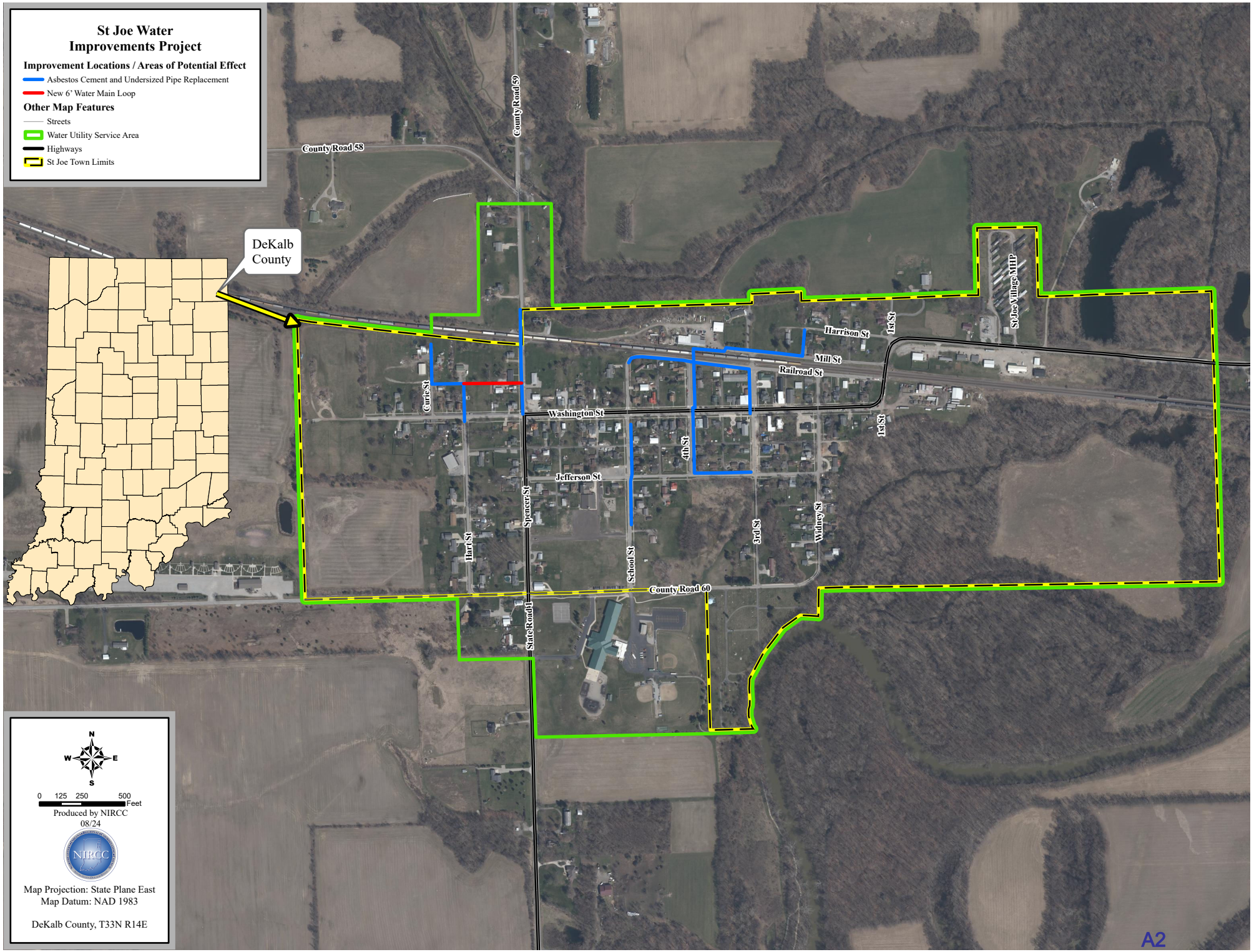
Environmental Assessment Record

Appendix A: Maps, Reports and Forms

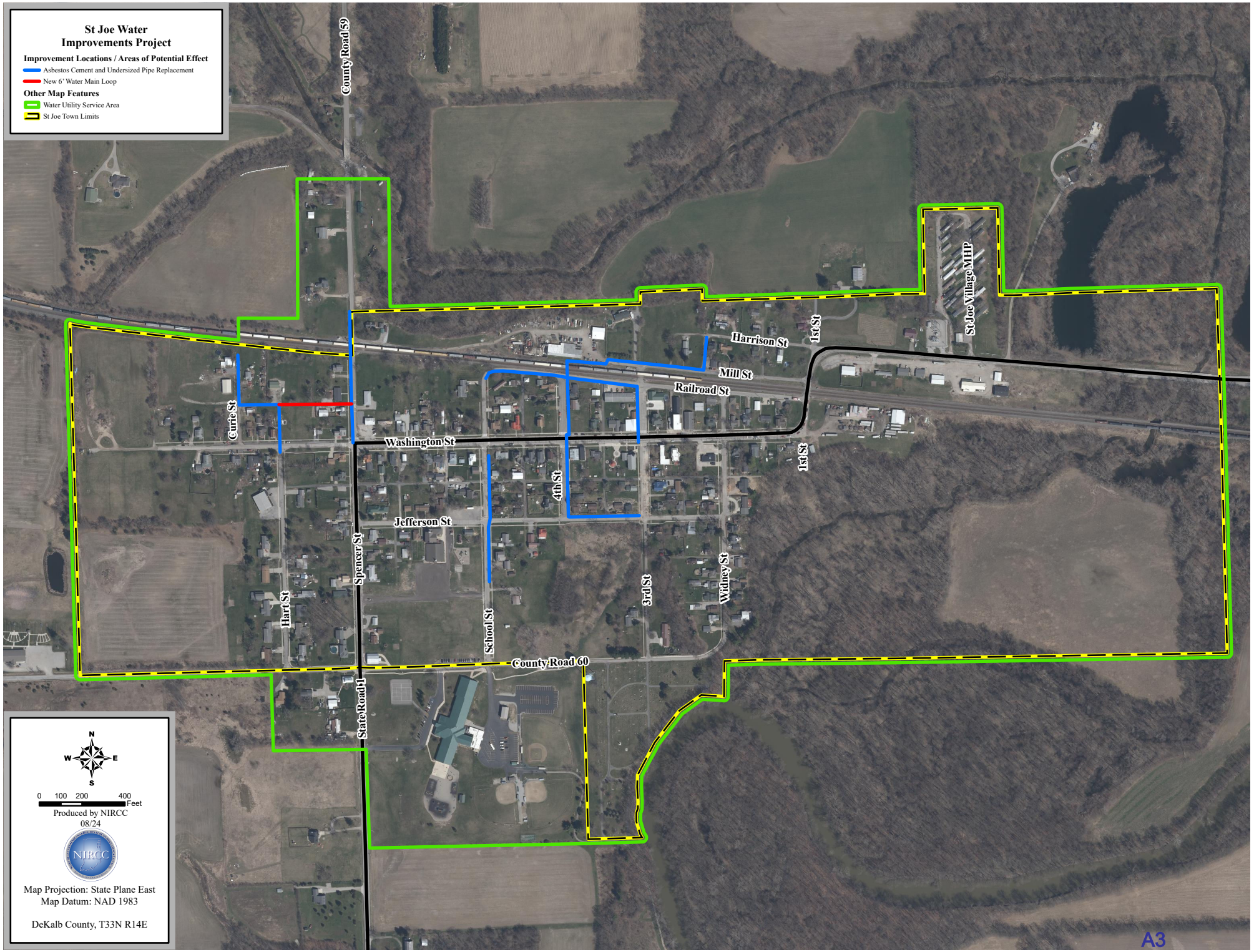
- **Project Location Maps**
  - **General Location – Pg A2**
  - **Project Area – Pg A3**
  - **Project Improvement Plans– Pg A4**

- **Relevant Environmental Maps/Reports/Forms**
  - **Floodplain / Wetlands – Pg A5**
  - **Floodplain Management Form #001 with attached FFRMS and FARA Reports -Pg A6-A12**
  - **USGS – Pg A13**
  - **Soils – Pg A14-A42**
  - **Wetlands Protection – Pg A43**
  - **Air Quality - Non-Attainment – Pg A44-A46**
  - **Wild & Scenic Rivers – Pg A47**
  - **Sole Source Aquifer – Pg A48**
  - **Coastal Zones – Pg A49**
  - **Coastal Barriers – Pg A50**
  - **Noise Abatement/Control – Pg A51**
  - **Site Contamination – Pg A52**
  - **Explosives & Flammables – Pg A53-A55**
  - **Geotechnical Report – Pg A56-A73**
  - **Airport Hazards – Pg A74-A78**
  - **Endangered Species – Pg A79-A85**

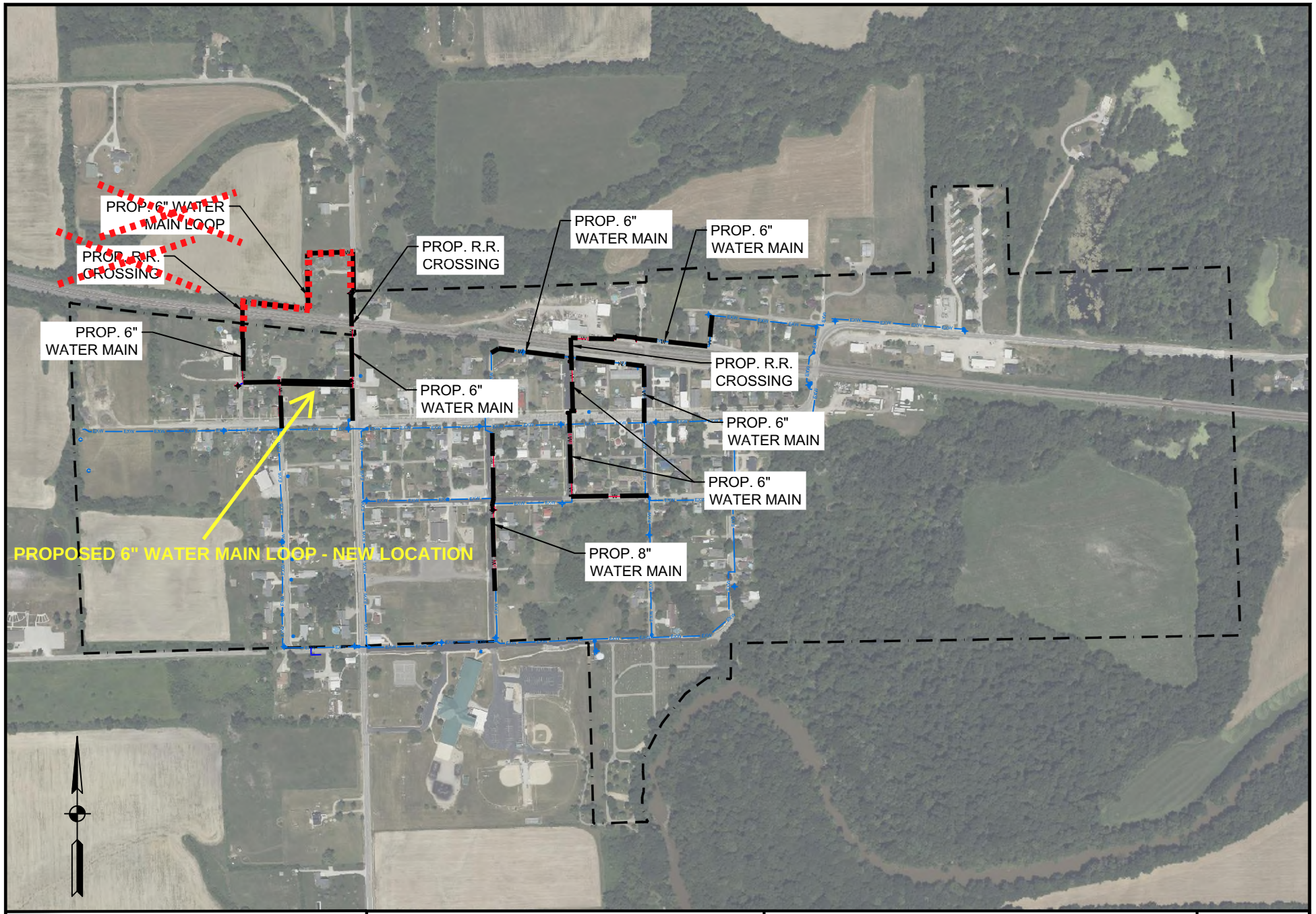
GENERAL LOCATION MAP



PROJECT AREA MAP



SITE IMPROVEMENT PLAN - revised 9/26/24 - black bold lines show areas of all proposed ground disturbance - black bold lines identified w/ red hash line and outside town limits have been removed from the project



SCALE: 1"=600'

600' 0 600'

COMMONWEALTH ENGINEERS, INC.™
A wealth of resources to master a common goal.

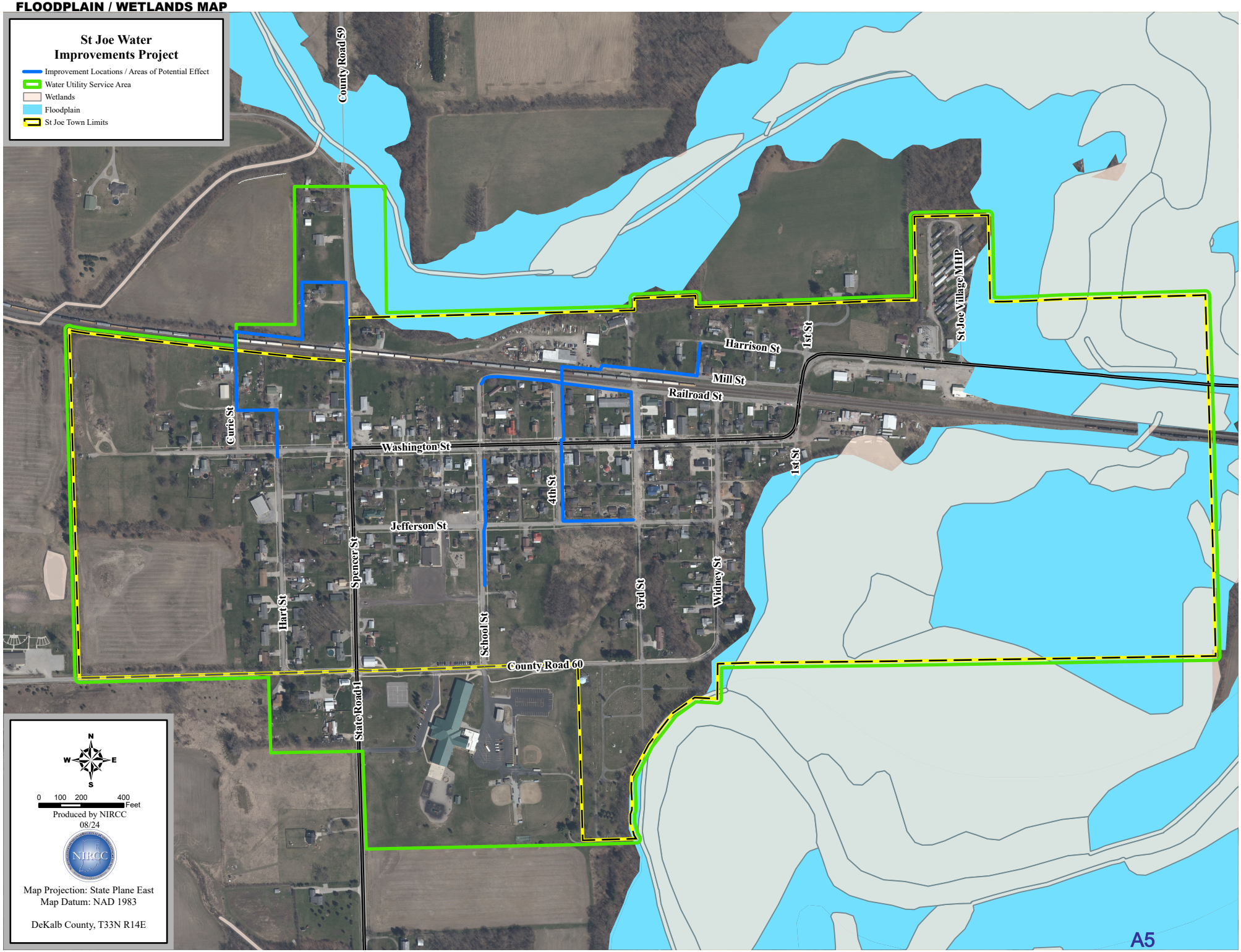
TOWN OF ST. JOE
DEKALB COUNTY, INDIANA

ASBESTOS CEMENT PIPE REPLACEMENT AND WATER MAIN LOOPING

FIGURE

4-2
A4

FLOODPLAIN / WETLANDS MAP



INDIANA OFFICE OF THE LIEUTENANT GOVERNOR
DIVISION OF GRANT SERVICES

Office of OCRA COMMUNITY & RURAL AFFAIRS

Form #:001

FLOODPLAIN MANAGEMENT
DETERMINATION OF 24 CFR PART 55 APPLICABILITY

SECTION 1: Project Information

1. Grantee/Applicant	2. State Project Identifier	3. Level of environmental Review
Town of St. Joe		☐ CEST
4. Grant Administrator	7. Chief Elected Official Name, Title	☒ EA
Matt Vondran	Randy Drake, Council President	
5. Grant Administrator Email	8. Chief Elected Official Email	☐ EIS
matt.vondran@co.allen.in.us	drake.of.stjoe.board@gmail.com	

9. Description of Proposed Activities. Attach additional paper as necessary. (Description must provide detailed summary of proposed activities, whether activities are rehab/repair/renovation/replacement of existing facilities and infrastructure or new construction, and proposed ground disturbance including expected depth of excavation/digging).

Water Utility Improvements Project:
1.Asbestos Cement Pipe and Undersized Pipe Replacement: includes replacement of the existing asbestos cement (AC) water mains with new 6" Main and the replacement of existing undersized non- AC 4" water mains with new 6" water mains at various locations throughout Town. The existing AC pipe would be abandoned in place due to the potential hazards associated with the removal of this material and replaced by new pipes (primarily 6" with 8" along School St.) immediately adjacent to the existing AC pipes within the existing r/w and area previously disturbed. The existing undersized 4" non-AC pipe would be removed and replaced by new 6" pipes in the same location within the existing r/w and area previously disturbed.

2. Water Main Looping: includes installation of new 6" water main along the ally south of the railroad tracks between Spencer St. and Curie St., within the existing r/w and area previously disturbed, to loop the system on the west side of Town. The water main looping will improve water quality and provide additional fire flow and pressure to the west side of Town north of the railroad tracks.

