Biological Assessment

Brent Spence Bridge Corridor

KYTC Item No. 6-17.00; ODOT PIN 116649

October 18, 2022

TEAM KENTUCKY TRANSPORTATION CABINET

BRENT SPENCE BRIDGE CORRIDOR

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CHAPTER 1 – PROJECT INTRODUCTION

1.1 BIOLOGICAL ASSESSMENT INTRODUCTION

As part of the consultation process defined in Section 7 of the Endangered Species Act (ESA), the Kentucky Transportation Cabinet (KYTC) and the Ohio Department of Transportation (ODOT) are submitting this Biological Assessment (BA) for the proposed Brent Spence Bridge (BSB) Corridor project in Kenton County, Kentucky and Hamilton County, Ohio. This project is referred to as KYTC item number 6-17 and ODOT PID number 116649.

1.2 PROJECT DESCRIPTION

The BSB Corridor project consists of 7.8 miles of I-71 and I-75 located within portions of Ohio and Kentucky. This corridor is located within the Greater Cincinnati/Northern Kentucky region and is a major route for regional and local mobility. Regionally, the BSB carries both I-71 and I-75 traffic over the Ohio River and connects to I-74, I-275, and US-50. The corridor is also one of the busiest trucking routes in the United States, connecting Michigan to Florida via I-75. The BSB corridor also facilitates local travel by providing access to downtown Cincinnati in Hamilton County, Ohio, and Covington in Kenton County, Kentucky.

The primary features of the BSB Corridor project are illustrated in Figure 1.3–1. The project will:

- Reconstruct I-71/I-75 and add one lane in each direction;
- Rebuild the overpass bridges and interchanges in the corridor, including removing some left hand exits and adding a new exit at Ezzard Charles Drive in Ohio;
- Construct a collector-distributor system between West 12th Street/Martin Luther King Jr. Boulevard in Kentucky and Ezzard Charles Drive in Ohio;
- Extend frontage roads connecting Pike Street to West 4th Street and West 5th Street in Kentucky;
- Add collector-distributor lanes between Dixie Highway and Kyles Lane in Kentucky;
- Rehabilitate and reconfigure the existing double decker BSB to carry local traffic; and
- Build a new double decker companion bridge west of the existing BSB to carry through (interstate) traffic.

1.3 PURPOSE AND NEED

The BSB Corridor project will improve the operational characteristics within the I-75 corridor for both local and through traffic. In the Greater Cincinnati/Northern Kentucky region, the I-75 corridor suffers from congestion and safety–related issues as a result of inadequate capacity to accommodate current traffic demand. The purpose of this project is to:

- improve traffic flow and level of service,
- improve safety,
- correct geometric deficiencies, and
- maintain connections to key regional and national transportation corridors.

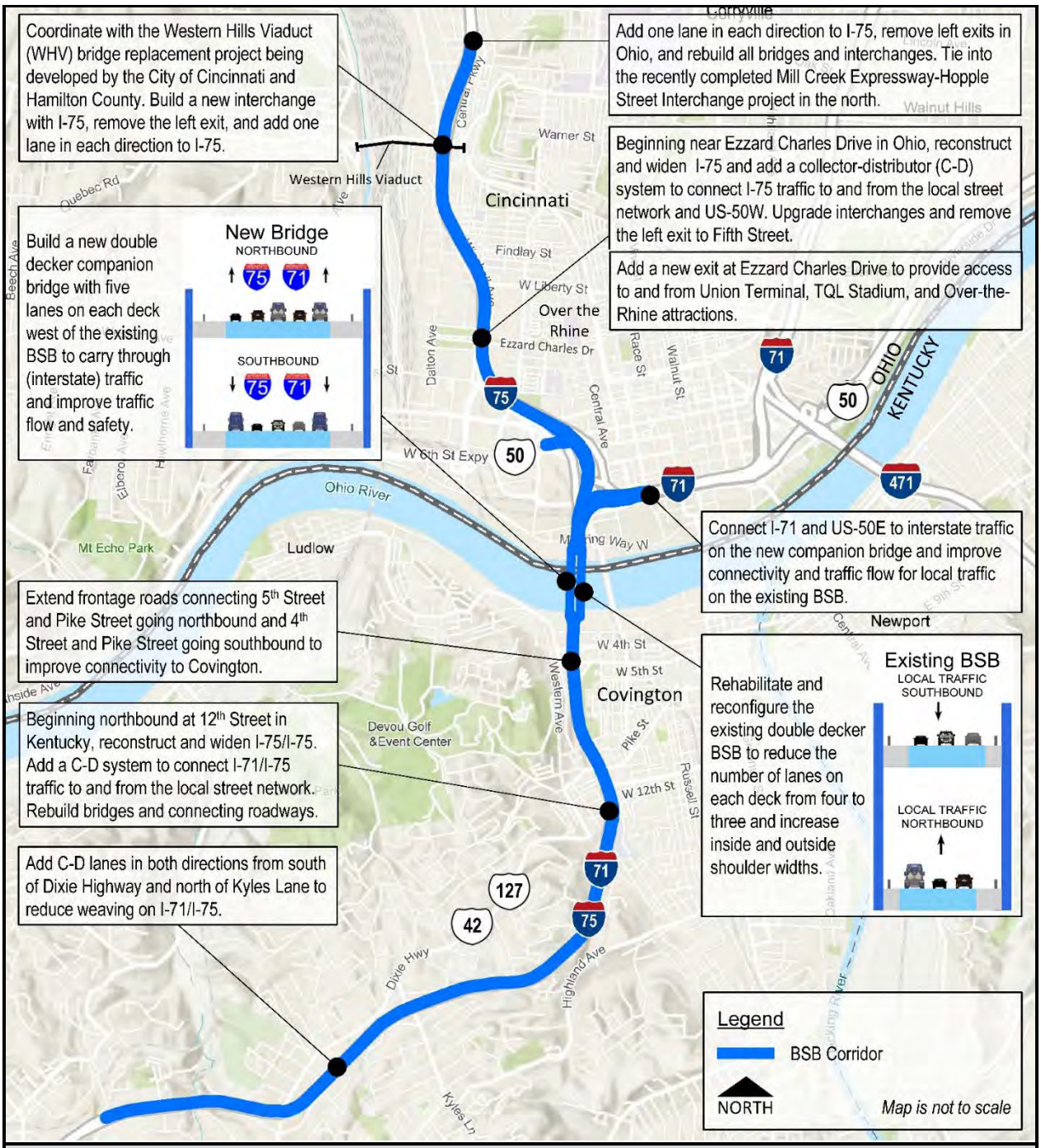

Figure 1.3–1. Primary Features of the BSB Corridor Project

1.4 PREFERRED ALTERNATIVE

KYTC and ODOT developed a range of alternatives for improving the I-71/I-75 corridor in Kentucky and Ohio through a series of preliminary engineering and planning studies coupled with extensive public and stakeholder involvement. These activities were documented in the project's Environmental Assessment (March 2012). On August 9, 2012, the Federal Highway Administration (FHWA) issued a Finding of No Significant Impact (FONSI) identifying Alternative I as the Preferred Alternative for the BSB project.

Since the approval of the FONSI, KYTC and the ODOT completed additional studies to update the Preferred Alternative to reflect current design standards, traffic counts, and traffic operations. KYTC and ODOT also conducted a value engineering analysis of the preferred alternative. These efforts resulted in refinements to Preferred Alternative I, which have been designated as Concept I-W.

Concept I-W matches Alternative I for the I-71/I-75 alignment from Dixie Highway north to West 12th Street in Kentucky and north of Freeman Avenue in Ohio. It also includes the local collector-distributor along both sides of I-75 in Ohio. Concept I-W also modifies the 5th Street intersection with Central Avenue in Ohio to include an additional eastbound through lane.

Concept I-W builds a new double decker companion bridge (with a width of 107 feet) just west of the existing BSB with all I-71 and I-75 traffic on the new bridge and all local collector-distributor traffic on the existing BSB. The new companion bridge carries five lanes of southbound I-71 and I-75 traffic on the lower deck and five lanes of northbound I 71 and I-75 traffic on the upper deck. The rehabilitated existing BSB carries three lanes of northbound local traffic on the lower deck and three lanes of southbound local traffic on the upper deck, as part of the collector-distributor roadway system.

In addition, Concept I-W includes the following value engineering components:

- Reconfigure the lanes on the existing BSB and new companion bridge to keep through (interstate) and local (collector-distributor) traffic on separate facilities.
- Optimize interchange geometry by utilizing the land formerly occupied by the Dunn-Humby building in Cincinnati.
- Adjust the design speed of the roadways to match the posted speed limits: 55 mph on the I-71/I-75 mainline and 45 mph on the collector-distributor roads.
- Allow the inside and outside shoulder widths on ramps to be flipped to reduce overall width and improve horizontal stopping sight distance.
- Provide 10-foot inside and outside shoulder widths for I-71/I-75 and the collector-distributor roads according to current design standards.
- Reduce the number of lanes on the frontage roads between West 12th Street and Pike Street in Kentucky, as supported by traffic operational analyses.

Furthermore, KYTC and ODOT are considering reducing the main span length of the new companion bridge from 1,000 feet to 870 feet based on informal coordination with the U.S. Coast Guard in late 2012 and early 2013.

The value engineering refinements incorporated within the limits of Phase III have not substantially changed the following major design components included in the 2012 EA/FONSI:

- The mainline and ramp layout from Dixie Highway (in Kentucky) to Linn Street (in Ohio);
- The number of interstate and collector-distributor lanes;
- The collector-distributor roadway concept between West 12th Street (Kentucky) and Ezzard Charles Drive (Ohio); and
- The approved bridge types for the new companion bridge – a simply supported arch bridge with inclined arch ribs and a two-tower cable-stayed bridge with vertical legs/towers.

The collective value engineering refinements that have been incorporated into the preferred alternative since the 2012 EA/FONSI are referred to as Preferred Alternative I (Concept I-W).

KYTC and ODOT are currently preparing a supplemental Environmental Assessment to reflect the refined Preferred Alternative (Concept I-W). These efforts also involve updating resource-specific studies to reflect any changes in conditions that have occurred since they were originally prepared.

1.5 COMPONENTS OF THE ACTION

The reconstruction of approximately five miles of I-71/I-75 in Kentucky and one mile of I-75 in Ohio would begin with the clearing and grubbing of trees, brush, and other vegetation within the clearing limits of the project alignment. Tree removal may occur prior to grubbing to accommodate tree clearing restrictions without requiring site stabilization. Construction of the roadway embankment will begin following clearing and grubbing activities, using approved rock and excavated materials to bring the roadbed up to final grade to bring existing conditions up to necessary road grade. Roadway construction may also require straightening and channelizing perennial, intermittent, and ephemeral streams for short distances. These streams will be permanently routed under bridges or through culverts depending on stream size.

While construction methods will be determined by the contractor, common construction methods will be utilized. The construction of bridge piers in the Ohio River will likely require temporary causeways. With the existing BSB immediately to the east of the proposed companion bridge, the causeways will most likely be built on the western side of the proposed bridge alignment. Exact plans for the causeway will be determined by the contractor. Construction will most likely include two temporary fixed causeway bridges constructed of steel piling driven into the riverbed. Transverse “legs” going from this main causeway will provide access to build pier foundations. This causeway design is beneficial over fill-based causeways as impacts are confined to the smaller footprint of the steel pilings. Additionally, the cross-sectional area of the river will remain unimpeded and should not affect aquatic habitats via elevated velocities and bed scour. Relatively small amounts of fill will be used on/near the banks for the transition onto the causeway and for pier construction on land.

Other construction methods that are anticipated include drilled shaft foundations and waterline footings for the bridge piers to minimize in-stream construction work, and potentially caissons or cofferdams, allowing for work in dry conditions. Pier locations may include areas where barges will spud (mooring midchannel using removable steel pilings attached to the barge). Excavation of the drilled shafts will be accomplished using an auger, drilling bucket, rock auger, belling bucket or similar tool depending on soil conditions and presence of rock. Drilling machines will be mounted on a carrier, such as a crane, excavator, crawler or truck, and operated from drilling platforms or barges.

Depending on soils, shafts may be partially to fully cased in steel that may be temporary or permanent. Casings will be installed to the appropriate depth using either an oscillator or rotator. Once casings are installed, the shaft will be filled with water or slurry to prevent collapse as the shafts are excavated. Following excavation of the shaft, a reinforcing cage constructed of rebar will be placed in the drill shaft and then concrete will be pumped into the shaft, displacing the water or slurry in the shaft. Drilled material will be disposed of offsite and will not enter waterways. Piers will be installed either on waterline footings or at the river/substrate interface, with concrete poured in dry conditions facilitated by the caissons/cofferdams. All efforts will be made to keep any water contaminated by the pours from entering the river. Any contaminated water will be extracted and either treated or properly disposed. Once the piers are installed, bridge construction will be able to proceed with little to no impact on instream features.

Staging, refueling, and clean-up areas will be constructed at a minimum of 100 feet from the normal water line, bank of jurisdictional waters, or waters of the State. Equipment cleaning/staging areas will be lined to prevent groundwater seepage and will include drainage controls to filter runoff through vegetated areas. Sediment control structures will be located between the staging area and receiving waterbodies to minimize the potential for impacts to jurisdictional waters. Fuel and other petroleum products will be stored in the staging area and best management practices (BMPs) will be implemented to minimize the potential for fuel spills and contamination.

CHAPTER 2 – ENVIRONMENTAL SETTING

2.1 PHYSIOGRAPHY, GEOGRAPHY, AND ECOREGION

The project is situated in the Interior Plateau physiographic region, more specifically the Outer Bluegrass Ecoregion (Woods et al. 2002). The Outer Bluegrass is described as rolling to hilly, containing sinkholes, springs. entrenched rivers, and intermittent and perennial streams. Discontinuous glacial outwash and leached, pre- Wisconsinian till deposits occur in the north. Natural soil fertility is relatively high. Pastureland and cropland are widespread, with dissected areas remaining wooded. Upland streams have moderate to high gradients and cobble, boulder, or bedrock substrates. Concentrations of suspended sediment and nutrients can be high (Woods et al. 2002).

A majority of Kenton County, Kentucky is deeply dissected upland. The north-central part of the county is characterized by flat-topped ridges with elevations ranging from 800-900 feet (245-275 meters) above sea level. The Ohio River forms the northern boundary, and the Licking River forms the eastern boundary; Boone County lies to the west and Grant and Pendleton Counties lie to the south.

In Ohio the vast majority of the project footprint is occupied by intensively developed urban land, including commercial, residential, and industrial areas; highways and streets; and maintained lawn. Terrestrial habitats are limited to a narrow (approximately 20-foot wide), wooded riparian zone consisting of young trees and shrubs located along portions of the Ohio River and scrub areas along the existing interstate right-of-way.

2.2 WATERSHED

The project impact area is contained within the eight-digit Hydrologic Unit Codes (HUC) Licking River (HUC 05100101), and the Middle Ohio - Laughery (HUC 05090203) watersheds. Eleven-digit HUCs which overlap the project area are the Ohio River, near Constance (05090203040), the Licking River, near the mouth (05100101270), Banklick Creek (05100101290), the Ohio River, below Little Miami River to above Great Miami River [except Mill Creek] (05090203020), and Mill Creek (05090203010). A majority of the original surface flow within the project footprint has been altered by the existing interstate, as well as the dense urban center of Covington and Cincinnati, and single- family residential, and commercial development along the interstate.

The project area is located within the major watersheds of the Licking River and the Ohio River. No Kentucky outstanding state resource waters (OSRWs) or Exceptional Waters are located in the project area. No streams listed as impaired on Kentucky's 303(d) list are near the project area.

2.3 LAND USE

The project is within an urban landscape dominated by single-family residential, multifamily residential, commercial development, maintained grass areas, the 1-75/1-71 transportation corridor, and institutional uses. Table 2.3–1 presents a summary of general land use/cover within one kilometer of the project (Homer et al. 2020). The land cover within a 1-km radius of the project footprint is primarily developed with 84.88% of total land cover comprised of the four types of developed (open space, low intensity, medium intensity, or high intensity).

Table 2.3–1. Land Use/Cover in the Project Area

LAND USE	ACRES	PERCENTAGE
Open Water	268.21	3.54%
Developed, Open Space	1,029.69	13.61%
Developed, Low Intensity	1,358.83	17.96%
Developed, Medium Intensity	1,802.51	23.82%
Developed, High Intensity	2,231.06	29.49%

LAND USE	ACRES	PERCENTAGE
Barren Land	17.35	0.23%
Deciduous Forest	636.05	8.41%
Evergreen Forest	4.89	0.06%
Mixed Forest	146.56	1.94%
Shrub/Scrub	1.78	0.02%
Grassland/Herbaceous	19.13	0.25%
Pasture/Hay	28.02	0.38%
Emergent Herbaceous Wetlands	22.02	0.29%
TOTAL	**7,566.10**	**100.00%**

CHAPTER 3 – LISTED SPECIES

3.1 COORDINATION

Early coordination with the U.S. Fish and Wildlife Service (USFWS) occurred on multiple occasions between 2006 and 2010 as part of the preliminary engineering and planning studies previously completed for the project. These early coordination and consultation letters are included in Appendix B.

Coordination with USFWS occurred again in 2022 to obtain the official list of Threatened and Endangered (T&E) species in the project area. This information was obtained from the USFWS's Information for Planning and Consultation (IPaC) website, which provides a list of federally T&E species in the project area and serves as coordination with USFWS (USFWS 2020a). Coordination efforts can be viewed in Appendix B. The USFWS listed species are as follows.

- Indiana bat (*Myotis sodalis*)
- northern long-eared bat (*Myotis septentrionalis*)
- gray bat (*Myotis grisescens*)
- tricolored bat (*Perimyotis subflavus*) (Proposed species)
- clubshell (*Pleurobema clava*)
- fanshell (*Cyprogenia stegaria*)
- northern riffleshell (*Epioblasma rangiana*)
- orangefoot pimpleback (*Plethobasus cooperianus*)
- pink mucket (*Lampsilis abrupta*)
- rabbitsfoot (*Quadrula cylindrica cylindrica*)
- ring pink (*Obovaria retusa*)
- rough pigtoe (*Pleurobema plenum*)
- sheepnose mussel (*Plethobasus cyphyus*)
- snuffbox mussel (*Epioblasma triquetra*)
- spectaclecase (*Cumberlandia monodonta*)
- monarch butterfly (*Danaus plexippus*) (Candidate species)

Species studied under this assessment included the gray bat, Indiana bat, northern long-eared bat, and the 11 listed mussel species. The tricolored bat is a proposed endangered species that will not require consultation and is not studied further under this assessment. The monarch butterfly is a candidate species that will not require consultation and is not studied further under this assessment.

3.2 STATUS OF LISTED SPECIES

3.2.1 GRAY BAT (*MYOTIS GRISESCENS*)

Current Status – Endangered

Listing Date – April 28, 1976

Recovery Plan/Status/Critical Habitat – There is no critical habitat listed for this species. A recovery plan for *Myotis grisescens* was published in 1982; the most recent notice of 5-year review initiation was published in 2019 (USFWS 2022c).

ID Features – The gray bat is a small, grey bat, generally weighing between 7-10 g, with an average total length of between 80-105 mm. Gray bats can be distinguished from the other myotis by uniform-colored dorsal fur from base to tip and by attachment of wing membrane at ankle, not at base of toe.

Preferred Habitat – This species forms roosts in caves during the winter months. During summer, forested habitat (riparian) is used for foraging.

Threats to Species Persistence – In addition to white-nose syndrome, human disturbance is a significant cause of mortality in this species. Disturbance to caves and their openings are the primary anthropogenic threats to this species' survival.

3.2.2 INDIANA BAT (*MYOTIS SODALIS*)

Current Status – Endangered

Listing Date – March 11, 1967

Recovery Plan/Status/Critical Habitat – Critical habitat for this species occurs in Illinois, Indiana, Kentucky, Missouri, and West Virginia. Two locations are designated critical habitat in Kentucky: Bat Cave in Carter County and Coach Cave in Edmonson County. A recovery plan for *Myotis sodalis* was published in 2007. The most current published 5-year review results were published in 2019. In addition, yearly guidance is provided by USFWS regarding capture methods and methods for mitigation of impacts to this species (USFWS 2022a).

ID Features –The Indiana bat is a small, brown bat, generally weighing between 5 – 11 g, with an average total length of between 75-102 mm. Notable similar species are the little brown bat (*Myotis lucifugus*) and northern long-eared bat (*Myotis septentrionalis*), from which it can be distinguished by the presence of a keeled calcar, coloration, and absence of long toe hairs.

Preferred Habitat – This species forms communal roosts in caves during the winter months. During summer, forested habitat (both upland and riparian) is used for foraging and roosting; of note is the use of forested areas as habitat for maternity colonies.

Threats to Species Persistence – White-nose syndrome causes mortality of significant numbers of communal-roost utilizing bats, including the Indiana bat. Direct disturbance to caves and their openings, as well as the loss of forested habitat in the species range are the primary anthropogenic threats to this species' survival.

3.2.3 NORTHERN LONG-EARED BAT (*MYOTIS SEPTENTRIONALIS*)

Current Status – Threatened with 4(d) Rule

Listing Date – May 4, 2015 **Final 4(d) Rule Date** – January 14, 2016

Recovery Plan/Status/Critical Habitat – Critical habitat for this species has not been listed. A recovery plan for *Myotis septentrionalis* has not been published at this time. Yearly guidance is provided by USFWS regarding capture methods and methods for mitigation of impacts to this species. A Species Status Assessment report was published in March of 2022 (USFWS 2022b).

ID Features – The northern long-eared bat is a small, brown bat, generally weighing between 5-10 g, with ears long enough to fold past the tip of the nose (17-19mm). Notably similar species are the little brown bat (*Myotis lucifugus*) and Indiana bat (*Myotis sodalis*), from which it can be distinguished by the lack of a keeled calcar, coloration, and the sparse to medium-long toe hairs.

Preferred Habitat – This species forms communal roosts in caves during the winter months. During summer, forested habitat (both upland and riparian) is used for foraging and roosting; of particular note is the use of forested areas as habitat for maternity colonies.

Threats to Species Persistence – White-nose syndrome causes mortality of significant numbers of communal-roost utilizing bats, including northern long-eared bat. Direct disturbances to caves and their openings are the primary anthropogenic threats to this species' survival.

3.2.4 CLUBSHELL (*PLEUROBEMA CLAVA*)

Current Status – Endangered and Experimental Population, Non-Essential

Listing Date – January 22, 1993

Recovery Plan/Status/Critical Habitat – A recovery plan was drafted in September of 1994. A five-year review was published in August of 2019 and can be found on the US Fish and Wildlife website. Currently there is no critical habitat listed for the clubshell (USFWS 2022d).

ID Features – The shell has an oval to triangle shape and is compressed and thick. The posterior margin is pointed and the anterior margin is rounded. The ventral margin is straight to slightly curved and the umbo extends above the hinge line. The shell is smooth and yellowish brown to brown with broken rays. (Cicerello & Schuster 2003).

Preferred Habitat – Sand and gravel of small to large rivers (Cicerello & Schuster 2003).

Threats to Species Persistence – It is negatively impacted by water quality degradation, the operation of impoundments, a variety of instream activities, land-based development near occupied habitats, and mining.

3.2.5 FANSHELL (*CYPROGENIA STEGARIA*)

Current Status – Endangered and Experimental Population, Non-Essential

Listing Date – June 21, 1990

Recovery Plan/Status/Critical Habitat – A recovery plan was drafted in July of 1991. A five-year review was published in July of 2019 and can be found on the US Fish and Wildlife website. No critical habitat is listed for the fanshell (USFWS 2022e).

ID Features – Rounded shell that is moderately inflated and thick. The shell has shingle-like growth rings and knobs on the anterior half of the shell. It is greenish to yellow or brown in color with many fine green dots or dashes bundled into broken dark rays (Cicerello & Schuster 2003).

Preferred Habitat – In the sand and gravel of medium-sized to large rivers (Cicerello & Schuster 2003).

Threats to Species Persistence – It is negatively impacted by water quality degradation, the operation of impoundments, a variety of instream activities, land-based development near occupied habitats, and mining.

3.2.6 NORTHERN RIFFLESHELL (*EPIOBLASMA RANGIANA*)

Current Status – Endangered

Listing Date – January 22, 1993

Recovery Plan/Status/Critical Habitat – A recovery plan was drafted in September of 1994. A five-year review was published in August of 2019 and can be found on the US Fish and Wildlife website. No critical habitat is listed for the northern riffleshell (USFWS 2022f).

ID Features – The shell is elongate oval to rectangular, the posterior margin is pointed or broadly rounded and inflated, and the anterior margin is rounded. The shell is moderately inflated, thick anteriorly and thin

posteriorly. The umbos are anterior and even with the hinge line. Posterior and middle ridges rounded, with or without low knobs. Finally, the shell is yellowish or greenish brown with fine green rays (Cicerello & Schuster 2003).

Preferred Habitat – In the sand and gravel of small to large rivers (Cicerello & Schuster 2003).

Threats to Species Persistence – It is negatively impacted by water quality degradation, the operation of impoundments, a variety of instream activities, land-based development near occupied habitats, and mining.

3.2.7 ORANGEFOOT PIMPLEBACK (*PLETHOBASUS COOPERIANUS*)

Current Status – Endangered

Listing Date – June 14, 1976

Recovery Plan/Status/Critical Habitat – A recovery plan was drafted in September of 1984. A five-year review was published in April of 2018 and can be found on the US Fish and Wildlife website. No critical habitat is listed for the orangefoot pimpleback (USFWS 2022g).

ID Features – The shell is round to slightly oval, the posterior margin is rounded, and the anterior margin is rounded. The shell is compressed and thick. The umbos are anterior and even with the hinge line. Knobs are present on the posterior two-thirds of the shell, and the ventral margin is curved. Finally, the shell is yellowish brown to reddish brown (Cicerello & Schuster 2003).

Preferred Habitat – In sand and gravel of large rivers (Cicerello & Schuster 2003).

Threats to Species Persistence – It is negatively impacted by water quality degradation, the operation of impoundments, a variety of instream activities, land-based development near occupied habitats, and mining.

3.2.8 PINK MUCKET (*LAMPSILIS ABRUPTA*)

Current Status – Endangered

Listing Date – June 14, 1976

Recovery Plan/Status/Critical Habitat – A recovery plan was drafted in January of 1985. A five-year review was published in July of 2019 and can be found on the US Fish and Wildlife website. No critical habitat is listed for the pink mucket (USFWS 2022h).

ID Features – The shell is oval, the posterior margin is pointed and the anterior margin is rounded. The shell is thick and inflated. The umbos are even with the hinge line. Finally, the shell is smooth and yellow to yellowish green, sometimes with faint rays (Cicerello & Schuster 2003).

Preferred Habitat – In the sand and gravel of medium-sized to large rivers (Cicerello & Schuster 2003).

Threats to Species Persistence – It is negatively impacted by water quality degradation, the operation of impoundments, a variety of instream activities, land-based development near occupied habitats, and mining.

3.2.9 RABBITSFOOT (*QUADRULA CYLINDRICA CYLINDRICA*)

Current Status – Threatened

Listing Date – October 17, 2013

Recovery Plan/Status/Critical Habitat – No recovery plan is available for this species. A five-year review was published in June of 2020 and can be found on the US Fish and Wildlife website. Critical habitat has been designated in Ballard, Edmonson, Green, Hart, Livingston, Logan, Marshall, McCracken, and Taylor Counties, Kentucky (USFWS 2022i).

ID Features – The shell is an elongate rectangle, cylindrical to compressed and relatively thick. The posterior margin is squared with scattered ribs or knobs on the posterior ridge. The shell is tan, brown or green with green or black chevrons (Cicerello & Schuster 2003).

Preferred Habitat – Found in sand and gravel of medium-sized to large rivers (Cicerello & Schuster 2003).

Threats to Species Persistence – It is negatively impacted by water quality degradation, the operation of impoundments, a variety of instream activities, land-based development near occupied habitats, and mining.

3.2.10 Ring Pink (mussel) (*Obovaria retusa*)

Current Status – Endangered and Experimental Population, Non-Essential

Listing Date – September 29, 1989

Recovery Plan/Status/Critical Habitat – A recovery plan was drafted in March of 1991. A five-year review was published in September of 2019 and can be found on the US Fish and Wildlife website. No critical habitat is listed for the ring pink (USFWS 2022j).

ID Features – The shell is round; the anterior, posterior, and ventral margins are rounded. The shell is compressed to moderately inflated, and thick. The umbos are inflated, even with the hinge line, and face anteriorly. Finally, the shell is smooth and tan or brown (Cicerello & Schuster 2003).

Preferred Habitat – In the sand and gravel of medium-sized to large rivers (Cicerello & Schuster 2003).

Threats to Species Persistence – It is negatively impacted by water quality degradation, the operation of impoundments, a variety of instream activities, land-based development near occupied habitats, and mining.

3.2.11 Rough Pigtoe (*Pleurobema plenum*)

Current Status – Endangered and Experimental Population, Non-Essential

Listing Date – June 14, 1976

Recovery Plan/Status/Critical Habitat – A recovery plan was drafted in August of 1984. A five-year review was published in May of 2021 and can be found on the US Fish and Wildlife website. No critical habitat is listed for the rough pigtoe (USFWS 2022k).

ID Features – The shell is triangular, and the posterior and anterior margins are rounded. The shell is thick and inflated. The umbo is inflated and extends above the hinge line. Finally, the shell is smooth with a shallow depression and color is light to dark brown, sometimes with faint rays (Cicerello & Schuster 2003).

Preferred Habitat – In the sand and gravel of medium-sized to large rivers (Cicerello & Schuster 2003).

Threats to Species Persistence – It is negatively impacted by water quality degradation, the operation of impoundments, a variety of instream activities, land-based development near occupied habitats, and mining.

3.2.12 Sheepnose Mussel (*Plethobasus cyphus*)

Current Status – Endangered

Listing Date – April 12, 2012

Recovery Plan/Status/Critical Habitat – A recovery plan was drafted in January of 2014. A five-year review was published in August of 2020 and can be found on the US Fish and Wildlife website. No critical habitat is listed for the sheepnose mussel (USFWS 2022l).

ID Features – The shell is oval, moderately flat and thick. The anterior margin is rounded, and the posterior margin is squared or bluntly pointed. There is a shallow depression followed a row of low knobs on the posterior ridge that extend to the ventral margin. The shell is yellow to brown (Cicerello & Schuster 2003).

Preferred Habitat – In sand and gravel of medium-sized to large rivers (Cicerello & Schuster 2003).

Threats to Species Persistence – It is negatively impacted by water quality degradation, the operation of impoundments, a variety of instream activities, land-based development near occupied habitats, and mining.

3.2.13 SNUFFBOX MUSSEL (*EPIOBLASMA TRIQUETRA*)

Current Status – Endangered

Listing Date – February 14, 2012

Recovery Plan/Status/Critical Habitat – A recovery plan was drafted in April of 2017. A five-year review was published in February of 2019 and can be found on the US Fish and Wildlife website. No critical habitat is listed for the snuffbox (USFWS 2022m).

ID Features – The shell is triangular, the posterior margin is pointed, and the anterior margin is rounded. The shell is thick and inflated. The umbo is large and extends above the hinge line. Finally, the shell is smooth and yellow to yellowish green with dark green chevron markings (Cicerello & Schuster 2003).

Preferred Habitat – In the sand and gravel of small streams to medium-sized rivers (Cicerello & Schuster 2003).

Threats to Species Persistence – It is negatively impacted by water quality degradation, the operation of impoundments, a variety of instream activities, land-based development near occupied habitats, and mining.

3.2.14 SPECTACLECASE (*CUMBERLANDIA MONODONTA*)

Current Status – Endangered

Listing Date – April 12, 2012

Recovery Plan/Status/Critical Habitat – A recovery plan was drafted in January of 2014. A five-year review was published in August of 2019 and can be found on the US Fish and Wildlife website. There is no critical habitat listed for this species (USFWS 2022n).

ID Features – The shell is elongate oval, and the posterior and anterior margins are rounded. The shell is compressed and thin. The umbos are nearly flush with the hinge line. Finally, the shell is smooth and light to dark brown (Cicerello & Schuster 2003).

Preferred Habitat – Among boulders in mud, sand, or gravel of medium-sized to large rivers (Cicerello & Schuster 2003).

Threats to Species Persistence – It is negatively impacted by water quality degradation, the operation of impoundments, a variety of instream activities, land-based development near occupied habitats, and mining.

CHAPTER 4 – METHODOLOGY

The project area was examined to assess the potential for habitat used by T&E species with the known potential to exist within the project area. Appropriate study methods, benchmarks, and additional criteria were determined through coordination with state and federal agencies and the KYTC and ODOT. All methods were preapproved by a KYTC DEA biologist, and any work involving species federally listed as "Endangered" or "Threatened" was performed by HMB (USFWS collecting permit #TE129703-6), and Stantec Consulting Services (Stantec) (permit #ES-38821A).

4.1 BAT HABITAT ASSESSMENT OFFICE REVIEW

4.1.1 KENTUCKY REVIEW

An initial investigation included a survey of documented sources (topographic mapping, mine mapping, and aerial photography) to identify areas of potential year-round habitat for gray bat, and winter habitat for Indiana bat and northern long-eared bat (i.e., known mine openings, cave openings) in a 5-km radius of the project's proposed right-of-way. The Kentucky Speleological Survey (KSS) was contacted to assess the presence of any known cave or mine openings within a 5-km radius of the project footprint in Kentucky. The review of documented sources was also used to identify forested areas, which serve as foraging and maternity habitat (summer habitat) for Indiana bat and northern long-eared bat (upland forests), and as foraging habitat for gray bat and Indiana bat (forested riparian corridors). The identified forested areas were delineated using GIS mapping.

KYTC has chosen to assume presence for the gray bat, the Indiana bat and northern long-eared bat at the project area based upon historical range records and these species' potential to occur in Kenton County, Kentucky. For all direct, indirect, and cumulative impacts to Indiana bat summer roosting habitat, KYTC has committed to use the *Programmatic Biological Opinion on the Effects of Transportation Projects in Kentucky on the Indiana Bat and Gray Bat* developed in by the United Stated Fish and Wildlife Service, Kentucky Field Office (USFWS KFO) and the Federal Highway Administration (FHWA). This programmatic opinion will also be used to account for potential impacts to roosting habitat and foraging habitat for gray bat. For the northern long-eared bat, KYTC has committed to using the Final 4(d) Rule to account for all potential direct, indirect, and cumulative impacts on northern long-eared bat hibernacula and summer roosting habitat. Because of the assumption of presence for gray bat, Indiana bat and northern long-eared bat, and the use of the programmatic biological opinion and the Final 4(d) Rule, no active capture methods (i.e., mist netting) to determine presence or absence of these species were performed.

4.1.2 OHIO REVIEW

Similar investigations were conducted in Ohio as part of the *Level 1 Ecological Survey Report* completed by ASC Group, Inc. (ASC) (Appendix F). This included a review of documented sources (topographic mapping, aerial mapping, etc.) as well as a records review. The review of documented sources was also used to identify forested areas and suitable wooded habitat (SWH) for the listed bat species. SWH is defined as any tree covered area that is 0.5 acres or larger, containing any potential roosts (i.e., live trees and/or snags 3-inches diameter at breast height (dbh) that have exfoliating bark, cracks, crevices, and/or cavities) greater than 13-feet tall and at least 3-inches dbh, or any patch of trees with these characteristics that is less than ½ acre in size but within 1,000 feet of or connected by a travel corridor to a potential maternity roost tree (PMRT), ½ acre or larger stand of SWH, or any patch of wooded riparian buffer. The acreage of SWH was calculated for areas within 100 feet of the edge of pavement and then the acreage beyond 100 feet. ASC also coordinated with USFWS's Ohio Office to determine if the project was within a bat buffer.

ODOT has chosen to use the February 29, 2016, *Framework Programmatic Biological Opinion* (OHPBO), revised on December 12, 2017, to account for direct, indirect, and cumulative impacts to the Indiana bat and northern long-eared bat. This project qualifies as a Tier I project under the guidelines. As with Kentucky, no capture methods (i.e., mist netting) to determine presence or absence for the Indiana bat and northern long-eared bat were performed due to the assumed presence of the listed bats and the use of the OHPBO. The portion of the project in Ohio is not in the range of the gray bat.

4.2 BAT HABITAT ASSESSMENT FIELD SURVEY

4.2.1 KENTUCKY FIELD SURVEY

After a literature search for known caves within the 5-km buffer, a Phase 1 Habitat Assessment utilizing USFWS 2022 Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines (USFWS 2022o) was performed by HMB inside the 1-km buffer surrounding the project area in Kentucky. During the field survey, HMB's biologists talked to landowners in the area and asked if they were aware of any caves or mine openings on their property and any known caves identified during the literature search were verified and accessed. In addition, the forested areas identified during the bat habitat assessment as potential summer habitat crucial to Indiana bat, northern long-eared bat, and gray bat were field verified during the field visit.

Since bridges have been known to be used as summer roosting habitat for Indiana and gray bats, each bridge in the project area that could be safely examined was investigated by HMB for potential use, evidence of use (staining, guano, etc.), or presence of any bat species. Results of these investigations were recorded on *Kentucky Bats in Bridges Datasheet* developed by the KYTC (Appendix E).

4.2.2 OHIO FIELD SURVEY

ASC conducted field visits to survey the project area and field verify the SWH identified in the literature search. The general conditions of the project area were noted, the species of trees considered SWH were identified, and photographs of the SWH were taken. With bridges over streams considered summer roosting habitat for the Indiana bat, the field survey completed by ASC included an inspection of the existing BSB for potential use, evidence of use (staining, guano, etc.), or presence of any bat species.

4.3 MUSSEL HABITAT ASSESSMENT

Prior to field investigations, potential habitat for the 11 identified mussel species was identified by locating streams within the project corridor. Potential streams were identified by reviewing the U.S. Geological Survey's (USGS) 7.5-minute series topographic mapping, National Elevation Dataset, and the USGS Hydrology of Kentucky website. Then a walkover survey was conducted, and all streams identified were evaluated using the Kentucky Division of Water's (KDOW) *Methods for Assessing Biological Integrity of Surface Waters in Kentucky* and the Environmental Protection Agency's (EPA) Rapid Bioassessment Protocol (RBP) Habitat Assessment score. During the walkover survey, identified streams were also evaluated as potential mussel habitat.

4.4 MUSSEL SURVEY

The construction of the new companion bridge has the potential to impact the Ohio River. The Ohio River is a perennial stream with substrate consisting of silt, clay, sand, gravel, cobble, and boulders, which is providing some suitable habitat for the listed mussels. The current plan for the Preferred Alternative (Concept I-W) includes two piers within 90m of each bank and downstream of the existing BSB. It is assumed that causeways or cofferdams will be needed to construct the two proposed piers.

A mussel survey proposal was submitted to the USFWS field offices in Kentucky and Ohio on July 7, 2022. The mussel survey followed the *Ohio Mussel Survey Protocol* (Protocol) issued in April of 2022 by the Ohio Department of Natural Resources (ODNR) and USFWS's Ohio Ecological Service Field Office. A transect-based study, as described in Group 4 protocols, was utilized with transects placed at 10-meter increments along the shoreline and bisecting the proposed study area. This methodology was designed to provide a sufficient assessment of the unionid assemblage within the areas of impact to the stream associated with the project to determine presence/absence of the listed mussels. The USFWS Kentucky and Ohio field offices approved the mussel survey proposal based on the available suitable habitat within the project's proposed right-of-way. This coordination can be found in Appendix B.

Mussels were collected by visual or surface searches, including moving cobble and woody debris, hand sweeping away silt, sand, and/or small detritus, and disturbing/probing the upper five centimeters of the substrate. The substrate was assessed by divers using visual or tactile methods.

Divers searched the area using surface-supplied air. Mussels were collected in mesh bags and brought to shore for identification and data processing. Live mussels were measured to the nearest whole millimeter (mm) and recorded. Time out of the water for mussels was limited to only the time necessary for processing. Mussels were temporarily held in permeable containment in the river until returned to the approximate location where found. Spent values were observed and recorded only at the beginning of the survey and whenever new-to-the-project species was identified.

4.4.1 STUDY AREA

The areas of direct impact (ADIs) for the BSB Corridor project were located on the north and south banks of the Ohio River directly adjacent downstream of the existing bridge. The north ADI is approximately 17,500 m^2 (188,368.43 ft^2) (140m long and 140m wide) (and the south ADI is approximately 9,800m^2 (105,486.3 ft^2) (140m long and 70m wide) (459.32 ft x 229.66 ft). Buffers will follow those for bridge projects. The upstream buffers (USB) extend 50m (164 ft) above the top of each respective ADI and a downstream buffer (DSB) extends 100m (328 ft) below the bottom of each ADI. A lateral buffer (LTB) extends 10m (32.8 ft) towards the river center from the ADIs, DSBs, and USBs.

Since impacts are not anticipated to span the river, LTBs did not extend bank to bank, but mid-channel searches were conducted to inform upon future planning and avoidance.

4.4.2 PHASE I SURVEY

The Phase 1 Survey included the respective ADIs, USBs, DSBs, and LTB for the north and south banks. Phase 1 of the survey consisted of transects spaced 10m apart and 1m^2 wide in each respective area within the ADI, LTB, DSB, and USB buffer. These transects were divided into 10m segments and searched at a rate of 1 minute per square meter in heterogeneous substrates. Maps showing transect locations can be reviewed in the exhibits of Appendix A.

Mid-channel substrates in large river systems are often comprised of dune ripple bedforms consisting of unstable shifting sand. No fill, staging, or construction is currently proposed for mid-channel habitats at the project site. However, some limited sampling of these habitats was deemed prudent to account for unforeseen design and/or construction modifications. In addition to those requirements within the Protocol, a set of 10 randomly selected points was searched by two divers moving in an upstream direction for a total of 20 searches. Search duration equaled 10 minutes or more for a minimum total search time of 200 minutes. Mussels were collected by visual or surface searches, including moving cobble and woody debris, hand sweeping away silt, sand, and/or small detritus, and disturbing/probing the upper five centimeters (two inches) of substrate. Substrate composition was assessed by divers using visual or tactile methods.

4.4.3 PHASE II SURVEY

Phase 2 surveys were conducted where one or both of the following triggers were met:

- Five or more individuals were collected in any 10m segment in any area of the survey; and/or
- At least three species not listed in Appendix H of the Ohio guidelines were observed along any transect or within a qualitative survey conducted between transects.

For the Phase 2 work, the targeted area was defined as an area encompassing all triggered locations connected by similar habitat surrounded by a 10m buffer, which did not exceed the Phase 1 survey area. Phase 2 transects were placed between Phase 1 transects. Phase II of the survey consisted of transects spaced at 10-meter intervals and 1-meter wide in each representative area within the ADI, LTP, DSD, and USB buffer. These transects were also divided into 10-meter segments and searched at a rate of one minute per square meter in heterogeneous substrates.

Species Richness Curves were developed to supplement transect surveys. The searches for curve development were limited to the area of mussel concentrations (as determined in previous surveys) within the ADIs. Enough searches (typically 15-minute increments) were conducted such that a plateau was reached on a plot of the cumulative number of individuals (x-axis) vs. the cumulative number of species (y-axis). Searches were conducted until at least 6 samples were collected with the addition of no new species.

A minimum of 10 quantitative samples, each 0.25m^2 in area, were excavated on the riverbed in areas of highest mussel concentration observed during Phase 1. Quadrats were excavated to a depth of 15 centimeters (6 inches) or until hardpan was encountered. Material was collected and sorted at the surface, removing all live and shell specimens. Sample results were recorded separately for each quadrat, including subsample data of surface counts and excavated counts for each sample. This data is important to assess the efficiency of qualitative sampling (i.e., % mussels at the surface vs. buried). All quality assurance samples were collected from the ADI and within the salvage zone limits.

CHAPTER 5 – RESULTS

5.1 BAT HABITAT ASSESSMENT OFFICE REVIEW RESULTS

5.1.1 KENTUCKY RESULTS

The survey of available published sources conducted by HMB (mine maps, USGS topographic mapping, and aerial photography) revealed no known caves and/or other features with the potential to serve as year around habitat for gray bat and winter habitat for Indiana bat and northern long-eared bat. Coordination with KSS went unanswered. A map showing the project area and 5-km survey area boundary can be found in Exhibit 2 in Appendix A and email correspondence with KSS can be viewed in Appendix B.

A total of 74.20 acres of forested habitat, including 69.82 acres of upland forest and 4.38 acres of riparian forest, was determined to exist inside the proposed project area in Kentucky. The forested habitat may serve as foraging or maternity area for Indiana bat and northern long-eared bat. The riparian forested habitat serves as potential foraging area for the gray bat. All forested habitat within the proposed right-of-way was considered area to be cleared and is included in this acreage.

5.1.2 OHIO RESULTS

Impacts to SWH for the Indiana bat and northern long-eared bat are anticipated. Approximately 15.80 acres of habitat was identified in the project area and has the potential to be impacted. All of the habitat is located within 100 feet from the edge of existing pavement, which qualifies as a Tier I project under the guidelines of the OHPBO. Coordination with USFWS determined that the project is not within a bat buffer.

5.1.3 PROJECT'S TOTAL RESULTS

Combined there are 90.00 acres of forested habitat impacted by the proposed project that may serve as foraging or maternity area for Indiana bat and northern long-eared bat. In both Ohio and Kentucky, the forested habitat is designated by USFWS as "Unsurveyed" habitat for both the Indiana bat and northern long-eared bat. This habitat is shown on Exhibits 3-1 an 3-2 of Appendix A.

5.2 BAT HABITAT ASSESSMENT FIELD SURVEY RESULTS

5.2.1 KENTUCKY RESULTS

In August of 2022, HMB conducted a field survey of the area within the 1-km project buffer to search for caves, mines, and rock shelters. None of these features were found and discussions with landowners did not identify any known caves within the area. All the bridges in the project area, that could be safely accessed, have been examined for bat use. There were seventeen bridges in the project area that were examined for bat use. None of the bridges along this section of the I71/I75 have signs of bat use. These are all bridges that have high traffic on both the deck as well as underneath the bridges.

A map showing the project area and 1-km survey area boundary can be found in Exhibit 2 in Appendix A. The completed Kentucky Bats in Bridges Datasheet can be found in Appendix E.

5.2.2 OHIO RESULTS

ASC conducted field surveys in Ohio on June 1 and June 27, 2022 and confirmed that all SWH is located within 100 feet of the edge of the pavement. Also, the SWH is all within the existing right-of-way, except for a small portion along the bank of the Ohio River. Wooded areas in the right-of-way were considered continuous to one another and collectively exceeded 0.5-acre.

Field investigations noted that the project area was very shrubby with a lot of honeysuckle trees, and that the forested habitat contained snags and exfoliating bark. The *Level 1 Ecological Survey Report* includes additional details and is included as Appendix F. This report is currently under review.

5.2.3 BRENT SPENCE BRIDGE RESULTS

A small portion of the BSB was examined for bats from the bank of the Ohio River by ASC on the Ohio side and by HMB on the Kentucky side. However, the bridge is elevated greater than 50 feet above the ground surface, and with investigations occurring from the riverbank, bridge crevices could not be examined. The bridge and area under the bridge were primarily examined for bat sounds, bat guano droppings, and bat urine staining on concrete supports. None of these indicators were observed during the field survey.

5.3 MUSSEL HABITAT ASSESSMENT RESULTS

In June and July of 2022, HMB and ASC completed a walkover survey of the project corridor to identify streams within the project corridor and evaluated them as potential mussel habitat. HMB identified eleven streams in Kentucky, including eight intermittent streams and three perennial streams (one being the Ohio River). No streams, other than the Ohio River, were identified in Ohio by ASC (see the Level 1 Ecological Survey Report in Appendix F). Streams are shown on Exhibit 4 of Appendix A.

The Ohio River was the only stream that provides suitable habitat for the listed mussel species. The other streams were all poor quality with low RBP scores and boulders as the dominant substrate. Due to these conditions, these streams lacked suitable habitat for the listed mussel species. See Appendix D for pictures of the streams and Appendix E for their Habitat Assessment Field Data Sheets.

5.4 MUSSEL SURVEY RESULTS

Biologists from Stantec sampled the areas of direct impact, as well as the upstream, downstream, and lateral buffer areas, beginning July 16, 2022, and completed the survey work on August 19, 2022.

5.4.1 SITE CHARACTERISTICS

A habitat assessment of the Ohio River was performed during the mussel survey. Based on the results of the habitat assessment described below, the Ohio River provides marginal habitat for the eleven identified mussel species.

Substrate

Sand was the dominant substrate or was present in most of the search segments. However, it was seldom the sole substrate as is often observed in big river systems. Sand was generally present with a heterogeneous mix of several other grain sizes, often with cobble as the co-dominant substrate. Where stable large grain substrates were present on the bed, they were often completely covered with Dreissenid mussels as were the native unionids. Another notable site characteristic was the extensive and sizeable woody debris jams that were observed parallel to the shoreline in the north survey area. Wood jams were also present in the south survey area but were much smaller. The Kentucky side of the Ohio River had more of sand and cobble substrate mix with very little silt and gravel. The Ohio side of the river had a larger variety, although the banks were consistently boulder-rubble followed by sand-gravel. Refer to Exhibit 5 in Appendix A for a detailed layout of the dominant and subdominant substrate found at each transect.

Water Conditions

Mean river stage for the survey period was 28.0 feet and ranged from 26.4 to 30.3 feet. River state was the lowest at the beginning of the survey and highest in late July and early August. Dissolved oxygen (DO) concentrations were low and ranged between 3.42 and 4.89 mg/L. Conductivity concentrations (mean = 365.5 µS/cm) were high enough to indicate potential impairment of aquatic macroinvertebrate assemblages (Pond 2010). Turbidity was not measured in the field. This parameter is generally used as an indicator for whether divers can visually observe habitat while searching for mussels. However, turbidity for the entire study period was much higher than the concentrations needed for divers to see. In the first week of the survey, divers could perceive light near the surface but at no point was it possible to collect mussels via visual searches. The entire survey was conducted using tactile methods in near or complete darkness.

Maximum observed diver depth ranged from 25 feet to 36 feet in the north survey area and 20 feet to 48 feet in the south survey area. Maximum depths from searches in the mid-channel survey area ranged from 45 feet to 55 feet.

5.4.2 UNSURVEYED AREAS

Ohio Transects

On July 29th, 2022, the team started work on the two furthest downstream transects on the Ohio side of the river. The river at this location was very deep and the bed dropped off rapidly to 60 feet in depth (in some cases) usually within 30 meters of the shoreline. Natural substrates were absent and, instead, the bed consisted of aggregate rubble including concrete, small flat slabs of rock, bricks, rebar, cut metal, and rough-cut rock with large trees sitting atop (see Exhibit 6). The combination of the steepness and the magnitude of the debris disposal raised several safety concerns. First, the rubble slabs are large and haphazardly stacked. In the zero-visibility environment, it is possible that divers might unknowingly enter a confined space "chamber". Second, the rubble might be prone to shifting as divers' traverse across transects on the steep face of the slope. The primary concern was that limbs and/or tethers and airlines might become trapped beneath shifting debris. In some cases, divers were suspended in the water column while holding onto to the transect line suspended between rock piles. While the lines are intended to carry some weight, they were not intended to carry the full load of a weighted and suspended diver. In the event of breakage and/or sweeping velocities, the diver would be cast adrift with little to no control over landing.

The dive team executed spot checks in order to assess the spatial extent of the debris piles on the Ohio side. The spot checks were performed by a commercial diver experienced in assessing areas of this nature. It was determined that all of the downstream buffer area and half of the downstream transects in the ADI are mostly comprised of the habitat described above (transects 1-20). The upstream half of the ADI transects were comprised of compacted cobble and gravel. The debris piles provide very poor habitat, and no mussels were found in the areas after 3 hours of surveying and exploratory habitat reconnaissance. Stantec's team did no additional surveys in the debris field. Regulatory agencies approved this modification of the survey. The areas not surveyed are shown in the exhibits of Appendix A and coordination is included in Appendix B.

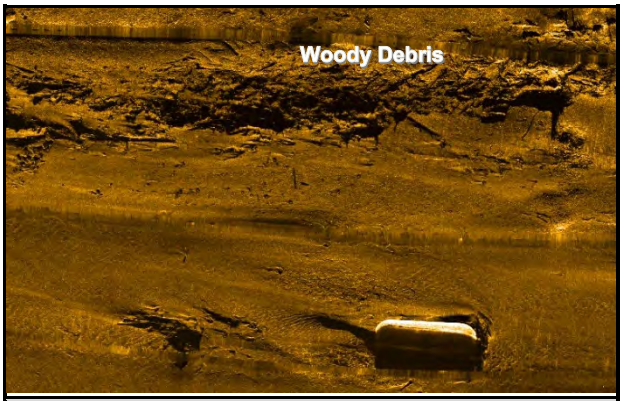

Figure 5.4–1. Side Scan Sonar Shows Woody Debris Jams Near North Bank

Another obstacle to completing the work as planned, were the extensive woody debris jams that accumulated in a long straight line approximately 40 meters to 60 meters offshore on the north side of the river. In some cases, divers standing at the bottom could not touch the top of the jam with outstretched hands. The jams were sometimes impenetrable, and divers could not follow intersecting transect lines or keep in contact with the bed where the chain traversed the jam. Rather than risk entanglement and disorientation, field personnel opted to skip over the jams and continue survey on the offshore side. It was difficult to anchor and maintain the transect position in the deeper and higher velocity mid-channel areas. Further, the lateral extent of the transects into the channel exposed divers to a greater risk of interaction with commercial and recreational traffic. Therefore, parallel transects were laid at the riverward side of the survey area incrementally increasing 10m in spacing starting at 85m and ending at 125m from shore.

These conditions are depicted on the side-sonar scan completed by Mainstream Commercial Divers, Inc. as shown in Figure 5.4–1 above and in Exhibit 6 of Appendix A. The scan was not done as part of this assessment, and therefore, it does not cover the entire mussel survey study area.

Kentucky Transects

Similar conditions were identified in transects 22, 23, and 24 along the Kentucky side of the river (see Exhibit 6). At these transects, wood debris jams prevented surveying the full length of the survey. The

survey covered as much of the transect as possible. The areas not surveyed are shown in the exhibits of Appendix A.

5.4.3 PHASE I AND II SURVEY RESULTS

During the Phase I transect surveys, six mussels in the north study area and 521 mussels in the south study area were encountered. These mussels belonged to fifteen different mussel species. The highest mussel densities found within the south study area were downstream of the existing bridge and generally 20 to 60 meters from the shoreline. Segments with the highest densities were found at the transition between the upstream area and the downstream buffer, and the downstream area of the ADI. The mid-channel searches found 8 mussels, belonging to four different species.

Twenty of the 30 survey transects on the south study area near Kentucky triggered Phase II transect surveys, while none were triggered on the north study area near Ohio. The Phase II transect surveys on the south study area found 366 mussels comprised of 18 species. Mussel densities were highest in the upstream buffer area. During the quantitative surveys, four mussels were collected during quadrat excavations after ten 0.25 squared meter quadrats were sampled. Quadrat sampling was focused on higher-quality habitat areas observed during the transect surveys in the south study area. Seven of the 10 quadrats excavated yielded no live mussels or shells.

In total, 905 mussels belonging to twenty species were encountered during the surveys. The mussels included 896 live, 3 fresh dead, 3 weathered, and 3 subfossil. No species listed as Threatened, Endangered, or Candidate by USFWS were found during the survey. The overwhelming majority (98.55%) of the live mussels (883 of 896) were found in the southern study area near the Kentucky shore. The area of the survey associated with the proposed northern pier near the Ohio shore yielded only 5 live mussels, and the remaining 8 were located in the mid-channel area.

A summary of the mussels encountered is included in Table 5.4–1. Additional tables that provide results for each area surveyed are provided in Appendix C. Locations of the transects can be seen on Exhibit 4-1 and 4-2 in Appendix A. Photographs of the project site and a representative of each species can be viewed in Appendix D.

Table 5.4–1. Mussel Species Encountered During the Mussel Survey

COMMON NAME	SCIENTIFIC NAME	LIVE	FRESH DEAD	WEATHERED	SUB-FOSSIL	TOTAL
Mucket	*Actinonaias ligamentina*	1				1
Threeridge	*Amblema plicata*	72				72
Pimpleback	*Cyclonaias pustulosa*	79				79
Butterfly	*Ellipsaria lineolata*	3				3
Elephantear	*Elliptio crassidens*	1				1
Ebonyshell	*Reginaia ebena*	8				8
Wabash Pigtoe	*Fusconaia flava*	144				144
Plain Pocketbook	*Lampsilis cardium*	2				2
Fragile Papershell	*Leptodea fragilis*	3	1			4
Black Sandshell	*Ligumia recta*	27				27
Washboard	*Megalonaias nervosa*	101				101
Threehorn Wartyback	*Obovaria reflexa*	223				223
Pyramid Pigtoe*	*Pleurobema rubrum*			1	2	3
Round Pigtoe	*Pleurobema sintoxia*	12				12
Ohio Pigtoe	*Pleurobema cordatum*	2				2
Pink Heelsplitter	*Potamilus alatus*	80	1	1		82

COMMON NAME	SCIENTIFIC NAME	LIVE	FRESH DEAD	WEATHERED	SUB-FOSSIL	TOTAL
Pink Papershell	*Potamilus ohiensis*	3				3
Wartyback	*Cyclonaias nodulata*	108	1	1	1	111
Mapleleaf	*Quadrula quadrula*	26				26
Monkeyface	*Theliderma metanevra*	1				1
	Total	**896**	**3**	**3**	**3**	**905**

* Note: The weathered and subfossil shells are not evidence of an extant population of pyramid pigtoe (*Pleurobema rubrum*) in the project area.

CHAPTER 6 – EFFECTS ANALYSIS

The effects of an action upon a species are dependent primarily on the type and extent of the action, the general setting in which the action occurs, the occurrence of the species in the area impacted by the action, and the likelihood that the action will alter the habitat in the area so as to reduce its usability by the species being examined. In addition to causing direct mortality to individuals, it is possible that a project could affect a species indirectly by causing stress or reducing food availability. This section examines these factors and the likelihood that they will affect the species of concern.

6.1 LANDSCAPE IMPACTS

Activities associated with the project will involve alteration and disturbance (both temporary and permanent) of habitat within the project footprint. The following sections provide baseline information regarding the adjacent landscapes near the project and any anticipated direct potential landscape impacts occurring within the project footprint.

6.1.1 ADJACENT LANDSCAPE

The area within 1-km of the project footprint consists of approximately 7,566.10 acres. There are 6,422.09 acres (84.88%) of developed land and 787.50 acres (10.41%) of forested (deciduous, evergreen, and mixed forests). This reflects the current and historical urban and rural land use in the area. Forested habitat occurs primarily in knob areas surrounding the area, in roadway right of ways, and in the riparian corridors unsuitable for agricultural use or development. Table 2.3–1 provided a detailed breakdown of the adjacent landscape.

6.1.2 IMPACTED LANDSCAPE

The project footprint is approximately 466 acres. Within this footprint are approximately 90.00 acres of forested areas, 85.62 acres of upland and 4.38 acres of riparian, that could serve as summer habitat for bats. In comparison, there are approximately 787.5 acres of similar forested habitat within the 7,566.10 acres within 1-km of the project area. While the percentage of area inside the project footprint containing forested habitat (19%) is more than to the percentage of forested area within 1-km of the project (10%), the project is not anticipated to have significant landscape impacts due to the project being adjacent to the existing interstate, the corridor surroundings being a highly developed urban area, and a large portion of the forested areas being within the existing right-of-way.

6.2 POTENTIAL EFFECTS ON THE INDIANA BAT

The Indiana bat could be potentially affected by the project in three ways: by direct stress or mortality caused by the actions necessary to complete the project, by alterations to the habitat changing its suitability for inhabitation by this species, or by conditions in the future changing as a result of the effect the project has had on the characteristics of the surrounding area. These three classes of effects are discussed below. Critical habitat is not near the project; therefore, no critical habitat will be directly or indirectly affected.

6.2.1 DIRECT EFFECTS

Because caves serve as winter roosting habitat for Indiana bats, any physical degradation of karst systems occurring during winter roosting season that causes stress or mortality to individuals would directly affect this species. Habitat with conservation importance for Indiana bats consists of large hibernacula, which are of primary concern for Indiana bat conservation, especially with the known presence of white-nose syndrome in bats (USFWS 2016b). The project is not underlain with karst, and because of the lack of suitable winter roosting habitat in the area, it is unlikely that any activities associated with the project at any time of year will have an effect on winter roosting habitat for Indiana bats. Therefore, it is unlikely that the project will result in direct effects on any individuals of this species while they are occupying winter hibernacula.

Forested areas (both upland and riparian) serve as summer maternity, roosting, and foraging habitat for Indiana bats. Summertime clearing of trees currently inhabited by bats during maternity season could result

in the loss of adult individuals and pups. Approximately 90.00 acres of "Unsurveyed" Indiana bat habitat are present within the clearing limits for the proposed highway reconstruction (15.80 in Ohio; 74.20 in Kentucky) as shown in Exhibits 3-1 and 3-2 in Appendix A. In Kentucky tree removal will be restricted during the maternity season from June 1 to July 31, when non-volant pups are most likely to be present. The *Programmatic Biological Opinion on the Effects of Transportation Projects in Kentucky on the Indiana Bat and Gray Bat* will be used to account for habitat loss and take. In Ohio no tree removal will occur during April 1 through September 30. The OHPBO will be used to account for habitat loss and take.

Indiana bats occasionally roost under bridges (Keeley and Tuttle 1999). There were seventeen bridges that were examined and showed no evidence of bat use. The bridges are all high-traffic bridges both on the bridge deck and underneath the bridges. There are also lights on the bridges and under some of them, with the bridges on the northern end of the project having a parking area under them.

6.2.2 INDIRECT EFFECTS

As previously discussed, caves are important winter habitat for Indiana bats. Construction activities that take place during the summer maternity season and that affect karst systems could indirectly affect Indiana bats through the loss these systems as winter habitat. There were no portals found in and it is not expected that any activities associated with the project at any time will have an effect on winter roosting habitat for Indiana bats.

Wintertime clearing of forested areas, while not likely to directly affect Indiana bats, could cause an indirect effect through the loss of foraging and maternity habitat for use in subsequent summer seasons. Approximately 90 acres of potential Indiana bat habitat was determined to exist inside the proposed right of way for the project (Exhibits 3-1 and Exhibit 3-2 in Appendix A). In Kentucky, tree removal will be restricted during the maternity season from June 1 to July 31, and in Ohio no tree removal will occur during April 1 through September 30.

The effect of construction on the aquatic ecosystem is another potential indirect effect of the project. Because many insect species upon which Indiana bats feed have aquatic larval forms; reduction in numbers of the larvae may in turn reduce the number of adults available as Indiana bat prey. There are 11 streams (8 intermittent, and 3 perennial) being crossed by the proposed project. Many of the aquatic systems the project crosses are already physically degraded; the effects of vehicular road usage already exist to varying extents within the area surrounding the project, and all streams crossed by the project are already subject to the effects of urban development. It is unlikely that the net condition of the streams crossed by the project will suffer from the presence of the new roadway due to these factors. Any potential indirect effect to Indiana bats due to the degradation of aquatic systems in the area will also be reduced by the minimization and mitigation techniques proposed for the project.

6.2.3 CUMULATIVE EFFECTS

The primary cumulative effect of roadway construction projects is subsequent development due to increased access and travel in an area (e.g. shopping centers or gas stations). Therefore, future development in the area due to the construction of this roadway would constitute a cumulative effect. No change to the current conditions along I-71/I-75 are anticipated, however, and further development is not likely to occur in the area. The current condition of streams combined with the lack of karst features providing suitable winter hibernacula and the low probability of future development as a result of the project indicates that cumulative impacts associated with the project are not likely to further decrease the suitability of this area for use by this species.

6.3 POTENTIAL EFFECTS ON THE NORTHERN LONG-EARED BAT

The project will impact 90.00 acres of forest habitat considered foraging or maternity area for the northern long-eared bat. All of this acreage is designated as "Unsurveyed" habitat. There were no caves located during the Phase I Habitat Assessment.

The northern long-eared bat qualifies for use of the Intraservice Biological Opinion Final 4(d) rule, and the project is consistent with the OHPBO. As a result, an analysis of effects to the northern long-eared bat from the removal of habitat associated with the proposed project is not included in this assessment.

6.4 POTENTIAL EFFECTS ON THE GRAY BAT

In Kentucky, where the gray bat is listed, the project will impact approximately 4.38 acres of riparian habitat that could serve is foraging habitat for gray bats. There were no caves or cave like features found within the 1-km of the project area. There were seventeen bridges that were examined and showed no evidence of bat use. The bridges are all high traffic bridges both on the bridge deck and underneath the bridges. There are also lights on the bridges and under some of them, with the bridges on the northern end of the project having a parking area under them.

KYTC will mitigate for take associated with the habitat loss through the *Programmatic Biological Opinion on the Effects of Transportation Projects in Kentucky on the Indiana Bat and Gray Bat*. This agreement will result in a contribution to the Imperiled Bat Conservation Fund for use in protection of these species. Direct, indirect, and cumulative effects to the gray bat from the removal of habitat under the agreement have been analyzed through a programmatic intra-Service biological opinion prepared by the USFWS (USFWS 2020). As a result, an analysis of effects to the gray bats from the removal of habitat associated with the proposed project is not included in this assessment.

6.5 POTENTIAL EFFECTS ON MUSSELS

The listed mussel species could be potentially affected by the project in three ways: by direct stress or mortality caused by the construction of the project, by alterations to habitat altering its suitability for inhabitation by these species, or by conditions in the future changing as a result of the effect the project has on the characteristics of the surrounding area. These three classes of effects are discussed below.

6.5.1 DIRECT EFFECTS

Direct effects to mussels could include placement of construction materials directly into areas occupied by the mussels, or physical disturbance of mussels during the construction process. Mussels could be crushed during construction activities, including the installation of causeway bridge supports, spudding of barges, barges nosing onto shore to anchor, and the installation of piers for the new companion bridge.

Waterline footings, caissons or cofferdams at pier locations will be dewatered. Any mussels in that area will be stranded in the substrate as water is pumped out and/or replaced by concrete. Mussels could be crushed or entrapped in the substrate when piers are installed.

Although twenty species of mussel were encountered during mussel surveys, none were species listed as Threatened, Endangered, or Candidate by USFWS; it is unlikely that this project would directly affect listed mussel species due to their probable absence.

6.5.2 INDIRECT EFFECTS

Short term increases in suspended sediments are expected during construction. Installation of drilled shafts, cofferdam or caisson structures, as well as the deposition of riprap may also cause increases in suspended sediments. This effect will be felt for a short distance downstream while sediments have sufficient time to settle out of the water column. Intermittent exposure to high levels of suspended solids has been shown to decrease clearance rates (filtration) of mussels impacting feeding ability and reproduction. However, the impacts seen during this project will most likely be localized and short in duration, resulting in no long-term impacts on mussels.

Installation of drilled shafts and cofferdam/caisson structures will change local hydrology around pier locations. This may result in scouring of sediments in that area, increasing turbidity and suspended sediments. This could impact mussels immediately downstream, and until sediments have sufficient time to settle out of the water column. Installation of turbidity curtains may be used around cofferdam/caisson structures or where pilings for causeways are installed. This could result in changes to water velocity and

may cause increased sedimentation within silt fences where suspended solids can settle from the water column.

