adjacent sidewalks are present the maximum desirable grade is 5%	IDM Figure 55-3H
in. Grade (±%)		Curbed Des: 0.5% Min 0.3%	
Vertical Curvature, K Value	**Crest**	Des: 44 Min: 29	IDM Figure 44-3A
	Sag	49	IDM Figure 44-3C
Min. Stopping Sight Distance	**Crest Curve (ft)**	Des: 305 ft Min: 250 ft	IDM Figure 44-3A
	Sag Curve (ft)	250 ft	IDM Figure 44-3C
Min. Curve Length	**Crest Curve (ft)**	3*(Design Speed) = 105 ft	IDM Section 44-3.01(01)
	Sag Curve (ft)	3.2*(Design Speed) = 112 ft	IDM Section 44-3.02(01)
VERTICAL CLEARENCE ELEMENTS			
Traffic Signal Clearance (ft)		17 ft	IDM Figure 44-4A
Overhead Signs (ft)		17.5 ft	
CROSS SECTION ELEMENTS			
Travel Lane Width (ft)		Des: 10 ft Min: 9 ft	IDM Figure 55-3H
Curb Offset		Des: 2 ft Min: 1 ft	
Shoulder Width (ft)		Des: 4 ft Min: 1 ft	
Auxiliary Lane Width (ft)		Des: 11 ft, Min: 9 ft	
Cross Section Slopes (Travel Lane)		2-3%	
Cross Section Slopes (Shoulder)		2-3%	
Clear Zone Width (ft)[3]		For an urban arterial, collector, or local street with vertical curbs at either the edge of the travel lane or the edge of shoulder,	IDM Section 49-2.03(03)

[3] See Chapter 49 of the IDM for clear zone adjustments due to curves, culverts and additional factors.

	the minimum clear-zone width is 10 ft from the edge of the travel lane or to the right-of-way line, whichever is less	
Obstruction-Free Zone	Where the design speed is 45 mph or lower, and curbs are at least 6 in. in height, the minimum obstruction-free-zone width from the face of the curb should be 1.5 ft. However, where traffic-signal supports are present, the minimum obstruction-free-zone width should be 2.5 ft.	IDM 55-5.02
Side Slopes Cut, Foreslope	2:1 or Flatter	IDM Figure 55-3H / IDM Section 55-4.05
Side Slopes Cut, Ditch Width	If right of way is available, the existing ditch line should be moved, and slopes flattened as much as practical.	
Side Slopes Cut, Backslope	2:1 or Flatter	IDM Figure 55-3H
Side Slopes Fill	2:1 or Flatter	
Sidewalk Width	Des: 6 ft; Min: 4 ft	IDM Figure 55-3H

Appendix C

Traffic Analysis

- Road HAT Analysis
- Crash Modification Factors
- IU Health Bloomington Regional Academic Campus Development Traffic Impact Study
- 2043 Projected Turning Movement Volumes
- Synchro Results – Existing
- Synchro Results – 2043 No Build
- Synchro Results – 2043 Added Turn Lanes
- SIDRA Results – 2043 Multi-Lane Roundabout

Index of Crash Frequency and Cost - Form F1

Location	SR 45 (10th St) at Pete Ellis Road	
2015-2018		
GIS		
Post		
Analyst	MES	
Date	1/17/2019	

INPUT	
Road Facility Type	Signalized Urban State-Local Intersection
Major Road AADT (veh/day)	14000
T-intersection Indicator (1 if present, 0 otherwise)	0
Arterial Indicator for Crossing Local Road (1 if present, 0 otherwise)	1
First Year with Crash Data (yyyy)	2015
Last Year with Crash Data (yyyy)	2018
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	2
Non-Incapacitating and Possible Injury Crashes	6
Property Damage Only Crashes	19
Route or Road Type	Signalized Urban State-Local Intersection
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	219500
Non-Incapacitating and Possible Injury Crashes	31300
Property Damage Only Crashes	7100
Crash Cost Year (yyyy)	2013
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.086
Non-Incapacitating and Possible Injury Crashes	1.08
Property Damage Only Crashes	4.62
All Crashes	5.78
Index of Crash Frequency	**0.26**
Index of Crash Cost	**1.10**

Index of Crash Frequency and Cost - Form F1

Location	SR 45 (10th St) at Pete Ellis Road	
2015-2018		
GIS		
Post		

Analyst	MES
Date	1/17/2019

Comments:

CMF / CRF Details

CMF ID: 7996

Install left-turn lane

Description:

Prior Condition: Intersections without left turn lanes

Category: Intersection geometry

Study: *Safety Evaluation of Signal Installation With and Without Left Turn Lanes on Two Lane Roads in Rural and Suburban Areas*, Srinivasan et al., 2014

Star Quality Rating:	[View score details]

Crash Modification Factor (CMF)	
Value:	0.748
Adjusted Standard Error:	
Unadjusted Standard Error:	0.095

Crash Reduction Factor (CRF)	
Value:	25.2 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	

Unadjusted Standard Error:	9.5

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Not specified
Number of Lanes:	2
Road Division Type:	
Speed Limit:	
Area Type:	All
Traffic Volume:	
Time of Day:	All

If countermeasure is intersection-based

Intersection Type:	Not specified
Intersection Geometry:	3-leg
Traffic Control:	Signalized
Major Road Traffic Volume:	2981 to 18248 Annual Average Daily Traffic (AADT)
Minor Road Traffic Volume:	972 to 13880 Annual Average Daily Traffic (AADT)

Development Details

Date Range of Data Used:	1992 to 2012
Municipality:	
State:	NC

Country:	
Type of Methodology Used:	Before/after using empirical Bayes or full Bayes
Sample Size Used:	

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Nov-10-2016
Comments:	The CMF was developed for both rural and suburban areas.

This site is funded by the U.S. Department of Transportation Federal Highway Administration and maintained by the University of North Carolina Highway Safety Research Center

CMF / CRF Details

CMF ID: 5651

Install right-turn lane

Description:

Prior Condition: Unsignalized intersections or driveways without right turn lane

Category: Intersection geometry

Study: *Safety Impacts of Right-Turn Lanes at Unsignalized Intersections and Driveways on Two-Lane Roadways: Crash Analysis*, Ale et al., 2014

Star Quality Rating:	[View score details]

Crash Modification Factor (CMF)	
Value:	0.993
Adjusted Standard Error:	
Unadjusted Standard Error:	

Crash Reduction Factor (CRF)	
Value:	0.7 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	

Unadjusted Standard Error:	

Applicability

Crash Type:	Dry weather
Crash Severity:	All
Roadway Types:	Principal Arterial Other Freeways and Expressways
Number of Lanes:	2
Road Division Type:	Undivided
Speed Limit:	>40 mph
Area Type:	All
Traffic Volume:	
Time of Day:	Not specified

If countermeasure is intersection-based

Intersection Type:	Roadway/roadway (not interchange related)
Intersection Geometry:	No values chosen.
Traffic Control:	Uncontrolled
Major Road Traffic Volume:	10000 to Annual Average Daily Traffic (AADT)
Minor Road Traffic Volume:	

Development Details

Date Range of Data Used:	2000 to 2005
Municipality:	
State:	MN

Country:	
Type of Methodology Used:	Regression cross-section
Sample Size Used:	

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Jan-21-2015
Comments:	This CMF is for non-truck-involved crashes at intersections, with clear weather condition and more than 10 % of daily heavy commercial vehicles.

This site is funded by the U.S. Department of Transportation Federal Highway Administration and maintained by the University of North Carolina Highway Safety Research Center

CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF Details

CMF ID: 4927

Conversion of intersection into multi-lane roundabout

Description: Conversion of intersection into multi-lane roundabout.

Prior Condition: The intersection was operating under no control, yield, TWSC, AWSC, or signal control.

Category: Intersection geometry

Study: *Evaluation of Roundabout Safety*, Qin et al., 2013

Star Quality Rating:	[View score details]

Crash Modification Factor (CMF)	
Value:	0.367
Adjusted Standard Error:	
Unadjusted Standard Error:	0.128

Crash Reduction Factor (CRF)	
Value:	63.28 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	

Unadjusted Standard Error:	12.8

Applicability

Crash Type:	All
Crash Severity:	K (fatal),A (serious injury),B (minor injury),C (possible injury)
Roadway Types:	Not specified
Number of Lanes:	4
Road Division Type:	All
Speed Limit:	
Area Type:	All
Traffic Volume:	
Time of Day:	All

If countermeasure is intersection-based

Intersection Type:	Roadway/roadway (not interchange related)
Intersection Geometry:	3-leg,4-leg
Traffic Control:	Other
Major Road Traffic Volume:	4100 (Total) to 48100 (Total) Annual Average Daily Traffic (AADT)
Minor Road Traffic Volume:	

Development Details

Date Range of Data Used:	1994 to 2010
Municipality:	Statewide
State:	WI

Country:	USA
Type of Methodology Used:	Before/after using empirical Bayes or full Bayes
Sample Size Used:	Crashes
Before Sample Size Used:	46 Crashes
After Sample Size Used:	23 Crashes

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Aug-01-2013
Comments:	- Study included three-year before and after crash data for each site. - "Traffic Control" included intersections with yield control, two-way stop-control, all-way stop-control, and signal control. - Min, max, avg AADTs are for both major and minor roads.

Appendix G

Early Coordination Meeting Minutes and Correspondence

DATE: March 18, 2019 – 1:00 p.m.

LOCATION: INDOT Seymour District Office

SUBJECT: SR 45 & Pete Ellis Road and SR 46 & North Smith Road Intersections

ATTENDANCE:

Karlei Metcalf	INDOT Seymour Dist PM	317-467-3978	kmetcalf@indot.in.gov
Damon Brown	INDOT Seymour District Traffic Engineer	812-524-3776	dabrown@indot.in.gov
Jeremeih Shaw	Traffic Planning Engineer	812-524-3756	jeshaw@indot.in.gov
Bill Read	Utility Engineer	812-524-3966	bread@indot.in.gov
Cassie Reiter	CMT P.M.	317-492-9166	creiter@cmtengr.com

The purpose of the meeting was to discuss the intersection improvement options for SR 45 & Pete Ellis Road and SR 46 & North Smith Road intersections projects.

SR 46 at North Smith Road:
2 options were presented – widen all to the east; widen partially to the east & partially to the west.
It was stated that perhaps the utility costs listed were low. Bill thought that the Duke lines in easement could be nearly $400,000 to move.
It was stated that the storage lengths in both options were the same.
Minimizing the overall project cost is what INDOT would like to do.
Therefore, Alternate 2 will be recommended alternative.

SR 45 at Pete Ellis:
3 options were presented – 2 widening options and 1 dual-lane roundabout.
The roundabout will not be the recommended alternative, as it's cost is nearly $1M higher than the widening options.
Bill indicates that to be a good partner with the utilities, the ROW line should not be set so tight that Duke or others are required to have easements.
Alternate 1 will be called Alternate 1A; Alternate 2 will be called Alternate 1b.
Alternate 3 (roundabout) will now be alternate 2.
At this time, the recommended alternative will be 1A, however this could change to 1B depending on further ROW and utility investigations.
Alternate 1A is desired at this time because it provides the larger turning radii for the EB to NB movement.

Note that APS is required for all pedestrian improvements.

Send appendices to Damon & Jeremeih for their review prior to next Monday's meeting with the City of Bloomington.

Prepared By: Cassie Reiter, CMT

Please advise in writing of any corrections/additions to the minutes. If no written response is received within seven (7) days of receipt of these minutes, they will be considered approved as written.