The trench where the water lines are to be installed are to be 40 to 42 inches deep, 3 feet wide, and 5 feet long per Indiana Code (Lines to be in easement areas next to existing AC lines: However, the water main looping will consist of approximately 400' to run along the alleyway from Hart St. to Spencer St. in a previously disturbed area) * See attached Map

SECTION 2: Review of Exemptions to 24 CFR Part 55

10. Does the project meet one of the criteria below to be exempt from 24 CFR Part 55?

☐ §55.12(a)	**HUD-assisted activities described in 24 CFR §58.34 and §58.35(b) (*Exempt & CENST activities*).**	**EXEMPTION IDENTIFIED.** **PROJECT IS EXEMPT FROM PART 55.** **SKIP TO SECTION 5.**
☐ §55.12(c)	**Financial assistance for restoring and preserving the functions of the floodplain or wetland, where a permanent covenant or restriction is placed on the property's continued use for flood control, wetland protection, open space, or park land, but only if: the property is cleared of all existing buildings and walled structures; and only those improvements necessary or direct flood control and wetland protection, open space or park land remain.**	
☐ §55.12(f)	**A minor amendment to a previously approved action with no additional adverse impact on or from a floodplain or wetland**	
☐ §55.12(g)	**A project where an incidental portion of of the site is within the FFRMS floodplain (not including the floodway, LiMWA, or coastal high hazard area), but only if: existing or proposed improvements that modify or occupy the floodplain will not exceed the threshold for de minimis improvements; and the proposed project will not result in new construction in/modification of a wetland.**	
☐ §55.12(i)	**Special projects directed to the removal of material and architectural barriers that restrict the mobility of and accessibility to elderly and persons with disabilities**	
☒ →→→→	**NO EXEMPTION EXISTS.**	**PROCEED TO SECTION 3.**

SECTION 3: Identification of FFRMS Floodplain, Wetland, & Other Special Flood Hazards

11. Is the proposed project site located in the FFRMS floodplain?	12. Type of Action	13. Description of method(s) used to determine floodplain and wetland status. If applicable, provide results and comparisons of elevations.
☐ FFRMS Floodplain using FFSST FVA ☐ 500-year Floodplain using IDNR INFIP ☐ 100-year Floodplain using IDNR INFIP ☐ Regulatory Floodway using IDNR INFIP ☐ Wetland (either in or directly adjacent to) ☒ NOT LOCATED IN A FLOODPLAIN OR WETLAND	Critical Action ◉ Non-Critical Action ○	The FFRMS Floodplain Report shows that No Data Exists for the project Area in St. Joe. The IDNR Floodplain Analysis was then reviewed for two areas in the utility project site, and it was determined that the base flood elevation (BFE) is NOT equal to or greater than the 100-year base flood elevation criteria for a FFRMS FVA Floodplain Note: some of the existing and proposed water lines are located along Spencer St. (SR1), and adjacent to the wetland area at Bear Creek; however, water lines will follow utility easements along existing roadways and allyways

SECTION 4: Permissible Uses in a Floodway/Floodplain Under 24 CFR §55.8

13. Does the project meet one of the criteria below to be eligible for funding pending completion of the 8-Step/5-Step Decision Making Process?

☐ §55.8(a)(1)(ii)	A permanent covenant or restriction will preserve the onsite FFRMS floodplain or wetland areas from future development and expansion of existing uses and may include rehab/reconstruction of properties affected by Presidentially declared disasters so long as the activity does not occur in the regulatory floodway.	**PERMISSIBLE USE IDENTIFIED.** **CONTINUE TO SECTION 5.**
☒ §55.8(a)(1)(ii)(A)	Activity is a functionally dependent use that must be necessarily located close/adjacent to water (e.g., damns, marinas, ports, waterfront parks, bridges) and utility lines.	
☐ §55.8(a)(1)(ii)(B)	Activity is limited to de minimis improvements including minimal ground disturbance or placement of impervious surface area for improved accessibility, so long as it does not increase or negatively impact the floodplain.	
☐ §55.8(a)(1)(ii)(C)	Activity is limited to removal/clearance of buildings and improvements in the floodway or floodplain.	
☐ →→→→	**NO PERMISSIBLE USE IDENTIFIED.**	**PROJECT MUST BE RELOCATED TO A NEW SITE OR CANCELLED.**

SECTION 5: Review of Exemptions from 24 CFR §55.20

14. Does the project meet the criteria below for a partial exemption of the Decision-Making Process at §55.20?

☐	§55.13(b)	Minor repairs or improvements on one- to four-family properties that do not meet the thresholds for "substantial improvement" under § 55.2(b)(12)
☑	§55.13(f)	Special projects for the purpose of improving the energy or water efficiency of utilities or installing renewable energy that involve the repair, rehabilitation, modernization, weatherization, or improvement of existing structures or infrastructure, do not meet the thresholds for "substantial improvement" under § 55.2(b)(12), and do not include the installation of equipment below the FFRMS floodplain elevation
☐	→→→→	**NO EXEMPTION EXISTS. PROCEED TO SECTION 6.**

[CONTINUED ON NEXT PAGE. SPACE INTENTIONALLY LEFT BLANK. CONTINUED ON NEXT PAGE.]

SECTION 6: Applicability of the Modified 5-Step Decision-Making Process

15. Does the project meet one of the criteria below to undergo the modified 5-Step Process (i.e., Steps 2, 3, and 7 are eliminated)?

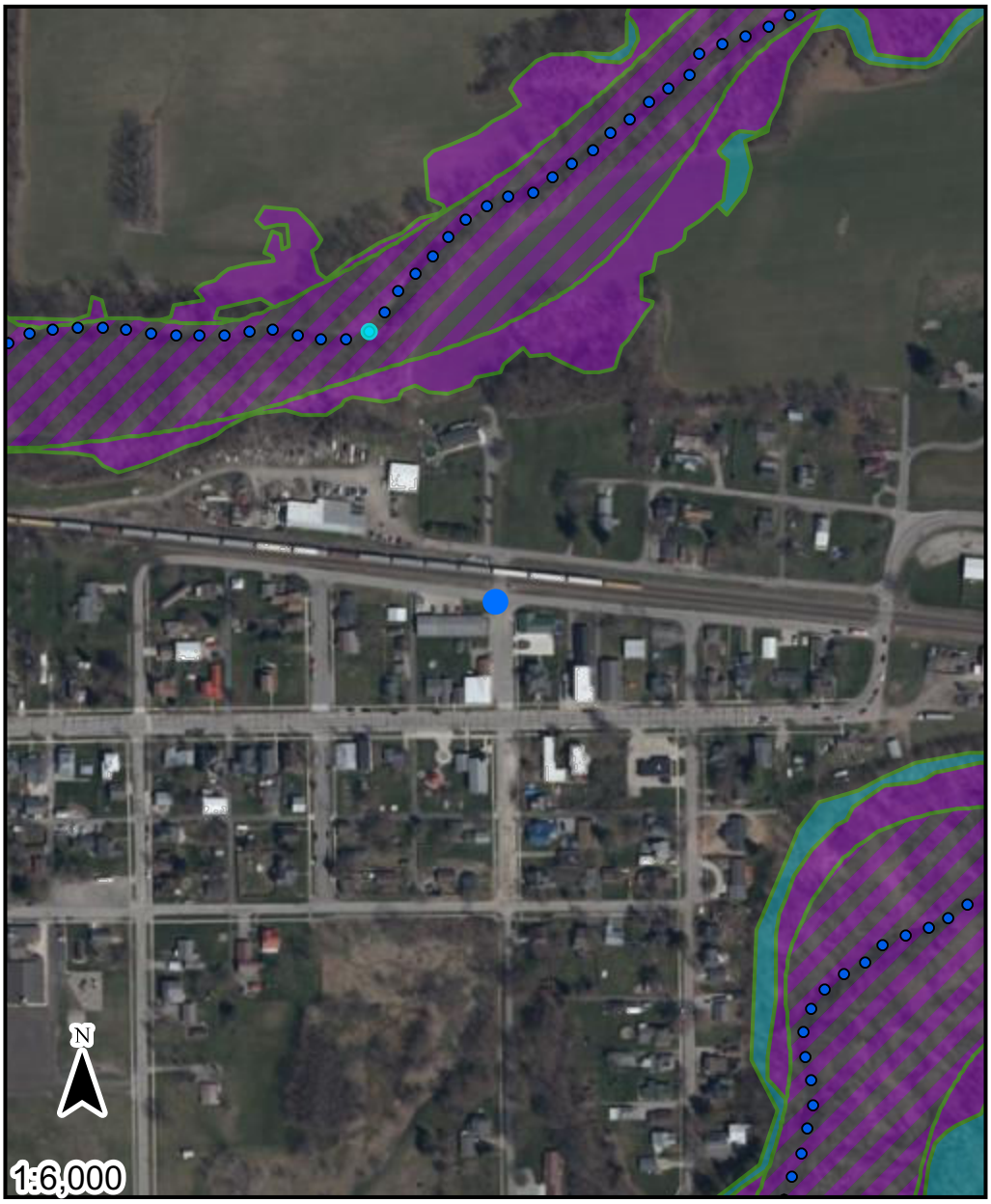
☐	§55.14(c)	The repair, rehabilitation, modernization, weatherization, or improvement of existing multifamily housing projects, hospitals, nursing homes, assisted living facilities, board and care facilities, intermediate care facilities, and one- to four-family properties, in communities that are in the Regular Program of the NFIP and are in good standing (i.e., not suspended from program eligibility or placed on probation under 44 CFR 59.24), provided that the number of units is not increased more than 20 percent, the action does not involve a conversion from nonresidential to residential land use, the action does not meet the thresholds for "substantial improvement" under § 55.2(b)(12), and the footprint of the structure and paved areas is not increased by more than 20 percent.	**EXCEPTION TO 8-STEP PROCESS IDENTIFIED.** **CONTINUE TO SECTION 7.**
☐	§55.14(d)	The repair, rehabilitation, modernization, weatherization, or improvement of existing nonresidential buildings and structures, in communities that are in the Regular Program of the NFIP and are in good standing (i.e., not suspended from program eligibility or placed on probation under 44 CFR 59.24), provided that the action does not meet the thresholds for "substantial improvement" under § 55.2(b)(12) and the footprint of the structure and paved areas is not increased by more than 20 percent.	**Complete the 5 step decision making process using FORM Floodplain-003: The 5 Step Decision Making Process.**
☐	§55.14(e)	The repair, rehabilitation, or replacement of existing nonstructural improvements including streets, curbs, and gutters, where any increase of the total impervious surface area of the facility is de minimis. This provision does not include critical actions, levee systems, chemical storage facilities (including any tanks), wastewater facilities, or sewer lagoons.	
☐	→→→→	**NO EXEMPTION OR CONDITION FOR THE MODIFIED 5-STEP PROCESS EXISTS.**	**CONTINUE TO SECTION 7.** **Complete the 8 step decision making process using FORM Floodplain-002: The 8 Step Decision Making Process.**

SECTION 7: DETERMINATION & CERTIFICATION

■ Based on the proposed scope of work and location of the project, 24 CFR Part 55 does not apply to the project. No further review is necessary for floodplain/wetland management.	☐ Based on the proposed scope of work, regardless of location, the project meets an exemption criterion under §55.12. No further review is necessary for floodplain/wetland management.
☐ Based on the proposed scope of work and location, the project is in the FFRMS floodplain but meets an exception criterion under §55.13. No further review is necessary for floodplain/wetland management.	☐ Based on the proposed scope of work and location of the project, 24 CFR Part 55 applies to the project. The project will undergo the decision making process, the level of which was determined in Section 6.
16. Grant Administrator/Preparer Signature Matt Vondran	19. Chief Elected Official Signature
17. Grant Administrator/Preparer Printed Name Matt Vondran	20. Chief Elected Official Printed Name, Title Randy Drake
18. Date April 1, 2025	21. Date April 1, 2025

DNR Indiana Department of Natural Resources

Floodplain Analysis & Regulatory Assessment (FARA)



Point of Interest
Base Flood Elevation Point
POI
1.0
DNR Approximate Floodway
FEMA Zone AE
DNR Approximate Fringe
Not Mapped

Long: **-84.90150503948932**

Lat: **41.31600481059985**

The information provided below is based on the point of interest shown in the map above.

County: **Dekalb**

Stream Name:
Bear Creek

Approximate Ground Elevation: **818.8 feet (NAVD88)**

Base Flood Elevation: **799.9 Feet (NAVD88)**

Drainage Area: **Not Available**

Best Available Flood Hazard Zone: **Not Mapped**

National Flood Hazard Zone: **Not Mapped**

Is a Flood Control Act permit from the DNR needed for this location? **See following pages**

Is a local floodplain permit needed for this location? **Contact your local Floodplain Administrator-**

Floodplain Administrator: **Randy Drake, Town Board**

Community Jurisdiction: **Town Of St. Joe, City proper**

Phone: **(260) 337-5449**

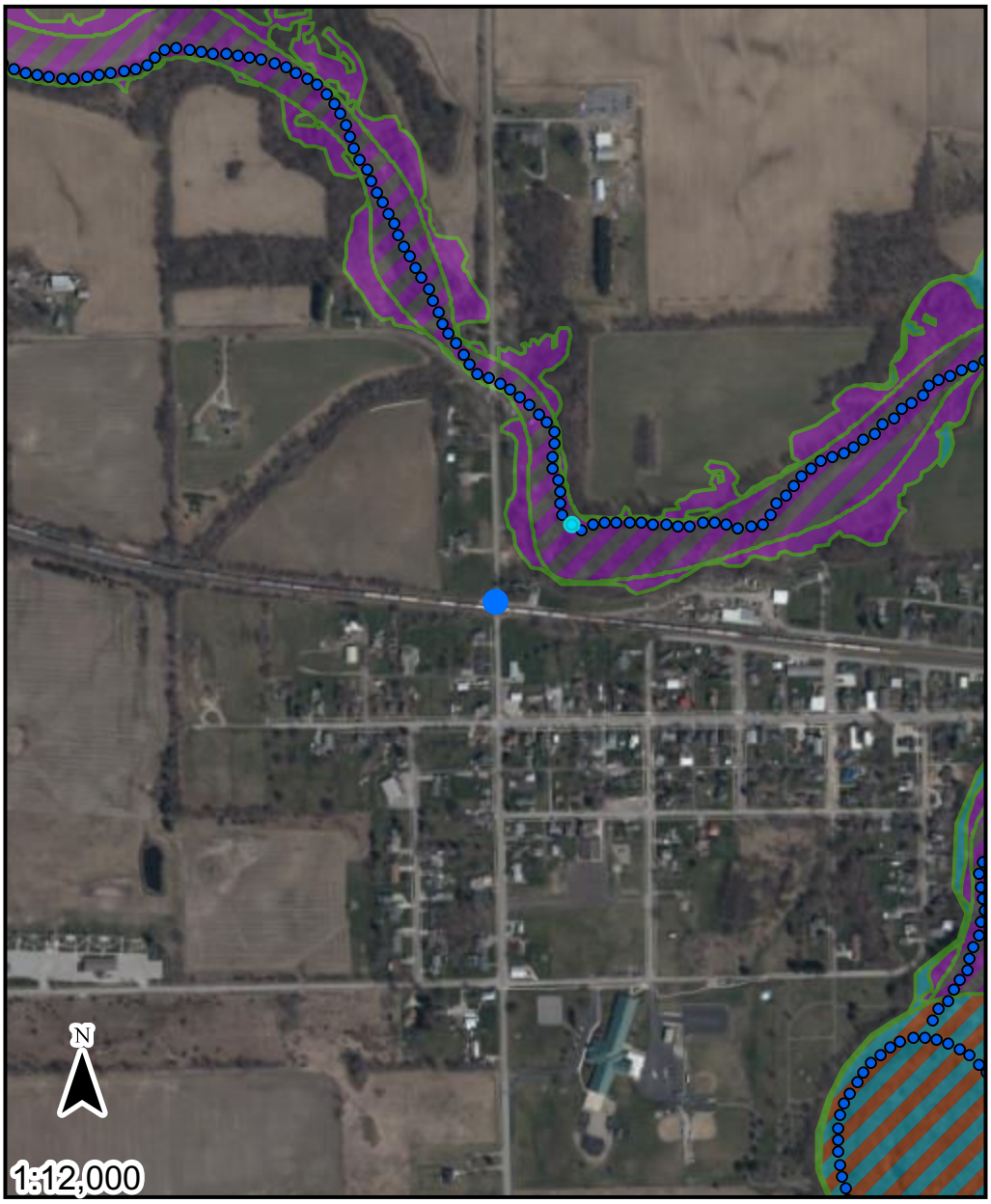
Email: **drake.of.stjoe.board@gmail.com**

US Army Corps of Engineers District: **Detroit**

Date Generated: 11/14/2024

DNR Indiana Department of Natural Resources

Floodplain Analysis & Regulatory Assessment (FARA)



- Point of Interest
- Base Flood Elevation Point
- POI
- 1.0
- FEMA Zone AE Floodway; FEMA Administrative Floodway
- DNR Approximate Floodway
- FEMA Zone AE
- DNR Approximate Fringe
- Not Mapped

Long: **-84.90638508468388**

Lat: **41.316640149442556**

The information provided below is based on the point of interest shown in the map above.

County: **Dekalb**

Stream Name: **Bear Creek**

Approximate Ground Elevation: **825.5 feet (NAVD88)**

Base Flood Elevation: **801.4 Feet (NAVD88)**

Drainage Area: **Not Available**

Best Available Flood Hazard Zone: **Not Mapped**

National Flood Hazard Zone: **Not Mapped**

Is a Flood Control Act permit from the DNR needed for this location? **See following pages**

Is a local floodplain permit needed for this location? **Contact your local Floodplain Administrator-**

Floodplain Administrator: **Randy Drake, Town Board**

Community Jurisdiction: **Town Of St. Joe, City proper**

Phone: **(260) 337-5449**

Email: **drake.of.stjoe.board@gmail.com**

US Army Corps of Engineers District: **Detroit**

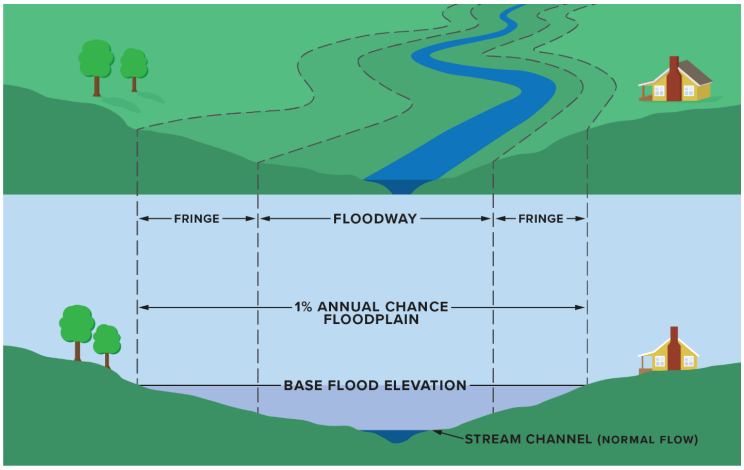
Date Generated: 10/29/2024

About the Floodplain Analysis and Regulatory Assessment (FARA):

All streams have a floodplain, whether mapped or not. This FARA, and the information provided herein, is designed for sites along streams with a mapped floodplain that delineates the floodway portion of the floodplain; see the image below for a visual guide to the floodplain, floodway, and flood fringe. The information in this document was determined using an automated mapping tool. The DNR has high confidence in the tool, but there are scenarios where the floodplain information provided requires additional review from the DNR.

All streams in DNR jurisdiction (streams that have a drainage area one square mile or greater) are shown by a blue line on the map on page 1. However, a floodplain/floodway may or may not be mapped for every stream. In any of the following scenarios, or if you have more detailed floodplain information, use the link at the bottom of this page to request a staff review of the site. Please note that staff review may take several weeks to complete.

Scenarios that require additional DNR review:
• The base flood elevation on page 1 is not available
• The tool selects the nearest flood elevation point for a stream outside the floodplain associated with the point of interest
• There is not a delineated floodway for the stream nearest your point of interest
• The point of interest is along a stream without a mapped floodplain
• The point of interest is in a mapped floodplain of another stream, but the stream nearest the point of interest does not have a mapped floodplain with a floodway of its own



If DNR review is required, do not use this FARA for your site's determination.
If you have questions about DNR permitting requirements, you can contact DNR, Division of Water toll-free at 1-877-928-3755 and select option 1 to speak to a Technical Services staff member. You can also write to the division at water_inquiry@dnr.IN.gov or use the Indiana Waterways Inquiry Request tool at waterways.IN.gov to submit a permitting determination request to both DNR and the Indiana Department of Environmental Management at once.