Construction activities could result in accidental spills of hazardous materials into the surrounding environment. Freshwater mussels can be exposed to chemicals via ingestion, with chemicals in the water column directly impacting mussel gills, mantle, and kidneys. Impacts can be reduced or avoided by following equipment servicing and operating guidelines, proper siting and use of staging areas, removing and property treating or disposing any water associated with the concrete pours and using containment spill and herbicide use plans.

The clearing of riparian habitat for construction activities and an increase in paved surface area can increase run-off. This has the potential to expose mussels to additional sediment loads and road salt / de-icing chemicals as well as elevated levels of agricultural and automotive chemicals which could increase stress levels or poison individuals. Any project affecting aquatic systems also has the potential to affect the micro-biota present in an area. Mussels rely on filter feeding and could be indirectly affected due to changes in plankton communities. Moreover, mussels require fish for successful reproduction. If construction activities adversely affect and change fish communities, this could adversely affect mussel reproductive success.

The area surrounding the new companion bridge piers will be subject to impacts from scouring and changing hydrology as river waters divert around the piers. This hydrological impact will scour the substrate around the piers, most likely sorting for larger sediment sizes (if not entirely riprapped to protect piers). This can impact mussels by prohibiting colonization by species that prefer smaller sediment sizes. However, this may create habitat for species that can tolerate larger sediment sizes.

Although twenty species of mussel were encountered during mussel surveys, none were species listed as Threatened, Endangered, or Candidate by USFWS; it is unlikely that this project would indirectly affect listed mussel species due to their probable absence.

6.5.3 CUMULATIVE EFFECTS

The primary cumulative effect of roadway construction projects is subsequent development due to increased access and travel in an area. Any future development in the area due to the construction of this roadway would constitute a cumulative effect of this project. No mussel species listed as Threatened, Endangered, or Candidate by USFWS were found; the proposed project is not likely to have any cumulative effect on listed mussel species.

CHAPTER 7 – MITIGATION & MINIMIZATION MEASURES

While projects often have the potential to impact T&E species, these effects can be reduced through appropriate minimization and mitigation practices. The following minimization and mitigation measures will be implemented with this project.

7.1 MINIMIZATION AND MITIGATION MEASURES FOR THE INDIANA, GRAY, AND NORTHERN LONG-EARED BATS

The project is within an area designated by the USFWS as "Unsurveyed" habitat for Indiana bats and northern long-eared bats. Clearing of 90 acres of suitable Indiana bat habitat and northern long-eared bats, including 4.38 acres of riparian habitat, will be required. With KYTC and ODOT having their own policies, programmatic agreements, and regulations to follow, different minimization and mitigation measures will be incorporated for each state.

7.1.1 KENTUCKY MEASURES

The *Programmatic Biological Opinion on the Effects of Transportation Projects in Kentucky on the Indiana Bat and Gray Bat* will be used to account for all direct, indirect, and cumulative impacts to Indiana bat summer roosting habitat and for potential impacts to roosting habitat and foraging habitat for gray bat. The Final 4(d) Rule will be used to account for all potential direct, indirect, and cumulative impacts on northern long-eared bat hibernacula and summer roosting habitat. As a minimization measure, seasonal tree clearing restrictions from June 1 to July 31 shall be imposed in Kentucky.

There are three blue-line perennial streams crossed by the project; an unnamed tributary to Pleasant Run Creek, an unnamed tributary to Banklick Creek, and the Ohio River. The following measures will serve to reduce negative effects to aquatic and riparian habitat, as many of the insect species upon which Indiana bats, gray bats, and northern long-eared bats feed have aquatic larval forms:

- KYTC is bound by the tenets of Kentucky Pollution Discharge System (KPDES), permit number KYR100000, to reduce erosion and sedimentation effects from projects involving soil disturbance. As required under Section 213 of the KYTC Standard Specifications, a site-specific Erosion Control Plan, including Best Management Practices (BMP), will be developed by the resident engineer and contractor prior to onsite activities to ensure continuous erosion control throughout the construction and post-construction period. The plan will identify individual Disturbed Drainage Areas (DDA) where stormwater from the construction area will be discharged off-site or into waters of the Commonwealth.
- The location of the individual erosion prevention/sediment control measures will be identified by the resident engineer and contractor.
- Mulch will be placed, during grade and drain activities, across all areas where no work will be conducted for a period of 14 consecutive days.
- Tree clearing within the riparian will be minimized. The trees to be removed will be determined by the resident engineer and the contractor prior to disturbance.
- Silt fence, or other approved method as appropriate, will be installed at the edge waters within the project corridors to eliminate the deposition of rock and debris in the stream during construction activities. In the unforeseen event that unintended debris does enter the stream, the resident engineer will halt the contributing activity until appropriate remedial actions have been implemented.
- To the maximum extent plausible, construction activities will take place during low-flow periods.

- Equipment staging and cleaning areas will be located to eliminate direct inputs to the waters of the Commonwealth. These areas will be located such that effluent will be filtered through vegetated areas and appropriate sediment controls prior to discharge offsite.
- Concrete will be poured in a manner to avoid spills into the stream. In the unforeseen event that a spill does occur, the USFWS will be notified, and the resident engineer will immediately halt the activity until remedial measures have been implemented.
- KYTC proposes to stabilize areas disturbed during construction activities through vegetation establishment and placement of riprap and geotextile fabric. Re-vegetation of the disturbed areas will allow thermoregulation of water within the streams, establish long-term, regenerative stabilization of the stream bank, and provide nutrients to the aquatic macroinvertebrate community through inputs of organic material.
- Areas disturbed during construction and not stabilized with riprap and erosion blanket will be seeded using a standard seed mix. Depending on project slope and project location, application rates will vary will utilize current and appropriate seed mixes as specified in the KYTC Standard Specifications book.

7.1.2 OHIO MEASURES

The OHPBO will be used to account for habitat loss and take of Indiana bats. The northern long-eared bat qualifies for use of the Intraservice Biological Opinion Final 4(d) rule, and the project is consistent with the OHPBO.

ODOT's standard bat avoidance and minimization measures (AMMs) will be followed:

- No tree removal will occur during April 1 through September 30.
- All phases/aspects of the project (e.g., temporary work areas, alignments) will be modified to avoid tree removal in excess of what is required to implement the project safely.
- Tree removal will be limited to that specified in project plans by clearly marking clearing limits. Contractors will be made aware of clearing limits and how they are marked in the field.

In addition, ODOT's *2016 Construction and Materials Specifications* (CMS) and ODOT Supplemental Specification (SS) 813, SS 832, and SS 913 will be followed **as applicable** to address the following AMMs:

- Lighting AMMs – ODOT's SS 813.
- Dust Control AMM – ODOT's CMS 616.
- Water Quality, Wetland and Stream Protection AMMs
    - Per ODOT's CMS 601, CMS 659, CMS 670, CMS 671, SS 832, and ODOT's *Location and Design Manual, Volume 2*.
    - The project will be developed in full compliance with Sections 404 and 401 of the Clean Water Act and/or Ohio's Isolated Wetland Law; compensatory stream and wetland mitigation will be conducted when required, and in accordance with the USACE's Mitigation Rule and Ohio EPA's rules on Water Quality.

7.2 MINIMIZATION AND MITIGATION MEASURES FOR MUSSELS

The Ohio River is a perennial stream with substrate consisting of silt, clay, sand, gravel, cobble, and boulder providing some suitable habitat for the listed mussel species. Biologists from Stantec sampled the areas of direct impact, along with upstream, downstream, and lateral buffer areas. No live species listed as Threatened, Endangered or Candidate by USFWS were found during the mussel survey, therefore; no direct or indirect impact to the listed mussels is anticipated. No other streams in the project corridor provided suitable habitat for the listed mussel species. The minimization and mitigation measures listed in Section 7.1 will serve to reduce negative effects to aquatic and riparian habitat.

All native mussels are protected within the state of Ohio (ORC Section 1533.324). A relocation of all mussels from the ADI and appropriate salvage zone buffer areas following the Ohio Mussel Survey Protocol will be conducted prior to construction to minimize impacts to mussels.

The contractor shall also comply with the sediment and erosion control plan developed for the project during construction. No construction will be initiated prior to the acquisition of all necessary permits. Anticipated permits required for the project include, but are not limited to:

- a Rivers and Harbor Act Section 9 permit,
- a Rivers and Harbor Act Section 10 permit,
- a Clean Water Act Section 404 permit,
- a Section 401 Water Quality Certification through each state,
- a National Pollutant Discharge Elimination System (NPDES) permit through each state, and
- a Floodway permit through each state.

CHAPTER 8 – DETERMINATION OF EFFECT

Based on the analysis of the proposed project, determinations were made as to its potential effects on the protected resources discussed in this document. From this, Section 7 findings were made for each resource and are given below:

8.1 INDIANA BAT DETERMINATION

The portal survey did not find any caves or rock shelters suitable for winter hibernacula by bats within 1-km of the project; therefore, the proposed activities will have no effect on Indiana bat winter hibernacula. Additionally, no evidence of use or presence of bats along the bridges in the project area was found. There is, however, approximately 90.00 acres of forested habitat designated as "Unsurveyed" that may serve as foraging or maternity area for Indiana bat present within the clearing limits for the proposed project. This includes 15.80 acres in Ohio and 74.20 in Kentucky (Exhibits 3-1 and 3-2 in Appendix A).

Due to the use of different programmatic agreements being utilized by KYTC and ODOT, there are different determinations for the Indiana bat for each state.

8.1.1 KENTUCKY DETERMINATION

It is KYTC's intent to address impacts to the Indiana bat in accordance with the *Programmatic Biological Opinion on the Effects of Transportation Projects in Kentucky on the Indiana Bat and Gray Bat*. As a minimization measure, seasonal tree clearing restrictions from June 1 to July 31 shall be imposed for the clearing of 74.20 acres of habitat in Kentucky. Should timing of the project letting or other circumstances conflict with seasonal tree clearing restrictions, KYTC shall address impacts to the Indiana bat in accordance with the provisions for take afforded in the *Programmatic Biological Opinion on the Effects of Transportation Projects in Kentucky on the Indiana Bat and Gray Bat*. Given the nature of the project, its location and the commitment to adhere to seasonal tree clearing restrictions, KYTC concludes that the Kentucky portion of the project is likely to adversely affect the Indiana bat. Therefore, the effect determination for the portion of the proposed project in **Kentucky is: "may affect, and is likely to adversely affect" Indiana bat, *Myotis sodalis***.

8.1.2 OHIO DETERMINATION

It is ODOT's intent to address impacts to the Indiana bat in accordance with the February 29, 2016, *Framework Programmatic Biological Opinion*, as revised. The clearing of 15.80 acres of suitable wooded habitat is all located within 100-feet of the edge of pavement. As a minimization measure, seasonal tree clearing restrictions from April 1 through September 30 shall be imposed for the clearing of 15.80 acres of habitat in Ohio. The effect determination for the portion of the proposed project in **Ohio is: "may affect, but is not likely to adversely affect" Indiana bat, *Myotis sodalis*.**

8.2 NORTHERN LONG-EARED BAT DETERMINATION

There is 90.00 acres of forested habitat for the northern long-eared bat within the proposed project area to be disturbed or removed that has been designated as "Unsurveyed". There are no known northern long-eared bat maternity roost sites within the project area and there is no known hibernaculum within a quarter mile of the project area. No evidence of use or presence of bats along the bridges in the project area was found. Also, there are no cumulative impacts expected as a direct consequence of this project.

8.2.1 KENTUCKY DETERMINATION

It is KYTC's intent to address impacts to the northern long-eared bat in accordance with the Intraservice Biological Opinion Final 4(d) rule. In Kentucky, as a minimization measure, seasonal tree clearing restrictions from June 1 to July 31 shall be imposed. Therefore, the effect determination for the proposed project in **Kentucky is: "may affect, likely to adversely affect" the northern long-eared bat, *Myotis septentrionalis*, but will not result in prohibited take under the Final 4(d) rule.**

8.2.2 OHIO DETERMINATION

For ODOT, the project is consistent with the OHPBO, which includes the Final 4(d) rule by reference. In Ohio, ODOT's standard bat avoidance and minimization measures (AMMs) will be followed, including no tree removal from April 1 through September 30. Therefore, the effect determination for the proposed project in **Ohio is: "may affect, not likely to adversely affect" the northern long-eared bat, *Myotis septentrionalis*.**

8.3 GRAY BAT DETERMINATION

The portion of the project in Kentucky is considered in the range of the gray bat, however, the portion in Ohio is not. Therefore, the analysis of the gray bat focused on the project's footprint in Kentucky.

The habitat assessment, literature search, and Phase I portal survey did not locate any caves or rock shelters suitable for use of bats within 1-km of the project area in Kentucky. There is 4.38 acres of riparian forested habitat within the Kentucky portion of the project's disturb limits that will be disturbed or removed. These indirect effects caused by the removal of this habitat will be reduced by minimization techniques outlined in Chapter 7 to the level that they are considered discountable. Therefore, the effect determination for the proposed project is: **"may affect, not likely to adversely affect" the gray bat, *Myotis grisescens*.**

8.4 MUSSEL DETERMINATION

While the substrate and flow regime of the Ohio River provide some suitable habitat for multiple mussel species, no federally listed mussels were found during the presence / absence survey conducted. With proper measures in place during construction, habitat will be preserved for any future listed mussels colonizing this stream. Therefore, the effect determination for the proposed project is **"may affect, not likely to adversely affect" the listed mussel species: Clubshell (*Pleurobema clava*), Fanshell (*Cyprogenia stegaria*), Northern Riffleshell (*Epioblasma torulosa rangiana*), Orangefoot Pimpleback (pearlymussel) (*Plethobasus cooperianus*), Pink Mucket (*Lampsilis abrupta*), Rabbitsfoot (*Quadrula cylindrica cylindrica*), Ring Pink (*Obovaria retusa*), Rough Pigtoe (*Pleurobema plenum*), Sheepnose Mussel (*Plethobasus cyphyus*), Snuffbox Mussel (*Epioblasma triquetra*), and Spectaclecase (*Cumberlandia monodonta*).**

CHAPTER 9 – REFERENCES

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APPENDIX A – EXHIBITS

Exhibit 1: Project Location

Exhibit 2: Portal Survey and Literature Review Buffers

Exhibit 3-1 through Exhibit 3-12: Potential Bat Habitat Impacts

Exhibit 4-1: Stream Impacts

Exhibit 5-1: Mussel Survey – Phase I Study Area

Exhibit 5-2: Mussel Survey – Phase II Study Area

Exhibit 6: Mussel Survey – Substrate Composition

Exhibit 7: Bathymetric Survey

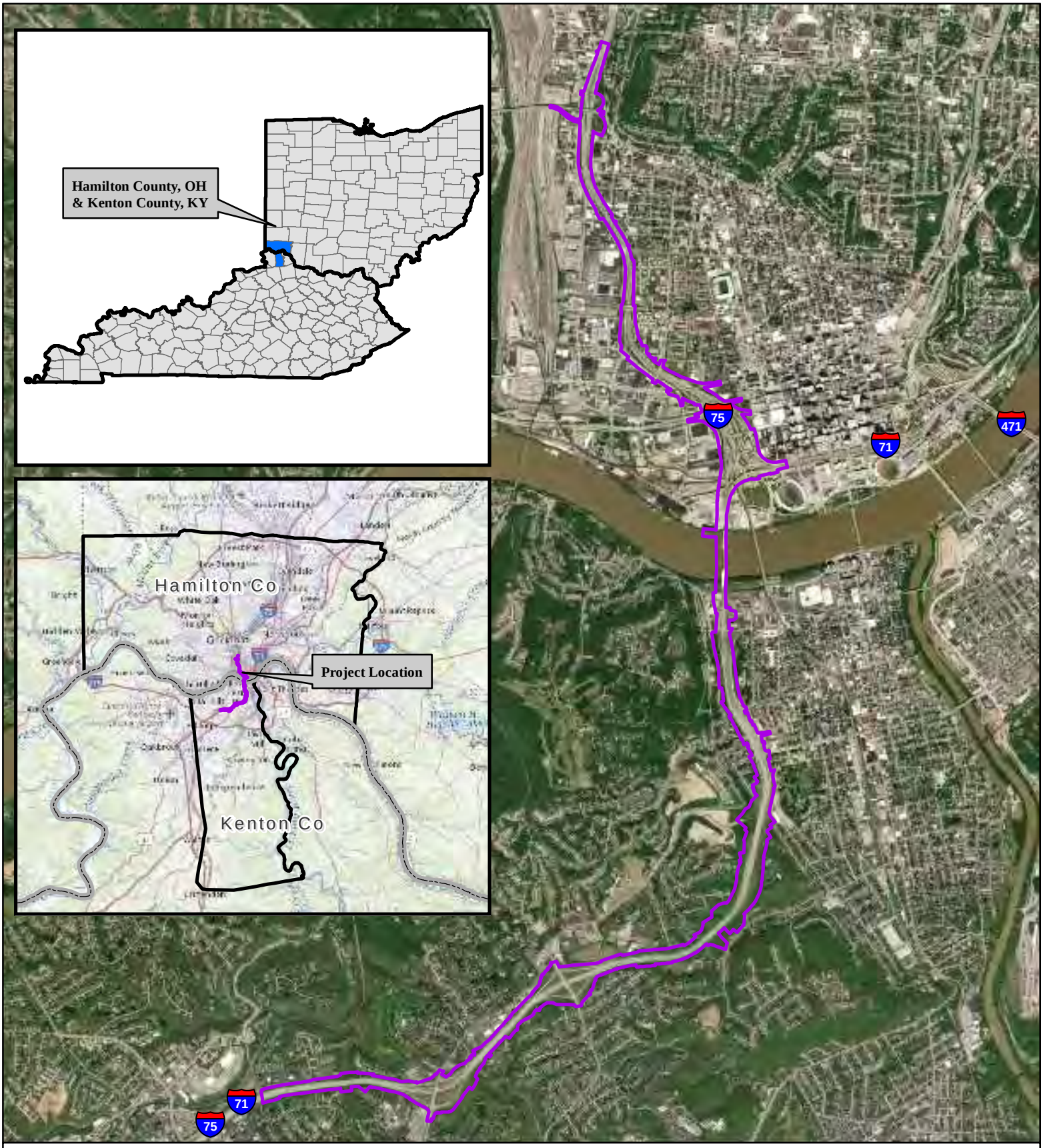


Exhibit 1: Project Location

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

Project Area

N

0 0.5 1 Miles

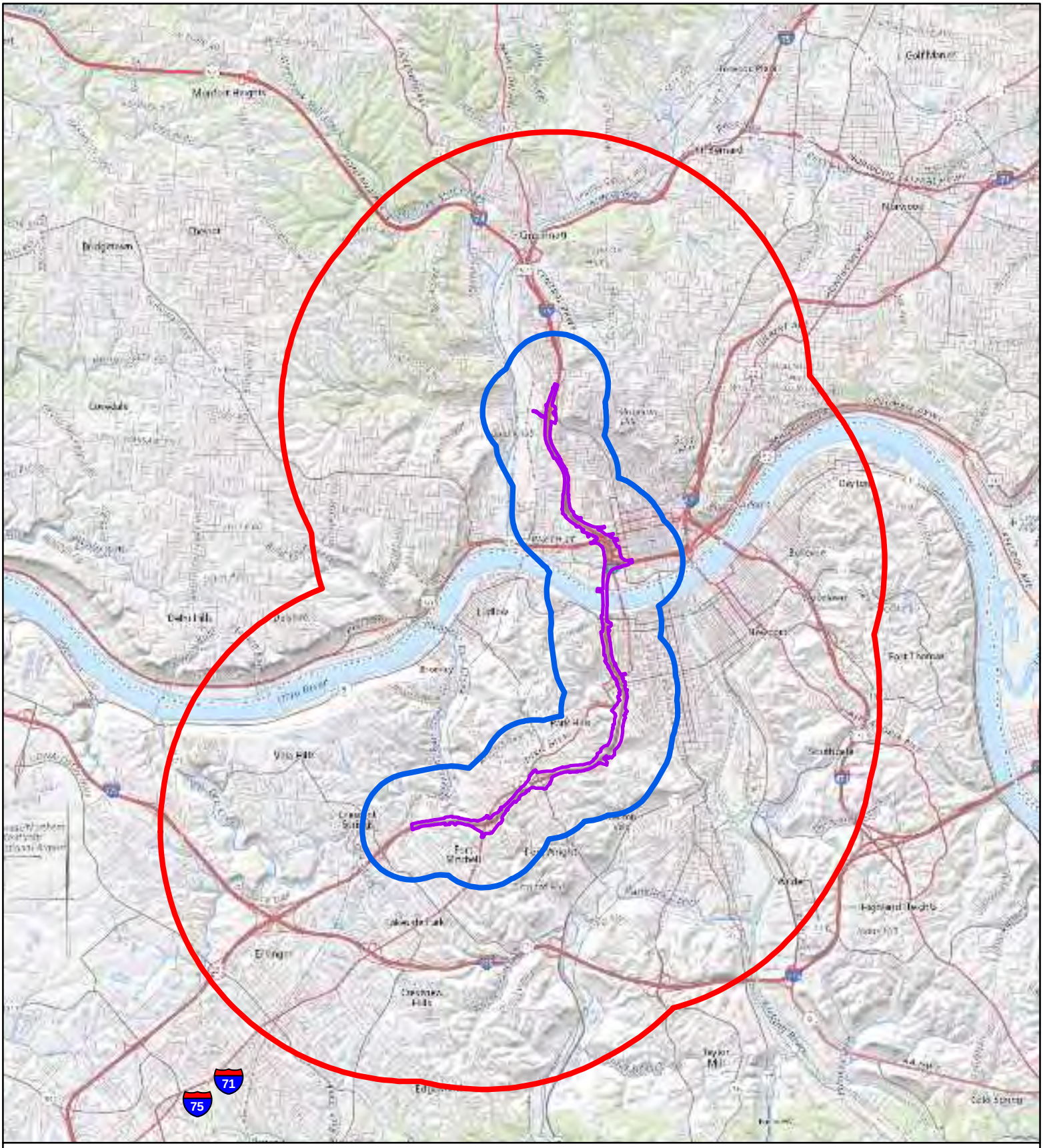


Exhibit 2: Portal Survey and Literature Review Buffers

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

Project Area
1-km Buffer of Project Area
5-km Buffer Project Area

N

0 1 2 Miles

Exhibit 3-1: Potential Bat Habitat Impacts

Project Area
NHD 24K Streams
Riparian Forested
Forested

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

0 500 1,000 Feet

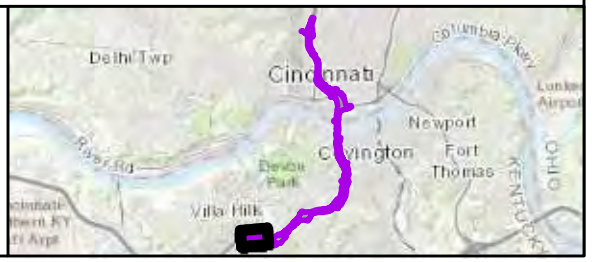


Exhibit 3-2: Potential Bat Habitat Impacts

Project Area
NHD 24K Streams
Riparian Forested
Forested

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 500 1,000

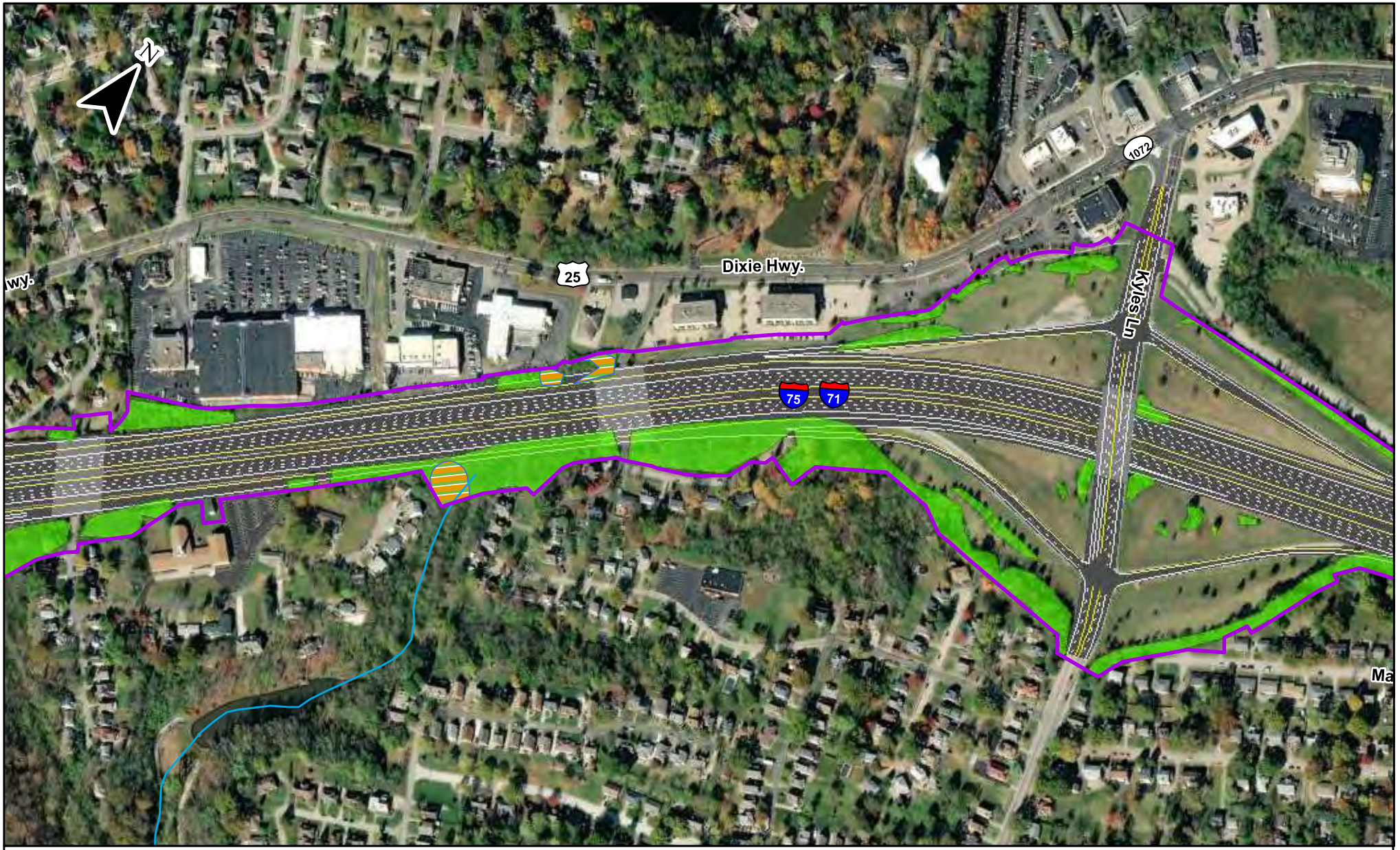


Exhibit 3-3: Potential Bat Habitat Impacts

Project Area
NHD 24K Streams
Riparian Forested
Forested

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 500 1,000

Exhibit 3-4: Potential Bat Habitat Impacts

Project Area
NHD 24K Streams
Riparian Forested
Forested

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 500 1,000

Exhibit 3-5: Potential Bat Habitat Impacts

Project Area
NHD 24K Streams
Riparian Forested
Forested

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 500 1,000

Exhibit 3-6: Potential Bat Habitat Impacts

Project Area
NHD 24K Streams
Riparian Forested
Forested

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 500 1,000

Exhibit 3-7: Potential Bat Habitat Impacts

Project Area
NHD 24K Streams
Riparian Forested
Forested

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

0 500 1,000 Feet

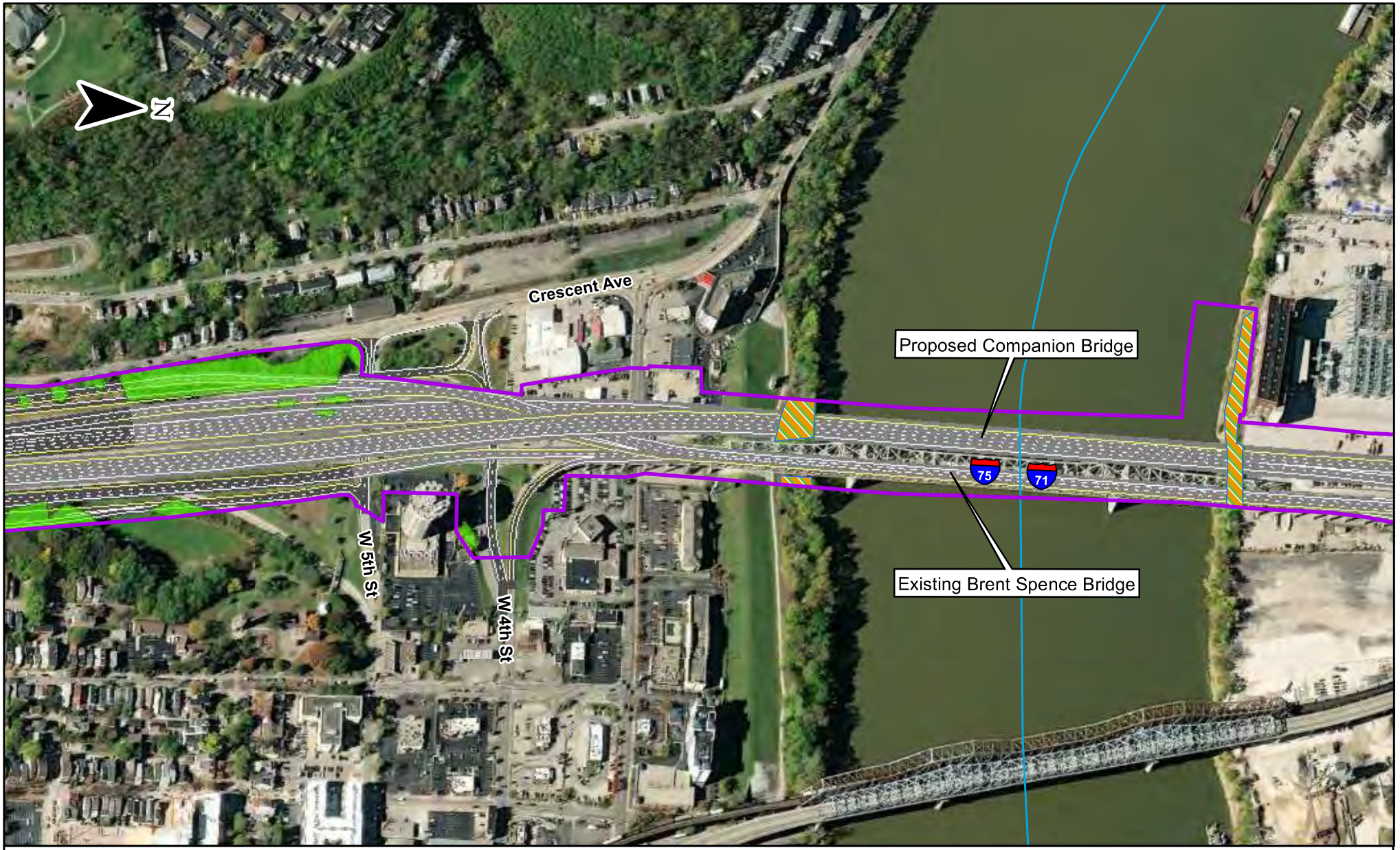


Exhibit 3-8: Potential Bat Habitat Impacts

Project Area
NHD 24K Streams
Riparian Forested
Forested

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 500 1,000

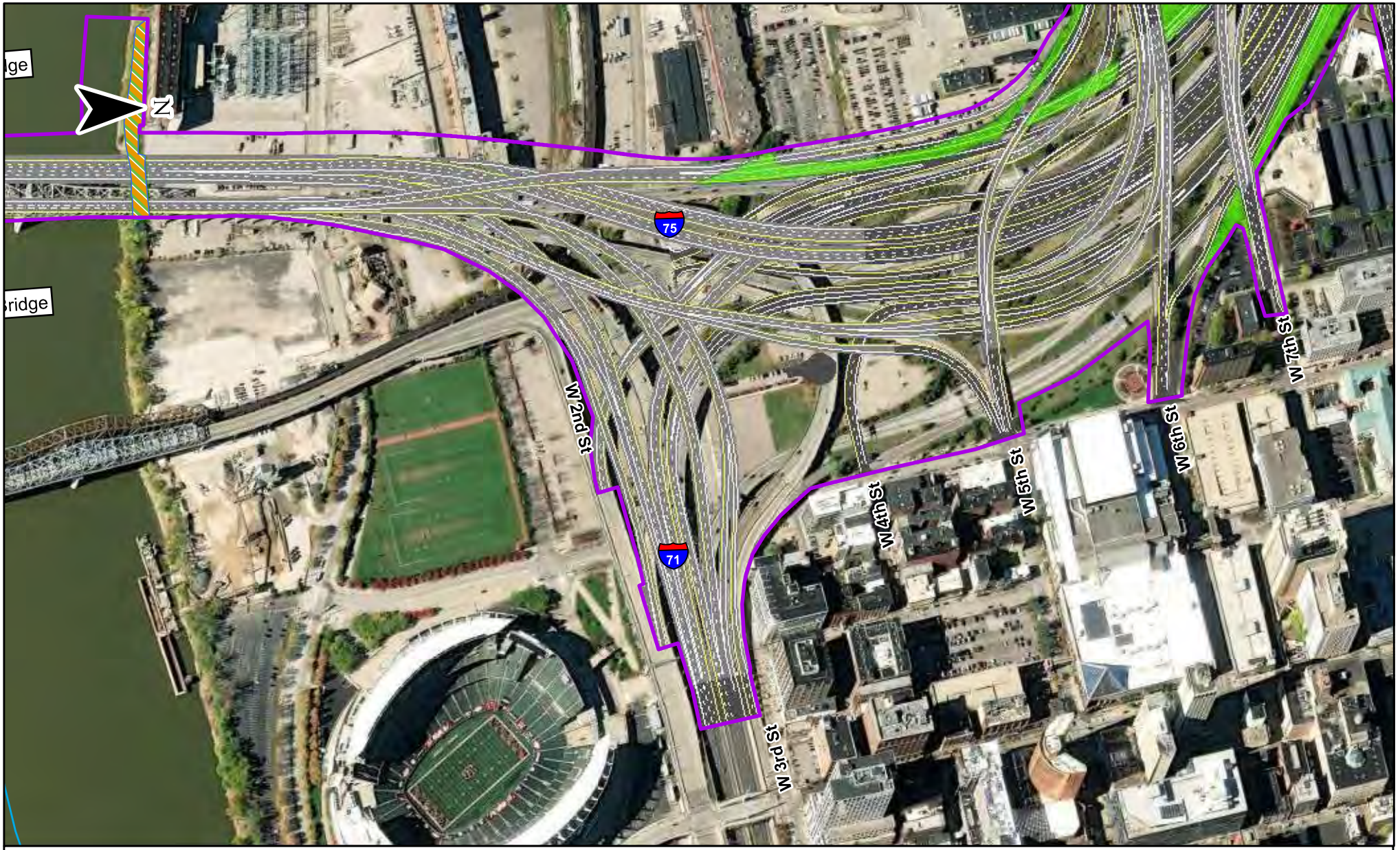


Exhibit 3-9: Potential Bat Habitat Impacts

Project Area
NHD 24K Streams
Riparian Forested
Forested

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 500 1,000

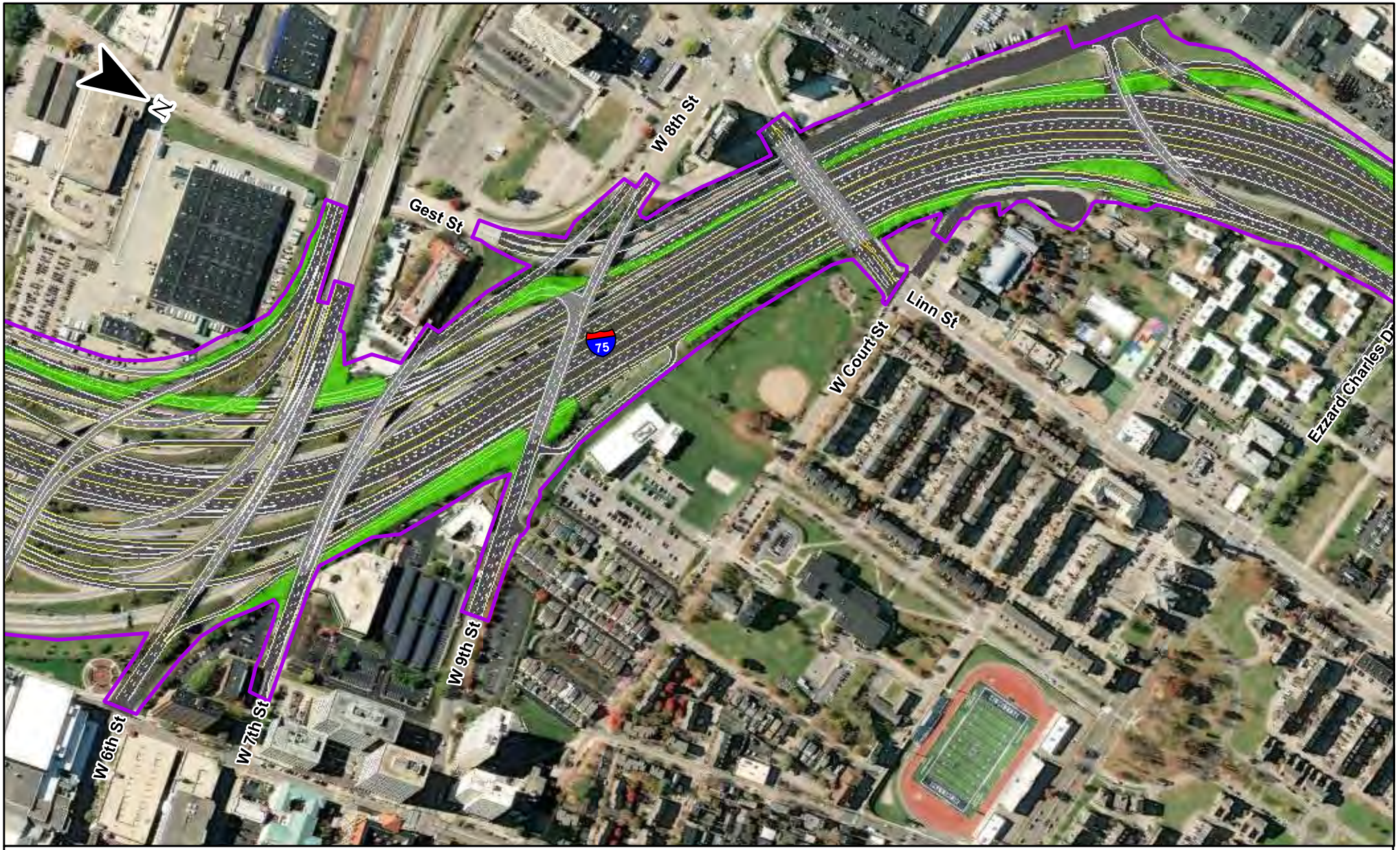


Exhibit 3-10: Potential Bat Habitat Impacts

Project Area
NHD 24K Streams
Riparian Forested
Forested

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 500 1,000

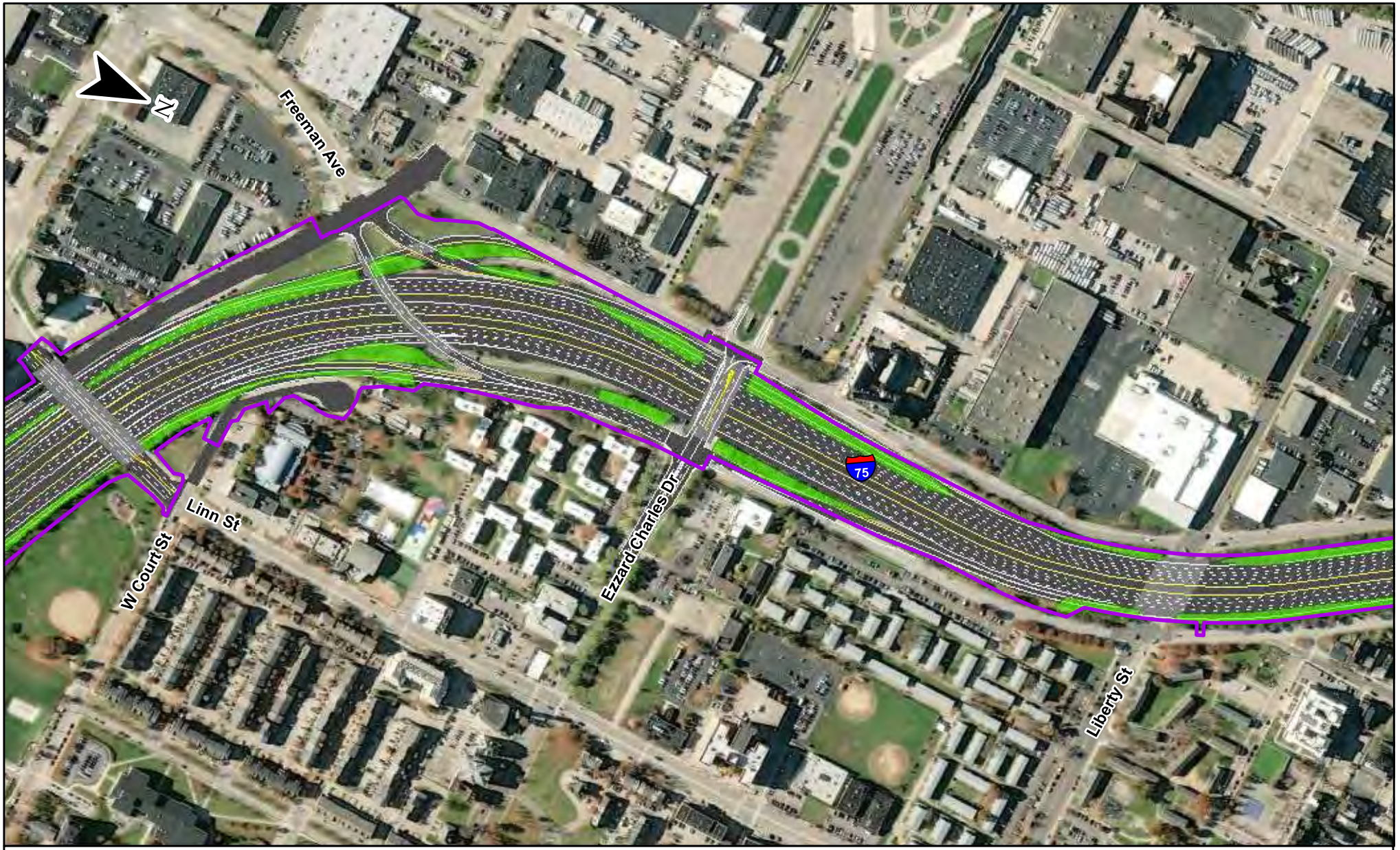


Exhibit 3-11: Potential Bat Habitat Impacts

Project Area
NHD 24K Streams
Riparian Forested
Forested

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 500 1,000

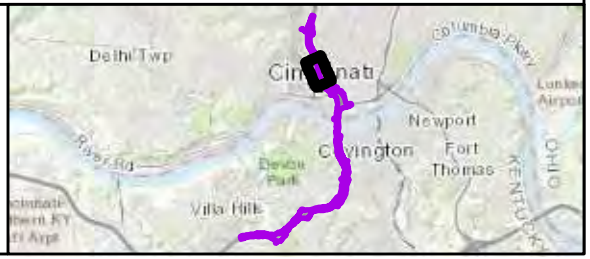


Exhibit 3-12: Potential Bat Habitat Impacts

Project Area
NHD 24K Streams
Riparian Forested
Forested

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

0 500 1,000 Feet

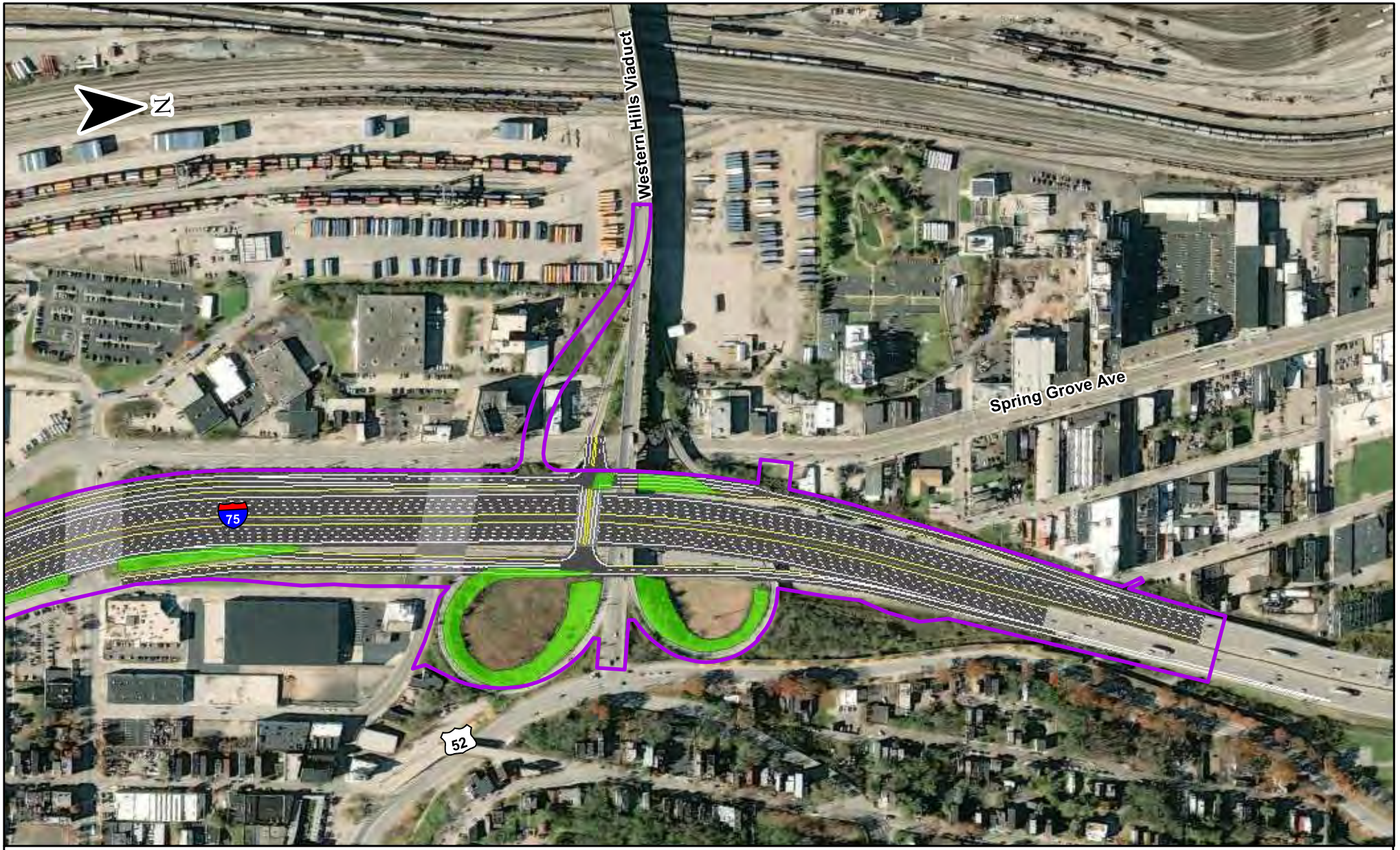


Exhibit 3-13: Potential Bat Habitat Impacts

Project Area
NHD 24K Streams
Riparian Forested
Forested

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

0 500 1,000 Feet

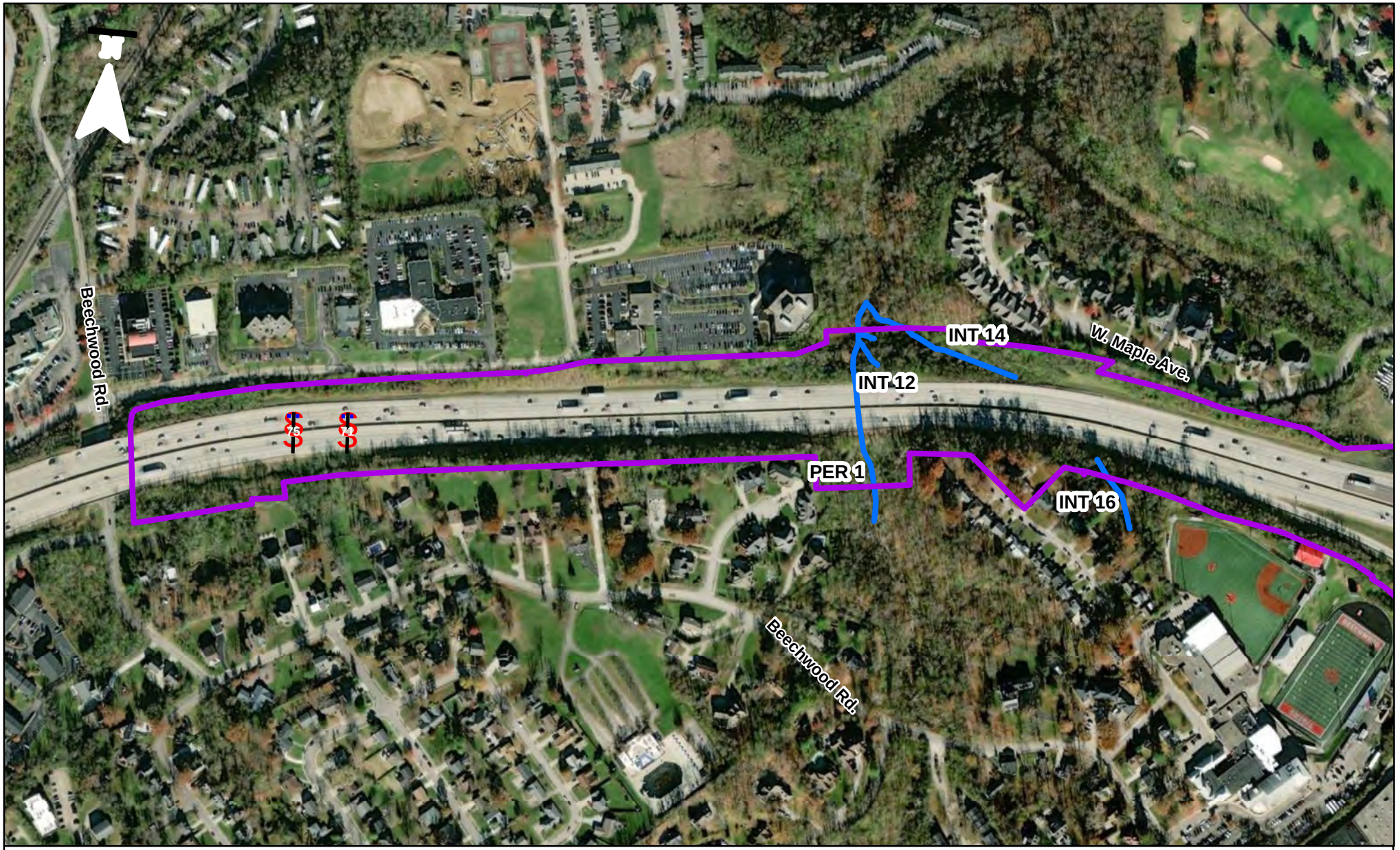


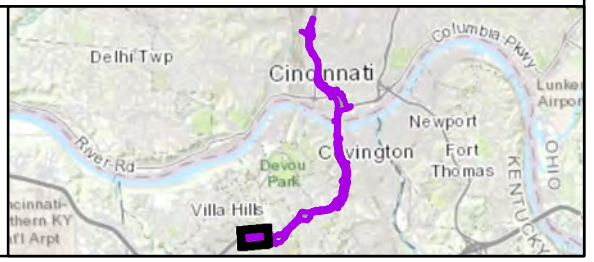
Exhibit 4-1: Stream Impacts

Streams

Study area

Brent Spence Bridge Corridor
Kenton, KY
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 500 1,000



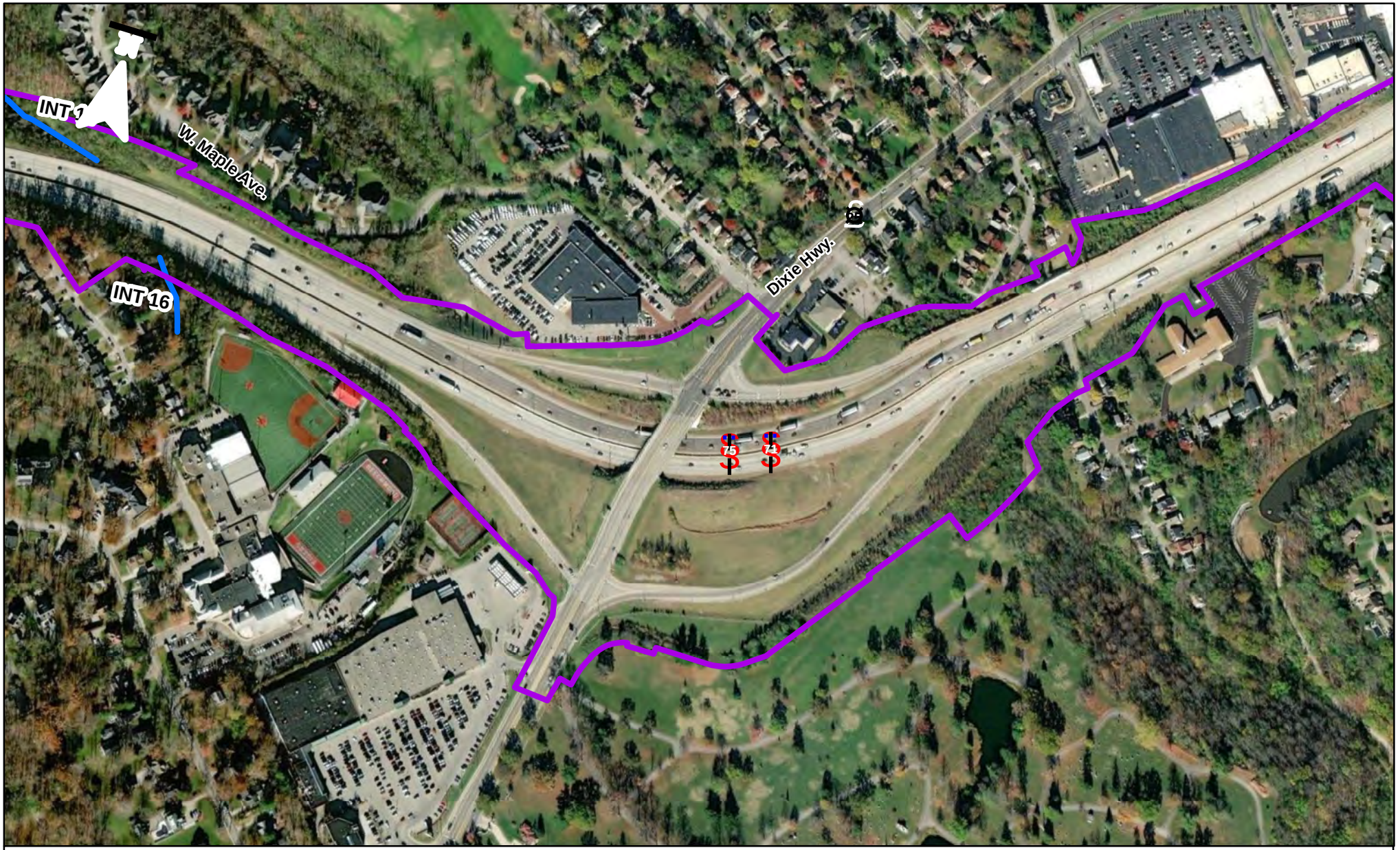


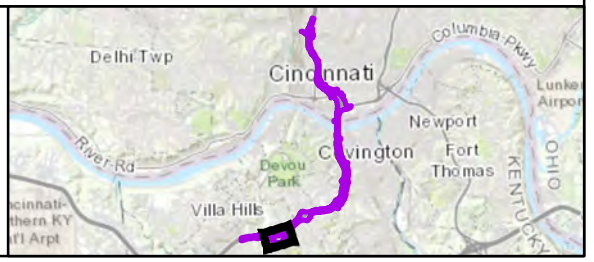
Exhibit 4-2: Stream Impacts

Streams

Study area

Brent Spence Bridge Corridor
Kenton, KY
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 500 1,000



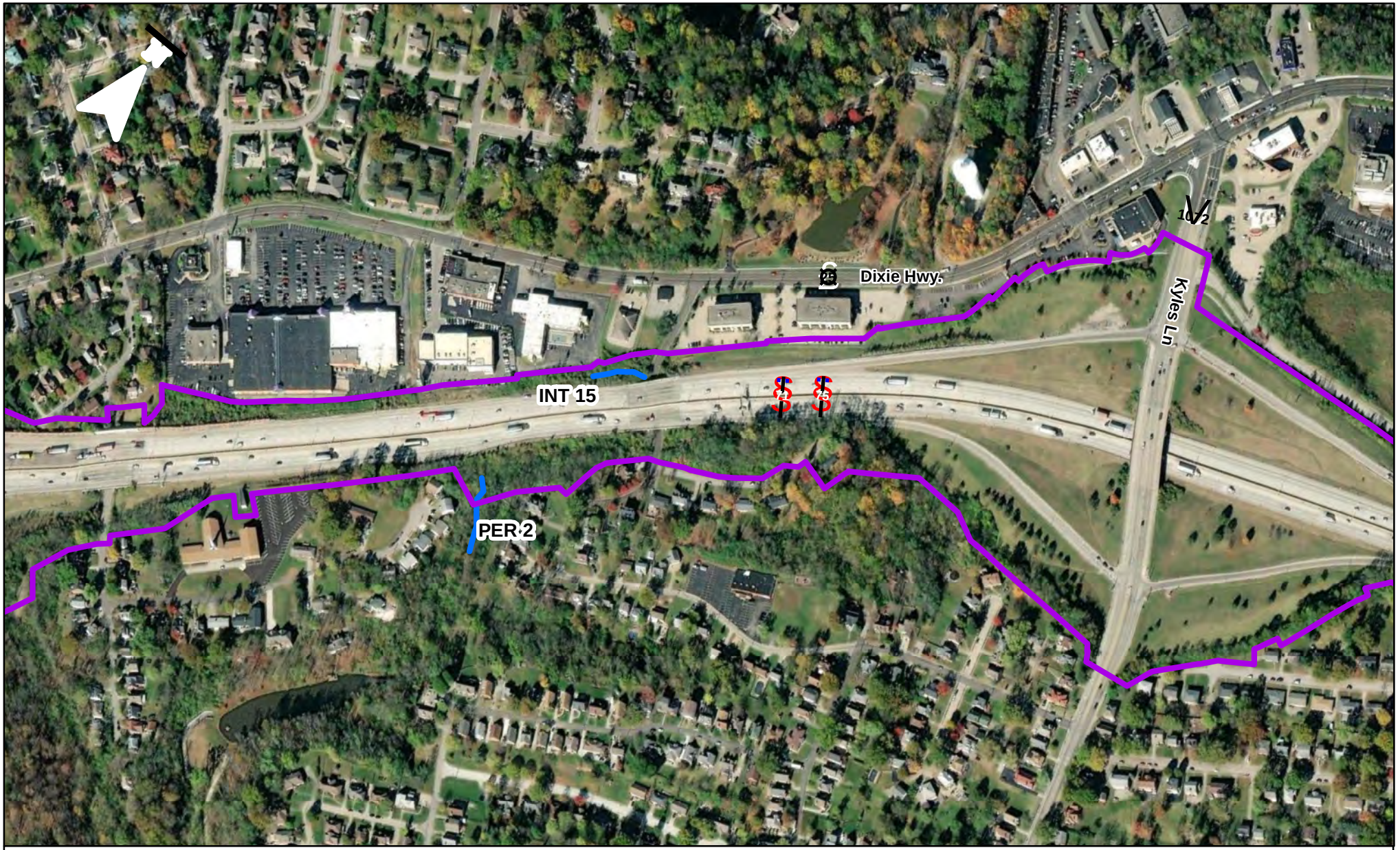


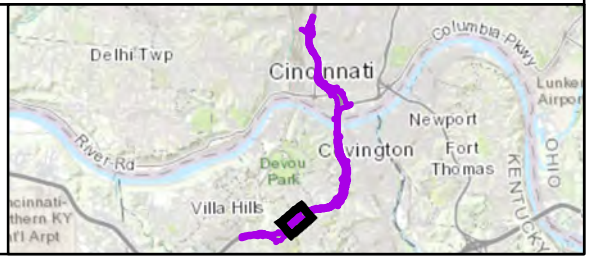
Exhibit 4-3: Stream Impacts

Streams

Study area

Brent Spence Bridge Corridor
Kenton, KY
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 500 1,000



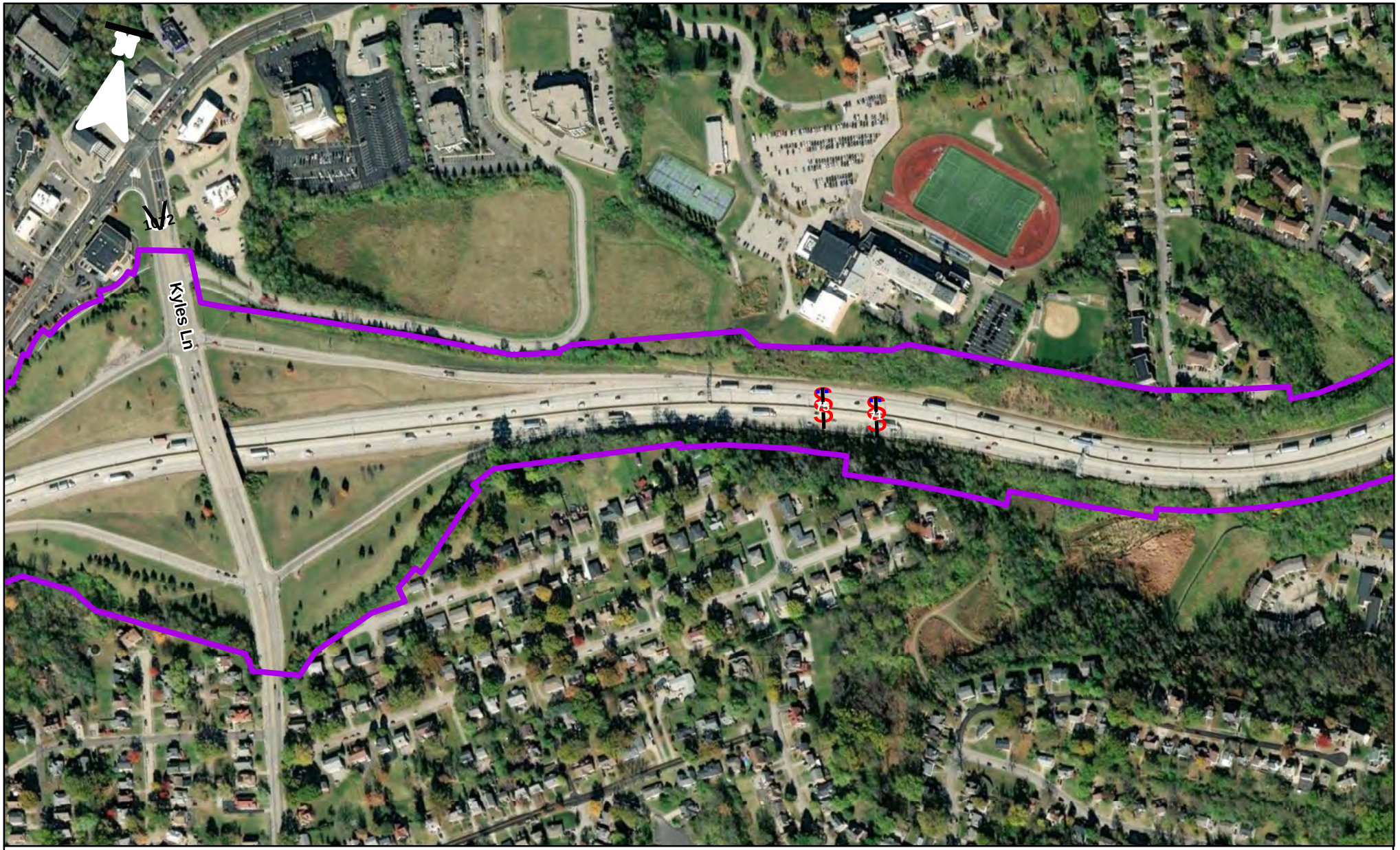


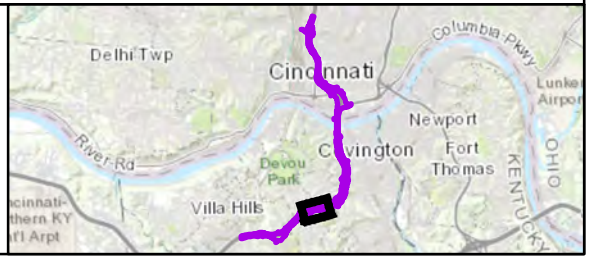
Exhibit 4-4: Stream Impacts

Streams

Study area

Brent Spence Bridge Corridor
Kenton, KY
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 500 1,000