DATE: March 25, 2019 – 11:00 a.m.

LOCATION: City of Bloomington, City Hall

SUBJECT: SR 45 & Pete Ellis Road and SR 46 & North Smith Road Intersections

ATTENDANCE:

Karlei Metcalf	INDOT Seymour Dist PM	317-467-3978	kmetcalf@indot.in.gov
Roy Aten	City of Bloomington	812-349-3591	atenro@bloomington.in.gov
Neil Kopper	City of Bloomington	812-349-3423	koppern@bloomington.in.gov
Beth Rosenbarger	City of Bloomington	812-349-3423	rosenbab@bloomington.in.gov
Cassie Reiter	CMT P.M.	317-492-9166	creiter@cmtengr.com

The purpose of the meeting was to discuss the intersection improvement options for SR 45 & Pete Ellis Road and SR 46 & North Smith Road intersections projects.

Action items are highlighted. CMT Response to questions in red.

SR 46 at N Smith Road:

- Close north side then south side for MOT is acceptable. 45-day closures each is acceptable per the City.
- Prefer construction when school is not in session.
- Most traffic here N-S is local traffic anyway.
- There are existing bike lanes north of 46 on N Smith Road. Those need to be included in the design. 5' wide bike lanes on both sides of N Smith Road.
  We suggest using the minimum criteria lane width (10 ft) for functional class. Revised typical section would have three 10ft lanes and provide 5ft bike lanes (3 ft pavement + 2 ft gutter) in each direction while maintaining our preliminary footprint.
- City would prefer a 5' wide buffer between sidewalk & curb
- City says they will accept 10' wide lanes (with a 1' curb offset) on N Smith Road
- City's plan is to have a multi-use path on the south side of 46 extend across the intersection. Ideally, this project will connect the existing path on the southwest corner of the intersection on the south side of SR 46 and continue to the southeast corner to connect to the existing sidewalk
  - Need to determine effects with Vectren and on ROW
- Trucks on N Smith Road are typically school busses & box trucks. No need to design for a WB-50 on N Smith Road per City. Allow a WB-40 to make the turn in some way in case the occasional truck goes through.
- Bloomington Transit busses travelling northbound on N Smith Road make a left turn onto SR 46
- At the existing bus stops on N Smith Rd, City wants a 8' deep x 5' long bus pad (concrete) sloped with the road
- City would like to know how the left turn lane storage lengths were determined.
- The left turn lanes were set based on IDM Figure 46-4H and where possible the desirable criteria was used. The Length of Deceleration was calculated using IDM Figure 46-4J, the Length of Storage was calculated using the 95% queue length from the synchro results. As stated in Fig. 46-4H in an urban facility, although the deceleration length is desirable it is not required. When

designing, as much of the deceleration as possible was included. See the summary below for the Smith Rd left turn lanes:

Approach	Length Taper (ft)	Length Decel (ft)	Length Storage (ft)	Total Desirable Length (ft)	Total Minimum Length (ft)	Actual Design Length (ft)	*NOTES
NB Smith Rd (30 MPH)	100	235	75	410	175	**235**	Deceleration length shortened to start turn lane after the side street
SB Smith Rd (30 MPH)	100	235	75	410	175	**410**	Full deceleration length met

SR 45 at Pete Ellis

- City would like to know the LOS for a single lane roundabout, and if that is an option.
  The SIDRA results for a single lane roundabout at this intersection is LOS F. Typically a single lane roundabout begins to break down once there are 2,000 vehicles per hour entering the roundabout. During the peak hours, there are 1,980 veh/hr (AM) and 2,790 veh/hr (PM) entering the roundabout.
- City would like to know why separate right turn lanes are included. They do not believe these are needed, and make it more difficult for pedestrians & cyclists to navigate through the intersection.
  Without exclusive right turns the intersection is LOS F during the PM peak hour. The Synchro results comparing the intersection with left and right turn lanes vs. only left turn lanes are shown in the table below. During the PM peak hour there are 270 vehicles making an EB right turn (25% of the EB turning movements) and 230 vehicles making a NB right turn (43% of the NB turning movements). As nearly half of the NB vehicles are turning right during the PM peak hour, this could be another justification for the right turn lanes.

Alternative		Eastbound SR 45		Westbound SR 45		Northbound Pete Ellis Rd		Southbound N. Range Rd		OVERALL INTERSECTION	
		LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
2043 Left & Right Turn Lanes	AM	A	10.0	C	22.4	D	40.8	C	20.7	C	23.8
	PM	B	14.3	B	14.9	D	38.3	D	35.3	C	22.4
2043 Left Turn Lanes	AM	B	14.5	C	25.9	E	59.0	C	24.5	C	31.1
	PM	C	32.5	E	59.9	F	148.5	F	153.9	F	81.6

- City said that in the hospital traffic study, they think the hospital trip generations study was extrapolated somehow, and in reality might be much higher than in the report.

After a quick comparison of the IU Health Traffic Impact Study's trip generation calculation using the current ITE Trip Generation Manual, the trip generation numbers seem appropriate for the hospital size listed in the report and the land use code specified. The Traffic Impact Study has been approved and CMT received concurrence to use the TIS for our base 2031 traffic volumes. From there, additional annual growth was developed to take into consideration the possible development of the empty parcel to the east of the hospital. If in fact, this parcel remains undeveloped, our annual growth percentage will be conservative enough to account for potential additional trips to the hospital.

- City wants a bike path on the north side of SR 45, plus bike lanes on SR 45 & on Pete Ellis

We can accommodate 5ft bike lanes on the south leg, by using 10ft travel lanes (currently 12ft). For the north leg, the roadway typical section will need to be 2ft wider as we have only 11ft lanes in the current layout.

- City would like to know how the left turn & right turn lane storage lengths were determined.

As noted above, turn bay/storage lengths were set based on IDM Figure 46-4H. See the summary of turn lanes below:

Approach	Length Taper (ft)	Length Decel (ft)	Length Storage (ft)	Total Desirable Length (ft)	Total Minimum Length (ft)	Actual Design Length (ft)	*NOTES
EB Left SR 45 (40 MPH)	100	320	45	465	145	**450**	Meets into existing two way left turn lane
EB Right SR 45 (40 MPH)	100	320	35	455	135	**400**	Decel length shortened to minimize impact to SW quadrant
WB Left SR 45 (40 MPH)	100	320	150	570	250	**570**	Full deceleration length met
WB Right SR 45 (40 MPH)	100	320	20	440	120	**420**	
NB Left Pete Ellis Dr (30 MPH)	100	235	200	535	300	**425**	Decel length shortened to avoid impact to rail raod
NB Right Pete Ellis Dr (30 MPH)	100	235	115	450	215	**250**	Decel length shortened to start turn lane after side street
SB Left Range Rd (35 MPH)	100	280	155	535	255	**350**	
SB Right Range Rd (35 MPH)	100	280	40	420	140	**350**	

- North side of Range Road up by the new hospital will have a multi-use path that ideally continues south on Range Road turning then to the east side to SR 45. City would like to see accommodations for this path in the project.
- City says 10' lanes with 1' curb offset are acceptable on Range Road/Pete Ellis
- Trucks on Pete Ellis and Range Road will be the box truck. Any trucks for the hospital will come from the other entrance on the west side of the hospital.
    - City doesn't know post office truck size, but indicates those trucks likely come in & exit from/to the west
- City wants sidewalks on all legs – 5' buffer with 5' sidewalk

Prepared By: Cassie Reiter, CMT

Please advise in writing of any corrections/additions to the minutes. If no written response is received within seven (7) days of receipt of these minutes, they will be considered approved as written.

Morgan Stumpf

From: Cassie Reiter
Sent: Wednesday, April 24, 2019 9:25 AM
To: Kristin Timmons; Morgan Stumpf
Subject: FW: Des#1800199 & Des#1800208 - SR45 and Pete Ellis & SR46 at Smith Road Intersections

FYI – the City has been informed of INDOT's plans.

Cassie Reiter
Crawford, Murphy & Tilly | Engineers & Consultants

From: Metcalf, Karlei A <KMetcalf1@indot.IN.gov>
Sent: Wednesday, April 24, 2019 10:22 AM
To: atenro@bloomington.in.gov; Neil Kopper <koppern@bloomington.in.gov>
Cc: Cassie Reiter <creiter@cmtengr.com>; Brown, Damon <DaBrown@indot.IN.gov>; Shaw, Jeremeih <JeShaw@indot.IN.gov>; Kristin Timmons <ktimmons@cmtengr.com>
Subject: Des#1800199 & Des#1800208 - SR45 and Pete Ellis & SR46 at Smith Road Intersections

Hi Neil and Roy,

I just wanted to touch base with you regarding the SR45/Pete Ellis and SR46/Smith Road intersections. We have looked over all of your comments and requests regarding these intersections and this is our current plan of action. If you have any additional questions or comments, please let us know.

45 at Pete Ellis:
-Must be right & left turn lanes added.
-INDOT OK with storage bay lengths.
-10' min lane width on Pete Ellis & Range is ok with INDOT.
-Sidewalk needs to go back in on Pete Ellis & north side sidewalk on the west approach.
-North leg – Range Road - Sidewalks being installed with the hospital project are not impacting the intersection performance in any way. Turn lanes only on the north approach. This project will continue the east-west path, but will not add any new facilities on the north leg.
-East approach – include sidewalk since no benefit for a 10' wide trail, when the sidewalks to the east are just sidewalk widths. 6' sidewalk at back of curb with no buffer. If a buffer were to be installed, the trees would definitely need to be removed, but may need to be removed anyway if no buffer would be installed.
-Could continue to investigate buffer on the north side or not during continued design. Replace the existing bus pad since it will be disturbed.
-South leg –widen the east side sidewalk to a path; sidewalk on the west side.

46 at Smith:
-We can include bike lanes, get the turn lane lengths we want & have it fit in without too much disturbance if 10' lanes (min) on Smith are used, with 5' bike lanes and no sidewalk buffer. We believe this is the more preferable option than widening any more than INDOT planned.
-Storage lengths - City may want that storage if the number of thru lanes on SR 46 will be reduced by a road diet in the future. City considering a road diet on SR 46, but still being investigated.
-Turn lane lengths are adequate.

-End bike lanes on N Smith at SR 46, and then the City's plan will continue as it does today. Doesn't preclude City's future plans for bike lane to the south. Will need to discuss design details such as: Do SB cars share a lane at the stop bar? Or how does that bike lane end? - *At this time, we are looking into keeping the 12' lane widths as proposed which will allow for the City of re-strip in the future if you want to reduce lane widths to add bike lines. This will be explored further with the engineering assessment and stage 1 plans development but is not a guarantee.*

-Existing bus stops are just signed. Since Smith Road is a city street, then any new bus pad installation on Smith Road (City's road) will need to be done by the City or they can cost-share. Bus pads are outside the scope of this project.

Thanks!

Karlei Metcalf
Project Manager
185 Agrico Lane
Seymour, IN 47274
Office: (812) 524-3792
Cell: (812) 525-1748
Email: KMetcalf1@indot.in.gov

ADDENDUM No. [1]
TO SR 45 AT PETE ELLIS ENGINEER'S REPORT

Project Number:	1800199
Route / Feature Crossed:	SR 45 at Pete Ellis Drive
Project Location:	SR 45 and Pete Ellis Drive/Discovery Parkway, located in The City of Bloomington, Indiana. Section 35, T-9-N, R-1-W, Bloomington Township, Monroe County, Indiana
Date:	9/16/2022

ADDENDUM JUSTIFICATION:

Proposed alternative addendum incorporates revisions to SR 45 layout to incorporate both EB and WB bike lanes as requested by the City of Bloomington. Storm sewer improvements are required to address existing undersized storm sewer infrastructure and provide inline detention for controlled release into the adjacent private pond. Revisions to project's western limits have been made to coordinate with the adjacent project SR 45 Added Lanes project (Des. 1800086). The CE document for both Des. 1800199 and Des. 1800086 is being completed as one document due to the historic property on the south side of SR 45, west of Pete Ellis Drive.