We recommend keeping a copy of this FARA for your records as the DNR will not have a copy on file.
For additional information on floodplain regulations please copy the following line into a web browser:
https://countydataharvest.in.gov/DNR/INFIP_Report_Backpgs.pdf

PATH TO COPY INTO WEB BROWSER TO COMPLETE SURVEY:

https://survey123.arcgis.com/share/3293526dfdca453e95c19b08fb7bdcfb??FIELD%3ALAT1=41.316640149442556&FIELD%3ALON1=-84.90638508468388&FIELD%3ADNR_PERMIT=See+following+p&FIELD%3ASTREAM=BEAR+CREEK&FIELD%3AINIT_DATE=10%2F29%2F2024&FIELD%3ABFE=801.35830607

If the link above does not work, copy and paste the text above into a web browser to open the survey you will fill out and submit. If this does not work then send a copy of this FARA to infipinquiry@dnr.IN.gov and describe the reason you are requesting a staff review. Include your name and contact information so that staff can follow-up with you.

From: LG Grant Services ER
To: Matt Vondran; LG Grant Services ER
Cc: Kristine A. Christlieb; Guerrero, Pamela (Pame); Hudgens, Christmas
Subject: RE: Federal Flood Risk Management Standards Policy Draft and Other CDBG Updates
Date: Friday, November 22, 2024 10:21:03 AM
Attachments: image008.png
image010.png
image011.png
image012.png
image013.png
image014.png
image015.png
image016.png
image001.png

Matt,

I have reviewed the project areas. I can confirm that Nonexistent or Inadequate Federal Flood Standard Support Tool Data occurs for both projects. Looking at the DNR floodplain data, the projects should have satisfied floodplain management compliance. Unless there are project activities occurring in the floodplain, then I am satisfied with the floodplain boundary being a firm boundary.

You are correct that the museum project would be non-critical, and the water project is critical.

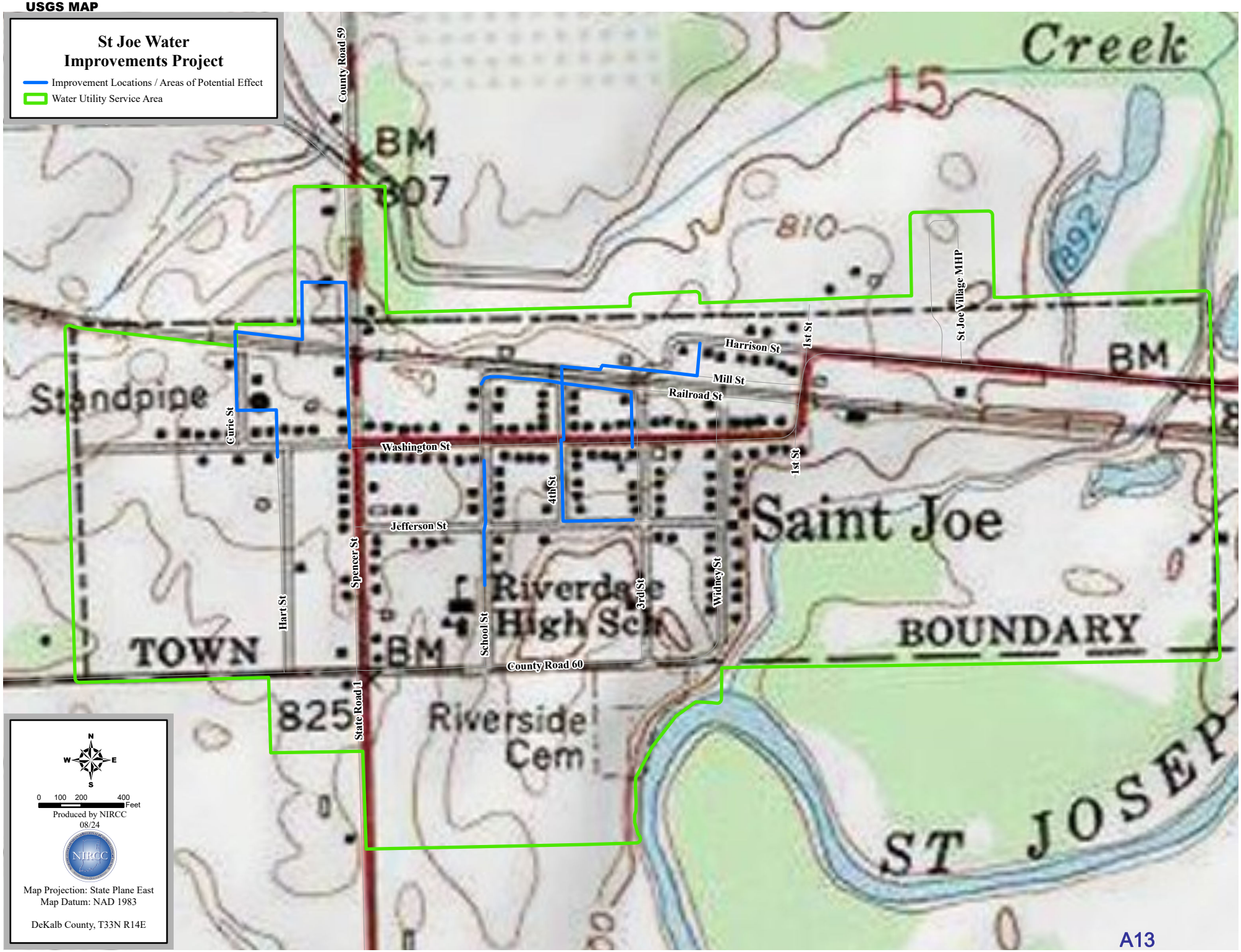
Form 1 should be submitted at the proposal stage. Otherwise, there would not be a GMS location to keep and retrieve the record. You are correct that we will require the map of the project area and any associated floodplain data.

Thank you,
Bryce

Bryce Gorman
Grants Manager, Environmental Review Specialist
Lt. Governor's Central Business Office
Phone: 463-245-7690
Email: BGorman@lg.in.gov
IN INDIANA™

From: Matt Vondran <Matt.Vondran@co.allen.in.us>
Sent: Thursday, November 21, 2024 2:11 PM
To: LG Grant Services ER <GrantServicesER@lg.IN.gov>
Cc: Kristine A. Christlieb <Kristine.Christlieb@co.allen.in.us>; Guerrero, Pamela (Pame)

USGS MAP


St Joe Water
Improvements Project
Improvement Locations / Areas of Potential Effect
Water Utility Service Area
County Road 59
Creek
15
BM
807
810
892
St Joe Village MHP
Harrison St
1st St
BM
Mill St
Railroad St
Standpipe
Curie St
Washington St
1st St
4th St
Saint Joe
Jefferson St
Spencer St
Hart St
Riverdale
High Sch
3rd St
Widney St
School St
BOUNDARY
TOWN
BM
County Road 60
825
State Road 1
Riverside
Cem
ST JOSEP
N
W
E
S
0 100 200 400
Feet
Produced by NIRCC
08/24
NIRCC
Map Projection: State Plane East
Map Datum: NAD 1983
DeKalb County, T33N R14E
A13

SOILS MAP

Soil Map - DeKalb County, Indiana

Town of St. Joe, Indiana - Water Utility Service Area and Proposed Improvements

-Yellow Hash Boundary is Town Limits - Green Boundary is Water Utility Service Area-

-Blue Lines are Improvement Locations / Areas of Potential Effects (APE)-

Map Scale: 1:10,300 if printed on A landscape (11" x 8.5") sheet.

N

Meters 0 150 300 600 900

Feet 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

9

A14

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for De Kalb County, Indiana

Town of St. Joe, Indiana

August 19, 2024

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: De Kalb County, Indiana
Survey Area Data: Version 28, Sep 1, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 18, 2022—Jun 21, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BaA	Blount loam, interlobate moraines, 0 to 2 percent slopes	13.8	2.7%
BaB2	Blount loam, interlobate moraines, 1 to 4 percent slopes, eroded	28.3	5.6%
BoB	Boyer sandy loam, 1 to 6 percent slopes	2.9	0.6%
Em	Eel loam, frequently flooded	53.5	10.7%
GnB2	Glynwood loam, 2 to 6 percent slopes, eroded	110.7	22.1%
HaA	Haskins loam, 0 to 3 percent slopes	0.2	0.0%
Hw	Houghton muck, drained	3.0	0.6%
Ld	Landes fine sandy loam, frequently flooded	88.6	17.7%
MoC2	Morley silt loam, 6 to 12 percent slopes, eroded	7.4	1.5%
OdB	Ormas loamy sand, 0 to 6 percent slopes	5.1	1.0%
OhB	Oshtemo sandy loam, 0 to 6 percent slopes	72.9	14.5%
Pe	Pewamo silty clay	34.9	7.0%
RaB	Rawson sandy loam, 2 to 6 percent slopes	36.7	7.3%
Re	Rensselaer loam, 0 to 1 percent slopes	1.9	0.4%
Se	Sebewa loam, disintegration moraine, 0 to 1 percent slopes	27.1	5.4%
W	Water	14.5	2.9%
Totals for Area of Interest		**501.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the

landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present

or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

De Kalb County, Indiana

BaA—Blount loam, interlobate moraines, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2yddh
Elevation: 700 to 1,050 feet
Mean annual precipitation: 34 to 42 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Blount and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Blount

Setting

Landform: End moraines, ground moraines
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave, linear
Across-slope shape: Linear
Parent material: Wisconsin till derived from limestone and shale

Typical profile

Ap - 0 to 9 inches: loam
Bt - 9 to 30 inches: clay
BC - 30 to 37 inches: clay loam
Cd - 37 to 79 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 28 to 48 inches to densic material
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 6 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: D
Ecological site: F111XB502IN - Wet Till Ridge
Hydric soil rating: No

Minor Components

Haskins

Percent of map unit: 9 percent
Landform: Ground moraines
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F111XB502IN - Wet Till Ridge
Hydric soil rating: No

Glynwood

Percent of map unit: 6 percent
Landform: End moraines, ground moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: F111XE503IN - Till Ridge
Hydric soil rating: No

Pewamo

Percent of map unit: 5 percent
Landform: Depressions on ground moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F111XB501IN - Till Depression
Hydric soil rating: Yes

BaB2—Blount loam, interlobate moraines, 1 to 4 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2yddj
Elevation: 700 to 1,050 feet
Mean annual precipitation: 34 to 42 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Blount, eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Blount, Eroded

Setting

Landform: End moraines, ground moraines
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wisconsin till derived from limestone and shale

Typical profile

Ap - 0 to 8 inches: loam
Bt - 8 to 28 inches: clay
BC - 28 to 35 inches: clay loam
Cd - 35 to 79 inches: clay loam

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 26 to 45 inches to densic material
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 6 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: F111XB502IN - Wet Till Ridge
Hydric soil rating: No

Minor Components

Haskins

Percent of map unit: 9 percent
Landform: End moraines
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F111XB502IN - Wet Till Ridge
Hydric soil rating: No

Glynwood, eroded

Percent of map unit: 8 percent
Landform: End moraines, ground moraines
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex

Ecological site: F111XE503IN - Till Ridge
Hydric soil rating: No

Pewamo

Percent of map unit: 3 percent
Landform: Depressions on end moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F111XB501IN - Till Depression
Hydric soil rating: Yes

BoB—Boyer sandy loam, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2t6l9
Elevation: 700 to 1,250 feet
Mean annual precipitation: 32 to 40 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 120 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Boyer and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Boyer

Setting

Landform: Moraines, stream terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear, convex
Parent material: Loamy outwash and/or sandy outwash over sandy and gravelly outwash

Typical profile

Ap - 0 to 9 inches: sandy loam
E - 9 to 17 inches: sandy loam
Bt - 17 to 30 inches: sandy loam
2C - 30 to 79 inches: stratified coarse sand to gravelly sand to very gravelly sand

Properties and qualities

Slope: 1 to 6 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F111XB404IN - Dry Outwash Upland
Hydric soil rating: No

Minor Components

Oshtemo

Percent of map unit: 9 percent
Landform: Moraines, stream terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear, convex
Ecological site: F111XB404IN - Dry Outwash Upland
Hydric soil rating: No

Bronson

Percent of map unit: 6 percent
Landform: Stream terraces, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F111XB404IN - Dry Outwash Upland
Hydric soil rating: No

Em—Eel loam, frequently flooded

Map Unit Setting

National map unit symbol: 5ctq
Elevation: 640 to 1,150 feet
Mean annual precipitation: 34 to 39 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 165 to 175 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Eel and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eel

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium

Typical profile

Ap - 0 to 9 inches: loam
C1 - 9 to 16 inches: loam
C2 - 16 to 27 inches: loam
C3 - 27 to 39 inches: loam
C4,C5 - 39 to 60 inches: stratified sandy loam to silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Ecological site: F111XB204IN - Dry Alluvium Forest
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Minor Components

Poorly drained aquolls

Percent of map unit: 10 percent
Landform: Depressions
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

GnB2—Glynwood loam, 2 to 6 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2v4br
Elevation: 700 to 1,060 feet
Mean annual precipitation: 34 to 38 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Glynwood and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Glynwood

Setting

Landform: Ground moraines on till plains, end moraines on till plains
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Wisconsin till derived from limestone and shale

Typical profile

Ap - 0 to 7 inches: loam
Bt - 7 to 26 inches: clay
BC - 26 to 30 inches: clay loam
Cd - 30 to 79 inches: clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 25 to 37 inches to densic material
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: F111XE503IN - Till Ridge

Hydric soil rating: No

Minor Components

Rawson

Percent of map unit: 6 percent
Landform: End moraines on till plains, ground moraines on till plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Ecological site: F111XE503IN - Till Ridge
Hydric soil rating: No

Blount

Percent of map unit: 5 percent
Landform: Ground moraines on till plains, end moraines on till plains
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F111XB502IN - Wet Till Ridge
Hydric soil rating: No

Pewamo

Percent of map unit: 4 percent
Landform: End moraines on till plains, ground moraines on till plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F111XB501IN - Till Depression
Hydric soil rating: Yes

HaA—Haskins loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2z6cr
Elevation: 660 to 1,130 feet
Mean annual precipitation: 31 to 39 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Haskins and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Haskins

Setting

Landform: Lake plains, ground moraines
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wisconsin till derived from limestone and shale

Typical profile

Ap - 0 to 10 inches: loam
Bt - 10 to 36 inches: clay loam
BC - 36 to 52 inches: clay loam
Cd - 52 to 79 inches: clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 30 to 60 inches to densic material
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F111XB502IN - Wet Till Ridge
Hydric soil rating: No

Minor Components

Pewamo, frequently ponded

Percent of map unit: 8 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Ecological site: F111XB501IN - Till Depression
Hydric soil rating: Yes

Blount

Percent of map unit: 6 percent
Landform: End moraines, ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Concave, convex
Across-slope shape: Linear
Ecological site: F111XB502IN - Wet Till Ridge
Hydric soil rating: No

Rawson

Percent of map unit: 4 percent
Landform: Ground moraines, end moraines
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F111XE503IN - Till Ridge
Hydric soil rating: No

Hw—Houghton muck, drained

Map Unit Setting

National map unit symbol: 5ctv
Elevation: 600 to 1,400 feet
Mean annual precipitation: 34 to 40 inches
Mean annual air temperature: 47 to 51 degrees F
Frost-free period: 170 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Houghton, drained, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Houghton, Drained

Setting

Landform: Depressions on moraines, depressions on lake plains, depressions on till plains, depressions on outwash plains
Landform position (two-dimensional): Footslope, toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material

Typical profile

Op - 0 to 9 inches: muck
Oa - 9 to 80 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 23.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: R111XC013IN - Deep Muck
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

Minor Components

Adrian, drained

Percent of map unit: 7 percent
Landform: Depressions on lake plains, depressions on outwash plains, depressions on till plains
Landform position (two-dimensional): Footslope, toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

Edwards, drained

Percent of map unit: 7 percent
Landform: Depressions on till plains, depressions on outwash plains, depressions on lake plains
Landform position (two-dimensional): Footslope, toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

Muskego, drained

Percent of map unit: 6 percent
Landform: Depressions on till plains, depressions on outwash plains, depressions on lake plains
Landform position (two-dimensional): Footslope, toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

Palms, drained

Percent of map unit: 5 percent
Landform: Depressions on till plains, depressions on outwash plains
Landform position (two-dimensional): Footslope, toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

Ld—Landes fine sandy loam, frequently flooded

Map Unit Setting

National map unit symbol: 5ctw
Elevation: 640 to 1,150 feet
Mean annual precipitation: 34 to 39 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 165 to 175 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Landes and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Landes

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium

Typical profile

Ap - 0 to 12 inches: fine sandy loam
Bw1 - 12 to 26 inches: fine sandy loam
Bw2 - 26 to 36 inches: fine sandy loam
C1,C2 - 36 to 60 inches: stratified silt loam to loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Available water supply, 0 to 60 inches: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A
Ecological site: F111XB202IN - Dry Alluvium Floodplain
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)

Hydric soil rating: No

Minor Components

Poorly drained aquolls

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

MoC2—Morley silt loam, 6 to 12 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2wvhb
Elevation: 660 to 1,120 feet
Mean annual precipitation: 37 to 40 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Morley and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Morley

Setting

Landform: Moraines
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Silty loess over wisconsin till derived from limestone and shale

Typical profile

Ap - 0 to 8 inches: silt loam
Bt1 - 8 to 17 inches: silty clay
Bt2 - 17 to 28 inches: clay
BC - 28 to 33 inches: clay loam
Cd - 33 to 79 inches: clay loam

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 24 to 38 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F111XE503IN - Till Ridge
Hydric soil rating: No

Minor Components

Glynwood

Percent of map unit: 7 percent
Landform: Moraines
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F111XE503IN - Till Ridge
Hydric soil rating: No

Blount

Percent of map unit: 5 percent
Landform: Moraines
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F111XB502IN - Wet Till Ridge
Hydric soil rating: No

Pewamo

Percent of map unit: 3 percent
Landform: Moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F111XB501IN - Till Depression
Hydric soil rating: Yes

OdB—Ormas loamy sand, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 5cv4
Elevation: 640 to 1,150 feet
Mean annual precipitation: 34 to 39 inches
Mean annual air temperature: 47 to 52 degrees F

Frost-free period: 165 to 175 days
Farmland classification: Not prime farmland

Map Unit Composition

Ormas and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ormas

Setting

Landform: Outwash terraces
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy over loamy outwash over sandy and gravelly outwash

Typical profile

Ap - 0 to 10 inches: loamy sand
E,A&B - 10 to 38 inches: loamy sand
Bt1 - 38 to 48 inches: sandy loam
Bt2 - 48 to 53 inches: sandy loam
Bt3 - 53 to 55 inches: gravelly sandy clay loam
2C - 55 to 60 inches: gravelly coarse sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 45 to 75 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F111XB404IN - Dry Outwash Upland
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

OhB—Oshtemo sandy loam, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 5cv5
Elevation: 640 to 1,150 feet

Mean annual precipitation: 34 to 40 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 165 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Oshtemo and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oshtemo

Setting

Landform: Outwash plains, outwash terraces
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy outwash over sandy and gravelly outwash

Typical profile

Ap - 0 to 12 inches: sandy loam
Bt1 - 12 to 25 inches: gravelly sandy loam
Bt2,BC - 25 to 47 inches: gravelly sandy loam
2C - 47 to 60 inches: stratified sand to gravelly coarse sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 40 to 75 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: F111XB404IN - Dry Outwash Upland
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Pe—Pewamo silty clay

Map Unit Setting

National map unit symbol: 5cv6
Elevation: 640 to 1,150 feet

Mean annual precipitation: 34 to 39 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 165 to 175 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Pewamo and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pewamo

Setting

Landform: Depressions on till plains, depressions on moraines
Landform position (two-dimensional): Footslope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Clayey till