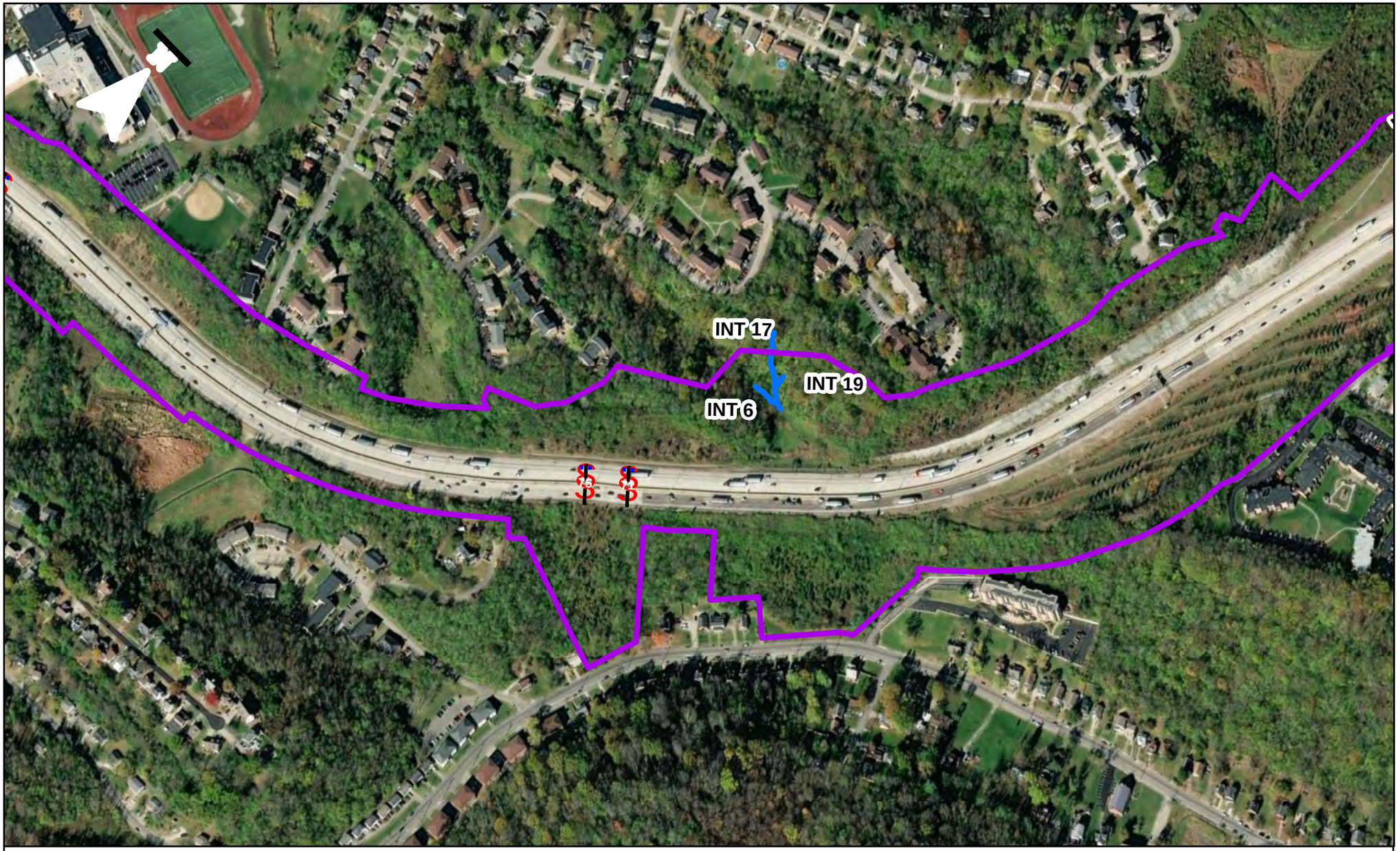


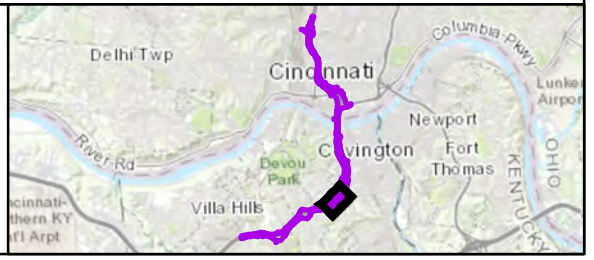
Exhibit 4-5: Stream Impacts

Streams

Study area

Brent Spence Bridge Corridor
Kenton, KY
KYTC Item No: 6-17.00
ODOT PID: 116649

0 500 1,000 Feet



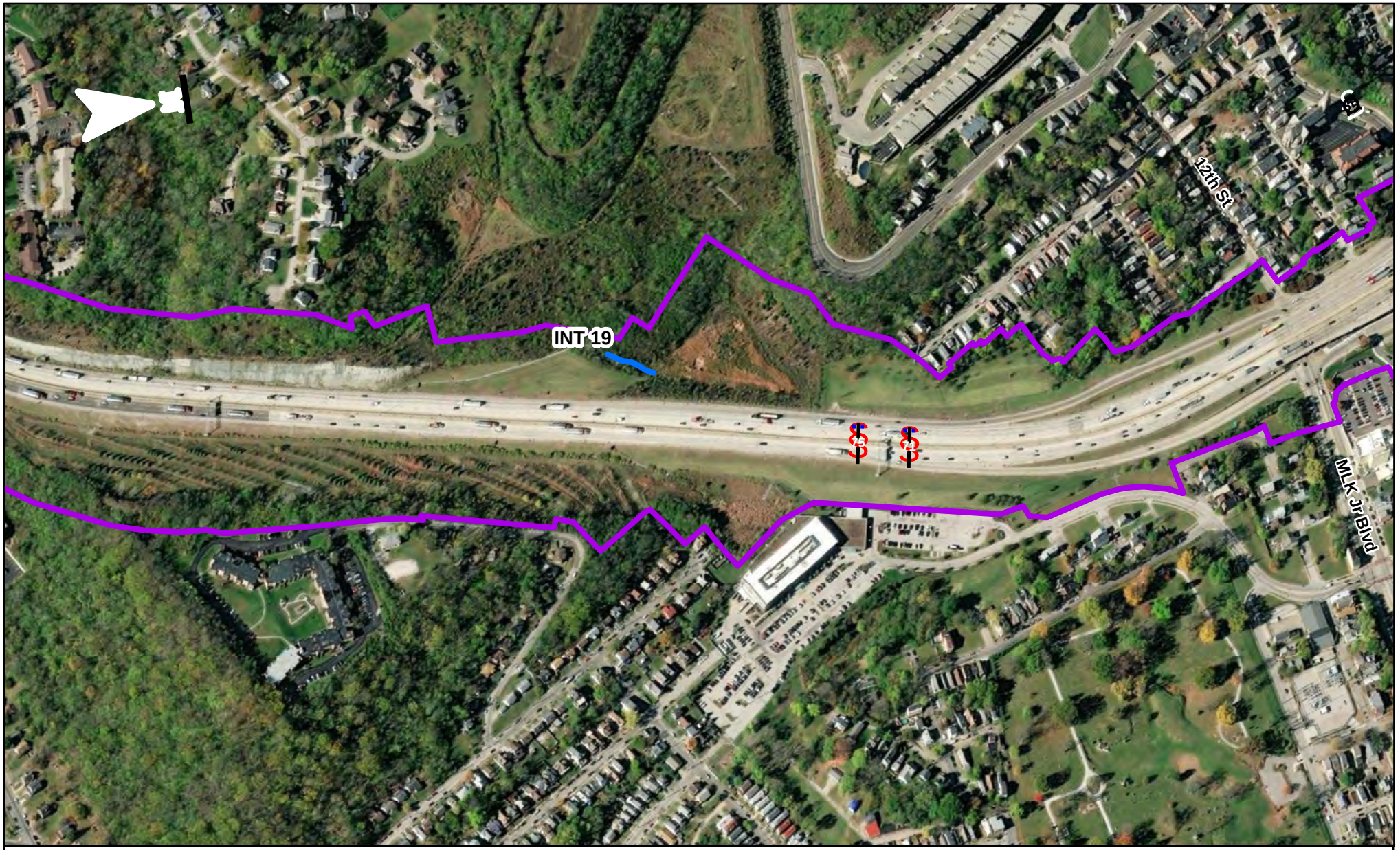


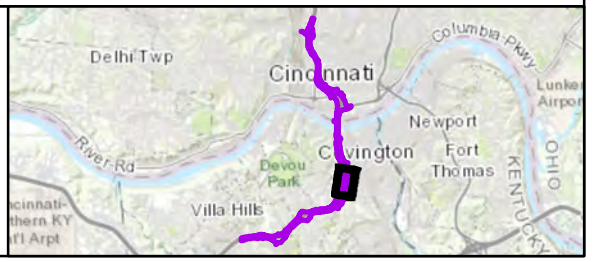
Exhibit 4-6: Stream Impacts

Streams

Study area

Brent Spence Bridge Corridor
Kenton, KY
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 500 1,000



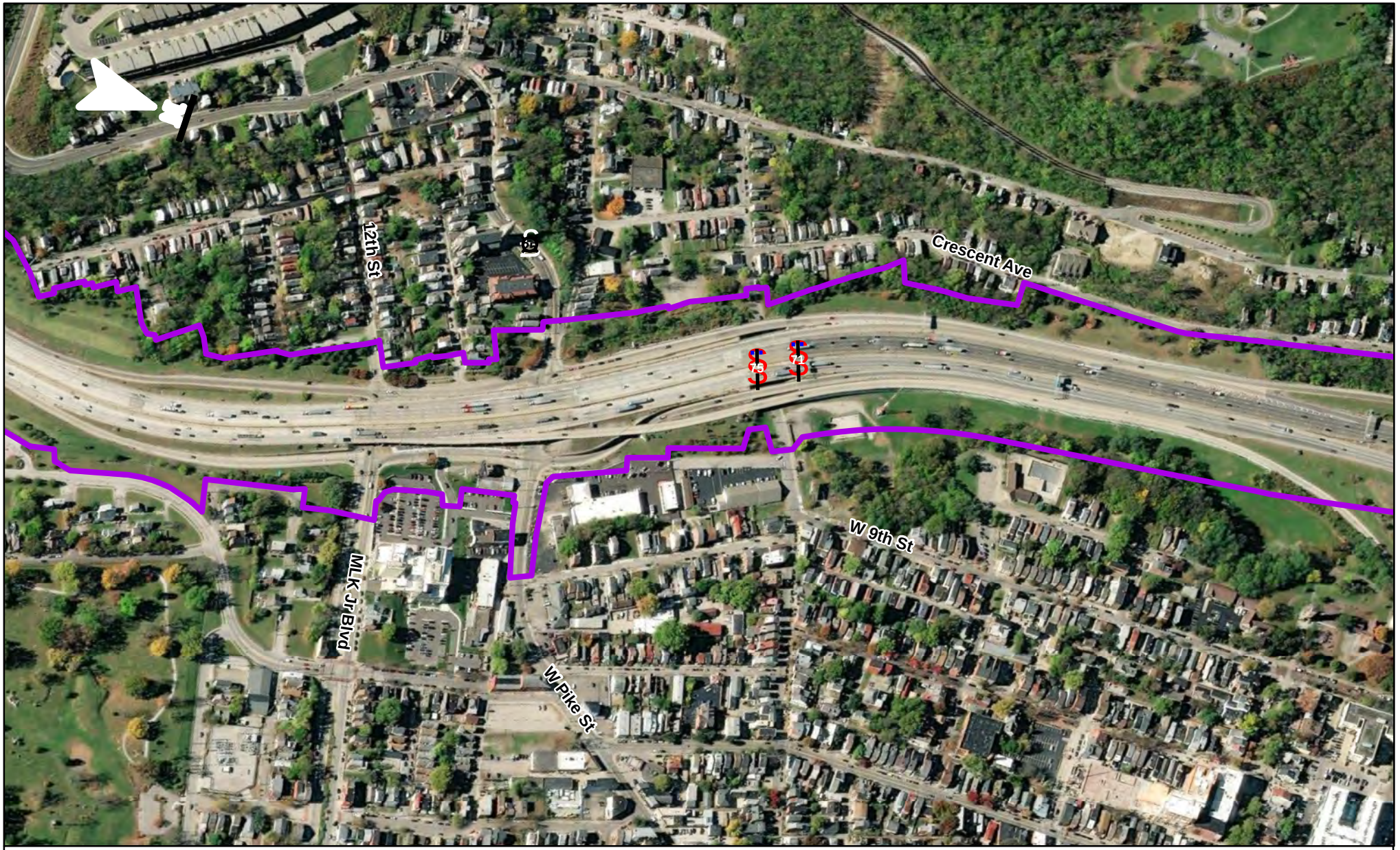


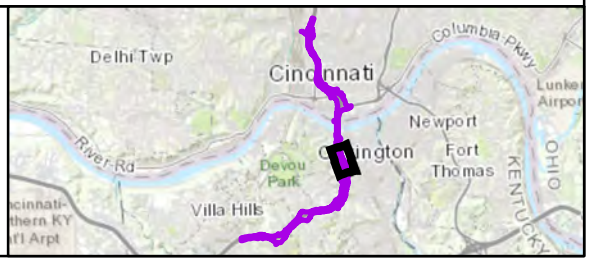
Exhibit 4-7: Stream Impacts

Streams

Study area

Brent Spence Bridge Corridor
Kenton, KY
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 500 1,000



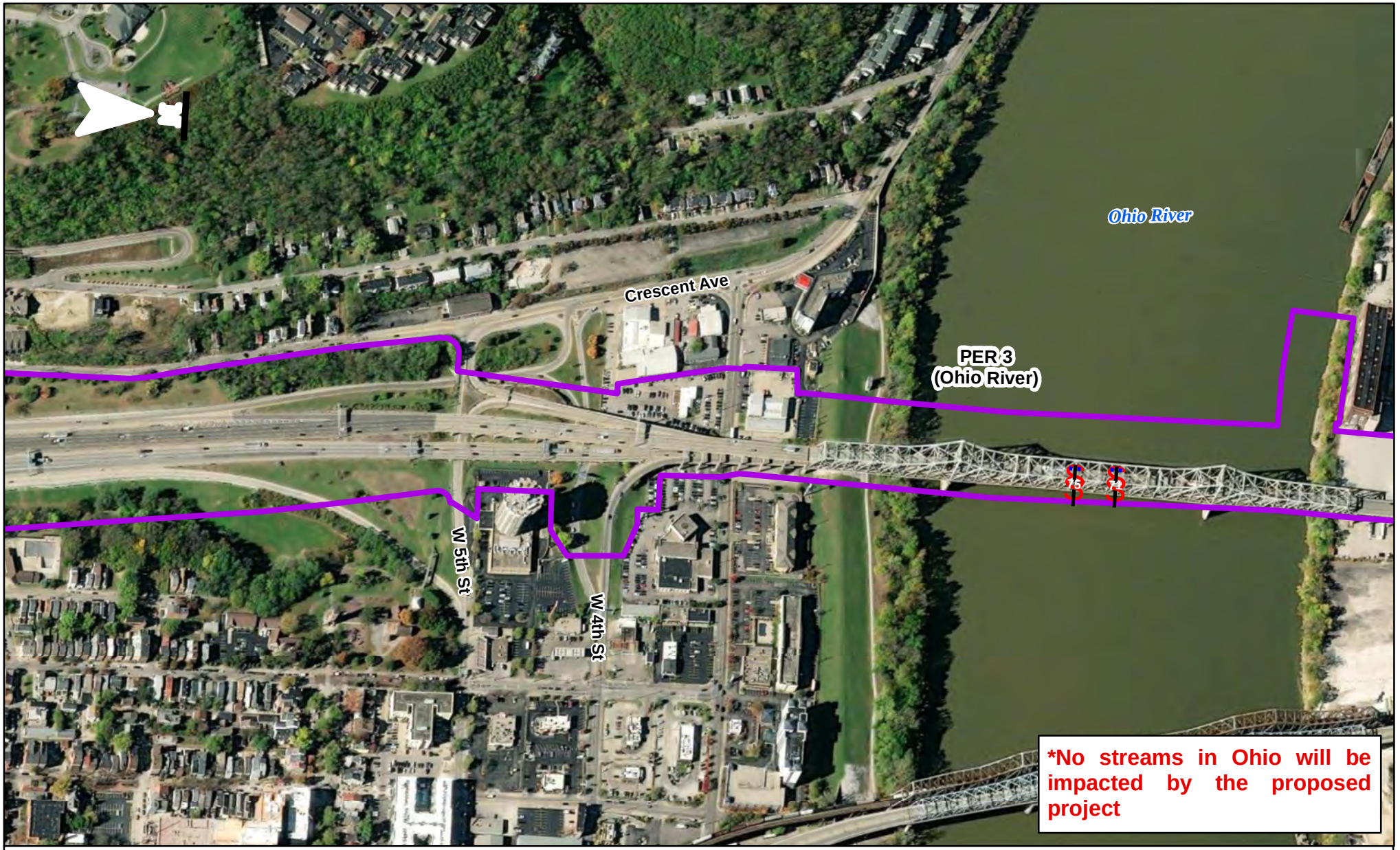


Exhibit 4-8: Stream Impacts

Streams

Study area

Brent Spence Bridge Corridor
Kenton, KY
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 500 1,000

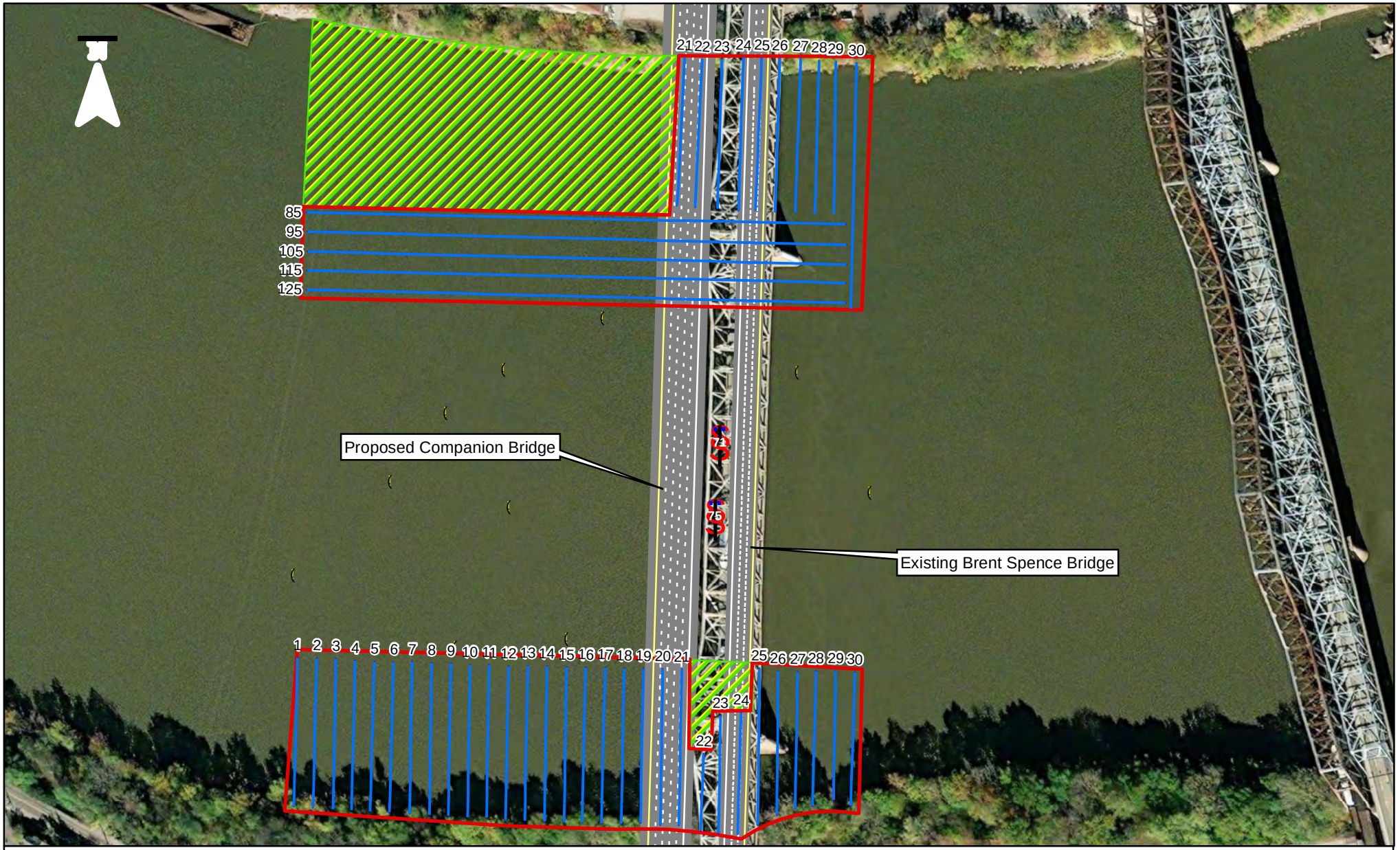


Exhibit 5-1: Mussel Survey - Phase I Study Area

(Mid-channel Search Locations

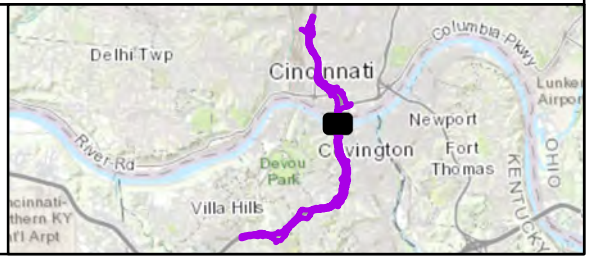
Phase I Transects

Surveyed Area

Areas Not Surveyed (Unsafe Conditions)

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

0 250 500 Feet



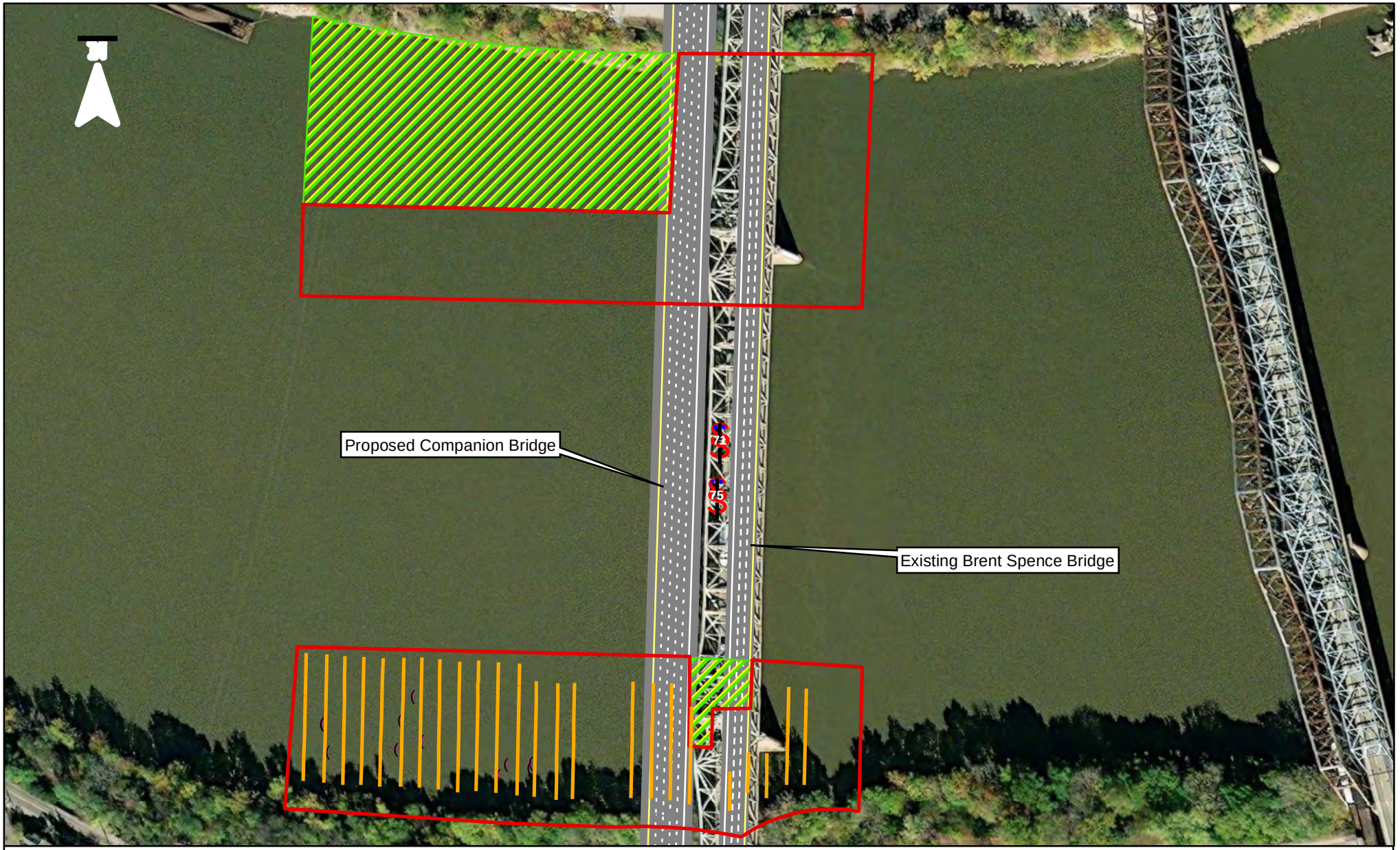


Exhibit 5-2: Mussel Survey - Phase II Study Area

Phase 2 Transects
Quadrat Locations
Surveyed Area
Areas Not Surveyed (Unsafe Conditions)

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

0 250 500 Feet

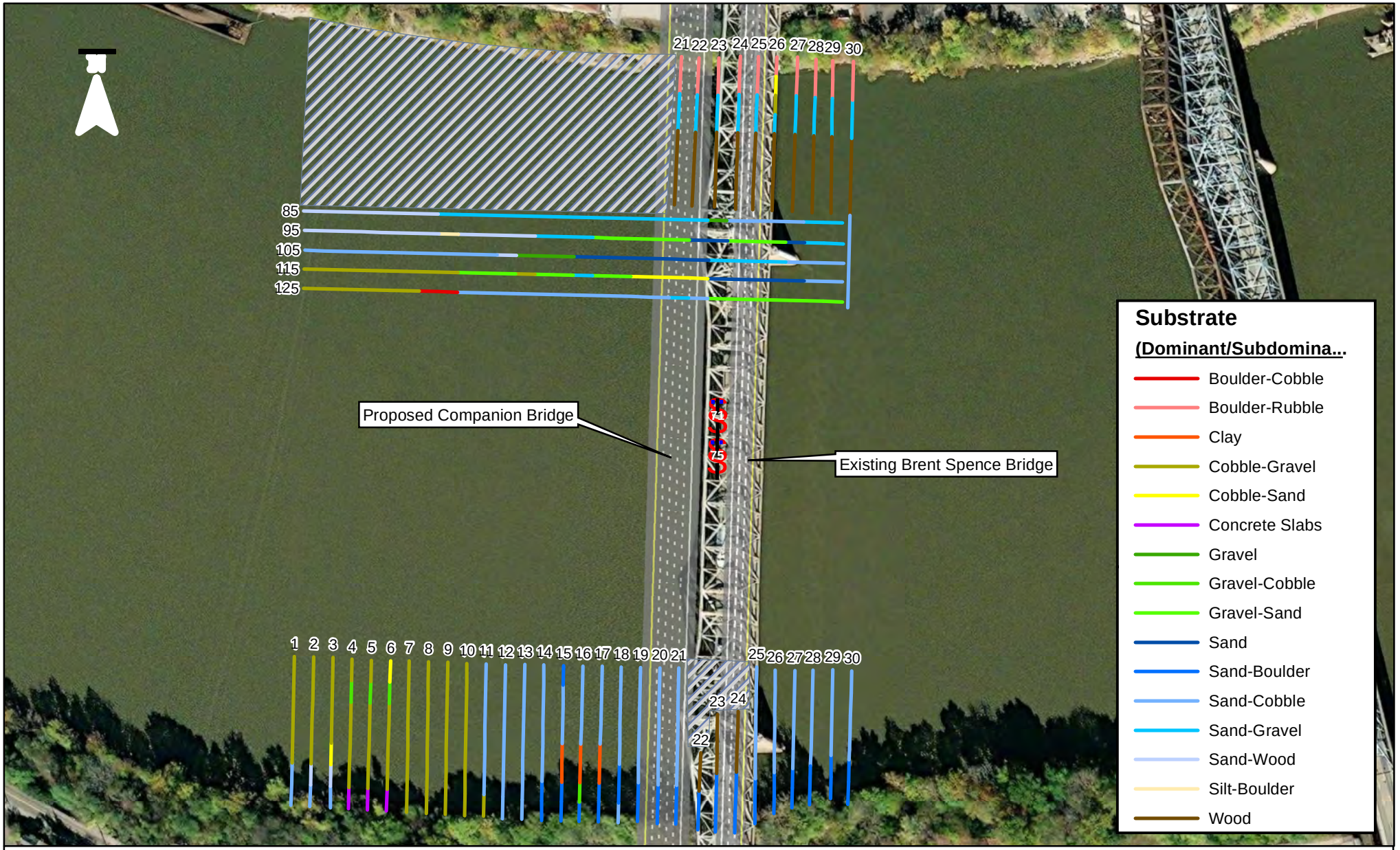
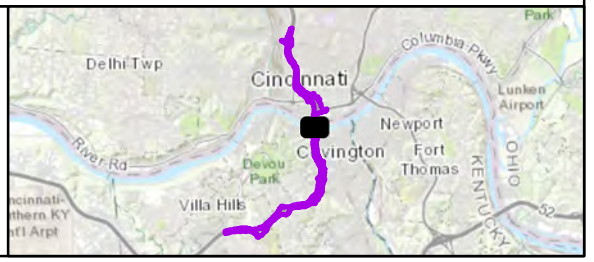


Exhibit 6: Mussel Survey – Substrate Composition

Areas Not Surveyed (Unsafe Conditions)

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

0 250 500 Feet



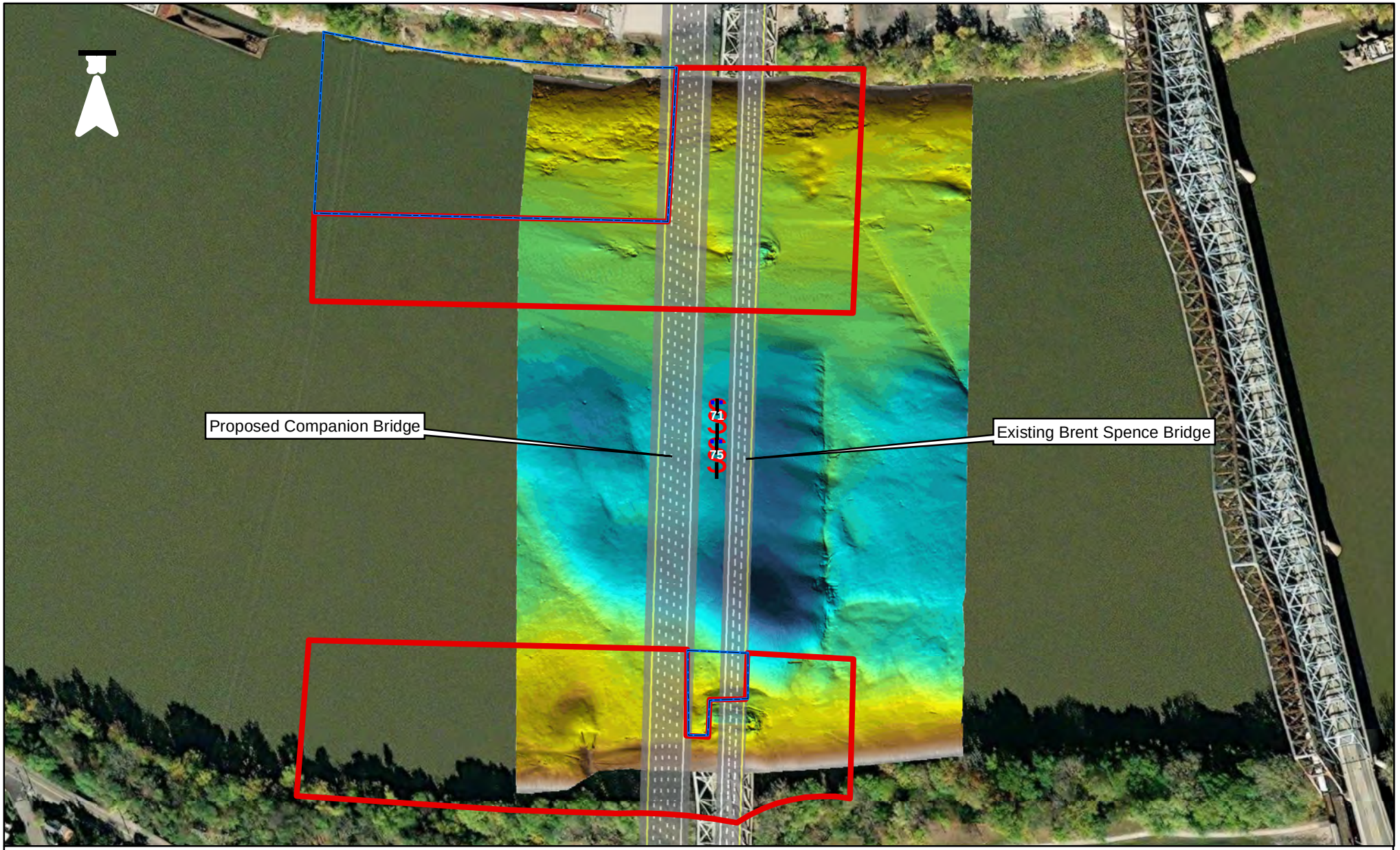


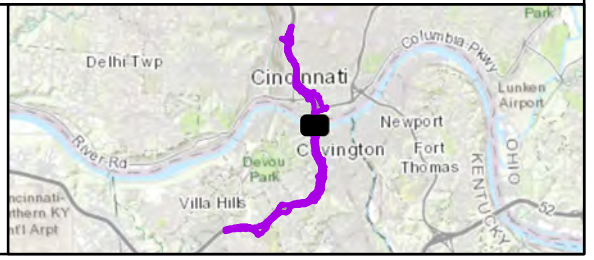
Exhibit 7: Bathymetric Survey

Surveyed Area

Areas Not Surveyed (Unsafe Conditions)

Brent Spence Bridge Corridor
KYTC Item No: 6-17.00
ODOT PID: 116649

Feet
0 250 500



APPENDIX B – COORDINATION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kentucky Ecological Services Field Office
J C Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601-8670
Phone: (502) 695-0468 Fax: (502) 695-1024

In Reply Refer To: October 12, 2022
Project Code: 2022-0055658
Project Name: Brent Spence Bridge Replacement

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 ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system 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:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.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 https://www.fws.gov/birds/policies-and-regulations.php.

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/birds/bird-enthusiasts/threats-to-birds.php.

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/birds/policies-and-regulations/executive-orders/e0-13186.php.

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.

Note: IPaC has provided all available attachments because this project is in multiple field office jurisdictions.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

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:

Kentucky Ecological Services Field Office
J C Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601-8670
(502) 695-0468

This project's location is within the jurisdiction of multiple offices. However, only one species list document will be provided for all offices. The species and critical habitats in this document reflect the aggregation of those that fall in each of the affiliated office's jurisdiction. Other offices affiliated with the project:

Ohio Ecological Services Field Office
4625 Morse Road, Suite 104
Columbus, OH 43230-8355
(614) 416-8993

Project Summary

Project Code: 2022-0055658
Project Name: Brent Spence Bridge Replacement
Project Type: Bridge - New Construction
Project Description: The project is set to replace the Brent Spence Bridge over the Ohio River between Kentucky and Ohio
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@39.0762883,-84.52015969817501,14z

Counties: Kentucky and Ohio

Endangered Species Act Species

There is a total of 16 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. Note that 2 of these species should be considered only under certain conditions.

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
Gray Bat *Myotis grisescens*	Endangered
No critical habitat has been designated for this species.	
This species only needs to be considered under the following conditions:	
▪ The project area includes potential gray bat habitat.	
Species profile: https://ecos.fws.gov/ecp/species/6329	
General project design guidelines: https://ipac.ecosphere.fws.gov/project/XFSBL5HRMFH7XJHK35CIAEXOXM/documents/generated/6422.pdf	
Indiana Bat *Myotis sodalis*	Endangered
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	
General project design guidelines: https://ipac.ecosphere.fws.gov/project/XFSBL5HRMFH7XJHK35CIAEXOXM/documents/generated/6422.pdf	
Northern Long-eared Bat *Myotis septentrionalis*	Threatened
No critical habitat has been designated for this species.	
This species only needs to be considered under the following conditions:	
▪ The specified area includes areas in which incidental take would not be prohibited under the 4(d) rule. For reporting purposes, please use the "streamlined consultation form," linked to in the "general project design guidelines" for the species.	
▪ Incidental take of the northern long-eared bat is not prohibited at this location. Federal action agencies may conclude consultation using the streamlined process described at https://www.fws.gov/midwest/endangered/mammals/nleb/s7.html	
Species profile: https://ecos.fws.gov/ecp/species/9045	
General project design guidelines: https://ipac.ecosphere.fws.gov/project/XFSBL5HRMFH7XJHK35CIAEXOXM/documents/generated/6422.pdf	
Tricolored Bat *Perimyotis subflavus*	Proposed Endangered
No critical habitat has been designated for this species.	
Species profile: https://ecos.fws.gov/ecp/species/10515	

Clams

NAME STATUS

Clubshell *Pleurobema clava* Endangered
Population: Wherever found; Except where listed as Experimental Populations
No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/3789
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/XFSBL5HRMFH7XJHK35CIAEXOXM/documents/generated/5639.pdf

Fanshell *Cyprogenia stegaria* Endangered
No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/4822
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/XFSBL5HRMFH7XJHK35CIAEXOXM/documents/generated/5639.pdf

Northern Riffleshell *Epioblasma rangiana* Endangered
No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/527
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/XFSBL5HRMFH7XJHK35CIAEXOXM/documents/generated/5639.pdf

Orangefoot Pimpleback (pearlymussel) *Plethobasus cooperianus* Endangered
No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/1132
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/XFSBL5HRMFH7XJHK35CIAEXOXM/documents/generated/5639.pdf

Pink Mucket (pearlymussel) *Lampsilis abrupta* Endangered
No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/7829
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/XFSBL5HRMFH7XJHK35CIAEXOXM/documents/generated/5639.pdf

Rabbitsfoot *Quadrula cylindrica cylindrica* Threatened
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/5165
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/XFSBL5HRMFH7XJHK35CIAEXOXM/documents/generated/5639.pdf

Ring Pink (mussel) *Obovaria retusa* Endangered
No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/4128
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/XFSBL5HRMFH7XJHK35CIAEXOXM/documents/generated/5639.pdf

NAME	STATUS
Rough Pigtoe *Pleurobema plenum* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6894 General project design guidelines: https://ipac.ecosphere.fws.gov/project/XFSBL5HRMFH7XJHK35CIAEXOXM/documents/generated/5639.pdf	Endangered
Sheepnose Mussel *Plethobasus cyphyus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6903 General project design guidelines: https://ipac.ecosphere.fws.gov/project/XFSBL5HRMFH7XJHK35CIAEXOXM/documents/generated/5639.pdf	Endangered
Snuffbox Mussel *Epioblasma triquetra* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4135	Endangered
Spectaclecase (mussel) *Cumberlandia monodonta* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7867 General project design guidelines: https://ipac.ecosphere.fws.gov/project/XFSBL5HRMFH7XJHK35CIAEXOXM/documents/generated/5639.pdf	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.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Sep 1 to Jul 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10

NAME	BREEDING SEASON
Cerulean Warbler *Dendroica cerulea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 23 to Jul 20
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Field Sparrow *Spizella pusilla* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 1 to Aug 15
Kentucky Warbler *Oporornis formosus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Prairie Warbler *Dendroica discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the

FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

■ probability of presence ■ breeding season | survey effort – no data

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species

- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

RIVERINE

- Riverine

IPaC User Contact Information

Agency: Department of Transportation
Name: Todd McDaniel
Address: 3 HMB Circle
City: Frankfort
State: KY
Zip: 40601
Email mmcdaniel@hmbpe.com
Phone: 5026959800

Lead Agency Contact Information

Lead Agency: Department of Transportation

Michael Leathers

From: DeGarmo, Phil <phil_degarmo@fws.gov>
Sent: Friday, July 8, 2022 11:34 AM
To: Mullins, Triston; KentuckyES, FW4; Boyer, Angela; Navarro, John; Monte McGregor; Fleece, Cody
Cc: Moyer, Jim; Michael Leathers; Hallberg, Karen I; Andrew.Logsdon@ky.gov; jana.day@ky.gov
Subject: Re: [EXTERNAL] Mussel Survey Study Plan for Brent Spence Bridge - KYTC

Triston,

Thank you for your request. The proposed survey methods are appropriate and approved. Should you need additional assistance, please let me know.

Sincerely,
Phil DeGarmo
USFWS KY FO
502-229-8830

From: Mullins, Triston <Triston.Mullins@stantec.com>
Sent: Thursday, July 7, 2022 12:12 PM
To: KentuckyES, FW4 <kentuckyes@fws.gov>; DeGarmo, Phil <phil_degarmo@fws.gov>; Boyer, Angela <angela_boyer@fws.gov>; Navarro, John <john.navarro@dnr.ohio.gov>; Monte McGregor <monte.mcgregor@ky.gov>; Fleece, Cody <Cody.Fleece@stantec.com>
Cc: Moyer, Jim <Jim.Moyer@stantec.com>; Michael Leathers <mleathers@hmbpe.com>; Hallberg, Karen I <Karen_Hallberg@fws.gov>; Andrew.Logsdon@ky.gov <Andrew.Logsdon@ky.gov>; jana.day@ky.gov <jana.day@ky.gov>
Subject: [EXTERNAL] Mussel Survey Study Plan for Brent Spence Bridge - KYTC

All,

Please see the attached study plan for a proposed mussel survey for the proposed bridge replacement adjacent to the existing Brent Spence bridge over the Ohio River between Kenton County, Kentucky and Hamilton County, Ohio. Our survey methods follow Ohio Mussel Survey Protocol for surveys completed on both banks.

Cody and I are available to talk if you have questions, comments, or concerns. If the study plan is acceptable, please send your authorization to proceed at the earliest opportunity. We currently have this work scheduled for beginning next week, July 11th, but we will await your response.

Thank you for your time and attention.

Triston Mullins

Triston Mullins M.S.

Malacologist/Fisheries Biologist

Mobile: 502-523-5616
triston.mullins@stantec.com

Michael Leathers

From: Boyer, Angela <angela_boyer@fws.gov>
Sent: Thursday, July 7, 2022 3:14 PM
To: Mullins, Triston; KentuckyES, FW4; DeGarmo, Phil; Navarro, John; Monte McGregor; Fleece, Cody
Cc: Moyer, Jim; Michael Leathers; Hallberg, Karen I; Andrew.Logsdon@ky.gov; jana.day@ky.gov
Subject: Re: [EXTERNAL] Mussel Survey Study Plan for Brent Spence Bridge - KYTC

Triston,

This is in response to your July 7, 2022, request for an amendment to your Federal Fish and Wildlife Permit No. ES38821A to perform a mussel survey for the Brent Spence Bridge Project in the Ohio River in Hamilton County, Ohio.

This notification serves as written concurrence that Stantec Consulting Services is authorized to proceed with the survey as described in your request. The survey must take place between May 1 and September 30, 2022. Upon completion of the survey, we request that you submit an electronic copy of the results to this office.

Please carry a copy of this site-specific authorization and your Federal permit while conducting the survey. Please contact me if you have questions.

Sincerely,
Angela Boyer
Endangered Species Coordinator for Ohio
U.S. Fish and Wildlife Service
4625 Morse Road, Suite 104
Columbus, Ohio 43230
angela_boyer@fws.gov

From: Mullins, Triston <Triston.Mullins@stantec.com>
Sent: Thursday, July 7, 2022 12:12 PM
To: KentuckyES, FW4 <kentuckyes@fws.gov>; DeGarmo, Phil <phil_degarmo@fws.gov>; Boyer, Angela <angela_boyer@fws.gov>; Navarro, John <john.navarro@dnr.ohio.gov>; Monte McGregor <monte.mcgregor@ky.gov>; Fleece, Cody <Cody.Fleece@stantec.com>
Cc: Moyer, Jim <Jim.Moyer@stantec.com>; Michael Leathers <mleathers@hmbpe.com>; Hallberg, Karen I <Karen_Hallberg@fws.gov>; Andrew.Logsdon@ky.gov <Andrew.Logsdon@ky.gov>; jana.day@ky.gov <jana.day@ky.gov>
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Triston Mullins

Triston Mullins M.S.
Malacologist/Fisheries Biologist

Mobile: 502-523-5616
triston.mullins@stantec.com

Michael Leathers

From: Mullins, Triston <Triston.Mullins@stantec.com>
Sent: Thursday, July 7, 2022 12:12 PM
To: Kentuckyes@fws.gov; phil_degarmo@fws.gov; Boyer, Angela; John.Navarro@dnr.ohio.gov; monte.mcgregor@ky.gov; Fleece, Cody
Cc: Moyer, Jim; Michael Leathers; karen_hallberg@fws.gov; Andrew.Logsdon@ky.gov; jana.day@ky.gov
Subject: Mussel Survey Study Plan for Brent Spence Bridge - KYTC
Attachments: KYTC.HMB_BrentSpence_StudyPlan_7.7.2022.pdf

All,

Please see the attached study plan for a proposed mussel survey for the proposed bridge replacement adjacent to the existing Brent Spence bridge over the Ohio River between Kenton County, Kentucky and Hamilton County, Ohio. Our survey methods follow Ohio Mussel Survey Protocol for surveys completed on both banks.

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Thank you for your time and attention.

Triston Mullins

Triston Mullins M.S.
Malacologist/Fisheries Biologist

Mobile: 502-523-5616
triston.mullins@stantec.com

Stantec Consulting Services Inc.
11687 Lebanon Road, Cincinnati OH 45241-2012

July 7, 2022
File: 173410642

Attention: Angela Boyer, Phil DeGarmo, John Navarro, Monte McGregor

Angela Boyer
U.S. Fish and Wildlife Service
Ohio Ecological Services Field Office
4625 Morse Road, Suite 104
Columbus, Ohio 43230

Phil DeGarmo
U.S. Fish and Wildlife Service
Kentucky Ecological Services Field Office
330 West Broadway, Room 265
Frankfort, Kentucky 40601

John Navarro
Ohio Department of Natural Resources
Division of Wildlife
2045 Morse Rd., Bldg. G
Columbus, Ohio 43229

Monte McGregor
Kentucky Department of Fish and Wildlife Resources
Center for Mollusk Conservation
3761 Georgetown Road
Frankfort, Kentucky 40601

Dear Reviewers,

Reference: Freshwater Mussel Phase 1 and Phase 2 Surveys Work Plan for Brent Spence Bridge Project on the Ohio River

Project Background

The Kentucky Transportation Cabinet (KYTC) has contracted HMB Professional Engineers, Inc. (HMB) to design improvements and propose alternatives for the Brent Spence Bridge (Bridge) carrying Interstates 71 and 75 (I-71 and I-75) across the Ohio River between Cincinnati, OH and Covington, KY. Bridge maintenance is needed, and the project addresses the on-going deterioration and extends the life of the Bridge. Rehabilitation will occur in place with no sections of the Bridge to be dropped in the river or need of maintenance in the river.

The proposed project also incorporates construction of a new tied arch bridge to be built adjacent to the existing Brent Spence bridge as an alternative (Concept I-W; Attachment: Study Plan Map). The plan for

Concept I-W currently incorporates two piers within 90m of each bank and downstream of the existing Bridge. It is assumed that causeways or cofferdams will be needed to construct the two proposed piers. To account for potential design changes in design plans, it has been assumed the impacts will occur within Concept I-W project plan.

Table 1. Project location and relevant stream information

Site	County, State	Latitude	Longitude	Drainage Area	ODNR Designation
North Bank	Hamilton, OH	39.091938°	-84.523217°	~76,580 miles^2	Group 4
South Bank	Kenton, KY	39.089204°	-84.523261°		Group 4

Proposed Study Design

Field surveys will be led by a federally permitted malacologist under Federal Permit # ES-38821A, which will be either James Kiser, Cody Fleece, and/or Triston Mullins. Currently the survey is to be led by Triston Mullins, who is an Ohio approved surveyor for this stream type under the authority of Ohio Scientific Collection Permit #23-084 and maintains Kentucky Scientific Wildlife Collecting Permit SC2211062 (Attachment: Collection Permits). Surveys are scheduled for the week of July 11th, 2022 but will occur during a more appropriate period if site conditions are not optimal during surveys. Field surveys will follow the Ohio Mussel Survey Protocol 2022 (Protocol) for bridge projects to maintain consistency between north and south bank surveys.

Presence/Absence Mussel Surveys

Survey Areas

The Areas of Direct Impact (ADIs) for the Brent Spence replacement project are located on the north and south banks of the Ohio River directly adjacent downstream of the existing bridge. The north ADI is approximately 17,500m^2 (140m long and 140m wide) and the south ADI is approximately 9,800m^2 (140m long and 70m wide). Buffers will follow those for bridge projects. The upstream buffers (USB) will extend 50m above the top of each respective ADI and a downstream buffer (DSB) will extend 100m below the bottom of each ADI. A lateral buffer (LTB) will extend 10m towards the river center from the ADIs, DSBs, and USBs. Since impacts are not anticipated to span the river, LTBs will not extend bank to bank, but mid-channel searches are proposed to inform upon future planning and avoidance (see section Mid-Channel Searches below).

Within survey areas mussels will be collected by visual or surface searches, including moving cobble and woody debris, hand sweeping away silt, sand, and/or small detritus, and disturbing/probing the upper five centimeters (two inches) of substrate. It is anticipated that SCUBA and/or surface-supplied air will be used for the entirety of the survey area. Surveys will be conducted when flow and visibility are appropriate to safely and effectively detect mussels. Mussels will be collected in mesh bags and brought to shore for identification and data processing. Time out of water for the mussels will be limited to only the time

necessary for processing. Mussels will be temporarily held in permeable containment in the river until returned to the approximate location where found.

Phase 1 Surveys

Phase 1 surveys will include the respective ADIs, USBs, DSBs, and LTB for the north and south banks (Attachement: Study Plan Map). Phase 1 of the survey will consist of transects spaced 10m apart and 1m^2 wide in each respective area within the ADI, LTB, DSB, and USB buffer. These transects will be divided into 10m segments and searched at a rate of 1 minute per square meter in heterogeneous substrates.

Phase 2 surveys will be conducted only if one or both of the following triggers are met:

- If five or more individuals are collected in any 10m segment in any area of the survey; and/or
- At least three species not listed in Appendix H of the are observed along any transect or within a qualitative survey conducted between transects.

Species Richness Curves shall be developed to supplement transect surveys. The searches for curve development will be limited to the area of mussel concentrations (as determined in previous surveys) within the ADIs. Enough searches (typically 15-minute increments) will be conducted such that a plateau is reached on a plot of cumulative number of individuals (x-axis) vs. cumulative number of species (y-axis). Searches shall be conducted until at least 6 samples are collected with the addition of no new species.

Quality Assurance

A minimum of 10 quantitative samples, each 0.25m^2 in area, will be excavated on the riverbed in areas of highest mussel concentration observed during Phase 1. Sample results should be recorded separately for each quadrat, including subsample data of surface counts and excavated counts for each sample. This data is important to assess the efficiency of qualitative sampling (i.e., % mussels at the surface vs. buried). If mussels are sparse and a concentration does not appear to exist, quantitative samples should be collected from the area exhibiting the best suitable habitat. All quality assurance samples must be collected from the ADI and within the salvage zone limits.

Mid-Channel Searches

Mid-channel substrates in large river systems are often comprised of dune ripple bedforms consisting of unstable shifting sand. No fill, staging, or construction is currently proposed for mid-channel habitats at the project site. However, as directed by KYTC, some limited sampling of these habitats is deemed prudent to account for unforeseen design and/or construction modifications. In addition to those requirements within the Protocol, a set of 10 randomly selected points will be searched by two divers moving in an upstream direction for a total of 20 searches. Search duration will equal 10 minutes or more for a minimum total search time of 200 minutes. Mussels will be collected by visual or surface searches, including moving cobble and woody debris, hand sweeping away silt, sand, and/or small detritus, and disturbing/probing the upper five centimeters (two inches) of substrate. Substrate composition will be assessed by divers using visual or tactile methods.

Reference: Freshwater Mussel Phase 1 and Phase 2 Surveys Work Plan for Brent Spence Bridge Project on the Ohio River

Phase 2 Surveys

If Phase 2 work is needed, the targeted area will be defined as an area encompassing all triggered area connected by similar habitat surrounded by a 10m buffer, which will not exceed the Phase 1 survey area. Phase 2 transects will be placed between Phase 1 transects.

Data Analysis and Reporting

Upon completion of the field survey, Stantec staff will prepare a brief report for KYTC submission to State and Federal agencies describing:

- Habitat conditions at the survey sites;
- Methods used to complete the survey;
- Level of effort;
- Species presence and abundances by transect/quadrat; and
- Photographs of voucher specimens.

Please respond with authorization to proceed with this survey at your earliest opportunity. If you have questions or concerns regarding this study plan, please contact me at (513) 262-3994.

Regards,

Stantec Consulting Services Inc.

Cody Fleece
Principal, Aquatic Ecologist
Phone: 513 842 8238
Cody.Fleece@stantec.com

Triston Mullins M.S.
Malacologist/Fisheries Biologist
Phone: 502 523 5616
triston.mullins@stantec.com

Attachment: Study Plan Map
State and Federal Collection Permits

c. Karen Hallberg, USFWS
Jim Moyer, Stantec
Michael Leathers, HMB
Andrew Logsden, KYTC
Jana Day, KYTC

Reference: Freshwater Mussel Phase 1 and Phase 2 Surveys Work Plan for Brent Spence Bridge Project on the Ohio River

Attachment: Study Plan Map

Stantec

Legend

Bridge

Salvage Area

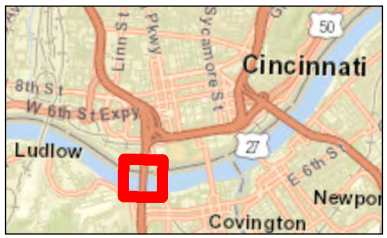
- Area of Direct Impact
- Downstream Buffer
- Lateral Buffer
- Upstream Buffer

0 100 200 300 400 Feet

1:3,519 (At original document size of 8.5x11)

Notes

1. Coordinate System: NAD 1983 StatePlane Kentucky North FIPS 1601 Feet
2. Base Imagery: ESRI Map Services.



Project Location
Ohio River
Hamilton Co., Ohio; Kenton Co., Kentucky

123456789
Prepared by EKD on 2022-05-24

Client/Project
Kentucky Transportation Cabinet
Brent Spence Bridge

Figure No.
1

Title
Mussel Survey Area

Page 01 of 01

C:\Users\ediltone\Documents\Proposals\Brent_Spence_Bridge\BSB_study_plan_v2.mxd Revised: 2022-07-06 By: ediltone

Reference: Freshwater Mussel Phase 1 and Phase 2 Surveys Work Plan for Brent Spence Bridge Project on the Ohio River

Attachment: Collection Permits

DIVISION OF WILDLIFE

Ohio Department of Natural Resources

Division of Wildlife Headquarters
2045 Morse Road, Bldg. G
Columbus, Ohio 43229-6693
1-800-WILDLIFE

Chief, Division of Wildlife: **Kendra S. Wecker**

WILD ANIMAL PERMIT: 23-084

SCIENTIFIC COLLECTION

DATE ISSUED
4/28/2020

JAMES D. KISER
STANTEC CONSULTING
10509 TIMBERWOOD CIRCLE, SUITE 100
LOUISVILLE, KY 40223-5301

Others authorized on permit
YES (SEE ATTACHMENT)

is hereby granted permission to take, possess, and transport at any time and in any manner specimens of wild animals, subject to the conditions and restrictions listed below or any documents accompanying this permit. This permit, unless revoked earlier by the Chief, Division of Wildlife, is effective from:

3/16/2020 to: 3/15/2023

The Chief of the Division of Wildlife will not issue permits for Dangerous Wild Animal (DWA) species (ORC 935.01 except native DWA, required for specific projects. The permit issued by the Chief does not relieve the permittee of any responsiblity to obtain a permit pursuant to R.C. Chapter 935 except as specified for the animals and purposes permitted herein. The permittee must adhere to all additional requirements under R.C. Chapter 935.

THIS PERMIT IS RESTRICTED AS FOLLOWS:

1. At least two weeks prior to the initiation of field work concerning bats, you must provide Angela Boyer (angela_boyer@fws.gov) with a study plan, specifying objectives, location, dates, and all other details, for review and approval (copy Sarah Stankavich (sarah.stankavich@dnr.state.oh.us)).
2. . At least 15 days prior to the initiation of a mussel survey in Group 1-3 systems, please provide John Navarro (john.navarro@dnr.state.oh.us) with a study plan specifying objectives, location, dates, and all other details, for Division of Wildlife review and approval. Follow the following link for more information on mussel surveys under wild animal collection link (http://wildlife.ohiodnr.gov/licenses-and-permits/specialty-licenses-permits). For mussel surveys in Group 2 and 4 systems, contact the USFWS (Angela Boyer at angela_boyer@fws.gov).
3. Twenty-four hours prior to collecting activities, permittee must contact the wildlife officer assigned to the county where activities will take place to advise locations and duration of sampling.
4. Permittee may collect mammals (bats), reptiles (copperbelly water snake), amphibians, fish, mussels and macroinvertebrates for survey and inventory. All specimens are to be immediately released except macroinvertebrates which may be taken back to the lab for identification. Mussel collection by approved surveyors only. Only relic shells may be taken as voucher specimens.
5. Collection of bats and mussels are authorized per letter permit from the Chief of the Division of Wildlife. All specimens are to be immediately released at capture site. Radio-transmitters may be applied to bats.
6. Must maintain and follow restrictions of current Native Endangered & Threatened Species Recovery permits TE38821A-4 and TE15027A-6 issued by the U.S. Fish and Wildlife Service.
7. Permittee must follow current U.S. Fish and Wildlife Service 2020 Joint Mist net Guidance and WNS decontamination protocols.
8. Notify Sarah Stankavich at 614-265-6764 within 48 hours if an Indiana bat or Northern long-eared bat is located. All Indiana bats and Northern long-eared bats must be banded using only ODNR bands. ODNR requests that little brown bats (Myotis lucifugus) and tri-colored bats (Perimyotis subflavus) be voluntarily banded. Contact Sarah for bands.
9. Please notify John Navarro by email or phone at 614-265-6346 if a new location for endangered mussel species is discovered or if a previously undocumented invasive species is located.
10. Biosecurity measures must be taken to minimize the potential transmission of diseases. Please follow the recommendations of the Northeast PARC (included) for all work with reptiles and amphibians.
11. FOR AQUATIC WORK: Collection is prohibited in the Killbuck Creek, Big and Little Darby Creeks, tributaries of and the east branch of the Chagrin River above I-90, Fish Creek (Williams County) and Division of Wildlife property without explicit written permission from the Division of Wildlife. Sampling is further restricted in streams that may have federally listed mussels. See the enclosed "USFWS Restricted Streams of Ohio" document for a list of streams and contact information.
12. All voucher specimens are to be deposited at The OSU, Museum of Biological Diversity or the Cleveland Museum of Natural History.

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13. An annual electronic report of bat collections must be submitted in the USFWS Mid-west Spreadsheet. All other species must report annually in the Diversity Database Excel spreadsheet format to the Division of Wildlife. 14. All work conducted on live bats and mussels, as well as identification of all bats and mussels collected, must be conducted by federal permittees. State sub-permittees may assist under the direct, on-site supervision of a federal permittee.

Locations of Collecting:

STATEWIDE WITH NOTED EXCEPTIONS

Equipment and method used in collection:

PRESENCE/ABSENCE BY SNORKELING, DIVING, HAND GRABBING, ELECTROFISHING, MACROINVERTEBRATE SAMPLERS, MIST NETS

Name and number of each species to be collected:

BATS, INCLUDING THE ENDANGERED INDIANA BAT AND THREATENED NORTHERN LONG-EARED BAT. ENDANGERED MUSSELS, FISH, REPTILES (INCLUDING THE COPPERBELLY WATER SNAKE) AMPHIBIANS AND AQUATIC MACROINVERTEBRATES FOR SURVEY AND INVENTORY. ENDANGERED SPECIES COLLECTION MUST BE CONDUCTED PER CURRENT LETTER PERMIT FROM THE CHIEF OF THE DIVISION OF WILDLIFE.

RESTRICTIVE DOCUMENTS ACCOMPANYING THIS PERMIT? YES

NO ENDANGERED SPECIES OR AQUATIC NUISANCE SPECIES MAY BE TAKEN WITHOUT WRITTEN PERMISSION FROM THE CHIEF

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ATTACHMENT

This attachment to permit # 23-084 authorizes the following persons to conduct the activities listed on the permit, within the conditions and restrictions set forth. Each person must carry and exhibit upon request, a copy of the permit and this attachment when conducting any of the listed activities. The person named on the permit assumes full responsibility for the actions of the persons on this list and for completing and submitting all required

Sub-permittee Name

DOUG STEPHENS	DANIEL SYMONDS
JOSH ADAMS	ROHINI VEMBAR
ANGELA SJOLLEMA	KIM CARTER
DAVID SAUGEY	LINDSEY WIGHT
MICHAEL DEVILLIERS	DAN GODEC
CODY FLEECE	JODY NICHOLSON
KATE BOMAR	NATHAN NOLAND
AARON KWOLEK	JANE DECLERCK
MATTHEW DENZLER	THOMAS ESTREM
TRISTON MULLINS	

Scientific Wildlife Collecting - Fed Protected

SC2211062

Stantec Consulting, Inc.
Triston Mullins
9200 Shelbyville Road, Suite 8

Louisville, KY 40222

Effective: **1/1/22**
Expires: **12/31/22**
Fed Permit # ES-38821A-5

This permit allows the taking and subsequent possession or release of federally-protected wildlife for the purposes of conducting scientific investigations or evaluations for which remuneration is received.

Regulated by
301 KAR 4:070

Your Scientific Wildlife Collecting - Fed Protected is attached below. Keep top portion for your records

Authorization Number: 20695
Issued on date: 21-Feb-2022

Kentucky Dept. of Fish and Wildlife Resources

Scientific Wildlife Collecting - Fed Protected
SC2211062 **Valid:** 1/1/22 **to** 12/31/22

Stantec Consulting, Inc.
Triston Mullins
9200 Shelbyville Road, Suite 8

Louisville, KY 40222

Authorized by KDFWR

ES-38821A-5

The Kentucky Department of Fish and Wildlife Resources is funded through the sale of hunting and fishing licenses. KDFWR receives no general tax dollars.

REPORT-A-POACHER 1-800-25ALERT

Have a question? Call 1-800-858-1549

Visit us on the web at fw.ky.gov

Important Document

Enclosed

Stantec Consulting, Inc.
Triston Mullins
9200 Shelbyville Road, Suite 800

Louisville, KY 40222

NATIVE ENDANGERED & THREATENED SP. RECOVERY

Permit Number: ES38821A

Version Number: 5

Effective: 2022-05-20 **Expires:** 2026-12-31

Issuing Office:

Department of the Interior

U.S. FISH AND WILDLIFE SERVICE

ES Bloomington Permit Office
5600 American Boulevard, West, Suite 990
Bloomington, Minnesota 55437-1458
permitsR3ES@fws.gov

Digitally signed by

Acting Endangered Species Division, Program Manager

Permittee:

STANTEC CONSULTING SERVICES

10509 TIMBERWOOD CIRCLE SUITE 100

LOUISVILLE, KY 40223-2177

US

Authority: Statutes and Regulations: 16 U.S.C. 1539 (a), 16 U.S.C. 1533 (d) 50 CFR 17.22, 50 CFR 17.32, 50 CFR 13

Location where authorized activity may be conducted:

ON LANDS SPECIFIED WITHIN THE ATTACHED SPECIAL TERMS AND CONDITIONS

Reporting requirements:

ANNUAL REPORTS DUE: 1/31

See permit conditions for reporting requirements

Authorizations and Conditions:

A. General Conditions set out in Subpart B of 50 CFR 13, and specific Conditions contained in Federal regulations cited above, are hereby made a part of this permit. All activities authorized herein must be carried out in accord with and for the purposes described in the application submitted. Continued validity, or renewal of this permit is subject to complete and timely compliance with all applicable Conditions, including the filing of all required information and reports.

B. The validity of this permit is also conditioned upon strict observance of all applicable foreign, state, local, tribal, or other federal law. Necessary state and/or local permits where applicable, must also be acquired and observed; this permit is invalid without such permits.

C. Valid for use by those identified in the List of Authorized Individuals.

C.1. Authorized Individuals:

Only individuals on the attached List of Authorized Individuals (LAI) are authorized to conduct activities pursuant to this permit. The LAI, printed on U.S. Fish and Wildlife Service (USFWS) letterhead, and signed and dated by the Region 3 permit issuing office or a Region 3 lead species Field Office, may identify special Conditions or circumstances under which individuals can conduct authorized activities and it must be retained with these Authorizations and Conditions. Each named individual shall be responsible for compliance with the Authorizations and Conditions of this permit.

Trained assistants not named on the attached LAI may work on permitted activities under the direct and on-site supervision of the individuals named on the LAI. “On-site supervision” is defined as having the Permittee at a distance close enough to enable immediate assistance to a supervised individual, as needed, while the supervised individual conducts an authorized activity. Trained assistants may not work independently at a site.

Permittee shall replace outdated LAIs and attach the subsequent current updated version of the LAI to this recovery permit upon receipt. **This permit will be considered invalid without a current attached LAI.**

C.2. To request changes to the LAI, the Permittee (Principal Officer for business permits) shall submit an amendment request via ePermits (epermits.fws.gov). The request shall be submitted at least 30 days prior to the desired effective date. The Permittee shall submit a $50.00 processing fee unless fee exempt [see 50 CFR 13.11 (d)], the request should include a desired effective date and shall include the following information:

a. The name of each individual (first name, middle initial, last name) to be appended to the LAI, confirmation that the individual is not permitted under another business or individual Federal recovery permit, and indicate the species they will be working with and the activities they will be conducting;

b. The resume/qualifications of each person, including specific information on previous professional experience working with the species/activity affected by the request. Information should include: the approximate number of hours of focused activity with each species in occupied habitat; approximate numbers of each species the applicant has worked with at each site (i.e., indicate the number specimens at specific sites or specific activities); names, dates, and location of areas surveyed; and experience with similar species;

c. For each individual: the names, titles, organizations, emails, and telephone numbers of a minimum of two references who can verify experience with the species (reference letters are preferred and always appreciated); and

d. The names of any individuals to be deleted from the LAI.

D. Acceptance of this permit serves as evidence that the Permittee understands and agrees to abide by the terms of this permit and all sections of Title 50 Code of Federal Regulations (CFR), Parts 13 and 17, pertinent to issued permits (https://fwsepermits.servicenowservices.com/fws). Section 11 of the Endangered Species Act of 1973, as amended, provides for civil and criminal penalties for failure to comply with permit conditions.

A request for permit renewal and the $100 application processing fee must be received **at least 30 days prior to the expiration date** of this permit to continue conducting authorized activities under the expired permit while your application is being processed (subject to compliance with 50 CFR, Parts 13.21 and 13.22). Please use https://fwsepermits.servicenowservices.com/fws to obtain specific information regarding the new ePermitting process to apply for and submit your digital recovery permit application and application processing fee. When these requirements are not met, this permit becomes invalid on the expiration date.

Unless otherwise instructed within the Authorizations and Conditions, **annual reports** are due by January 31 following each year your permit is in effect and shall be submitted to all offices identified in the permit Conditions

E. Permittee is authorized to take Indiana bat (*Myotis sodalis*), gray bat (*Myotis grisescens*), northern long-eared bat (*Myotis septentrionalis*), Ozark big-eared bat (*Corynorhinus townsendii ingens*), Virginia big-eared bat (*Corynorhinus townsendii virginianus*), listed mussel and fish species identified in the tables below, copperbelly water snake (*Nerodia erythrogaster neglecta*), and big sandy crayfish (*Cambarus callianus*) and for scientific research aimed at recovery of the species: presence/absence surveys, studies to document habitat use, population monitoring, and to evaluate potential impacts. This permit does **not** authorize the collection of voucher specimens.