REVISION TO ORIGINAL SCOPE DOCUMENT:

The SR 45 at Pete Ellis Drive Engineer's Report is being revised as follows:

Section 1.2-Project Location

- Project limits along SR 45 to the west have been extended approximately 200' due to coordination and tie in with adjacent project Des. 1800086 added lanes project.

Section 2.1-Roadways

- Project design criteria has changed from 3R (Non-Freeway) to 4R (Non-Freeway) Reconstruction.

Section 5.3-Alternative 1A

- Roadway footprint includes westbound bike lane and eastbound bike lane on the north and south sides of SR 45, respectively. Additional widening required to incorporate bike lanes.
- Storm sewer improvements including additional inlets, manholes, and oversized pipes for required inline detention are included in the updated recommended alternative.
- The SR 45 proposed profile will be raised to provide cover for proposed oversized storm sewer pipes necessary for inline detention. Full depth pavement reconstruction is required through the section of proposed profile raise.

Section 6.0-Recomendations

- Project design criteria has changed from 3R (Non-Freeway) to 4R (Non-Freeway) Reconstruction due to the profile grade raise which requires SR 45 pavement reconstruction.

Section 6.1-Project Limits

- Project limits along SR 45 to the east have been extended to tie into the existing SR 45 lane configuration.
- Project limits along SR 45 to the west have been extended due to coordination and tie in with adjacent project Des. 1800086 added lanes project.

Section 6.2-Typical Cross Sections

- Roadway footprint includes westbound bike lane and eastbound bike lane on the north and south sides of SR 45, respectively.
- SR 45 proposed lane widths revised from 12 feet to 11 feet.

Section 6.3-Alignments

- Proposed horizontal alignment revision to minimize impacts to the historic property.
- Proposed vertical alignment revision to provide for stormwater detention.

Section 6.5-Hydraulics

- Storm sewer improvements including additional inlets, manholes, and oversized pipes for required inline detention are included in the updated recommended alternative.

Section 7.0-Maintenance of Traffic

- Pedestrian MOT has been added to the project.

Section 8.0-Conceptual Cost Estimate

- Cost updates associated with design changes.

Section 10.0-Right of Way Impact

- R/W acquisition has increased due to larger construction limit footprint and overlap of parcels with Des. 1800086.

Section 11.0-Adjacent Projects

- Des. 1800086 Added Lanes Project

Section 12.0-Coordination Meetings

- 04-29-2022-SR 45 Meeting with Bloomington
- 10-20-2021-INDOT SR 45/Pete Ellis FFC
- 06-30-2021-Utility Coordination Meeting
- 04-27-2021-INDOT-Bloomington Transit Meeting
- 03-29-2021-INDOT-ROW Discussion
- 03-18-2021-INDOT-MOT Discussion Meeting Minutes
- 02-04-2021-ENV Meeting
- 01-12-2021-INDOT-Bloomington Transit Meeting
- 06-12-2020-INDOT SR 45/Pete Ellis PFC
- 02-12-2019-SR 45 and SR 46 Early Utility Discussion Agenda

Attach any documents that support the addendum (pavement design memo, etc).

Does the revision change the project's Purpose & Need statement? ☐ Yes ☒ No

Does the revision change the project's recommended alternative? ☒ Yes ☐ No

- Roadway footprint includes westbound bike lane and eastbound bike lane on the north and south sides of SR 45, respectively. Additional widening required to incorporate bike lanes.
- Storm sewer improvements including additional inlets, manholes, and oversized pipes for required inline detention are included in the updated recommended alternative.
- The SR 45 proposed profile will be raised to provide cover for proposed oversized storm sewer pipes necessary for inline detention. Full depth pavement reconstruction is required through the section of proposed profile raise.
- Project limits along SR 45 to the west have been extended approximately 200' due to coordination and tie in with adjacent project Des. 1800086 added lanes project.

Does the revision change the project's cost estimate? ☒ Yes ☐ No

Remove table below if cost is not revised; state in the comments section if there is no change to a specific portion of project cost. For example, the CN cost may increase without changing the ROW requirements or railroad costs.

Estimated Total Project Costs	*Revised Amount*	*Original Amount*
Right of Way Purchase	*$735,000	$250,000
Right of Way Services	NA	NA
Preliminary Engineering	NA	NA
Roadway CN	$4,890,149.35	$1,551,000
Utilities PE-Combined Des. 1800199 and 1800086	$301,500+$75,000=$376,500	$301,500+$75,000=$376,500
Utilities CE-Des. 1800199	$301,500	$301,500
Construction Total: RW+CN+Utilities CE (1800199)	$5,926,649.35	. $2,102,500
Other Considerations	NA	NA
TOTAL:	$5,926,649.35	$2,102,500

*ROW cost increase is primarily due to the extended project limits along SR 45 west of Pete Ellis Drive. There is an overlap of property owners for Des. 1800086 and Des. 1800199. The parcels were not split and all of the ROW is being acquired as a part of Des. 1800199.

Does the revision change the project's environmental impacts? ☒ Yes ☐ No

	Description	*Notes*
☐	Additional coordination with resource agencies	
☐	Red Flag/HAZMAT revisions	
☒	Section 106/4F/6F/Archaeology	Historic Property
☐	Waters Report Update	
☐	Change to public involvement requirements	
PCE	CE type revision	

As stated above, the amended CE document incorporates both Des. 1800086 and 1800199 projects. Corridor improvements located near historical property on the south side of SR 45, west of Pete Ellis Drive.

Does the revision require additional Right-of-Way? ☒ Yes ☐ No

- R/W acquisition has increased due to larger construction limit footprint and overlap of parcels with Des. 1800086.

Does the revision change the project's schedule (design or construction)? ☒ Yes ☐ No

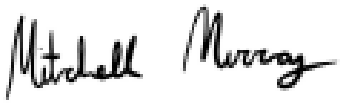
- Project design schedule has been adjusted to better line up with the adjacent project Des. 1800086 and allow for projects to be bundled for construction.

Does the revision require additional coordination with utility companies? ☒ Yes ☐ No

- Utility coordination is ongoing. Relocations required for the intersection improvement project (Des. 1800199) will be in conjunction with the adjacent added lanes project (Des. 1800086). No increase in utility relocation cost is anticipated with the amended construction limit footprint.

ADDENDUM CONCURRENCE

This document was prepared by:



9/16/2022

Mitchell Murray
Crawford, Murphy & Tilly, Inc.

9/16/2022

Kristin Timmons
Design QA/QC Review
Crawford, Murphy & Tilly, Inc.

9/16/2022

Cassie Reiter
Project Manager
Crawford, Murphy & Tilly, Inc.

Reviewed by:

Robert F. Tally Jr.

[Date] 11/17/2022

Robert F. Tally, Jr. P.E.
System Asset Manager, Seymour District

Approved by:

Greg Prince

[Date] 11/17/2022

Greg Prince
INDOT Project Manager, Seymour District

Appendix B

Design Criteria

- IDM Figure 53-8

Design Element			Manual Section	Design Value (By Type of Area)		
				Suburban	Intermediate	Built-Up
Design Controls	Design Forecast Period		40-2.02	20 Years	20 Years	20 Years
	*Design Speed, mph (2)		40-3.0	Curbed: 30 - 50 Uncurbed: 30 - 50	Curbed: 30 - 45 Uncurbed: 30 - 45	Curbed: 30 - 35
	Access Control		40-5.0	None	None	None
	Level of Service		40-2.0	Desirable: C; Minimum: D	Desirable: C; Minimum: D	Desirable: C; Minimum: D
	On-Street Parking		45-1.04	Optional (3)	Optional (3)	Optional (3)
Alignment Elements	Travel Lane	*Width (4)	45-1.01	Curbed: Des: 12 ft; Min: 11 ft Uncurbed: Des: 12 ft; Min: 11 ft	Curbed: Des: 12 ft; Min: 11 ft Uncurbed: Des: 12 ft; Min: 11 ft	Curbed: Des: 12 ft; Min: 10 ft
		Typical Surface Type (5)	Ch. 304	Asphalt / Concrete	Asphalt / Concrete	Asphalt / Concrete
	*Curb Offset (6)		45-1.02	2 ft	2 ft	2 ft
	Shoulder	*Paved Width (7)	45-1.02	Curbed Des: 8 ft; Min. 2 ft Uncurbed: 8 ft	Curbed: Des: 6 ft; Min: 2 ft Uncurbed: 6 ft	8 ft
		Typical Surface Type (5)	Ch. 304	Asphalt / Concrete	Asphalt / Concrete	Asphalt / Concrete
	Cross Slope	*Travel Lane (8)	45-1.01	2%	2%	2%
		Shoulder (8A)	45-1.02	4%	4%	2%
	Auxiliary Lane	Lane Width	45-1.03	Des: 12 ft; Min: 11 ft	Des: 12 ft; Min: 10 ft	Des: 12 ft; Min: 10 ft
		Curb Offset		Des: 1 ft; Min: 0.0 ft	Des: 1 ft; Min: 0.0 ft	Des: 1 ft; Min: 0.0 ft
		Shoulder Width		Des: 8 ft; Min: 2 ft	Des: 6 ft; Min: 2 ft	Des: 4 ft; Min: 2 ft
		Typical Surface Type (5)	Ch. 304	Asphalt / Concrete	Asphalt / Concrete	Asphalt / Concrete
	TWLTL Width		46-5.0	Des: 16 ft; Min: 12 ft	Des: 14 ft; Min: 12 ft	Des: 14 ft; Min: 12 ft
	Parking-Lane Width (1)		45-1.04	Des: 11 ft; Min: 8 ft	Des: 11 ft; Min: 8 ft	Des: 11 ft; Min: 8 ft
	Median Width	Raised Island	45-2.0	Des: 18 ft; Min: 4 ft (9)	Des: 18 ft; Min: 4 ft (9)	Des: 18 ft; Min: 4 ft (9)
		Flush / Corrugated		Des: 16 ft; Min: 4 ft (9)	Des: 16 ft; Min: 4 ft (9)	Des: 16 ft; Min: 4 ft (9)
	Sidewalk Width (10)		45-1.06	5 ft with 5 ft Buffer (Des)	5 ft with 5 ft Buffer (Des)	Varies, 6 ft Min
	Bicycle-Lane Width (11)		51-7.0	Curbed: 5 ft Uncurbed: Shld. Width +4 ft	Curbed: 5 ft Uncurbed: Shld. Width +4 ft	Curbed: 5 ft
	Clear-Zone Width		49-2.0	(12)	(12)	(12)
	Typical Curbing Type, where used (13)		45-1.05	Sloping / Vertical	Sloping / Vertical	Sloping / Vertical
	Side Slopes, Uncurbed (14)	Cut: Foreslope	45-3.0	Des: 6:1; Max: 4:1 (15)	Des: 6:1; Max: 4:1 (15)	N/A
		Cut: Ditch Width		4 ft (16)	4 ft (16)	N/A
		Cut: Backslope		4:1 for 4 ft; 3:1 Max. to Top (17)	4:1 for 4 ft; 3:1 Max. to Top (17)	N/A
		Fill		Des: 6:1 to Clr Zone; 3:1 Max to Toe Max: 4:1 to Clr Zone; 3:1 Max to Toe	Des: 6:1 to Clr Zone; 3:1 Max to Toe Max: 4:1 to Clr Zone; 3:1 Max to Toe	N/A
	Side Slopes, Curbed	Cut(Backslope)	45-3.0	(18)	(18)	(18)
		Fill (19)		12:1 for 12 ft; 3:1 Max to Toe	12:1 for 12 ft; 3:1 Max to Toe	12:1 for 12 ft; 3:1 Max to Toe