Typical profile

Ap - 0 to 10 inches: silty clay
Btg1,Btg2 - 10 to 34 inches: silty clay
Cg1,Cg2 - 34 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 6 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F111XB501IN - Till Depression
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

RaB—Rawson sandy loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 5cv7
Elevation: 640 to 1,150 feet
Mean annual precipitation: 34 to 39 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 165 to 175 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Rawson and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rawson

Setting

Landform: Till plains, terraces
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy outwash over clayey till

Typical profile

Ap - 0 to 10 inches: sandy loam
Bt1 - 10 to 13 inches: sandy loam
Bt2-Bt4 - 13 to 39 inches: gravelly sandy clay loam
2C1 - 39 to 43 inches: silty clay loam
2C2 - 43 to 60 inches: silty clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 24 to 48 inches to densic material
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F111XE503IN - Till Ridge
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Minor Components

Pewamo

Percent of map unit: 3 percent
Landform: Depressions
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

Blount

Percent of map unit: 3 percent
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Rensselaer

Percent of map unit: 2 percent
Landform: Depressions
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

Haskins

Percent of map unit: 2 percent
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Re—Rensselaer loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2wp2b
Elevation: 600 to 1,010 feet
Mean annual precipitation: 34 to 40 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 185 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Rensselaer and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rensselaer

Setting

Landform: Depressions
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Loamy outwash

Typical profile

Ap - 0 to 15 inches: loam
Btg1 - 15 to 38 inches: clay loam
Btg2 - 38 to 42 inches: loam
Cg1 - 42 to 76 inches: stratified fine sand to silt loam
Cg2 - 76 to 79 inches: loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches

Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: R111XC008IN - Wet Overflow, R111XB401IN - Wet Outwash Mollisol
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

Minor Components

Whitaker

Percent of map unit: 7 percent
Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F111XB403IN - Outwash Upland
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Crosier

Percent of map unit: 5 percent
Landform: Moraines
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F111XB502IN - Wet Till Ridge
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Houghton, undrained

Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R111XB003IN - Deep Muck
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

Se—Sebewa loam, disintegration moraine, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2v4bv

Elevation: 700 to 1,250 feet
Mean annual precipitation: 32 to 40 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 120 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Sebewa, drained, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sebewa, Drained

Setting

Landform: Drainageways on stream terraces, drainageways on outwash fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Loamy drift over sandy and gravelly outwash

Typical profile

Ap - 0 to 11 inches: loam
Btg1 - 11 to 21 inches: clay loam
Btg2 - 21 to 33 inches: clay loam
2Cg - 33 to 79 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 23 to 39 inches to strongly contrasting textural stratification
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 45 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: R111XB401IN - Wet Outwash Mollisol
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

Minor Components

Rensselaer

Percent of map unit: 10 percent
Landform: Drainageways on stream terraces, drainageways on outwash fans
Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread
Down-slope shape: Linear, convex
Across-slope shape: Concave, linear
Ecological site: R111XB401IN - Wet Outwash Mollisol
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: Yes

Homer

Percent of map unit: 5 percent
Landform: Outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F111XB403IN - Outwash Upland
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

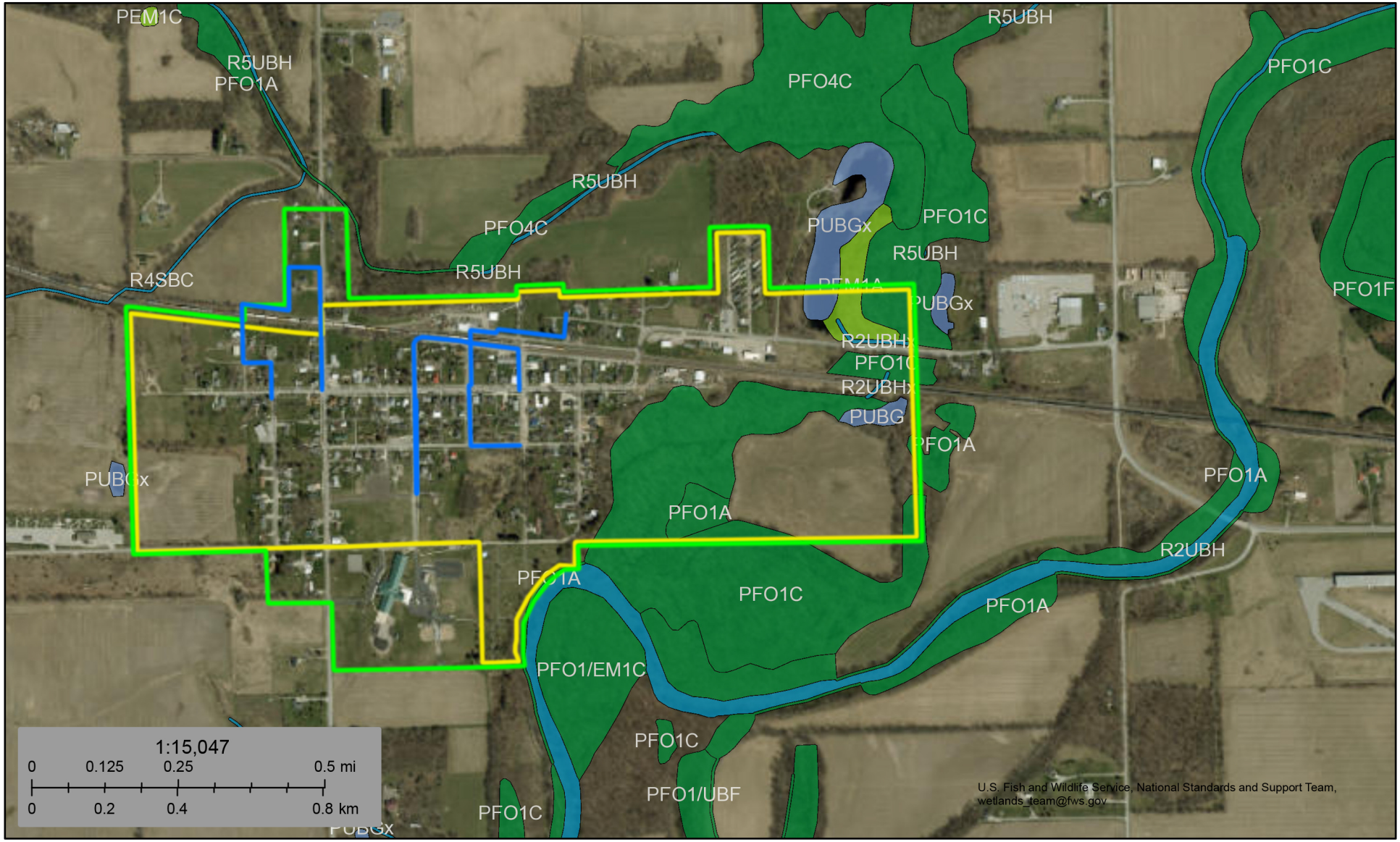
A42 - BLANK PAGE

U.S. Fish and Wildlife Service

National Wetlands Inventory

St Joe Water Wetlands

WETLANDS PROTECTION



September 4, 2025

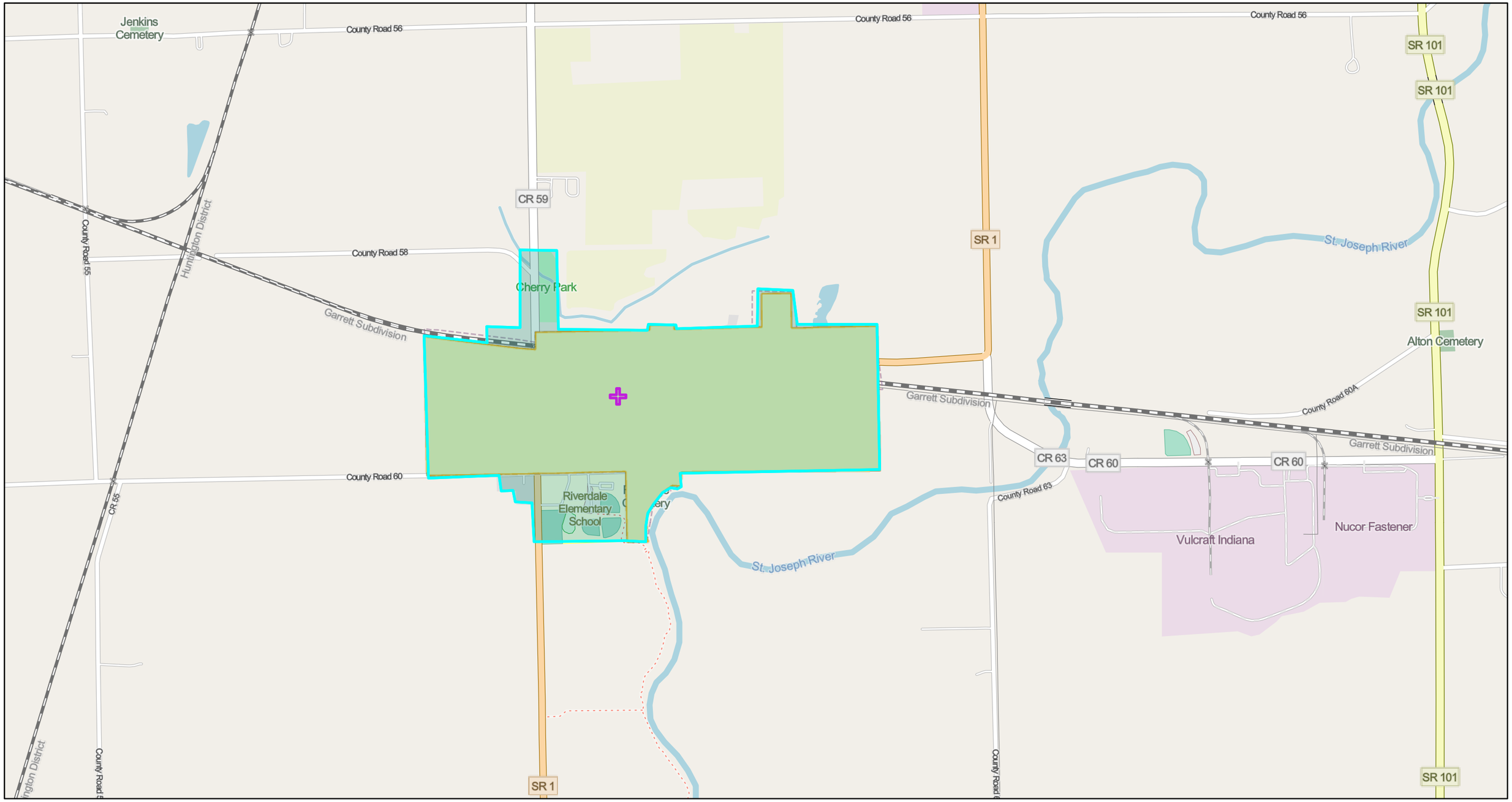
Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Yellow Boundary: St Joe Town Limits
Green Boundary: St Joe Water Service Area
Blue Lines: Proposed Improvement Locations

A43

Air Quality Nonattainment Areas Map - St. Joe, IN



February 10, 2025

St. Joe Water Improvement Project Area

Search Result (point)

City Boundary

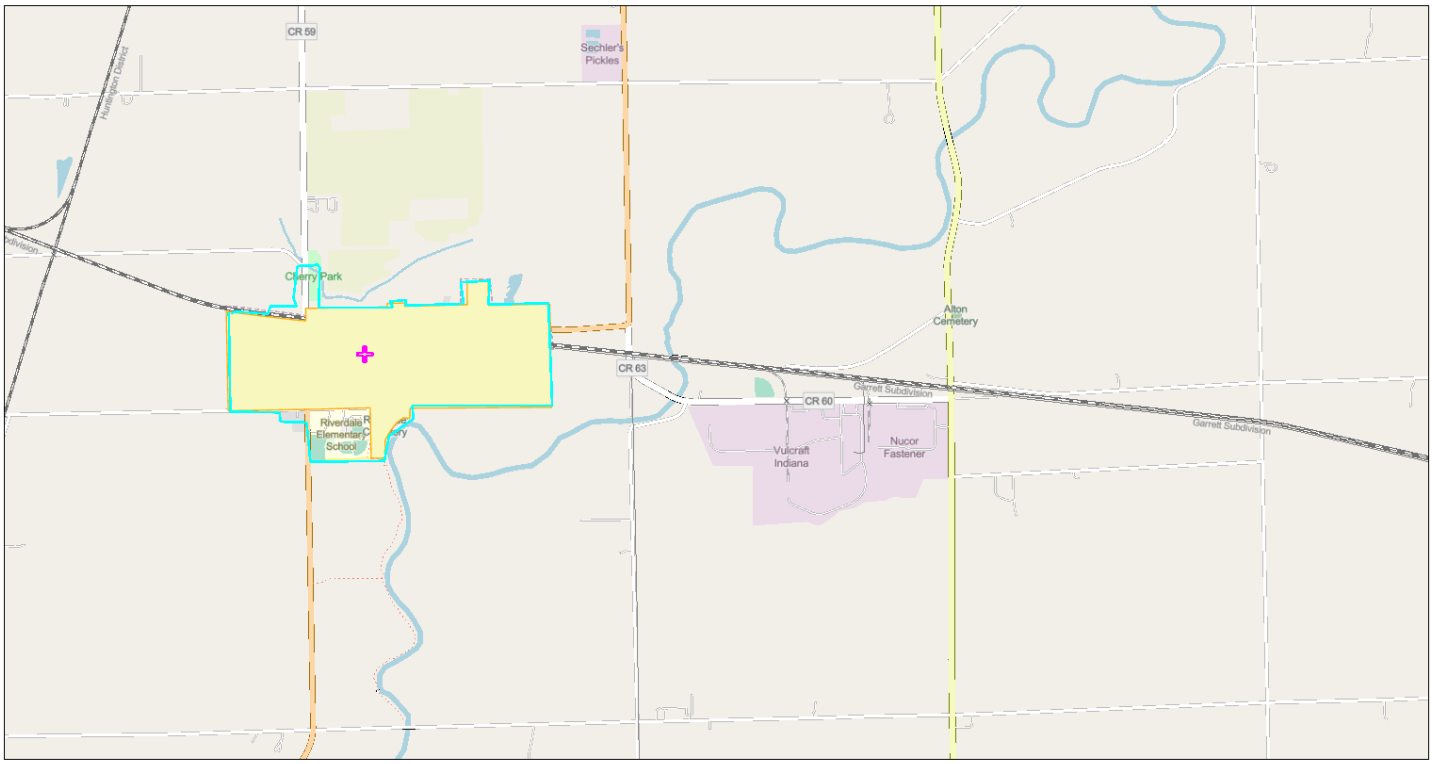
1:18,056

0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

NEPAssist Report

St. Joe Water Improvement Project Area



February 10, 2025

St. Joe Water Improvement Project Area

Search Result (point)

City Boundary

1:23,958

0 0.23 0.45 0.9 mi

0 0.35 0.7 1.4 km

Input Coordinates: 41.316815,-84.911032,41.312304,-84.910939,41.312269,-84.907960,41.311849,-84.907913,41.311814,-84.906331,41.310031,-84.906098,41.310066,-84.901629,41.311185,-84.901349,41.311989,-84.899860,41.312584,-84.899953,41.312584,-84.891480,41.317234,-84.891713,41.317164,-84.895344,41.318248,-84.895251,41.318178,-84.897020,41.317199,-84.896834,41.317129,-84.900325,41.317374,-84.900325,41.317304,-84.901303,41.317024,-84.901117,41.317024,-84.905586,41.318842,-84.905539,41.318982,-84.905679,41.318982,-84.905725,41.318982,-84.905772,41.318982,-84.905819,41.318947,-84.905819,41.318912,-84.906889,41.317444,-84.907122,41.317094,-84.906936,41.317094,-84.908519,41.316745,-84.908658,41.316849,-84.910660,41.316745,-84.910846,41.316710,-84.910846

Length of digitized line	3.40 mi
Within 1000 meters of an Ozone 1-hr (1979 standard) Non-Attainment/Maintenance Area?	no
Within 1000 meters of an Ozone 8-hr (1997 standard) Non-Attainment/Maintenance Area?	no
Within 1000 meters of an Ozone 8-hr (2008 standard) Non-Attainment/Maintenance Area?	no
Within 1000 meters of an Ozone 8-hr (2015 standard) Non-Attainment/Maintenance Area?	no
Within 1000 meters of a Lead (2008 standard) Non-Attainment/Maintenance Area?	no
Within 1000 meters of a SO2 1-hr (2010 standard) Non-Attainment/Maintenance Area?	no
Within 1000 meters of a PM2.5 24hr (2006 standard) Non-Attainment/Maintenance Area?	no
Within 1000 meters of a PM2.5 Annual (1997 standard) Non-Attainment/Maintenance Area?	no
Within 1000 meters of a PM2.5 Annual (2012 standard) Non-Attainment/Maintenance Area?	no
Within 1000 meters of a PM10 (1987 standard) Non-Attainment/Maintenance Area?	no

Within 1000 meters of a CO Annual (1971 standard) Non-Attainment/Maintenance Area?	no
Within 1000 meters of a NO2 Annual (1971 standard) Non-Attainment/Maintenance Area?	no
Within 1000 meters of a Federal Land?	no
Within 1000 meters of an impaired stream?	yes
Within 1000 meters of an impaired waterbody?	no
Within 1000 meters of a waterbody?	no
Within 1000 meters of a stream?	yes
Within 1000 meters of an NWI wetland?	Available Online
Within 1000 meters of a Brownfields site?	no
Within 1000 meters of a Superfund site?	no
Within 1000 meters of a Toxic Release Inventory (TRI) site?	no
Within 1000 meters of a water discharger (NPDES)?	yes
Within 1000 meters of a hazardous waste (RCRA) facility?	yes
Within 1000 meters of an air emission facility?	no
Within 1000 meters of a school?	yes
Within 1000 meters of an airport?	no
Within 1000 meters of a hospital?	no
Within 1000 meters of a designated sole source aquifer?	no
Within 1000 meters of a historic property on the National Register of Historic Places?	no
Within 1000 meters of a Chemical Data Reporting (CDR) site?	no
Within 1000 meters of a Land Cession Boundary?	yes
Within 1000 meters of a tribal area (lower 48 states)?	no
Within 1000 meters of the service area of a mitigation or conservation bank?	yes
Within 1000 meters of the service area of an In-Lieu-Fee Program?	yes
Within 1000 meters of a Public Property Boundary of the Formerly Used Defense Sites?	no
Within 1000 meters of a Munitions Response Site?	no
Within 1000 meters of an Essential Fish Habitat (EFH)?	no
Within 1000 meters of a Habitat Area of Particular Concern (HAPC)?	no
Within 1000 meters of an EFH Area Protected from Fishing (EFHA)?	no
Within 1000 meters of a Bureau of Land Management Area of Critical Environmental Concern?	no
Within 1000 meters of an ESA-designated Critical Habitat Area per U.S. Fish & Wildlife Service?	no
Within 1000 meters of an ESA-designated Critical Habitat river, stream or water feature per U.S. Fish & Wildlife Service?	no