Fish Species

Etheostoma chienense	Relict darter
Etheostoma percnurum	Duskytail darter
Etheostoma spilotum	Kentucky arrow darter
Notropis albizonatus	Palezone shiner
Phoxinus cumberlandensis	Blackside dace
Scaphirhynchus albus	Pallid sturgeon

Freshwater Mussel Species

Alasmidonta atropurpurea	Cumberland elktoe
Cumberlandia monodonta	Spectaclecase
Cyprogenia stegaria	Fanshell
Dromus dromas	Dromedary pearlymussel
Epioblasma brevidens	Cumberlandian combshell
Epioblasma capsaeformis	Oyster mussel
Epioblasma florentina walkeri	Tan riffleshell
Epioblasma obliquata perobliqua	White catspaw
Epioblasma obliquata obliquata	Purple catspaw
Epioblasma torulosa gubernaculum	Green blossom pearlymussel
Epioblasma torulosa rangiana	Northern riffleshell

Epioblasma triquetra	Snuffbox
Epioblasma turgidula	Turgid blossom pearlymussel
Fusconaia cuneolus	Finerayed pigtoe
Fusconaia cor	Shiny pigtoe
Hemistena lata	Cracking pearlymussel
Lampsilis abrupta	Pink mucket
Lampsilis altilis	Finelined pocketbook
Lampsilis higginsii	Higgins eye pearlymussel
Lemiox rimosus	Birdwing pearlymussel
Leptodea leptodon	Scaleshell
Obovaria retusa	Ring pink
Pegias fabula	Littlewing pearlymussel
Plethobasus cicatricosus	White wartyback pearlymussel
Plethobasus cooperianus	Orangefoot pimpleback pearlymussel
Plethobasus cyphyus	Sheepnose
Pleurobema clava	Clubshell
Pleuorbema gibberum	Cumberland pigtoe
Pleurobema plenum	Rough pigtoe
Pleuronaia dolabelloides	Slabside pearlymussel
Potamilus capas	Fat pocketbook
Ptychobranchus subtentus	Fluted kidneyshell
Quadrula cylindrica cylindrica	Rabbitsfoot
Quadrula cylindrica strigillata	Rough rabbitsfoot
Quadrula fragosa	Winged mapleleaf
Quadrula intermedia	Cumberland monkeyface pearlymussel
Quadrula sparsa	Appalachian monkeyface pearlymussel
Toxolasma cylindrellus	Pale lilliput pearlymussel
Villosa fabalis	Rayed bean
Villosa perpurpurea	Purple bean
Villosa trabilis	Cumberland bean

F. Activities are authorized at the following locations:

F.1. Within U.S. Fish and Wildlife Service (USFWS) Southwest Region 2: Texas and Oklahoma, upon receipt of written concurrence from the Field Supervisor, and upon coordination with Ozark Plateau National Wildlife Refuge prior to (1) surveys of caves known to be used by federally-listed bats, and (2) examinations of caves suspected of containing federally-listed bat species (some presence/absence surveys may require the presence of a U.S. Fish and Wildlife Service Biologist), and as outlined in Condition G.

F.2. Within USFWS Midwest Region 3: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.3. Within USFWS Southeast Region 4: Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.4. Within USFWS Northeast Region 5: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.5. Within USFWS Mountain-Prairie Region 6: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, and Wyoming, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

G. For bats and mussels permittee shall notify and request approval from the USFWS Field Supervisor for the state in which activities are proposed to occur (Condition U.) at least 15 days prior to conducting any activities.

For fish and Copperbelly water snake permittee shall notify and request approval from the USFWS Species Recovery Lead Office Field Supervisor *and* the USFWS Field Supervisor for the state in which activities are proposed to occur (Condition U.) at least 15 days prior to conducting any activities.

For Big sandy crayfish permittee shall notify and request approval from the USFWS Species Recovery Lead Office Field Supervisor *and* the USFWS Field Supervisor for the state in which activities are proposed to occur (Condition U.) at least 30 days prior to conducting any activities.

Contact information is available at: https://www.fws.gov/service/3-200-59-scientific-purposes-enhancement-propagation-or-survival-permits-recovery-permits. Your request for this site-specific approval must be in writing and must indicate:

G.1. Species for which proposed activities are being conducted.

G.2. Location of proposed activities, including project site, county, and state.

G .3. A complete description of activities (i.e., proposed project plan, including purpose and need, surveys, methods, etc.).

G.4. Dates when the project is proposed to take place.

G.5. Evidence that Permittee has received any required contracts to complete the activities.

G.6. Whether all annual reporting requirements have been fulfilled.

You may proceed with only the activities described in your written concurrence letter, upon receipt from the applicable USFWS Field Supervisor. ***Your concurrence letter must be carried with this permit to authorize site-specific activities*.**

H. **BAT SPECIES:** Permittee is authorized to take (capture with mist-nets or harp traps, handle, identify, band, radio-tag, collect non-intrusive measurements, enter hibernacula, and release). Permittee shall adhere to the following conditions:

H.1. Bats may be captured with mist nets following the protocol included in the Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines. Guidelines are available at: https://fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines. Note: Permittee must use the most up-to-date version of the Summer Survey Guidelines, available on

the USFWS website page, for your summer surveys. The monitoring interval for mist nets is +/- 10 minutes and may not exceed 15 minutes. Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.

H.2. Bats may be captured with harp traps with written concurrence from the Field Supervisor in the state in which trapping is proposed. **Harp traps must be continually monitored.** Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.

At least one named Permittee must remain present at each mist-net and harp trap site while it is being operated.

H.3. Permittee shall carry out non-intrusive measurements on all captured bats. Data shall be recorded for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data sheet provided by the USFWS (e.g., Bat Reporting Spreadsheet). Handling should be limited to the maximum extent practicable and should cease immediately at signs of undue stress (e.g., bat becoming unresponsive, etc.). Bats that appear stressed from handling should be placed in a dark, quiet location away from activity where it can safely fly away after recovery, and should be checked to ensure successful recovery before leaving the study site. Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

H.4. Lipped metal bands having a unique identifier may be applied to the forearm of captured bats prior to release. No more than one band per bat may be used. Bands should be applied to the forearm of captured bats prior to release. Position the band on the wing so that when the bat is hanging upside down, the band numbers are right-side up. A single band should be placed on the right forearm of each male and the left forearm of each female bat.

H.5. Radio transmitters may be applied during spring, summer, and fall roosting and migration periods via nontoxic skin bond adhesive. The total weight of the transmitter may not exceed 5% of the bat's body weight and the total weight of the package (forearm band, transmitter and adhesive) may not exceed 6% of the bat's body weight. The lightest package (both transmitter and adhesive) capable of accomplishing the required task should be used, especially with pregnant females and newly volant

juveniles. Bats carrying transmitters must be monitored daily for at least three days, or until the transmitter falls off, whichever occurs first. *Although not required as a condition of this permit, in order to gather needed information to promote the conservation of the northern long-eared bat, it is recommended that the permittee radio-track female and juvenile northern long-eared bats captured when conducting mist-netting and radio-tracking of Indiana bats within the white-nose syndrome (WNS) zone of the range of the northern long-eared bat. Specifics on the number of females and juvenile bats to be tracked will be determined in coordination with the appropriate Field Office, as specified in Condition G.*

H.6. No trapping activities shall occur within 20 meters of a known Indiana bat maternity roost site, either natural or artificial roosts, unless Permittee receives prior written approval from the USFWS Field Supervisor for the state in which the activities are proposed to occur.

H.7. Equipment used to capture and handle bats shall be cleaned and decontaminated, including personal gear such as boots and gloves, using products cited in decontamination guidelines and in compliance with label directions. The most recent decontamination guidance is found on the web at: https://www.whitenosesyndrome.org/topics/decontamination.

H.8. Caves, mines, or other suitable hibernation sites may be quietly searched in a manner that minimizes disturbance by utilizing the minimum number of people and time required to complete the survey. Surveys should not be repeated more often than once every other year in any given hibernaculum that is occupied by endangered or threatened bats. Where hibernacula area and safety conditions allow, individuals entering caves are recommended to utilize night vision goggles or red-filtered light and to remain in the cave no more than 90 minutes to complete the work.

H.9. You shall immediately remove Ozark big-eared bats (*Corynorhinus townsendii ingens*) and Virginia big-eared bats (*C. t. virginianus*) from the net/trap after capture, then process and release each individual. When there are multiple bats in the net, Ozark big-eared bats (OZBB) and Virginia big-eared bats (VABB) shall be removed first and processed as quickly as possible. If this is not possible, the species shall be placed into a **HOLDING CAGE** and held no longer than 10 minutes. Place the cage in a dark, quiet location, and process all as soon as possible. **Do not put these bat species in holding bags, nor in an individual holding bag or container** (*C. t. ingens and C. t. virginianus* are highly social and being held individually in a bag increases stress and can lead to mortality). Holding cage

options include small rubber/plastic/vinyl coated soft-sided (mesh) pet carriers or modified standard minnow traps with rubber coated mesh where the top of the trap is either a plastic bucket or flower pot with a hole in the center (contact the OZBB or VABB Lead Recovery Biologist for further information on acceptable enclosures -- see Condition U. for contact information). A holding cage shall contain only multiple OZBBs, or only multiple VABBs (avoid overcrowding). Do not place other species/subspecies in either cage(s). Holding cages shall be decontaminated using the most current White-nose Syndrome decontamination guidance after a night of use (https://www.whitenosesyndrome.org/topics/decontamination). Do not decontaminate holding cages within a single net night.

When an OZBB or VABB appear to be going into shock (i.e., becomes limp and unresponsive), place the bat in a dark, quiet location either on a rock or other flat surface considered the safest option for the bat in that situation to recover (removed from capture activities and predators) and monitor it periodically. **Do not continue to handle the bat, nor place it in a holding cage or in a holding cage with other OZBBs or VABBs**. If the stressed bat recovers, release it immediately without an attempt to gather additional data, collect samples, apply a band or a transmitter, etc.

H.10. **Wes Cunningham and Lynda Mills** are not authorized to take Ozark big-eared bat (*Corynorhinus townsendii ingens*) and Virginia big-eared bat (*C. t. virginianus*). The USFWS acknowledges that incidental (unintentional) capture of these co-occurring listed bat species may potentially occur while conducting lawful survey activities directed at authorized bat species. Wes Cunningham and Lynda Mills **are no**t **authorized to conduct** any activities for the specific purpose of capture of Ozark or Virginia big-eared bats. Permittee shall be observant and cautious to eliminate or minimize "take" of co-occurring listed species to the maximum extent practicable. In the event of incidental (unintentional) capture of Ozark big-eared bat or Virginia big-eared bat, Permittee shall immediately remove the bat(s) from the net/trap after capture, document with a photograph and release at the capture site. ***Do not put these bat species in holding cages, bags, or containers*.** Within 48 hours, you must notify the USFWS in the state in which you are working of the incidental capture (see https://www.fws.gov/service/3-200-59-scientific-purposes-enhancement-propagation-or-survival-permits-recovery-permits).

I. **MUSSEL SPECIES:** Permittee is authorized to take (capture, handle, release, and relocate under special circumstances) mussels by hand via wading, snorkeling, or diving. Permittee shall adhere to the following conditions:

I.1. Permittee may take (remove from the substrate, by hand, for identification and data collection) mussels via wading, snorkeling, or diving and temporarily hold healthy specimens.

I.2. Permittee may temporarily hold specimens in mesh bags, either suspended in the water or held in a container containing river water, while awaiting identification and data collection. Specimens may be held for up to three hours if they are held in the water in bags that allow free movement of water in the river from which the mussels were taken or held in containers of water that is changed every hour [every half-hour when air temperatures are at or above 80^{o} Fahrenheit (F)] and replaced with water freshly taken from the water where the mussels were collected. When practicable, specimens held in containers must remain in the shade. Specimens must be returned to the locality from which they were taken. Live specimens that cannot be identified at the site must be photographed for identification purposes.

I.3. Collection of live mussel specimens must be done only when the water temperature is above 40^{o} F. Mussels must be returned by hand to suitable habitat, by divers if necessary. When air temperatures are below 32^{o} F or above 90 ^{o} F, specific details regarding collection and handling activities as well as how mussels should be placed (i.e., reburying instructions) shall be coordinated with the field office(s) where activities are occurring (Condition U).

I.4. All live mussels shall be measured (length and height) and, if possible, sexed and aged. No intrusive activities are permitted. Data collected shall include descriptions of external morphometry and reproductive status. All specimens of federally listed species – or a representative sample for each species – must be photographed prior to release.

I.5. Capture and relocation shall be authorized under this permit only under special circumstances when listed mussels are anticipated to be harmed by dewatering and/or stranding and only with written approval from the USFWS Field Supervisor for the state(s) in which the activity is proposed and in accordance with the conditions described below. Such specimens may be moved into deeper water at the survey site; to a suitable location near the survey site; or, to an alternative location within the

same HUC 12 watershed, coordinated with and approved by the appropriate U.S. Fish and Wildlife Field office. Capture and relocation under other circumstances shall be authorized under this permit only in Michigan and requires written approval from the USFWS Field Supervisor in the Michigan Ecological Services Field Office. In Michigan, any relocation would also be conducted in accordance with the Michigan Freshwater Mussel Survey Protocols and Relocation Procedures.

I.5.a. Take (remove from the substrate by hand) the species via wading, snorkeling or diving.

I.5.b. For transportation purposes, Permittee may temporarily hold specimens in either river water within aerated holding tanks or in ice chests draped in damp burlap and may move specimens to relocation site(s) as authorized in writing by the U.S. Fish and Wildlife Service Field Office. In all cases, handling and exposure shall be kept to a minimum during relocation effort.

I.5.c. Specimens shall be measured, photographed, and tagged prior to transporting them to approved relocation sites. Tagging of mussels may be omitted under special circumstances, such as emergency salvage, when time does not allow for adherence to established tagging procedures. The locations for replanting must have a stable substrate and characteristics (temperature and water chemistry) conducive to survival of specimens. Permittee should loosen substrate by hand or with a small tool to a depth of about one-half the length of the mussel. Place the mussel approximately half way into the loosened substrate, near the center of the loosened area, siphon (posterior) end up and pointing upstream.

I.5.d. Permittee may temporarily hold specimens in mesh bags, either suspended in the water or held in a container containing river water, while awaiting identification and data collection. Specimens may be held for up to 3 hours provided that they are held in the water in bags that allow free movement of water in the water body from which the mussels were taken from or held in buckets containers of water that is changed every hour [every half-hour when air temperatures are at or above 80o Fahrenheit (F)] and replaced with water freshly taken from the water where the mussels were collected. When practicable, specimens held in containers must remain in the shade. Live specimens that cannot be identified at the site must be photographed for identification purposes.

I.5.e. Collection of live mussel specimens for prior approved relocation must be done only when the air temperature is above 32^{o} Fahrenheit and the water temperature is above 40^{o} Fahrenheit. *Specimens may <u>not</u> be collected and transported to a new location when air temperature is above 90^{o}F.*

I.5.f. Specimens must be returned to a suitable locality. A suitable location for replanting of specimens shall be determined prior to taking mussels from the original site. The location for replanting must have a stable substrate and have characteristics similar to the substrate from which the specimens are collected (and approved by the Michigan Ecological Services Field Office as explained in Condition G.).

I.5.g. The permittee shall obtain, record, and report the geographic coordinates of the specific relocation site(s) using a GPS receiver. In addition to GPS data, the permittee shall describe the general relocation area using unique river or bank identifiers to provide a general location of the site using triangulation. Live mussels must be returned unharmed to the substrate within three hours of collection. Divers should follow the protocol in H.3., above to position the relocated specimens in the substrate by hand.

I.5.h. The USFWS Field Supervisor in the Michigan Ecological Services Field Office will specify in writing whether all listed mussels shall be marked or etched with a unique identifier and will also describe in writing the nature of marking (e.g., shellfish tag vs. etching) to be used. This USFWS field office may convey this in any site-specific authorization provided or in writing separately.

I.6. The shells of all live specimens collected or captured temporarily must be thoroughly inspected for the presence of zebra mussels (*Dreissena polymorpha*). Unionids with zebra mussels attached must be cleaned by scrubbing prior to returning to the substrate. Document the incidence of zebra mussels and Asiatic clams (*Corbicula fluminea*) at project sites.

I.7. Any dead endangered or threatened mussel shells and any specimens accidentally killed or that are moribund or freshly-dead and contain soft tissue are to be preserved according to standard museum practices, properly identified and indexed (collection site, UTM coordinates, site conditions when collected, date collected, and permit authorizing collection). All dead specimens shall be sent to a

public scientific or educational facility or museum in the state the individuals were collected along with a copy of the permit(s) under which they were collected. All specimens retained under this permit remain the property of the United States Government and must clearly be identified as such.

J. FISH SPECIES: Permittee is authorized to take (capture, temporary hold, collect non-intrusive measurements and release) fish. Permittee shall adhere to the following conditions:

J.1. Permittee may hold specimens for a maximum of 15 minutes for photographic documentation, non-intrusive data collection, and release unharmed at the point of capture.

J.2. Electrofishing surveys are only authorized by written concurrence of the U.S. Fish and Wildlife Service Field Supervisor for the state in which the activity is proposed.

K. **COPPERBELLY WATER SNAKE**: Permittee is authorized to take (capture, handle, collect non-intrusive measurements, and release) Copperbelly water snake (*Nerodia erythrogaster neglecta*). The following conditions apply to activities related to presence/absence surveys for Copperbelly water snake:

K.1. Activities may be conducted by visual searches of habitat to assess habitat quality and to determine presence or absence of Copperbelly water snake.

K.2. Time searches shall be based on protocol developed and discussed by Bruce Kingsbury (Attachment # 1).

K.3. Drift fences may also be employed for more quantifiable population estimates.

L. **BIG SANDY CRAYFISH**: Permittee is authorized to take (capture, handle, and release) Big sandy crayfish (*Cambarus callainus*). The following conditions apply to the activities to survey for the presence/absence of the Big sandy crayfish:

L.1. USFWS Ecological Services Field Office authorization is required prior to conducting surveys. Permittee must submit survey plan 30 days prior to proposed survey dates.

L.2. Surveys shall be conducted following the protocol attached to this permit (Attachment #2), entitled, Big Sandy and Guyandotte River Crayfish Survey Protocol.

L.3. Permittee may capture Big sandy crayfish using an 8’ x 4’ seine, with double leads and double floats, and 1/8 inch netting.

L.4. Big sandy crayfish shall be removed from the net and placed into trolling buckets and retained in the stream until processing. Crayfish specimens must be held out of the water for processing for the shortest time possible, no more than 5 minutes.

L.5. Non-intrusive measurements, data collection, and photographs may be taken. Standardized data sheets will be provided by the authorizing Ecological Services Field Office and the natural resources agency for the state in which surveys are proposed. All data required by the USFWS and the state shall be collected for any Big sandy crayfish that are captured under the authority of this permit. You must also record location and physical attributes of habitat where discovered, such as substrate, water velocity, riffles, channelization, etc.

L.6. All Big sandy crayfish shall be released unharmed immediately upstream of capture site.

L.7. Any discovery of Big sandy crayfish shall be reported to the USFWS West Virginia Field Office (Condition U.12.) within 48 hours.

M. Upon determination that endangered or threatened species are present at previously undocumented sites, Permittee shall notify the following within 48 hours: the USFWS Regional Recovery Permit Coordinator, the Species Recovery Lead (Condition U.), and the USFWS Field Office within the geographic location of study areas (https://www.fws.gov/media/region-3-recovery-permit-contact-information).

N. Accidental injury or mortality of bats, mussels, fish, or crayfish may not exceed two (2) specimens of any listed species. In the event that any accidental injury or mortality occurs, all activities must cease. The Permittee must report any species mortality or serious injury within 24 hours to the applicable USFWS Field Office in the state in which the incident occurred (contact information provided at: https://www.fws.gov/media/region-3-recovery-permit-contact-information). Written notification must also be made within 48 hours to the Midwest Region 3 Recovery Permit Coordinator and the Species Recovery

Lead (Condition U.). The Permittee's statement must document the cause of the injury or mortality, and identify all remedial measures employed by the Permittee to eliminate future mortality or injury events. Based on consultation between the USFWS offices, decisions will be made regarding remedial measures that will be implemented and whether and/or when any of the authorized activities may continue. The Species Recovery Lead Office will provide a decision within five (5) business days concerning the disposition of any injured or dead specimen. Dead or moribund species may be retained for further study only with the written permission of the USFWS. Any species that are not authorized for retention are to be chilled and promptly transferred to the USFWS Species Recovery Lead for potential necropsy and/or contaminants analysis. Permitted activities may resume upon receipt of written approval from the Species Recovery Lead Office.

O. No injury or mortality is anticipated or allowed as a result of Copperbelly water snake surveys. In the event that injury or mortality occurs, all activities must cease. The circumstances of any injury or mortality must be reported in writing within 48 hours to the office listed in Condition U.1., the USFWS Ohio Ecological Services Field Office (Condition U.13.), and the nearest USFWS Law Enforcement, Special Agent Office (https://www.fws.gov/visit-us). Before you reinitiate studies authorized by this permit, you must receive written authorization from the USFWS Ohio Ecological Services Field Office (Condition U.13.). Dead or moribund specimens may be retained for further study only with the written permission of the USFWS Ohio Ecological Services Field Office. Any specimens that are not authorized for retention are to be chilled and promptly transferred to the USFWS for potential necropsy and/or contaminants analysis (Condition U.14.).

P. This permit is non-transferable.

Q. Permittee must carry a copy of this permit at all times when conducting the authorized activities. Shipments of collected biological materials should also be accompanied by a copy of this permit. Note that this permit is limited to the above activities and identified species.

R. Issuance of this permit does not constitute permission to conduct these activities on National Wildlife Refuges or any other public or private lands; such permission must be obtained separately from the appropriate landowner or land manager before beginning these authorized activities. This permit, neither directly nor by implication, grants the right of trespass.

S. Upon locating a dead, injured, or sick federally listed species, under circumstances not addressed in this authorization, initial notification must be made immediately to the USFWS Field Office in the State in which the specimen is found (https://www.fws.gov/media/region-3-recovery-permit-contact-information).

Notification should also be made by the next business day to the USFWS Midwest Region 3 Recovery Permit Coordinator identified below. Those offices will confer with the USFWS' Division of Law Enforcement as appropriate and determine next steps. Care should be taken in handling sick, injured, or dead specimens to ensure effective treatment or to preserve biological materials for later analysis. In conjunction with the care of sick or injured endangered or threatened species, and the preservation of biological materials from a dead individual, the finder should take responsible steps to ensure that the site is not unnecessarily disturbed.

T. An Annual Report of all activities conducted under the authority of this permit is due by January 31 following **each year** this permit is in effect. When assisting with netting, the permit number of the individual responsible for each capture should be recorded on the data collection form. Reports shall be sent electronically and your transmittal email must cite your Federal permit number, Permittee name, and the Annual Report year in the subject line (***Note: thumb drives/flash drives and links to documents cannot be accepted***). In addition, copies of all publications and reports resulting from work conducted under this permit must be submitted as they become available. Failure to furnish any reports required by this permit is cause for permit revocation and/or denial of future permit applications. At a minimum, your report shall include:

T.1. A complete discussion of field procedures, data collection methods, results, and conclusions.

T.2. Information on any injuries and/or mortalities and disposition of specimens.

T.3. Copies of any separate reports and/or publications resulting from work conducted under the authority of this permit.

T.4. Copies of all site specific authorization letters required under Condition G.

T.5. A description of locations surveyed where no specimens were encountered.

T.6. Electronic copies of all field data sheets.

T.7. The date, time, geographic locations (state, county, locality, UTM coordinates or GIS data with projection information), species, age, sex, weight (bats), water depth, substrate composition, sedimentation, where specimens were returned (mussels), and any other relevant data for all specimens encountered. We would also appreciate receiving this information for all candidate mussel species encountered.

T.8. A complete description of injuries and/or mortalities to listed species while in your possession, the dates of occurrence, any circumstances surrounding the incidents, and a description of any steps taken to reduce the likelihood that such injuries and/or mortalities will occur in the future.

T.9. The "Bat Reporting Spreadsheet" is required for reporting data and can be found on the FWS Midwest Permits website (https://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html). Prior to reporting, check the permits website to ensure you are using the most up to date form. Using the reporting form will help standardize data collection and increase efficiency in reporting.

T.10. If applicable, any identification numbers or marks added to live specimens and band numbers of all bats banded.

T.11. Location and characteristics of roost trees and bat colonies.

T.12. A completed data collection sheet as found in the Survey Guidelines, cited in Condition H.1.

T.13. Data shall be submitted for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data sheet provided by the USFWS (e.g., the reporting spreadsheets found on the current Rangewide Indiana Bat Summer Survey Guidelines website cited in Condition H.1., or other species specific data sheets). Photographs of the identifying characteristics for each individual federally listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

T.14. The "3-2523_USFWS Freshwater Mussel Reporting Form" is required for reporting data and can be found on the FWS Midwest Permits website (https://www.fws.gov/service/3-200-59-scientific-purposes-enhancement-propagation-or-survival-permits-recovery-permits). Prior to reporting, check the permits website to ensure you are using the most up to date form. Using the reporting form will help standardize data collection and increase efficiency in reporting.

T.15. The size, estimated age, sex and condition (if determinable) of any listed individuals encountered, and any other data you may have collected for individual naiads, such as evidence of damage or injury, and observations of zebra mussel (*Dreissena polymorpha*) and/or Asiatic clam (*Corbicula fluminea*) infestation.

T.16. Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged, but not required.

IF NO ACTIVITIES OCCURRED OVER THE COURSE OF THE YEAR, INDICATION OF SUCH SHALL BE SUBMITTED AS AN ANNUAL REPORT.

U. Copies of your reports shall be sent to **all offices** indicated below**.** Your transmittal letter (or email) must cite your Federal permit number, Permittee name, and the Annual Report year in the subject line. Electronic copies shall be submitted in MS Word, Portable Document Format, Rich Text Format, or other file format that is compatible with the receiving office (**thumb drives/flash drives and links to documents cannot be accepted**).

U.1. Regional Recovery Permit Coordinator (Region 3)
U.S. Fish and Wildlife Service
Ecological Services – Endangered Species
5600 American Blvd. W., Suite 990
Bloomington, Minnesota 55437-1458
(612/713-5343; fax 612/713-5292)
permitsR3ES@fws.gov

U.2. Regional Recovery Permit Coordinator (Region 2)
U.S. Fish and Wildlife Service
Endangered Species Permits Office
P.O. Box 1306
Albuquerque, New Mexico 87103-1306
(505/248-6420; fax 505/248-6788)
permitsR2ES@fws.gov

U.3. Regional Recovery Permit Coordinator (Region 4)
U.S. Fish and Wildlife Service
Endangered Species Permits Office
1875 Century Blvd.
Atlanta, Georgia 30345-3301
(404/679-7097; fax 404/679-7081)
permitsR4ES@fws.gov

U.4. Regional Recovery Permit Coordinator (Region 5)
U.S. Fish and Wildlife Service
Endangered Species Division
300 Westgate Center Drive
Hadley, Massachusetts 01035-9589
(413/253-8212; fax 413/253-8482)
permitsR5ES@fws.gov

U.5. Regional Recovery Permit Coordinator (Region 6)
U.S. Fish and Wildlife Service
Endangered Species Permits Office
Denver Federal Center, P.O. Box 25486
Denver, Colorado 80225-0489
(303/236-4224; fax 303/236-0027)
permitsR6ES@fws.gov

Additionally, based on species, reports and publications shall be submitted to the following:

U.6. ***For any bat species:***
Keith Lott
U.S. Fish and Wildlife Service
Keith_Lott@fws.gov

U.7. ***For studies involving gray bat:***
Vona Kuczynska

U.S. Fish and Wildlife Service
Missouri Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-0007
(573/234-2132; fax 573/234-2181)
vona_kuczynska@fws.gov

U.8. ***For studies involving Indiana bat:***

Lori Pruitt
U.S. Fish and Wildlife Service
Indiana Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261; fax 812/334-4273)
lori_pruitt@fws.gov

U.9. ***For studies involving northern long-eared bat:***

Jill Utrup
U.S. Fish and Wildlife Service
Minnesota-Wisconsin Field Office
4101 American Blvd. E.
Bloomington, Minnesota 55425-1665
(952/252-0092; fax 952/646-2873)
jill_utrup@fws.gov

U.10. ***For studies involving Ozark big-eared bat:***

Richard Stark
U.S. Fish and Wildlife Service
Ozark Plateau National Wildlife Refuge
9014 East 21st Street
Tulsa, Oklahoma 74129
(918/382-4520; fax 918/581-7467)
richard_stark@fws.gov

U.11. ***For studies involving Virginia big-eared bat:***

Liz Stout
U.S. Fish and Wildlife Service
West Virginia Field Office
6263 Appalachian Highway
Davis, West Virginia 26260
elizabeth_stout@fws.gov

U.12. ***For studies involving Big sandy crayfish:***

West Virginia Field Office
U.S. Fish and Wildlife Service
90 Vance Dr.
Elkins, West Virginia 26241
(304/636-6586)
FW5_WVFO@fws.gov

U.13. ***For studies involving Copperbelly water snake:***

Ohio Ecological Services Field Office
U.S. Fish and Wildlife Service
4625 Morse Rd. Suite 104
Columbus, Ohio 43230
(614/416-8993)

U.14. Additionally, based on geographic area, **reports and publications shall be submitted to** the applicable offices under "For Fish and Wildlife Permit Holders" at: https://www.fws.gov/media/region-3-recovery-permit-contact-information.

cc: FWS/Regional Offices – Regions 2, 4, 5, 6 (Attn: Regional Recovery Permit Coordinator)
FWS, TE Coordinator: Illinois-Iowa, Indiana, Michigan, Minnesota-Wisconsin, Missouri, Ohio
DNR/DOC, TE Coordinator: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin

END

United States Department of the Interior

FISH AND WILDLIFE SERVICE

5600 American Boulevard West, Suite 990
Bloomington, Minnesota 55437-1458

IN REPLY REFER TO:

FWS-AES/TE

LIST OF AUTHORIZED INDIVIDUALS
TE38821A-5
Terry VanDeWalle (Principal Officer)

C.1. Individuals authorized to independently conduct activities under this permit:

The following individuals are authorized to conduct scientific research in accordance with all conditions in this permit.

- James Kiser: Authorized to conduct all activities described for all listed bats, fish, freshwater mussels, Copperbelly water snake (*Nerodia erythrogaster neglecta*), and Big Sandy crayfish (*Cambarus callainus*).

- David Saugey, Joseph Johnson, and Lindsay Wight: Authorized for all activities described for all listed bat species.

- Wes Cunningham and Lynda Mills: Authorized for all activities described for gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), and northern long-eared bat (*Myotis septentrionalis*) only.

- Cody Fleece: Authorized to conduct all activities described for all listed freshwater mussels and fish species, with the exception of Kentucky arrow darter (*Etheostoma spilotum*).

- Daniel Symonds: Authorized to conduct all activities with listed freshwater mussel species, with the exception of Appalachian monkeyface (*Quadrula sparsa*).

- Douglas Stephens: Authorized to conduct all activities described for listed bats, fish, and freshwater mussels, with the exception of Appalachian monkeyface (*Quadrula sparsa*).

- Triston Mullins: Authorized to conduct all activities described for listed freshwater mussels, with the exception of Higgins eye pearlymussel (*Lampsilis higginsii*), Finerayed pigtoe (*Fusconaia cuneolus*), Purple bean (*Villosa perpurpurea*), Rough rabbitsfoot (*Quadrula cylindrica strigillata*), Shiny pigtoe (*Fusconaia cor*), Turgid blossom pearlymussel (*Epioblasma turgidula*), Finelined pocketbook (*Lampsilis altilis*), Cumberland pigtoe (*Pleurobema gibberum*), Cumberland monkeyface pearlymussel (*Quadrula intermedia*), Appalachian monkeyface (*Quadrula sparsa*), and Pale lilliput pearlymussel (*Toxolasma cylindrellus*).

Unnamed trained assistants may conduct activities pursuant to this permit only under the direct and on-site supervision of an above-named individual. "On-site supervision" is defined as having the Permittee at a distance close enough to enable immediate assistance to a supervised individual, as needed, while the supervised individual conducts an authorized activity.

_____ _____

Acting, Chief, Division of Endangered Species Date
Region 3, U.S. Fish &Wildlife Service

This List of Authorized Individuals (LAI) is valid only when it is dated on or after the permit issuance date. Federal Permit TE38821A-5 will be considered invalid without this LAI.

PROTOCOL FOR COPPERBELLY SURVEYORS

The following guidelines are being distributed to all those working on the surveys for the Copperbelly Water Snake Conservation Agreement, or who are conducting other surveys and wish to follow the same protocol. If there are questions regarding any aspect of this protocol, contact Bruce Kingsbury, Department of Biology, Indiana-Purdue University, Fort Wayne, IN 46805-1499, 219-481-5755 (W), 219-486-6300 (H), (219) 437-6876 (M), kingsbur@ipfw.edu.

Replicate surveys. You have been assigned a set of survey sites, and an approximate order in which to survey them. You must conduct the surveys in the assigned order: other surveyors will be visiting the same sites at other times. Sites that have already been visited will have the general path of the survey determined. However, if you are the first one on the site, you will have the responsibility of defining the path and length of the transect. Check your maps and directions to determine what you need to do. When delineating a transect, keep the following points in mind. The goal for survey duration is two hours, although the survey does not have to be exactly that. Care should be taken to avoid overlapping the same transect line (i.e., going around a wetland and crossing over where you've already been) or flushing snakes, thus risking the potential of counting the same snakes twice. Once a new transect has been delineated, details should immediately be relayed to Bruce Kingsbury for transmittal to other surveyors.

Presence/Absence surveys. P/A surveys are opportunistic in nature, and have no formal structure. Potential areas for these surveys are indicated on some of your maps, but you will very likely see other areas of interest. The main goal of these surveys is to establish if copperbellies or other *Nerodia* (I) are present. We are also particularly curious about other species such as mud snakes (*Farancia*) and cottonmouths (*Agkistrodon*), as these are unusual finds. Scouting out areas and searching under things such as trash or boards can be informative. If you are at a good chunk of habitat and can do a replicate-style survey, use the data form for those surveys. A brief examination of a site does not require strict adherence to filling out all of the details on the data sheet- but if you plan to survey the site for an extended time, the additional information would be useful. If you think that you have found a future replicate survey site, please communicate this right away to Bruce Kingsbury. You should also report opportunistic surveys that produced no copperbellies, as negative information is also useful. Also, please be sensitive to concerns about trespassing.

Surveys will be conducted by traveling the survey path (transect) and counting the snakes seen over a known time and estimated distance. Surveyors should move slowly and cautiously with frequent stops (pauses) of one or more minutes to scan both sides of the transect for snakes. The duration of pauses is left to the discretion of the surveyor, but should be long enough to allow careful examination of the field of view before moving on. An initial suggestion for distance to move between pauses is 10 paces. Transect length will be approximated as accurately as possible using the

corresponding topo map. The time will be recorded at the beginning and end of the transect, as well as each time the habitat type, as defined by the habitat classification below, changes. Habitat classification should default to the more open habitat when a decision must be made between two types. If you are walking along a shrub/scrub vs. palustrine forest boundary, you are surveying shrub/scrub. To minimize the impact of inclement weather, surveys will only be conducted on partly sunny days of at least 70 F, or sunny days between 65-90 F, to maximize chance of seeing the snakes out basking and traveling. Also, as the weather turns hot, observations will be made in early morning and late afternoon to avoid hot temperatures that drive the snakes to cooler microhabitats.

Copperbellies are very mobile and can be found in all sorts of habitat. However, empirical evidence shows that copperbellies prefer 1) the edge habitat between open canopy areas, such as shrub-scrub wetlands, and forest, to bask and rest, and 2) extremely shallow waters (<15 cm (6")), to forage. They do not spend much time in open, deep water (>30 cm), or fast moving water. However, they commonly seen basking on platforms over deep water, and will not hesitate to swim across open water. They are not as easily found in forest, but sometimes can be found at pools of water. Surveyors are most likely to find stationary snakes basking on horizontal surfaces just above the water, such as on nearly sunken logs or branches, or a little higher on living branches of bushes such as buttonbush (*Cephalanthus occidentalis*). Foraging snakes may be seen cruising shorelines. Ripples on the water's surface may also indicate the presence of a foraging or traveling snake, and should be investigated.

Equipment. Surveyors should always bring binoculars and use them. They are vital for examining complex habitats such as brush, and for properly identifying snakes to species. A watch is needed for timing transects. If you are marking a new transect, you will need flagging tape and markers. A compass is also handy, especially for the directionally challenged. A thermometer is needed as well, and we can provide one for you if needed. Surveyors will need to consider footwear. Hip or chest waders may keep you dry, but are tiring to wear for any length of time, and can get hot. Pull-on farm boots work okay unless there is any flooding. Once the water has warmed, I just go ahead and get wet, wearing "Army" boots to protect my feet. Use pencil to keep your notes- pen will smear and run if it gets wet, erasing your data. Ziplock bags are good for keeping things dry.

Data Sheet Explanation

At the top of the data sheet, *Date*, *Site ID Code & Name* (provided for you), *Surveyors*, and *Weather Summary (Beg.)* comments are filled out prior to beginning the survey. *Start* time is entered when the survey actually begins. *Finish* time is entered when the survey is suspended. Times should be recorded in military time (1200 is 12 noon, 1400 is 2PM). *Weather Summary (End)* is for indicating what things are like when you stop.

Initial and final temperatures should be taken in the sun, shade, and water. The sun (in nearest opening in canopy) and shade (under nearest canopy) temperatures should be taken at waist height with no direct light hitting the instrument (use your body or hand to block light from striking the thermometer bulb). Water temperatures should be taken approximately 5 cm below the surface. Keep in mind that a wet bulb will give a cooler temperature than a dry bulb. Substantive changes in the weather should be indicated on data rows between observations.

Transect length is the best estimate of the transect length based on your route and the scale on your map. Length should be recorded in kilometers. *Travel method* would be foot or boat. Additionally, a line is provided to *summarize* your observations: number of each species observed.

Data: The codes for data entries are described in the survey code descriptions provided below. The last column (*Comm*) is for a reference number for additional comments in the space at the bottom of the page. Additional comments could also be made on the back. Surveyor comments will be used to help establish habitat extent and quality throughout the range of the snake, so surveyors are encouraged to make note of their surroundings (including apparent condition of water). You might also comment on directions to the site. Weather comments would include cloud cover, wind, etc. In the field, comments can also be inserted on the data row(s) beneath the relevant observation. If habitat changes during the length of the transect, times and lengths of subtransects should be recorded by habitat. *Time* is when you start a new habitat classification, *elapsed time* is the total time surveying that habitat. *Species* of snake is coded: at least all *Nerodia* should be included. *Age* is the apparent age class of the snake. *Behavior* is the activity of the snake at time of observation.

Three distances are recorded: *Trans* is the distance from the transect line to the snake (perpendicular distance to you). *Shore* is the distance the snake is from shore (distance to shore will be negative for terrestrial observations). A range-finder is useful here, and we can provide you with one if you request it. Since the transect line may be the shore in a shoreline survey, *Trans* and *Shore* may be the same value. *Vertical* is the distance above the substrate. All measurements should be in meters, not yards.

*Hab*itat and *Micro*habitat are coded as indicated in the attached habitat classification (based on a simplification of Cowardin et al.'s wetland classification system). Code should be strictly adhered to, and deviation from the code should be well-documented with comments. *In sun* asks whether or not the snake is in direct sunlight (Y/N).

Final comments: pursuit of individual snakes may not only be illegal for some surveyors, but will also disrupt the continuity of the survey. Snakes should be approached only to the extent that species identification is certain. Lastly, if you have any suggestions for improvement of the survey, feel free to let me know.

SURVEY CODE DESCRIPTIONS

Habitats

This classification was designed to be suitable for studying habitat use by the copperbelly water snake. It is intended to be relatively compatible with the National Wetlands Inventory (NWI) classification developed by Cowardin et al. (1979). Habitat is a large-scale measure: if a habitat area cannot be mapped discretely on a topographic map, it should be incorporated into a neighboring habitat type.

SYSTEM	SUBSYSTEM	CODE	DESCRIPTION
Aquatic Habitats			
Palustrine- shallow (0<2m) water wetlands without extensive open water: vegetated with some trees, shrubs, or emergent vegetation			
	Forested	PF	-floodplain forest, with greater than 30% canopy cover by trees
	Scrub-shrub	PS	-shrub-scrub cover exceeds 30%, but tree cover does not
	Emergent	PE	-emergent vegetation present (cats, etc.) but not enough shrubs to be PS
	Open water	PO	-open water of palustrine system
Note: moist soil units should be commented as such, but would be classified as PE or PO.			
Lacustrine- deep water (>2m) wetlands such as large ponds and lakes, lacking emergent vegetation except near shore. The limnetic (deep water) portion of a lacustrine system is termed as LD, while the littoral zone (shoreline zone) will follow the palustrine subsystem, substituting L for P: LF, LS, LE, LO.			
Riverine- flowing water all or part of the year. Pooled water in partially dried river is still riverine.			
	Lower perennial	RL	- slow moving stream- muddy or silty bottom, water usually present
	Upper perennial	RU	- faster flowing stream- rocky or cobbly bottom, water usually present
	Intermittent	RI	- only temporarily running
Upland Classification			
Just in case you find yourself with dry feet...			
Forest-		UF	- greater than 30% canopy cover by trees, elevated above any potential flooding by sloping topography
Scrub-Shrub		US	-not forest, but >30% cover by shrubs such as berry bushes, willows, crab-apples and hawthorns.
Oldfield		OF	-fallow fields well-covered with herbaceous or grassy cover. CRP lands would often be included here.

Agricultural-is highly disturbed, and includes activities such as farming, substantial grazing, and repeatedly mowed areas

Crops	AC	-farm fields, croplands
Grazed	AG	-grazed or mowed areas
Residential	RS	-all space used for living by people

Microhabitat Classification

Microhabitat classification is somewhat similar to habitat, but on a smaller scale. Its use as a category allows the specific position (substrate) of the animal to vary to some degree from its general surroundings.

Shrub	-up in a bush
Tree	-up in a tree
Grass	-in a patch of grass
Rock	-on a rock or rocks
Log	-on a log
Herbaceous	-in a patch of herbs
Water	-in the water
Barren (soil)	-on bare soil
Island	-on a small hummock
Detritus	-on leafy debris, such as leaves

Behavioral Classification

Basking	-at rest in sunny location
Resting	-resting in non-basking position
Courting	-male pursuing female, female, being pursued by male
Mating	-actually copulating (much less likely than courting)
Foraging	-moving slowly and methodically through shallow water or on shore
Traveling	-moving continuously in linear path, with little investigative behavior along the way
Unknown	-behavior ambiguous or snake disturbed before behavior observed: *something that happens all the time!*

Miscellaneous

Species- **N**- copperbelly (*N.e. neglecta*), **D**- diamondback (*N. rhombifera*) , **M**- midland *(N. sipedon*), **Y**- yellowbelly water snake (*N. e. flavigaster*), **F**- mud snake (*Farancia abacura*), **A**- cottonmouth (Agkistrodon piscivorus), **U**-unknown

Canopy- Tree and shrub canopy cover in the general vicinity of the snake (ca. within 10 m radius) should be characterized as:
1=sparse: little or no cover,
2=moderate: forest margin or broken canopy as at treefall or in select cut woods,
3=complete: complete or nearly complete.

Age- Three categories:
Y=juvenile: young of the year, retaining juvenile striped color pattern;
S=subadult: adult coloration, or nearly so, but not yet having attained lg. adult body size;
A=adult: large-bodied, classic copperbelly coloration.

Big Sandy and Guyandotte River Crayfish Survey Protocol

Project-specific survey plans shall be coordinated with and approved by the U.S. Fish and Wildlife Service (USFWS) at the address below prior to conducting any surveys within potential habitat for the Big Sandy crayfish (*Cambarus callainus*) or the Guyandotte River crayfish (*C. veteranus*). Survey plans should be submitted at least 30 days prior to the proposed start of surveys. When surveys are conducted to evaluate whether a proposed project may affect the species, surveys should be conducted early in project planning so that project modifications can be made to avoid and minimize project effects. Surveyors must have a valid Scientific Collecting Permit from the West Virginia Division of Natural Resources (WVDNR) prior to conducting the work.

Surveys are not permitted from July 20 through September 10 due to egg extrusion and rearing of juveniles by females. Surveys must be conducted when water conditions/temperatures are conducive to detecting *C. callainus/C. veteranus*. Water temperature must be above 50° F/ 10° C and surveys cannot be completed for 72 hours after a precipitation greater than 0.5in/1.3cm to ensure clear water and that suitable sampling conditions are present.

Surveys should be conducted throughout the entire reach of stream that may be affected by a potential project; total upstream and downstream distance to be sampled from the point of direct impact will be determined for each project by the USFWS. Once the survey area has been delineated, the area should be divided into sampling reaches and each reach sampled following the approved protocol.

Each sampling reach should be approximately 125 meters (m) in length and include at least one riffle, run, or both riffle and run habitats. Crayfish sampling shall be performed using an 8'x4' seine, with double leads and double floats, and 1/8" netting. Sampling shall be performed by hauling a seine at a minimum of 10 locations within the 125m stream reach. Seine hauls will be completed by overturning every slab boulder (rocks approximately 1m wide x 1m long; 5cm

high) present per 2m linear upstream/downstream distance in riffles and runs. One to two slab boulders can be sampled per seine haul.

Seine hauls should be completed with at minimum a two-person team using the seine. One crew member will hold both handles/brails, with the seine spread approximately 2m in width. Handles should be held at a 40°-50° angle from the stream surface. The other crew members should ensure that the seines lead line is making contact with the stream substrate and that the lead line is not resting on substrate items that are planned to be sampled in the ensuing haul. Once these conditions are met, surveyors charged with flipping substrate items should do so quickly and assertively. When each substrate item is overturned, the surveyor should kick in the direction of the seine over the area of stream substrate uncovered by moving rocks being sampled.

Slab boulders should always be given sampling priority given *C. callainus/C. veteranus*' association with them. If a sampling reach does not contain sufficient slab boulders, the following substrate features should be given sampling priority in the following order of importance: boulders, large cobble, course woody debris, and artificial cover. All substrate items should be placed back in their original position immediately following the seine hauls in which they were dislodged from the substrate.

At the end of each haul, surveyors must ensure that the lead line is removed from the water prior to the float line so all captured organisms remain in the net bellows and are not dumped back into the stream following sampling. At this time, crayfishes should be removed from the net and placed into trolling buckets. All substrate items should be placed back in their original position immediately following the seine hauls in which they were dislodged from the substrate.

All crayfishes collected shall be housed temporarily in trolling bait buckets that do not leave the stream proper until processing begins. No more than five adult *C. callainus/C. veteranus* are to be housed in one bucket at one time; multiple buckets are suggested. Buckets are to be anchored in the stream or attached to collectors during active sampling.

Data must be recorded on the standardized datasheets provided with your collecting permit. A minimum of ten seine hauls per sampling reach is required; the total number of seine hauls employed at a reach shall be recorded as well as the total number of crayfish collected of each species per seine haul. Electric fishing gear ***should never*** be used at potential *C. callainus* and *C.*

veteranus sites. Electric fishing gear is not considered efficient gear for the collection of stream crayfishes.

When sampling is completed, collectors are required to identify all captured crayfish to species, sex all captured crayfish (Form I, Form II, Female, Female Glair, Female-Ovig, Female-Attached Juveniles), and record total carapace length (TCL) in millimeters for each *C. callainus*/*C. veteranus* encountered using calipers. Data shall be recorded on the standardized WVDNR Crayfish Morphometric Datasheet. A photographic voucher is required for all *C. callainus*/*C. veteranus* captured prior to release; representatives of other crayfish species should also be photographed. Every effort should be undertaken to ensure animals are outside of water for the briefest period of time possible (5 minute maximum, but a shorter period is preferred). Following data collection, animals are to be returned to the stream bottom upstream of their home rocks and guided back to their rock or other substrate debris.

Collection of water quality and physical habitat metrics are required at each collection locale. At each sampling site, pH, temperature, percent dissolved oxygen, turbidity, and conductivity are to be measured. In addition to water quality, physical habitat will be evaluated through completion of a Qualitative Habitat Evaluation Index (QHEI; OEPA 2006).

If any C. *callainus* or *C. veteranus* are captured, the WVDNR and USFWS shall be notified within 48 hours of collection via a reporting spreadsheet provided by the WVDNR. Written reports of all survey efforts shall be provided to the WVDNR and USFWS and shall include, at a minimum, information on the survey dates and water conditions, who conducted the survey, the methods used, survey results including results per seine haul, photographs of *C. callainus or C. veteranus* specimens and of the survey area, and all water quality and QHEI data gathered.

Agency Contact Information:

West Virginia Division of Natural Resources, PO Box 67, Elkins, WV 26241

(304) 637-0245

U.S. Fish and Wildlife Service, West Virginia Field Office, 90 Vance Drive, Elkins WV 26241

(304) 636-6586

Michael Leathers

From: McGregor, Monte (FW) <Monte.McGregor@ky.gov>
Sent: Monday, August 1, 2022 2:41 PM
To: Boyer, Angela; Day, Jana (KYTC); KentuckyES, FW4; DeGarmo, Phil; Hallberg, Karen I; Navarro, John
Cc: Logsdon, Andrew M (KYTC); Fleece, Cody; Moyer, Jim; Michael Leathers; Megan.Michael@dot.ohio.gov; Matt.Raymond@dot.ohio.gov
Subject: RE: [EXTERNAL] FW: Brent Spence Status

Staying out of harms way is a better approach as well. I agree with Angie.

Monte

Monte A. McGregor, Ph.D.
Aquatic Scientist/Malacologist
Kentucky Dept. of Fish & Wildlife Resources
Center for Mollusk Conservation
3761 Georgetown Road, Frankfort, KY 40601
502.573.0330 ext 221 office, 242 (lab), 246 (research building), greenhouse (239)
502.573.0335 fax
email: Monte.McGregor@ky.gov
check out our website: http://fw.ky.gov/
Support Kentucky Wild: https://fw.ky.gov/Pages/Kentucky-Wild.aspx

Buy Your Fishing or Hunting License Today

From: Boyer, Angela <angela_boyer@fws.gov>
Sent: Monday, August 1, 2022 2:13 PM
To: Day, Jana (KYTC) <jana.day@ky.gov>; KentuckyES, FW4 <kentuckyes@fws.gov>; DeGarmo, Phil <phil_degarmo@fws.gov>; Hallberg, Karen I <Karen_Hallberg@fws.gov>; Navarro, John <john.navarro@dnr.ohio.gov>; McGregor, Monte (FW) <Monte.McGregor@ky.gov>
Cc: Logsdon, Andrew M (KYTC) <Andrew.Logsdon@ky.gov>; Fleece, Cody <Cody.Fleece@stantec.com>; Moyer, Jim <Jim.Moyer@stantec.com>; Michael Leathers <mleathers@hmbpe.com>; Megan.Michael@dot.ohio.gov; Matt.Raymond@dot.ohio.gov
Subject: Re: [EXTERNAL] FW: Brent Spence Status

Hello,

I am ok with your request to skip the areas where you find this type of hazardous condition. Stay safe!

Sincerely,

Angie

From: Day, Jana (KYTC) <jana.day@ky.gov>
Sent: Monday, August 1, 2022 10:17 AM
To: KentuckyES, FW4 <kentuckyes@fws.gov>; DeGarmo, Phil <phil_degarmo@fws.gov>; Boyer, Angela <angela_boyer@fws.gov>; Hallberg, Karen I <Karen_Hallberg@fws.gov>; Navarro, John <john.navarro@dnr.ohio.gov>; Monte McGregor <monte.mcgregor@ky.gov>
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Thank you,
Jana M. Day
Environmental Biologist Consultant
Division of Environmental Analysis
Kentucky Transportation Cabinet
200 Mero Street Frankfort KY 40622
(502) 782-5008 (office)
(443) 534-3118 (cell)

From: Fleece, Cody <Cody.Fleece@stantec.com>
Sent: Sunday, July 31, 2022 5:33 PM
To: Michael Leathers <mleathers@hmbpe.com>; Logsdon, Andrew M (KYTC) <Andrew.Logsdon@ky.gov>; Day, Jana (KYTC) <jana.day@ky.gov>
Cc: DeClerck, Jane <Jane.DeClerck@stantec.com>; Mullins, Triston <Triston.Mullins@stantec.com>; Podoll, Nathan <nathan.podoll@stantec.com>
Subject: Brent Spence Status

Michael
Andrew
Jana

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Thanks for your time and attention!

Cody Fleece
Principal, Aquatic Ecologist

Direct: 513 842-8238
Mobile: 513 262-3994
Fax: 513 842-8250
Cody.Fleece@stantec.com

Stantec

Michael Leathers

From: Boyer, Angela <angela_boyer@fws.gov>
Sent: Monday, August 1, 2022 2:13 PM
To: Day, Jana (KYTC); KentuckyES, FW4; DeGarmo, Phil; Hallberg, Karen I; Navarro, John; Monte McGregor
Cc: Logsdon, Andrew M (KYTC); Fleece, Cody; Moyer, Jim; Michael Leathers; Megan.Michael@dot.ohio.gov; Matt.Raymond@dot.ohio.gov
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Kentucky Transportation Cabinet
200 Mero Street Frankfort KY 40622
(502) 782-5008 (office)

(443) 534-3118 (cell)

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Sent: Sunday, July 31, 2022 5:33 PM
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Cc: DeClerck, Jane <Jane.DeClerck@stantec.com>; Mullins, Triston <Triston.Mullins@stantec.com>; Podoll, Nathan <nathan.podoll@stantec.com>
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Cody.Fleece@stantec.com

Stantec

Michael Leathers

From: Day, Jana (KYTC) <jana.day@ky.gov>
Sent: Monday, August 1, 2022 10:18 AM
To: KentuckyES, FW4; DeGarmo, Phil; angela_boyer@fws.gov; karen_hallberg@fws.gov; john.navarro@dnr.ohio.gov; McGregor, Monte (FW)
Cc: Logsdon, Andrew M (KYTC); Fleece, Cody; Moyer, Jim; Michael Leathers; Megan.Michael@dot.ohio.gov; Matt.Raymond@dot.ohio.gov
Subject: FW: Brent Spence Status
Attachments: IMG_2520.jpg; IMG_0401.jpg; IMG_0406.jpg; IMG_0410.jpg; QuickRoughBathy.zip

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Mobile: 513 262-3994
Fax: 513 842-8250
Cody.Fleece@stantec.com

Stantec

From: Eric Smith
To: Michael Leathers
Subject: Fwd: Copy of Your Request to the Kentucky Speleological Survey
Date: Wednesday, September 28, 2022 3:44:30 PM

Get Outlook for iOS

From: Eric Smith
Sent: Wednesday, September 14, 2022 3:32:29 PM
To: Kentucky Speleological Survey <admin@ksscaves.com>
Subject: RE: Copy of Your Request to the Kentucky Speleological Survey

I don't believe I ever heard back on this project and was seeing if there were any results in our buffer.

Thanks,
Eric

From: Kentucky Speleological Survey <admin@ksscaves.com>
Sent: Wednesday, August 3, 2022 11:38 AM
To: Eric Smith <esmith@hmbpe.com>
Subject: Copy of Your Request to the Kentucky Speleological Survey

Hello Eric Smith,

Please review below and make sure everything looks correct for what you submitted.

Your Name	Eric Smith
Address:	3 HMB Circle
City:	Frankfort
State:	KY
Phone:	5026959800
Email Address	esmith@hmbpe.com
Organization:	HMB Professional Engineers
Data Information Requested:	We are currently under contract with the Kentucky Transportation Cabinet (KYTC) to conduct an ecological study in Kenton County. Indiana bats and Northern long-eared bats are known to occur in this county. We have been asked to conduct a literature search within a 5km buffer surrounding the project. We are requesting any information you may have within the 5km buffer. Attached is a

	shapefile of a 5km buffer of the project area. This project is the rehabilitation of the Brent Spence Bridge along the I-75 corridor connecting northern Kentucky and Cincinnati, Ohio.
Intended Use of Data/Information:	Anything within 1km of the project will have a Phase 1 habitat assessment sheet filled out to help determine if bats are using the area. Openings will briefly be discussed in the biological assessment document. None of the portals will be entered. Data will be submitted to the KYTC for coordination with the US Fish and Wildlife Service.
Qualifications:	HMB has a federal collecting permit (permit no. 129703-6). I am listed on the permit to handle Indiana, northern long-eared and Virginia Big-eared bats. I have also been assisting the Kentucky Department of Fish and Wildlife on winter hibernacula surveys for the past 7 years. I know of the threat of WNS on bat species and I know of the closures of caves because of WNS. As stated above, none of the portals will be entered.
Attachments:	20220803153731_bent-spence-5km-buffer.zip

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

May 11, 2010

Timothy M. Hill
Office of Environmental Services
Ohio Department of Transportation
P.O. Box 899
Columbus, OH 43216-0899

TAILS: 31420-2010-I-0517 (PID 75119)

Attn: Matt Raymond
Mike Pettegrew

RE: **HAM-71/75-0.00/0.22 (PID 75119)**
Brent Spence Bridge Replacement/Rehabilitation Project

Dear Mr. Hill:

This is in response to your April 7, 2010 letter, received in our Columbus Ohio Field Office (COFO) on April 9, 2010 and received in our Frankfort Kentucky Field Office (FKFO) on April 12, 2010, requesting U.S. Fish & Wildlife Service (Service) comments regarding the subject project. Your office submitted two Ecological Survey Reports (ESRs) with your April 7 letter, one for the Ohio portion of the project (ODOT PID No. 75119) and the other for the Kentucky portion of the project (KYTC Project Item No. 6-17). We appreciate the opportunity to provide comments throughout the project development process. This project proposes to improve capacity and safety and correct design deficiencies along I-71, I-75, and the Brent Spence Bridge in the Greater Cincinnati/Northern Kentucky region. In a letter from our office to Dennis Decker at the Federal Highway Administration (FHWA) dated August 16, 2006, the Service agreed to participate in the environmental review process, with COFO (formerly the Reynoldsburg Ohio Field Office) serving as the lead Service Field Office for this project. Comments provided in this letter have been coordinated with FKFO.

ODOT coordinated with the Service on the Conceptual Alternatives (CA) analysis for this project in June 2009. The CA concluded that two of the build alternatives would be developed and analyzed further: 1) a combination of Alternatives C & D; and 2) Alternative E – with both alternatives including some design elements of Alternative G. The current ESRs provide updated information on the two resulting feasible alternatives (Alternative C/D and Alternative E), including mapping of the proposed alignments.

According to your letter and ESRs, only surveys for the following species/habitats have been conducted: 1) presence of the Federally Endangered running buffalo clover (*Trifolium stoloniferum*); 2) habitat for the Federally Endangered Indiana bat (*Myotis sodalis*); and 3) presence of the bald eagle (*Haliaeetus leucocephalus*), a Federal species of concern protected under the Bald & Golden Eagle Protection Act

(BGEPA) and the Migratory Bird Treaty Act (MBTA). Suitable habitat for the running buffalo clover and suitable summer habitat for the Indiana bat were found within the project area in Kenton County, Kentucky. However, no suitable habitat for either species is located within the project area in Hamilton County, Ohio.

Suitable habitat for running buffalo clover was surveyed in 2006 within the original study area and in 2009 within the extended study area. No individuals of the species were found during either survey; therefore, Kentucky Transportation Cabinet (KYTC) has determined that this project *may affect but is not likely to adversely affect* running buffalo clover. The Service concurs with this determination.

No eagle nests were found within the entire study area; therefore ODOT and KYTC have determined that the project will have *no effect* on the bald eagle. If eagles are not nesting with the study area, adverse impacts to the species would not be expected. For further guidance regarding the bald eagle and compliance with BGEPA, please refer to the Service's website at www.fws.gov.

Summer habitat for the Indiana bat was found within the project area in Kenton County, KY. We understand that KYTC will further analyze potential impacts to the bat when a preferred alternative has been selected. As stated in our June 19, 2009 letter, KYTC should coordinate further with USFWS FKFO to determine the appropriate actions (e.g., seasonal cutting date restrictions, mist-net surveys, etc.) if trees will be cleared within areas containing suitable Indiana bat habitat.

We understand that, with the exception of the Ohio River, none of the streams in the project area possess suitable habitat for any listed mussel species. In addition, your letter states that a mussel survey in the Ohio River project area has not yet been conducted but that a "detailed mussel survey of the Ohio River will be conducted within the expected areas of impact by a qualified malacologist." In our June 19, 2009 letter, we recommended that: 1) a habitat reconnaissance survey be conducted under the proposed alignment site and under the existing bridge, if any in-water work will be required for the rehabilitation of that structure; and 2) further coordination with the Service occur following the results of that initial assessment to determine the appropriate level of additional survey effort, if any, that will be needed to adequately support an effects determination and to conclude consultation with the Service.

In addition, impacts to Trust Resources resulting from the development of staging, borrow, or waste areas or from the relocation of utilities should be coordinated with the Service, as these are considered part of the action. Per the Endangered Species Act Consultation Regulations 50 CFR 402, effects of the action also include direct and indirect effects of the action that are interrelated or interdependent with the proposal under consideration. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification; interdependent actions are those that have no significant independent utility apart from the action that is under consideration. In this case, "but for" the larger action (i.e., new bridge and approaches) the aforementioned actions would not occur and are considered interrelated and interdependent.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act, of 1973, as amended, and are consistent with the intent of the National Environmental Policy Act of 1969, and the U.S. Fish and Wildlife Service's Mitigation Policy. At this time, the FHWA has not provided effects determinations for federally listed mussel species and the Indiana bat. The Service would like to clarify that, once a preferred alternative is approved, additional informal consultation will be necessary and formal consultation may be necessary if adverse effects to the aforementioned listed species will occur. Specific measures to avoid and minimize impacts to listed species may also be necessary pending our review of the specific level and type of impacts associated with the preferred alternative.

If you have questions, or if we may be of further assistance in this matter, please contact Karen Hallberg at extension 23 in this office.

Sincerely,

Angela L. Boyer

for Mary Knapp, Ph.D.
Field Supervisor

cc: USFWS, Frankfort Kentucky Field Office
ODNR, DOW, SCEA Unit, Columbus, OH
Ohio Regulatory Transportation Office, Columbus, OH (*email only*)
OEPA, Columbus, OH (*email only*)

OHIO DEPARTMENT OF TRANSPORTATION
CENTRAL OFFICE • 1980 WEST BROAD STREET • COLUMBUS, OH 43223
TED STRICKLAND, GOVERNOR • JOLENE M. MOLITORIS, DIRECTOR

April 7, 2010

Mary Knapp, Supervisor
U.S. Fish and Wildlife Service
4625 Morse Road, Suite 104
Columbus, Ohio 43230

Re: HAM-71/75-0.00/0.22 (ODOT PID 75119) (KYTC Project Item No. 6-17)
Brent Spence Bridge Replacement/Rehabilitation Project
Ecological Coordination

Dr. Knapp:

Enclosed for your review in accordance with the Fish and Wildlife Coordination Act (16 U.S.C 661 et seq.) and the Endangered Species Act of 1973 (as amended), are two Ecological Survey Reports for the Brent Spence Bridge Replacement/Rehabilitation Project in Hamilton County, Ohio and Kenton County, Kentucky. The project proposes to improve capacity and safety and correct design deficiencies along I-71, I-75, and the Brent Spence Bridge in the Greater Cincinnati/Northern Kentucky Region.

Through previous correspondence (dated August 16, 2006), the USFWS Ohio Field Office agreed to serve as the lead Service Filed Office for the project. This project was previously coordinated with your office in a Planning Study (dated September 2006), and a Conceptual Alternatives Study (dated May 2009). The enclosed Ecological Survey Reports discuss the recommended feasible alternatives (selected from the conceptual alternatives), and provide an inventory of the ecological resources present within the study area boundaries within the State of Ohio and the Commonwealth of Kentucky. A copy of this letter and copies of the ecological survey reports have also been submitted to Phil DeGarmo, Wildlife Biologist/Transportation Liaison at the USFWS Kentucky Field Office.

Hamilton County, Ohio is within the known or historic range of the of the endangered Indiana Bat (*Myotis sodalis*), the endangered fanshell mussel (*Cyprogenia stegaria*), the endangered pink muckett pearly mussel (*Lampsilis abrupta*), the endangered running buffalo clover (*Trifolium stoloniferum*), the federal candidate sheepnose mussel (*Plethobasus cyphyus*), the federal species of concern snuffbox mussel (*Epioblasma triquetra*), and the federal species of concern bald eagle (*Haliaeetus leucocephalus*). Kenton County, Kentucky is within the known range of the endangered Indiana Bat (*Myotis sodalis*), the endangered fanshell mussel (*Cyprogenia stegaria*), the endangered northern riffleshell mussel (*Epioblasma torulosa*), the endangered purple catspaw pearlymussel (*Epioblasma obliquata obliquata*), the the endangered pink muckett pearly mussel (*Lampsilis abrupta*), the endangered ring pink mussel (*Obvaria retusa*), the endangered orangefoot pimpleback mussel (*Plethobasus cyphus*), the endangered clubshell mussel (*Pleurobema clava*), the endangered rough pigtoe mussel (*Pleurobema plenum*), the endangered running buffalo clover (*Trifolium stoloniferum*), and the federal candidate sheepnose mussel

(*Plethobasus cyphyus*). None of these species, nor any other federally listed species, were encountered during the field surveys of the project areas.

The Indiana bat life cycle requires suitable summer roosting and brood rearing habitat (which includes living or standing dead trees or snags with exfoliating, peeling or loose bark, split trunks and/or branches, or cavities) and suitable hibernacula during the winter months (typically caves, or abandoned mines that provide cool, humid, stable conditions for hibernation). While no suitable winter roosting habitat was found within the project area, and no suitable summer roosting habitat was identified within portion of the project within Ohio, areas of potential and marginal summer roosting habitat will be impacted as a result of construction activities within Kentucky. Once a preferred alternative has been selected, an effect determination on the Indiana bat will be made based on impacts to the potential summer roosting and foraging habitats, and through coordination with the with the USFWS.

Running buffalo requires periodic disturbance and a somewhat open habitat to successfully flourish, but it cannot tolerate full-sun, full-shade, or severe disturbance. Potential areas of running buffalo clover habitat include partially shaded woodlots, periodically mowed areas (lawns, parks, cemeteries), and partially shaded woods along streams and trails. No suitable habitat for this species was identified within the Ohio portion of the project. Potentially suitable habitats for this species were identified within the Kentucky portion of the project area. Surveys of these potentially suitable habitats were conducted in 2006 (original study area) and 2009 (extended study area), and no individuals of these species were found. A biological assessment prepared by the KYTC for the extended portion of the study area concluded that the proposed project is "**Not Likely to Adversely Affect**" the running buffalo clover.

With the exception of the Ohio River, none of the streams encountered within the project area possessed potentially suitable habitats for any of the listed mussel species. A detailed survey of the Ohio River was not conducted as part of the ecological studies. ODOT and KYTC acknowledge the potential for mussel beds possessing both listed and non-listed mussel species to be present within the Ohio River within the project area. Once a preferred alternative has been selected, a detailed mussel survey of the Ohio River will be conducted within the expected areas of impact by a qualified malacologist. An effects determination on these mussel species will be based on the results of the survey and the proposed level of disturbance. Additional details on the proposed mussel survey of the Ohio River will be established through coordination with the USFWS, the Ohio Department of Natural Resources, and the Kentucky Department of Fish and Wildlife Resources.

In addition to being a federal species of concern, the bald eagle is protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. No eagle nests were identified during a survey of the study area, and the only known nesting location for this species within Hamilton County, Ohio is located approximately 15 miles northeast of the proposed project area along the Great Miami River. Due to the distance from the nearest known nesting location, it is expected that the project will have "**No Effect**" on the bald eagle.