Des: Desirable Min: Minimum
U: Urban SU: Suburban

* Level One controlling criterion, see page 2 of 4

GEOMETRIC DESIGN CRITERIA FOR URBAN COLLECTOR

(New Construction or Reconstruction)

Figure 53-8 (Page 1 of 4)

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Design Element			Manual Section	Design Value (By Type of Area)			
				Suburban	Intermediate		Built-Up
Bridges	New or Reconstructed Bridge	*Structural Capacity (20)	Ch. 403	HL-93	HL-93		HL-93
		*Clear-Roadway Width (21)	45-4.01	Uncurbed: Full Paved Approach Width Curbed: Full Approach Curb-to-Curb Width			
	Existing Bridge to Remain in Place	*Structural Capacity	Ch. 72	HS-20	HS-20		HS-20
		*Clear-Roadway Width	45-4.01	Uncurbed: Travelway Plus 2 ft on Each Side Curbed: Full Approach Curb-to-Curb Width			
	*Vertical Clearance, Collector under (22)	New or Replaced Overpassing Bridge (22)	44-4.0	14.5 ft	14.5 ft		14.5 ft
		Existing Overpassing Bridge		14 ft	14 ft		14 ft
	Vertical Clearance, Collector over Railroad (23)		Ch. 402-6.01	23 ft			
Alignment Element	Design Speed			30 mph	35 mph	45 mph	50 mph
	*Stopping Sight Distance		42-1.0	200 ft	250 ft	360 ft	425 ft
	Decision Sight Distance	Speed / Path / Direction Change	42-2.0	U: 620 ft SU: 535 ft	U: 720 ft SU: 625 ft	U: 930 ft SU: 800 ft	U: 1030 ft SU: 890 ft
		Stop Maneuver		490 ft	590 ft	800 ft	910 ft
	Intersection Sight Distance, -3% to +3% (28)		46-10.0	P: 330 ft SUT: 420 ft	P: 390 ft SUT: 490 ft	P: 500 ft SUT: 630 ft	P: 630 ft SUT: 780 ft
	*Minimum Radius for e_{max} = 4% / 6%		43-2.0	270 ft / 250 ft (24a)	430 ft / 400 ft (24a)	610 ft / 560 ft (24a)	760 ft (24b)
	*Superelevation Rate (25)		43-3.0	Up to e_{max} = 6%			e_{max} = 8%
	*Horizontal Sight Distance		43-4.0	(26)			
	*Vertical Curvature, K-value	Crest	44-3.0	19	29	61	84
		Sag		37	49	79	96
	*Maximum Grade (27)	Level	44-1.02	9%	9%	8%	7%
		Rolling		11%	10%	9%	8%
	Minimum Grade		44-1.03	Desirable: 0.5% Minimum: 0.3% (Curbed); 0.0% (Uncurbed)			

U: Urban SU: Suburban

* Level One controlling criterion. Except as noted in this chapter, the values shown in AASHTO's *A Policy on Geometric Design of Highways and Streets* (the *Green Book*) may be used as minimum values if they are lower than similar values shown herein. A controlling criterion that does not meet the minimum value is a design exception and is subject to approval. See Section 40-8.0.

. These criteria apply regardless of funding source.

GEOMETRIC DESIGN CRITERIA FOR URBAN COLLECTOR

(New Construction or Reconstruction)

Figure 53-8 (Page 2 of 4)

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(1) Parking Lane. In a residential area, a parallel parking lane of 7 to 8 ft width should be provided on one or both sides of the street. In a commercial or industrial area, parking-lane width should range from 8 to 11 ft, and lanes should usually be provided on both sides of the street. The minimum value may only be used if the lane is not intended for use as a travel lane in a restricted condition. Where a curb-and-gutter section is used, the gutter-pan width may be considered as part of the parking-lane width. Where practical, the parking-lane width should be in addition to the gutter-pan width.

(2) Design Speed. The minimum design speed should equal the minimum value, the anticipated posted speed limit after construction, or the legal speed limit on a non-posted highway. The legal speed limit in an urban district is 30 mph. Based upon an engineering study, the design speed may be raised to an absolute maximum of 55 mph.

(3) On-Street Parking. In general, on-street parking is discouraged.

(4) Travel-Lane Width. In an industrial area, a 12 ft width should be used. Where right-of-way is restricted, an 11 ft width may be used in an industrial area, or a 10 ft width may be used in a residential area. On a multi-lane facility in a built-up area, the minimum width is 10 ft.

(5) Surface Type. The pavement-type selection will be determined by the INDOT Office of Pavement Engineering.

(6) Curb Offset. The curb offset should be 2 ft. Vertical curbs introduced intermittently should be offset 2 ft. A continuous curb used along a median or channelizing island may be offset 1 ft.

(7) Shoulder Width. The value applies to paved-shoulder width. The following will also apply.

a. For an uncurbed section, the shoulder is paved to the front face of guardrail. The desirable guardrail offset is 2 ft from the usable shoulder width. See Section 49-4.0 for more information.
b. For an uncurbed section, a desirable additional 1 ft of compacted aggregate will be provided.
c. For a curbed section, the curb offset is included in the paved shoulder width.

(8) Cross Slope, Travel Lane. Cross slopes of 1.5% are acceptable on an existing bridge to remain in place.

(8A) Cross Slope, Shoulder. See Figure 45-1A(1) or Figure 45-1A(2) for more-specific information.

(9) Minimum Median Width. The criteria assume the presence of mountable curbs with a 0 ft curb offset.

(10) Sidewalk Width. A buffer of less than 2 ft wide is not permitted. If no buffer is provided, the sidewalk width should be 6 ft.

(11) Bicycle-Lane Width. The width is in addition to the width of a parking lane, if present. See Section 51-7.0 for additional details.

(12) Clear-Zone Width. The following will apply.

a. Facility with Vertical Curbs. The clear-zone width will be measured from the edge of travel lane or will be to the right-of-way line, whichever is less. No clear zone is required where there is 24-h parking.
b. Facility with Sloping Curbs or without Curbs. The clear-zone width will vary according to design speed, traffic volume, side slopes, and horizontal curvature.
c. Curbed Facility. There should be an appurtenance-free area as measured from the gutter line of a curb.
d. Value. See Section 49-2.0 for specific clear-zone-width value

(13) Curbing Type. Vertical curbs may only be used with a design speed 45 mph or lower.

GEOMETRIC DESIGN CRITERIA FOR URBAN COLLECTOR

(New Construction or Reconstruction)

Figure 53-8 (Page 3 of 4)

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(14) Side Slopes, Uncurbed. Value is for new construction. See Sections 45-3.0 and 45-8.0 for more information. For a reconstruction project, see Section 49-3.0

(15) Foreslope. See Sections 49-2.0 and 49-3.0 for the lateral extent of the foreslope in a ditch section.

(16) Ditch Width. A V-ditch should be used in a rock cut.

(17) Backslope. The backslope for a rock cut will vary according to the height of the cut and the geotechnical requirements. See Section 45-3.02 and 107-6.02 for typical rock-cut sections.

(18) Side Slope, Curbed, Cut. A shelf or sidewalk will be present immediately behind the curb before the toe of the backslope. The minimum width of a shelf will be 6 ft. Where a sidewalk is present, the toe of the backslope will be 1 ft beyond the edge of sidewalk. See Section 45-3.0 for more information.

(19) Side Slope, Curbed, Fill. If no sidewalks are present or planned, the lateral extent of the 12:1 slope may be reduced to 4 ft.

(20) Structural Capacity, New or Reconstructed Bridge. The following will apply.
a. A State-highway bridge within 15 mi of a Toll-Road gate must be designed for Toll-Road loading.
b. A bridge on an Extra-Heavy-Duty Highway must be designed for the Michigan Train truck loading configuration.
c. See Chapter 403 for additional information on the loading configurations.

(21) Width, New or Reconstructed Bridge. See Section 402-6.02(01) for more information. The bridge clear-roadway width is the algebraic sum of the following:
a. the approach traveled-way width;
b. the approach usable shoulder width without guardrail; and
c. a bridge-railing offset (see Figure 402-6H).

(22) Vertical Clearance, Collector Under. Value includes an additional 6 in. allowance for future pavement overlays. Vertical clearance applies from usable edge to usable edge of shoulder.

(23) Vertical Clearance, Collector Over Railroad. See Chapter 402-6.01(03) for additional information on railroad clearance under a highway.

(24) Minimum Radius. The following will apply.
a. Based on e_{max} = 4% or 6% and low-speed urban street conditions.
b. Based on e_{max} = 8% and open-road conditions.

(25) Superelevation Rate. See Section 43-3.0 for value of superelevation rate based on design speed and radius. See Section 43-3.0 and the INDOT *Standard Drawings* for information on superelevation requirements.

(26) Horizontal Sight Distance. For a given design speed, the necessary middle ordinate will be determined by the radius and the sight distance which applies at the site. See the discussion in Section 43-4.0.

(27) Maximum Grade. For a grade along a longitudinal distance of less than 500 ft (PVT to PVC), a one-way downgrade, or a road with AADT < 400, the maximum grade may be up to 2% steeper than the table value. Where adjacent sidewalks are present, the maximum desirable grade is 5%.

(28) Intersection Sight Distance. For a left turn onto a 2-lane roadway: P = Passenger car; SUT = single unit truck. See Figure 46-10G for value for a combination truck.

GEOMETRIC DESIGN CRITERIA FOR URBAN COLLECTOR

(New Construction or Reconstruction)

Figure 53-8 (Page 4 of 4)

Appendix D

Meeting Minutes

From: Cassie Reiter
To: Kristin Timmons; Greg Prince (gprince@indot.in.gov); Brown, Damon
Subject: Meeting with Bloomington today at 1:30pm
Date: Friday, April 29, 2022 1:25:20 PM

Greg Prince, Damon Brown
Andrew Cibor, Neil Kopper, Beth Rosenbarger

Kristin shared revisions in the exhibit, with an explanation of the improvements.

Andrew – appreciate looking at the City's comments & trying to incorporate the elements COB suggested. General questions – future corridor project to the East – how will these new changes be incorporated into the corridor project?
Greg – INDOT is still working through the Engineer's Report for the corridor project and looking at this connectivity. In this case, Damon & CMT will work to understand how this will connect.
Kristin – looked at this briefly, but need to look into logistics of what can be done – challenging grades at the creek, further investigate the culvert conditions, unknown if bike lanes or path.

Andrew – focusing back on this project – it is 2 separate projects, but understanding now that Pete Ellis & SR 45 AL project would go together.
Kristin – SR 46 @ Smith – moving forward on its own track – April 2023 letting.
SR 45 @ Pete Ellis has been pushed back to align with 45 AL project. These are August 2024 letting as a bundle.