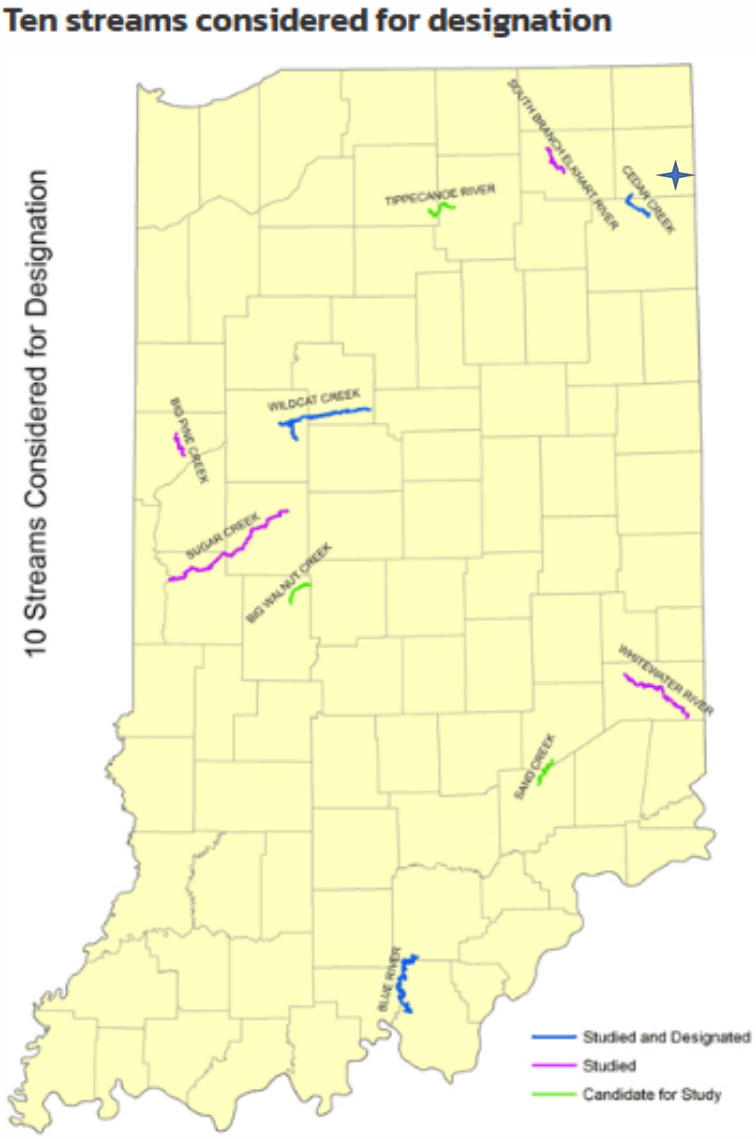
Created on: 2/10/2025 1:27:50 PM

SCENIC RIVERS MAP
St. Joe Water Improvements Project

DNR Indiana Department of Natural Resources

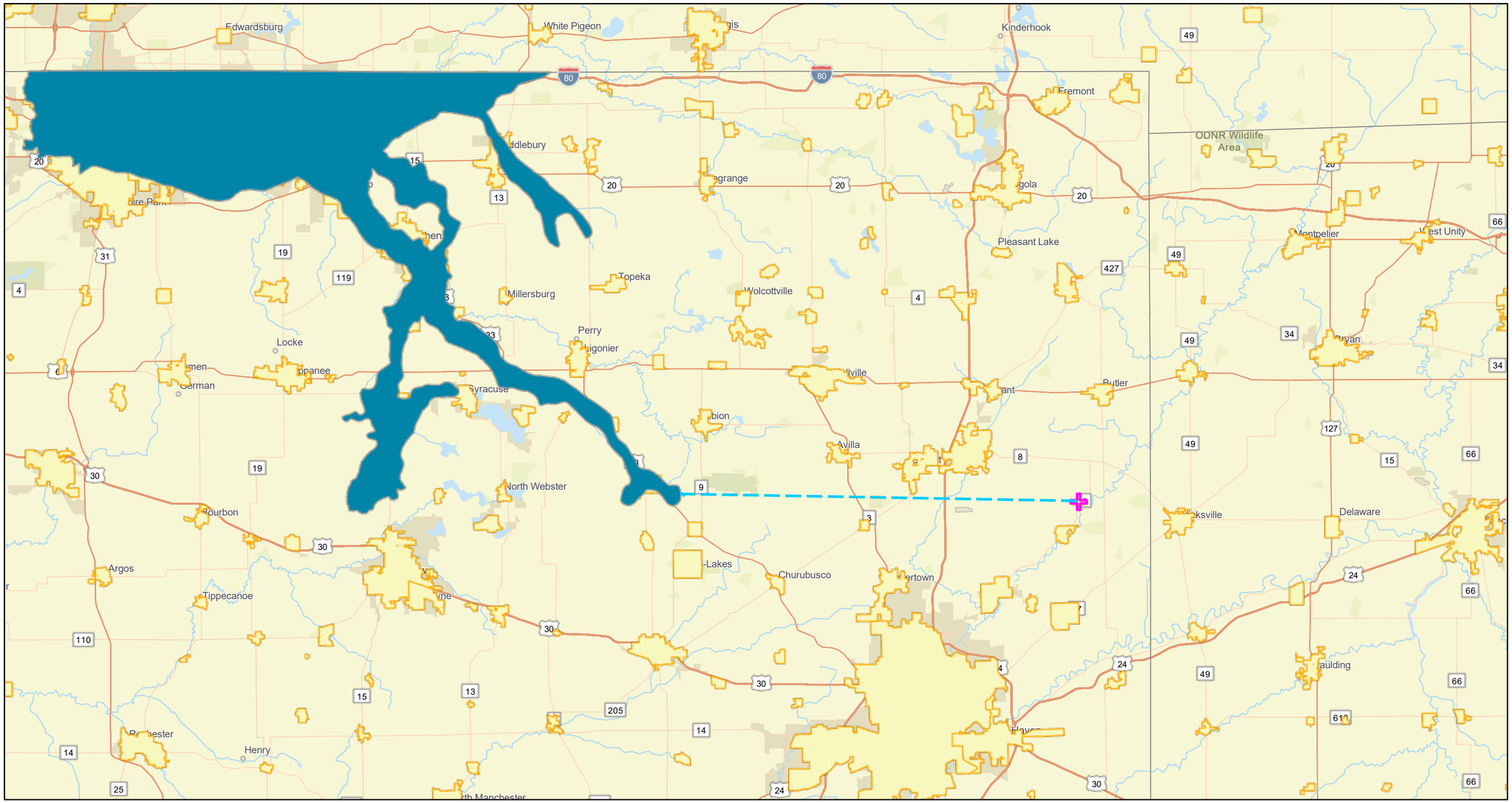
St. Joe Project Location

Note: Project will not impact



Source: [DNR: State Parks: Scenic River System](#) Downloaded 2-11- 25

Sole Source Aquifer Map - St. Joe Water Project



February 10, 2025

1:577,791

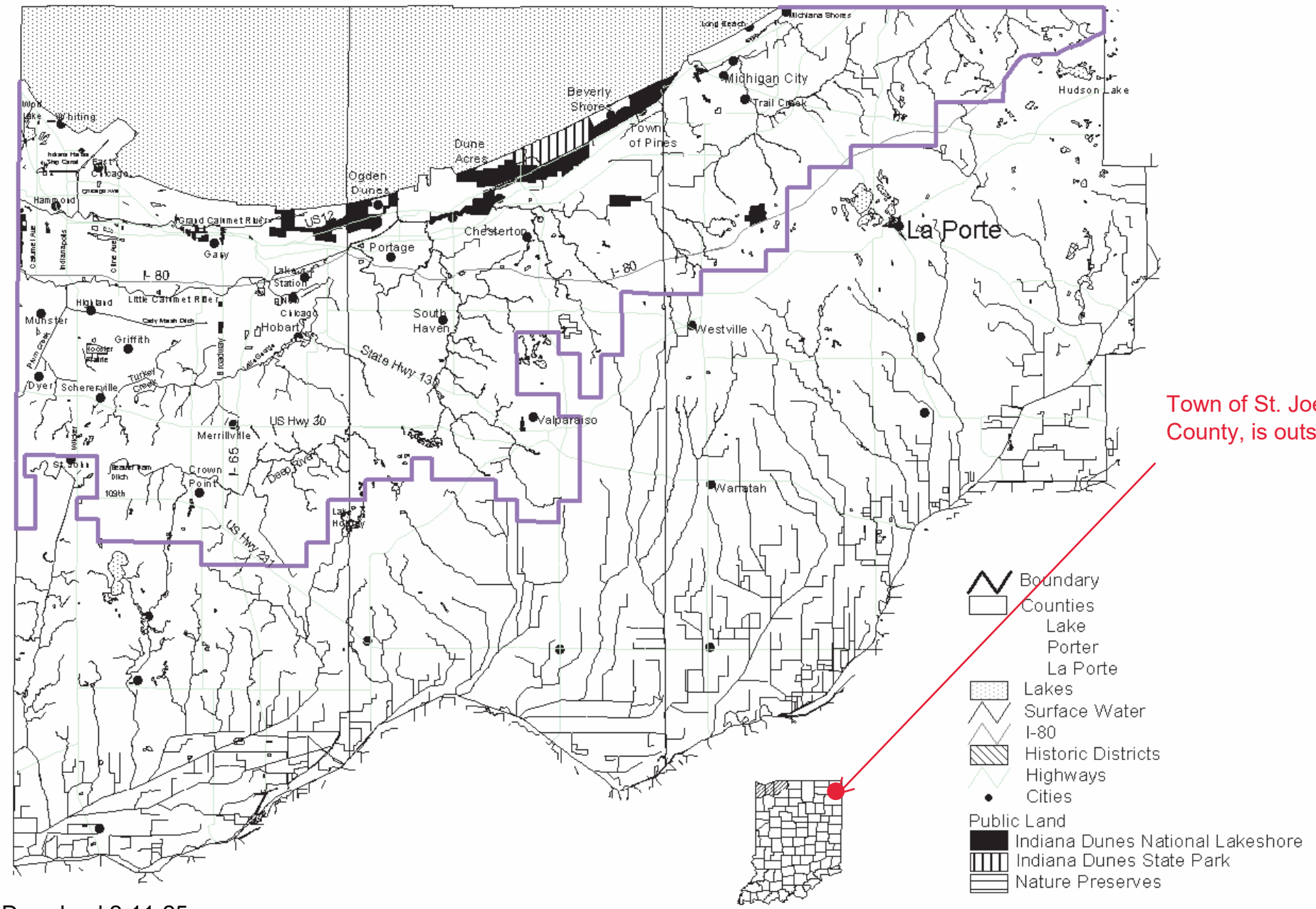
- 37.7 Miles from Project Area
- St. Joe Water Improvement Project Area
- Sole Source Aquifers
- City Boundary

0 5 10 20 mi

0 5 10 20 km

Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, USFWS, EPA OEI

Lake Michigan Coastal Program Area



Town of St. Joe, DeKalb County, is outside LMCP

Download 2-11-25

Source: https://www.in.gov/dnr/lake-michigan-coastal-program/files/lm-boundary_and_watershed.pdf

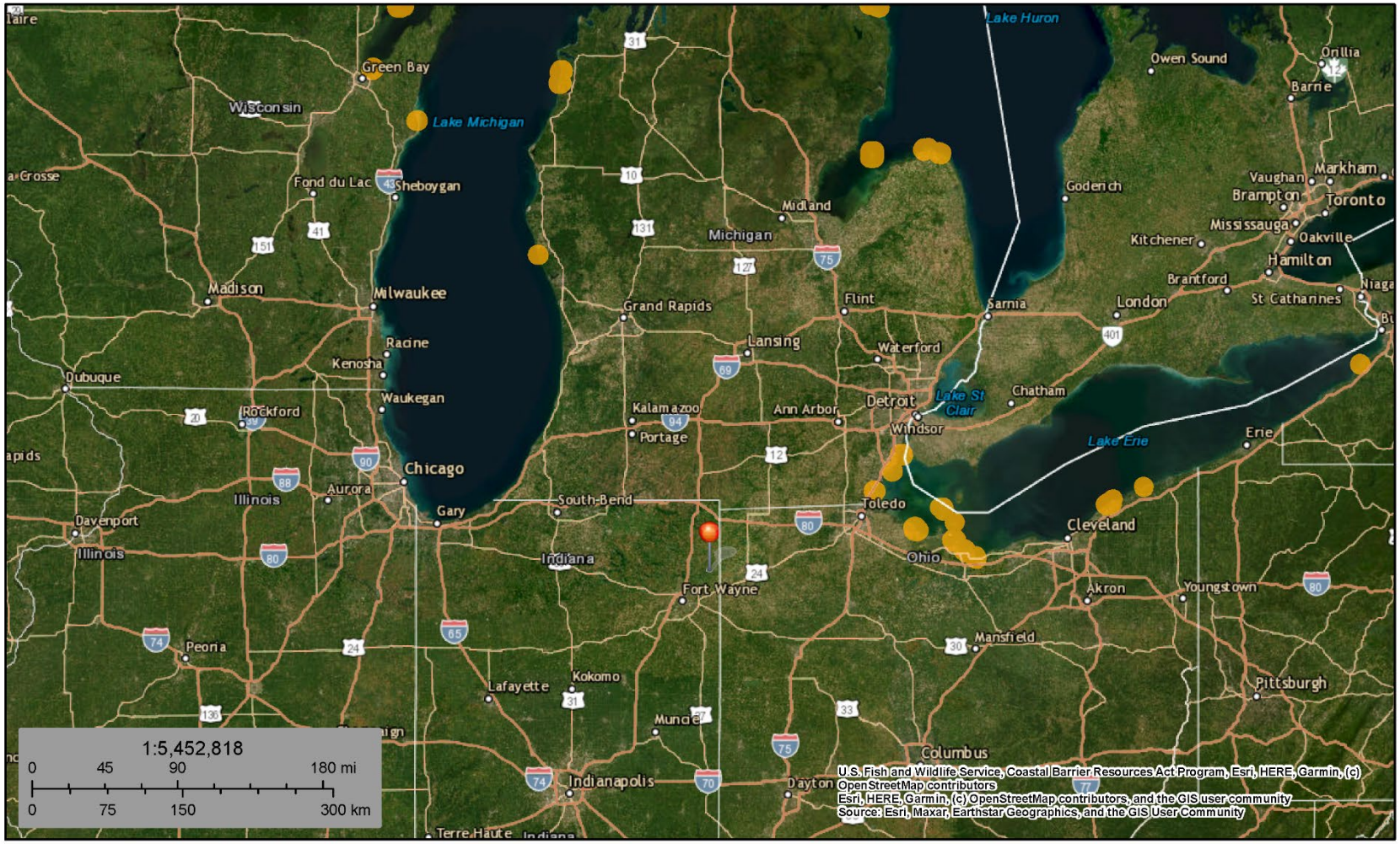
USFWS Coastal Barrier Map

St. Joe Water Utility Improvements Project

U.S. Fish and Wildlife Service

Coastal Barrier Resources System

Coastal Barrier Map - St. Joe



February 17, 2025

Generalized Units

St. Joe Project Location

NO IMPACT

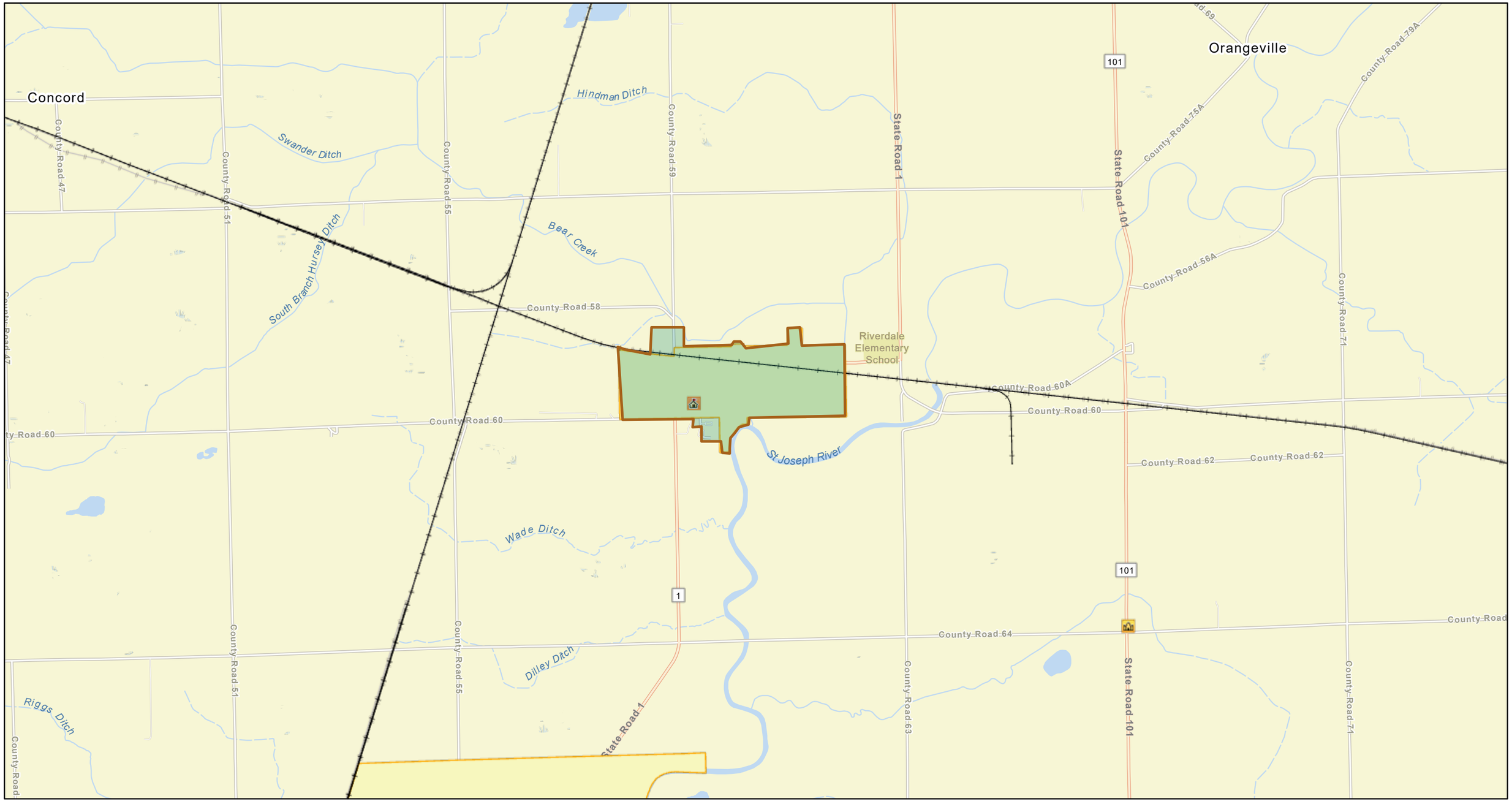
This map is for general reference only. The Coastal Barrier Resources System (CBRS) boundaries depicted on this map are representations of the controlling CBRS boundaries, which are shown on the official maps, accessible at https://www.fws.gov/library/collections/official-coastal-barrier-resources-system-maps. All CBRS related data should be used in accordance with the layer metadata found on the CBRS Mapper website.

The CBRS Buffer Zone represents the area immediately adjacent to the CBRS boundary where users are advised to contact the Service for an official determination (https://www.fws.gov/service/coastal-barrier-resources-system-property-documentation) as to whether the property or project site is located "in" or "out" of the CBRS.