The Ecological Survey Reports, as well as other information on the project, are also available on line at http://www.brentspencebridgecorridor.com/.

The Service's concurrence and/or comments on the project would be appreciated as soon as possible. If comments or notification of when comments will be furnished are not received within 30 days, we will proceed with project development.

Please send any comments on the reports to:

Mr. Timothy Hill, Administrator
Office of Environmental Services
Ohio Department of Transportation
1980 W. Broad Street
Columbus, OH 43223

If you have any questions or concerns contact Matt Raymond, Environmental Specialist, at (614) 466-5129.

Respectfully,

Timothy M. Hill
Administrator
Office of Environmental Services

Enclosures

c: Phil DeGarmo, USFWS - Keith Smith, District 8 – Stefan Spinosa, District 8 – John Eckler, KYTC - Larry Hoffman, OES - File - Reading File

OHIO DEPARTMENT OF TRANSPORTATION
CENTRAL OFFICE • 1980 WEST BROAD STREET • COLUMBUS, OH 43223
TED STRICKLAND, GOVERNOR • JOLENE M. MOLITORIS, DIRECTOR

April 7, 2010

U.S. Army Corps of Engineers
Ohio Regulatory Transportation Office
DSCC Building 10, Section 10
3990 East Broad Street
Columbus, Ohio 43218

Attention: Mr. Peter Clingan, Team Leader
Ohio Regulatory Transportation Office

Re: HAM-71/75-0.00/0.22 (ODOT PID 75119) (KYTC Project Item No. 6-17)
Brent Spence Bridge Replacement/Rehabilitation Project
Pre-application Coordination and Request for Jurisdictional Determination

Dear Mr. Clingan:

Enclosed for your review are two Ecological Survey Reports for the Brent Spence Bridge Replacement/Rehabilitation Project in Hamilton County, Ohio and Kenton County, Kentucky. The project proposes to improve capacity and safety and correct design deficiencies along I-71, I-75, and the Brent Spence Bridge in the Greater Cincinnati/Northern Kentucky Region.

In a letter received from the USACE dated October 19, 2006 (attached), it was determined that the Ohio Regulatory Transportation Office would "undertake the environmental review and process any subsequent permit application." This project was previously coordinated with your office in a Planning Study (dated September 2006), and a Conceptual Alternatives Study (dated May 2009). The enclosed Ecological Survey Reports discuss the recommended feasible alternatives (selected from the conceptual alternatives), and provide an inventory of the ecological resources present within the study area boundaries within the State of Ohio and the Commonwealth of Kentucky.

The Ecological Survey Reports, as well as other information on the project, are also available on line at http://www.brentspencebridgecorridor.com/.

This information is being provided for the purposes of pre-application coordination. Your concurrence and/or comments, including a jurisdictional determination of Waters of the U.S. within the project area in both Ohio and Kentucky, would be appreciated as soon as possible. If comments or notification of when comments will be furnished are not received within 30 days, we will proceed with project development.

Please send any comments on the reports to:

Mr. Timothy Hill, Administrator
Office of Environmental Services
Ohio Department of Transportation
1980 W. Broad Street
Columbus, OH 43223

If you have any questions or concerns contact Matt Raymond, Environmental Specialist, at (614)466-5129.

Respectfully,

Timothy M. Hill
Administrator
Office of Environmental Services

Enclosures
c: Keith Smith, District 8 – Stefan Spinosa, District 8 – John Eckler, KYTC - Larry Hoffman, OES - File - Reading File

OHIO DEPARTMENT OF TRANSPORTATION
CENTRAL OFFICE • 1980 WEST BROAD STREET • COLUMBUS, OH 43223
TED STRICKLAND, GOVERNOR • JOLENE M. MOLITORIS, DIRECTOR

April 7, 2010

U.S. Environmental Protection Agency
NEPA Implementation Section, Mail Code E-19J
77 W. Jackson Blvd.
Chicago, IL 60604

Attention: Mr. Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Science, Ecosystems, and Communities

Re: HAM-71/75-0.00/0.22 (ODOT PID 75119) (KYTC Project Item No. 6-17)
Brent Spence Bridge Replacement/Rehabilitation Project

Dear Mr. Westlake:

Enclosed for your review are two Ecological Survey Reports for the Brent Spence Bridge Replacement/Rehabilitation Project in Hamilton County, Ohio and Kenton County, Kentucky. The project proposes to improve capacity and safety and correct design deficiencies along I-71, I-75, and the Brent Spence Bridge in the Greater Cincinnati/Northern Kentucky Region.

The Ecological Survey Reports, as well as other information on the project, are also available on line at http://www.brentspencebridgecorridor.com/.

Please send any comments on the reports to:

Mr. Timothy Hill, Administrator
Office of Environmental Services
Ohio Department of Transportation
1980 W. Broad Street
Columbus, OH 43223

If you have any questions or concerns, please contact Matt Raymond, Environmental Specialist, at (614) 466-5129.

Respectfully,

Timothy M. Hill
Administrator
Office of Environmental Services

Enclosures

c: Keith Smith, District 8 – Stefan Spinosa, District 8 – John Eckler, KYTC - Larry Hoffman, OES - File - Reading File

OHIO DEPARTMENT OF TRANSPORTATION
CENTRAL OFFICE • 1980 WEST BROAD STREET • COLUMBUS, OH 43223
TED STRICKLAND, GOVERNOR • JOLENE M. MOLITORIS, DIRECTOR

April 7, 2010

U.S. Coast Guard
Eighth Coast Guard District
1222 Spruce Street
St. Louis, Mo 63103-2832

Attention: Mr. Rodger K. Wiebusch, Bridge Administrator

Re: HAM-71/75-0.00/0.22 (ODOT PID 75119) (KYTC Project Item No. 6-17)
Brent Spence Bridge Replacement/Rehabilitation Project

Dear Mr. Wiebusch:

Enclosed for your review are two Ecological Survey Reports for the Brent Spence Bridge Replacement/Rehabilitation Project in Hamilton County, Ohio and Kenton County, Kentucky. The project proposes to improve capacity and safety and correct design deficiencies along I-71, I-75, and the Brent Spence Bridge in the Greater Cincinnati/Northern Kentucky Region.

The Ecological Survey Reports, as well as other information on the project, are also available on line at http://www.brentspencebridgecorridor.com/.

Please send any comments on the reports to:

Mr. Timothy Hill, Administrator
Office of Environmental Services
Ohio Department of Transportation
1980 W. Broad Street
Columbus, OH 43223

If you have any questions or concerns contact Matt Raymond, Environmental Specialist, at (614) 466-5129.

Respectfully,

Timothy M. Hill
Administrator
Office of Environmental Services

Enclosures

c: Keith Smith, District 8 – Stefan Spinosa, District 8 – John Eckler, KYTC - Larry Hoffman, OES - File - Reading File

OHIO DEPARTMENT OF TRANSPORTATION
INTEROFFICE COMMUNICATION
Office of Environmental Services

DATE: April 7, 2010

TO: Brian Mitch, Division of Engineering, ODNR

FROM: Timothy M. Hill, Administrator, Office of Environmental Services

SUBJECT: Ecological Coordination

PROJECT: HAM-71/75-0.00/0.22 (PID 75119), Brent Spence Bridge Replacement/Rehabilitation Project

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Enclosed for your review is an Ecological Survey Report for the Brent Spence Bridge Replacement / Rehabilitation Project in Hamilton County, Ohio and Kenton County, Kentucky. The project proposes to improve capacity and safety and correct design deficiencies along I-71, I-75, and the Brent Spence Bridge in the Greater Cincinnati/Northern Kentucky Region. This project was previously coordinated with your agency in a Planning Study (dated September 2006), and a Conceptual Alternatives Study (dated May 2009). The enclosed Ecological Survey Report discusses the recommended feasible alternatives (selected from the conceptual alternatives), and provides an ecological analysis of the portion of the Brent Spence Bridge relocation/rehabilitation project located within the State of Ohio.

Expected impacts within the Ohio portion of the project corridor are limited to those associated with the construction of the new bridge over the Ohio River. No other streams, wetlands, or rare or unique habitats were identified within Ohio.

A review of the ODNR Natural Heritage Database did indicate the presence of several listed species within 1 mile of the project area. While suitable habitats for many of these species were present within the study area, terrestrial habitats were surveyed, and no State or Federally listed species were observed during the ecological field studies.

A detailed survey of the Ohio River was not conducted as part of the ecological studies. ODOT acknowledges the potential for mussel beds possessing both listed and non-listed mussel species to be present within the Ohio River within the project area. Once a preferred alternative has been selected, a detailed mussel survey of the Ohio River will be conducted within the expected areas of impact by a qualified malacologist. An effects determination on these mussel species will be based on the results of the survey and the proposed level of disturbance. Additional details on the proposed mussel survey of the Ohio River will established through coordination/consultation with the USFWS, ODNR, and the Kentucky Department of Fish and Wildlife Resources.

The Ecological Survey Report, as well as other information on the project, is also available on line at http://www.brentspencebridgecorridor.com/.

ODNR's concurrence and/or comments on the project would be appreciated as soon as possible. If comments or notification of when comments will be furnished are not received within 30 days, we will proceed with project development.

If you have any questions or concerns contact Matt Raymond, Environmental Specialist, at (614) 466-5129.

TMH:MAP:mwr
Enclosure

c: Keith Smith, District 8 – Stefan Spinosa, District 8 – John Eckler, KYTC– Larry Hoffman, OES - File - Reading File

Ohio Department of Transportation
INTER-OFFICE COMMUNICATION
Office of Environmental Services

TO: Ric Queen, OEPA - DSW **DATE:** April 7, 2010

FROM: Timothy M. Hill, Administrator, Office of Environmental Services

SUBJECT: Pre-application Coordination

PROJECT: HAM-71/75-0.00/0.22 (PID 75119), Brent Spence Bridge Replacement/Rehabilitation Project

---

Enclosed for your review is an Ecological Survey Report for the Brent Spence Bridge Replacement/Rehabilitation Project in Hamilton County, Ohio and Kenton County, Kentucky. The project proposes to improve capacity and safety and correct design deficiencies along I-71, I-75, and the Brent Spence Bridge in the Greater Cincinnati/Northern Kentucky Region. This project was previously coordinated with your agency in a Planning Study (dated September 2006), and a Conceptual Alternatives Study (dated May 2009). The enclosed Ecological Survey Report discusses the recommended feasible alternatives (selected from the conceptual alternatives), and provides an ecological analysis of the portion of the Brent Spence Bridge relocation/rehabilitation project located within the State of Ohio.

Expected impacts within the Ohio portion of the project corridor are limited to those associated with the construction of the new bridge over the Ohio River. No other streams, wetlands, or rare or unique habitats were identified within Ohio.

The Ecological Survey Report, as well as other information on the project, is also available on line at http://www.brentspencebridgecorridor.com/.

This information is being provided for the purposes of pre-application coordination. Your concurrence and/or comments would be appreciated as soon as possible. If comments or notification of when comments will be furnished are not received within 30 days, we will proceed with project development.

If you have any questions or concerns contact Matt Raymond, Environmental Specialist, at (614) 466-5129.

TMH:MAP:mwr
Enclosure

c: Keith Smith, District 8 – Stefan Spinosa, District 8 – John Eckler, KYTC - Larry Hoffman, OES - File - Reading File

OHIO DEPARTMENT OF TRANSPORTATION
CENTRAL OFFICE • 1980 WEST BROAD STREET • COLUMBUS, OH 43223
TED STRICKLAND, GOVERNOR • JOLENE M. MOLITORIS, DIRECTOR

April 7, 2010

U.S. Environmental Protection Agency
NEPA Implementation Section, Mail Code E-19J
77 W. Jackson Blvd.
Chicago, IL 60604

Attention: Mr. Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Science, Ecosystems, and Communities

Re: HAM-71/75-0.00/0.22 (ODOT PID 75119) (KYTC Project Item No. 6-17)
Brent Spence Bridge Replacement/Rehabilitation Project

Dear Mr. Westlake:

Enclosed for your review are two Ecological Survey Reports for the Brent Spence Bridge Replacement/Rehabilitation Project in Hamilton County, Ohio and Kenton County, Kentucky. The project proposes to improve capacity and safety and correct design deficiencies along I-71, I-75, and the Brent Spence Bridge in the Greater Cincinnati/Northern Kentucky Region.

The Ecological Survey Reports, as well as other information on the project, are also available on line at http://www.brentspencebridgecorridor.com/.

Please send any comments on the reports to:

Mr. Timothy Hill, Administrator
Office of Environmental Services
Ohio Department of Transportation
1980 W. Broad Street
Columbus, OH 43223

If you have any questions or concerns, please contact Matt Raymond, Environmental Specialist, at (614) 466-5129.

Respectfully,

Timothy M. Hill
Administrator
Office of Environmental Services

Enclosures

c: Keith Smith, District 8 – Stefan Spinosa, District 8 – John Eckler, KYTC - Larry Hoffman, OES - File - Reading File

APPENDIX C – TABLES

Table 1: All Mussel Species Encountered During the Mussel Survey

Common Name	Scientific Name	Live	Fresh Dead	Weathered	Subfossil	Grand Total
Mucket	*Actinonaias ligamentina*	1				1
Threeridge	*Amblema plicata*	72				72
Pimpleback	*Cyclonaias pustulosa*	79				79
Butterfly	*Ellipsaria lineolata*	3				3
Elephantear	*Elliptio crassidens*	1				1
Ebonyshell	*Reginaia ebena*	8				8
Wabash Pigtoe	*Fusconaia flava*	144				144
Plain Pocketbook	*Lampsilis cardium*	2				2
Fragile Papershell	*Leptodea fragilis*	3	1			4
Black Sandshell	*Ligumia recta*	27				27
Washboard	*Megalonaias nervosa*	101				101
Threehorn Wartyback	*Obovaria reflexa*	223				223
Pyramid Pigtoe	*Pleurobema rubrum*			1	2	3
Round Pigtoe	*Pleurobema sintoxia*	12				12
Ohio Pigtoe	*Pleurobema cordatum*	2				2
Pink Heelsplitter	*Potamilus alatus*	80	1	1		82
Pink Papershell	*Potamilus ohiensis*	3				3
Wartyback	*Cyclonaias nodulata*	108	1	1	1	111
Mapleleaf	*Quadrula quadrula*	26				26
Monkeyface	*Theliderma metanevra*	1				1
TOTAL		**896**	**3**	**3**	**3**	**905**

Note: The weathered and subfossil shells are not evidence of an extant population of pyramid pigtoe (*Pleurobema rubrum*) in the project area.

Table 2: Mussel Species Encountered Along the Ohio Side During the Phase I Transect Surveys

Common Name	Scientific Name	Live	Fresh Dead	Weathered	Subfossil	Grand Total
Wabash Pigtoe	*Fusconaia flava*	3				3
Fragile Papershell	*Leptodea fragilis*	1				1
Pink Heelsplitter	*Potamilus alatus*	1		1		2
TOTAL		**5**	**0**	**1**	**0**	**6**

Table 3: Results of the Phase I Transect Surveys Along the Kentucky Side (cont.)

Transect Segment	Effort (min)	Live County	Richness	CPUE
1.1	10			0
1.2	10	1	1	6
1.3	10			0
1.4	10	4	4	24
1.5	10	3	3	18
1.6	10	4	4	24
1.7	10	2	1	12
2.1	10			0
2.2	10	1	1	6
2.3	10	9	5	54
2.4	10	8	6	48
2.5	10	6	4	36
2.6	10	7	5	42
2.7	10			0
3.1	10			0
3.2	10	4	4	24
3.3	10	10	3	60
3.4	10			0
3.5	10	7	4	42
3.6	10	2	1	12
3.7	10			0
4.1	10			0
4.2	10	13	5	78
4.3	10	6	6	36
4.4	10	3	3	18
4.5	10	5	3	30
4.6	10			0
4.7	10	3	3	18
5.1	10			0
5.2	10			0
5.3	10			0
5.4	10			0
5.5	10			0
5.6	10			0
5.7	10			0
6.1	10			0
6.2	10			0
6.3	10	3	2	18
6.4	10	6	3	36
6.5	10	7	4	42
6.6	10			0
6.7	10			0
7.1	10			0
7.2	10	6	1	36
7.3	10	7	4	42
7.4	10	1	1	6
7.5	10	5	2	30

Table 3: Results of the Phase I Transect Surveys Along the Kentucky Side (cont.)

7.6	10	4	3	24
8.1	10	3	1	18
8.2	10	1	1	6
8.3	10	14	7	84
8.4	10	10	6	60
8.5	10	6	3	36
8.6	10	9	4	54
8.7	10	7	4	42
9.1	10			0
9.2	10			0
9.3	10	2	2	12
9.4	10	14	5	84
9.5	10	9	5	54
9.6	10	3	3	18
9.7	10	1	1	6
10.1	10			0
10.2	10	2	1	12
10.3	10	5	3	30
10.4	10	6	5	36
10.5	10	15	7	90
10.6	10	4	3	24
10.7	10	2	2	12
11.1	10			0
11.2	10	2	2	12
11.3	10	9	3	54
11.4	10	11	6	66
11.5	10	1	1	6
11.6	10	2	2	12
11.7	10	4	4	24
12.1	10			0
12.2	10	2	2	12
12.3	10	2	2	12
12.4	10	7	4	42
12.5	10	9	5	54
12.6	10	2	2	12
12.7	10	4	3	24
13.1	10			0
13.2	10	3	2	18
13.3	10	4	3	24
13.4	10	8	5	48
13.5	10	9	5	54
13.6	10	1	1	6
13.7	10	3	2	18
13.8	10			0
14.1	10			0
14.2	10			0
14.3	10	7	4	42
14.4	10	10	4	60

Table 3: Results of the Phase I Transect Surveys Along the Kentucky Side (cont.)

14.5	10			0
14.6	10	7	4	42
14.7	10			0
14.8	10	1	1	6
15.1	10			0
15.2	10			0
15.3	10	4	3	24
15.4	10	2	2	12
15.5	10			0
15.6	10			0
15.7	10	1	1	6
15.8	10			0
16.1	10			0
16.2	10			0
16.3	10			0
16.4	10	1	1	6
16.5	10			0
16.6	10			0
16.7	10			0
16.8	10			0
17.1	10			0
17.2	10	2	2	12
17.3	10	10	5	60
17.4	10	1	1	6
17.5	10	10	5	60
17.6	10	4	3	24
17.7	10	10	5	60
17.8	10	1	1	6
18.1	10			0
18.2	10			0
18.3	10	1	1	6
18.4	10	13	7	78
18.5	10	1	1	6
18.6	10	12	8	72
18.7	10			0
18.8	10			0
19.1	10			0
19.2	10			0
19.3	10			0
19.4	10	10	1	60
19.5	10	5	1	30
19.6	10	1	1	6
19.7	10	1	1	6
19.8	10	1	1	6
20.1	10			0
20.2	10	3	2	18
20.3	10	2	2	12
20.4	10	4	3	24

Table 3: Results of the Phase I Transect Surveys Along the Kentucky Side (cont.)

20.5	10	4	3	24
20.6	10	5	2	30
20.7	10	2	1	12
20.8	10	2	2	12
21.1	10	2	2	12
21.2	10			0
21.3	10			0
21.4	10	5	3	30
21.5	10	1	1	6
21.6	10	1	1	6
21.7	10			0
21.8	10			0
22.1	10			0
22.2	10	1	1	6
22.3	10			0
22.4	10	1	1	6
23.1	10			0
23.2	10			0
23.3	10			0
23.4	10	3	3	18
23.5	10			0
23.6	10			0
24.1	10			0
24.2	10			0
24.3	10	1	1	6
24.4	10	2	2	12
24.5	10	1	1	6
24.6	10			0
25.1	10			0
25.2	10			0
25.3	10	3	2	18
25.4	10			0
25.5	10	1	1	6
25.6	10			0
25.7	10			0
26.1	10			0
26.2	10	1	1	6
26.3	10	2	2	12
26.4	10	2	2	12
26.5	10	6	5	36
26.6	10			0
26.7	10			0
27.1	10			0
27.2	10			0
27.3	10	3	2	18
27.4	10	3	2	18
27.5	10			0
27.6	10			0

Table 3: Results of the Phase I Transect Surveys Along the Kentucky Side (cont.)

27.7	10	1	1	6
29.1	10			0
29.2	10			0
29.3	10	1	1	6
29.4	10			0
29.5	10			0
29.6	10			0
30.1	10			0
30.2	10	2	2	12
30.3	10	3	2	18
30.4	10	1	1	6
30.5	10	3	2	18
30.6	10			0
TOTAL	**2040**	**521**	**18**	**15.32**

Table 4: Mussel Species Encountered Along the Kentucky Side During the Phase I Transect Surveys

Common Name	Scientific Name	Live	Fresh Dead	Weathered	Subfossil	Grand Total
Threeridge	*Amblema plicata*	47				47
Pimpleback	*Cyclonaias pustulosa*	52				52
Butterfly	*Ellipsaria lineolata*	2				2
Ebonyshell	*Reginaia ebena*	6				6
Wabash Pigtoe	*Fusconaia flava*	89				89
Plain Pocketbook	*Lampsilis cardium*	1				1
Fragile Papershell	*Leptodea fragilis*		1			1
Black Sandshell	*Ligumia recta*	19				19
Washboard	*Megalonaias nervosa*	62				62
Threehorn Wartyback	*Obovaria reflexa*	128				128
Round Pigtoe	*Pleurobema sintoxia*	4				4
Pink Heelsplitter	*Potamilus alatus*	44				44
Pink Papershell	*Potamilus ohiensis*	2				2
Wartyback	*Cyclonaias nodulata*	47	1	1		49
Mapleleaf	*Quadrula quadrula*	18				18
TOTAL		**521**	**2**	**1**	**0**	**524**

Table 5: Results of the Phase II Transect Surveys Along the Kentucky Side (cont.)

Transect Cell	Effort (min)	Live County	Richness	CPUE
A.2	10	1	1	6
A.3	10	5	3	30
A.4	10	3	3	18
A.5	10	4	4	24
A.6	10	4	3	24
A.7	10			0
AA.2	10			0
AA.3	10			0
AA.4	10			0
AA.5	10	2	2	12
AA.6	10	1	1	6
B.2	10			0
B.3	10	13	5	78
B.4	10	1	1	6
B.5	10	4	3	24
B.6	10	11	6	66
B.7	10			0
C.2	10	2	1	12
C.3	10	8	5	48
C.4	10	4	2	24
C.5	10	11	6	66
C.6	10	9	7	54
C.7	10	6	5	36
D.2	10	2	1	12
D.3	10	9	3	54
D.4	10	8	5	48
D.5	10	2	2	12
D.6	10	1	1	6
D.7	10			0
E.2	10	5	4	30
E.3	10	4	3	24
E.4	10			0
E.5	10			0
E.6	10			0
E.7	10			0
F.2	10			0
F.3	10			0
F.4	10			0
F.5	10	1	1	6
F.6	10			0
F.7	10			0
G.2	10	3	3	18
G.3	10	2	2	12
G.4	10	3	3	18
G.5	10	5	3	30
G.6	10	1	1	6
G.7	10			0

Table 5: Results of the Phase II Transect Surveys Along the Kentucky Side (cont.)

H.2	10	1	1	6
H.3	10	5	3	30
H.4	10	15	3	90
H.5	10	11	4	66
H.6	10	13	4	78
H.7	10	10	6	60
I.2	10			0
I.3	10	5	2	30
I.4	10	6	3	36
I.5	10	4	1	24
I.6	10	9	4	54
I.7	10	5	5	30
J.2	10	2	2	12
J.3	10	1	1	6
J.4	10	2	2	12
J.5	10			0
J.6	10	1	1	6
J.7	10			0
K.2	10			0
K.3	10	5	3	30
K.4	10	4	3	24
K.5	10	14	4	84
K.6	10	5	4	30
K.7	10	2	2	12
L.2	10			0
L.3	10	1	1	6
L.4	10	2	2	12
L.5	10	3	2	18
L.6	10	3	3	18
L.7	10	1	1	6
M.2	10	1	1	6
M.3	10	2	1	12
M.4	10	7	4	42
M.5	10	5	5	30
M.6	10	2	2	12
M.7	10	1	1	6
N.2	10	1	1	6
N.3	10	1	1	6
N.4	10	2	2	12
N.5	10	1	1	6
N.6	10	1	1	6
N.7	10			0
O.2	10	6	1	36
O.3	10	6	3	36
O.4	10	4	4	24
O.5	10			0
O.6	10			0
R.2	10	1	1	6

Table 5: Results of the Phase II Transect Surveys Along the Kentucky Side (cont.)

R.3	10			0
R.4	10			0
R.5	10			0
R.6	10	1	1	6
R.7	10	1	1	6
S.2	10			0
S.3	10	3	2	18
S.4	10	4	3	24
S.5	10	3	3	18
S.6	10	2	2	12
S.7	10			0
T.2	10			0
T.3	10	4	4	24
T.4	10			0
T.5	10	7	4	42
T.6	10	5	4	30
T.7	10	2	2	12
U.2	10			0
U.3	10	2	3	12
U.4	10	6	4	36
U.5	10	2	3	12
U.6	10	4	3	24
W.2	10			0
W.3	10	1	1	6
X.2	10			0
X.3	10			0
Y.2	10			0
Y.3	10			0
Z.2	10	1	1	6
Z.3	10			0
Z.4	10	2	2	12
Z.5	10	1	1	6
Z.6	10	3	3	18
TOTAL	**1280**	**360**	**20**	**16.88**

Table 6: Mussel Species Encountered Along the Kentucky Side During the Phase II Transect Surveys

Common Name	Scientific Name	Live	Fresh Dead	Weathered	Subfossil	Grand Total
Mucket	*Actinonaias ligamentina*	1				1
Threeridge	*Amblema plicata*	23				23
Pimpleback	*Cyclonaias pustulosa*	27				27
Butterfly	*Ellipsaria lineolata*	1				1
Elephantear	*Elliptio crassidens*	1				1
Ebonyshell	*Reginaia ebena*	2				2
Wabash Pigtoe	*Fusconaia flava*	52				52
Fragile Papershell	*Leptodea fragilis*	2				2
Black Sandshell	*Ligumia recta*	8				8
Washboard	*Megalonaias nervosa*	39				39
Threehorn Wartyback	*Obovaria reflexa*	94				94
Round Pigtoe	*Pleurobema sintoxia*	8				8
Ohio Pigtoe	*Pleurobema cordatum*	2				2
Pink Heelsplitter	*Potamilus alatus*	29				29
Pink Papershell	*Potamilus ohiensis*	1				1
Wartyback	*Cyclonaias nodulata*	61				61
Mapleleaf	*Quadrula quadrula*	8				8
Monkeyface	*Theliderma metanevra*	1				1
TOTAL		**360**	**0**	**0**	**0**	**360**

Table 7: Mussel Species Encountered During the Phase I Mid-channel Survey

Common Name	Scientific Name	Live	Fresh Dead	Weathered	Subfossil	Grand Total
Threeridge	*Amblema plicata*	1				1
Plain Pocketbook	*Lampsilis cardium*	1				1
Pyramid Pigtoe	*Pleurobema rubrum*			1	2	3
Pink Heelsplitter	*Potamilus alatus*	6				6
TOTAL		**8**	**0**	**1**	**2**	**11**

Note: The weathered and subfossil shells are not evidence of an extant population of pyramid pigtoe (*Pleurobema rubrum*) in the project area.

Table 8: Mussel Species Encountered During the Phase II Quadrats Survey

Common Name	Scientific Name	Live	Fresh Dead	Weathered	Subfossil	Grand Total
Threeridge	*Amblema plicata*	1				1
Threehorn Wartyback	*Obovaria reflexa*	1				1
Pink Heelsplitter	*Potamilus alatus*		1			1
Wartyback	*Cyclonaias nodulata*				1	1
TOTAL		**2**	**1**	**0**	**1**	**4**

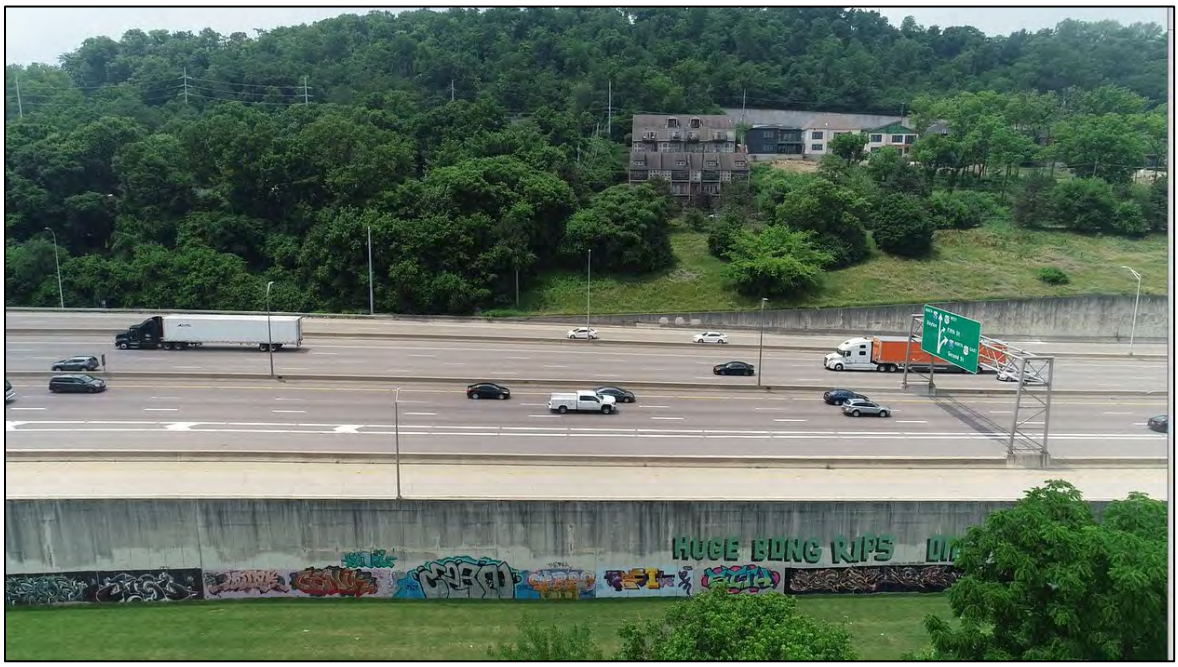
Table 9: Summary of Live Mussel Species Encountered by Location

Common Name	Scientific Name	Ohio Side	KY Side	Mid-Channel	Grand Total
Mucket	*Actinonaias ligamentina*		1		1
Threeridge	*Amblema plicata*		71	1	72
Wartyback	*Cyclonaias nodulata*		108		108
Pimpleback	*Cyclonaias pustulosa*		79		79
Butterfly	*Ellipsaria lineolata*		3		3
Elephantear	*Elliptio crassidens*		1		1
Wabash Pigtoe	*Fusconaia flava*	3	141		144
Plain Pocketbook	*Lampsilis cardium*		1	1	2
Fragile Papershell	*Leptodea fragilis*	1	2		3
Black Sandshell	*Ligumia recta*		27		27
Washboard	*Megalonaias nervosa*		101		101
Threehorn Wartyback	*Obovaria reflexa*		223		223
Ohio Pigtoe	*Pleurobema cordatum*		2		2
Round Pigtoe	*Pleurobema sintoxia*		12		12
Pink Heelsplitter	*Potamilus alatus*	1	73	6	80
Pink Papershell	*Potamilus ohiensis*		3		3
Mapleleaf	*Quadrula quadrula*		26		26
Ebonyshell	*Reginaia ebena*		8		8
Monkeyface	*Theliderma metanevra*		1		1
TOTAL		**5**	**883**	**8**	**896**

APPENDIX D – PHOTOS

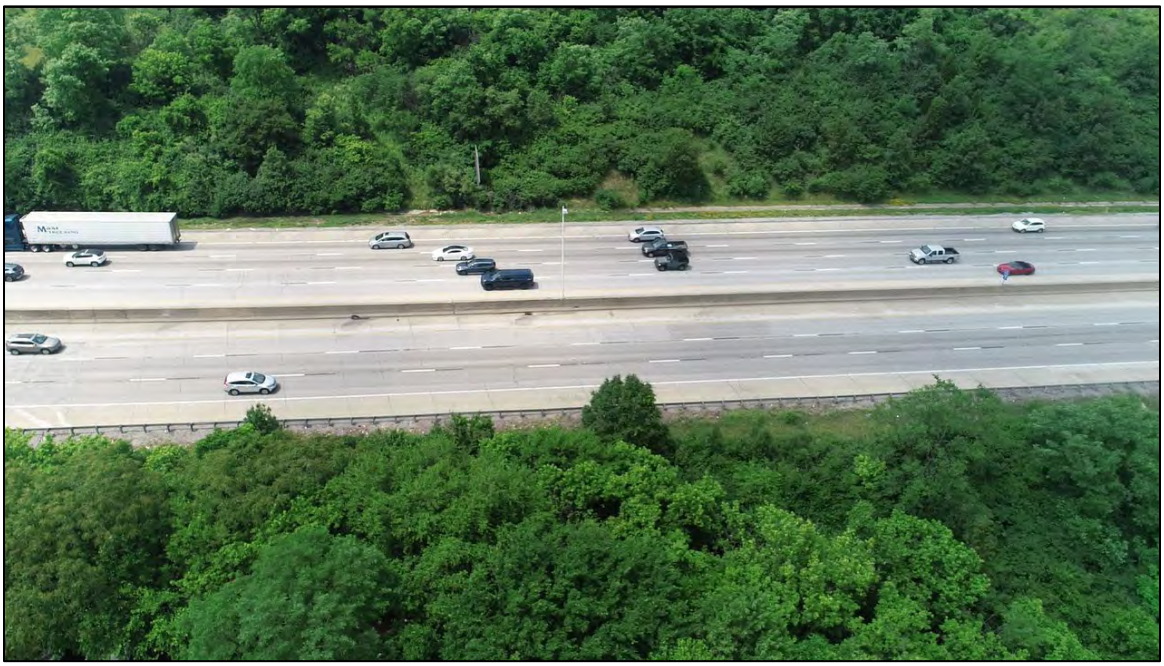
Existing BSB Bridge

Project Area with Forested Habitat



Project Area

Project Area with Forested Habitat

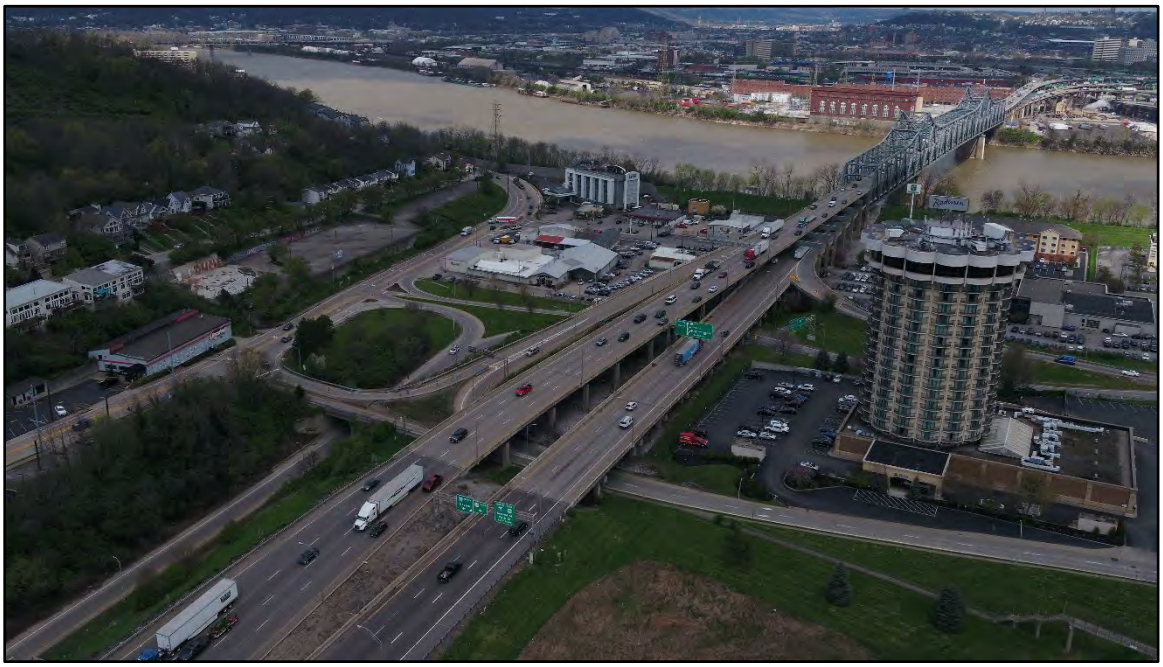


Project Area

Existing Bridge with Parking and Lighting Underneath

Ohio RIver

Project Area Approaching the Ohio RIver



Stream PER 1, Perennial, RBP Score 117

Stream INT 12, Intermittent, RBP Score 82

Stream INT 14, Intermittent, RBP Score 84

Stream PER 2, Perennial, RBP Score 108

Stream INT 15, Intermittent, RBP Score 78

Stream INT 16, Intermittent, RBP Score 65

Stream INT 17, Ephemeral, RBP Score 97

Stream INT 18, Intermittent, RBP Score 97

Stream INT 6, Intermittent, RBP Score 90

Stream INT 19, Intermittent, RBP Score 90

Stantec

Client:	**HMB Professional Engineers, Inc.**	**Project:**	**Brent Spence Bridge Freshwater Mussel Survey**
Site Name:	**Cincinnati, OH -Ohio River**	**Site Location:**	**39.090984, -84.523602**

Photograph ID: 1

Photo Location:

Direction:

Survey Date: 8/4/2022

Comments: *Actinonaias ligamentina*

Photograph ID: 2

Photo Location:

Direction:

Survey Date: 7/18/2022

Comments: *Amblema plicata*

Stantec

Client:	**HMB Professional Engineers, Inc.**	**Project:**	**Brent Spence Bridge Freshwater Mussel Survey**
Site Name:	**Cincinnati, OH -Ohio River**	**Site Location:**	**39.090984, -84.523602**

Photograph ID: 3 **Photo Location:** **Direction:** **Survey Date:** 7/19/2022 **Comments:** *Cyclonaias nodulata*	

Photograph ID: 4 **Photo Location:** **Direction:** **Survey Date:** 8/9/2022 **Comments:** *Cyclonaias pustulosa*	

Stantec

Client:	**HMB Professional Engineers, Inc.**	**Project:**	**Brent Spence Bridge Freshwater Mussel Survey**
Site Name:	**Cincinnati, OH -Ohio River**	**Site Location:**	**39.090984, -84.523602**

Photograph ID: 5 **Photo Location:** **Direction:** **Survey Date:** 8/8/2022 **Comments:** *Ellipsaria lineolata*	
Photograph ID: 6 **Photo Location:** **Direction:** **Survey Date:** 8/13/2022 **Comments:** *Elliptio crassidens*	

Stantec

Client:	**HMB Professional Engineers, Inc.**	**Project:**	**Brent Spence Bridge Freshwater Mussel Survey**
Site Name:	**Cincinnati, OH -Ohio River**	**Site Location:**	**39.090984, -84.523602**

Photograph ID: 7 **Photo Location:** **Direction:** **Survey Date:** 7/25/2022 **Comments:** *Fusconaia flava*	
Photograph ID: 8 **Photo Location:** **Direction:** **Survey Date:** 7/22/2022 **Comments:** *Lampsilis cardium*	

Stantec

Client:	**HMB Professional Engineers, Inc.**	**Project:**	**Brent Spence Bridge Freshwater Mussel Survey**
Site Name:	**Cincinnati, OH -Ohio River**	**Site Location:**	**39.090984, -84.523602**

Photograph ID: 9 **Photo Location:** **Direction:** **Survey Date:** 7/19/2022 **Comments:** *Leptodea fragilis*	
Photograph ID: 10 **Photo Location:** **Direction:** **Survey Date:** 7/19/2022 **Comments:** *Ligumia recta*	

Stantec

Client:	**HMB Professional Engineers, Inc.**	**Project:**	**Brent Spence Bridge Freshwater Mussel Survey**
Site Name:	**Cincinnati, OH -Ohio River**	**Site Location:**	**39.090984, -84.523602**

Photograph ID: 11 **Photo Location:** **Direction:** **Survey Date:** 9/12/2022 **Comments:** *Pleurobema cordatum*	
Photograph ID: 12 **Photo Location:** **Direction:** **Survey Date:** 8/11/2022 **Comments:** *Pleurobema rubrum*	

Stantec

Client:	**HMB Professional Engineers, Inc.**	**Project:**	**Brent Spence Bridge Freshwater Mussel Survey**
Site Name:	**Cincinnati, OH -Ohio River**	**Site Location:**	**39.090984, -84.523602**

Photograph ID: 13 **Photo Location:** **Direction:** **Survey Date:** 8/9/2022 **Comments:** *Pleurobema sintoxia*	

Photograph ID: 14 **Photo Location:** **Direction:** **Survey Date:** 7/18/2022 **Comments:** *Potamilus alatus*	

Stantec

Client:	**HMB Professional Engineers, Inc.**	**Project:**	**Brent Spence Bridge Freshwater Mussel Survey**
Site Name:	**Cincinnati, OH -Ohio River**	**Site Location:**	**39.090984, -84.523602**

Photograph ID: 15 **Photo Location:** **Direction:** **Survey Date:** 8/13/2022 **Comments:** *Potamilus ohiensis*	

Photograph ID: 16 **Photo Location:** **Direction:** **Survey Date:** 8/9/2022 **Comments:** *Megalonaias nervosa*	

Stantec

Client:	**HMB Professional Engineers, Inc.**	**Project:**	**Brent Spence Bridge Freshwater Mussel Survey**
Site Name:	**Cincinnati, OH -Ohio River**	**Site Location:**	**39.090984, -84.523602**

Photograph ID: 17 **Photo Location:** **Direction:** **Survey Date:** 7/18/2022 **Comments:** *Obliquaria reflexa*	

Photograph ID: 18 **Photo Location:** **Direction:** **Survey Date:** 8/9/2022 **Comments:** *Quadrula quadrula*	

Stantec

Client:	**HMB Professional Engineers, Inc.**	**Project:**	**Brent Spence Bridge Freshwater Mussel Survey**
Site Name:	**Cincinnati, OH -Ohio River**	**Site Location:**	**39.090984, -84.523602**

Photograph ID: 19 **Photo Location:** **Direction:** **Survey Date:** 7/19/2022 **Comments:** *Reginaia ebenus*	

Photograph ID: 20 **Photo Location:** **Direction:** **Survey Date:** 8/8/2022 **Comments:** *Theliderma metanevra*	

APPENDIX E – FIELD DATA SHEETS

BATS IN BRIDGES DATASHEET

KYTC Structure ID 059B00038L **KYTC Item No** 6-17

Bridge Location: I-75 over West 9th Street

County: Boone **Lat:** 39.07903317090164 **Long:** -84.5215833879224

Date: 8/3/2022 **Time of Survey:** 1:18 pm **Investigator Name(s):** Todd McDaniel

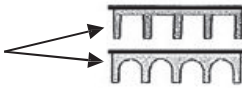
Bridge Type: (check one)

☐ Parallel Box Beam 

☐ Steel I-beam 

☑ Pre-stressed Girder 

☐ Flat Slab / Box 

☐ Cast in Place 

☐ Trapezoidal Box 

☐ Culvert – Box

☐ Culvert – Pipe/Round ☐ Other: _____

Underdeck Material:

☐ Concrete

☑ Corrugated Steel

☐ Other: _____

Road Type: (check one) ■ Interstate ☐ U.S. Highway ☐ State Road ☐ County Road

Surrounding Habitat: (check all that apply)

■ Residential ☐ Row Crop ■ Commercial ☐ Woodland ■ Grassland ☐ Pasture ☐ Riparian ☐ Mixed ☐ Wetland

Conditions Under Bridge: (check all that apply)

☐ Bare ground /sediment ☐ Concrete ☐ Rip rap ☐ Flowing water ☐ Standing water

☐ Open vegetation (not obstructing flight path) ☐ Closed vegetation (may obstruct flight path)

■ Two lane road ☐ Four (or more) lane highway ☐ Dirt road ☐ Railroad

☐ Evidence of superstructure flooding Bridge height above water: _____

Bat indicators: (check all that apply) ☐ Visual ☐ Smell ☐ Sound ☐ Staining ☐ Guano ■ None

Use intensity: (check one) ☐ Minor (scattered, individual guano pellets and/or few small areas of staining covering <1 ft each - few bats or temporary usage)

☐ Major (guano piles and/or large areas of staining covering >1 ft each – semi permanent colony)

Bats Present: ☐ YES ■ NO

BATS IN BRIDGES DATASHEET

Species Present (record number of individuals if known)

_____ Myotis septentrionalis (Northern long-eared)
_____ Myotis sodalis (Indiana)
_____ Myotis leibii (Eastern small-footed)
_____ Myotis lucifugus (Little brown)
_____ Myotis grisescens (Gray)
_____ Myotis austroriparius (Southeastern)
_____ Lasiurus cinereus (Hoary)
_____ Lasiurus borealis (Eastern red)
_____ Lasiurus seminolus (Seminole)
_____ Lasiurus noctivagans (Silver-haired)
_____ Perimyotis subflavus (Tri-colored)
_____ Eptesicus fuscus (Big brown)
_____ Nycticeius humeralis (Evening)
_____ Tadarida brasiliensis (Braz. free-tailed)
_____ Corynorhinus t. townsendii (Virginia)
_____ Corynorhinus rafinesquii (Rafinesque's)
_____ UNKNOWN

Roost description (If known, check all that apply): ☐ Day Roost ☐ Nursery Roost ☐ Night Roost ☐ Unknown

Number of roosts _____

Roost feature: (check all that apply)

☐ Crack/crevice/expansion joint: underside of bridge ☐ Crack/crevice/expansion joint: top side of bridge

☐ Plugged drain ☐ Under/along the main bridge structure ☐ Rail ☐ Other:_____

Human disturbance or traffic under bridge or at structure? ■ High ☐ Low ☐ None

Evidence of bats using bird nests? ☐ Yes ■ No (if yes, please describe and photograph nest location)

Areas Inspected: (check all that apply)

■ Vertical surfaces on I-beams ■ Vertical surfaces between concrete end walls and bridge deck

☐ Expansion joints ■ Rough surfaces ☐ Guardrails ☐ Crevices ☐ Other:_____

Areas NOT Inspected because of safety or inaccessibility:
Some of the middle sections of the bridge were not sampled due to I71/I75 traffic.

Additional Comments / Sketch:
This section of I71/I75 is very busy throughout the day and well into the night.

BATS IN BRIDGES DATASHEET

KYTC Structure ID 059B00038R **KYTC Item No** 6-17

Bridge Location: I-75 over West 9th Street

County: Boone **Lat:** 39.07912062062308 **Long:** -84.52141709095793

Date: 8/3/2022 **Time of Survey:** 1:10 pm **Investigator Name(s):** Todd McDaniel

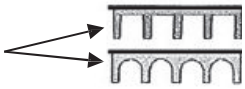
Bridge Type: (check one)

☐ Parallel Box Beam 

☐ Steel I-beam 

☑ Pre-stressed Girder 

☐ Flat Slab / Box 

☐ Cast in Place 

☐ Trapezoidal Box 

☐ Culvert – Box

☐ Culvert – Pipe/Round ☐ Other: _____

Underdeck Material:

☐ Concrete

☑ Corrugated Steel

☐ Other: _____

Road Type: (check one) ■ Interstate ☐ U.S. Highway ☐ State Road ☐ County Road

Surrounding Habitat: (check all that apply)

■ Residential ☐ Row Crop ■ Commercial ☐ Woodland ■ Grassland ☐ Pasture ☐ Riparian ☐ Mixed ☐ Wetland

Conditions Under Bridge: (check all that apply)

☐ Bare ground /sediment ☐ Concrete ☐ Rip rap ☐ Flowing water ☐ Standing water

☐ Open vegetation (not obstructing flight path) ☐ Closed vegetation (may obstruct flight path)

■ Two lane road ☐ Four (or more) lane highway ☐ Dirt road ☐ Railroad

☐ Evidence of superstructure flooding Bridge height above water: _____

Bat indicators: (check all that apply) ☐ Visual ☐ Smell ☐ Sound ☐ Staining ☐ Guano ■ None

Use intensity: (check one) ☐ Minor (scattered, individual guano pellets and/or few small areas of staining covering <1 ft each - few bats or temporary usage)

☐ Major (guano piles and/or large areas of staining covering >1 ft each – semi permanent colony)

Bats Present: ☐ YES ■ NO

BATS IN BRIDGES DATASHEET

Species Present (record number of individuals if known)

_____ Myotis septentrionalis (Northern long-eared)
_____ Myotis sodalis (Indiana)
_____ Myotis leibii (Eastern small-footed)
_____ Myotis lucifugus (Little brown)
_____ Myotis grisescens (Gray)
_____ Myotis austroriparius (Southeastern)
_____ Lasiurus cinereus (Hoary)
_____ Lasiurus borealis (Eastern red)
_____ Lasiurus seminolus (Seminole)
_____ Lasiurus noctivagans (Silver-haired)
_____ Perimyotis subflavus (Tri-colored)
_____ Eptesicus fuscus (Big brown)
_____ Nycticeius humeralis (Evening)
_____ Tadarida brasiliensis (Braz. free-tailed)
_____ Corynorhinus t. townsendii (Virginia)
_____ Corynorhinus rafinesquii (Rafinesque's)
_____ UNKNOWN

Roost description (If known, check all that apply): ☐ Day Roost ☐ Nursery Roost ☐ Night Roost ☐ Unknown

Number of roosts _____

Roost feature: (check all that apply)

☐ Crack/crevice/expansion joint: underside of bridge ☐ Crack/crevice/expansion joint: top side of bridge

☐ Plugged drain ☐ Under/along the main bridge structure ☐ Rail ☐ Other:_____

Human disturbance or traffic under bridge or at structure? ■ High ☐ Low ☐ None

Evidence of bats using bird nests? ☐ Yes ■ No (if yes, please describe and photograph nest location)

Areas Inspected: (check all that apply)

■ Vertical surfaces on I-beams ■ Vertical surfaces between concrete end walls and bridge deck

☐ Expansion joints ■ Rough surfaces ☐ Guardrails ☐ Crevices ☐ Other:_____

Areas NOT Inspected because of safety or inaccessibility:
Some of the middle sections of the bridge were not sampled due to I71/I75 traffic.

Additional Comments / Sketch:
This section of I71/I75 is very busy throughout the day and well into the night.

BATS IN BRIDGES DATASHEET

KYTC Structure ID 059B00039N **KYTC Item No** 6-17

Bridge Location: West 5th Street over I-71 on ramp

County: Boone **Lat:** 39.08524672347906 **Long:** -84.52341754476915

Date: 8/3/2022 **Time of Survey:** 1:35 PM **Investigator Name(s):** Todd McDaniel

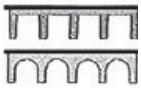
Bridge Type: (check one)

☐ Parallel Box Beam 

☐ Steel I-beam 

☑ Pre-stressed Girder 

☐ Flat Slab / Box 

☐ Cast in Place 

☐ Trapezoidal Box 

☐ Culvert – Box ☐ Culvert – Pipe/Round ☐ Other: _____

Underdeck Material:

☐ Concrete

☑ Corrugated Steel

☐ Other: _____

Road Type: (check one) ■ Interstate ☐ U.S. Highway ☐ State Road ☐ County Road

Surrounding Habitat: (check all that apply)

■ Residential ☐ Row Crop ■ Commercial ☐ Woodland ■ Grassland ☐ Pasture ☐ Riparian ☐ Mixed ☐ Wetland

Conditions Under Bridge: (check all that apply)

☐ Bare ground /sediment ☐ Concrete ☐ Rip rap ☐ Flowing water ☐ Standing water

☐ Open vegetation (not obstructing flight path) ☐ Closed vegetation (may obstruct flight path)

■ Two lane road ☐ Four (or more) lane highway ☐ Dirt road ☐ Railroad

☐ Evidence of superstructure flooding Bridge height above water: _____

Bat indicators: (check all that apply) ☐ Visual ☐ Smell ☐ Sound ☐ Staining ☐ Guano ■ None

Use intensity: (check one) ☐ Minor (scattered, individual guano pellets and/or few small areas of staining covering <1 ft each - few bats or temporary usage)

☐ Major (guano piles and/or large areas of staining covering >1 ft each – semi permanent colony)

Bats Present: ☐ YES ■ NO

BATS IN BRIDGES DATASHEET

Species Present (record number of individuals if known)

_____ Myotis septentrionalis (Northern long-eared)
_____ Myotis sodalis (Indiana)
_____ Myotis leibii (Eastern small-footed)
_____ Myotis lucifugus (Little brown)
_____ Myotis grisescens (Gray)
_____ Myotis austroriparius (Southeastern)
_____ Lasiurus cinereus (Hoary)
_____ Lasiurus borealis (Eastern red)
_____ Lasiurus seminolus (Seminole)
_____ Lasiurus noctivagans (Silver-haired)
_____ Perimyotis subflavus (Tri-colored)
_____ Eptesicus fuscus (Big brown)
_____ Nycticeius humeralis (Evening)
_____ Tadarida brasiliensis (Braz. free-tailed)
_____ Corynorhinus t. townsendii (Virginia)
_____ Corynorhinus rafinesquii (Rafinesque's)
_____ UNKNOWN

Roost description (If known, check all that apply): ☐ Day Roost ☐ Nursery Roost ☐ Night Roost ☐ Unknown

Number of roosts _____

Roost feature: (check all that apply)

☐ Crack/crevice/expansion joint: underside of bridge ☐ Crack/crevice/expansion joint: top side of bridge

☐ Plugged drain ☐ Under/along the main bridge structure ☐ Rail ☐ Other:_____

Human disturbance or traffic under bridge or at structure? ■ High ☐ Low ☐ None

Evidence of bats using bird nests? ☐ Yes ■ No (if yes, please describe and photograph nest location)

Areas Inspected: (check all that apply)

■ Vertical surfaces on I-beams ■ Vertical surfaces between concrete end walls and bridge deck

☐ Expansion joints ■ Rough surfaces ☐ Guardrails ☐ Crevices ☐ Other:_____

Areas NOT Inspected because of safety or inaccessibility:
Some of the middle sections of the bridge were not sampled due to I71/I75 traffic.

Additional Comments / Sketch:
This section of I71/I75 is very busy throughout the day and well into the night.

BATS IN BRIDGES DATASHEET

KYTC Structure ID 059B00040N **KYTC Item No** 6-17

Bridge Location: I-75 over West 4th Streer

County: Boone **Lat:** 39.08665557244103 **Long:** -84.52268287118335

Date: 8/3/2022 **Time of Survey:** 2:00 PM **Investigator Name(s):** Todd McDaniel

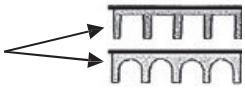
Bridge Type: (check one)

☐ Parallel Box Beam 

☐ Steel I-beam 

☑ Pre-stressed Girder 

☐ Flat Slab / Box 

☐ Cast in Place 

☐ Trapezoidal Box 

☐ Culvert – Box

☐ Culvert – Pipe/Round ☐ Other: _____

Underdeck Material:

☐ Concrete

☑ Corrugated Steel

☐ Other: _____

Road Type: (check one) ■ Interstate ☐ U.S. Highway ☐ State Road ☐ County Road

Surrounding Habitat: (check all that apply)

■ Residential ☐ Row Crop ■ Commercial ☐ Woodland ■ Grassland ☐ Pasture ☐ Riparian ☐ Mixed ☐ Wetland

Conditions Under Bridge: (check all that apply)

☐ Bare ground /sediment ☐ Concrete ☐ Rip rap ☐ Flowing water ☐ Standing water

☐ Open vegetation (not obstructing flight path) ☐ Closed vegetation (may obstruct flight path)

■ Two lane road ☐ Four (or more) lane highway ☐ Dirt road ☐ Railroad

☐ Evidence of superstructure flooding Bridge height above water: _____

Bat indicators: (check all that apply) ☐ Visual ☐ Smell ☐ Sound ☐ Staining ☐ Guano ■ None

Use intensity: (check one) ☐ Minor (scattered, individual guano pellets and/or few small areas of staining covering <1 ft each - few bats or temporary usage)

☐ Major (guano piles and/or large areas of staining covering >1 ft each – semi permanent colony)

Bats Present: ☐ YES ■ NO

BATS IN BRIDGES DATASHEET

Species Present (record number of individuals if known)

_____ Myotis septentrionalis (Northern long-eared)
_____ Myotis sodalis (Indiana)
_____ Myotis leibii (Eastern small-footed)
_____ Myotis lucifugus (Little brown)
_____ Myotis grisescens (Gray)
_____ Myotis austroriparius (Southeastern)
_____ Lasiurus cinereus (Hoary)
_____ Lasiurus borealis (Eastern red)
_____ Lasiurus seminolus (Seminole)
_____ Lasiurus noctivagans (Silver-haired)
_____ Perimyotis subflavus (Tri-colored)
_____ Eptesicus fuscus (Big brown)
_____ Nycticeius humeralis (Evening)
_____ Tadarida brasiliensis (Braz. free-tailed)
_____ Corynorhinus t. townsendii (Virginia)
_____ Corynorhinus rafinesquii (Rafinesque's)
_____ UNKNOWN

Roost description (If known, check all that apply): ☐ Day Roost ☐ Nursery Roost ☐ Night Roost ☐ Unknown

Number of roosts _____

Roost feature: (check all that apply)

☐ Crack/crevice/expansion joint: underside of bridge ☐ Crack/crevice/expansion joint: top side of bridge

☐ Plugged drain ☐ Under/along the main bridge structure ☐ Rail ☐ Other:_____

Human disturbance or traffic under bridge or at structure? ■ High ☐ Low ☐ None

Evidence of bats using bird nests? ☐ Yes ■ No (if yes, please describe and photograph nest location)

Areas Inspected: (check all that apply)

■ Vertical surfaces on I-beams ■ Vertical surfaces between concrete end walls and bridge deck

☐ Expansion joints ■ Rough surfaces ☐ Guardrails ☐ Crevices ☐ Other:_____

Areas NOT Inspected because of safety or inaccessibility:
Some of the middle sections of the bridge were not sampled due to I71/I75 traffic.

Additional Comments / Sketch:
This section of I71/I75 is very busy throughout the day and well into the night.

BATS IN BRIDGES DATASHEET

KYTC Structure ID 059B00041N **KYTC Item No** 6-17

Bridge Location: West 5th Street over I-75

County: Boone **Lat:** 39.051303 **Long:** -84.551011

Date: 8/3/2022 **Time of Survey:** 1:25 pm **Investigator Name(s):** Todd McDaniel

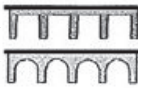
Bridge Type: (check one)

☐ Parallel Box Beam 

☐ Steel I-beam 

☐ Pre-stressed Girder 

☐ Flat Slab / Box 

☑ Cast in Place 

☐ Trapezoidal Box 

☐ Culvert – Box

☐ Culvert – Pipe/Round ☐ Other: _____

Underdeck Material:

☑ Concrete

☐ Corrugated Steel

☐ Other: _____

Road Type: (check one) ☐ Interstate ☐ U.S. Highway ☐ State Road ■ County Road

Surrounding Habitat: (check all that apply)

■ Residential ☐ Row Crop ■ Commercial ☐ Woodland ■ Grassland ☐ Pasture ☐ Riparian ☐ Mixed ☐ Wetland

Conditions Under Bridge: (check all that apply)

☐ Bare ground /sediment ☐ Concrete ☐ Rip rap ☐ Flowing water ☐ Standing water

☐ Open vegetation (not obstructing flight path) ☐ Closed vegetation (may obstruct flight path)

■ Two lane road ☐ Four (or more) lane highway ☐ Dirt road ☐ Railroad

☐ Evidence of superstructure flooding Bridge height above water: _____

Bat indicators: (check all that apply) ☐ Visual ☐ Smell ☐ Sound ☐ Staining ☐ Guano ■ None

Use intensity: (check one) ☐ Minor (scattered, individual guano pellets and/or few small areas of staining covering <1 ft each - few bats or temporary usage)

☐ Major (guano piles and/or large areas of staining covering >1 ft each – semi permanent colony)

Bats Present: ☐ YES ■ NO

BATS IN BRIDGES DATASHEET

Species Present (record number of individuals if known)

_____ Myotis septentrionalis (Northern long-eared)
_____ Myotis sodalis (Indiana)
_____ Myotis leibii (Eastern small-footed)
_____ Myotis lucifugus (Little brown)
_____ Myotis grisescens (Gray)
_____ Myotis austroriparius (Southeastern)
_____ Lasiurus cinereus (Hoary)
_____ Lasiurus borealis (Eastern red)
_____ Lasiurus seminolus (Seminole)
_____ Lasiurus noctivagans (Silver-haired)
_____ Perimyotis subflavus (Tri-colored)
_____ Eptesicus fuscus (Big brown)
_____ Nycticeius humeralis (Evening)
_____ Tadarida brasiliensis (Braz. free-tailed)
_____ Corynorhinus t. townsendii (Virginia)
_____ Corynorhinus rafinesquii (Rafinesque's)
_____ UNKNOWN

Roost description (If known, check all that apply): ☐ Day Roost ☐ Nursery Roost ☐ Night Roost ☐ Unknown

Number of roosts _____

Roost feature: (check all that apply)

☐ Crack/crevice/expansion joint: underside of bridge ☐ Crack/crevice/expansion joint: top side of bridge

☐ Plugged drain ☐ Under/along the main bridge structure ☐ Rail ☐ Other:_____

Human disturbance or traffic under bridge or at structure? ■ High ☐ Low ☐ None

Evidence of bats using bird nests? ☐ Yes ■ No (if yes, please describe and photograph nest location)

Areas Inspected: (check all that apply)

■ Vertical surfaces on I-beams ■ Vertical surfaces between concrete end walls and bridge deck

☐ Expansion joints ■ Rough surfaces ☐ Guardrails ☐ Crevices ☐ Other:_____

Areas NOT Inspected because of safety or inaccessibility:
Some of the middle sections of the bridge were not sampled due to I71/I75 traffic.

Additional Comments / Sketch:
This section of I71/I75 is very busy throughout the day and well into the night.

BATS IN BRIDGES DATASHEET

KYTC Structure ID 059B00043L/059B00043R **KYTC Item No** 6-17

Bridge Location: I-75 over Rivard Rd.

County: Boone **Lat:** 39.056431 **Long:** -84.542825

Date: 8/3/2022 **Time of Survey:** 9:35am **Investigator Name(s):** Todd McDaniel

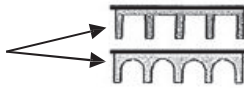
Bridge Type: (check one)

☐ Parallel Box Beam 

☐ Steel I-beam 

☑ Pre-stressed Girder 

☐ Flat Slab / Box 

☐ Cast in Place 

☐ Trapezoidal Box 

☐ Culvert – Box

☐ Culvert – Pipe/Round ☐ Other: _____

Underdeck Material:

☑ Concrete

☐ Corrugated Steel

☐ Other: _____

Road Type: (check one) ■ Interstate ☐ U.S. Highway ☐ State Road ☐ County Road

Surrounding Habitat: (check all that apply)

■ Residential ☐ Row Crop ■ Commercial ☐ Woodland ☐ Grassland ☐ Pasture ☐ Riparian ☐ Mixed ☐ Wetland

Conditions Under Bridge: (check all that apply)

☐ Bare ground /sediment ☐ Concrete ☐ Rip rap ☐ Flowing water ☐ Standing water

☐ Open vegetation (not obstructing flight path) ☐ Closed vegetation (may obstruct flight path)

■ Two lane road ☐ Four (or more) lane highway ☐ Dirt road ☐ Railroad

☐ Evidence of superstructure flooding Bridge height above water: _____

Bat indicators: (check all that apply) ☐ Visual ☐ Smell ☐ Sound ☐ Staining ☐ Guano ■ None

Use intensity: (check one) ☐ Minor (scattered, individual guano pellets and/or few small areas of staining covering <1 ft each - few bats or temporary usage)

☐ Major (guano piles and/or large areas of staining covering >1 ft each – semi permanent colony)

Bats Present: ☐ YES ■ NO

BATS IN BRIDGES DATASHEET

Species Present (record number of individuals if known)

_____ Myotis septentrionalis (Northern long-eared)
_____ Myotis sodalis (Indiana)
_____ Myotis leibii (Eastern small-footed)
_____ Myotis lucifugus (Little brown)
_____ Myotis grisescens (Gray)
_____ Myotis austroriparius (Southeastern)
_____ Lasiurus cinereus (Hoary)
_____ Lasiurus borealis (Eastern red)
_____ Lasiurus seminolus (Seminole)
_____ Lasiurus noctivagans (Silver-haired)
_____ Perimyotis subflavus (Tri-colored)
_____ Eptesicus fuscus (Big brown)
_____ Nycticeius humeralis (Evening)
_____ Tadarida brasiliensis (Braz. free-tailed)
_____ Corynorhinus t. townsendii (Virginia)
_____ Corynorhinus rafinesquii (Rafinesque's)
_____ UNKNOWN

Roost description (If known, check all that apply): ☐ Day Roost ☐ Nursery Roost ☐ Night Roost ☐ Unknown

Number of roosts _____

Roost feature: (check all that apply)

☐ Crack/crevice/expansion joint: underside of bridge ☐ Crack/crevice/expansion joint: top side of bridge

☐ Plugged drain ☐ Under/along the main bridge structure ☐ Rail ☐ Other:_____

Human disturbance or traffic under bridge or at structure? ■ High ☐ Low ☐ None

Evidence of bats using bird nests? ☐ Yes ■ No (if yes, please describe and photograph nest location)

Areas Inspected: (check all that apply)

■ Vertical surfaces on I-beams ■ Vertical surfaces between concrete end walls and bridge deck

☐ Expansion joints ■ Rough surfaces ☐ Guardrails ☐ Crevices ☐ Other:_____

Areas NOT Inspected because of safety or inaccessibility:
Some of the middle sections of the bridge were not surveyed due to I71/I75 traffic.

Additional Comments / Sketch:

BATS IN BRIDGES DATASHEET

KYTC Structure ID 059B00044L/059B00044R **KYTC Item No** 6-17

Bridge Location: I75 over Martin Luther King Blvd and Pike St.