Andrew – challenges shared are how it ties to the BRI agreements, and what is the process moving forward for this.
Kristin – this design team had follow-up with Patrick Carpenter who had follow-up with BRI & SHPO. The project will need to have an addended memorandum – won't need a full Section 106 process for this change. We still need to provide BRI this new layout, but Steve Wyatt didn't have any big concerns about the change to sidewalk, so long as there were no other historic impacts. We still need feedback from them.
Greg – no one had any real concerns or issues moving forward.

Neil – high level looks like most everything has been incorporated. No bump-out & need to keep bus lane in the SE corner at Pete Ellis. If needed for turning movements, then he understands.
East of Pete Ellis, switching from MUP to sidewalk because there is a bike lane. COB views it as "separate".
INDOT is not precluding it from COB adding path in future, but INDOT is needing to stay within the budget, and COB previously indicated bike lane plus buffered sidewalk, or trail.
Greg – understand the point.
Neil – west of here there is a path plus bike lane. INDOT has to put the path back here, since it exists there today.

Damon – what is City's perspective on sidewalk & trail, and now was our understanding that COB would prefer sidewalks over the trail because the City doesn't need to maintain the sidewalks. When does the City want a trail vs a sidewalk.

Andrew – on south side of 10th St, COB had preference for sidewalk instead of path. So fair question.

INDOT still needs to reach back out to Bloomington Transit to get their feedback on this new plan. We were reaching back to COB first before reaching out to others.

Beth – Part about MUP on the north side of the street – is that something that COB can add on to, or can the City consider. If not in this project, would it be a rationale for not continuing to the east?
INDOT – a MUP & a bike lane WB would be a large cost add to that corridor project. Beth would like to know when to discuss with INDOT about that project.
Greg – as we continue through the Engineer's report, look into those options, and then discuss a potential for cost sharing & look for ways to see if something could be achieved. INDOT still needs to continue to look at the options of what a MUP plus a bike lane would cost. But INDOT welcomes a conversation from COB at any time about cost share.
Improvement widths on the corridor project varied – it was not the same throughout.
Kristin – could have a separate meeting to go over that project once CMT gets back into the project.

Andrew – appreciate the INDOT & CMT team listening & incorporating ideas from COB into the project. If, when comfortable, would be good to share this drawing and the corridor project, and a similar conversation on the corridor project Engineer's Report.

Kristin can share the exhibit from the meeting to Andrew. In the meantime, INDOT will be coordinating with BT & BRI.
Kristin will reach back out to Patrick for a meeting with BRI to share the exhibit.
Cassie will reach out to BT for a meeting to share the exhibit for feedback on the bus stops.

CASSIE REITER | Project Manager

Crawford, Murphy & Tilly | **Engineers & Consultants**
w 317.492.9166 | m 317.223.6739 | creiter@cmtengr.com

Centered in Value

Date: October 20, 2021

Location: Project site – SR 45 at Pete Ellis then SR 46 at Smith Road, Bloomington

Subject: Final Field Check
SR 45 at Pete Ellis / Discovery Parkway Intersection Improvement – Des No. 1800199
SR 46 at Smith Road Intersection Improvement – Des No. 1800208

Attendees:

Greg Prince	INDOT
Bill Reed	INDOT
Rachel Wren	INDOT
Phil Peden	CBU
Joe Bryniarski	Smithville
Alec Schory	Vectren
Peter Tsu	Duke Energy
Lynn Vorinheder	IU
Scot Osborn	IU
Andy Mullis	AT&T
Josh Heath	JDH Contracting (Zayo)
Trevor Bennett	JDH Contracting (Zayo)
Richy Condre	CMT
Cassie Reiter	CMT
Mitchell Murray	CMT

Purpose: The purpose of the meeting was to discuss development of the plans for the subject projects.

Meeting Discussion – SR 45 at Pete Ellis / Discovery Parkway:

- Richy (CMT) will begin to coordinate SUE.
- Richy (CMT) to send Scot & Lynn from IU the latest plan set.
    - Richy to send latest plans to all other utilities as well.
- CMT to confirm utility contact information is up to date on plans.

Meeting Discussion – SR 46 at Smith Road:

- The south side of the existing trail along SR 46 is eroding badly. May need to grade a shelf with a slope down to the existing grade.

- There is a mailbox that will be impacted on the church property just north of the entrance off Smith Rd. CMT to note this relocate in plans.
- Richy (CMT) will begin to coordinate SUE.
- Rachel suggested if it would be possible to move the Church entrance from Smith Road to SR 46. Because the entrance would be from the RT turn lane, rather than the thru lane (due to the restripe of SR 46). Cassie (CMT) concerned about the LT turn in and the entrance proximity to the signal.
    - Rachel suggested we take a look then confer with Damon. A sketch from CMT was sent to Damon on 10/25/21 to take a look & offer his opinion.
- Duke placed new poles as part of their own project. New pole location may be beneficial to SR 46/Smith project.
- New General Info: State Statute says storm sewers (pipes and manholes) in a state route are the responsibility/owned by the City, not INDOT. The inlets are INDOT's. Bill Read brought this to the group's attention.

SR 45 ATL project discussion:

- Survey utilities are not showing up on plans or were not collected. Information/locations needs to be shown on plans. CMT to look into this and send another set of plans.
- CMT will revisit southern trail design and location to avoid utilities.
- Curb ramps may be necessary at apartment entrance on the south side.
- Pipe will be needed in the trail under the proposed North-South sidewalk to allow existing flow of water along swale on the south side of the road.

Please advise in writing of any corrections/additions to the minutes. If no written response is received within seven (7) days of receipt of these minutes, they will be considered approved as written.

Prepared by:
CMT

Utility Coordination Meeting
SR 45 and Pete Ellis Road Intersection Improvements

Date 06/30/2021
Time 1:00 pm

Meeting Agenda

Goal – To review the proposed improvements for the intersection improvements for SR 45 in Bloomington, IN, Utility Corridors, Potential Facility Improvements, and site issues for the utility installations.

I. Attendees

- Kristin Timmons (CMT)
- Mitchell Murry (CMT)
- Richy Condre (CMT)
- Andrew Mullis (AT&T-D)
- Russ Owens (AT&T-D)
- Phil Paden (CBU)
- Rich Miller (Comcast)
- Peter Tsa (Duke Energy)
- Jason Banach (IU)
- Mark Menefee (IU)
- Pankaj Patel (IU)
- Mia Williams (IU)
- Phil Nichols (IU)
- Lynn Vornheder (IU)
- Scott Osborn (IU)
- Wendell Solomon (OCM Group for Everstream)
- Natasha Mershon (OCM Group for Everstream)
- Jared Griswold (OCM Group for Everstream)
- Joe Bryniarski (Smithville Communications)
- Mostafa Khallad (Centerpoint Energy)
- Whitney Land (EN Engineering for Centerpoint Energy)
- Joshua Heath (JDH Contracting for Zayo Communications)
- Trevor Bennett (
- Leora Meehen-Numminen

II. Project Overview – Kristin Timmons

1. Kristin reviewed the SR 45 and Pete Ellis/Discovery Lane Parkway intersection improvement project. Since the last version of the plans there has been a multi-use path added to the southwest corner of the intersection along the historic property.
2. This project will connect to the SR 45 Added Travel Lane project, this project is separate; however, these two projects are being developed together to coordinate the design.

3. CMT working to assure the utilities are located properly and they can identify potential conflicts that can be incorporated into the design or whether relocation will be necessary by the utilities.

III. **Potential Utility Relocations and Improvements – Richy Condre**

1. AT&T (Andrew Mullis – Russ Owens) AT&T-D has conflict s with their existing plant on the northeast quadrant and will be working to determine how their easement is affected and the facilities that will be maintained or relocated. They also have the manhole near the southeast corner of the intersection, that will be reviewed to determine how it and their duct will be affected by the proposed construction.
2. AT&T – Transmission, did not attend
3. Bloomington Utilities (Phil Paden) City of Bloomington has been reviewing the plans as they have been forwarded to them. Currently they do not believe the projects will conflict with the proposed construction. CBU will review the updated plans to confirm any conflicts, particularly with the existing water main. CBU will review the proposed storm improvements to determine how the improvements align with their existing system.
4. Comcast Cable (Rich Miller) they have significant facilities located within the limits of both projects. They will need to review the proposed plans to determine the extent of their facilities. They need to determine splice locations if relocations are necessary as they need to have minimum 1000' length connections. They do have an underground facility the crossing SR 45 from the south at approximately Sta. 41+00 to a riser at Sta. 42+50 where the facility becomes overhead on the Duke Energy pole line.
5. Duke Energy (Peter Tsa) there are known conflicts on the northside of the roadway that Duke Energy will review when the new plans are received. Duke will also review the underground electrical facilities along Discovery Parkway to determine if relocation will be necessary.
6. Indiana University (Scott Osborn) at this time the facilities for Indiana University are clear from conflict with the project, they will need to monitor the providers of their service they may need to relocate as necessary for this project. Jason Banach wanted to know if CMT has communicated with Etica, he received a call from Brian asking about the Bloomington Greenway project. Kristin did confirm that Etica is performing Right of Way services from CMT on this project. Mia Williams inquired in the tree clearing and how the replacement of the trees will be handled. IU would like to maintain the cover that is currently provided by the tree line along the northside of SR 45 and their maintenance facility. Kristin will review the environmental document that will dictate the replacement of trees for this project.
7. Everstream (Wendell Solomon) anticipates potential relocations will be necessary due to conflicts with the proposed storm improvements.
8. Smithville Communications (Joe Brynairski) Will review plans and the potential conflicts with the storm and grade improvements.
9. Centerpoint Energy (Whitney Land) A Relocation Plan has been prepared for this area, they will be relocating the main west of the intersection from the south side to the north side of SR 45 and will be relocating the main on Pete Ellis from the east

side to the west side. Mostafa Khallad, no major concerns with the proposed relocations or adjustments based on the additional changes to the plans.

10. Zayo (Joshua Heath) currently their fiber facility running east of the intersection conflicts with the proposed storm sewer. They also have a potential conflict on the east side of Pete Ellis with the proposed construction, they will determine if these existing facilities can be shifted to avoid the proposed storm improvements. The Zayo facilities will be reviewed when the updated plans are received from CMT.

IV. Utility Corridors, Shared Conduit Duct Bank

a. As the design proceeds if CMT evaluates possible relocation corridors for the communications facilities a 3-foot-wide alignment will be used to provide appropriate spacing for the utilities to use for their relocations.
b. All utility relocations are to be performed within the Right of Way of the roadway. The anticipated exceptions will be where utilities currently have easements or property interest, AT&T-D is working to determine how the proposed Right of Way impacts their easement and facilities on the northeast corner.
c. The existing Highway Easement will be converted to Right of Way as a part of this project.

V. Potential Issues with relocations

a. At this time no known material or crew shortages will impact this project; however, this could change based on several factors.

VI. Action Items

1. CMT to update plans for the modifications to the plans since the last version was distributed to the utilities for review and evaluation of conflicts.
2. Richy Condre (CMT) to work with the utilities to review potential conflicts and the corridors that will be used for relocation to allow all utilities the ability to know where their facilities will need to be located to avoid conflicts with utilities and proposed roadway construction.

MEETING MINUTES

DATE: April 27, 2021; 10:00am

PROJECT: INDOT Des. 1800199 State Route 45 & Pete Ellis Road and Des. 1800086 SR 45 Added Lanes projects

MEETING LOCATION: Virtual Teams Meeting

MEETING PURPOSE: Updated coordination with Bloomington Transit

MEETING ATTENDEES: Attendees are noted below.

