

The USFWS issued a finding on March 13, 2003 that the project is “Not Likely to Adversely Affect” endangered species. The ESA prohibits the taking of endangered species of fish, wildlife and plants, including import or export of endangered species or products made from endangered species; interstate or foreign commerce in listed species or their products; and possessions of unlawfully taken endangered species.

Survey Methods

Through coordination with USFWS, IDNR, KSNPC and the Kentucky Department of Fish and Wildlife Resources, the plant and animal species listed as threatened or endangered on federal or state lists, and which occur within the project area, were identified. Existing records and USGS and National Wetlands Inventory (NWI) maps were also reviewed in an effort to identify potential habitat for the various species. Copies of this correspondence received from resource agencies can be referenced in Appendix C.

In 1999 and 2000, biological surveys were conducted within the project area to search for evidence of the listed plant and animal species and to collect samples of those species. For avian species that occur near streams, stream bank surveys were performed both on foot and by boat. Gravel and sandbars were searched and riparian vegetation was observed for nests. For fish species, archival data for the Ohio River, Beargrass Creek and Harrods Creek was reviewed. Fish species were sampled in Goose Creek, Little Goose Creek, Wolf Pen Branch, Hunting Creek and Muddy Fork (of Beargrass Creek) in Kentucky; Lancassange Creek and Lentzier Creek were sampled in Indiana.

Additionally, as part of the field surveys, the general habitat in the survey area was recorded. For example, while surveying streams for fish, observations of birds in the area, surrounding tree canopy, and understory plants were recorded. Documented coordination with the USFWS can be referenced in Appendix C.

Federal Species

Eleven federally protected species were identified, through consultation, as having potential to occur within the project area. These include:

- **Birds**
 - Bald Eagle
 - Interior Least Tern
- **Mammals**
 - Gray Bat
 - Indiana Bat
- **Mussels**
 - Pink Mucket
 - Ring Pink
 - Orangefoot Pimpleback
 - Fat Pocketbook
 - Clubshell

- **Plants**
 - Short's Goldenrod
 - Running Buffalo Clover

Table 4.7-1 also lists these species and provides information regarding their habitat and potential to occur within the project area.

State Species

Fifty-eight state-listed species were found, through consultation, to have the potential to occur within the project area. State endangered species include any species whose prospects for survival or continued existence within the state are in immediate jeopardy and are in danger of disappearing entirely from the region. This typically includes all species classified as endangered by the federal government, which occur in a particular site. Table 4.7-2 lists these state species along with their habitat and potential for occurrence in the project area.