CBRS Units normally extend seaward out to the 20- or 30-foot bathymetric contour (depending on the location of the unit). The true seaward

This page was produced by the CBRS Mapper

Noise Abatement/Control Map - St. Joe Water Improvements



February 12, 2025

- St. Joe Water Improvement Project Area
- Schools
- Places of Worship
- Railroads
- City Boundary

1:36,112

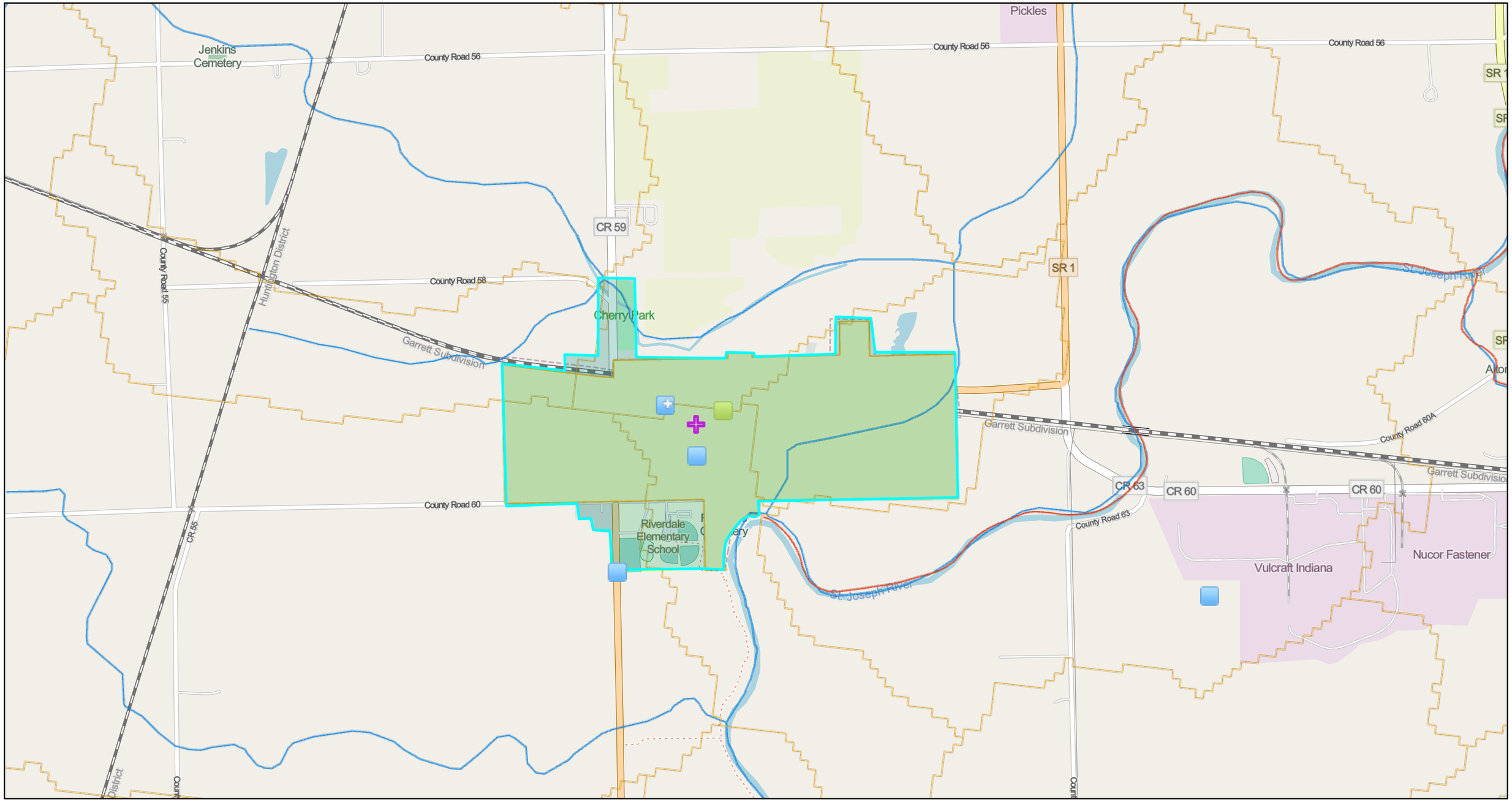
0 0.33 0.65 1.3 mi

0 0.5 1 2 km

Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS, EPA OEI, EPA OEI, OFA

A51

EPA Site Contamination Impaired Water Points Map Map



February 10, 2025

1:18,056

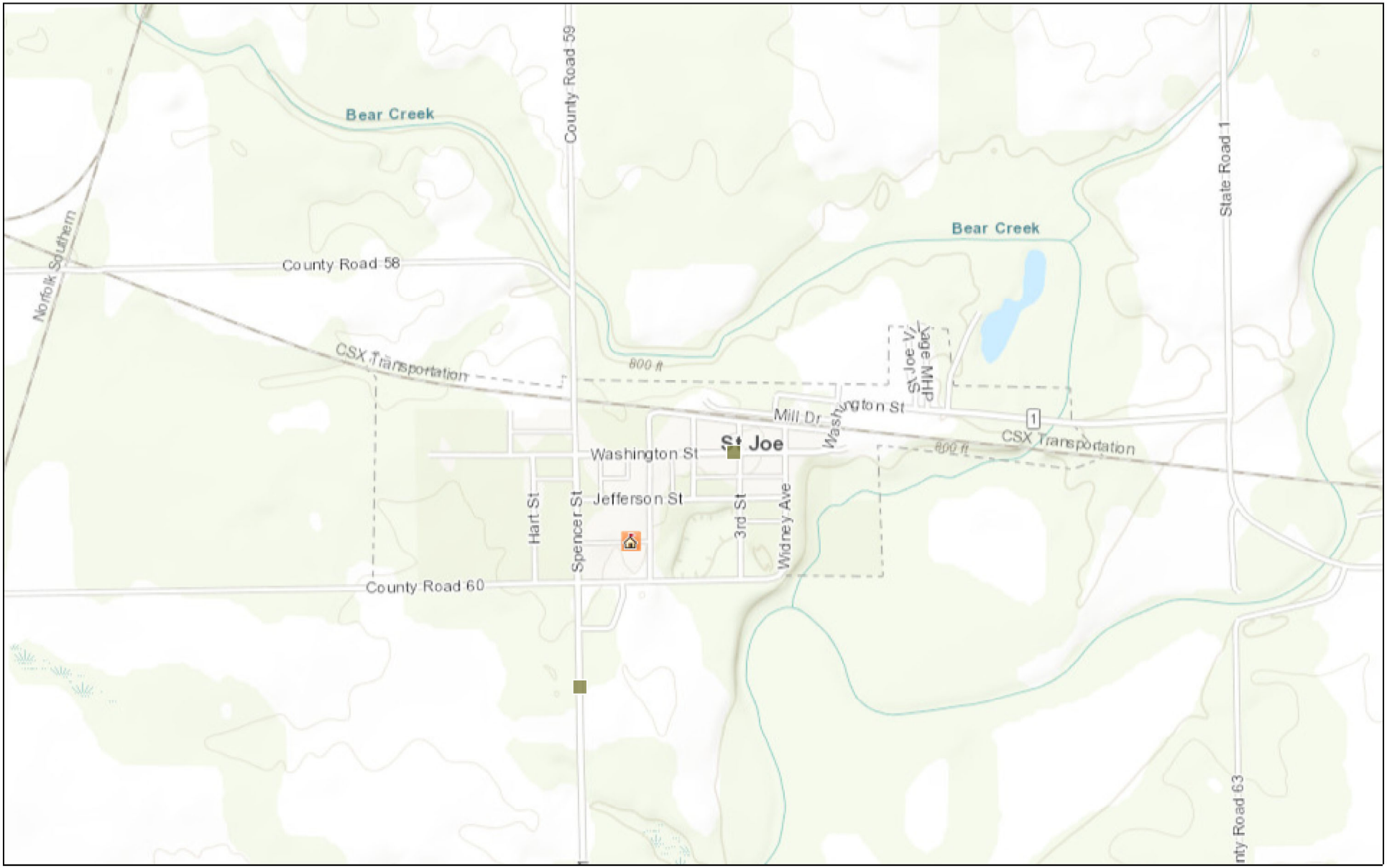
0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

- Water Dischargers (NPDES)
- Water Dischargers (NPDES)
- Hazardous Waste (RCRAInfo)
- St. Joe Water Improvement Project Area
- Search Result (point)
- Impaired Streams
- Catchments (ATTAINS)
- Streams
- City Boundary

See Geotechnical Report, page A56 - NO IMPACT

EPA Explosives & Flammables Map - St. Joe, IN



February 18, 2025

- Single Facility
- Schools

1:18,056

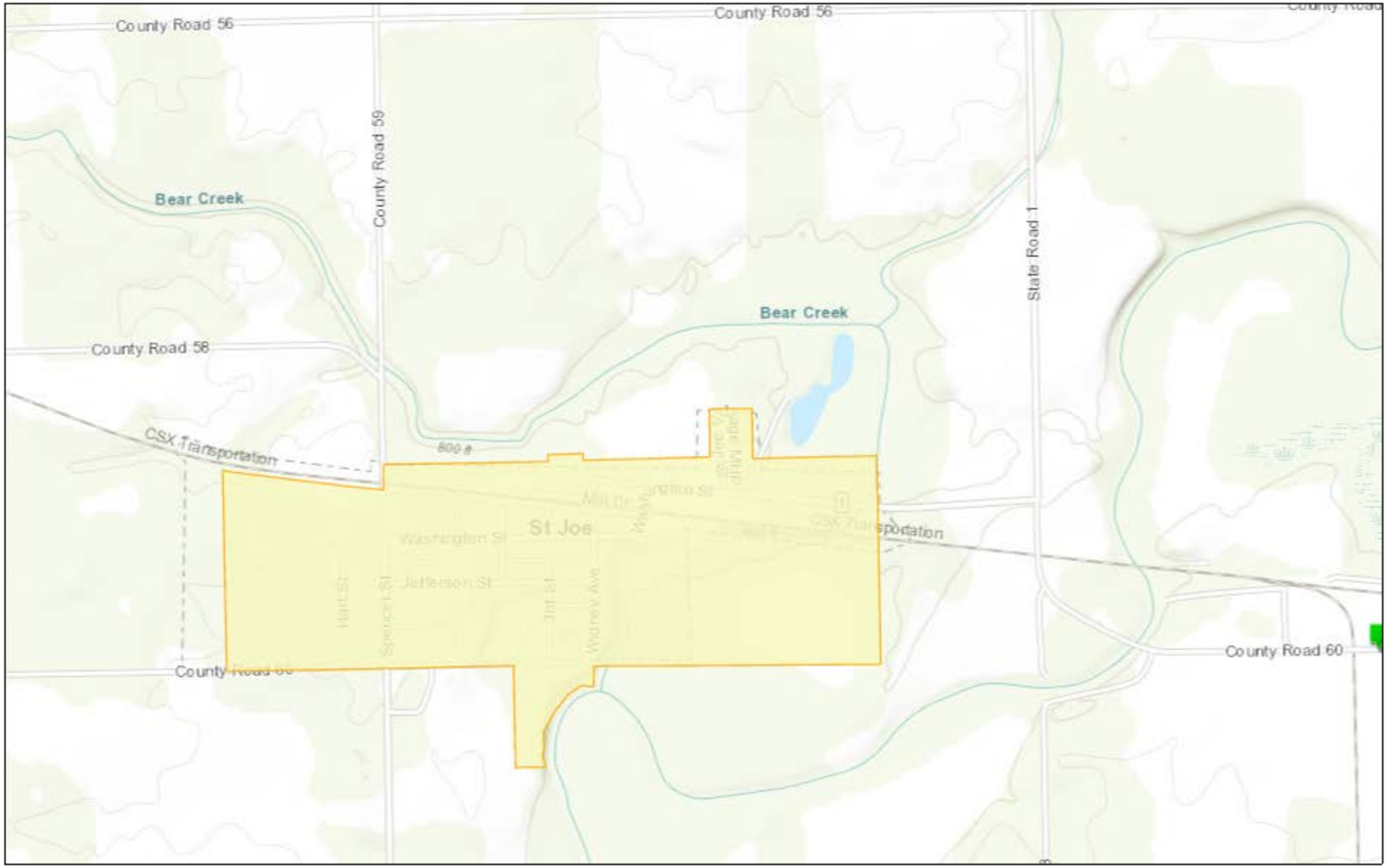
0 0.1 0.2 0.4 mi

0 0.17 0.35 0.7 km

Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA, EPA OEI, OFA

See Geotechnical Report, page A56 - NO IMPACT

EPA Explosives & Flammables Map - St. Joe, IN



February 13, 2025

Single Facility

City Boundary

1:18,056

0 0.1 0.2 0.4 mi

0 0.17 0.35 0.7 km

Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA, EPA OEI

See Geotechnical Report, page A56 - NO IMPACT

EPA Explosives & flammable Facilities - EnviroMapper Search 2-18-25																					
REGISTRY_ID	LATITUDE	LONGITUDE	PRIMARY_NAME	LOCATION_ADDRESS	CITY_NAME	COUNTY_NAME	STATE_CODE	POSTAL_CODE	FIPS_CODE	HUC_CODE	ICIS	ACRES	CERCLIS	NPL	RCRAINFO	SDWIS	NPDES	TRIS	BRS	GHG
1.10E+11	41.3275	-84.887694	PICKLE PROPERTIES, LLC	5686 S.R. 1	ST JOE	DE KALB	IN	46785	18033		None	None	None	None	None	None	Y	None	None	None
1.10E+11	41.315357	-84.901637	SEBERT OIL	315 WASHINGTON ST	ST JOE	DE KALB	IN	46785	18033		None	None	None	None	Y	None	None	None	None	None
1.10E+11	41.31012	-84.90621	IN DOT DES 1601101 PAVEMENT REPLACEMENT PROJECT	SR 1	ST JOE	DEKALB COUNTY	IN	46785	18033		None	None	None	None	None	None	Y	None	None	None

See Geotechnical Report, page A56 - NO IMPACT

GME TESTING

Geotechnical Report

GME Project No. G24-092583

Proposed Water Main

4th Street: between Washington Street and Railroad Street
St. Joe, IN

December 24, 2024

Prepared For:

A&Z Engineering, LLC (A&Z)
1220 Ruston Pass
Fort Wayne, IN 46825
Attn: Logan A. Gonya, PE

Prepared By:

GME Testing
3517 Focus Dr
Fort Wayne, IN 46818

December 24, 2024
G24-092583

A&Z Engineering, LLC (A&Z)
1220 Ruston Pass
Fort Wayne, IN 46825
Attn: Logan A. Gonya, PE

REF: SUBSURFACE EXPLORATION AND RECOMMENDATIONS
Proposed Water Main
4th Street: between Washington Street and Railroad Street
St. Joe, IN

Dear Mr. Gonya:

In compliance with your recent request, ***GME Testing*** is pleased to submit our report on subsurface exploration and recommendations for the design and construction of a proposed water main along 4th Street. The project limits will be between Washington Street and Railroad Street in St. Joe, Indiana.

AUTHORIZATION

Our work was performed in accordance with our proposal GMEP 24-090464, dated September 18, 2024. Our services were authorized by Mr. Landon Grogg's email dated November 18, 2024.

SITE DESCRIPTION

The Site is located within an urban residential area with asphalt-paved and grass-covered surfaces. The project site contains overhead and below ground utilities. The site is bordered by Railroad Street to the north and the railroad tracks beyond, by Washington Street to the south, and by residential properties to the east and west of 4th Street.

PURPOSE OF INVESTIGATION

The purposes of this geotechnical investigation are to evaluate the subsurface conditions and to develop geotechnical recommendations for use by the A&Z Engineering design team in preparing the proposed utility project plans.

FIELD WORK

Our subsurface exploration consisted of drilling four (4) vertical soil test borings to depths of 30 feet at the locations determined by A&Z. The borings were slightly moved for safety due to existing overhead utilities. Exhibit A, included in Appendix A of this report, depicts the site vicinity and approximate locations of the test borings.

Our subsurface exploration was performed in accordance with the Standard Penetration Test, ASTM D-1586. The stratification of soils, as shown on the accompanying boring logs, included in Appendix B of this report represents the soil conditions at the drilled borehole locations. All samples were classified in general accordance with ASTM D-2487. Our test results are included in the individual boring logs included in Appendix B.

PROPOSED CONSTRUCTION

The plan and profile sheet for the proposed project were requested but are not available for our review at this time. However, based on our communications with the designer (Mr. Landon Grogg of A&Z Engineering, LLC) on December 19, 2024, we anticipate that the project will consist of a water main pipe having 6 to 8-inch diameters. Mr. Grogg indicated that the pipe inverts are expected to be found at or below a depth of 5 feet beneath the existing ground surface (bgs). Based on the information provided to us, the preferred installation method for these pipes will be the conventional open trench and backfill, following applicable OSHA standards and in accordance with acceptable plans and specifications. However, where the water main is expected to cross under the existing railroad tracks, it was reported that the jack-and-bore method (i.e., directional drilling and trenchless pipe installation) will be used. We anticipate that the designer will adopt applicable local and railroad safety and construction standards and specifications in the design of the water main alignment.

In the absence of design details and applicable grading requirements, GME Testing anticipates that all utility pipes and any incidental construction elements will bear on natural, approved soils. Furthermore, the excavation contractor will follow the plans and specifications set forth by the designer and the recommendations presented in this report. GME Testing should be allowed to review final plans upon completion. If significant changes occur or our assumptions made in this report are inaccurate, changes to our recommendations will be necessary after our review.

GENERALIZED SUBSURFACE AND GROUNDWATER CONDITIONS

The following summary outlines the materials encountered during the test borings program. Detailed descriptions and data for each test boring are available in the Borehole Logs in Appendix B. This overview reflects the Site's geotechnical conditions based on our field investigation and laboratory testing. Conditions not represented at boring locations may be encountered during construction and could affect the project.

Surficial Material: The soil borings drilled within the existing asphalt pavement disclosed approximately 6.5 to 7 inches of asphalt (surface and binder) over 5 inches of limestone aggregate base (in B-1 and B-3).

Native Soils: The native soils primarily consisted of “medium stiff to very stiff and hard” silty and sandy silty clay with occasional sand seams and “medium dense” and “dense” granular soils, such as fine sand, silty sand, and clayey silt (in B-2 through B-3), as indicated on the boring logs.

The relative densities and consistencies of existing soils are based on the results of the SPT, N-values according to ASTM D-1586. Our **General Notes** sheet, which follows the boring logs included in Appendix B, provides an explanation of these correlations.

Groundwater Measurements: Groundwater measurements were taken during our field operations by noting the depth of water on the rods and in open boreholes following the withdrawal of the drilling augers after the completion of drilling activities in test borings. Groundwater was encountered in all test borings except B-4 at depths of 18 to 28 feet bgs, during our drilling program. The groundwater depths shown on the boring logs reflect groundwater levels **only** for the date on which the borings were drilled. Fluctuations in the level and rate of seepage of groundwater will occur due to variations in rainfall, water level, and other factors.

GENERAL GEOTECHNICAL EVALUATIONS AND RECOMMENDATIONS

There will be 6-to-8-inch water main pipes designed and installed by conventional open cut and backfilling along 4th Street, between Railroad Street and Washington Street in St. Joe, Indiana. Details about the project were unavailable and were being developed by A&Z Engineering when GME Testing was preparing this report.

Our evaluation, based on the information from the test borings, is based on the suitability of the existing soils to support the proposed water main. The existing natural stiff to very stiff, silty clays and sandy silty clays observed at the planned depth of pipe excavation of 5 or more feet should provide adequate bearing support for the pipes and bedding materials. This is provided that all utility excavations will be prepared and protected according to this report and project plans.

Prior to excavating trenches for the proposed water main pipes, it is recommended that any underground utilities in conflict with the proposed pipes be relocated or supported where necessary. Depending on the pipe inverts, excavation difficulties, including sloughing and cave-ins, should be anticipated. The contractor should be prepared to protect excavations, and the current OSHA requirements pertaining to worker safety should be met.

If the trenchless method of installation is considered within the railroad right-of-way, it is the responsibility of the contractor to follow the railroad safety guidelines and secure the necessary railroad permits before attempting any excavations.

Based on the soil conditions disclosed in boring B-1 (close to the railroad), very stiff to hard silty and sandy silty clay soils were disclosed, and difficulties should be expected in advancing the pipes in soils similar to those encountered by the borings. It is recommended that the contractor select suitable equipment in good working conditions to penetrate the various soil strata.

Due care should be taken to maintain the alignment and integrity of the railroad track during pipe installation. This responsibility lies with the contractor.