ATTENDEES	REPRESENTING
Greg Prince	INDOT PM
Lew May	Bloomington Transit
Zac Huneck	Bloomington Transit
Kristin Timmons	CMT
Cassie Reiter	CMT

Purpose: The purpose of the meeting was to discuss the changes made since the last discussion with Bloomington Transit (BT) and to coordinate bus stops with the MOT plan for 1800199 – SR 45 at Pete Ellis Construction.

Meeting Discussion:

- Westbound bus stop on SR 45, east of Pete Ellis (the one with the existing gazebo):
    - We were able to accommodate 2 busses as requested by (BT) by extending the right turn lane farther east
    - CMT will look into the possibility of allowing space for a shelter to be installed by BT, but not sure about this due to grades. Depth of shelter space min. is 5'.
    - BT requested a paved connection from the trail to the curb line at this bus stop, near STA 56+50.
- Eastbound bus stop on SR 45, east of Pete Ellis (by the Post Office)
    - BT indicated it is rare for 2 busses to be there at one time
    - CMT will look into the possibility of allowing space for a shelter to be installed by BT.
    - Bus is 40' in length, so to clear the intersection, bus stop at about STA 53+75 would work for BT. This gets it closer to the intersection, where the crosswalk will be located.
- The bus stops above were discussed with regard to pedestrian, worker and driver safety during construction. These bus stops would be closed during construction for the following reasons.

- Students at IU are the biggest users. Less busy in the summers, but still large numbers of students using the stops.
- At John Hinkle place, the westbound bus stop had been reconstructed to allow for 2 busses.
- Because the sidewalks to the apartment complex on the north side will be open to the apartments during construction, the stop at John Hinkle could be utilized.
- Eastbound, there is a turn lane/pulloff at John Hinkle, and a crosswalk across SR 45/10th St.
- 1 lane of traffic will remain open in each direction at all times, except during flagger operations for specific activities.

- Scholars Quad eastbound bus stop
  - Temporary condition to keep this stop open either at its existing location or shifted west during construction
  - In the permanent condition, the westbound bus stop will be moved to the IU Tech Park entrance.
    - A crosswalk across SR 45 was shown in the Engineer's Report and will be included in the Stage 1 Plans submission.
- Bus shelters – BT will need to go through INDOT permits in order to remove or replace the bus shelters.
- It is CMT & BT understanding that the gazebo is owned by the apartment complex. Coordination on this will occur during the ROW acquisition stage. But the shelter will need to be removed to accommodate the widening of SR 45.

From:	Cassie Reiter
To:	Metcalf, Karlei A; Wilson, Dan; Clift, Wm. Todd; Fedorchak, Paul; Nick Schmitt; Brian Stanoch; Jason Hesler
Cc:	Kristin Timmons; Mitchell Murray; Nicholas Hoevener
Subject:	1800199 ROW - INDOT discussion
Date:	Tuesday, March 30, 2021 1:27:48 PM

A discussion was had with INDOT ROW & Real Estate & Appraising regarding Des No 1800199 & 1800086 ROW needs and the best way to move forward. The following were discussion items and action items. If I have misstated anything, please let me know.

- The Project Manager is the one who needs to make the decisions on acquiring Perm Highway Easement as fee ROW or leaving as-is.
- Because additional ROW on the north side of SR 45, west of Discovery Parkway is needed outside of the Permanent Highway Easement (underlying property owned by Indiana University), then that piece could be acquired as additional Perm High Easement, or the entirety of the existing Perm High Easement plus this additional piece could all be acquired as fee ROW.
    - Karlei will talk with IU as soon as possible to determine:
        - Will IU do all the land as fee ROW? Or does it need to remain Perm High Easement?
        - What is the new piece needed, if the ex. Perm High Easement remains? Is it add'l Perm High Easement or is it fee ROW?
        - If the land is donated, will IU need an appraisal on it?
    - If Perm High Easement is acquired as fee ROW, we will need to have a discussion about how it is acquired under 2 different Des No.
    - Karlei will get back to us once she speaks with IU – has a kitchen table meeting with them.
- On the south side of SR 45, west of Pete Ellis, CMT's team will prepare the ROW plans showing the adjoiner signing a Quit Claim deed. Don West with INDOT can help if needed.
    - INDOT could make 1 offer on the 2 parcels (1 in each Des No), since 1 Env Doc. However, 2 offers may be best because the ROW from the 2 parcels, although same owner, is needed for 2 separate projects, and the properties are 2 different uses.
- For the Post Office property, this is a standard acquisition process, but it typically takes longer.

CMT's team is preparing the ROW plans for 1800199, and title work is pulled for the parcels for 1800199.

Thank you for your time – the discussion was very helpful for our team.
Cassie

CASSIE REITER | Project Manager

Crawford, Murphy & Tilly | **Engineers & Consultants**
w 317.492.9166 | m 317.223.6739 | f 317.298.4503 | creiter@cmtengr.com

Date: March 18, 2021
Location: Virtual Teams meeting
Subject: Maintenance of Traffic
SR 45 at Pete Ellis / Discovery Parkway Intersection Improvement –
Des No. 1800199

Attendees:

Karlei Metcalf	INDOT
Rachel Wren	INDOT
Marcus Bruce	INDOT
Crystal Weaver	INDOT
Kristin Timmons	CMT
Nikki Patke	CMT
Cassie Reiter	CMT

Purpose: The purpose of the meeting was to discuss development of the MOT plans for the subject project.

Meeting Discussion:

- A quick run-thru of the MOT requirements, as listed in the MOT notes on the plans was given by CMT.
- A discussion regarding how to install temporary pavement was discussed. It was determined that installation of the temporary pavement completed overnight under flagging conditions is appropriate in Bloomington and for this project.
- A discussion was had about the 5' offset from the work zone to the edge of the travel way shoulder. There would be a dropoff with regard to the new pavement installation excavation, and then a grade raise of 1' due to the new intersection profile. Therefore, it was determined that TTB (temp barrier) should be used instead of channelizers, because contractors will likely request the use of barrier after contract award.
- Need to look at moving the bus stops outside the construction limits on either end of the project, so pedestrians don't cross SR 45 in the work zone – for their safety as well as driver safety. CMT will continue to coordinate this with Bloomington Transit. The stops would not be moving miles – just 600' or so. Note though that at the eastern end, there are still open bus stops at John Hinkle. In addition, there may need to be temporary accommodations for the bus stops if they are moved.
- ADA access during construction: existing trail and some of sidewalk is not compliant. CMT to confer with INDOT ADA on how to handle this during construction. CMT to look into Stage 1, if the contractor could build the new trail on the north side of the existing trail while keeping the

existing trail open, then move people to the new trail and then build the roadway improvements. May need to have temp plastic barrier, and temp curb ramps.

Please advise in writing of any corrections/additions to the minutes. If no written response is received within seven (7) days of receipt of these minutes, they will be considered approved as written.

Prepared by:
CMT

Meeting Minutes – SR 45 @ Pete Ellis Intersection project 1800199 & SR 45 Added Travel Lanes project 1800086 – Environmental/Section 106 Discussion

2/4/2021 Teams virtual meeting

Attendees –
Cassie Reiter, CMT
Ellen Hogrebe, CMT
Karen Wood, SJCA
Patrick Carpenter, INDOT CRO
Brandon Miller, INDOT ES
Karlei Metcalf, INDOT PM

Cassie opened the meeting with a brief overview of the project scopes for Des. 1800086 ("Added Travel Lanes") and Des. 1800199 ("SR 45/Pete Ellis Intersection").

Patrick Carpenter asked about the additional properties around the Added Travel Lanes project; it was determined that the railroad line would be identified as the southern end of the area of potential effects (APE) which would exclude the mid-century neighborhood located southwest of the Added Travel Lanes project area. All of the other properties have been identified as modern within the extended APE.

It was discussed and determined that the following submission would be prepared by SJCA to be reviewed by INDOT and sent out to consulting parties (CP) for one 30 day review:

1. Letter (explaining that the projects have been combined)
2. HPR addendum (brief description of the extended APE and properties therein and a map)
3. Effects Report (explaining the effects upon the historic property; assume finding of "adverse effect" and offer initial mitigation measures; and offer a date and time for a consulting parties meeting to occur within the 30-day review)
    a. CP meeting minutes to be distributed after meeting for 2-week comment period

This documentation and review would take approximately 2 months.

Mitigation ideas consisted of landscape plantings and screening to account for widening of the roadway; orchard tree planting, or donation to the historic property owner (non-for-profit org) as a net benefit to avoid Section 4(f) evaluation. An individual 4(f) evaluation would potentially add minimim 3 months to the project schedule after Section 106 review.

Archaeological fieldwork would occur during the 30-day review time and then the report for the combined projects would be submitted to INDOT for review; followed by another 30-day review for SHPO and CP review and comment.

While Archaeology report is out for review, the 800.11 and draft MOA can be prepared and reviewed concurrently. It was discussed that right of entry could be included in the MOA if plantings on the historic property were agreed upon as mitigation. If the archaeology is not able to be completed, the MOA can be drafted with archaeology pending. The 800.11 would go out for the final 30-day review; the draft MOA would be circulated for review and comments, and then a final MOA would be circulated for signatures.

The CE document can be ready to be submitted while 106 is being finalized; level would be CE-4 due to adverse effect. INDOT ES can provide an expedited review if the schedule dictates. Once released for public involvement, a notice needs to be published offering the opportunity for a hearing. If it is not requested, review can continue. CE-4 requires FHWA review and approval.

Brandon Miller offered the option of using MAP21, which would allow the start of the right of way acquisition process as long as the properties are not 4(f) or federal. (Two properties are—the historic property is 4(f) and the post office is federal. Both properties are on the south side of SR 45.). Ron Bales could help out with getting that started, so Karlei to contact Ron. Karlei to contact Todd Clift at INDOT regarding the federal land transfer process.

Date: June 12, 2020

Location: Project site – SR 45 at Pete Ellis then SR 46 at Smith Road, Bloomington

Subject: Preliminary Field Check
SR 45 at Pete Ellis / Discovery Parkway Intersection Improvement – Des No. 1800199
SR 46 at Smith Road Intersection Improvement – Des No. 1800208

Attendees:

Karlei Metcalf	INDOT
Rachel Wren	INDOT
Marcus Bruce	INDOT
Jeremiah Shaw	INDOT
Roy Aten	City of Bloomington
Phil Peden	CBU
Russ Owen	AT&T
Luke Dillow	AT&T
Addison Clopton	Duke
Peter Tsa	Duke
Steve Wiesner	IU
Joe Bryniarski	Smithville
Richy Condre	CMT
Cassie Reiter	CMT

Purpose: The purpose of the meeting was to discuss development of the plans for the subject projects.

Meeting Discussion – SR 45 at Pete Ellis / Discovery Parkway:

- The project is added turn lanes at all 4 legs of the intersection. The design has been laid out as far west as possible, knowing the existing utilities in the northeast corner of the intersection, while still minimizing the historic property impacts on the southwest corner of the intersection.