**Table 4.7-1
Federal Threatened and Endangered Species Potentially Occurring in the Project Area**

Scientific Name	Common Name	Habitat	Status	Potential for Occurrence
BIRDS				
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Tall, dead trees along major water bodies such as the Ohio River, for roosting.	Federal-T	Occurs along Ohio River. Has potential to occur in project area around the Ohio River in the winter during migration. Nearest known nest in Indiana is located in Fredonia, (outside project area). None found during field surveys.
<i>Sterna antillarum</i>	Interior Least Tern	Open or sparsely vegetated sandbars, gravel beaches, and alluvial islands. Also on artificial habitats, such as dredge islands, dike fields, shores of reservoirs, and sand and gravel pits. Lays eggs in a shallow depression in sand or gravel.	Federal-E	Found near the confluence of the Tennessee and Ohio Rivers. A nesting colony exists in Gibson County, Indiana. Historical breeding range has included the Ohio River system. Recorded in the Falls of the Ohio River area. Except for one tern at the Falls of the Ohio, no others observed during field surveys.
MAMMALS				
<i>Myotis grisescens</i>	Gray Bat	Caves in specific home territories, which meet certain temperature and environmental criteria. May migrate seasonally between hibernating and maternity caves, usually located near streams or reservoirs. Uses forested riparian areas, sometimes several miles from the roost cave, for forage and protective flyways.	Federal-E	Recorded in Goose Creek Drainage Basin. Found during field surveys in Indiana and Kentucky within Goose Creek and Lancassange Creek drainage basin. A known maternity site occurs outside the project limits in Southern Indiana. Also identified on the INAAP property outside the project limits.
<i>Myotis sodalis</i>	Indiana Bat	Caves (in winter), which meets certain temperature requirements for hibernation. Large, old (dead), exfoliated trees in forested areas during summer, where it raises young. Forages several miles from the maternity roost, near streams. Tends to return to specific maternity areas each year.	Federal-E	Recorded in a wooded area off Woodside Drive just east of downtown Louisville. Found during field surveys in the Goose Creek drainage area.
MUSSELS				
<i>Lampsilis abrupta</i> , formerly <i>Lampsilis orbiculata</i>	Pink Mucket	Shallow to deep waters with various currents, gravel, cobble, silt, or boulder substrates.	Federal-E	Recorded in Ohio River and its larger tributaries, including a 1982 Ohio River study.
<i>Obovaria retusa</i>	Ring Pink formerly Golf Stick Mussel	Relatively shallow, swift waters with gravel and sand substrates.	Federal-E	Historically found in the large streams of the Ohio River basin in Indiana and Kentucky, including in the Ohio River at Louisville. Today considered extirpated from all but five relic populations, two of which are in Kentucky.
<i>Plethobasus cooperianus</i>	Orange-footed Pimpleback, or Orange-footed Pearly Mussel	Large rivers in sand, gravel or sand/gravel mix substrates, usually at depths of 15 to 20 feet.	Federal-E	Historically common in Ohio river, including New Albany area. Today considered extremely rare with very limited distribution.
<i>Pleurobema clava</i>	Clubshell	Gravel or mixed sand and gravel substrates in deep waters of medium to large rivers.	Federal-E	Reported in Ohio River at Louisville from New Albany shore.
<i>Potamilus capax</i> , formerly <i>Proptera capax</i>	Fat Pocketbook	Medium to large-sized rivers in flowing waters and stable substrate, usually a mixture of silt, clay and sand. Often occurs around islands and back channels at depths of a few inches to 8 feet.	Federal-E	Historically common in Ohio River; found near McAlpine Dam and Falls of the Ohio. Recorded along shoreline near Jeffersonville.
PLANTS				
<i>Solidago shortii</i>	Short's Goldenrod	Does not appear to compete well with other vegetation, and apparently does not tolerate dense shade.	Federal-E	Historically found only in the inner Bluegrass Region along old buffalo traces. Recorded in the Falls of the Ohio, but today considered extirpated from the area. Blue Licks Battlefield State park in north-central Kentucky is the only site where the species grows. None found during field surveys.
<i>Trifolium stoloniferum</i>	Running Buffalo Clover	Along stream banks, trails, and forested areas with filtered light. Apparently prefers disturbed areas such as lawns, parks and cemeteries.	Federal-E	Historically associated with the movement of bison. Occurs only in Kentucky and Indiana Bluegrass regions. None found in project area during field surveys. Grows in the Wolf Pen area (outside project area).