Open-Cut Installation

Utility excavations should be properly designed and constructed. Field density compaction testing is critical to minimize backfill movement that could cause settlement. All utility backfill and bedding materials must be controlled and compacted to achieve the desired density, as outlined in this report and project plans.

Although not expected, should any weak, compressible soils be observed at the anticipated pipe inverts, undercutting and replacement with an adequate thickness of bedding material should be anticipated, as directed in the field by the engineer.

Suitable bedding materials, such as free-draining granular soils (e.g., INDOT No. 53 or No. 8), should be used under and around the pipe to ensure proper support. The appropriate type and thickness should be determined by the engineer but should be no less than 4 to 6 inches, provided groundwater-related issues are manageable.

All pipe backfill materials and to replace unsuitable materials (if encountered) should consist of non-organic, naturally occurring, non-expansive granular soils (i.e., INDOT No. 8, No. 53, or No. 73. All backfill materials should be approved by GME Testing and placed at a moisture content within ±2 percent of the Optimum Moisture Content (OMC).

All pipes and fittings should also conform to state or applicable local standards, whichever is more stringent. Positive seals must be provided at joints between pipe sections according to the pipe manufacturer's specifications. The contractor should utilize construction methods that are in accordance with good construction practices.

Trenchless Pipe Installation

Because directional drilling is a specialized installation procedure, this procedure requires a specific type of experience, and construction should be performed by a specialty contractor who develops, designs, installs, and warrants one of the various proprietary types of trenchless construction. Drilling fluids might be necessary for the installation of the proposed pipes while using the directional drilling method. However, a specialty contractor should choose the means and methods of construction.

Table 1 below provides soil parameters for boring B-1, located in the vicinity of the existing railroad. Additional information for other borings can be provided upon request.

Table 1: Summary of Soil Parameters

Boring Number	Depth (feet)	*Internal Angle of Friction (ϕ), deg	*Average Cohesion (c), psf	*Total Soil Unit Weight (γ), pcf
B-1	0 to 6	0	4,000	110
	6 to 10	0	3,000	110
	10 to 25	0	4,000	110
	25 to 30	0	1,500	110

**Ultimate Soil Parameters*

EXCAVATIONS AND TRENCHES

Temporary excavations that encounter water seepage may require shoring, bracing, and/or lateral supports. All excavations should be monitored by a Competent Person, as defined by the OSHA standard, and appropriate shoring or sloping techniques should be used to prevent cave-ins. These regulations provide trench sloping and shoring design parameters for trenches up to 20 feet deep based on a description of the soil types encountered. Trenches and/or excavations greater than 20 feet deep, if required, should be designed by the contractor's professional engineer.

Soils exposed at the base of a satisfactory excavation should be protected against any detrimental change in conditions, such as disturbance, rain, and freezing. Surface run-off water should be drained away from the excavation.

Spoils from the trench excavation should not be placed near the edge of the excavation. For open-cut trenches or braced excavations, the spoils should be placed away from the edge of the excavation at a minimum distance equal to the excavation depth. This distance should be evaluated in the field by the contractor's professional engineer and may be exceeded. If spoil piles are placed closer to the recommended distance to the braced excavation, the resulting surcharge loads should be considered in the bracing or trench box design.

The above recommendations should be considered as guidelines only, and an experienced design engineer should be contacted for further recommendations regarding the design of the shoring system.

ENGINEERED FILL

Fill material should be mechanically compacted in uniform horizontal lifts at a relative compaction of 95 percent of the maximum Proctor density, in accordance with ASTM D-1557 (Modified Proctor). However, every effort should be made not to cause damage to the pipe due to over-compaction of fill materials. To achieve the recommended compaction limit of the fill, the fill material should be placed and compacted in layers not exceeding 8 inches in loose thickness (the loose lift thickness should be reduced to 6 inches when utilizing small hand compactors) and within the specified range of OMC. All fill placements should be monitored by a GME Testing representative.

CONSTRUCTION MONITORING

Our experience indicates that the actual subsoil conditions at a site could vary from those generalized on the basis of a test borehole made at a specific location. We recommend that a GME Testing geotechnical engineer or designee be retained to continuously evaluate and test the encountered materials on-site during the actual construction.

GENERAL COMMENTS

This field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical investigation report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. Although individual test borings are representative of the subsurface conditions at the boring locations on the dates drilled, they are not necessarily representative of the subsurface conditions between boring locations or subsurface conditions during other seasons of the year.

The lines of demarcation shown on the logs represent approximate boundaries between the various classifications. The stratification of soils, as shown on the accompanying test borehole logs, represents the soil conditions at the drilled borehole locations, and variations may occur between the boreholes. In-situ strata changes could occur gradually or at different levels. Also, it should be noted that the boreholes depict conditions at the particular-locations and times indicated.

The report was prepared by GME Testing solely for the use of the Client in accordance with an executed contract. The Client's use of or reliance on this report is limited by the terms and conditions of the contract and by the qualifications and limitations stated in the report. It is also acknowledged that the Client's use of and reliance of this report is limited for reasons which include actual site conditions that may change with time; hidden conditions, not discoverable within the scope of the assessment may exist at the site; and the scope of the investigation may have been limited by time, budget and other constraints imposed by the client.

Neither the report nor its contents, conclusions or recommendations are intended for the use of any party other than the Client. GME Testing and the Client assume no liability for any reliance placed on this report by such party. The rights of the client under contract may not be assigned to any person or entity, without the consent of GME Testing which shall not be unreasonably withheld.

Our services have been provided consistent with its professional standards of care. No other warranties are made, either expressed or implied.

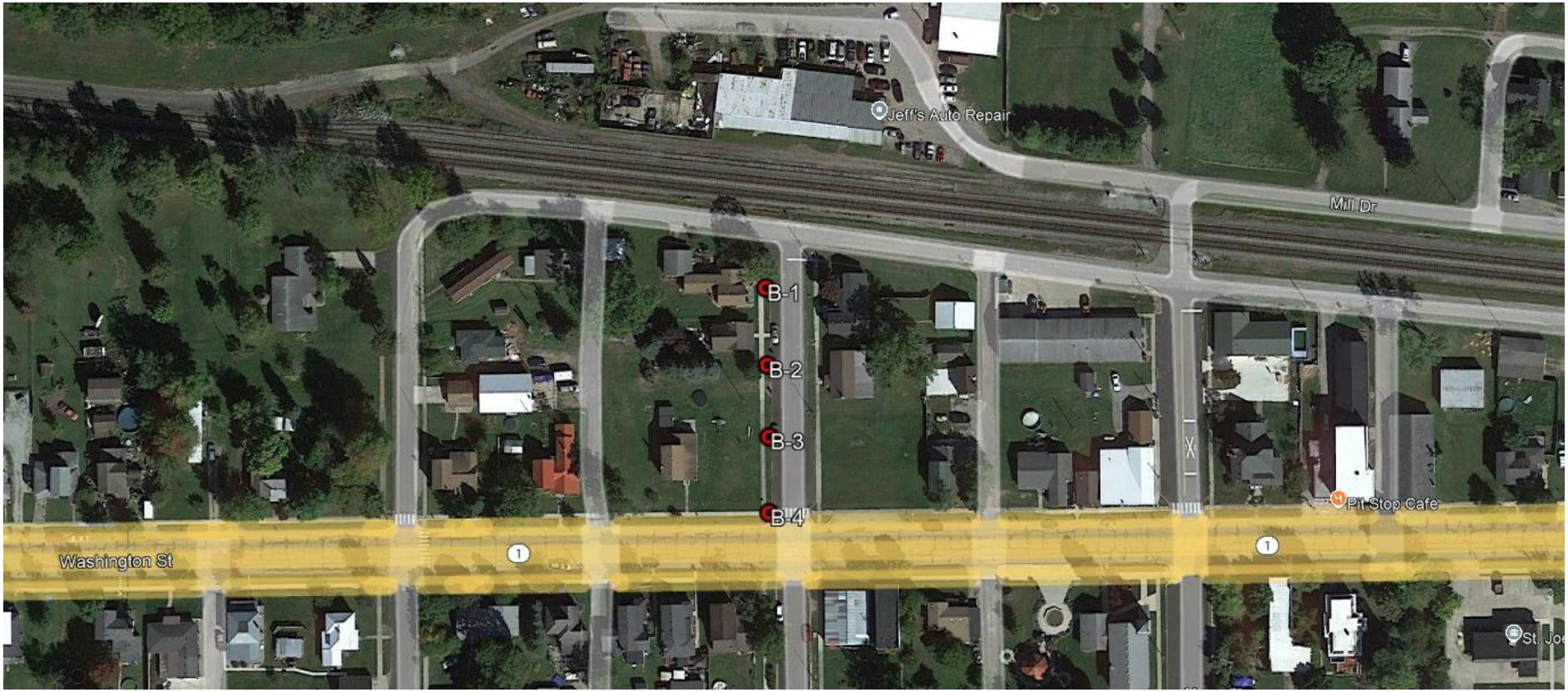
Sincerely,
GME Testing

Rami M. Anabtawi, P.E., BC.GE

RAMI M. ANABTAWI
920294
REGISTERED
PROFESSIONAL
ENGINEER
STATE OF INDIANA

S M Naziur Mahmud, E.I.T.

APPENDIX A



VICINITY MAP (NOT TO SCALE)

NOTES

1. All boring locations are approximate.
2. Vicinity map generated using imagery from google.com/maps.

N

LEGEND

B-1
Test Boring Location and Designation

EXHIBIT A – APPROXIMATE BORING LOCATION MAP

Project Name: Proposed Water Main

Location: 4th Street: between Washington Street and Railroad Street, St. Joe, IN

Client Name: A&Z Engineering, LLC (A&Z)

GME Project Number: G24-092583

GME TESTING

APPENDIX B

GME TESTING

TEST BORING LOG

BORING NO.: **B-1**
SHEET 1 OF 1
GME PROJECT NO: G24-092583
STRUCTURE
DATUM :
DATE STARTED : 12-02-24
DRILLER/INSP : JS/DW

CLIENT: A&Z Engineering, LLC (A&Z)
PROJECT TYPE : Proposed Water Main
LOCATION : 4th Street: between Washington Street and Railroad Street, St. Joe, IN

ELEVATION	:	BORING METHOD	: ASTM D-1586	LATITUDE	: 41.316022
STATION	:	RIG TYPE	: Skid	LONGITUDE	: -84.902892
OFFSET	:	CASING DIA.	: 3.3 in		
LINE	:	HAMMER	: Auto		
DEPTH	: 30.0 ft				

GROUNDWATER: ▽ Encountered at 26.0 ft ▼ At completion 28.0 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6" (N)	% RECOVERY	% MOISTURE CONTENT	UNCONF. COMP., tsf	Qp (tsf)	REMARKS
		±7" ASPHALT. 0.6							
		FILL: Stone. 1.0							
	2.5		SS 1	4-6-10 (16)	100	20.8	3.5	4.5+	
		Brown, Moist, SILTY CLAY, Trace Fine Gravel.							
	5.0		SS 2	9-18-21 (39)	100	15.6		4.5+	
		6.0							
	7.5		SS 3	8-10-13 (23)	100	12.6		3.0	
	10.0		SS 4	10-14-16 (30)	100	13.1	5.1	3.5	
	12.5								
	15.0	Brown and Gray, Moist, SANDY SILTY CLAY, Trace Fine Gravel, Occasional Fine Sand Seams @ 23.5 feet.	SS 5	10-13-16 (29)	100	9.6	4.7	4.5+	
	17.5								
	20.0		SS 6	12-16-20 (36)	100	7.3		4.5+	
	22.5								
	25.0	25.0	SS 7	25-28-33 (61)	100	11.4			
	27.5	Gray, Moist, SANDY SILTY CLAY, Trace Fine Gravel.							
	30.0	30.0	SS 8	9-10-12 (22)	100	13.0	1.6	1.0	
		Bottom of Boring at 30.0 ft							
	32.5								
	35.0								

GME TESTING

TEST BORING LOG

BORING NO.: **B-2**
SHEET 1 OF 1
GME PROJECT NO: G24-092583
STRUCTURE
DATUM :
DATE STARTED : 12-02-24
DRILLER/INSP : JS/DW

CLIENT: A&Z Engineering, LLC (A&Z)
PROJECT TYPE : Proposed Water Main
LOCATION : 4th Street: between Washington Street and Railroad Street, St. Joe, IN

ELEVATION	:	BORING METHOD	: ASTM D-1586	LATITUDE	: 41.315822
STATION	:	RIG TYPE	: Skid	LONGITUDE	: -84.902886
OFFSET	:	CASING DIA.	: 3.3 in		
LINE	:	HAMMER	: Auto		
DEPTH	: 30.0 ft				

GROUNDWATER: ▽ Encountered at 18.0 ft ▼ At completion 24.0 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6" (N)	% RECOVERY	% MOISTURE CONTENT	UNCONF. COMP., tsf	Qp (tsf)	REMARKS
		±7" ASPHALT. 0.6							
	2.5	Brown, Moist, SILTY CLAY, Trace Fine Gravel.	SS 1	4-5-6 (11)	100	22.4	4.1	4.0	
	5.0		SS 2	6-7-8 (15)	100	16.4		4.0	
		6.0							
	7.5		SS 3	6-8-9 (17)	100	17.5	1.8	1.5	
	10.0		SS 4	16-20-25 (45)	100	8.9	5.7	4.5+	
	12.5	Brown, Moist, SANDY SILTY CLAY, Trace Fine Gravel.							
	15.0		SS 5	19-23-30 (53)	100	10.2			
	17.5								
		18.0							
	20.0	Brown, Very Moist, Fine SAND.	SS 6	45-47-50 (97)	100	18.4			
		21.0							
	22.5								
	25.0	Gray, Moist, CLAYEY SILT, Occasional Sand Seams.	SS 7	9-11-16 (27)	100	16.2			
	27.5								
	30.0	30.0	SS 8	8-10-20 (30)	100	14.8			
		Bottom of Boring at 30.0 ft							
	32.5								
	35.0								

GME TESTING

TEST BORING LOG

BORING NO.: B-3
SHEET 1 OF 1
GME PROJECT NO: G24-092583
STRUCTURE
DATUM :
DATE STARTED : 12-02-24
DRILLER/INSP : JS/DW

CLIENT: A&Z Engineering, LLC (A&Z)
PROJECT TYPE : Proposed Water Main
LOCATION : 4th Street: between Washington Street and Railroad Street, St. Joe, IN

ELEVATION	:	BORING METHOD	: ASTM D-1586	LATITUDE	: 41.315636
STATION	:	RIG TYPE	: Skid	LONGITUDE	: -84.902881
OFFSET	:	CASING DIA.	: 3.3 in		
LINE	:	HAMMER	: Auto		
DEPTH	: 30.0 ft				

GROUNDWATER: ▽ Encountered at 18.0 ft ▼ At completion 18.0 ft ▨ Caved in at 19.0 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6" (N)	% RECOVERY	% MOISTURE CONTENT	UNCONF. COMP., tsf	Qp (tsf)	REMARKS
		±6.5" ASPHALT. 0.5							
	2.5	FILL: Stone. 1.0	SS 1	3-5-5 (10)	100	19.6		2.5	
	5.0		SS 2	3-5-7 (12)	100	17.2	2.0	2.5	
	7.5	Brown, Moist, SANDY SILTY CLAY, Trace Gravel.	SS 3	7-9-10 (19)	100	11.1		3.0	
	10.0		SS 4	10-10-10 (20)	100	11.9		1.5	
	12.5	13.0							
	15.0	Brown, Moist, SANDY SILTY CLAY, Trace Gravel, Occasional Sand Seams.	SS 5	12-14-15 (29)	100	14.5		2.0	
	17.5	18.0 ▼ ▨							
	20.0	Gray, Moist, SANDY SILTY CLAY, Trace Gravel.	SS 6	20-25-31 (56)	100	9.8		4.5+	
	22.5	22.0							
	25.0	Gray, Very Moist, Fine SAND, Trace Gravel.	SS 7	12-15-19 (34)	100	14.9			
	27.5	28.5							
	30.0	Gray, Moist, SILTY CLAY, Trace Fine Gravel. 30.0	SS 8	5-5-7 (12)	100	14.4		1.0	
	32.5	Bottom of Boring at 30.0 ft							
	35.0								

GME TESTING

TEST BORING LOG

BORING NO.: **B-4**
SHEET 1 OF 1
GME PROJECT NO: G24-092583
STRUCTURE
DATUM :
DATE STARTED : 12-02-24
DRILLER/INSP : JS/DW

CLIENT: A&Z Engineering, LLC (A&Z)
PROJECT TYPE : Proposed Water Main
LOCATION : 4th Street: between Washington Street and Railroad Street, St. Joe, IN

ELEVATION	:	BORING METHOD	: ASTM D-1586	LATITUDE	: 41.315439
STATION	:	RIG TYPE	: Skid	LONGITUDE	: -84.902881
OFFSET	:	CASING DIA.	: 3.3 in		
LINE	:	HAMMER	: Auto		
DEPTH	: 30.0 ft				

GROUNDWATER: ▽ Encountered at Dry ▼ At completion Dry

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6" (N)	% RECOVERY	% MOISTURE CONTENT	UNCONF. COMP., tsf	Qp (tsf)	REMARKS
		±7" ASPHALT. 0.6							
	2.5	Brown and Black Stained, Moist, Mottled SILTY CLAY, Trace Fine Gravel and Organics. 2.0	SS 1	3-4-5 (9)	100	26.4	1.6	1.0	
		Dark Gray and Brown, Moist, SILTY CLAY, Trace Gravel and Sand. 3.0							
	5.0	Brown, Moist, SILTY CLAY.	SS 2	7-12-15 (27)	100	17.5		4.5+	
		6.0							
	7.5		SS 3	7-9-10 (19)	100	10.7		4.0	
	10.0	Brown, Moist, SANDY SILTY CLAY, Trace Fine Gravel.	SS 4	8-10-11 (21)	100	11.4		4.0	
		12.0							
	12.5								
	15.0		SS 5	12-9-9 (18)	100	10.9	1.4	1.5	
		Gray, Moist, SANDY SILTY CLAY, Trace Fine Gravel, Occasional Sand Seams.							
	17.5								
	20.0	20.0	SS 6	30-34-40 (74)	100	9.6		4.5	
	22.5								
	25.0	Gray, Moist, Fine SAND.	SS 7	17-29-40 (69)	100	12.1			
	27.5								
		28.5							
	30.0	Gray, Moist, SILTY CLAY. 30.0	SS 8	20-50-51 (101)	100	14.9			
		Bottom of Boring at 30.0 ft							
	32.5								
	35.0								

GENERAL NOTES

SAMPLE IDENTIFICATION

Visual soil classifications are made in general accordance with the United States Soil Classification System on the basis of textural and particle size categorization, and various soil behavior and characteristics. Visual classifications should be made by appropriate laboratory testing when more exact soil identification is required to satisfy specific project applications criteria.