- The utility pole at approx. STA 412+25 on the south side of SR 45 was discussed. This pole is an AT&T facility with an unconfirmed under-build, this pole will be relocated outside of the obstruction free zone.
- CMT (Richy Condre) will coordinate with INDOT (Bill Read) regarding the ability to obtain locations/depths for the underground facilities.
- There is a hydrant relocation needed on the northwest corner, approximate Sta. 600+75, Lt.
- Duke will need to relocate their pole line on the north side of SR 45 west of the intersection.
- There is underground power at the northeast corner of the intersection, approx. 3'-5' deep, Duke will determine whether this facility will be relocated or retired.
- Duke will need to relocate a pole in the northeast corner of the intersection that will be within the planned curb ramp.
- Duke has underground on the east side of the intersection as well.
- The depth of the water main on the northeast corner of the intersection is unknown.
- IU is planning a sidewalk/path on the west side of Discovery Parkway (north of SR 45).
- CMT notes that storm sewer was just laid out preliminarily and that further design is needed for inverts, pipe sizes, etc.
- INDOT does not utilize ONLY for pavement markings. They use arrows at the beginning of the lane and then again within the turn lane.
- Duke has poles with a streetlight at approximately Sta. 421+20 and Sta. 423+35 that will need to be relocated out of the sidewalk.
- Duke will have relocations of utility poles from Sta. 425+00 to Sta. 429+00.
- CMT to check with Phil Peden CBU regarding the storm sewer outlet and if it is private or public storm sewer.

Meeting Discussion – SR 46 at Smith Road:

- The project is added turn lanes at the Smith Road legs of the intersection. The design has been laid out as far west as possible, knowing the existing utilities in the northeast corner of the intersection.
- INDOT currently has a resurfacing and restriping project on SR 46 that keeps the curb lines the same but changes the lane configurations. INDOT sent plans to CMT. CMT to revise for STG 2 submission.
- The City may be planning a path on the west side of Smith Road south of SR 46. City to send information to CMT/INDOT.

- CMT notes that storm sewer was just laid out preliminarily and that further design is needed for inverts, pipe sizes, etc.
- At storm structure 204, Duke would like to know the depth, as there is a transmission pole and guy wire close to the existing storm facilities.
- AT&T has facilities in the southeast corner of the intersection. These do not appear to be shown on the plans. AT&T to provide location.
- The Duke pole in the northwest corner of the intersection – it will need to be determined if it can remain, or if it will need to be moved.
- The storm line shown in the PFC plans is too close to the existing Duke poles in the northeast corner of the intersection. CMT will look at a different configuration for the storm sewer in this location.
- Duke has underground (approx. 3'-5' deep) from the transmission pole to transmission pole in the northeast corner of the intersection.
- Smithville has underground from pole to pole in the northeast corner of the intersection.
- Cross sections are needed where the traffic signal strain poles will be placed to confirm the elevation of the spans in relation to the Duke distribution facilities. Minimum separation will need to be maintained. CMT and Duke will coordinate this separation.

Please advise in writing of any corrections/additions to the minutes. If no written response is received within seven (7) days of receipt of these minutes, they will be considered approved as written.

Prepared by:
CMT

SR 45 Added Travel Lanes Engineering Assessment

Des Number: 1800086

MONROE COUNTY, INDIANA

February 2021

8790 Purdue Road, Indianapolis, IN 46268

Report excerpted for purposes of environmental document

1.3 PROJECT NEED AND PURPOSE

The purpose of this analysis is to determine the alternative that best reduces congestion, improves safety, and accommodates future growth along SR 45 between SR 46 and Pete Ellis Drive/Discovery Parkway. The proposed alternatives must also match the improvements proposed in the SR 45 and Pete Ellis/Discovery Parkway reconstruction, contract number R-41465. With the existing Indiana University facilities to the north and west and the proposed development of the hospital to the north of the intersection of SR 45 at SR 46, there is predicted to be significant growth in traffic volume. This is expected to increase congestion along the corridor between the intersections of SR 45 at SR 46 and SR 45 at Pete Ellis Drive/Discovery Parkway. The need for this project is to provide additional roadway capacity to address current deficient level of service conditions which are anticipated to worsen with growing traffic volumes. The design of this corridor will be completed in a manner that best meets the needs of INDOT, Monroe County, the City of Bloomington, and the traveling public. The formal need and purpose for the project will be determined through the NEPA process, but initial components of the need and purpose utilized for this study will include:

- Provide necessary future capacity of the roadway segment.
- Coordinate with SR 45 at Pete Ellis Drive/Discovery Parkway intersection improvement project.
- Minimize right of way acquisition and environmental impacts.
- Improve safety of traveling public, including providing ADA compliant facilities.

1.4 ADJACENT ROADWAY PROJECT

The intersection of SR 45 at Pete Ellis Drive/Discovery Parkway is being reconstructed under contract number R-41465. The proposed improvements for the SR 45 at Pete Ellis Drive/Discovery Parkway project will be reflected in the proposed design of the added travel lane project analyzed within this report. The proposed improvements included in the SR 45 at Pete Ellis Drive/Discovery Parkway include but are not limited to:

- An added travel lane in the westward direction
  - This added travel lane will connect to the proposed added travel lane for the project analyzed within this report and run through the project limits and terminate at the intersection of SR 45 at SR 46.
- A bike lane along the southern most eastbound travel lane
  - This bike lane will be continued within the project limits of the proposed project analyzed within this report and terminate at the intersection of SR 45 at SR 46.

Stage 2 plans for the proposed improvements for the SR 45 at Pete Ellis Drive/Discovery Parkway project can be found in ***Appendix D – Adjacent Roadway Project***.

- **AT&T-Distribution**: There is a telephone line running along the south side of SR 45.
- **AT&T-Transmission:** No utilities found in initial survey.
- **Bloomington Utilities**: There is a 12" water main in the southeast corner of the intersection that tees into a watermain that runs along the centerline of SR 45.
- **Comcast:** No utilities found in initial survey.
- **Duke Energy:** No utilities found in initial survey.
- **Indiana University**: No utilities found in initial survey.
- **Smithville:** No utilities found in initial survey.
- **Vectren**: There is a 6" gas line that runs along the north side of SR 45.
- **Zayo Bandwidth:** No utilities found in initial survey.

3.0 TRAFFIC DATA AND CAPACITY ANALYSIS

3.1 TRAFFIC DATA

The Traffic Data utilized in this study was provided by INDOT's Office of Traffic Statistics and can be in ***Appendix C – Traffic Analysis***. The project traffic forecast report spans from the intersection of SR 45 at SR 46, Segment 1 Forecast in the provided Traffic Data, to the intersection of SR 45 at Pete Ellis Drive/Discovery Parkway, Segment 2 Forecast in the provided Traffic Data. Existing volumes and design year volumes were projected using a linear growth rate provided by INDOT of 0.36% based on the Statewide Travel Demand Model shown in ***Appendix C – Traffic Analysis***. These volumes were used to analyze the existing and future conditions. A prior traffic study created by American StructurePoint Inc. is also located in ***Appendix C – Traffic Analysis*** although the 1.5% annual linear background growth rate used in that report was not utilized for the analysis.

A singular design hourly volume was provided in the INDOT traffic report. To calculate the percentage of the ADT for design hourly volumes in the AM and PM peak hour, the west leg turning movements from the SR 45 and Pete Ellis Drive traffic count were utilized. The volume of the west leg of the SR 45 and Pete Ellis Drive was compared to the AADT of the segment to provide a percentage of DHV for the AM and PM peak hour. The percentages were used to calculate the AM and PM peak hour volumes and analyze the SR 45 capacity. The table below summarizes the traffic count results and projections.

TABLE 2 - SR 45 FROM SR 46 TO PETE ELLIS DRIVE AADT – SEGMENT 1

	Average Annual Daily Traffic		
	Count Year 2019	Design Year 2043	Commercial % AADT
SR 45 (Eastbound)	7,668	8,331	3.44%
SR 45 (Westbound)	7,496	8,144	3.44%

3.2 CAPACITY ANALYSIS

The operational analysis associated with this report includes an analysis of the existing conditions and design year traffic volumes. Highway Capacity Software 7 (HCS7) was used to model the added travel lane along SR 45. Highway Capacity Manual (HCM) 2010 default values were used for modeling traffic behavior.

With the current volumes and planned hospital development in the area, it is anticipated that this segment will continue to see increases in congestion as traffic volumes rise. The approved IU Health Bloomington Traffic Impact Study, included in ***Appendix C – Traffic Analysis***, was used to provide base traffic volumes and turning percentages for the year 2031, when the hospital site is planned to be fully built out. The results of the existing conditions analysis are presented in ***Table 3***.

TABLE 3 - 2019 EXISTING CONDITIONS

Criteria	AM		PM	
	LOS	Density pc/mi/ln	LOS	Density pc/mi/ln
SR 45 Eastbound	D	12.1	E	16.9
SR 45 Westbound	D	11.7	E	16.4

The results in ***Table 3*** suggest that congestion occurs east of the SR 46 intersection with SR 45. The segment is currently operating at a substandard level-of-service (LOS) during both the morning and evening peak hours.

The No-Build and Added Turn Lanes scenarios were modeled in HSC7 using the calculated DHVs for the design year. The No-Build was modeled using the 2 Lane template, and the added travel lane was modeled using the Multi-Lane template. The added travel lane was modeled using a speed limit of 45 MPH as opposed to the proposed 35 MPH speed limit. This was due to the Multi-Lane segment roadway model's limited variable options in HCS7. The design year segment LOS for the added travel lane is shown in ***Table 4***.

TABLE 4 - LEVEL OF SERVICE SUMMARY

Alternative		Eastbound SR 45		Westbound SR 45		OVERALL	
		LOS	Density pc/mi/ln	LOS	Density pc/mi/ln	LOS	Density pc/mi/ln
2043 No Build	AM	D	13.6	D	13.1	**D**	**26.7**
	PM	E	18.9	E	18.4	**E**	**37.3**
2043 Added Travel Lanes	AM	A	8.7	A	8.5	**A**	**19.2**
	PM	B	11.1	A	10.8	**B**	**21.9**

*Note: This data is for straight segments only. No turning movement counts were conducted or available to the drives at Scholar's Quad Collegiate Apartments or IU facilities. It was assumed that the existing left turn lane lengths were adequate as no deficiencies were noted by the design team.

The segment performance results in ***Table 4*** shows that for the No Build scenario the segment will continue to provide a substandard LOS. While the conditions did not degrade, the added hospital trips and increased traffic volumes exacerbate congestion throughout the segment. According to the Indiana Design Manual, the minimum acceptable level of service for both an urban arterial and an urban collector road is LOS D.

With the added travel lanes, the 2043 design year intersection LOS improves from LOS D to LOS A in the AM peak hour and it improves from LOS E to LOS B in the PM peak hour. The added travel lanes provide more travel space for the increased traffic.

Existing storage lengths for the westbound approach of the SR45 at SR46 intersection were checked using Synchro 10 software. Turning movements were taken from the Indiana University Traffic Impact Study and applied to the SR 45 at SR 46 intersection. The provided growth rate was used to project turning movement volumes in the design year. The existing storage lengths were found to provide adequate storage for the expected queue lengths for the current turning movement volumes and the design year volumes.

4.0 CRASH DATA AND ANALYSIS

4.1 CRASH DATA

A safety analysis was performed to evaluate historic crash data as well as to compare build and No Build alternatives. Crash data for Monroe County was provided by INDOT. Crashes that took place within the last three years of data were counted (2017-2019). There were no reported crashes resulting in fatalities or serious injuries recorded within

the study period. The analysis was done only for the study segment. A map detailing reported crash locations can be found in ***Appendix C – Traffic Analysis.***

TABLE 5 - HISTORICAL CRASH SEVERITY DATA (2017-2019)

	Rear-End			Head On Collision			Right Angle / Turning			Same Direction Sideswipe			Total
	PDO	NIC	F/IC	PDO	NIC	F/IC	PDO	NIC	F/IC	PDO	NIC	F/IC	
2017	4	0	0	0	0	0	0	0	0	0	0	0	**4**
2018	1	0	0	0	0	0	0	0	0	0	0	0	**1**
2019	5	2	0	0	0	0	2	1	0	0	0	0	**10**
Total	**10**	**2**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**0**	**15**
Percentage	**80%**			**0%**			**20%**			**0%**			

PDO = Property Damage Only

NIC = Not Incapacitating Injury

F/IC = Fatality/Incapacitating

The data shows that approximately 80% of the crashes at the intersection of SR 46 at SR 45 are rear end crashes. The other predominate crash type was right angle/turning crashes at 20%. Based on the primary causes reported for these crashes, some analysis can be made on the crashes that were observed.