County: Boone **Lat:** 39.075986 **Long:** -84.519656

Date: 8/3/2022 **Time of Survey:** 10:30am **Investigator Name(s):** Todd McDaniel

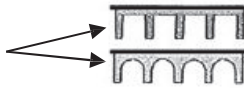
Bridge Type: (check one)

☐ Parallel Box Beam 

☐ Steel I-beam 

☑ Pre-stressed Girder 

☐ Flat Slab / Box 

☐ Cast in Place 

☐ Trapezoidal Box 

☐ Culvert – Box

☐ Culvert – Pipe/Round ☐ Other: _____

Underdeck Material:

☑ Concrete

☐ Corrugated Steel

☐ Other: _____

Road Type: (check one) ■ Interstate ☐ U.S. Highway ☐ State Road ☐ County Road

Surrounding Habitat: (check all that apply)

■ Residential ☐ Row Crop ■ Commercial ☐ Woodland ☐ Grassland ☐ Pasture ☐ Riparian ☐ Mixed ☐ Wetland

Conditions Under Bridge: (check all that apply)

☐ Bare ground /sediment ■ Concrete ■ Rip rap ☐ Flowing water ☐ Standing water

☐ Open vegetation (not obstructing flight path) ☐ Closed vegetation (may obstruct flight path)

■ Two lane road ☐ Four (or more) lane highway ☐ Dirt road ☐ Railroad

☐ Evidence of superstructure flooding Bridge height above water: _____

Bat indicators: (check all that apply) ☐ Visual ☐ Smell ☐ Sound ☐ Staining ☐ Guano ■ None

Use intensity: (check one) ☐ Minor (scattered, individual guano pellets and/or few small areas of staining covering <1 ft each - few bats or temporary usage)

☐ Major (guano piles and/or large areas of staining covering >1 ft each – semi permanent colony)

Bats Present: ☐ YES ■ NO

BATS IN BRIDGES DATASHEET

Species Present (record number of individuals if known)

_____ Myotis septentrionalis (Northern long-eared)
_____ Myotis sodalis (Indiana)
_____ Myotis leibii (Eastern small-footed)
_____ Myotis lucifugus (Little brown)
_____ Myotis grisescens (Gray)
_____ Myotis austroriparius (Southeastern)
_____ Lasiurus cinereus (Hoary)
_____ Lasiurus borealis (Eastern red)
_____ Lasiurus seminolus (Seminole)
_____ Lasiurus noctivagans (Silver-haired)
_____ Perimyotis subflavus (Tri-colored)
_____ Eptesicus fuscus (Big brown)
_____ Nycticeius humeralis (Evening)
_____ Tadarida brasiliensis (Braz. free-tailed)
_____ Corynorhinus t. townsendii (Virginia)
_____ Corynorhinus rafinesquii (Rafinesque's)
_____ UNKNOWN

Roost description (If known, check all that apply): ☐ Day Roost ☐ Nursery Roost ☐ Night Roost ☐ Unknown

Number of roosts _____

Roost feature: (check all that apply)

☐ Crack/crevice/expansion joint: underside of bridge ☐ Crack/crevice/expansion joint: top side of bridge

☐ Plugged drain ☐ Under/along the main bridge structure ☐ Rail ☐ Other:_____

Human disturbance or traffic under bridge or at structure? ■ High ☐ Low ☐ None

Evidence of bats using bird nests? ☐ Yes ■ No (if yes, please describe and photograph nest location)

Areas Inspected: (check all that apply)

■ Vertical surfaces on I-beams ■ Vertical surfaces between concrete end walls and bridge deck

☐ Expansion joints ■ Rough surfaces ☐ Guardrails ☐ Crevices ☐ Other:_____

Areas NOT Inspected because of safety or inaccessibility:
Some of the middle sections of the bridge were not surveyed due to I71/I75 traffic.

Additional Comments / Sketch:
There are numerous roads and a parking lot under this bridge.

BATS IN BRIDGES DATASHEET

KYTC Structure ID 059B00044L **KYTC Item No** 6-17

Bridge Location: I-71 over US-25/US-42

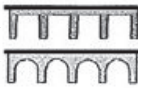
County: Boone **Lat:** 39.077291055290395 **Long:** -84.52034773135026

Date: 8/3/2022 **Time of Survey:** 12:40 pm **Investigator Name(s):** Todd McDaniel

Bridge Type: (check one)

☐ Parallel Box Beam 

☑ Pre-stressed Girder 

☐ Cast in Place 

☐ Culvert – Box

☐ Steel I-beam 

☐ Flat Slab / Box 

☐ Trapezoidal Box 

☐ Culvert – Pipe/Round ☐ Other: _____

Underdeck Material:

☐ Concrete

☑ Corrugated Steel

☐ Other: _____

Road Type: (check one) ■ Interstate ☐ U.S. Highway ☐ State Road ☐ County Road

Surrounding Habitat: (check all that apply)

■ Residential ☐ Row Crop ■ Commercial ☐ Woodland ■ Grassland ☐ Pasture ☐ Riparian ☐ Mixed ☐ Wetland

Conditions Under Bridge: (check all that apply)

☐ Bare ground /sediment ☐ Concrete ☐ Rip rap ☐ Flowing water ☐ Standing water

☐ Open vegetation (not obstructing flight path) ☐ Closed vegetation (may obstruct flight path)

■ Two lane road ☐ Four (or more) lane highway ☐ Dirt road ☐ Railroad

☐ Evidence of superstructure flooding Bridge height above water: _____

Bat indicators: (check all that apply) ☐ Visual ☐ Smell ☐ Sound ☐ Staining ☐ Guano ■ None

Use intensity: (check one) ☐ Minor (scattered, individual guano pellets and/or few small areas of staining covering <1 ft each - few bats or temporary usage)

☐ Major (guano piles and/or large areas of staining covering >1 ft each – semi permanent colony)

Bats Present: ☐ YES ■ NO

BATS IN BRIDGES DATASHEET

Species Present (record number of individuals if known)

_____ Myotis septentrionalis (Northern long-eared)
_____ Myotis sodalis (Indiana)
_____ Myotis leibii (Eastern small-footed)
_____ Myotis lucifugus (Little brown)
_____ Myotis grisescens (Gray)
_____ Myotis austroriparius (Southeastern)
_____ Lasiurus cinereus (Hoary)
_____ Lasiurus borealis (Eastern red)
_____ Lasiurus seminolus (Seminole)
_____ Lasiurus noctivagans (Silver-haired)
_____ Perimyotis subflavus (Tri-colored)
_____ Eptesicus fuscus (Big brown)
_____ Nycticeius humeralis (Evening)
_____ Tadarida brasiliensis (Braz. free-tailed)
_____ Corynorhinus t. townsendii (Virginia)
_____ Corynorhinus rafinesquii (Rafinesque's)
_____ UNKNOWN

Roost description (If known, check all that apply): ☐ Day Roost ☐ Nursery Roost ☐ Night Roost ☐ Unknown

Number of roosts _____

Roost feature: (check all that apply)

☐ Crack/crevice/expansion joint: underside of bridge ☐ Crack/crevice/expansion joint: top side of bridge

☐ Plugged drain ☐ Under/along the main bridge structure ☐ Rail ☐ Other:_____

Human disturbance or traffic under bridge or at structure? ■ High ☐ Low ☐ None

Evidence of bats using bird nests? ☐ Yes ■ No (if yes, please describe and photograph nest location)

Areas Inspected: (check all that apply)

■ Vertical surfaces on I-beams ■ Vertical surfaces between concrete end walls and bridge deck

☐ Expansion joints ■ Rough surfaces ☐ Guardrails ☐ Crevices ☐ Other:_____

Areas NOT Inspected because of safety or inaccessibility:
Some of the middle sections of the bridge were not sampled due to I71/I75 traffic.

Additional Comments / Sketch:
This section of I71/I75 is very busy throughout the day and well into the night.

BATS IN BRIDGES DATASHEET

KYTC Structure ID 059B00044R **KYTC Item No** 6-17

Bridge Location: I-75 over US-25/US-42

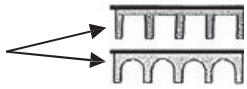
County: Boone **Lat:** 39.07732933585763 **Long:** -84.52010875871123

Date: 8/3/2022 **Time of Survey:** 12:40 pm **Investigator Name(s):** Todd McDaniel

Bridge Type: (check one)

☐ Parallel Box Beam 

☑ Pre-stressed Girder 

☐ Cast in Place 

☐ Culvert – Box

☐ Steel I-beam 

☐ Flat Slab / Box 

☐ Trapezoidal Box 

☐ Culvert – Pipe/Round ☐ Other: _____

Underdeck Material:

☐ Concrete

☑ Corrugated Steel

☐ Other: _____

Road Type: (check one) ■ Interstate ☐ U.S. Highway ☐ State Road ☐ County Road

Surrounding Habitat: (check all that apply)

■ Residential ☐ Row Crop ■ Commercial ☐ Woodland ■ Grassland ☐ Pasture ☐ Riparian ☐ Mixed ☐ Wetland

Conditions Under Bridge: (check all that apply)

☐ Bare ground /sediment ☐ Concrete ☐ Rip rap ☐ Flowing water ☐ Standing water

☐ Open vegetation (not obstructing flight path) ☐ Closed vegetation (may obstruct flight path)

■ Two lane road ☐ Four (or more) lane highway ☐ Dirt road ☐ Railroad

☐ Evidence of superstructure flooding Bridge height above water: _____

Bat indicators: (check all that apply) ☐ Visual ☐ Smell ☐ Sound ☐ Staining ☐ Guano ■ None

Use intensity: (check one) ☐ Minor (scattered, individual guano pellets and/or few small areas of staining covering <1 ft each - few bats or temporary usage)

☐ Major (guano piles and/or large areas of staining covering >1 ft each – semi permanent colony)

Bats Present: ☐ YES ■ NO

BATS IN BRIDGES DATASHEET

Species Present (record number of individuals if known)

_____ Myotis septentrionalis (Northern long-eared)
_____ Myotis sodalis (Indiana)
_____ Myotis leibii (Eastern small-footed)
_____ Myotis lucifugus (Little brown)
_____ Myotis grisescens (Gray)
_____ Myotis austroriparius (Southeastern)
_____ Lasiurus cinereus (Hoary)
_____ Lasiurus borealis (Eastern red)
_____ Lasiurus seminolus (Seminole)
_____ Lasiurus noctivagans (Silver-haired)
_____ Perimyotis subflavus (Tri-colored)
_____ Eptesicus fuscus (Big brown)
_____ Nycticeius humeralis (Evening)
_____ Tadarida brasiliensis (Braz. free-tailed)
_____ Corynorhinus t. townsendii (Virginia)
_____ Corynorhinus rafinesquii (Rafinesque's)
_____ UNKNOWN

Roost description (If known, check all that apply): ☐ Day Roost ☐ Nursery Roost ☐ Night Roost ☐ Unknown

Number of roosts _____

Roost feature: (check all that apply)

☐ Crack/crevice/expansion joint: underside of bridge ☐ Crack/crevice/expansion joint: top side of bridge

☐ Plugged drain ☐ Under/along the main bridge structure ☐ Rail ☐ Other:_____

Human disturbance or traffic under bridge or at structure? ■ High ☐ Low ☐ None

Evidence of bats using bird nests? ☐ Yes ■ No (if yes, please describe and photograph nest location)

Areas Inspected: (check all that apply)

■ Vertical surfaces on I-beams ■ Vertical surfaces between concrete end walls and bridge deck

☐ Expansion joints ■ Rough surfaces ☐ Guardrails ☐ Crevices ☐ Other:_____

Areas NOT Inspected because of safety or inaccessibility:
Some of the middle sections of the bridge were not sampled due to I71/I75 traffic.

Additional Comments / Sketch:
This section of I71/I75 is very busy throughout the day and well into the night.

BATS IN BRIDGES DATASHEET

KYTC Structure ID 059B00047N **KYTC Item No** 6-17

Bridge Location: Kyles Ln over I-75

County: Boone **Lat:** 39.058903 **Long:** -84.538308

Date: 8/3/2022 **Time of Survey:** 10:00am **Investigator Name(s):** Todd McDaniel

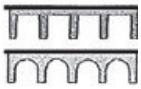
Bridge Type: (check one)

☐ Parallel Box Beam 

☐ Steel I-beam 

☑ Pre-stressed Girder 

☐ Flat Slab / Box 

☐ Cast in Place 

☐ Trapezoidal Box 

☐ Culvert – Box

☐ Culvert – Pipe/Round ☐ Other: _____

Underdeck Material:

☑ Concrete

☐ Corrugated Steel

☐ Other: _____

Road Type: (check one) ☐ Interstate ■ U.S. Highway ☐ State Road ☐ County Road

Surrounding Habitat: (check all that apply)

■ Residential ☐ Row Crop ■ Commercial ■ Woodland ☐ Grassland ☐ Pasture ☐ Riparian ☐ Mixed ☐ Wetland

Conditions Under Bridge: (check all that apply)

☐ Bare ground /sediment ■ Concrete ■ Rip rap ☐ Flowing water ☐ Standing water

☐ Open vegetation (not obstructing flight path) ☐ Closed vegetation (may obstruct flight path)

☐ Two lane road ■ Four (or more) lane highway ☐ Dirt road ☐ Railroad

☐ Evidence of superstructure flooding Bridge height above water: _____

Bat indicators: (check all that apply) ☐ Visual ☐ Smell ☐ Sound ☐ Staining ☐ Guano ■ None

Use intensity: (check one) ☐ Minor (scattered, individual guano pellets and/or few small areas of staining covering <1 ft each - few bats or temporary usage)

☐ Major (guano piles and/or large areas of staining covering >1 ft each – semi permanent colony)

Bats Present: ☐ YES ■ NO

BATS IN BRIDGES DATASHEET

Species Present (record number of individuals if known)

_____ Myotis septentrionalis (Northern long-eared)
_____ Myotis sodalis (Indiana)
_____ Myotis leibii (Eastern small-footed)
_____ Myotis lucifugus (Little brown)
_____ Myotis grisescens (Gray)
_____ Myotis austroriparius (Southeastern)
_____ Lasiurus cinereus (Hoary)
_____ Lasiurus borealis (Eastern red)
_____ Lasiurus seminolus (Seminole)
_____ Lasiurus noctivagans (Silver-haired)
_____ Perimyotis subflavus (Tri-colored)
_____ Eptesicus fuscus (Big brown)
_____ Nycticeius humeralis (Evening)
_____ Tadarida brasiliensis (Braz. free-tailed)
_____ Corynorhinus t. townsendii (Virginia)
_____ Corynorhinus rafinesquii (Rafinesque's)
_____ UNKNOWN

Roost description (If known, check all that apply): ☐ Day Roost ☐ Nursery Roost ☐ Night Roost ☐ Unknown

Number of roosts _____

Roost feature: (check all that apply)

☐ Crack/crevice/expansion joint: underside of bridge ☐ Crack/crevice/expansion joint: top side of bridge

☐ Plugged drain ☐ Under/along the main bridge structure ☐ Rail ☐ Other:_____

Human disturbance or traffic under bridge or at structure? ■ High ☐ Low ☐ None

Evidence of bats using bird nests? ☐ Yes ■ No (if yes, please describe and photograph nest location)

Areas Inspected: (check all that apply)

■ Vertical surfaces on I-beams ■ Vertical surfaces between concrete end walls and bridge deck

☐ Expansion joints ■ Rough surfaces ☐ Guardrails ☐ Crevices ☐ Other:_____

Areas NOT Inspected because of safety or inaccessibility:
Some of the middle sections of the bridge were not surveyed due to I71/I75 traffic.

Additional Comments / Sketch:

BATS IN BRIDGES DATASHEET

KYTC Structure ID 059B00087N **KYTC Item No** 6-17

Bridge Location: off ramp I-75 over on ramp I-75

County: Boone **Lat:** 39.07802075484109 **Long:** -84.52028666104017

Date: 8/3/2022 **Time of Survey:** 12:50 pm **Investigator Name(s):** Todd McDaniel

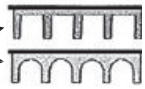
Bridge Type: (check one)

☐ Parallel Box Beam 

☐ Steel I-beam 

☑ Pre-stressed Girder 

☐ Flat Slab / Box 

☐ Cast in Place 

☐ Trapezoidal Box 

☐ Culvert – Box

☐ Culvert – Pipe/Round ☐ Other: _____

Underdeck Material:

☐ Concrete

☑ Corrugated Steel

☐ Other: _____

Road Type: (check one) ■ Interstate ☐ U.S. Highway ☐ State Road ☐ County Road

Surrounding Habitat: (check all that apply)

■ Residential ☐ Row Crop ■ Commercial ☐ Woodland ■ Grassland ☐ Pasture ☐ Riparian ☐ Mixed ☐ Wetland

Conditions Under Bridge: (check all that apply)

☐ Bare ground /sediment ☐ Concrete ☐ Rip rap ☐ Flowing water ☐ Standing water

☐ Open vegetation (not obstructing flight path) ☐ Closed vegetation (may obstruct flight path)

■ Two lane road ☐ Four (or more) lane highway ☐ Dirt road ☐ Railroad

☐ Evidence of superstructure flooding Bridge height above water: _____

Bat indicators: (check all that apply) ☐ Visual ☐ Smell ☐ Sound ☐ Staining ☐ Guano ■ None

Use intensity: (check one) ☐ Minor (scattered, individual guano pellets and/or few small areas of staining covering <1 ft each - few bats or temporary usage)

☐ Major (guano piles and/or large areas of staining covering >1 ft each – semi permanent colony)

Bats Present: ☐ YES ■ NO

BATS IN BRIDGES DATASHEET

Species Present (record number of individuals if known)

_____ Myotis septentrionalis (Northern long-eared)
_____ Myotis sodalis (Indiana)
_____ Myotis leibii (Eastern small-footed)
_____ Myotis lucifugus (Little brown)
_____ Myotis grisescens (Gray)
_____ Myotis austroriparius (Southeastern)
_____ Lasiurus cinereus (Hoary)
_____ Lasiurus borealis (Eastern red)
_____ Lasiurus seminolus (Seminole)
_____ Lasiurus noctivagans (Silver-haired)
_____ Perimyotis subflavus (Tri-colored)
_____ Eptesicus fuscus (Big brown)
_____ Nycticeius humeralis (Evening)
_____ Tadarida brasiliensis (Braz. free-tailed)
_____ Corynorhinus t. townsendii (Virginia)
_____ Corynorhinus rafinesquii (Rafinesque's)
_____ UNKNOWN

Roost description (If known, check all that apply): ☐ Day Roost ☐ Nursery Roost ☐ Night Roost ☐ Unknown

Number of roosts _____

Roost feature: (check all that apply)

☐ Crack/crevice/expansion joint: underside of bridge ☐ Crack/crevice/expansion joint: top side of bridge

☐ Plugged drain ☐ Under/along the main bridge structure ☐ Rail ☐ Other:_____

Human disturbance or traffic under bridge or at structure? ■ High ☐ Low ☐ None

Evidence of bats using bird nests? ☐ Yes ■ No (if yes, please describe and photograph nest location)

Areas Inspected: (check all that apply)

■ Vertical surfaces on I-beams ■ Vertical surfaces between concrete end walls and bridge deck

☐ Expansion joints ■ Rough surfaces ☐ Guardrails ☐ Crevices ☐ Other:_____

Areas NOT Inspected because of safety or inaccessibility:
Some of the middle sections of the bridge were not sampled due to I71/I75 traffic.

Additional Comments / Sketch:
This section of I71/I75 is very busy throughout the day and well into the night.

BATS IN BRIDGES DATASHEET

KYTC Structure ID 059B00088N **KYTC Item No** 6-17

Bridge Location: I-75 over West 9th Street

County: Boone **Lat:** 39.07924554860853 **Long:** -84.52112741237464

Date: 8/3/2022 **Time of Survey:** 1:00 pm **Investigator Name(s):** Todd McDaniel

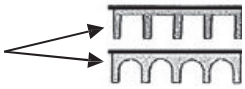
Bridge Type: (check one)

☐ Parallel Box Beam 

☐ Steel I-beam 

☑ Pre-stressed Girder 

☐ Flat Slab / Box 

☐ Cast in Place 

☐ Trapezoidal Box 

☐ Culvert – Box

☐ Culvert – Pipe/Round ☐ Other: _____

Underdeck Material:

☐ Concrete

☑ Corrugated Steel

☐ Other: _____

Road Type: (check one) ■ Interstate ☐ U.S. Highway ☐ State Road ☐ County Road

Surrounding Habitat: (check all that apply)

■ Residential ☐ Row Crop ■ Commercial ☐ Woodland ■ Grassland ☐ Pasture ☐ Riparian ☐ Mixed ☐ Wetland

Conditions Under Bridge: (check all that apply)

☐ Bare ground /sediment ☐ Concrete ☐ Rip rap ☐ Flowing water ☐ Standing water

☐ Open vegetation (not obstructing flight path) ☐ Closed vegetation (may obstruct flight path)

■ Two lane road ☐ Four (or more) lane highway ☐ Dirt road ☐ Railroad

☐ Evidence of superstructure flooding Bridge height above water: _____

Bat indicators: (check all that apply) ☐ Visual ☐ Smell ☐ Sound ☐ Staining ☐ Guano ■ None

Use intensity: (check one) ☐ Minor (scattered, individual guano pellets and/or few small areas of staining covering <1 ft each - few bats or temporary usage)

☐ Major (guano piles and/or large areas of staining covering >1 ft each – semi permanent colony)

Bats Present: ☐ YES ■ NO

BATS IN BRIDGES DATASHEET

Species Present (record number of individuals if known)

_____ Myotis septentrionalis (Northern long-eared)
_____ Myotis sodalis (Indiana)
_____ Myotis leibii (Eastern small-footed)
_____ Myotis lucifugus (Little brown)
_____ Myotis grisescens (Gray)
_____ Myotis austroriparius (Southeastern)
_____ Lasiurus cinereus (Hoary)
_____ Lasiurus borealis (Eastern red)
_____ Lasiurus seminolus (Seminole)
_____ Lasiurus noctivagans (Silver-haired)
_____ Perimyotis subflavus (Tri-colored)
_____ Eptesicus fuscus (Big brown)
_____ Nycticeius humeralis (Evening)
_____ Tadarida brasiliensis (Braz. free-tailed)
_____ Corynorhinus t. townsendii (Virginia)
_____ Corynorhinus rafinesquii (Rafinesque's)
_____ UNKNOWN

Roost description (If known, check all that apply): ☐ Day Roost ☐ Nursery Roost ☐ Night Roost ☐ Unknown

Number of roosts _____

Roost feature: (check all that apply)

☐ Crack/crevice/expansion joint: underside of bridge ☐ Crack/crevice/expansion joint: top side of bridge

☐ Plugged drain ☐ Under/along the main bridge structure ☐ Rail ☐ Other:_____

Human disturbance or traffic under bridge or at structure? ■ High ☐ Low ☐ None

Evidence of bats using bird nests? ☐ Yes ■ No (if yes, please describe and photograph nest location)

Areas Inspected: (check all that apply)

■ Vertical surfaces on I-beams ■ Vertical surfaces between concrete end walls and bridge deck

☐ Expansion joints ■ Rough surfaces ☐ Guardrails ☐ Crevices ☐ Other:_____

Areas NOT Inspected because of safety or inaccessibility:
Some of the middle sections of the bridge were not sampled due to I71/I75 traffic.

Additional Comments / Sketch:
This section of I71/I75 is very busy throughout the day and well into the night.

BATS IN BRIDGES DATASHEET

KYTC Structure ID 059B00089N **KYTC Item No** 6-17

Bridge Location: I-75 over West 9th Street

County: Boone **Lat:** 39.07919974170622 **Long:** -84.52125079399345

Date: 8/3/2022 **Time of Survey:** 1:08 pm **Investigator Name(s):** Todd McDaniel

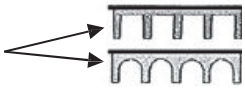
Bridge Type: (check one)

☐ Parallel Box Beam 

☐ Steel I-beam 

☑ Pre-stressed Girder 

☐ Flat Slab / Box 

☐ Cast in Place 

☐ Trapezoidal Box 

☐ Culvert – Box

☐ Culvert – Pipe/Round ☐ Other: _____

Underdeck Material:

☐ Concrete

☑ Corrugated Steel

☐ Other: _____

Road Type: (check one) ■ Interstate ☐ U.S. Highway ☐ State Road ☐ County Road

Surrounding Habitat: (check all that apply)

■ Residential ☐ Row Crop ■ Commercial ☐ Woodland ■ Grassland ☐ Pasture ☐ Riparian ☐ Mixed ☐ Wetland

Conditions Under Bridge: (check all that apply)

☐ Bare ground /sediment ☐ Concrete ☐ Rip rap ☐ Flowing water ☐ Standing water

☐ Open vegetation (not obstructing flight path) ☐ Closed vegetation (may obstruct flight path)

■ Two lane road ☐ Four (or more) lane highway ☐ Dirt road ☐ Railroad

☐ Evidence of superstructure flooding Bridge height above water: _____

Bat indicators: (check all that apply) ☐ Visual ☐ Smell ☐ Sound ☐ Staining ☐ Guano ■ None

Use intensity: (check one) ☐ Minor (scattered, individual guano pellets and/or few small areas of staining covering <1 ft each - few bats or temporary usage)

☐ Major (guano piles and/or large areas of staining covering >1 ft each – semi permanent colony)

Bats Present: ☐ YES ■ NO

BATS IN BRIDGES DATASHEET

Species Present (record number of individuals if known)

_____ Myotis septentrionalis (Northern long-eared)
_____ Myotis sodalis (Indiana)
_____ Myotis leibii (Eastern small-footed)
_____ Myotis lucifugus (Little brown)
_____ Myotis grisescens (Gray)
_____ Myotis austroriparius (Southeastern)
_____ Lasiurus cinereus (Hoary)
_____ Lasiurus borealis (Eastern red)
_____ Lasiurus seminolus (Seminole)
_____ Lasiurus noctivagans (Silver-haired)
_____ Perimyotis subflavus (Tri-colored)
_____ Eptesicus fuscus (Big brown)
_____ Nycticeius humeralis (Evening)
_____ Tadarida brasiliensis (Braz. free-tailed)
_____ Corynorhinus t. townsendii (Virginia)
_____ Corynorhinus rafinesquii (Rafinesque's)
_____ UNKNOWN

Roost description (If known, check all that apply): ☐ Day Roost ☐ Nursery Roost ☐ Night Roost ☐ Unknown

Number of roosts _____

Roost feature: (check all that apply)

☐ Crack/crevice/expansion joint: underside of bridge ☐ Crack/crevice/expansion joint: top side of bridge

☐ Plugged drain ☐ Under/along the main bridge structure ☐ Rail ☐ Other:_____

Human disturbance or traffic under bridge or at structure? ■ High ☐ Low ☐ None

Evidence of bats using bird nests? ☐ Yes ■ No (if yes, please describe and photograph nest location)

Areas Inspected: (check all that apply)

■ Vertical surfaces on I-beams ■ Vertical surfaces between concrete end walls and bridge deck

☐ Expansion joints ■ Rough surfaces ☐ Guardrails ☐ Crevices ☐ Other:_____

Areas NOT Inspected because of safety or inaccessibility:
Some of the middle sections of the bridge were not sampled due to I71/I75 traffic.

Additional Comments / Sketch:
This section of I71/I75 is very busy throughout the day and well into the night.

BATS IN BRIDGES DATASHEET

KYTC Structure ID 059B00090N **KYTC Item No** 6-17

Bridge Location: I-75 over West 9th Street

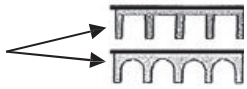
County: Boone **Lat:** 39.07891657110444 **Long:** -84.52187306650566

Date: 8/3/2022 **Time of Survey:** 1:20 pm **Investigator Name(s):** Todd McDaniel

Bridge Type: (check one)

☐ Parallel Box Beam 

☑ Pre-stressed Girder 

☐ Cast in Place 

☐ Culvert – Box

☐ Steel I-beam 

☐ Flat Slab / Box 

☐ Trapezoidal Box 

☐ Culvert – Pipe/Round ☐ Other: _____

Underdeck Material:

☐ Concrete

☑ Corrugated Steel

☐ Other: _____

Road Type: (check one) ■ Interstate ☐ U.S. Highway ☐ State Road ☐ County Road

Surrounding Habitat: (check all that apply)

■ Residential ☐ Row Crop ■ Commercial ☐ Woodland ■ Grassland ☐ Pasture ☐ Riparian ☐ Mixed ☐ Wetland

Conditions Under Bridge: (check all that apply)

☐ Bare ground /sediment ☐ Concrete ☐ Rip rap ☐ Flowing water ☐ Standing water

☐ Open vegetation (not obstructing flight path) ☐ Closed vegetation (may obstruct flight path)

■ Two lane road ☐ Four (or more) lane highway ☐ Dirt road ☐ Railroad

☐ Evidence of superstructure flooding Bridge height above water: _____

Bat indicators: (check all that apply) ☐ Visual ☐ Smell ☐ Sound ☐ Staining ☐ Guano ■ None

Use intensity: (check one) ☐ Minor (scattered, individual guano pellets and/or few small areas of staining covering <1 ft each - few bats or temporary usage)

☐ Major (guano piles and/or large areas of staining covering >1 ft each – semi permanent colony)

Bats Present: ☐ YES ■ NO

BATS IN BRIDGES DATASHEET

Species Present (record number of individuals if known)

_____ Myotis septentrionalis (Northern long-eared)
_____ Myotis sodalis (Indiana)
_____ Myotis leibii (Eastern small-footed)
_____ Myotis lucifugus (Little brown)
_____ Myotis grisescens (Gray)
_____ Myotis austroriparius (Southeastern)
_____ Lasiurus cinereus (Hoary)
_____ Lasiurus borealis (Eastern red)
_____ Lasiurus seminolus (Seminole)
_____ Lasiurus noctivagans (Silver-haired)
_____ Perimyotis subflavus (Tri-colored)
_____ Eptesicus fuscus (Big brown)
_____ Nycticeius humeralis (Evening)
_____ Tadarida brasiliensis (Braz. free-tailed)
_____ Corynorhinus t. townsendii (Virginia)
_____ Corynorhinus rafinesquii (Rafinesque's)
_____ UNKNOWN

Roost description (If known, check all that apply): ☐ Day Roost ☐ Nursery Roost ☐ Night Roost ☐ Unknown

Number of roosts _____

Roost feature: (check all that apply)

☐ Crack/crevice/expansion joint: underside of bridge ☐ Crack/crevice/expansion joint: top side of bridge

☐ Plugged drain ☐ Under/along the main bridge structure ☐ Rail ☐ Other:_____

Human disturbance or traffic under bridge or at structure? ■ High ☐ Low ☐ None

Evidence of bats using bird nests? ☐ Yes ■ No (if yes, please describe and photograph nest location)

Areas Inspected: (check all that apply)

■ Vertical surfaces on I-beams ■ Vertical surfaces between concrete end walls and bridge deck

☐ Expansion joints ■ Rough surfaces ☐ Guardrails ☐ Crevices ☐ Other:_____

Areas NOT Inspected because of safety or inaccessibility:
Some of the middle sections of the bridge were not sampled due to I71/I75 traffic.

Additional Comments / Sketch:
This section of I71/I75 is very busy throughout the day and well into the night.

BATS IN BRIDGES DATASHEET

KYTC Structure ID 059B00099N **KYTC Item No** 6-17

Bridge Location: US 25 over I-75

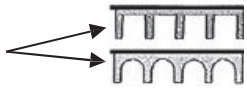
County: Boone **Lat:** 39.051303 **Long:** -84.551011

Date: 8/3/2022 **Time of Survey:** 9:00 am **Investigator Name(s):** Todd McDaniel

Bridge Type: (check one)

☐ Parallel Box Beam 

☑ Pre-stressed Girder 

☐ Cast in Place 

☐ Culvert – Box

☐ Steel I-beam 

☐ Flat Slab / Box 

☐ Trapezoidal Box 

☐ Culvert – Pipe/Round ☐ Other: _____

Underdeck Material:

☐ Concrete

☑ Corrugated Steel

☐ Other: _____

Road Type: (check one) ☐ Interstate ■ U.S. Highway ☐ State Road ☐ County Road

Surrounding Habitat: (check all that apply)

■ Residential ☐ Row Crop ■ Commercial ☐ Woodland ■ Grassland ☐ Pasture ☐ Riparian ☐ Mixed ☐ Wetland

Conditions Under Bridge: (check all that apply)

☐ Bare ground /sediment ☐ Concrete ☐ Rip rap ☐ Flowing water ☐ Standing water

☐ Open vegetation (not obstructing flight path) ☐ Closed vegetation (may obstruct flight path)

☐ Two lane road ■ Four (or more) lane highway ☐ Dirt road ☐ Railroad

☐ Evidence of superstructure flooding Bridge height above water: _____

Bat indicators: (check all that apply) ☐ Visual ☐ Smell ☐ Sound ☐ Staining ☐ Guano ■ None

Use intensity: (check one) ☐ Minor (scattered, individual guano pellets and/or few small areas of staining covering <1 ft each - few bats or temporary usage)

☐ Major (guano piles and/or large areas of staining covering >1 ft each – semi permanent colony)

Bats Present: ☐ YES ■ NO

BATS IN BRIDGES DATASHEET

Species Present (record number of individuals if known)

_____ Myotis septentrionalis (Northern long-eared)
_____ Myotis sodalis (Indiana)
_____ Myotis leibii (Eastern small-footed)
_____ Myotis lucifugus (Little brown)
_____ Myotis grisescens (Gray)
_____ Myotis austroriparius (Southeastern)
_____ Lasiurus cinereus (Hoary)
_____ Lasiurus borealis (Eastern red)
_____ Lasiurus seminolus (Seminole)
_____ Lasiurus noctivagans (Silver-haired)
_____ Perimyotis subflavus (Tri-colored)
_____ Eptesicus fuscus (Big brown)
_____ Nycticeius humeralis (Evening)
_____ Tadarida brasiliensis (Braz. free-tailed)
_____ Corynorhinus t. townsendii (Virginia)
_____ Corynorhinus rafinesquii (Rafinesque's)
_____ UNKNOWN

Roost description (If known, check all that apply): ☐ Day Roost ☐ Nursery Roost ☐ Night Roost ☐ Unknown

Number of roosts _____

Roost feature: (check all that apply)

☐ Crack/crevice/expansion joint: underside of bridge ☐ Crack/crevice/expansion joint: top side of bridge

☐ Plugged drain ☐ Under/along the main bridge structure ☐ Rail ☐ Other:_____

Human disturbance or traffic under bridge or at structure? ■ High ☐ Low ☐ None

Evidence of bats using bird nests? ☐ Yes ■ No (if yes, please describe and photograph nest location)

Areas Inspected: (check all that apply)

■ Vertical surfaces on I-beams ■ Vertical surfaces between concrete end walls and bridge deck

☐ Expansion joints ■ Rough surfaces ☐ Guardrails ☐ Crevices ☐ Other:_____

Areas NOT Inspected because of safety or inaccessibility:
Some of the middle sections of the bridge were not sampled due to I71/I75 traffic.

Additional Comments / Sketch:
This section of I71/I75 is very busy throughout the day and well into the night.

BATS IN BRIDGES DATASHEET

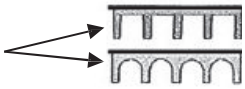
KYTC Structure ID 059B00100L/059B00100R **KYTC Item No** 6-17

Bridge Location: I-75 over East Orchard Rd.

County: Boone **Lat:** 39.053092 **Long:** -84.547186

Date: 8/3/2022 **Time of Survey:** 9:15am **Investigator Name(s):** Todd McDaniel

Bridge Type: (check one)

☐ Parallel Box Beam 
☐ Steel I-beam 
☑ Pre-stressed Girder 
☐ Flat Slab / Box 
☐ Cast in Place 
☐ Trapezoidal Box 
☐ Culvert – Box
☐ Culvert – Pipe/Round ☐ Other: _____

Underdeck Material:

☐ Concrete
☑ Corrugated Steel
☐ Other: _____

Road Type: (check one) ■ Interstate ☐ U.S. Highway ☐ State Road ☐ County Road

Surrounding Habitat: (check all that apply)

■ Residential ☐ Row Crop ■ Commercial ☐ Woodland ☐ Grassland ☐ Pasture ☐ Riparian ☐ Mixed ☐ Wetland

Conditions Under Bridge: (check all that apply)

☐ Bare ground /sediment ☐ Concrete ☐ Rip rap ☐ Flowing water ☐ Standing water

☐ Open vegetation (not obstructing flight path) ☐ Closed vegetation (may obstruct flight path)

■ Two lane road ☐ Four (or more) lane highway ☐ Dirt road ☐ Railroad

☐ Evidence of superstructure flooding Bridge height above water: _____

Bat indicators: (check all that apply) ☐ Visual ☐ Smell ☐ Sound ☐ Staining ☐ Guano ■ None

Use intensity: (check one) ☐ Minor (scattered, individual guano pellets and/or few small areas of staining covering <1 ft each - few bats or temporary usage)
☐ Major (guano piles and/or large areas of staining covering >1 ft each – semi permanent colony)

Bats Present: ☐ YES ■ NO

BATS IN BRIDGES DATASHEET

Species Present (record number of individuals if known)

_____ Myotis septentrionalis (Northern long-eared)
_____ Myotis sodalis (Indiana)
_____ Myotis leibii (Eastern small-footed)
_____ Myotis lucifugus (Little brown)
_____ Myotis grisescens (Gray)
_____ Myotis austroriparius (Southeastern)
_____ Lasiurus cinereus (Hoary)
_____ Lasiurus borealis (Eastern red)
_____ Lasiurus seminolus (Seminole)
_____ Lasiurus noctivagans (Silver-haired)
_____ Perimyotis subflavus (Tri-colored)
_____ Eptesicus fuscus (Big brown)
_____ Nycticeius humeralis (Evening)
_____ Tadarida brasiliensis (Braz. free-tailed)
_____ Corynorhinus t. townsendii (Virginia)
_____ Corynorhinus rafinesquii (Rafinesque's)
_____ UNKNOWN

Roost description (If known, check all that apply): ☐ Day Roost ☐ Nursery Roost ☐ Night Roost ☐ Unknown

Number of roosts _____

Roost feature: (check all that apply)

☐ Crack/crevice/expansion joint: underside of bridge ☐ Crack/crevice/expansion joint: top side of bridge

☐ Plugged drain ☐ Under/along the main bridge structure ☐ Rail ☐ Other:_____

Human disturbance or traffic under bridge or at structure? ■ High ☐ Low ☐ None

Evidence of bats using bird nests? ☐ Yes ■ No (if yes, please describe and photograph nest location)

Areas Inspected: (check all that apply)

■ Vertical surfaces on I-beams ■ Vertical surfaces between concrete end walls and bridge deck

☐ Expansion joints ■ Rough surfaces ☐ Guardrails ☐ Crevices ☐ Other:_____

Areas NOT Inspected because of safety or inaccessibility:
Some of the middle sections of the bridge were not sampled due to I71/I75 traffic.

Additional Comments / Sketch:

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME PER 1		LOCATION Brent Spence	
STATION #_____ RIVERMILE_____		STREAM CLASS (PER ✓ INT EPH)	
LAT 39.0507863684 LONG -84.5598242488		RIVER BASIN Ohio	
STATION #		AGENCY KYTC	
INVESTIGATORS ELS, MTM			
FORM COMPLETED BY ELS	DATE 7/13/22 TIME 10:42 ✓ AM PM		REASON FOR SURVEY

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 ✓13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness (In riffles – estimated from 5 largest rocks in 4 quads)	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 ✓17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime (At Bankfull)	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	✓10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition (in pools)	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 ✓12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status (Bars must be covered to score high bankfull)	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 ✓9 8 7 6	5 4 3 2 1 0

3 Dominant Trees: _____

Bankfull Depth: 2' Bankfull Width: 10' Bankfull Area: _____

Max. Wetted Depth: 1' Avg. Wetted Depth: 3" Specific Conductivity: _____ Temp: _____

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 ✓13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 ✓7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0

Total Score 117

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME PER 1	LOCATION Brent Spence	
STATION #_____ RIVERMILE_____	STREAM CLASS (PER ✓ INT EPH)	
LAT 39.0507863684 LONG -84.5598242488	RIVER BASIN Ohio	
STATION #	AGENCY KYTC	
INVESTIGATORS ELS, MTM		
FORM COMPLETED BY ELS	DATE 7/13/22 TIME 10:42 ✓ AM PM	REASON FOR SURVEY

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 ✓13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness (In riffles – estimated from 5 largest rocks in 4 quads)	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 ✓17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime (At Bankfull)	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	✓10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition (in pools)	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 ✓12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status (Bars must be covered to score high bankfull)	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 ✓9 8 7 6	5 4 3 2 1 0

3 Dominant Trees: _____

Bankfull Depth: 2' Bankfull Width: 10' Bankfull Area: _____

Max. Wetted Depth: 1' Avg. Wetted Depth: 3" Specific Conductivity: _____ Temp: _____

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 ✓13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 ✓7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0

Total Score 117

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME	INT 14	LOCATION	Brent Spence
STATION #_____ RIVERMILE_____		STREAM CLASS (PER INT EPH)	
LAT 39.0522760047 LONG -84.5597287288		RIVER BASIN	Ohio
STATION #		AGENCY	KYTC
INVESTIGATORS	ELS, MTM		
FORM COMPLETED BY ELS	DATE 7/13/22 TIME 11:25 ✓ AM PM	REASON FOR SURVEY	

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 ✓14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness (In riffles – estimated from 5 largest rocks in 4 quads)	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 ✓8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime (At Bankfull)	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	✓10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition (in pools)	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 ✓7 6	5 4 3 2 1 0
5. Channel Flow Status (Bars must be covered to score high bankfull)	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 ✓1 0

3 Dominant Trees: _____

Bankfull Depth: _____1'_____ Bankfull Width: _____5'_____ Bankfull Area: _____

Max. Wetted Depth: ___2"___ Avg. Wetted Depth: ___<1"___ Specific Conductivity: _____ Temp: _____

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 ✓ 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	✓ 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 ✓ 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 ✓ 3	2 1 0

Total Score 84

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME PER 2	LOCATION Brent Spence	
STATION #_____ RIVERMILE_____	STREAM CLASS (PER ✓ INT EPH)	
LAT 39.0545682559 LONG -84.5439518003	RIVER BASIN Licking	
STATION #	AGENCY KYTC	
INVESTIGATORS ELS, MTM		
FORM COMPLETED BY ELS	DATE 7/13/22 TIME 1:02 AM ✓ PM	REASON FOR SURVEY

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 ✓14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness (In riffles – estimated from 5 largest rocks in 4 quads)	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 ✓14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime (At Bankfull)	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 ✓13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition (in pools)	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 ✓12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status (Bars must be covered to score high bankfull)	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 ✓6	5 4 3 2 1 0

3 Dominant Trees: _____

Bankfull Depth: 2' Bankfull Width: 8' Bankfull Area: _____

Max. Wetted Depth: 8" Avg. Wetted Depth: 8" Specific Conductivity: _____ Temp: _____

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 ✓7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	✓10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 ✓4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 ✓4 3	2 1 0

Total Score 108

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME	INT 15	LOCATION	Brent Spence
STATION #_____ RIVERMILE_____		STREAM CLASS (PER ✓ INT EPH)	
LAT 39.0564228861 LONG -84.5437087049		RIVER BASIN	Licking
STATION #		AGENCY	KYTC
INVESTIGATORS	ELS, MTM		
FORM COMPLETED BY ELS	DATE 7/13/22 TIME 1:21 AM ✓ PM	REASON FOR SURVEY	

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 ✓ 6	5 4 3 2 1 0
2. Embeddedness (In riffles – estimated from 5 largest rocks in 4 quads)	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 ✓ 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime (At Bankfull)	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	✓0 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition (in pools)	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 ✓ 7 6	5 4 3 2 1 0
5. Channel Flow Status (Bars must be covered to score high bankfull)	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 ✓ 2 1 0

3 Dominant Trees: _____

Bankfull Depth: 8" Bankfull Width: 4' Bankfull Area: _____

Max. Wetted Depth: 3" Avg. Wetted Depth: 1" Specific Conductivity: _____ Temp: _____

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 ✓7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 ✓6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	✓5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	✓5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 ✓3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 ✓3	2 1 0

Total Score 78

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME	INT 16	LOCATION	Brent Spence
STATION #_____ RIVERMILE_____		STREAM CLASS (PER INT EPH)	
LAT 39.0508944646 LONG -84.5570297104		RIVER BASIN	Ohio
STATION #		AGENCY	KYTC
INVESTIGATORS		ELS, MTM	
FORM COMPLETED BY ELS	DATE 7/14/22 TIME 10:20 ✓ AM PM	REASON FOR SURVEY	

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 ✓ 3 2 1 0
2. Embeddedness (In riffles – estimated from 5 largest rocks in 4 quads)	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 ✓ 1 0
3. Velocity/Depth Regime (At Bankfull)	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	✓0 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition (in pools)	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 ✓ 1 0
5. Channel Flow Status (Bars must be covered to score high bankfull)	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 ✓ 0

3 Dominant Trees: _____

Bankfull Depth: _____1'_____ Bankfull Width: _____6'_____ Bankfull Area: _____

Max. Wetted Depth: ___3"___ Avg. Wetted Depth: ___1"___ Specific Conductivity: _____ Temp: _____

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 ✓8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 ✓6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	✓5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	✓5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	✓5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	✓5 4 3	2 1 0

Total Score 65

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME	INT 17	LOCATION	Brent Spence
STATION #_____ RIVERMILE_____		STREAM CLASS (PER ✓ INT EPH)	
LAT 39.0641243058 LONG -84.5241334042		RIVER BASIN	Licking
STATION #		AGENCY	KYTC
INVESTIGATORS	ELS, MTM		
FORM COMPLETED BY ELS	DATE 7/14/22 TIME 3:15 AM ✓ PM	REASON FOR SURVEY	

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 ✓ 8 7 6	5 4 3 2 1 0
2. Embeddedness (In riffles – estimated from 5 largest rocks in 4 quads)	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 ✓ 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime (At Bankfull)	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	✓ 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition (in pools)	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 ✓	5 4 3 2 1 0
5. Channel Flow Status (Bars must be covered to score high bankfull)	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 ✓

3 Dominant Trees: _____

Bankfull Depth: 1.5' Bankfull Width: 7' Bankfull Area: _____

Max. Wetted Depth: _____ Avg. Wetted Depth: _____ Specific Conductivity: _____ Temp: _____

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 ✓11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	✓10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 ✓7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 ✓7 6	5 4 3	2 1 0

Total Score 97

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME	INT 18	LOCATION	Brent Spence
STATION #_____ RIVERMILE_____		STREAM CLASS (PER ✓ INT EPH)	
LAT 39.0642211724 LONG -84.5237115601		RIVER BASIN	Licking
STATION #		AGENCY	KYTC
INVESTIGATORS	ELS, MTM		
FORM COMPLETED BY ELS	DATE 7/14/22 TIME 3:23 AM ✓ PM	REASON FOR SURVEY	

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 ✓ 8 7 6	5 4 3 2 1 0
2. Embeddedness (In riffles – estimated from 5 largest rocks in 4 quads)	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 ✓ 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime (At Bankfull)	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	✓0 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition (in pools)	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 ✓	5 4 3 2 1 0
5. Channel Flow Status (Bars must be covered to score high bankfull)	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 ✓ 0

3 Dominant Trees: _____

Bankfull Depth: 1.5' Bankfull Width: 6' Bankfull Area: _____

Max. Wetted Depth: 1" Avg. Wetted Depth: <1" Specific Conductivity: _____ Temp: _____

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 ✓11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	✓10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 ✓7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 ✓7 6	5 4 3	2 1 0

Total Score 97

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME INT 6		LOCATION Brent Spence	
STATION #_____ RIVERMILE_____		STREAM CLASS (PER ✓ INT EPH)	
LAT 39.0641099386 LONG -84.5238566474		RIVER BASIN Licking	
STATION #		AGENCY KYTC	
INVESTIGATORS ELS, MTM			
FORM COMPLETED BY ELS	DATE 7/14/22 TIME 3:33 AM ✓ PM	REASON FOR SURVEY	

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 ✓ 8 7 6	5 4 3 2 1 0
2. Embeddedness (In riffles – estimated from 5 largest rocks in 4 quads)	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 ✓ 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime (At Bankfull)	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	✓0 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition (in pools)	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 ✓	5 4 3 2 1 0
5. Channel Flow Status (Bars must be covered to score high bankfull)	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 ✓ 0

3 Dominant Trees: _____

Bankfull Depth: 1.5' Bankfull Width: 6' Bankfull Area: _____

Max. Wetted Depth: 1" Avg. Wetted Depth: <1" Specific Conductivity: _____ Temp: _____

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 ✓11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	✓10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	✓5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	✓5 4 3	2 1 0

Total Score 90

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME	INT 19	LOCATION	Brent Spence
STATION #_____ RIVERMILE_____		STREAM CLASS (PER INT EPH)	
LAT 39.0700533752 LONG -84.5205950578		RIVER BASIN	Ohio
STATION #		AGENCY	KYTC
INVESTIGATORS		ELS, MTM	
FORM COMPLETED BY MTM	DATE 8/4/22 TIME 10:45 AM ✓ PM	REASON FOR SURVEY	

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 ✓11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness (In riffles – estimated from 5 largest rocks in 4 quads)	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 ✓9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime (At Bankfull)	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	10 ✓9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition (in pools)	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	✓3 4 3 2 1 0
5. Channel Flow Status (Bars must be covered to score high bankfull)	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 ✓9 8 7 6	5 4 3 2 1 0

3 Dominant Trees: Willow, Cottonwood, Boxelder

Bankfull Depth: 8" Bankfull Width: 6' Bankfull Area: _____

Max. Wetted Depth: 2" Avg. Wetted Depth: 1" Specific Conductivity: _____ Temp: _____

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 ✓7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	✓10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 ✓7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 ✓7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 ✓6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 ✓6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	✓2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	✓2 1 0

Total Score 90

Flows into wetland to drainage tile in the middle of the wetland.

APPENDIX F – LEVEL I ECOLOGICAL SURVEY REPORT

OHIO DEPARTMENT OF TRANSPORTATION

Level 1 Ecological Survey Report
(Version: 10-19)

for

HAM IR 71/75 0.00/0.22 PID 75119

ESR: HAM IR 71/75 000/022 Re-Eval

Accepted: 10/11/2022 1:47:02 PM

Report author: Len Mikles
Email: lmikles@ascgroup.net
Affiliation: ASC Group, Inc.
Phone: 614-268-2514

I certify that I have personally examined and am familiar with the information in this report and all attachments, and that the data collection was supervised by an individual(s) prequalified to conduct ecological surveys for ODOT or by trained ODOT Environmental staff. Based on my inquiry of those persons immediately responsible for obtaining the information contained in the report, I believe that the information has been collected in accordance with the ODOT Ecological Manual current at the time of the report preparation, and is true, accurate, and complete.

Responsible party name: Len Mikles
Responsible party title: Principal Ecologist

Table of Contents

1 General Project Information

1.1 Project Information

Project Location Details:

County(ies): HAMILTON
Township(s): Cincinnati
Latitude (DD.ddddd): 39.10189
Longitude (-DD.ddddd): -84.52293
Study area size (ac.): 175.167

Survey Conditions:

Field investigator name(s): Len Mikles and Stuart Jennings
Date(s) of survey work: 06/27/2022, 06/01/2022

Survey Area Designations:

USGS quadrangle(s): Cincinnati West, Ohio and Covington, Kentucky-Ohio
Impacting or adjacent to ODNR property: No
Project description:

ASC Group, Inc. (ASC) has completed a Level 1 Ecological Survey Report (ESR) for the Brent Spence Bridge (BSB) Project (HAM-71/75-0.00/0.22; PID 89068) in the City of Cincinnati, Hamilton County, Ohio. The project proposes to improve the BSB crossing over the Ohio River. Previous activities related to the project were documented in the project's Environmental Assessment (March 2012). On August 9, 2012, the Federal Highway Administration (FHWA) issued a Finding of No Significant Impact (FONSI) identifying Alternative I as the preferred alternative for the BSB project.

Since the approval of the FONSI, additional studies have refined Preferred Alternative I, which have been designated as Concept I-W. Concept I-W follows the Preferred Alternative I design for the I-71/I-75 alignment from the Dixie Highway interchange to 12th Street in Kentucky; north of Freeman Avenue in Ohio; and the local collector-distributor (C-D) roads along both sides of I-75 in Ohio. In addition, a companion bridge will be built just west of the existing BSB with all I-71 and I-75 traffic on the new bridge and all local C-D traffic on the existing BSB. The new bridge will carry five lanes of southbound (SB) I-71 and I-75 on the lower deck and five lanes of northbound (NB) I-71 and I-75 traffic on the upper deck. The existing BSB will be rehabilitated to carry three lanes for NB local traffic on the lower deck and three lanes for SB local traffic on the upper deck.

The Kentucky Transportation Cabinet (KYTC) and ODOT are currently re-evaluating the project's Environmental Assessment to reflect the refined preferred alternative (Concept I-W). The re-evaluation efforts also involve updating resource-specific studies, including the Level 1 ESR, to reflect any changes in conditions that have occurred since they were originally prepared.

ASC conducted field visits on June 1 and 27, 2022, to locate waterways, wetlands, listed species habitat, and other sensitive ecological areas within the proposed Concept I-W construction limits. No wetlands were identified, which is similar to the findings present in the original 2010 ESR. The Ohio River is located in the project area. This was also the only waterway identified in the 2010 ESR. Impacts to the Ohio River are estimated to be 633 ft. Impacts to Suitable Wooded Habitat (SWH) for the Indiana Bat (*Myotis sodalis*) and Northern Long-Eared Bat (*Myotis septentrionalis*) are anticipated. Approximately 15.80 acres (ac) of SWH was identified in the project area and has the potential to be impacted. All of the SWH is located within 100 feet (ft) from the edge of existing pavement. Impacts to potential habitat for the State Endangered Little Brown Bat (*Myotis lucifugus*), Tricolored Bat (*Perimyotis subflavus*), Washboard (*Megalonaias nervosa*), Elephant-ear (*Elliptio crassidens*), Monkeyface (*Theliderma metanevra*), Butterfly (*Ellipsaria lineolata*), Ebonyshell (*Reginaia ebena*), and Ohio Pigtoe (*Pleurobema cordatum*) are anticipated. Impacts to potential habitat for the State Threatened Black-Crowned Night Heron (*Nycticorax nycticorax*), Channel Darter (*Percina copelandi*), and River Darter (*Percina shumardi*) are also likely.

List of Project Alternatives:

Alternative name	Area of construction limits (ac.)	Preferred alternative
Concept I-W	175.167	Yes

2 Aquatic Ecology
2.1 Streams:

Streams present: Yes

Total length of streams within the project study area (ft.): 633

Streams:

Stream name	Latitude (DD.ddddd)	Longitude (-DD.ddddd)	Photo ID	Drainage area (sq. mi.)	OEPA River Mile (if applicable)	12-Digit HUC	Captured within the roadway ditch	Stream hydrology type	USACE flow characteristics	Habitat assessment	Habitat score	pH value	Salamanders observed	Fish observed	Aquatic macro-invertebrates observed	OEPA aquatic life use designation	Provisional or official designation	Antidegradation designation	401 WQC for nationwide permit eligibility	National or state scenic rivers or NRI streams	Potential in-water work restriction based on proximity to scenic river	Designation for potential in-water work restriction	Length within open channel (ft.) in the study area	Length within existing culvert (ft.) in the study area	Total length in study area (ft.)	Alternative Name	Permanent estimated impact length (ft.) by alternative construction limits (Include temporary impact within the permanent impact area) (if known)	Temporary estimated impact length (ft.) by alternative construction limits (Only include temporary impact outside the permanent impact area) (if known)	Total estimated impact length (ft.) for the preferred alternative construction limits
Ohio River	39.09259	-84.52240	6	76580	510.2	050902030202	No	Perennial	TNW	None		N/A	Not Surveyed	Not Surveyed	Not Surveyed	WWH	Official from OAC	General High Quality Water	Eligible	No		Percid Streams	633	0	633	Concept I-W	350	283	633

Flow path to TNW:
The Ohio River is considered a TNW.

Details on stream impact or other information (if known):
The Ohio River could not be accessed during the ecological survey field visits. The river is fenced off and is only accessible by boat. The drainage area of the Ohio River at the location of the Brent Spence Bridge could not be obtained from StreamStats.

The preferred alternative will build a new double-decker companion bridge west of the existing Brent Spence Bridge (BSB). There are two bridge types under consideration, an arch bridge and a cable-stayed bridge. The preferred alternative described in the 2012 EA/FONSI provides a span length over the main navigation channel for the Ohio River of approximately 1,000 feet from center to center of the proposed piers for the new bridge. However, coordination with the U.S. Coast Guard is on-going, and the required length of the main span may be reduced from 1,000 feet to 870 feet during final design. Permanent impacts to the Ohio River will occur from pier construction for the new companion bridge. Construction is anticipated to be completed primarily from barges, and cofferdams will be used to dewater the areas surrounding the proposed piers. Temporary impacts to the Ohio River are anticipated due to construction and barge staging and cofferdam construction. No in-stream work will occur during the rehabilitation of the existing BSB. The total impacts to the Ohio River are estimated to be 633 feet. Area of direct impact is estimated to be 6.92 acres. Construction details and impacts will be finalized during detailed design of the new companion bridge.

PERENNIAL	Total estimated permanent impact length to all streams by alternative (ft.):	Total estimated temporary impact length to all streams by alternative (ft.):	Total estimated (temporary + permanent) impact length to all streams by alternative (ft.):
Concept I-W	350	283	633

INTERMITTENT	Total estimated permanent impact length to all streams by alternative (ft.):	Total estimated temporary impact length to all streams by alternative (ft.):	Total estimated (temporary + permanent) impact length to all streams by alternative (ft.):
Concept I-W	0	0	0

EPHEMERAL	Total estimated permanent impact length to all streams by alternative (ft.):	Total estimated temporary impact length to all streams by alternative (ft.):	Total estimated (temporary + permanent) impact length to all streams
Concept I-W	0	0	0

2.2 Wetlands:

Wetlands present: No

2.3 Ditches:

Potentially jurisdictional ditches or non-jurisdictional conveyances for adjacent wetlands present: No

2.4 Ponds, Lakes, Reservoirs, Retention/Detention Basins:

Other water bodies present: No

2.7 Mussels

The project includes a stream(s) greater than or equal to 5 square miles in drainage area: Yes - Stream(s) Listed as Group 2 or 4 in the Ohio Mussel Survey Protocol. Reconnaissance Not Acceptable. Include a Survey by a Federally Permitted Malacologist. Complete Table.

Mussels:

Stream name	Group listing	Evidence of mussels	Level of effort	Documentation attached
Ohio River	Group 4	Living Mussels and/or Fresh Dead Mussel Shell(s)	Professional Malacologist Survey	Survey Report

Summary of results:

Stantec conducted a Group 4 Phase1/Phase 2 survey per the requirements set forth in the Ohio Mussel Survey Protocol. No live or fresh dead FLS were noted during the survey efforts. Most mussels were found on the southern side of the river. The Ohio portion of the river was dominated by large chunks of rubble and silt.

3 Terrestrial Ecology

3.1 Vegetative Communities and Land Cover

Vegetative Communities and Land Cover:

Vegetative communities and land cover found within the project study area	Degree of man induced ecological disturbance	Unique, rare, or high quality	Within project study area(s) (ac.)	Vegetation and land cover areas identified on figure(s)	Alternative Name	Alternative impacts (ac.)
Developed, High Intensity (DH) - Includes Highly Developed Areas Where People Reside or Work in High Numbers. Examples Include Apartment Complexes, Row Houses and Commercial/Industrial. Impervious Surfaces Account for 80 to100% of the Total Cover.	Extreme Disturbance/Ruderal Community (Dominated by Opportunistic Invaders or Native Highly Tolerant Taxa)	No	172.897		Concept I-W	172.897
Open Water - All Areas of Open Water, Generally with Less Than 25% Cover of Vegetation or Soil.	Extreme Disturbance/Ruderal Community (Dominated by Opportunistic Invaders or Native Highly Tolerant Taxa)	No	2.27		Concept I-W	2.27
				Total Impacts	Concept I-W	175.167

Additional Information:

The project area is located in a highly urbanized area consisting of industrial, commercial, and residential properties. The majority of the project area is developed and paved over. The areas containing vegetation are primarily confined to the road right-of-way. These areas consist of plant species adapted to high levels of disturbance. Impacts to rare, unique, or high quality plant communities are not anticipated.

3.4 Birds

Colony nesting birds or any peregrine falcon sightings on bridges or culverts: No

4 Listed Species

4.1 Federally Listed Species

ODOT is the lead Federal action agency for this project: Yes

4.1.1 Federally Listed Bats

Federally Listed Bats:

Species common name	Species scientific name	Listing status
Indiana Bat	Myotis sodalis	Endangered
Northern Long-eared Bat	Myotis septentrionalis	Threatened

Suitable habitat:

The 2016 PBO defines suitable wooded habitat (SWH) for these species as any tree covered area that is 0.5 ac or larger, containing any potential roosts (i.e., live trees and/or snags 3 inches dbh that have exfoliating bark, cracks, crevices, and/or cavities) greater than 13 ft tall and at least 3 in dbh, or any patch of trees with these characteristics that is less than ½ acre in size but is within 1,000 feet of or connected by a travel corridor to a PMRT, ½-acre or larger stand of SWH, or any patch of wooded riparian buffer. Additionally, these species may use bridges over streams as summer roosting habitat. During the winter months these species inhabit hibernacula (typically caves, or abandoned mines that provide cool, humid, stable conditions for hibernation).

Bat management unit: Eastern Management Unit

The project is in a known bat buffer: No

Record type(s) (color):

Date of records request: 06/03/2022

4.1.1.1 Bat Impacts Per Alternative

Concept I-W

The alternative will impact suitable wooded habitat (SWH): Yes
Acreage of SWH impacts within 100 feet of the edge of pavement: 15.80
All SWH to be impacted is within 100 feet of the edge of pavement: Yes
The impact to SWH is less than or equal to 0.10 acre: No
The alternative will impact a bridge spanning 20 feet and located over water: Yes (Complete the Bridge Bat Inspection grid below)
The bridge inspection showed the evidence of bats: No
Consultation category: CC1
Effect determination: May Affect, Not Likely to Adversely Affect

Discussion including impacts to suitable habitat:

All of the SWH located in the project area is located within 100 ft from the edge of pavement and is all within the existing right-of-way, except for a small portion along the Ohio River. Impacts to SWH from the project area expected. ODOT-OES provided some additional guidance for determining SWH in the project area. See attachments. Wooded areas in the right-of way were considered continuous to one another and collectively exceed the 0.5 ac threshold. The SWH observed in the right-of way is primarily dominated by White Mulberry (*Morus alba*), Northern Catalpa (*Catalpa speciosa*), Tree-of-Heaven (*Ailanthus altissima*), Black Locust (*Robinia pseudoacacia*), Honey-Locust (*Gleditsia triacanthos*), Callery Pear (*Pyrus calleryana*), Staghorn Sumac (*Rhus typhinia*), Amur Honeysuckle (*Lonicera maackii*), and River-Bank Grape (*Vitis riparia*). Dead ash (*Fraxinus* spp.) trees were readily observed. The bank of the Ohio River under the Brent Spence Bridge was historically paved with concrete. The portions of SWH by the Ohio River are growing in large pavement cracks. The dominant species observed along the river included many of the species mentioned above as well as Silver Maple (*Acer saccharinum*), American Sycamore (*Platanus occidentalis*), and Asian Bittersweet (*Celastrus orbiculatus*).

Bridge Bat Inspection:

Structure C-R-S	Select the Alternative(s) in which the structure is found	Inspector(s)	Date of inspection	Waterbody	Factors negatively affecting habitat suitability for bats	Intensity of human disturbance
HAM IR 71/75 000/022	Concept I-W	Len Mikles, Stuart Jennings	06/27/2022	Ohio River	Human Disturbance or Traffic Under the Bridge.	High

Factors negatively affecting habitat suitability for bats:

Human Disturbance or Traffic Under the Bridge.

Intensity of human disturbance:

High

Areas inspected on the bridge structure:

Difficulty Surveying Underside of Structure (Safety or Other Reasons)

Other Information:

Only a small portion of the bridge was examined for bats. The portion of the bridge examined was elevated greater than 50 feet above the ground surface and located adjacent to the Duke Energy substation property. The bat investigation took place from the ground. Bridge crevices could not be examined. The bridge and area under the bridge were primarily examined for bat sounds, bat guano droppings, and bat urine staining on concrete supports. None of these indicators were observed during the field survey.

Results of observations for bats:

No Evidence of Bats Observed. (Only select when no other options below apply)

4.1.2 Bald Eagles

Bald Eagle:

Species common name	Species scientific name	Listing status
Bald Eagle	Haliaeetus leucocephalus	Species of Concern

Suitable habitat:

The Bald Eagle is protected under the Bald and Golden Eagle Protection Act which prohibits taking bald eagles, including disturbance. The preferred habitat includes mature forests adjacent to open water for nesting and foraging. Within Ohio bald eagles use the tops of large trees to build nests, which they typically use and enlarge each year.

4.1.2.1 Bald Eagle Impacts Per Alternative

Concept I-W

A nest (a known record or an observed nest) is located within 0.5 mile of the roadway alternative: No
Effect determination: No Effect

The project will take an eagle nest: No
The project will require a non-purposeful take permit: No

Discussion including impacts to suitable habitat:

Evidence of Bald Eagles or suitable habitat in the project area was not observed. Impacts to potential habitat are not expected.

4.1.3 Other Federally Listed Species

Other Federally Listed Species:

Species common name	Species scientific name	Listing status
Fanshell	Cyprogenia stegaria	Endangered
Suitable habitat: The Fanshell mussel is found in large streams and rivers in sand or gravel substrates in deep water of moderate current. In Ohio, this species is only known from certain high-quality waterways (designated in the Ohio Mussel Survey Protocol as Group 2 and 4 streams) with drainages larger than 5 square miles.		
Concept I-W	**Discussion including impacts to suitable habitat:** Potentially suitable habitat for this species is likely present in the Ohio River. A Group 4 Phase I/II hybrid survey was conducted by Stantec, a firm with federally permitted biologists to determine presence or probable absence of FLS within the bridge study area. No live individuals or fresh dead shells of federally listed mussels were found during the survey.	
	Effect Determination: May Affect, Not Likely to Adversely Affect	

Species common name	Species scientific name	Listing status
Pink Mucket Pearly Mussel	Lampsilis abrupta	Endangered
Suitable habitat: The Pink Mucket Pearly Mussel is found large rivers in a variety of substrates including mud and sand, an in shallow riffles and shoals swept free of silt. In Ohio, this species is only known from the Ohio River and lower Muskingum River.		
Concept I-W	**Discussion including impacts to suitable habitat:** Potentially suitable habitat for this species is likely present in the Ohio River. A Group 4 Phase I/II hybrid survey was conducted by Stantec, a firm with federally permitted biologists to determine presence or probable absence of FLS within the bridge study area. No live individuals or fresh dead shells of federally listed mussels were found during the survey.	
	Effect Determination: May Affect, Not Likely to Adversely Affect	

Species common name	Species scientific name	Listing status
Rayed Bean	Villosa fabalis	Endangered
Suitable habitat: The Rayed Bean mussel is usually found in streams but can also live in large rivers and wave-washed areas of glacial lakes. The rayed bean mussel prefers gravel or sand substrates and is often found in and around roots of aquatic vegetation. In Ohio, this species is only known from certain high-quality waterways (designated in the Ohio Mussel Survey Protocol as Group 2 and 4 streams) with drainages larger than 5 square miles.		
Concept I-W	**Discussion including impacts to suitable habitat:** Potentially suitable habitat for this species is likely present in the Ohio River. A Group 4 Phase I/II hybrid survey was conducted by Stantec, a firm with federally permitted biologists to determine presence or probable absence of FLS within the bridge study area. No live individuals or fresh dead shells of federally listed mussels were found during the survey.	
	Effect Determination: May Affect, Not Likely to Adversely Affect	

Species common name	Species scientific name	Listing status
Sheepnose	Plethobasus cyphyus	Endangered
Suitable habitat: The Sheepnose mussel is found in very large streams to large rivers where they are most often found in shallow areas with moderate to swift currents that flow		

Species common name	Species scientific name	Listing status
Concept I-W	**Discussion including impacts to suitable habitat:** Potentially suitable habitat for this species is likely present in the Ohio River. A Group 4 Phase I/II hybrid survey was conducted by Stantec, a firm with federally permitted biologists to determine presence or probable absence of FLS within the bridge study area. No live individuals or fresh dead shells of federally listed mussels were found during the survey.	
	Effect Determination: May Affect, Not Likely to Adversely Affect	

Species common name	Species scientific name	Listing status
Snuffbox	Epioblasma triquetra	Endangered
Suitable habitat: The Snuffbox mussel is usually found in streams and small rivers, although they can also be found in Lake Erie and some larger rivers. Snuffbox mussels prefer areas with a swift current, and can be found in sand, gravel, or cobble substrates. In Ohio, this species is only known from certain high-quality waterways (designated in the Ohio Mussel Survey Protocol as Group 2 and 4 streams) with drainages larger than 5 square miles.		
Concept I-W	**Discussion including impacts to suitable habitat:** Potentially suitable habitat for this species is likely present in the Ohio River. A Group 4 Phase I/II hybrid survey was conducted by Stantec, a firm with federally permitted biologists to determine presence or probable absence of FLS within the bridge study area. No live individuals or fresh dead shells of federally listed mussels were found during the survey.	
	Effect Determination: May Affect, Not Likely to Adversely Affect	

4.2 State Listed Species

Date of the ONHDB check: 06/12/2022

State listed species considered include:
·All of the endangered, threatened, or potentially threatened species records from the Ohio Natural Heritage Database for any animal species located within 1 mile of the project, and any plant species records within 0.5 mile of the project.
·Any state endangered and threatened animals suspected of being within the county (from the county range list provided by the DOW).
·Does not include species that have already been included in the Federally Listed Species table
Project is within the range: Within the Range of the Following State Listed Species

State Listed Species:

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
Riverbank Paspalum	Paspalum repens	Yes	Threatened	Yes	2000
Description of suitable habitat: Shallow water or wet muddy soils; margins of temporary pools, riverbanks and riverine woodlands. A portion of the bank of the Ohio River is within the study area for this project. This bank is mostly armored with concrete and contains very little vegetation. The study area was searched for this species by OES in 2008 and was not found during the initial ecological survey in 2010. This species was not observed during the 2022 survey.					
Concept I-W	**The species or its suitable habitat will be impacted by this project:** No				
	Effect determination: No Impact				

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
Virginia-mallow	Riparioside hermaphrodita	Yes	Potentially Threatened	Yes	0

Description of suitable habitat:

Open to semi-open disturbed situations in sandy soils along rivers. All of the southern Ohio plants grow either along or very near the bank of the Ohio River. The Williams County site is near a stream.