RELATIVE PROPORTIONS OF COHESIONLESS SOILS

Term	Defining Range by % of Weight
Trace	1-10 %
Little	11-20 %
Some	21-35 %
And	36-50 %

WATER LEVEL MEASUREMENT

NE	No Water Encountered
BF	Backfilled upon Completion

ORGANIC CONTENT BY COMBUSTION METHOD

Soil Description	LOI
w/ organic matter	4-15 %
Organic Soil (A-8)	16-30 %
Peat (A-8)	More than 30%

LABORATORY TESTS

Qp	Penetrometer Reading, tsf
Qu	Unconfined Strength, tsf
MC	Moisture Content, %
LL	Liquid Limit, %
PL	Plastic Limit, %
PI	Plastic Index
SL	Shrinkage Limit, %
pH	Measure of Soil Alkalinity/Acidity
γ	Dry Unit Weight, pcf
LOI	Loss of Ignition, %

DRILLING AND SAMPLING SYMBOLS

AS	Auger Sample
BS	Bag Sample
PID	Photo ionization Detector (Hnu meter) volatile vapor level,(PPM)
COA	Clean-Out Auger
CS	Continuous Sampling
FA	Flight Auger
HA	Hand Auger
HAS	Hollow Stem Auger
NR	No Recovery
PT	3” O.D. Piston Tube Sample
RB	Rock Bit
RC	Rock Coring
REC	Recovery
RQD	Rock Quality Designation
RS	Rock Sounding
S	Soil Sounding
SS	2”O.D. Split-Barrel Sample
2ST	2”O.D. Tin-Walled Tube Sample
3ST	3” O.D. Thin-Walled Tube Sample
VS	Vane Shear Test
DB	Diamond Bit
WS	Wash Sample
RB	Roller Bit
ST	Shelby Tube, 2” O.D. or 3” O.D.
CB	Carbide Bit
WOH	Weight of the Hammer

GRAIN SIZE TERMINOLOGY

Soil fraction	Particle size	Us standard sieve size
Boulders	larger than 75 mm	Larger than 3”
Gravel	2mm to 75 mm	#10 to 75 mm
Coarse Sand	0.425 mm to 2 mm	#40 to #10
Fine Sand	0.075mm to 0.425 mm	#200 to #40
Silt	0.002 mm to 0.075 mm	Smaller than #200
Clay	Smaller than 0.002 mm	Smaller than #200

RELATIVE DENSITY

Term	“N” Value
Very Loose	0-5
Loose	6-10
Medium Dense	11-30
Dense	31-50
Very Dense	51+

CONSISTENCY

Term	“N” Value
Very Soft	0-3
Soft	4-5
Medium Stiff	6-10
Stiff	11-15
Very Stiff	16-30
Hard	31+

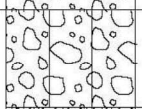
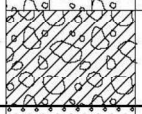
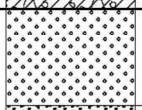
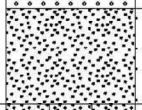
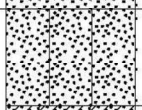
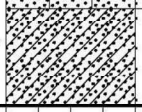
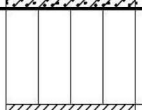
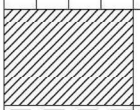
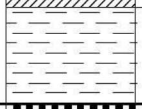
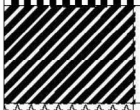
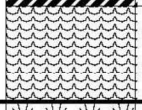
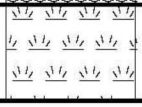
PLASTICITY

Term	Plastic Index
None to Slight	0-4
Slight	5-7
Medium	8-22
High/Very High	Over 22

Note(s):
The penetration resistance, “N” Value, is the summation of the number of blows required to effect two successive 6-inch penetrations of the 2-inch split-barrel sampler. The sampler is driven with a 140-lb. weight falling 30-inches and is seated to a depth of 6-inches before commencing the standard penetration test.
Water level measurements shown on the boring logs represent conditions at the time indicated and may not reflect static levels, especially in cohesive soils

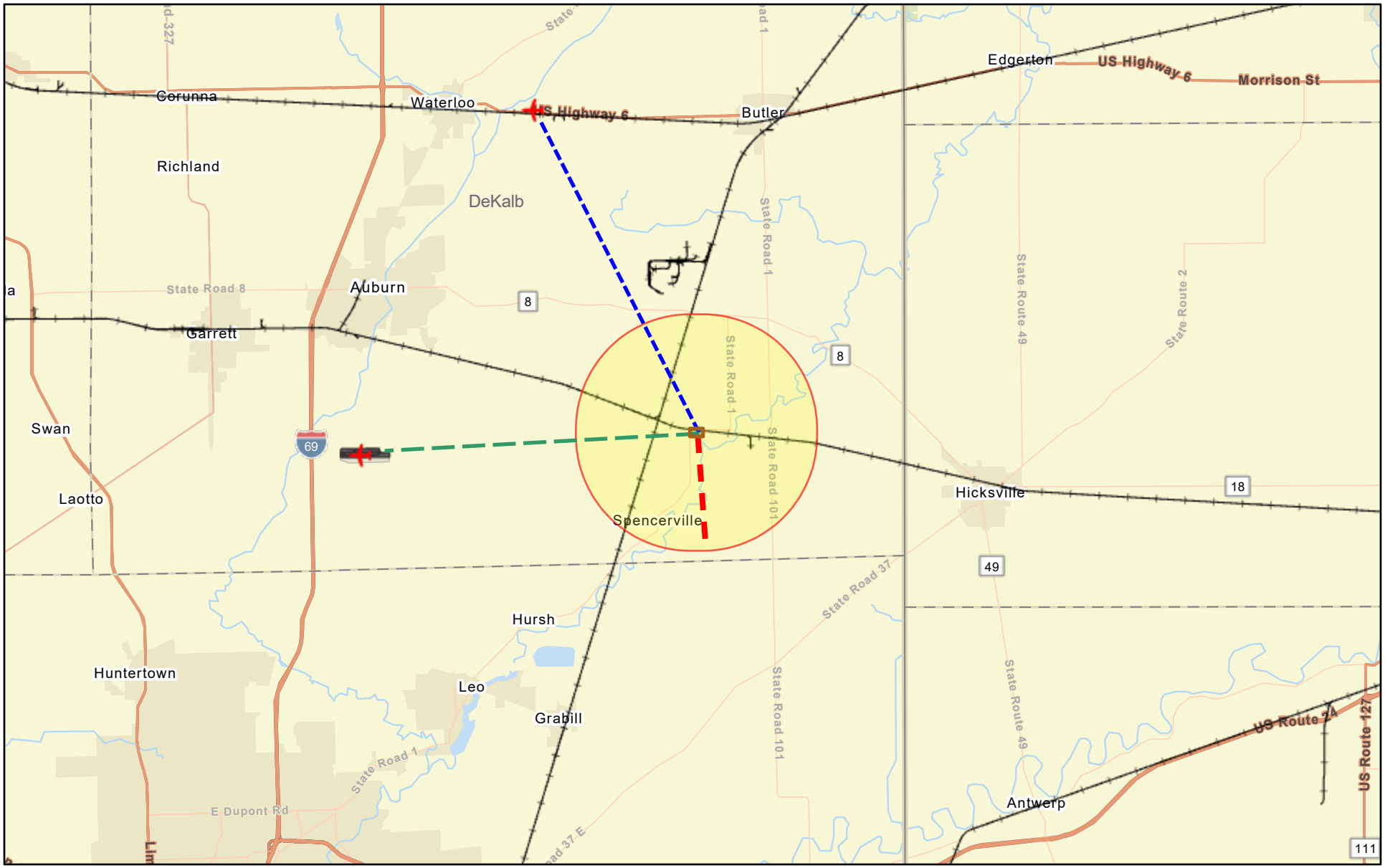
GME TESTING
3517 Focus Drive
Fort Wayne, IN 46818
(260) 497- 8127▪ (877) 660-4GME▪ (260) 497- 0826 fax
Division of ***GEOTECHNICAL & MATERIALS ENGINEERS, INC.***
www.gmetesting.com

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS — MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS — MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

Saint Joe Water Project Airport Hazard Map



February 7, 2025

- Project Area
- 15,000 ft Project Buffer
- 10.44 miles
- 11.92 miles
- Project Buffer
- Airport Points
- Airport Polygons
- Railroads

1:288,895

0 1.75 3.5 7 mi

0 3 6 12 km

Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS, EPA OEI

A74

Airport Hazards (CEST and EA) – St. Joe Water Improvements Project

General policy	Legislation	Regulation
It is HUD's policy to apply standards to prevent incompatible development around civil airports and military airfields.		24 CFR Part 51 Subpart D
References		
https://www.hudexchange.info/environmental-review/airport-hazards		

1. **To ensure compatible land use development, you must determine your site's proximity to civil and military airports. Is your project within 15,000 feet of a military airport or 2,500 feet of a civilian airport?**

   ☒No → *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide a map showing that the site is not within the applicable distances to a military or civilian airport (See Attached Map)*

   ☐Yes → *Continue to Question 2.*

2. **Is your project located within a Runway Potential Zone/Clear Zone (RPZ/CZ) or Accident Potential Zone (APZ)?**

   ☐Yes, project is in an APZ → *Continue to Question 3.*

   ☐Yes, project is an RPZ/CZ → *Project cannot proceed at this location.*

   ☒No, project is not within an APZ or RPZ/CZ

   → *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide a map showing that the site is not within either zone.*

3. **Is the project in conformance with DOD guidelines for APZ?**

   ☐Yes, project is consistent with DOD guidelines without further action.

   Explain how you determined that the project is consistent:

   → *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documentation supporting this determination.*

☐No, the project cannot be brought into conformance with DOD guidelines and has not been approved. → *Project cannot proceed at this location.*

☐Project is not consistent with DOD guidelines, but it has been approved by Certifying Officer or HUD Approving Official.

Explain approval process:

N/A

If mitigation measures have been or will be taken, explain in detail the proposed measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation.

N/A

→ *Based on the response, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documentation supporting this determination.*

Worksheet Summary

Compliance Determination

Provide a clear description of your determination and a synopsis of the information that it was based on, such as:

- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your region

1. The closest civilian airport has an approximate 10.44-Mile distance from St. Joe Water Improvements project and is not located within a Runway Potential Zone/Clear Zone (RPZ/CZ) or Accident Potential Zone (APZ).

See Airport Hazards Map

See Consulted Parties List – No objections or adverse effects noted.

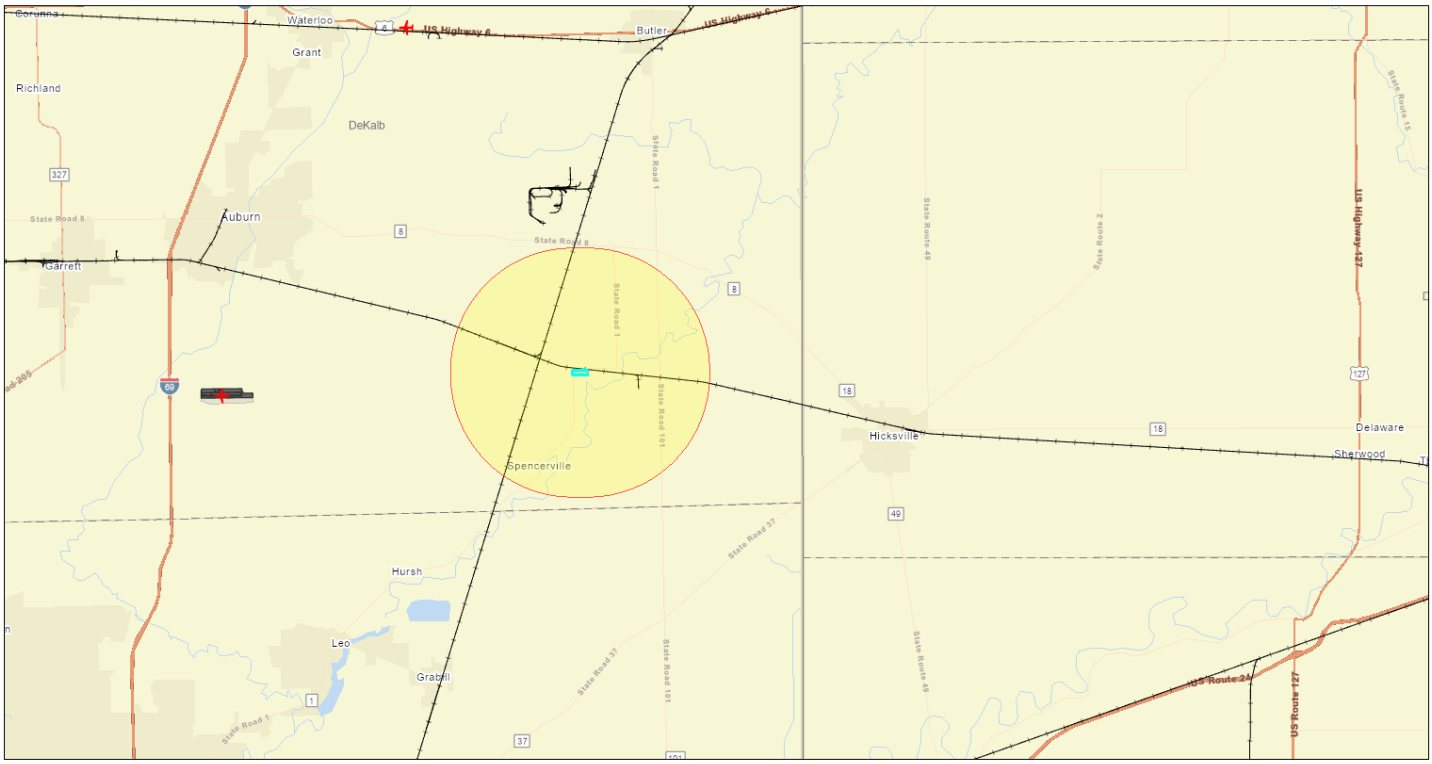
Are formal compliance steps or mitigation required?

☐ Yes

☒ No

NEPAssist Report

Airport Hazards Map



February 7, 2025

Project Buffer

Airport Hazards Map

Airport Points

Airport Polygons

Railroads

1:177,908

0 1.5 3 6 mi

0 2.5 5 10 km

Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS, EPA OEI

Input Coordinates: 41.315773,-84.906923,41.315773,-84.899857,41.314150,-84.899857,41.314150,-84.906923,41.315773,-84.906923	
Project Area	0.04 sq mi
Within 15000 feet of an Ozone 1-hr (1979 standard) Non-Attainment/Maintenance Area?	no
Within 15000 feet of an Ozone 8-hr (1997 standard) Non-Attainment/Maintenance Area?	no
Within 15000 feet of an Ozone 8-hr (2008 standard) Non-Attainment/Maintenance Area?	no
Within 15000 feet of an Ozone 8-hr (2015 standard) Non-Attainment/Maintenance Area?	no
Within 15000 feet of a Lead (2008 standard) Non-Attainment/Maintenance Area?	no
Within 15000 feet of a SO2 1-hr (2010 standard) Non-Attainment/Maintenance Area?	no
Within 15000 feet of a PM2.5 24hr (2006 standard) Non-Attainment/Maintenance Area?	no
Within 15000 feet of a PM2.5 Annual (1997 standard) Non-Attainment/Maintenance Area?	no
Within 15000 feet of a PM2.5 Annual (2012 standard) Non-Attainment/Maintenance Area?	no
Within 15000 feet of a PM10 (1987 standard) Non-Attainment/Maintenance Area?	no
Within 15000 feet of a CO Annual (1971 standard) Non-Attainment/Maintenance Area?	no
Within 15000 feet of a NO2 Annual (1971 standard) Non-Attainment/Maintenance Area?	no
Within 15000 feet of a Federal Land?	no
Within 15000 feet of an impaired stream?	yes
Within 15000 feet of an impaired waterbody?	no
Within 15000 feet of a waterbody?	yes
Within 15000 feet of a stream?	yes

Within 15000 feet of an NWI wetland?	Available Online
Within 15000 feet of a Brownfields site?	no
Within 15000 feet of a Superfund site?	no
Within 15000 feet of a Toxic Release Inventory (TRI) site?	yes
Within 15000 feet of a water discharger (NPDES)?	yes
Within 15000 feet of a hazardous waste (RCRA) facility?	yes
Within 15000 feet of an air emission facility?	yes
Within 15000 feet of a school?	yes
Within 15000 feet of an airport?	no
Within 15000 feet of a hospital?	no
Within 15000 feet of a designated sole source aquifer?	no
Within 15000 feet of a historic property on the National Register of Historic Places?	yes
Within 15000 feet of a Chemical Data Reporting (CDR) site?	yes
Within 15000 feet of a Land Cession Boundary?	yes
Within 15000 feet of a tribal area (lower 48 states)?	no
Within 15000 feet of the service area of a mitigation or conservation bank?	yes
Within 15000 feet of the service area of an In-Lieu-Fee Program?	yes
Within 15000 feet of a Public Property Boundary of the Formerly Used Defense Sites?	no
Within 15000 feet of a Munitions Response Site?	no
Within 15000 feet of an Essential Fish Habitat (EFH)?	no
Within 15000 feet of a Habitat Area of Particular Concern (HAPC)?	no
Within 15000 feet of an EFH Area Protected from Fishing (EFHA)?	no
Within 15000 feet of a Bureau of Land Management Area of Critical Environmental Concern?	no
Within 15000 feet of an ESA-designated Critical Habitat Area per U.S. Fish & Wildlife Service?	no
Within 15000 feet of an ESA-designated Critical Habitat river, stream or water feature per U.S. Fish & Wildlife Service?	no

Created on: 2/7/2025 9:19:10 AM

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Indiana Ecological Services Field Office
620 South Walker Street
Bloomington, IN 47403-2121
Phone: (812) 334-4261 Fax: (812) 334-4273

In Reply Refer To: 09/06/2024 13:38:02 UTC
Project Code: 2024-0140561
Project Name: St. Joe Water Improvements Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through IPaC by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see Migratory Bird Permit | What We Do | U.S. Fish & Wildlife Service (fws.gov).

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

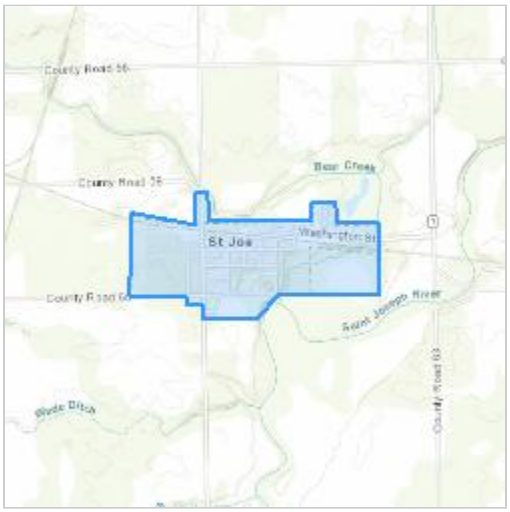
Indiana Ecological Services Field Office
620 South Walker Street
Bloomington, IN 47403-2121
(812) 334-4261

PROJECT SUMMARY

Project Code: 2024-0140561
Project Name: St. Joe Water Improvements Project
Project Type: Federal Grant / Loan Related
Project Description: The Town of St. Joe's proposed Water Improvements Project, located in DeKalb County, Indiana within the Town of St. Joe's Water Utility Service Area, includes the replacement of asbestos cement water mains throughout Town and water main looping on the northwest side of Town to improve water quality and provide additional fire flow and pressure. The Town of St. Joe anticipates funding this project with the use of Community Development Block Grant (CDBG) grant funds from the Indiana Office of Community and Rural Affairs and a State Revolving Fund (SRF) Loan from the Indiana Finance Authority (IFA). Contingent upon funding approval, the Town anticipates construction between the Fall of 2025 and the end of 2026.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.3147242,-84.90190583752513,14z



Counties: DeKalb County, Indiana

ENDANGERED SPECIES ACT SPECIES

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered

BIRDS

NAME	STATUS
Whooping Crane *Grus americana* Population: U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/758	Experimental Population, Non-Essential

CLAMS

NAME	STATUS
Rayed Bean *Villosa fabalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5862	Endangered
Salamander Mussel *Simpsonaias ambigua* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6208	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency: St. Joe town
Name: Matt Vondran
Address: 200 East Berry Street, Ste 230
City: Fort Wayne
State: IN
Zip: 46802
Email matt.vondran@co.allen.in.us
Phone: 2604497903

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Department of Housing and Urban Development
Name: Bryce Gorman
Email: BGorman@lg.in.gov
Phone: 4632457690