- Rear-end crashes commonly can be caused by congested traffic. The recurring primary factor in these crashes was “following too closely”. Out of the 12 rear-end crashes, 10 of them had the reported cause of “following too closely”. It is assumed most of these occurred due to driver inattentiveness in queues at the traffic signal.
- 11 of the 15 crashes within the project area took place within the right turn lane along westbound SR 45.

4.2 SAFETY ANALYSIS

The crash history for the SR 46 at SR 45 intersection was input into INDOT’s RoadHAT 3.0 project to compare the segment to similar locations statewide. Indices of crash frequency (ICF) and crash cost (ICC) are calculated to determine how many standard deviations away from average an intersection’s crash history and severity are compared to other similar segments across Indiana. The RoadHAT results for the current year (2019) traffic volumes and crash history from 2017-2019 can be found in ***Table 6.***

TABLE 6 - ROADHAT RESULTS

Segment	2017-2019	
	Icf	Icc
SR 46 at SR 45	3.06	1.36

The Road HAT results indicate that this segment of road, particularly the westbound approach to the intersection, is a safety concern. The index of crash frequency is higher than similar segments in the state. The index of crash cost is slightly higher than similar segments. Although higher than average crashes are occurring, they are mostly PDO which results in the lower ICC.

To improve safety along SR 45, crash modification factors (CMFs) were reviewed for possible segment improvements. CMFs were found on FHWA's Crash Modification Factor Clearinghouse website. The CMF targeted was an added travel lane. An added travel lane can reduce congestion which is generally considered a major factor in rear end crashes. The CMF can be found in ***Appendix C – Traffic Analysis***. The table below summarizes how the crash modification factor could reduce predicted crashes at the intersection.

TABLE 7 – CRASH REDUCTION SUMMARY TABLE

	CMF Value	PDO Crashes	NIC Crashes	% Crash Reduction
Existing Conditions	--	12	3	--
Installing Additional Travel Lane	0.74	9	3	20%

The addition of another travel lane could provide a reduction in crashes along the SR 45 segment from SR 46 to Pete Ellis Drive/Discovery Parkway.

5.0 ALTERNATIVES ANALYSIS

5.1 INTRODUCTION

Three alternatives were analyzed: two build alternatives and one No Build alternative. The summary of each alternative is shown in the section below. The conceptual exhibits can be found in ***Appendix A – Project Graphics.*** Any recommendations from the evaluation would still need to be evaluated for the environmental impacts through the NEPA process.

Appendix B

Design Criteria Memo

SR 45 (10th St) Added Travel Lane
MONROE COUNTY, IN

Indiana Department of Transportation

Design Criteria

Technical Memorandum

February, 2021

CMT
Engineers and Consultants

8790 Purdue Road
Indianapolis, IN 46268

Assumptions / Notes:

1. SR 45 (10th St) is assumed to be a minor arterial two-lane facility.
2. SR 45 posted speed limit is 40 mph through the project area (INDOT considering reducing speed to 35 MPH).
3. This corridor improvement will be a 3R Project, Non-freeway as stated in section 40-6.01(06) of the INDOT Design Manual.
4. Traffic numbers provided by a 24 hour traffic count by Quality Counts.

ROADWAY DESIGN CRITERIA
Urban Minor Arterial, 3R Project
SR 45 (10th St)

IDM = Indiana Design Manual

Functional Classification		Minor Arterial (Urban)	INDOT Classification Map
DESIGN CONTROL ELEMENTS			
2043 AADT (Design Year)		16,500	
Design Speed (MPH)		40 mph	IDM Figure 55-3F
Posted Speed (MPH)		40 mph	
Level of Service		Desirable: C, Minimum: D	IDM Figure 55-3F
ALIGNMENT ELEMENTS			
Min. Radius (ft)		535ft / The existing radius will be retained	IDM Figure 43-2B / IDM Section 55-4.03(01)
Min. Curve Length (ft)		The minimum length of curve on a low-speed urban street will be determined as required.	IDM Section 43-2.05
Stopping Sight Distance (ft)		305 ft	IDM Figure 42-1A
Decision Sight Distance (ft)	Stop Maneuver	690 ft	IDM Figure 42-2A
	Speed/Path/Direction Change	715 ft	
Intersection Sight Distance (ft)	P	440 ft	IDM Figure 46-10G
	SUT	560 ft	
Superelevation Rate		e_{max} = 4%	IDM Section 43-3.01(02)
Design Vehicle for Turning		WB-50	IDM Figure 46-1E
Max. Grade (±%)		9% (Level)	IDM Figure 55-3F
Min. Grade (±%)		Curbed 0.5%	
Vertical Curvature, K Value	**Crest**	Des: 61, Min: 44 / retain existing vertical curve	IDM Figure 44-3A / IDM Section 55-4.04(03)
	Sag	64 / retain existing vertical curve	IDM Figure 44-3C / IDM Section 55-4.04(03)
Min. Stopping Sight Distance	**Crest Curve (ft) (Min/ Desirable)**	305 ft / 360 ft	IDM Figure 44-3A
	Sag Curve (ft)	305 ft	IDM Figure 44-3C
Min. Curve Length	**Crest Curve (ft)**	3*(Design Speed) = 120 ft	IDM Section 44-3.01(01)
	Sag Curve (ft)	3.2*(Design Speed) = 128 ft	IDM Section 44-3.02(01)
VERTICAL CLEARENCE ELEMENTS			
Traffic Signal Clearance (ft)		17 ft	IDM Figure 44-4A
Overhead Signs (ft)		17.5 ft	
CROSS SECTION ELEMENTS			
Travel Lane Width (ft)		Des:12 ft Min: 11 ft	IDM Figure 55-3F
Curb Offset		Des: 2 ft Min: 1 ft	
Shoulder Width (ft)		Des: 8 ft Min: 4 ft	
Auxiliary Lane Width (ft)		Des: 12 ft, Min: 11 ft	
Cross Section Slopes (Travel Lane)		2-3%	
Cross Section Slopes (Shoulder)		4-6%	

Clear Zone Width (ft)[1]	For an urban arterial, collector, or local street with vertical curbs at either the edge of the travel lane or the edge of shoulder, the minimum clear-zone width is 10 ft from the edge of the travel lane or to the right-of-way line, whichever is less	IDM Section 49-2.03(03)
Obstruction-Free Zone	Where the design speed is 45 mph or lower, and curbs are at least 6 in. in height, the minimum obstruction-free-zone width from the face of the curb should be 1.5 ft. However, where traffic-signal supports are present, the minimum obstruction-free-zone width should be 2.5 ft.	IDM 55-5.02
Side Slopes Cut	Use of 3:1 should be considered Foreslope: 2:1 or flatter Ditch width: If R/W is available existing ditch line should be moved, and slopes flattened as much as practical. Backslope: 2:1 or flatter	IDM Figure 55-3F / IDM Section 55-4.05(09)
Side Slopes Fill	2:1 or flatter.	
Sidewalk Width	Des: 6 ft; Min: 4 ft	IDM Figure 55-3F

[1] See Chapter 49 of the IDM for clear zone adjustments due to curves, culverts and additional factors.

Appendix C

Traffic Analysis

- Road HAT Analysis
- Crash Modification Factors
- SR 45 Monroe Traffic Forecast Report
- IU Health Bloomington Regional Academic Campus Development Traffic Impact Study
- Synchro Results – Existing
- Synchro Results – 2043 No Build
- Synchro Results – 2043 Added Turn Lanes
- HCS Report

Index of Crash Frequency and Cost - Form F1

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Location	SR 45 ATL	
SR 45 between SR 46 and Pete Ellis Road		
GIS		
Post		
Analyst	GTB	
Date	2/3/2021	

INPUT	
Road Facility Type	Urban Two-Lane Segment
AADT (veh/day)	15165
Segment Length (mi)	.18
Intersection Density (int/mi)	
First Year with Crash Data (yyyy)	2017
Last Year with Crash Data (yyyy)	2019
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	0
Non-Incapacitating and Possible Injury Crashes	4
Property Damage Only Crashes	12
Route or Road Type	Urban Two-Lane Segment
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	380640
Non-Incapacitating and Possible Injury Crashes	31440
Property Damage Only Crashes	6510
Crash Cost Year (yyyy)	2013
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.019
Non-Incapacitating and Possible Injury Crashes	0.12
Property Damage Only Crashes	0.55
All Crashes	0.69
Index of Crash Frequency	**3.06**
Index of Crash Cost	**1.36**

Index of Crash Frequency and Cost - Form F1

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Location	SR 45 ATL	
SR 45 between SR 46 and Pete Ellis Road		
GIS		
Post		
Analyst	GTB	
Date	2/3/2021	

Comments:

CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF COMPARISON

Below you will find comparisons for the CMFs you chose.
Please note that the rows highlighted in **light blue** and bold/italic contain the differences in the selected CMFs.

Countermeasure Name	Install an additional lane	Install an additional lane	Install an additional lane
CMF ID	8334	8335	8336
CMF	0.76	0.75	0.74
Study Reference	DIXON ET AL., 2016	DIXON ET AL., 2016	DIXON ET AL., 2016
Unadjusted Standard Error CMF	***0.092***	***0.095***	***0.098***
CMFunction			
Star Rating	★★★☆☆	★★★☆☆	★★★☆☆
Crash Type	All	All	All
Crash Severity	Fatal,Serious injury,Minor injury	Fatal,Serious injury,Minor injury	Fatal,Serious injury,Minor injury
Crash Time of Day	All	All	All
Area Type	Urban	Urban	Urban
Road Division Type	Divided by Median	Divided by Median	Divided by Median
Road Type	Principal Arterial Other Freeways and Expressways	Principal Arterial Other Freeways and Expressways	Principal Arterial Other Freeways and Expressways
Number of Lanes	2-5	2-5	2-5
Intersection Type			
Intersection Geometry			
Traffic Control			
Speed Limit	>50	>50	>50
Study Type	Regression cross-section	Regression cross-section	Regression cross-section
Years From	2010	2010	2010
Years To	2013	2013	2013
Traffic Volume Unit	***Average Daily Traffic (ADT)***	***Average Daily Traffic (ADT)***	***Annual Average Daily Traffic (AADT)***
Min Traffic Volume	200	200	200
Max Traffic Volume	281450	281450	281450
Min Major Rd Volume			
Max Major Rd Volume			
Min Minor Rd Volume			
Max Minor Rd Volume			
Avg Traffic Volume	152163	152163	152163
Avg Major Rd Volume			
Avg Minor Rd Volume			
State of Origin	TX	TX	TX
Municipality	Dallas, Houston, San Antonio	Dallas, Houston, San Antonio	Dallas, Houston, San Antonio
Country	USA	USA	USA
Comments	***CMF applies to adding one additional lane with 11 ft average lane width***	***CMFs of adding one additional lane with 11.5 ft average lane width***	***CMFs of adding one additional lane with 12 ft average lane width***

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For more information, contact Karen Scurry at karen.scurry@dot.gov