Concept I-W	**The species or its suitable habitat will be impacted by this project:** Yes
	Discussion of impacts to suitable habitat or species: Marginal habitat for this species exists within the project study area near the edge of the water on the Ohio River. Most of the bank within the project area is armored with concrete and has tree of heaven and vines growing out of the cracks. OES personnel looked for this species in the project area in 2008 and did not observe it. It was also not noted during the 2010 and 2022 ecological surveys.
	Effect determination: No Impact

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
Smooth Buttonweed	Spermacoce glabra	Yes	Potentially Threatened	Yes	2000

Description of suitable habitat:

Swamps, wet woods and openings; in Ohio found mostly on muddy shores and low banks of the Ohio River.

The banks of the Ohio River within the project area have little to no suitable habitat for this species. The bank along the Ohio side is mostly armored in concrete with vines and invasive species growing out of the cracks in the concrete. This species was not noted during the 2010 or 2022 ecological surveys.

Concept I-W	**The species or its suitable habitat will be impacted by this project:** No
	Effect determination: No Impact

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area
Kirtland's Snake	Clonophis kirtlandii	No

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
Black-crowned Night-heron	Nycticorax nycticorax	Yes	Threatened	Yes	2000

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
Description of suitable habitat: The Black-Crowned Night Heron (*Nycticorax nycticorax*) once occurred in marshes and swamps throughout Ohio. The species has been eliminated as a mainland nester and presently is relegated to the Lake Erie Islands. They presently nest on West Sister Island National Wildlife Refuge and Turning Point Island in Sandusky Bay. These herons are often found roosting in thick vegetation along streams, lakes, and wetlands. Suitable roosting habitat is located along the Ohio River and has the potential to be impacted.					
Concept I-W	**The species or its suitable habitat will be impacted by this project:** Yes				
	Discussion of impacts to suitable habitat or species: Some marginally suitable nesting habitat is present within the study area, mostly on the Kentucky side of the river. No nesting activity was noted during the ecological survey.				
	Effect determination: Not Likely to Impact				

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
Channel Darter	Percina copelandi	Yes	Threatened	Yes	1
Description of suitable habitat: Channel darters are found large course sand or fine gravel bars in large rivers or along the shore of Lake Erie. There is a record for this species in the Ohio River under the Brent Spence Bridge. Potentially suitable habitat for this species is likely present in the Ohio River.					
Concept I-W	**The species or its suitable habitat will be impacted by this project:** Yes				
	Discussion of impacts to suitable habitat or species: A record for this species was identified in the study area and suitable habitat is likely present in the Ohio River within the project area. In-stream work for this project will be limited to the pier locations and along the edge of the stream for barge moorings. Most of the stream bottom will remain undisturbed. As most of the project area impacts will be in the portion of the river controlled by Kentucky, this project will not automatically have in-stream work restrictions applied. As this species is mobile, it will likely relocate from any impact areas during construction.				
	Effect determination: Not Likely to Impact				

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
River Darter	Percina shumardi	Yes	Threatened	Yes	1
Description of suitable habitat: The River Darter is found in very large rivers typically in areas of swift current. They are found over a gravel or rocky bottom in depths of 3 feet or more. In Ohio this species has historically been found in some of the larger western Lake Erie tributaries. They have also been found in the Ohio River and the lower portion of larger tributaries such as the Scioto, Hocking, and Muskingum Rivers. There is a record for this species in the Ohio River under the Brent Spence Bridge. Potentially suitable habitat for this species is likely present in the Ohio River.					

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
Concept I-W	**The species or its suitable habitat will be impacted by this project:** Yes				
	Discussion of impacts to suitable habitat or species: A record for this species was identified in the study area and suitable habitat is likely present in the Ohio River within the project area. In-stream work for this project will be limited to the pier locations and along the edge of the stream for barge moorings. Most of the stream bottom will remain undisturbed. As most of the project area impacts will be in the portion of the river controlled by Kentucky, this project will not automatically have in-stream work restrictions applied. As this species is mobile, it will likely relocate from any impact areas during construction.				
	Effect determination: Not Likely to Impact				

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
Washboard	Megalonaias nervosa	Yes	Endangered	Yes	200
Description of suitable habitat: This species primarily inhabits large rivers with a good current; occasionally medium-sized streams in mud, sand, or gravel. Potentially suitable habitat for this species is present in the Ohio River.					
Concept I-W	**The species or its suitable habitat will be impacted by this project:** Yes				
	Discussion of impacts to suitable habitat or species: Potentially suitable habitat for this species is present in the Ohio River. A mussel survey was conducted for the project. A total of 101 live individuals were documented during the survey. An environmental commitment to relocate the mussels to areas outside of the construction limits will be added to the environmental document. Impacts to this species are not expected due to the relocation efforts that will take place.				
	Effect determination: Not Likely to Impact				

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
Little Brown Bat	Myotis lucifugus	Yes	Endangered	No	
Description of suitable habitat:					

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
The entire state is within the range of the little brown bat. During spring and summer (April 1 through September 30), this species of bat predominately roosts in trees behind loose, exfoliating bark, in crevices and cavities of living or dead trees, although they also use structures such as barns and bridges. In the winter, this species hibernates in caves, mines, and other underground structures that provide cool, humid areas with stable temperature.					
Concept I-W	**The species or its suitable habitat will be impacted by this project:** Yes				
	Discussion of impacts to suitable habitat or species: Potential habitat is located in the project area and is within 100 ft from the edge of pavement. All potential habitat is within the existing right-of-way, except for a small portion along the Ohio River. Impacts to potential habitat from the project area expected. The project is not likely to impact the species since tree cutting is likely to take place from October1 through March 31.				
	Effect determination: No Impact				

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
Tricolored Bat	Perimyotis subflavus	Yes	Endangered	No	
Description of suitable habitat: The entire state is within the range of the tricolored bat. During spring and summer (April 1 through September 30), this species of bat predominately roosts in living or dead clusters of leaves near the top of the crown of larger live trees. They also may rarely roost in structures, including bridges. In the winter, this species hibernates in caves, mines, and other underground structures that provide cool, humid areas with stable temperature.					
Concept I-W	**The species or its suitable habitat will be impacted by this project:** Yes				
	Discussion of impacts to suitable habitat or species: Potential habitat is located in the project area and is within 100 ft from the edge of pavement. All potential habitat is within the existing right-of-way, except for a small portion along the Ohio River. Impacts to potential habitat from the project area expected. In order to protect this species during the active roosting/brood-rearing period, tree removal will only occur between October 1 and March 31.				
	Effect determination: No Impact				

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
Elephantear	Elliptio crassidens	Yes	Endangered	Yes	1
Description of suitable habitat:					

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
This species inhabits muddy sand, sand and rocky substrates in moderate currents.					
Concept I-W	**The species or its suitable habitat will be impacted by this project:** Yes				
	Discussion of impacts to suitable habitat or species: Potentially suitable habitat for this species is present in the Ohio River. A mussel survey was conducted for the project. One live individual was documented during the survey. An environmental commitment to relocate the mussel to an area outside of the construction limits will be added to the environmental document. Impacts to this species are not expected due to the relocation efforts that will take place.				
	Effect determination: Not Likely to Impact				

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
Monkeyface	Theliderma metanevra	Yes	Endangered	Yes	1
Description of suitable habitat: This species is typically found in medium to large rivers in gravel or mixed sand and gravel.					
Concept I-W	**The species or its suitable habitat will be impacted by this project:** Yes				
	Discussion of impacts to suitable habitat or species: Potentially suitable habitat for this species is present in the Ohio River. A mussel survey was conducted for the project. One live individual was documented during the survey. An environmental commitment to relocate the mussel to an area outside of the construction limits will be added to the environmental document. Impacts to this species are not expected due to the relocation efforts that will take place.				
	Effect determination: Not Likely to Impact				

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
Wartyback	Cyclonaias nodulata	Yes	Endangered	Yes	1
Description of suitable habitat: This species is frequently found in in large streams or rivers in firm sand and mud.					
	The species or its suitable habitat will be impacted by this project: Yes				

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
Concept I-W	**Discussion of impacts to suitable habitat or species:** Potentially suitable habitat for this species is present in the Ohio River. A mussel survey was conducted for the project. A total of 108 live individuals were documented during the survey. An environmental commitment to relocate the mussels to areas outside of the construction limits will be added to the environmental document. Impacts to this species are not expected due to the relocation efforts that will take place.				
	Effect determination: Not Likely to Impact				

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area
Cave Salamander	Eurycea lucifuga	No

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area
Eastern Hellbender	Cryptobranchus alleganiensis alleganiensis	No

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area
American Bittern	Botaurus lentiginosus	No

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area
Lark Sparrow	Chondestes grammacus	No

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area
Loggerhead Shrike	Lanius ludovicianus	No

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area
Trumpeter Swan	Cygnus buccinator	No

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area
Least Bittern	Ixobrychus exilis	No

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
Butterfly	Elliparia lineolata	Yes	Endangered	Yes	0

Description of suitable habitat:

The butterfly mussel usually inhabits areas of large rivers with swift currents in sand or gravel substrates. This species has adapted to living in reservoirs and impoundments in some parts of its range.

Concept I-W	**The species or its suitable habitat will be impacted by this project:** Yes
	Discussion of impacts to suitable habitat or species: A Group 4 Phase 1/Phase 2 survey was conducted at this site during the summer of 2022 by Stantec federally permitted biologists. A single living specimen was found within the project study area. A mussel relocation following the methods in the Ohio Mussel Survey Protocol will be conducted prior to construction in order to protect this species and common mussels found within the project area.
	Effect determination: Not Likely to Impact

Species common name	Species scientific name	The species or its suitable habitat is present within the project study area	Listing status	A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species	Proximity to the project (ft.)
Ebonyshell	Reginaia ebena	Yes	Endangered	Yes	0

Description of suitable habitat:

. The ebonyshell mussel primarily inhabits large rivers in sand or gravel

Concept I-W	**The species or its suitable habitat will be impacted by this project:** Yes
	Discussion of impacts to suitable habitat or species: A Group 4 Phase 1/Phase 2 survey was conducted at this site during the summer of 2022 by Stantec federally permitted biologists. Two living specimens were found within the project study area. A mussel relocation following the methods in the Ohio Mussel Survey Protocol will be conducted prior to construction in order to protect this species and common mussels found within the project area.
	Effect determination: Not Likely to Impact

<table>
<tr><th>Species common name</th><th>Species scientific name</th><th>The species or its suitable habitat is present within the project study area</th><th>Listing status</th><th>A record is within 1 mile of the project if it is an animal species, or within 0.5 mile of the project if it is a plant species</th><th>Proximity to the project (ft.)</th></tr>
<tr><td>Ohio Pigtoe</td><td>Pleurobema cordatum</td><td>Yes</td><td>Endangered</td><td>Yes</td><td>0</td></tr>
<tr><td colspan="6">Description of suitable habitat:
Medium to large rivers in sand or gravel in areas with moderate flow.</td></tr>
<tr><td rowspan="3">Concept I-W</td><td colspan="5">The species or its suitable habitat will be impacted by this project: Yes</td></tr>
<tr><td colspan="5">Discussion of impacts to suitable habitat or species:
A Group 4 Phase 1/Phase 2 survey was conducted at this site during the summer of 2022 by Stantec federally permitted biologists. Two living specimens were found within the project study area. A mussel relocation following the methods in the Ohio Mussel Survey Protocol will be conducted prior to construction in order to protect this species and common mussels found within the project area.</td></tr>
<tr><td colspan="5">Effect determination: Not Likely to Impact</td></tr>
</table>

5 Literature Cited

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6 Appendices

Appendix 1: Mapping:

- Topographic Map*
- Aerial Photo*
- Water Resource Map*
- Suitable Wooded Habitat

Appendix 2: Photo Log:

- Photo Location Map*
- Project Photos*
- Bat Habitat Photos

Appendix 3: Plans:

Appendix 4: Forms:

Appendix 5: Agency Data Requests:

- ODNR - Ohio Natural Heritage Database Search Results
- USFWS - Bat Record Search Results
- Other

Appendix 6: List of Supporting Survey Report Titles or Literature Sources:

Brent Spence Bridge Replacement/Rehabilitation Project Level One Ecological Survey Report, ODOT PID No. 75119. HAM-71/75-0.00/0.22. March 2010. Prepared by Parsons Brinckerhoff.

N

0 1 2 3 4 Kilometers

0 1 2 3 Miles

Figure 1

Portion of the Hamilton County highway map showing the vicinity of the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 7/21/2022 4:47:01 PM

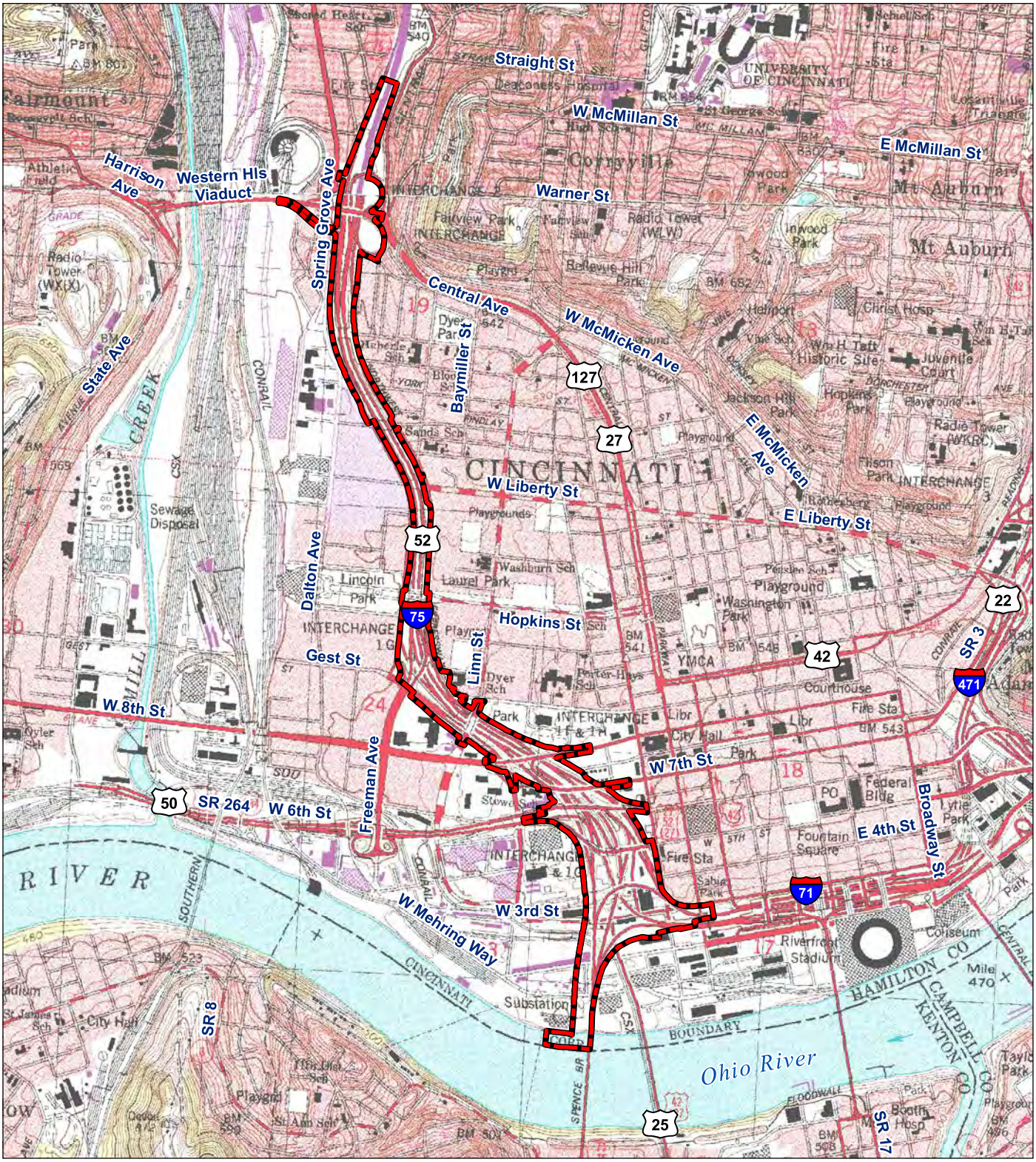
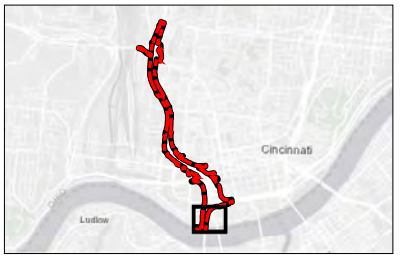


Figure 2

Portions of the 1981Cincinnati West, Ohio and 1987 Covington KY-OH quadrangles (USGS 7.5' topographic maps) showing the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Base: USGS Cincinnati West, OH, and Covington, KY-OH, 7.5' series quadrangles

Created by TMD, JVT; last saved: 8/2/2022 12:45:31 PM



Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 1 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM

Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

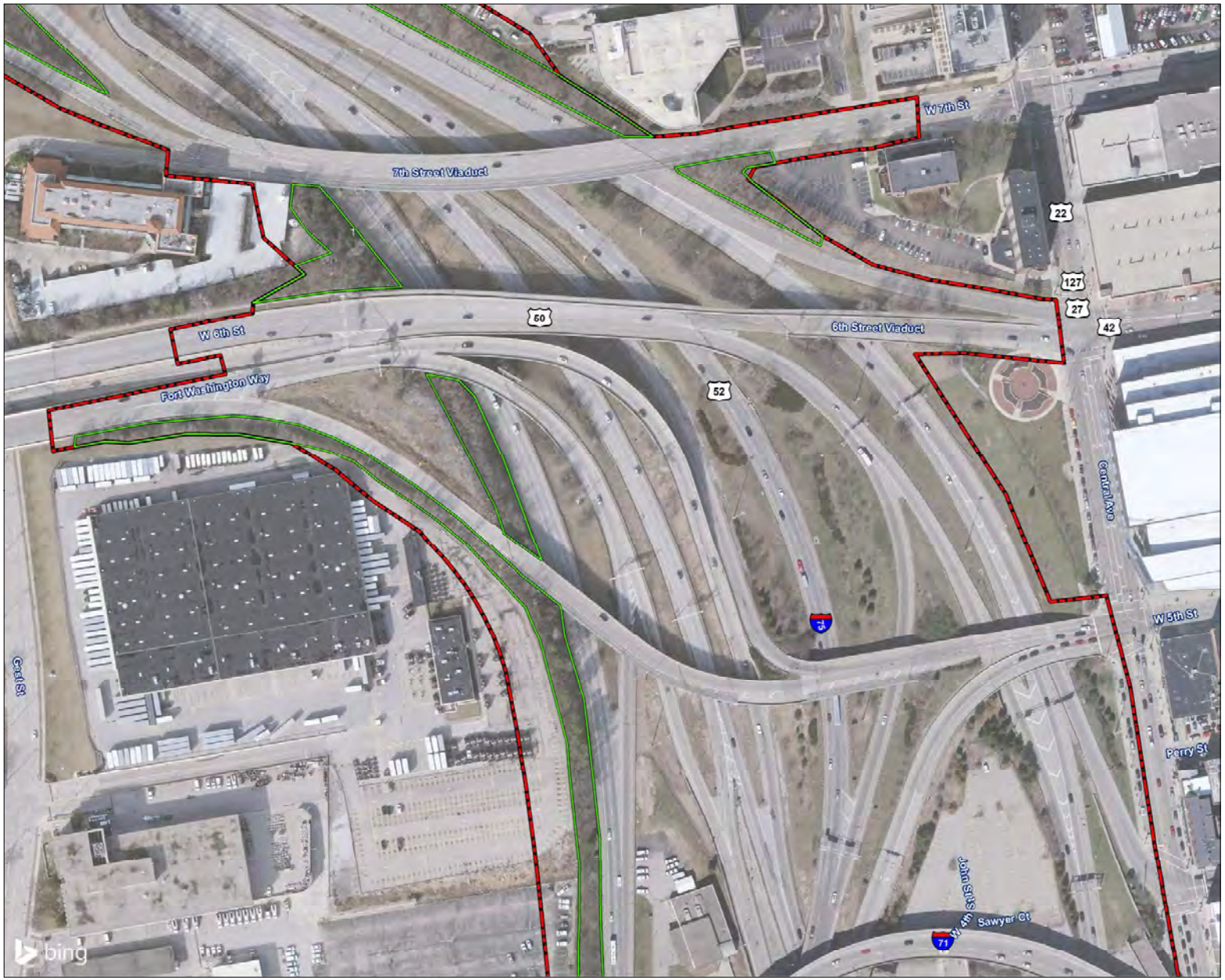
0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 2 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM



Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

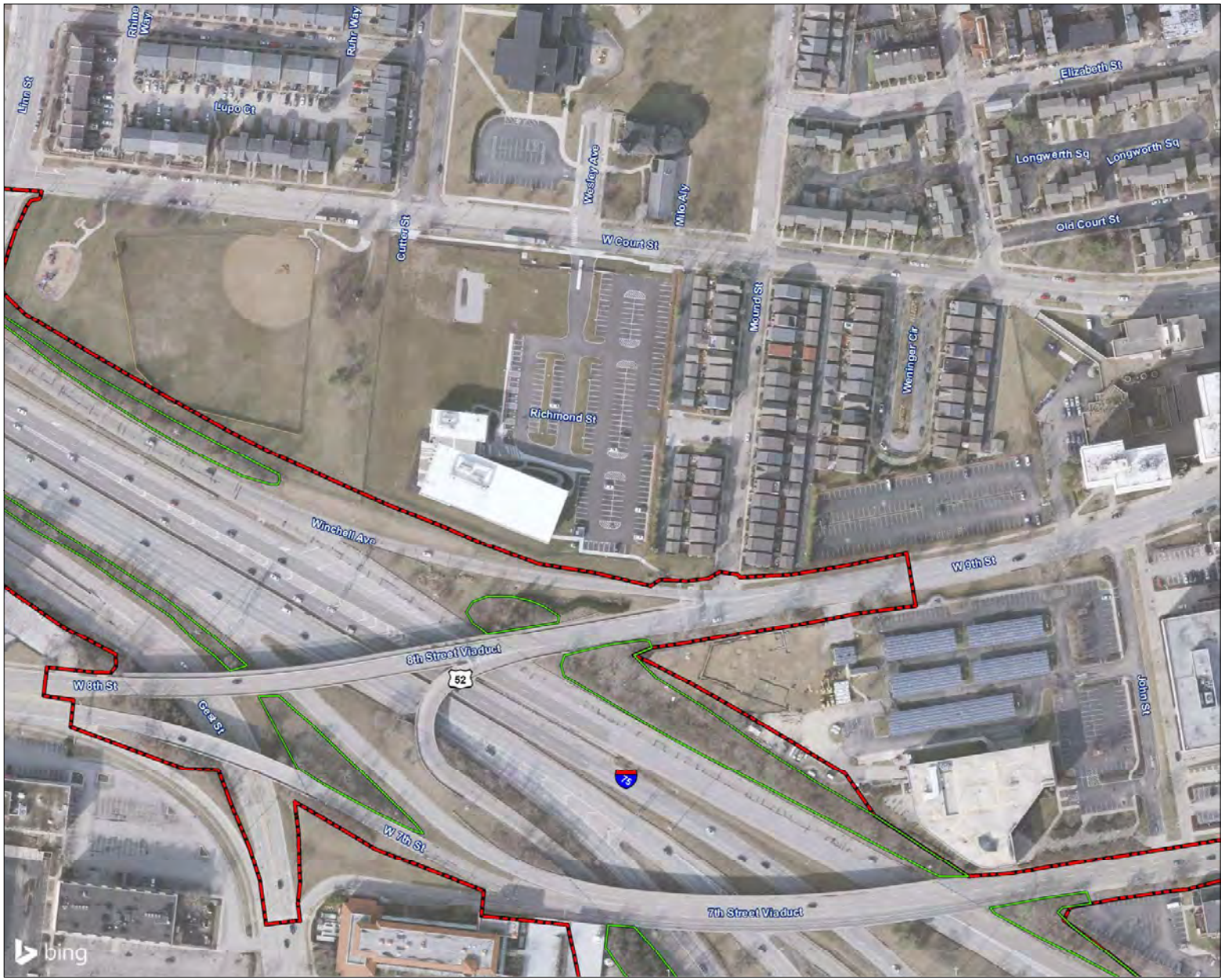
0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 3 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM



Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

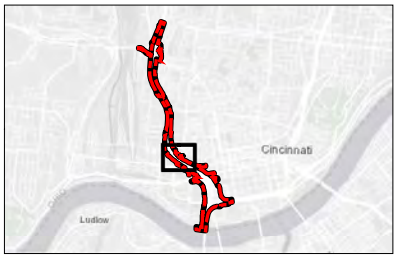
0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 4 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM



Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 5 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

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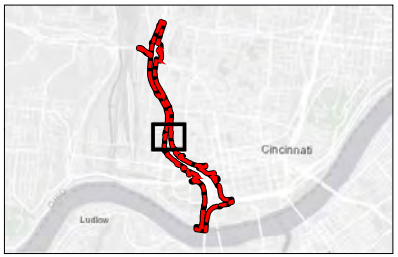

Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 6 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

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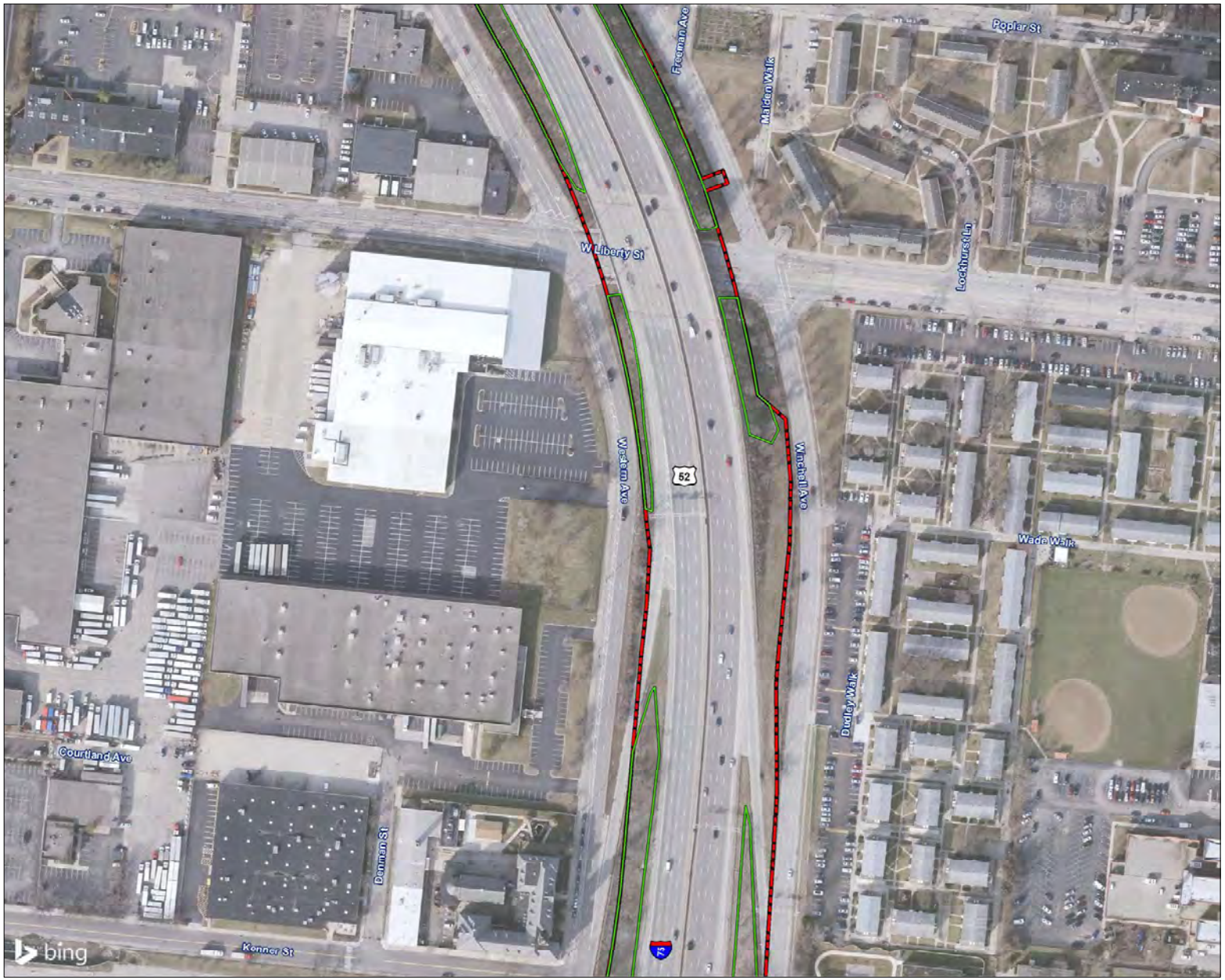

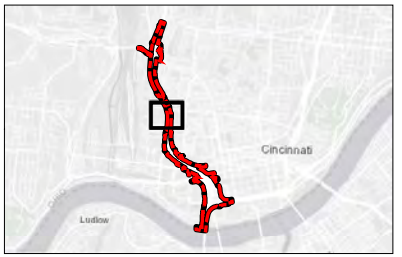

Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 7 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM

Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 8 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

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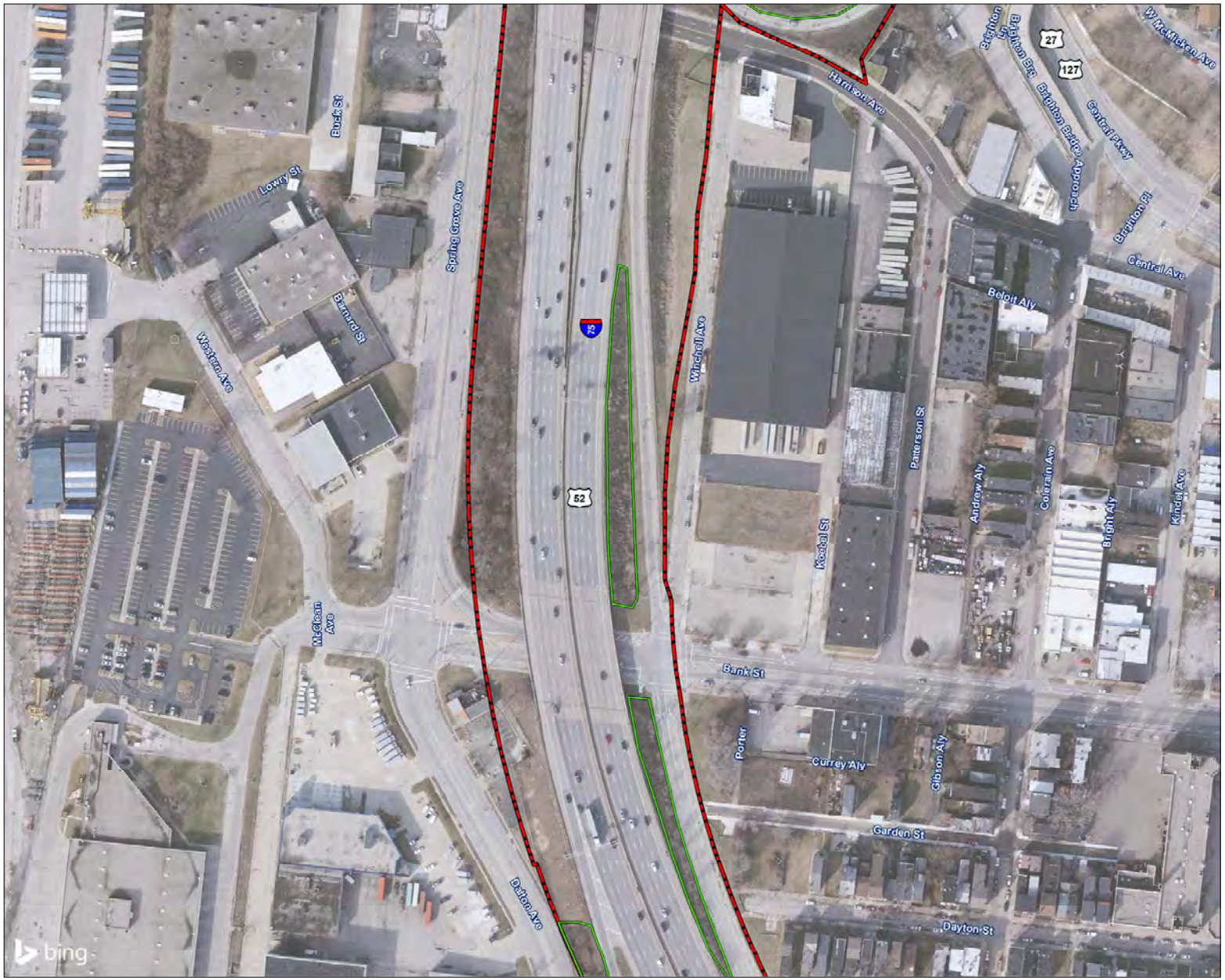

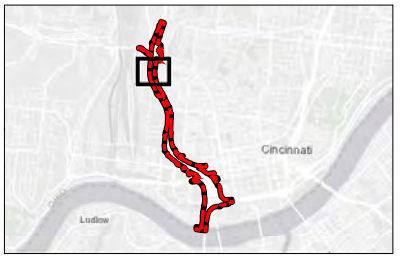

Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 9 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

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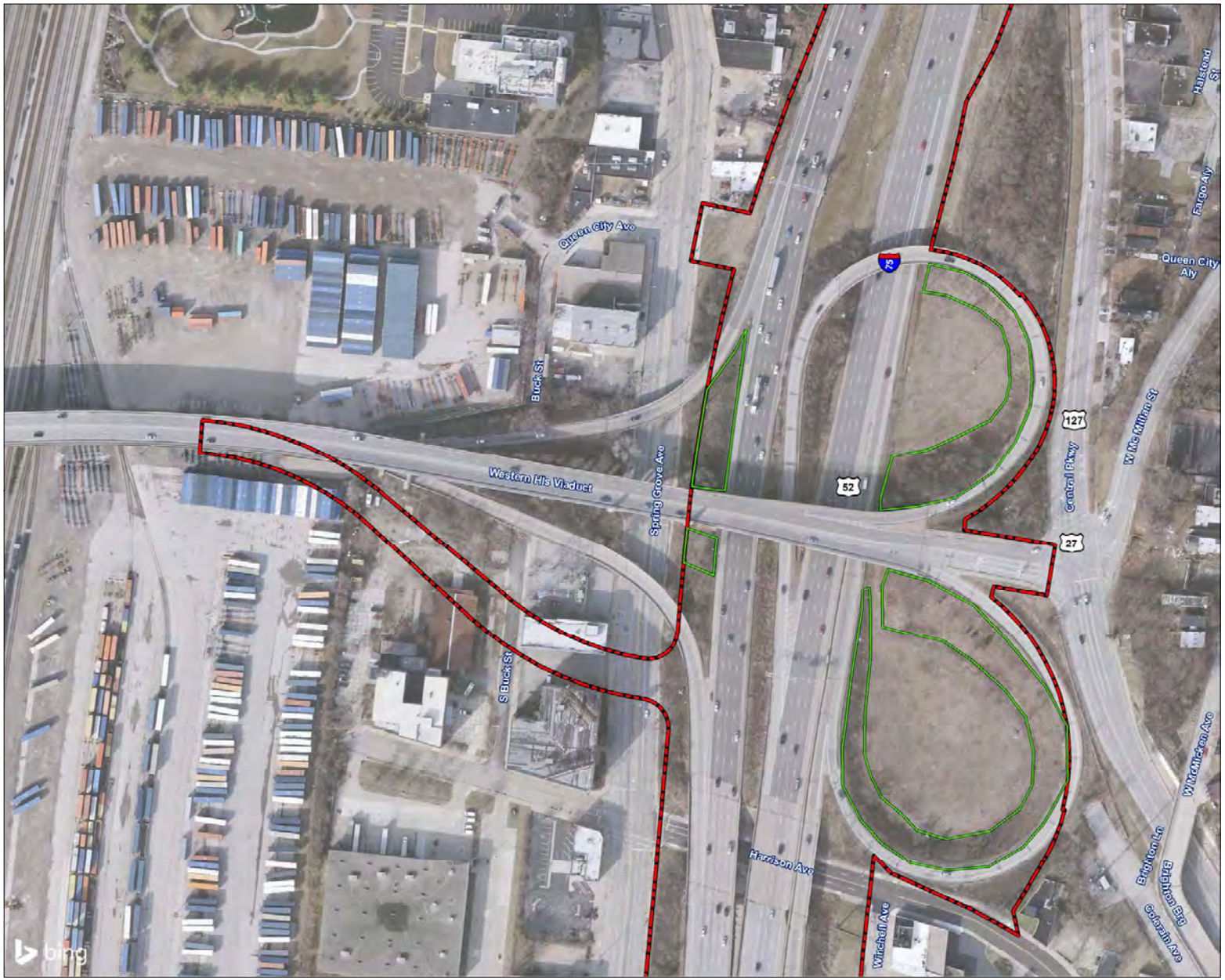

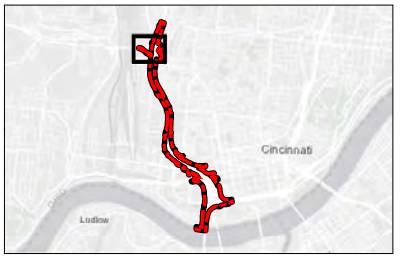

Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 10 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

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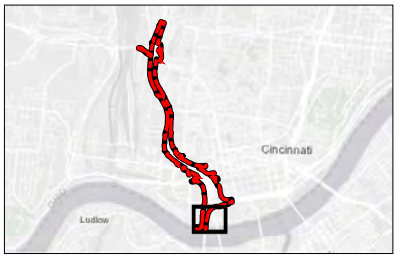
Figure 3 **Sheet 11 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM



Construction limits

Suitable Wooded Habitat (SWH)

Photograph location

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 4 **Sheet 1 of 11**

Aerial photograph showing the ecological resources and photograph locations for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits. (11 Sheets)

Created by TMD, JVT; last saved: 8/4/2022 9:07:29 AM

Construction limits

Suitable Wooded Habitat (SWH)

Photograph location

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 4 **Sheet 2 of 11**

Aerial photograph showing the ecological resources and photograph locations for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits. (11 Sheets)

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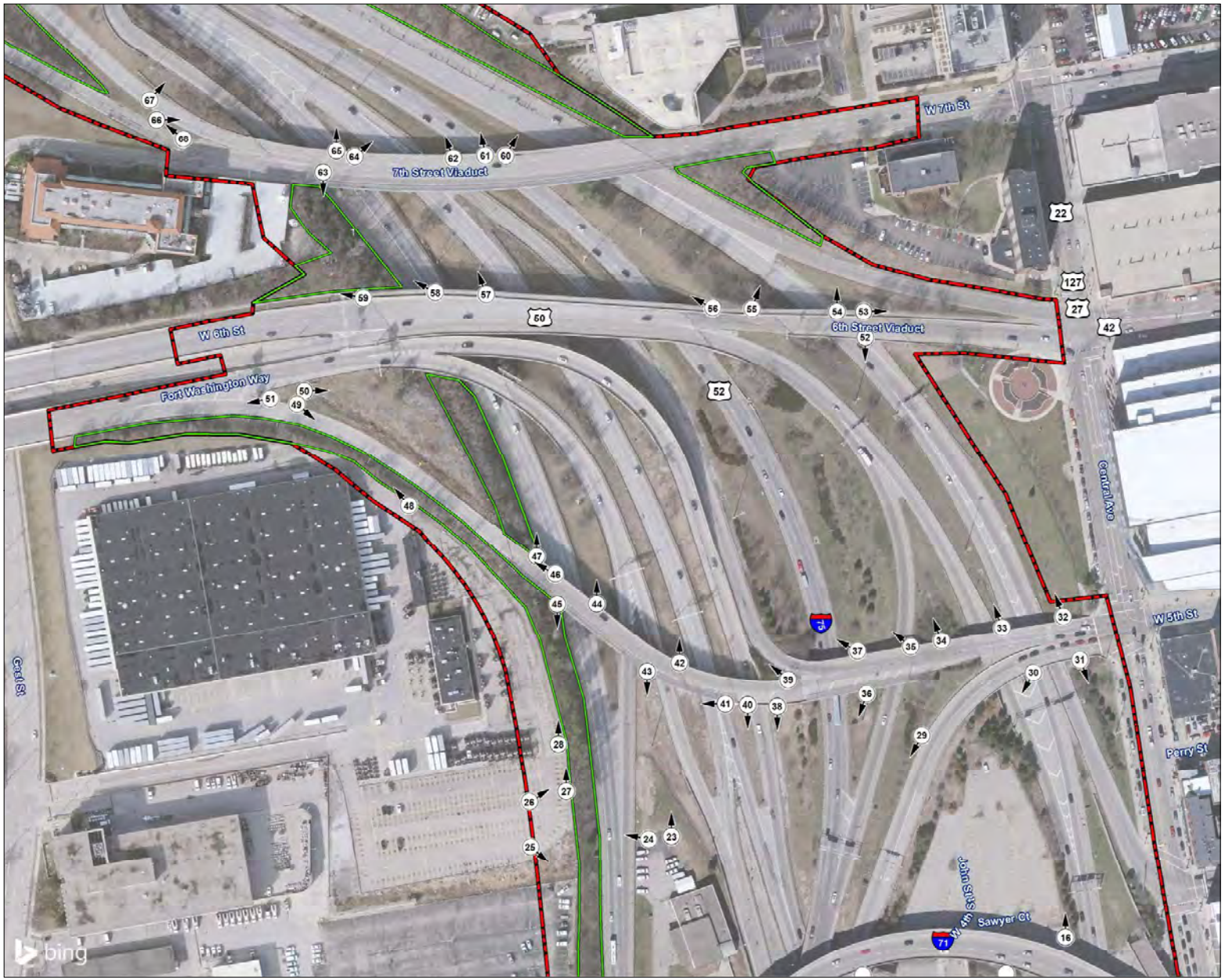

Construction limits

Suitable Wooded Habitat (SWH)

Photograph location

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 4 **Sheet 3 of 11**

Aerial photograph showing the ecological resources and photograph locations for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits. (11 Sheets)

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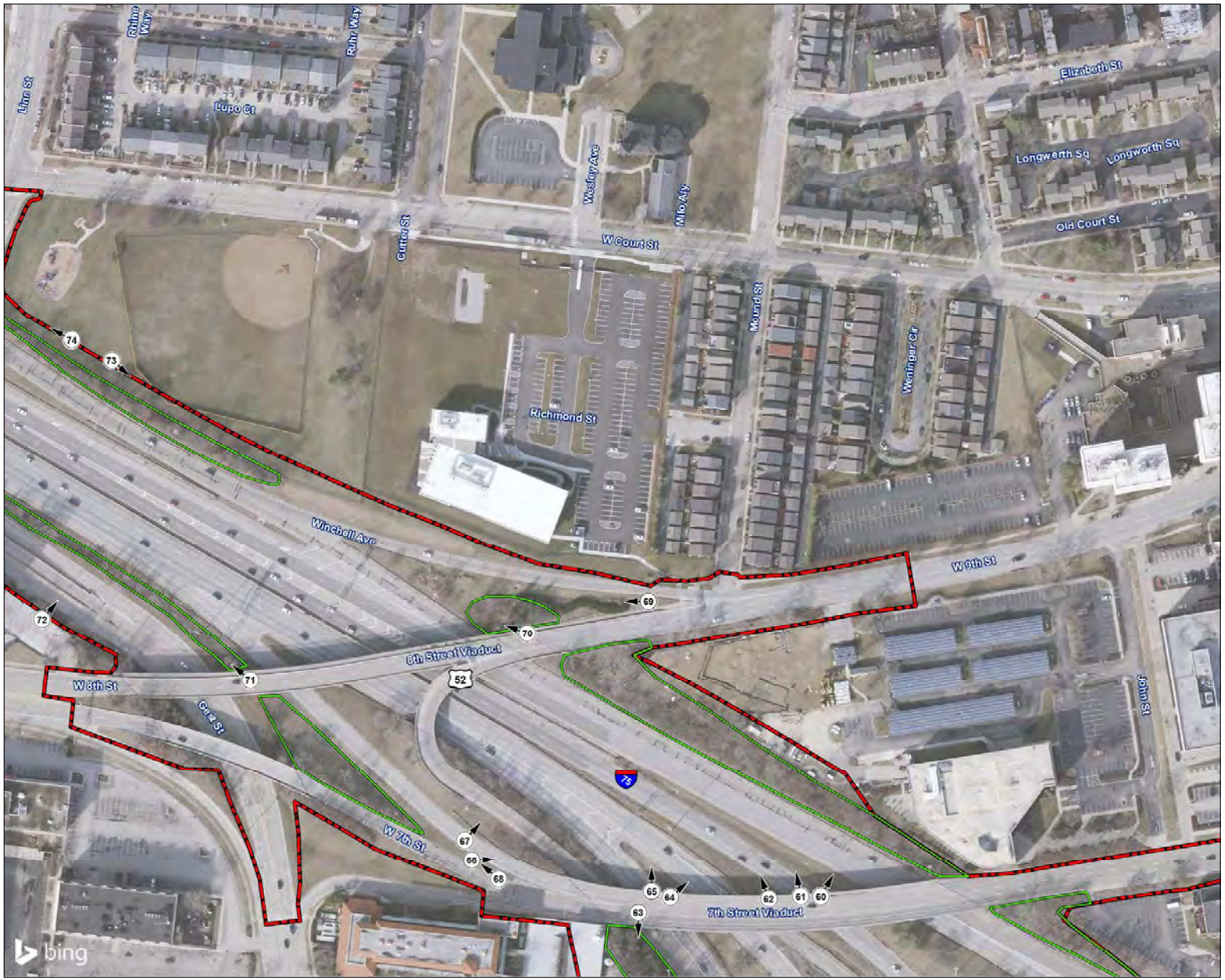

Construction limits

Suitable Wooded Habitat (SWH)

Photograph location

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0 90 180 270 360 450 Feet

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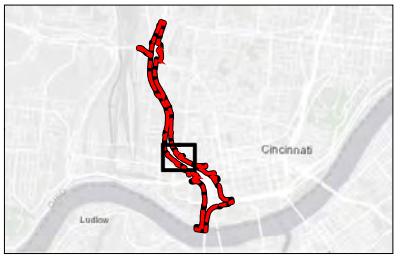

Construction limits

Suitable Wooded Habitat (SWH)

Photograph location

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 4 **Sheet 5 of 11**

Aerial photograph showing the ecological resources and photograph locations for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits. (11 Sheets)

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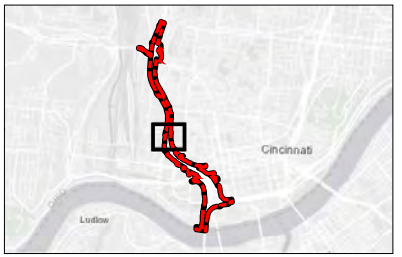

Construction limits

Suitable Wooded Habitat (SWH)

Photograph location

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 4 **Sheet 6 of 11**

Aerial photograph showing the ecological resources and photograph locations for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits. (11 Sheets)

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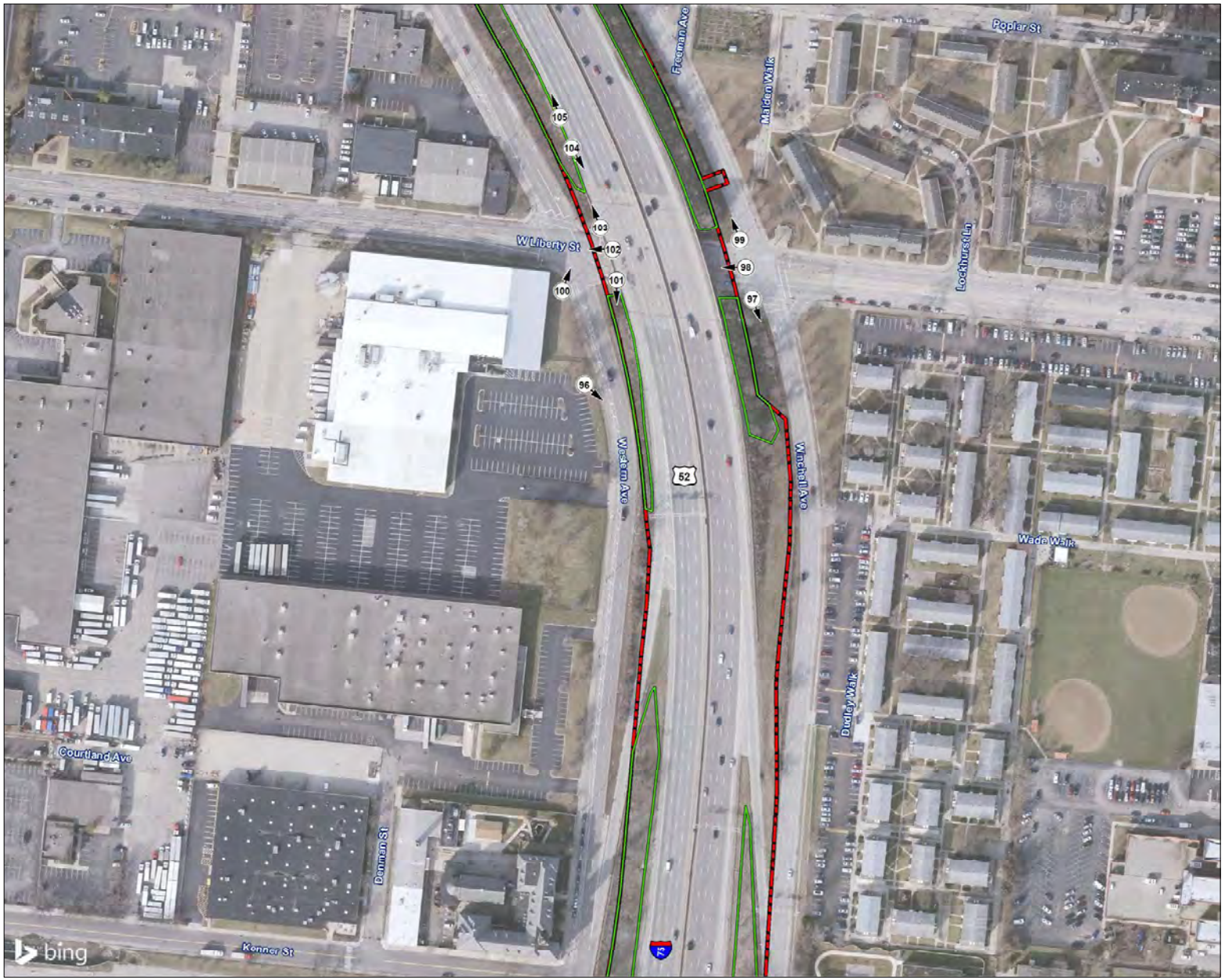

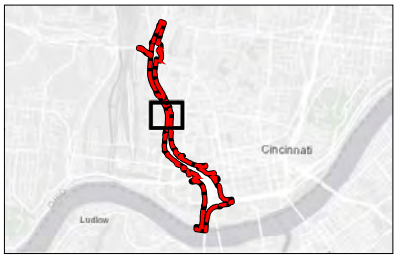

Construction limits

Suitable Wooded Habitat (SWH)

Photograph location

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 4 **Sheet 7 of 11**

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Construction limits

Suitable Wooded Habitat (SWH)

Photograph location

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

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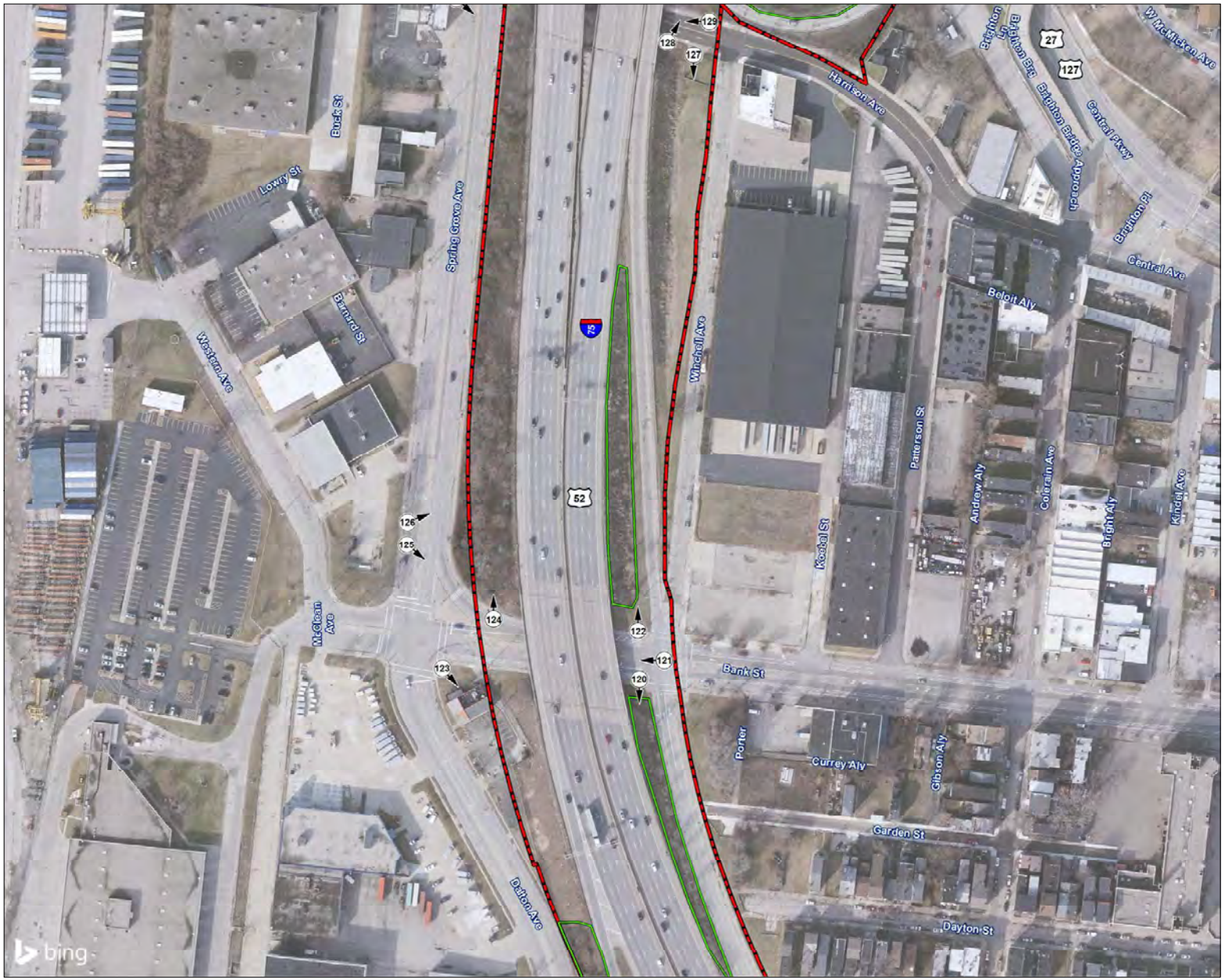
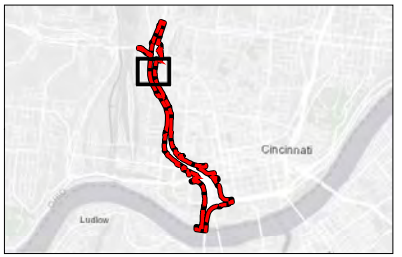
Figure 4 **Sheet 8 of 11**

Aerial photograph showing the ecological resources and photograph locations for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits. (11 Sheets)

Created by TMD, JVT; last saved: 8/4/2022 9:07:29 AM





Construction limits

Suitable Wooded Habitat (SWH)

Photograph location

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

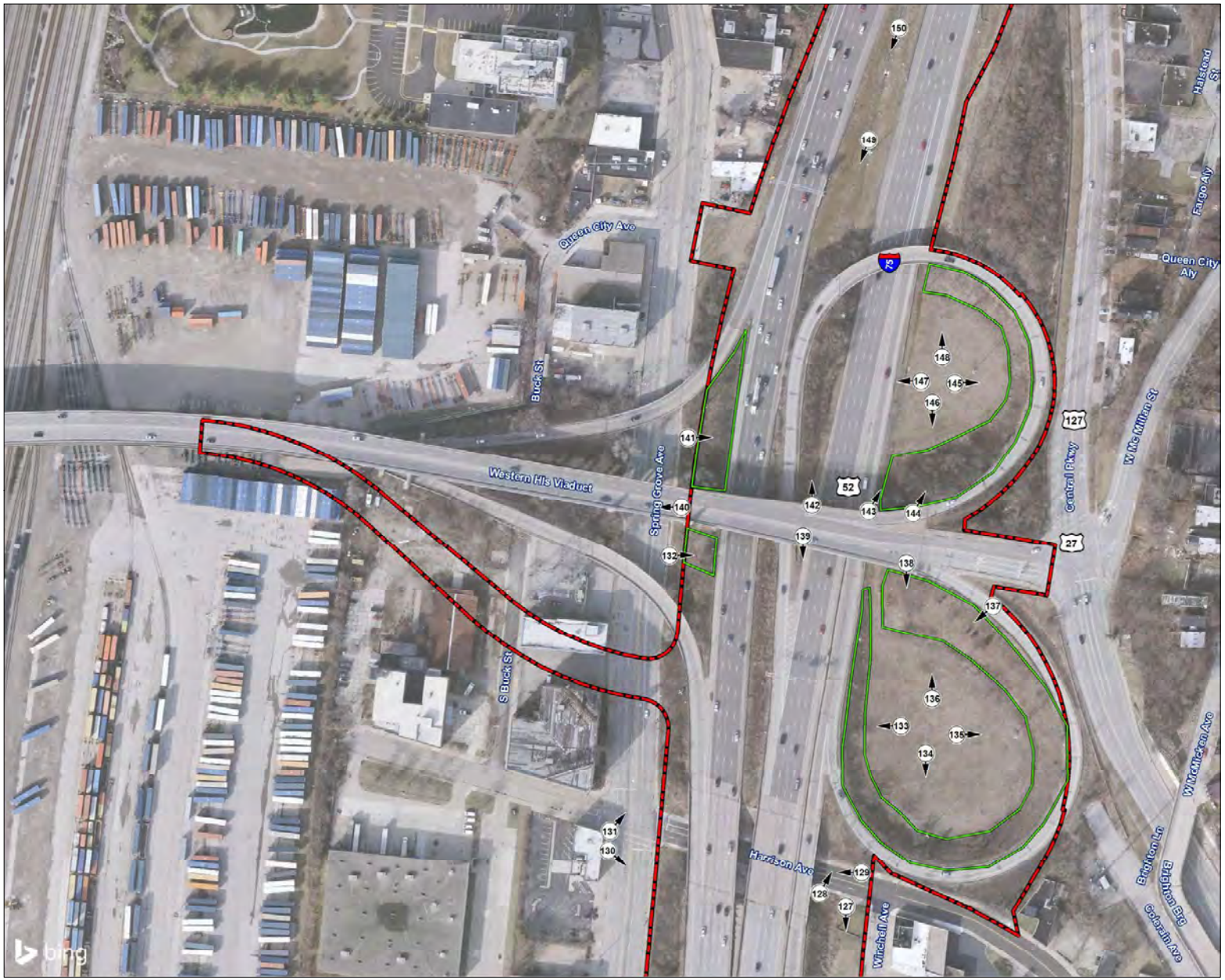
0 25 50 75 100 125 Meters

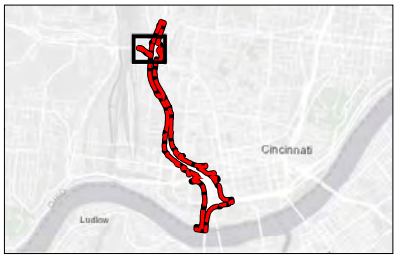
0 90 180 270 360 450 Feet

Figure 4 **Sheet 9 of 11**

Aerial photograph showing the ecological resources and photograph locations for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits. (11 Sheets)

Created by TMD, JVT; last saved: 8/4/2022 9:07:29 AM





Construction limits

Suitable Wooded Habitat (SWH)

Photograph location

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

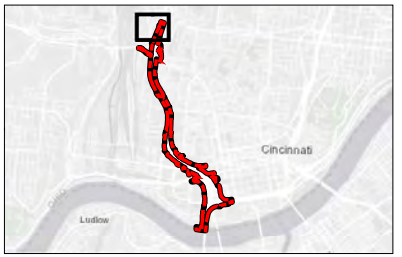
0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 4 **Sheet 10 of 11**

Aerial photograph showing the ecological resources and photograph locations for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits. (11 Sheets)

Created by TMD, JVT; last saved: 8/4/2022 9:07:29 AM



Construction limits

Suitable Wooded Habitat (SWH)

Photograph location

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 4 **Sheet 11 of 11**

Aerial photograph showing the ecological resources and photograph locations for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits. (11 Sheets)

Created by TMD, JVT; last saved: 8/4/2022 9:07:29 AM

Photograph 1. View of Suitable Wooded Habitat (SWH) adjacent to the Brent Spence Bridge, looking south.

Photograph 2. View of the study area adjacent to the Brent Spence Bridge, looking north.

Photograph 3. View of SWH (right) adjacent to the Brent Spence Bridge, looking east.

Photograph 4. View of SWH and concrete armored slopes along the Ohio River, looking south.

Photograph 5. View of the study area adjacent to the Brent Spence Bridge, looking northeast.

Photograph 6. View of SWH under the Brent Spence Bridge, looking south.

Photograph 7. View of SWH adjacent to the Brent Spence Bridge, looking southwest.

Photograph 8. View of the underside of the Brent Spence Bridge showing no signs of bat usage, looking south.

Photograph 9. View of the underside of the Brent Spence Bridge showing no signs of bat usage, looking south.

Photograph 10. View of the underside of the Brent Spence Bridge showing no signs of bat usage, looking north.

Photograph 11. View of study area, looking south.

Photograph 12. View of study area, looking north.

Photograph 13. View of study area, looking northwest.

Photograph 14. View of study area, looking northeast.

Photograph 15. View of mowed grass in the study area, looking south.

Photograph 16. View of I-75 right-of-way with a mix of deciduous and pine trees, looking north.

Photograph 17. View of study area with disturbed ground, looking south-southeast.

Photograph 18. View of I-75 right-of-way with shrubs, looking southwest.

Photograph 19. View of study area, looking south.

Photograph 20. View of I-75 right-of-way with SWH, looking southeast.

Photograph 21. View of I-75 right-of-way with SWH, looking northeast.

Photograph 22. View of I-75 right-of-way, looking south.

Photograph 23. View of mowed grass in the study area, looking north.

Photograph 24. View of study area with SWH, looking west-northwest.

Photograph 25. Distant view of SWH along the I-75 right-of-way, looking southeast.

Photograph 26. View of SWH along the I-75 right-of-way, looking northeast.

Photograph 27. View of SWH along the I-75 right-of-way and UPS parking area, looking north.

Photograph 28. View of SWH along the I-75 right-of-way and UPS parking area, looking north.

Photograph 29. View of I-75 right-of-way, looking southwest.

Photograph 30. View of I-75 right-of-way with pine trees and shrubby growth, looking southwest.

Photograph 31. View of I-75 right-of-way with pine trees and shrubby growth, looking southeast.

Photograph 32. View of I-75 right-of-way with mowed grass and shrubby growth, looking northwest.

Photograph 33. View of I-75 right-of-way with mowed grass, looking northwest.

Photograph 34. View of I-75 right-of-way with mowed grass, looking northwest.

Photograph 35. View of I-75 right-of-way with mowed grass and pine trees, looking northwest.

Photograph 36. View of shrubby I-75 right-of-way, looking southwest.

Photograph 37. View of I-75 right-of-way with mowed grass, shrubby growth, and pine trees, looking northwest.

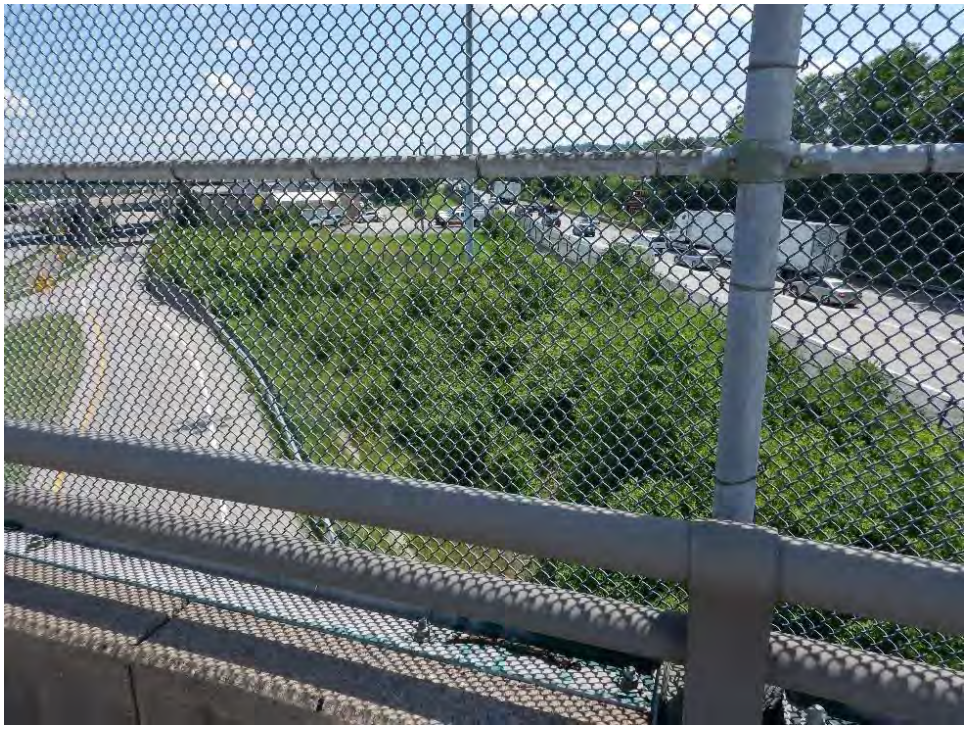
Photograph 38. View of I-75 right-of-way, looking south.

Photograph 39. View of I-75 right-of-way, looking northwest.

Photograph 40. View of I-75 right-of-way, looking south.

Photograph 41. View of I-75 right-of-way with mowed grass, shrubs, and SWH (distant), looking west.

Photograph 42. View of I-75 right-of-way, looking north.



Photograph 43. View of shrubby I-75 right-of-way, looking south.

Photograph 44. View of I-75 right-of-way, looking north.

Photograph 45. View of I-75 right-of-way with SWH (right), looking south.

Photograph 46. View of SWH along the 6th Street Expressway, looking northwest.

Photograph 47. View of I-75 right-of-way with SWH, looking north.

Photograph 48. View of SWH along the I-75 right-of-way and UPS parking area, looking northwest.

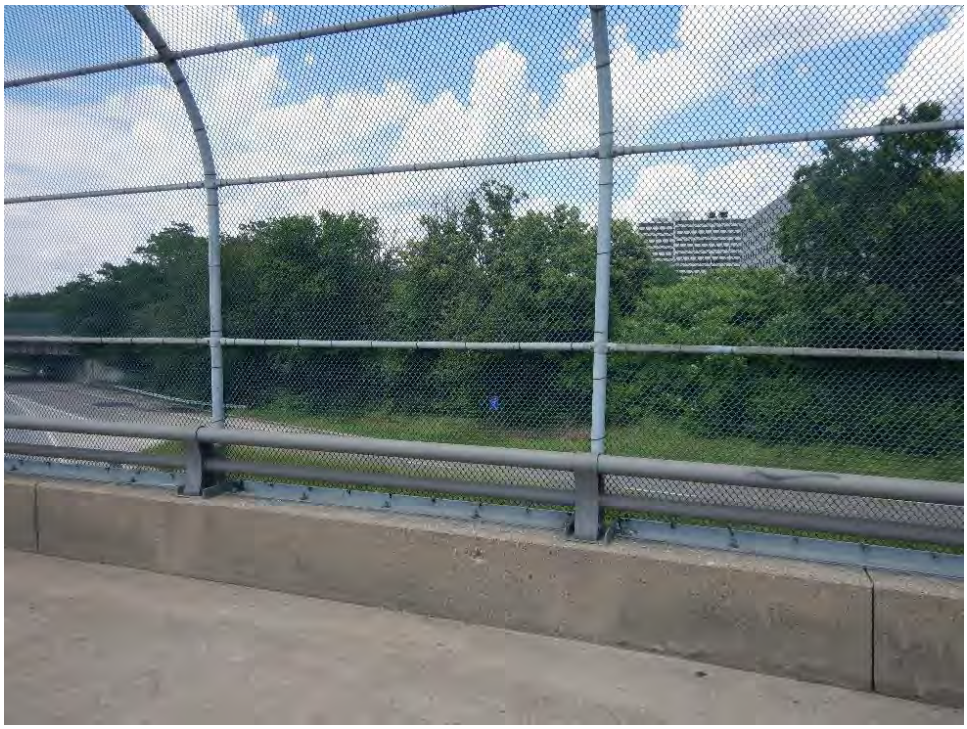
Photograph 49. View of SWH along the 6th Street Expressway, looking southeast.

Photograph 50. View of I-75 right-of-way with mowed grass, shrubby area, and SWH (distant), looking east.

Photograph 51. View of SWH along Fort Washington Way, looking west-southwest.

Photograph 52. View of study area, looking south.

Photograph 53. View of along the 6th Street Viaduct with SWH, looking east.



Photograph 54. View of I-75 right-of-way with SWH (distant), looking north.

Photograph 55. View of I-75 right-of-way with SWH (distant), looking northeast.

Photograph 56. View of study area, looking northwest.

Photograph 57. View of study area, looking northwest.

Photograph 58. View along West 6th Street and I-75 right-of-way with SWH (distant), looking northwest.

Photograph 59. View along West 6th Street with SWH (right), looking west-northwest.

Photograph 60. View of a snag and SWH in the I-75 right-of-way, looking northeast.

Photograph 61. View of a snag and SWH in the I-75 right-of-way, looking north-northwest.

Photograph 62. View of study area, looking northwest.

Photograph 63. View of I-75 right-of-way with SWH, looking south.

Photograph 64. View of I-75 right-of-way with SWH (distant), looking northeast.

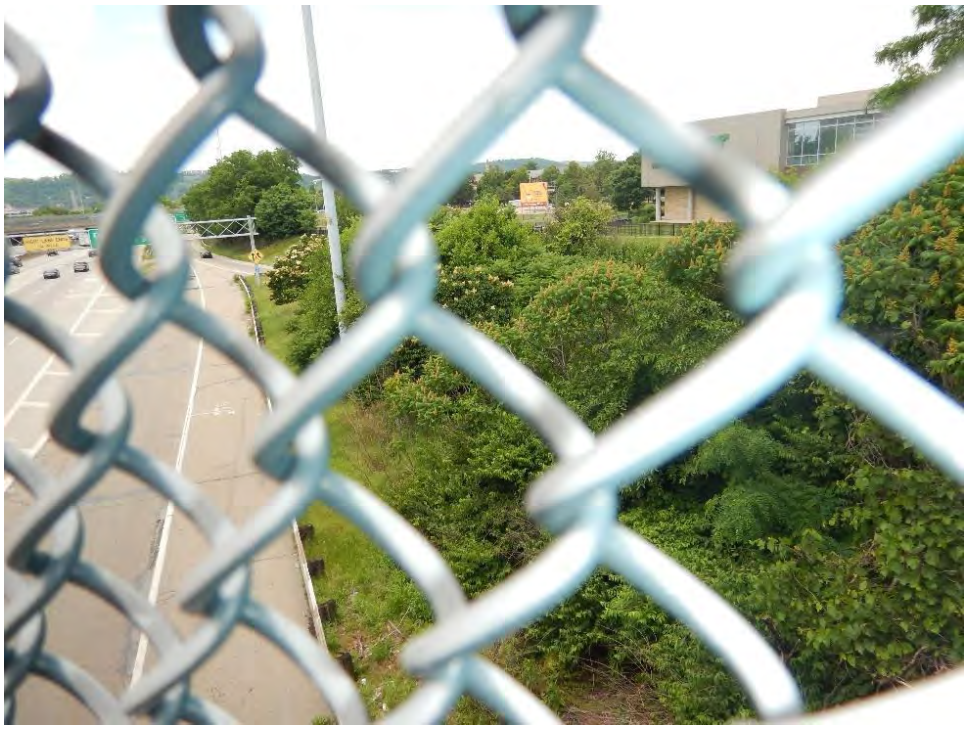
Photograph 65. View of I-75 right-of-way with SWH (distant), looking north.

Photograph 66. View of I-75 right-of-way with SWH, looking east.

Photograph 67. View of I-75 right-of-way with SWH (distant), looking northeast.

Photograph 68. View of I-75 right-of-way with SWH (distant), looking northwest.

Photograph 69. View of study area, looking west.



Photograph 70. View of I-75 right-of-way with SWH (right side), looking west-northwest.

Photograph 71. View of I-75 right-of-way with SWH, looking northwest.

Photograph 72. View of I-75 right-of-way with SWH (distant), looking northeast.

Photograph 73. View of I-75 right-of-way with SWH (right side) and mowed grass, looking southeast.

Photograph 74. View of I-75 right-of-way with SWH (left side) and mowed grass, looking northwest.

Photograph 75. View of I-75 right-of-way with SWH (distant) and mowed grass, looking southwest.

Photograph 76. View of study area along West Court Street, I-75 right-of-way with SWH (distant), and mowed grass, looking northwest.

Photograph 77. View of study area along West Court Street, I-75 right-of-way with SWH (right side), looking south-southeast.

Photograph 78. View of study area along West Court Street, looking south.

Photograph 79. View of study area along West Court Street, I-75 right-of-way with SWH (left side), looking north-northwest.

Photograph 80. View of I-75 right-of-way with SWH and mowed grass, looking southeast.

Photograph 81. View of I-75 right-of-way with SWH and mowed grass, looking northeast.

Photograph 82. View of I-75 right-of-way with SWH (distant) and mowed grass, looking north.

Photograph 83. View of I-75 right-of-way with SWH and mowed grass, looking north.

Photograph 84. View of I-75 right-of-way with mowed grass, looking south.

Photograph 85. View of I-75 right-of-way with SWH, looking north-northwest.

Photograph 86. View of I-75 right-of-way, looking north

Photograph 87. View along Western Avenue and I-75 right-of-way, looking south.

Photograph 88. View along Western Avenue and I-75 right-of-way with SWH (right side), looking north.

Photograph 89. View of I-75 right-of-way with SWH, looking south.

Photograph 90. View along I-75 and right-of-way, looking west.

Photograph 91. View along I-75 and right-of-way with SWH, looking south.

Photograph 92. View of I-75 right-of-way with SWH, looking north.

Photograph 93. View along I-75 and right-of-way, looking east.

Photograph 94. View of I-75 right-of-way with SWH, looking north.

Photograph 95. View along I-75 and right-of-way with SWH (right side), looking north.

Photograph 96. View of Western Avenue with SWH, looking southeast.

Photograph 97. View of I-75 right-of-way with SWH, looking southeast.

Photograph 98. View along West Liberty Street, looking west.

Photograph 99. View of I-75 right-of-way with SWH, looking northwest.

Photograph 100. View of I-75 right-of-way with SWH, looking northeast.

Photograph 101. View along I-75 and right-of-way with SWH, looking south.

Photograph 102. View along West liberty Street, looking west.

Photograph 103. View along I-75 and right-of-way with SWH, looking northwest.

Photograph 104. View along I-75 and right-of-way with SWH, looking southeast.

Photograph 105. View along I-75 and right-of-way with SWH, looking north-northwest.

Photograph 106. View of I-75 right-of-way with SWH, looking southeast.

Photograph 107. View along Findlay Street, looking west.

Photograph 108. View of I-75 right-of-way with SWH, looking north-northwest.

Photograph 109. View of I-75 right-of-way with SWH, looking southeast.

Photograph 110. View of I-75 right-of-way with SWH, looking north

Photograph 111. View along I-75 and right-of-way with SWH, looking south.

Photograph 112. View along Findlay Street, looking west.

Photograph 113. View along I-75 and right-of-way with SWH, looking northwest.

Photograph 114. View along I-75 and right-of-way with SWH, looking southeast.

Photograph 115. View along I-75 and right-of-way with SWH, looking north-northwest.

Photograph 116. View of I-75 right-of-way with SWH, looking southeast.

Photograph 117. View of trees in the study area, looking northwest.

Photograph 118. View of I-75 right-of-way and Winchell Avenue, looking southeast.

Photograph 119. View of I-75 right-of-way and Winchell Avenue, looking northwest.

Photograph 120. View of I-75 right-of-way with SWH, looking south

Photograph 121. View along Banks Street, looking west.

Photograph 122. View of I-75 right-of-way with SWH, looking north.

Photograph 123. View of mowed grass, looking southeast.

Photograph 124. View of I-75 right-of-way with shrubby vegetation, looking north.

Photograph 125. View of I-75 right-of-way with shrubby vegetation, looking southeast.

Photograph 126. View of I-75 right-of-way with shrubby vegetation, looking northeast.

Photograph 127. View of mowed right-of-way, looking south.

Photograph 128. View of I-75 right-of-way with SWH, looking northeast.

Photograph 129. View along Harrison Avenue, looking west.

Photograph 130. View of I-75 right-of-way with shrubby vegetation, looking southeast.

Photograph 131. View of I-75 right-of-way with shrubby vegetation, looking northeast.

Photograph 132. View of I-75 right-of-way with shrubby vegetation, looking east.

Photograph 133. View of I-75 interchange with upland shrubby and grassy vegetation and SWH (distant), looking west

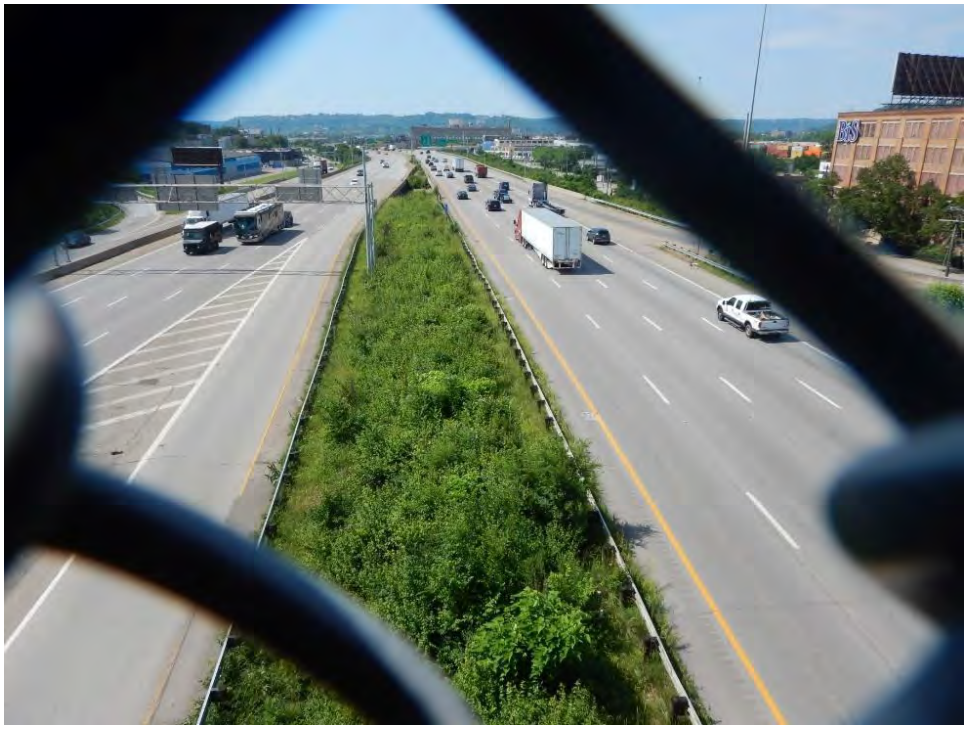
Photograph 134. View of I-75 interchange with upland shrubby and grassy vegetation and SWH (distant), looking south.

Photograph 135. View of I-75 interchange with upland shrubby and grassy vegetation and SWH (distant), looking east.

Photograph 136. View of I-75 interchange with upland shrubby and grassy vegetation and SWH (distant), looking north.

Photograph 137. View of I-75 right-of-way with SWH (in foreground), looking southwest.

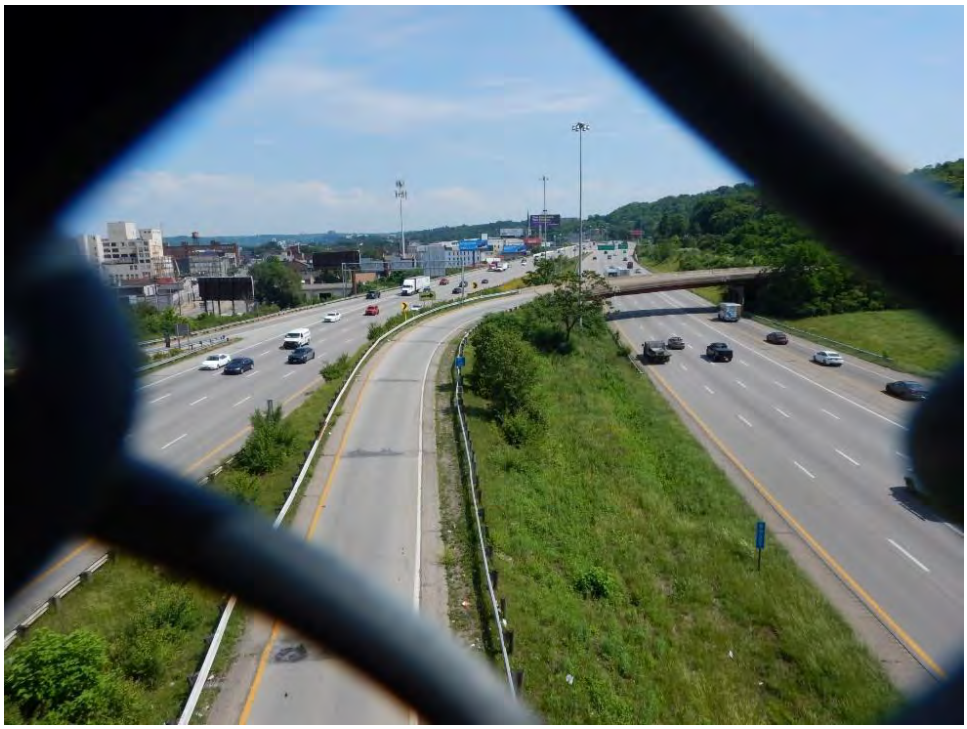
Photograph 138. View of I-75 right-of-way with SWH (along perimeter of interchange), looking south.



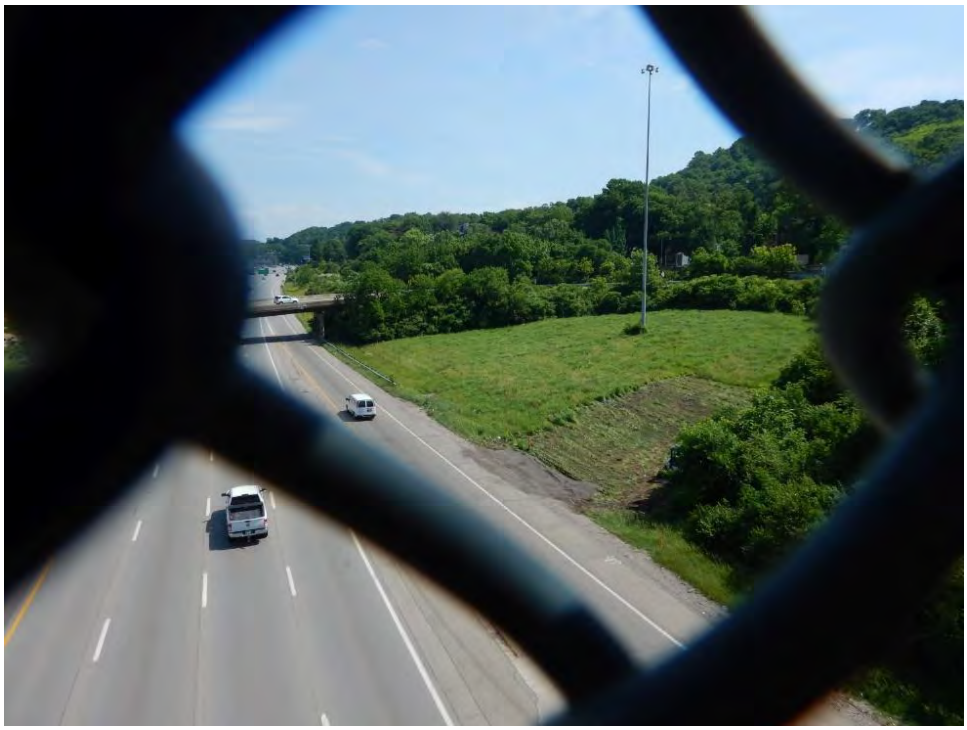
Photograph 139. View of I-75 right-of-way, looking south.

Photograph 140. View along Western Hills Viaduct, looking west.

Photograph 141. View of I-75 right-of-way with SWH, looking east.



Photograph 142. View of I-75 right-of-way, looking north.



Photograph 143. View of I-75 right-of-way with SWH (along perimeter of interchange), looking northeast.

Photograph 144. View of I-75 right-of-way with SWH, looking northeast.

Photograph 145. View of I-75 interchange with upland grassy vegetation and SWH (distant), looking east.

Photograph 146. View of I-75 interchange with upland grassy vegetation and SWH (distant), looking south.

Photograph 147. View of I-75 interchange with upland grassy vegetation and shrubby vegetation (distant), looking west.

Photograph 148. View of I-75 interchange with upland grassy vegetation and SWH (distant), looking north.

Photograph 149. View of I-75 right-of-way with grassy vegetation, looking southwest.

Photograph 150. View of a non-jurisdictional drainage ditch with hydrophytic vegetation, looking southwest.

Photograph 151. View of a non-jurisdictional drainage ditch, looking north-northeast.

Photograph 152. View of a non-jurisdictional drainage ditch with hydrophytic vegetation, looking southwest.

Photograph 153. View along I-75 and right-of-way, looking southwest.

Photograph 154. View of adjacent right-of-way and properties, looking west.

Photograph 155. View along I-75 and right-of-way, looking north-northeast.

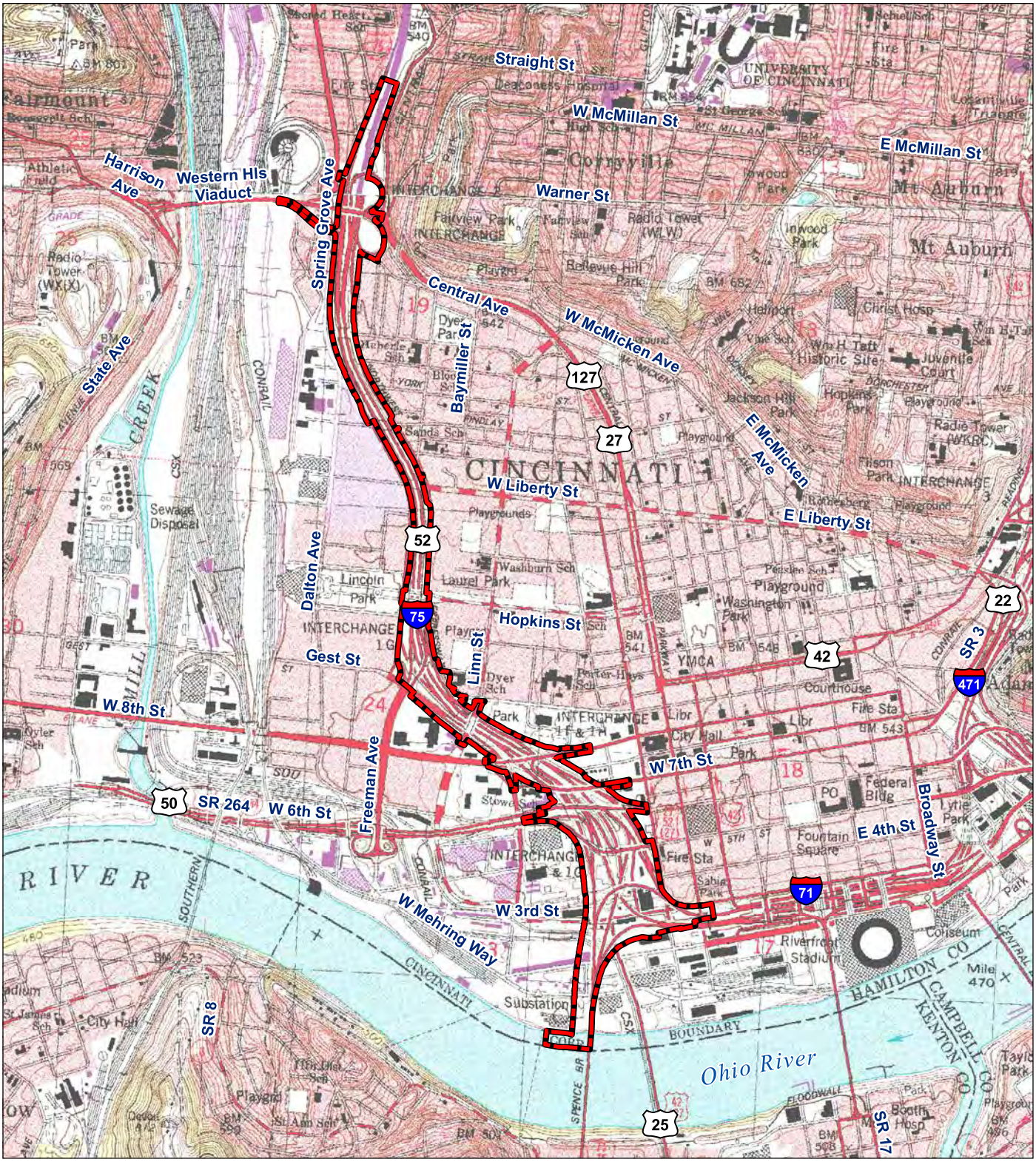


Figure 2

Portions of the 1981Cincinnati West, Ohio and 1987 Covington KY-OH quadrangles (USGS 7.5' topographic maps) showing the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Base: USGS Cincinnati West, OH, and Covington, KY-OH, 7.5' series quadrangles

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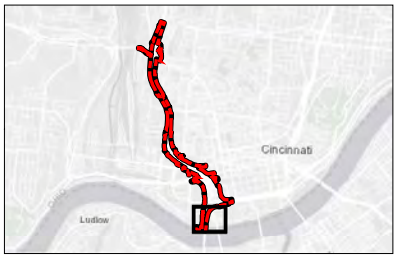


Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 1 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM

Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

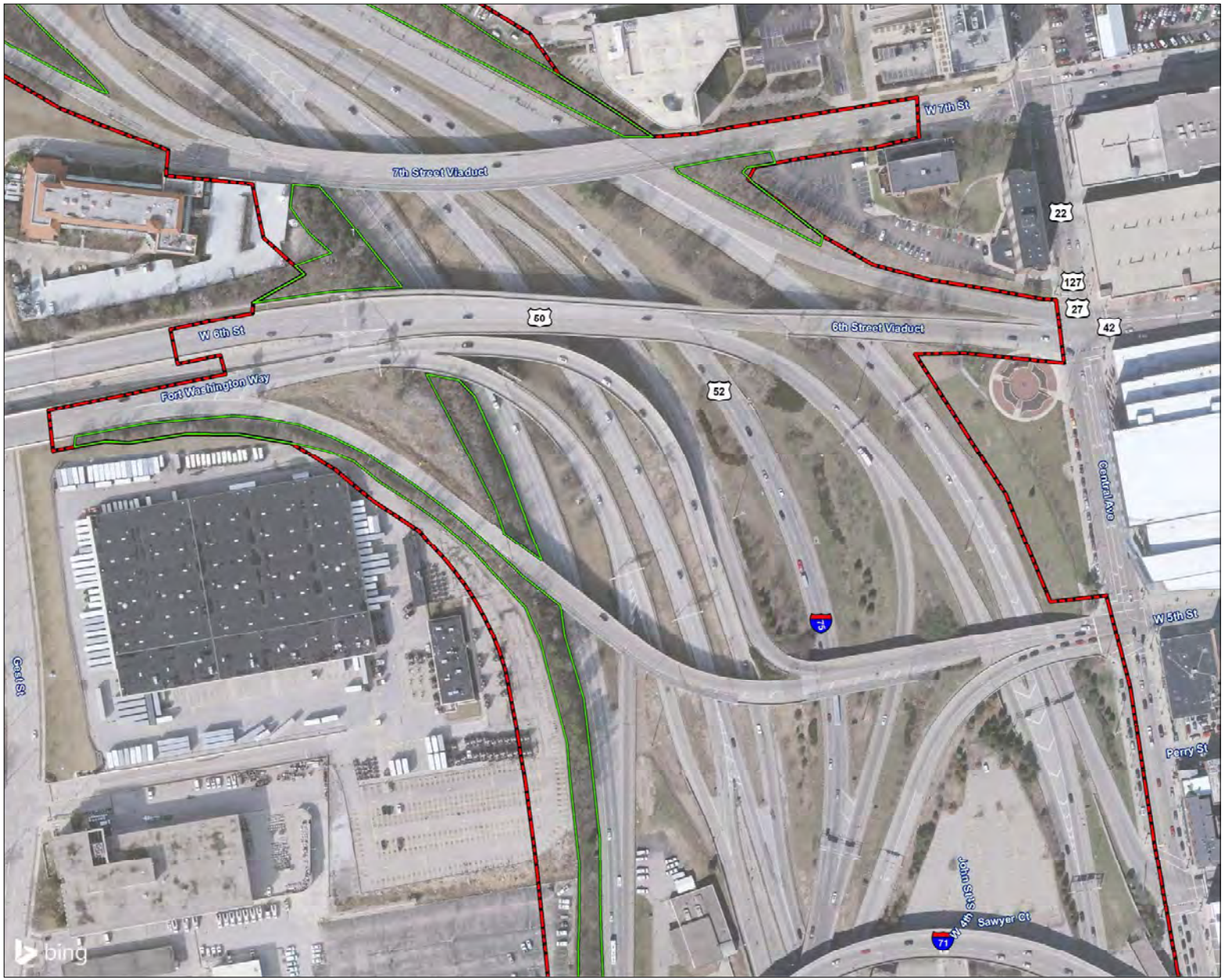
0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 2 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM



Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

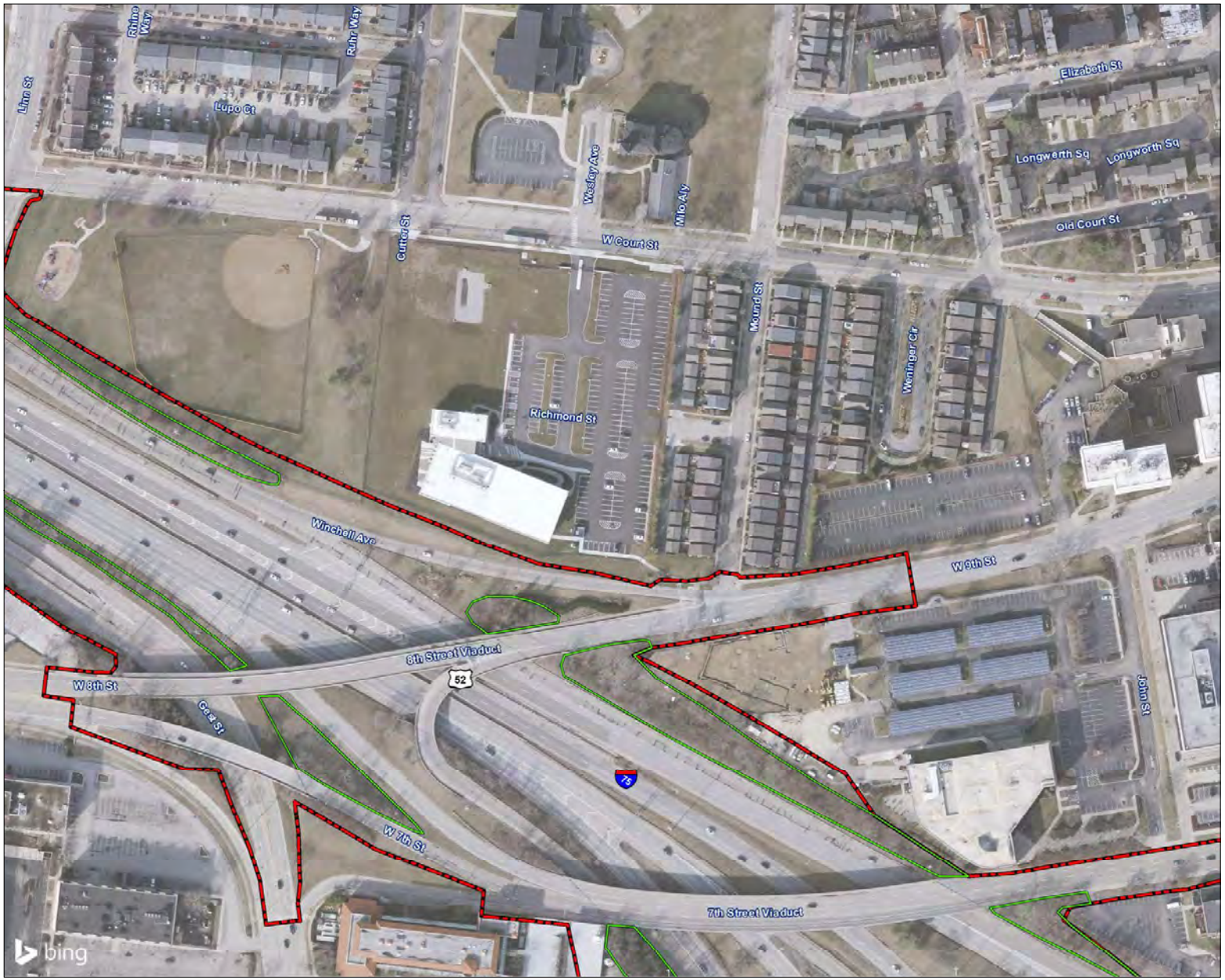
0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 3 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM



Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

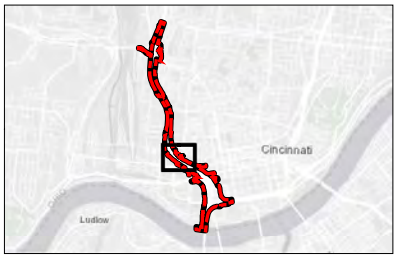
0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 4 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM



Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

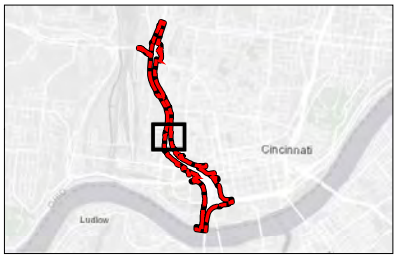
0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 5 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM



Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

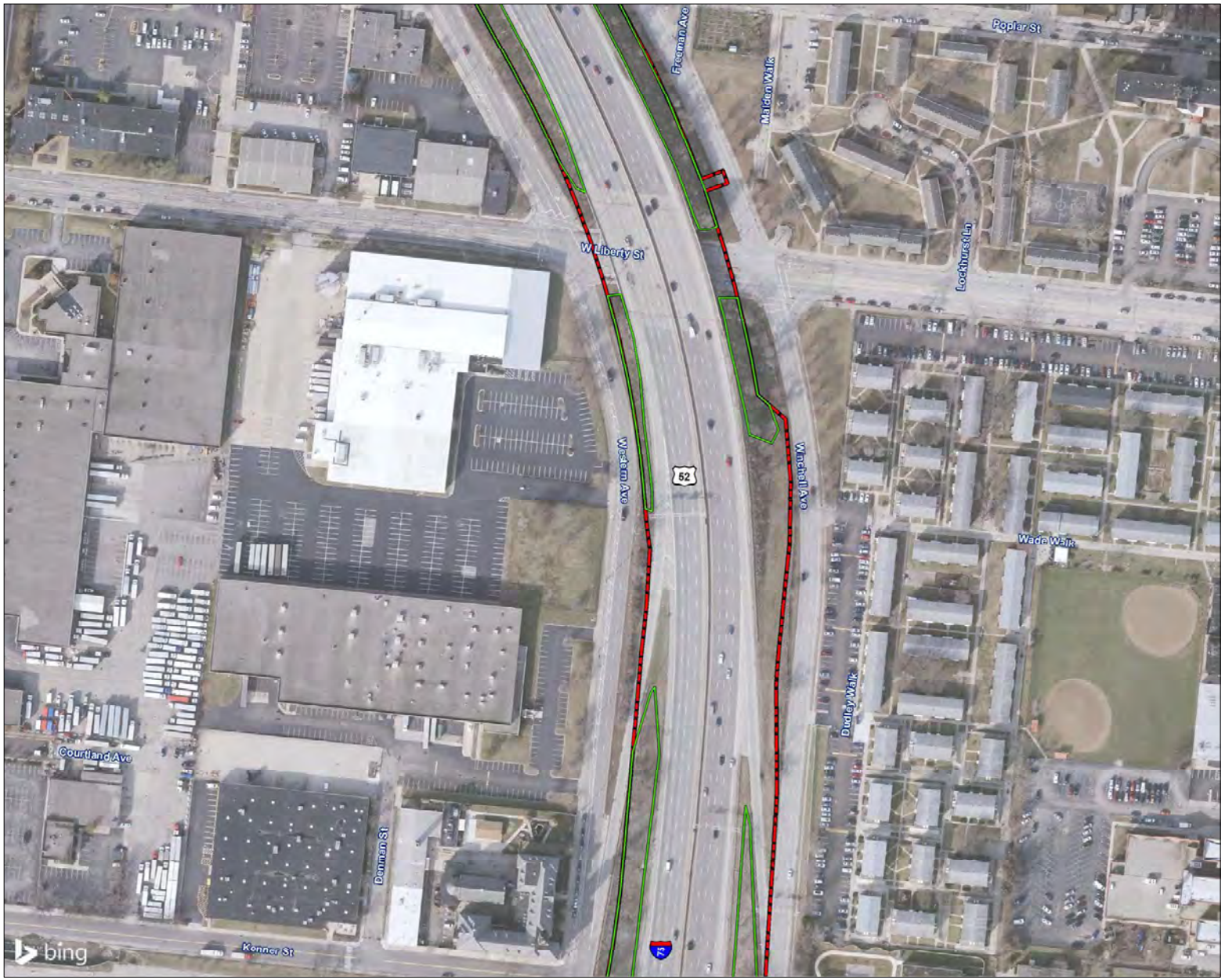
0 25 50 75 100 125 Meters

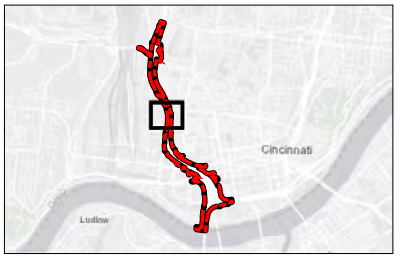
0 90 180 270 360 450 Feet

Figure 3 **Sheet 6 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM





Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 7 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM

Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

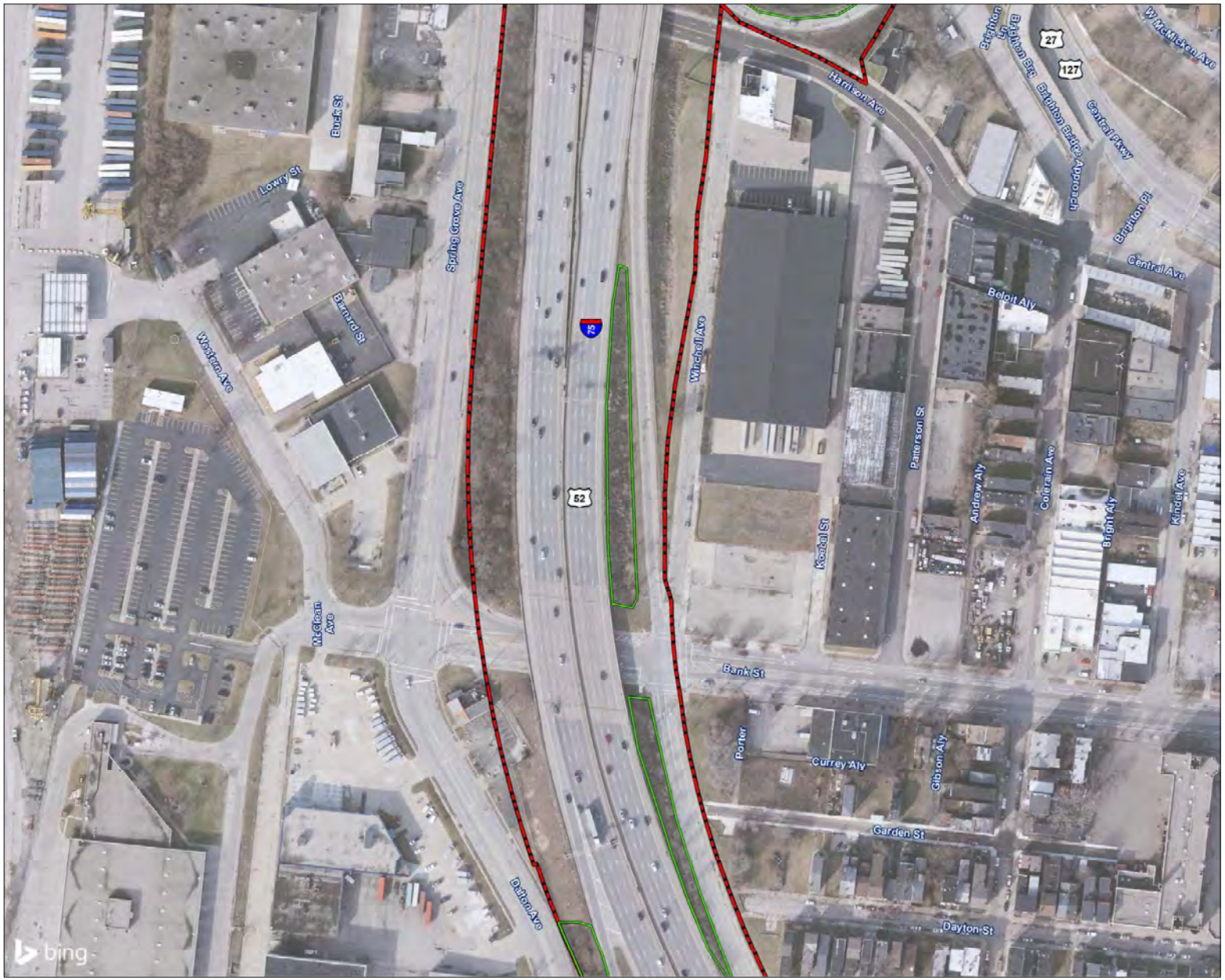
0 25 50 75 100 125 Meters

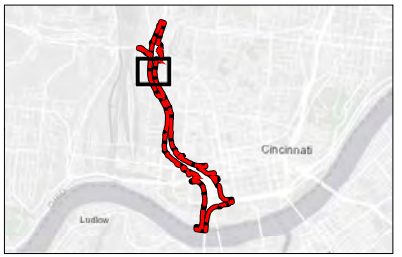
0 90 180 270 360 450 Feet

Figure 3 **Sheet 8 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM





Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

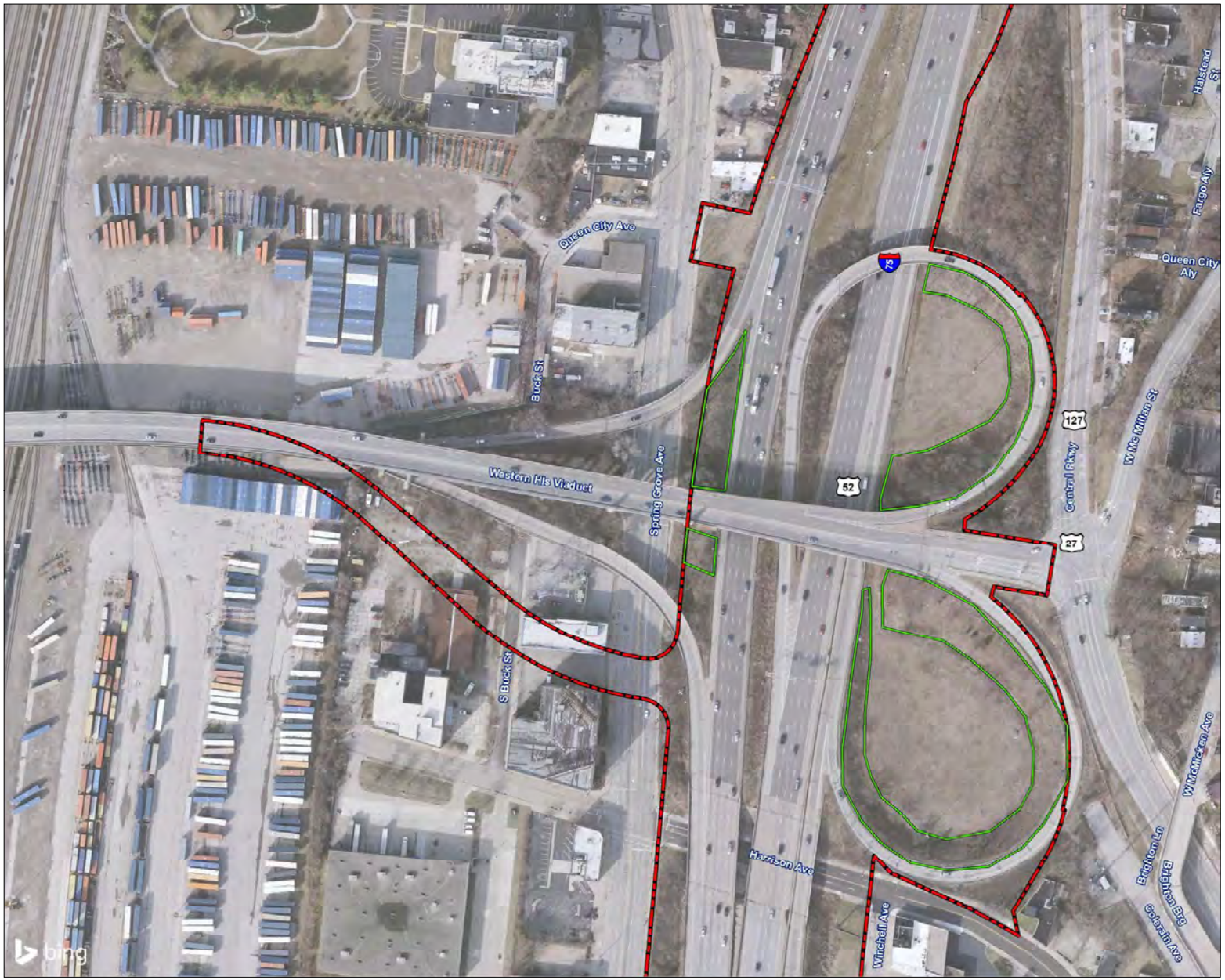
0 25 50 75 100 125 Meters

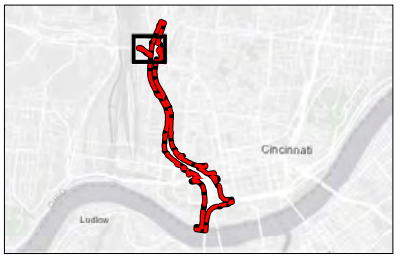
0 90 180 270 360 450 Feet

Figure 3 **Sheet 9 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM





Construction limits

Suitable Wooded Habitat (SWH)

Base: Aerial photograph 2018 and Microsoft Corporation 2022

N

0 25 50 75 100 125 Meters

0 90 180 270 360 450 Feet

Figure 3 **Sheet 10 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM

Figure 3 **Sheet 11 of 11**

Aerial photograph showing the ecological resources for the HAM IR 71/75 0.00/0.22 Re-Eval 2022 construction limits.

Created by TMD, JVT; last saved: 8/2/2022 12:04:02 PM

From: Hallberg, Karen I
To: Len Mikles
Cc: Korfel, Lindsey M
Subject: HAM - IR 71/75-0.00/0.22 - PID 89068- Bat and Eastern Massasauga Buffer Request
Date: Wednesday, July 6, 2022 5:05:03 PM
Attachments: image.png
image.png

Hello Len,

It seems there may have been some confusion with your bat/EMR buffer request. I'm responding here to the follow up email you sent to me on June 20, in case you have not otherwise received a response from us.

I checked our records against the shapefile you provided and found that the project does not lie within any bat buffer or within an EMR range polygon. I've indicated that finding in the buffer options listed immediately below. Please note that we can only provide information on species' presence within the project limits on the Ohio side of the Ohio River. Please request information regarding the presence of federally listed species within the Kentucky portion of the project area from the USFWS Ecological Services Field Office in Frankfort, Kentucky. The POC in that office is Phil DeGarmo, phil_degarmo@fws.gov.

If you have any questions or require additional information, please let me know.
thank you,
Karen

The project is located within the following bat buffer:
_____ BLUE (IBAT hibernaculum)
_____ PURPLE (NLEB hibernaculum)
_____ RED (IBAT swarming location)
_____ YELLOW (Acoustic IBAT detection)
_____ GOLD (IBAT maternity colony)
_____ BROWN (NLEB maternity roost)
_____ GREEN (Male/Non-repro female IBAT)
__**X**_ Project is not located within a bat buffer

This project is located within an eastern massasauga range polygon:

_____ Yes

__**X**__ No

From: Len Mikles <lmikles@ascgroup.net>

Sent: Monday, June 20, 2022 5:05 PM
To: Hallberg, Karen I <Karen_Hallberg@fws.gov>
Subject: [EXTERNAL] FW: HAM - IR 71/75-0.00/0.22 - PID 89068- Bat and Eastern Massasauga Buffer Request

Hi Karen.

I just wanted to follow up on this request. See below. This is a big area so I have included a shapefile for you to do your buffer analysis. Please let me know if you need anything.

Thank you.

Len Mikles, PWS
Principal Ecologist

ASC Group, Inc.
800 Freeway Drive North, Suite 101
Columbus, Ohio 43229
614.268.2514 (Office)
614.396.7369 (Direct)

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Reply

Forward

From: Len Mikles
Sent: Friday, June 10, 2022 8:49 AM
To: 'Korfel, Lindsey M' <lindsey_korfel@fws.gov>
Subject: RE: HAM - IR 71/75-0.00/0.22 - PID 75119 - Bat and Eastern Massasauga Buffer Request

Hi Lindsey.

When you send the letter can you please use the following PID number in your correspondence?

PID 89068

I was informed by ODOT to use this number instead of the 75119 PID.

Thank you. Have a good weekend.

Len Mikles, PWS
Principal Ecologist

ASC Group, Inc.
800 Freeway Drive North, Suite 101
Columbus, Ohio 43229
614.268.2514 (Office)
614.396.7369 (Direct)

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ASC_New email logo_web

From: Len Mikles
Sent: Friday, June 3, 2022 10:46 AM
To: Korfel, Lindsey M <lindsey_korfel@fws.gov>
Cc: Len Mikles <lmikles@ascgroup.net>
Subject: HAM - IR 71/75-0.00/0.22 - PID 75119 - Bat and Eastern Massasauga Buffer Request

This project is a federal aid highway project, and will be coordinated with your office (if coordination is required) through the ODOT-OES Ecological MOA process and 2017 PBO. This is a request for bat and Eastern Massasauga buffer information only, and a technical guidance letter is not required.

Project coordinates:
Start
Lat.: 39.1313
Long.: -84.5327

End
Lat.: 39.0932
Long.: -84.5225

The project is located within the following bat buffer:
____ BLUE (IBAT hibernaculum)
____ PURPLE (NLEB hibernaculum)
____ RED (IBAT swarming location)
____ YELLOW (Acoustic IBAT detection)
____ GOLD (IBAT maternity colony)
____ BROWN (NLEB maternity roost)
____ GREEN (Male/Non-repro female IBAT)
____ Project is not located within a bat buffer

This project is located within an eastern massasauga range polygon:

_____ Yes

_____ No
Thanks for your help.

Len Mikles, PWS
Principal Ecologist

ASC Group, Inc.
800 Freeway Drive North, Suite 101
Columbus, Ohio 43229
614.268.2514 (Office)
614.396.7369 (Direct)

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Karen I. Hallberg, Ph.D. (she/her)
Wildlife Biologist / Transportation Liaison
U.S. Fish & Wildlife Service
Ohio Ecological Services Field Office
4625 Morse Road, Suite 104
Columbus, OH 43230
karen_hallberg@fws.gov

Direct Line: (614) 528-9697 *(see statement below)*
Main Office Phone: (614) 416-8993 *ext. 123(see statement below)*

Please note I am currently on a full-time telework schedule due to the Covid-19 pandemic and am not checking my office voicemail daily. ***Therefore, please contact me via email to ensure your questions and/or concerns are brought to my immediate attention.***

Jeff Johnson, Chief
Division of Natural Areas & Preserves
2045 Morse Rd, Building H
Columbus, Ohio 43229

June 12, 2022

Len Mikles
ASC Group, Inc.
800 Freeway Dr. N, Suite 101
Columbus, OH 43229

Dear Len,

I have reviewed the Natural Heritage Database for the Brent Spence Bridge (PID 89068) project area in the City of Cincinnati, Hamilton County, Ohio. We have records for ten rare species within a mile of the project area. They are listed below and shown on the attached map by number in blue:

1. Riverbank Paspalum (*Paspalum repens*), T
2. Virginia-mallow (*Ripariosida hermaphrodita*), P
3. Smooth Buttonweed (*Spermacoce glabra*), P
4. Kirtland's Snake (*Clonophis kirtlandii*), T [four locations]
5. Black-crowned Night-heron (*Nycticorax nycticorax*), T
6. Channel Darter (*Percina copelandi*), T
7. River Darter (*Percina shumardi*), T
8. Black Sandshell (*Ligumia recta*), T **
9. Washboard (*Megalonaias nervosa*), E
10. Threehorn Wartyback (*Obliquaria reflexa*), T **

Common name, scientific name and status are given for each species. Conservation status abbreviations are as follows: E = state endangered; T = state threatened; P = state potentially threatened; SC = state species of concern; SI = state special interest; U = state status under review; X = presumed extirpated in Ohio; FE = federal endangered, and FT = federal threatened. ** Note that state conservation status should be re-checked for possible changes on July 1, 2022 at the following website: https://ohiodnr.gov/discover-and-learn/safety-conservation/about-ODNR/wildlife/state-listed-species

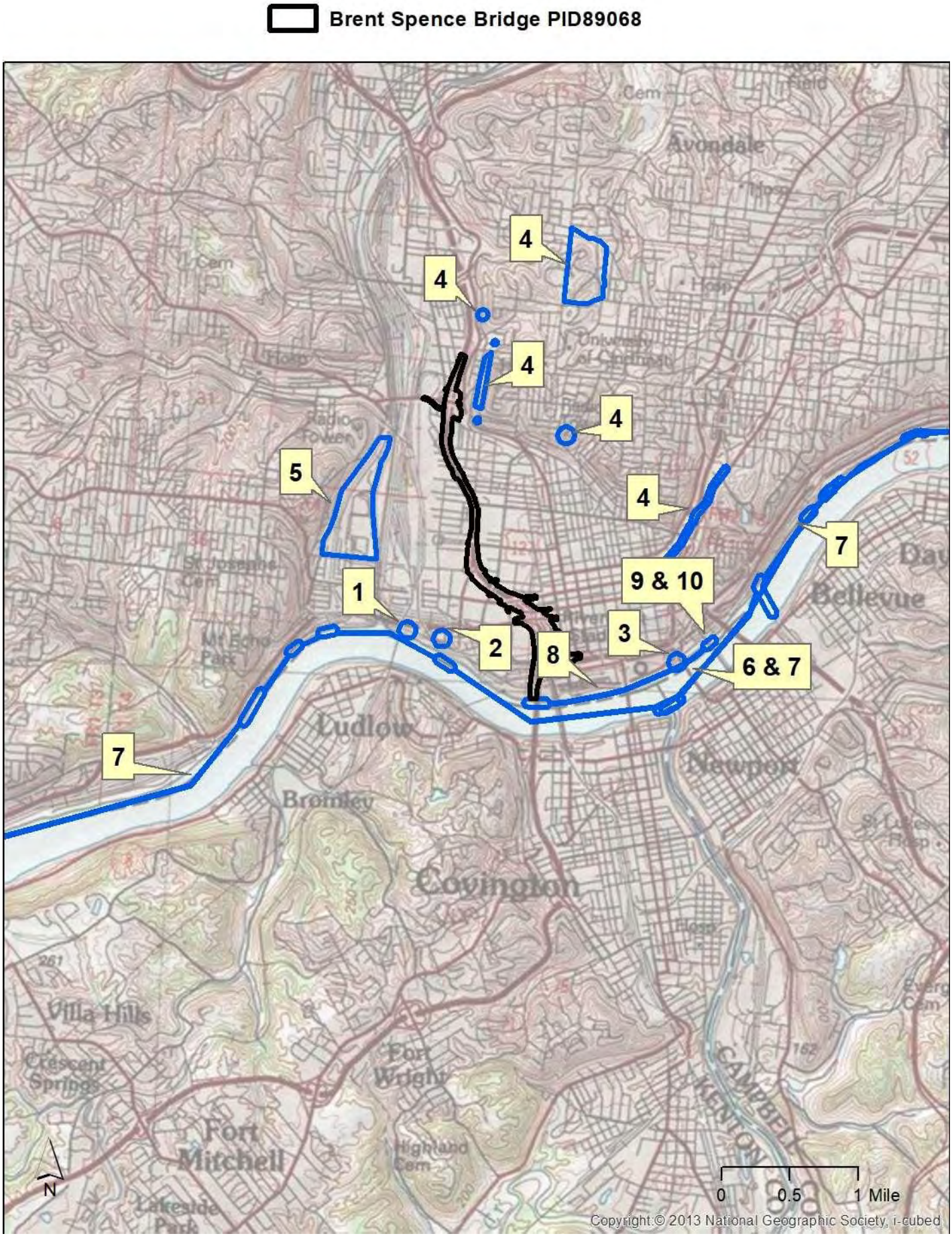
Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. This letter only represents a review of rare species and natural features data within the Ohio Natural Heritage Database. It does not fulfill coordination under the National Environmental Policy Act (NEPA) or the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S. C. 661 et seq.) and does not supersede or

replace the regulatory authority of any local, state or federal agency nor relieve the applicant of the obligation to comply with any local, state or federal laws or regulations.

Please contact me by email or voicemail at 614-265-6818 if I can be of further assistance.

Sincerely,

Kendra Millam
Ohio Natural Heritage Program


Brent Spence Bridge PID89068
4
4
4
4
5
4
7
9 & 10
1
2
8
3
6 & 7
7
Avondale
Bellevue
Ludlow
Bromley
Newport
Covington
Villa Hills
Crescent Springs
Fort Wright
Fort Mitchell
Lakeside Park
N
0
0.5
1 Mile
Copyright:© 2013 National Geographic Society, i-cubed

From: Megan.Michael@dot.ohio.gov
To: Len Mikles
Cc: Matt.Raymond@dot.ohio.gov
Subject: RE: Brent Spence Bridge - Suitable Wooded Habitat
Date: Tuesday, June 14, 2022 11:25:36 AM

Hi Len,

Per our phone call, if the areas are pretty much connected, consider the patches SWH. Overpasses are not a disconnect based on my conversation with USFWS. I wanted to send the follow up email to document the conversation since this project is such a high priority for both Ohio and Kentucky.

Here are areas that should be considered SWH

- Single trees and small patches of trees (less than 0.5 acre) that do possess roosting characteristics may be considered SWH if they are within 1,000 feet of forested areas, or are connected to forested patches via travel corridors or a line of trees.
- Any trees that are part of a wooded area larger than 0.5 acre

Areas that can be eliminated include:

- Large patches of honeysuckle with no trees or only small trees under 3" dbh
- Patches of cedar or other evergreens
- Patches of ornamental plantings
- Areas smaller than 0.5 acres that are obviously isolated from any other areas.

As you noted, trying to determine if all of the little patches of trees are connected or not and determining if they have a snag or a tree with roosting habitat is not really feasible for this size of project and the lack of access along the highway. If the patches of trees are close to a larger strip of trees, count them as SWH. As noted, this would include most of the strips of trees in the ROW along the east and west side of the project corridor. If they are obviously isolated (like no doubt in your mind), don't include them. You can also eliminate stands of evergreens or patches of just honeysuckle and saplings. After the ESR is in, we can always ask USFWS to do a field review and see if they would eliminate other areas based on habitat quality. Coordination seems to go easier if we have been conservative (toward the species) in our calls.

Thanks so much for contacting me and ensuring that we are all on the same page. Have a great afternoon!

Megan Michael
Environmental Specialist 3
Office of Environmental Services
1980 W. Broad Street, Mail Stop 4170
Columbus, Ohio 43223
(p) 614.644-7099
transportation.ohio.gov

From: Len Mikles <lmikles@ascgroup.net>
Sent: Tuesday, June 14, 2022 10:25 AM
To: Michael, Megan <Megan.Michael@dot.ohio.gov>
Subject: RE: Brent Spence Bridge - Suitable Wooded Habitat

Hi Megan.

Sorry for all the questions. I need to go back in the field to look at the area by the Ohio River. It would be good to know if I need to look at some of these smaller wooded areas a little more. What I am thinking from our conversation is that essentially any treed area with snags located in the project footprint needs to be documented as SWH, regardless of size? Please correct me if I am wrong. Below is the approach I have been using.

My approach so far has been to identify the areas 0.5 acres in size. If the area contains snags I consider it SWH and I put a 1,000 ft buffer on it and try to identify smaller areas in the buffer, under a half acre, that might contain snags. If these smaller areas contain snags I consider them SWH.

- Any areas that are half acre or greater and do not contain snags are not considered SWH.
- Smaller areas, under a half acre, not within a 1,000 foot SWH buffer, that do or don't contain snags are NOT considered SWH since they do not meet the PBO half acre threshold. (I am thinking this approach/interpretation of the PBO guidance is not correct based on what you are saying.) There were no PMRT's observed in the project foot print and it looks like there is only riparian buffer by the Ohio River. None of these areas under a half acre are connected to the riparian buffer along the Ohio River.

If it is easier to talk on the phone you can call me at 614-598-3228. Thank you for the help.

Len Mikles, PWS
Principal Ecologist

ASC Group, Inc.
800 Freeway Drive North, Suite 101
Columbus, Ohio 43229
614.268.2514 (Office)
614.396.7369 (Direct)

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From: Megan.Michael@dot.ohio.gov [mailto:Megan.Michael@dot.ohio.gov]
Sent: Monday, June 13, 2022 10:37 AM
To: Len Mikles <lmikles@ascgroup.net>
Subject: RE: Brent Spence Bridge - Suitable Wooded Habitat

If snags exist in the smaller areas, the entire treed area is SWH. You do not have to document the snags.

Thanks,

Megan

From: Len Mikles <lmikles@ascgroup.net>
Sent: Monday, June 13, 2022 10:15 AM
To: Michael, Megan <Megan.Michael@dot.ohio.gov>
Subject: RE: Brent Spence Bridge - Suitable Wooded Habitat

Thanks Megan. I just want to make sure I understand correctly. Areas under a half acre need to be verified for snags. If these smaller areas, under a half acre, contain snags you would like me to document them as SWH or just document the snags?

Thanks.

Len Mikles, PWS
Principal Ecologist

ASC Group, Inc.
800 Freeway Drive North, Suite 101
Columbus, Ohio 43229
614.268.2514 (Office)
614.396.7369 (Direct)

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From: Megan.Michael@dot.ohio.gov [mailto:Megan.Michael@dot.ohio.gov]
Sent: Monday, June 13, 2022 10:00 AM
To: Len Mikles <lmikles@ascgroup.net>
Subject: RE: Brent Spence Bridge - Suitable Wooded Habitat

Hi Len,

In order to eliminate SWH because it is a patch less than 0.5 acre, you will need to look at those areas to determine if they contain snags. I am fine with you using cut-offs as described, but you will have to confirm that they do not contain snags. I have contacted District 8 to see if they can commit to winter clearing (either with or without a separate tree clearing contractor). If they can commit to winter clearing, you won't have to be as particular with trying to eliminate patches of potential SWH. We get unlimited acreage of clearing within 100 feet EOP.

Obviously, the areas that you are looking at are not good bat habitat, but I don't want to turn in a document with any questionable calls. If you think an area may count as SWH, go ahead and count it as SWH. We have the option of a field review with the Ohio USFWS, so if we do end up having to do summer clearing, we may take them out to the site and try to argue against mitigating for poor habitat.

One other caveat: The SWH definition does not count for state listed bats. If an area contains trees, that acreage needs to be counted for at least little brown bat (tricolor tend to use large living trees in woodlots, which msy not exist within this study area). When doing the write-ups in the ESR, do not use the OHPBO terms or definitions for state listed bats.

Let me know if you have any questions or concerns.

Thanks,

Megan

From: Len Mikles <lmikles@ascgroup.net>
Sent: Friday, June 10, 2022 11:51 AM
To: Michael, Megan <Megan.Michael@dot.ohio.gov>
Subject: RE: Brent Spence Bridge - Suitable Wooded Habitat

Thanks Megan. I appreciate the help. Is it okay if I use over pass bridges and areas cut over with shrubby vegetation as breaks for determining if an area meets the 0.5 acreage threshold? That is what I have been doing so far. I have attached some aerials with notes.

Thank you.

Len Mikles, PWS
Principal Ecologist

ASC Group, Inc.
800 Freeway Drive North, Suite 101
Columbus, Ohio 43229
614.268.2514 (Office)
614.396.7369 (Direct)

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From: Megan.Michael@dot.ohio.gov [mailto:Megan.Michael@dot.ohio.gov]
Sent: Friday, June 10, 2022 11:18 AM
To: Len Mikles <lmikles@ascgroup.net>
Subject: RE: Brent Spence Bridge - Suitable Wooded Habitat

I think the areas that are 0.5 acre and greater with snags definitely count. You will have to look at the areas less than 0.5 acre with snags to see if they are further than 1000 feet from other patches of SWH or travel corridors, per the definitions in the OHPBO. All of the acreage is within 100 feet EOP, so the amount is not as important unless they decide to cut in the summer. If you aren't sure for some areas, I would err on the side of calling them habitat. Even if we have to mitigate, I would rather have everything accounted for in the project than have to go back later.

Thanks,

Megan Michael
Environmental Specialist 3
Office of Environmental Services
1980 W. Broad Street, Mail Stop 4170
Columbus, Ohio 43223
(p) 614.644-7099
transportation.ohio.gov

From: Len Mikles <lmikles@ascgroup.net>
Sent: Friday, June 10, 2022 11:10 AM
To: Michael, Megan <Megan.Michael@dot.ohio.gov>
Subject: Brent Spence Bridge - Suitable Wooded Habitat

Hi Megan.

I hope all is well. I wanted to follow up on the meeting yesterday regarding SWH in the Brent Spence Bridge corridor. When I conducted the fieldwork for the project we ran into a couple areas in the I-75 ROW that were slightly greater than a half-acre between overpass bridges and they contained snags with exfoliating bark. The areas are very shrubby with a lot of honeysuckle. Since the areas do have trees, woody growth, snags, and are over a half acre I am inclined to call it SWH for the bats. I am not documenting areas as SWH if they are under a half-acre and contain snags. I attached some pictures of the area in question. Your conformation would be appreciated. I figure it is better to ask now then have this cause a problem down the road.

Thank you. Have a good weekend.

Len Mikles, PWS
Principal Ecologist

ASC Group, Inc.
800 Freeway Drive North, Suite 101
Columbus, Ohio 43229
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