Legend

T = Threatened
E = Endangered

**Table 4.7-2
State Threatened and Endangered Species Potentially Occurring in the Project Area**

Scientific Name	Common Name	Habitat	Status	Potential for Occurrence
FISH				
<i>Acipenser fulvescens</i>	Lake Sturgeon	Lakes and large streams with firm sand or gravel bottoms. Usually travels up river to spawn, although some lake populations do not migrate.	Indiana-E Kentucky-E	Occurs at Falls of the Ohio area.
<i>Alosa alabamae</i>	Alabama Shad	Spends most of adult life in ocean, but swims up rivers to spawn.	Kentucky -E	Occurs in Ohio River near Kennedy Bridge and the area between Sand Island and Sherman Minton Bridge.
<i>Atractosteus spatula</i>	Alligator Gar	Large rivers and oxbow lakes in backwaters and sluggish pools. Bottomland swamps, which flood about the same time the species spawns.	Kentucky-E	Recorded in Falls of the Ohio area.
<i>Cypleptus elongatus</i>	Blue Sucker ¹	Large rivers with strong currents.	Indiana -S	Recorded in the Ohio River near the 606-mile marker adjacent to New Albany.
<i>Ictiobus niger</i>	Black Buffalo	Reservoirs and medium to large rivers with a variety of current speeds and medium to low gradient.	Kentucky -S	Recorded in the Goose Creek drainage, from the backwater area of Ohio River to the confluence of Goose and Little Goose Creeks. None found during field surveys.
<i>Lota lota</i>	Burbot	Deep water of large rivers and lakes.	Kentucky -S	Ohio River is the extreme southern border of its range; recorded in the river at New Albany.
<i>Percopsis omiscomaycis</i>	Trout Perch	Sandy bottom pools in medium sized streams.	Kentucky-S	Recorded in the Harrods Creek drainage. None found during field surveys.
REPTILES				
<i>Clonophis kirtlandii</i>	Kirtland's Water Snake	Wet meadows, edges, open woods, and open swamp forests; often found in urban areas.	Indiana-E Kentucky-T	Recorded in Louisville area and north side of Jeffersonville. None found during field surveys.
BIRDS				
<i>Accipiter striatus</i>	Sharp-shinned Hawk ³	Large tracts of mature forest or small forested lots, for nesting. Also semi-open areas.	Indiana-S Kentucky-S	Recorded in area southwest of Anchorage, Kentucky (outside project area). Found in Lancassange Creek area during field surveys.
<i>Actitis macularia</i>	Spotted Sandpiper	Open areas, including fields, pastures, edges of ponds and streams, and roadsides.	Kentucky-E	Nests sporadically in Kentucky, including Falls of the Ohio area where it nested in substantial numbers in the 1960's; breeding confirmed there in 1985. None found during field surveys.
<i>Aimophila aestivalis</i>	Bachman's Sparrow ²	Open pine or oak woods with scattered understory, grassy orchards, and overgrown fields with thickets and briers.	Indiana-E Kentucky-E	Recorded in Indian Hills, just east of Louisville, and at Black Bridge near Worthington. None found during field surveys.
<i>Ammodramus henslowii</i>	Henslow's Sparrow	Open areas dominated by grassy vegetation, such as abandoned fields, and other unmowed grassy areas. Nests in or on ground.	Indiana-E Kentucky-S	Recorded near the junction of Schuler Lane and Brownsboro Road, at Wolf Pen Branch Road, and in the Worthington area, Highway 22.
<i>Anas discors</i>	Blue-winged Teal	Marshes and ponds; builds nest on ground on borders of water bodies.	Kentucky-T	Recorded in Caperton Swamp in the Beargrass Creek basin and at the Falls of the Ohio. None found during field surveys.
<i>Ardea herodias</i>	Great Blue Heron	Fresh or salt water swamps, lakes, streams, and ponds, for feeding.	Kentucky -S	Found during field surveys in Harrods Creek area near Putney's Pond, in Wolf Pen Creek area, and near Falls of the Ohio. No known nesting colonies occur within these drainages
<i>Bubulcus ibis</i>	Cattle Egret	Ponds and marshes; farms. Nests in trees near water.	Kentucky -S	Recorded on Shipping Port Island near Falls of the Ohio. None found during field surveys.
<i>Ardea alba</i>	Great Egret	Large river floodplains; nest in high trees along riparian corridors, swamps, and forests.	Indiana -S Kentucky-E	Found during field surveys; observed wading near Falls of the Ohio (shoreline). No known nesting colonies in project area.
<i>Cistothorus platensis</i>	Sedge Wren	Moist meadows and grassy margins of marshes and bogs. Cultivated grainfields, overgrown pastures, fallow fields, hayfields, and moist meadows, in areas of thick herbaceous cover.	Indiana -E Kentucky-S	Recorded near Worthington and in the Ohio River bottomlands near Prospect. Found in Wolf Pen Branch area (outside project area) during field surveys.
<i>Egretta caerulea</i>	Little Blue Heron	Fresh water marshes.	Kentucky-E	Recorded at Shipping Port Island near Falls of the Ohio. None found during field surveys.
<i>Falco peregrinus</i>	Peregrine Falcon	Steep and rocky cliffs, or tall buildings, where it nests and hunts for other birds in open areas around the nest. Returns to the same territory each year.	Indiana-E Kentucky-E	Historically nested in Kentucky in cliffs of Pine Mountain area, the south central river gorges, and in trees in western wetlands. Nesting on Kennedy Bridge has been documented for past several years. Observed on three occasions during field surveys, flying over the Ohio River near Kennedy Bridge.

Scientific Name	Common Name	Habitat	Status	Potential for Occurrence
<i>Ixobrychus exilis</i>	Least Bittern	Freshwater marshes, for feeding.	Indiana-E Kentucky-T	Recorded at Riverfields Park area in Louisville and in Caperton Swamp in the Beargrass Creek Basin. None found during field surveys.
<i>Lanius ludovicianus</i>	Loggerhead Shrike	Open country with scattered trees.	Indiana-E Kentucky-E	Found on abandoned quarry property north of Utica during field surveys.
<i>Lophodytes cucullatus</i>	Hooded Merganser	Wetland sloughs and ponds in the lowlands of major rivers, for feeding. Tree cavities in mature forests, for nesting.	Kentucky-T	Recorded in Caperton Swamp just east of Louisville, approximately 300 yards from the Ohio River and Riverfields Park area. None found during field surveys.
<i>Nyctanassa violacea</i>	Yellow-crowned Night Heron	Marshes, swamps, lakes and lagoons; prefer wooded areas. Will nest near residential areas.	Indiana-E Kentucky-T	Recorded at Cherokee Park, Riverfields Park, and two sites at Shipping Port Island. Found during field surveys at Harrods, Goose and Little Goose Creek drainages; no nests identified.
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	Riparian corridors.	Indiana-E Kentucky-T	Long-standing colony has nested along the Ohio River in Louisville area since at least 1930, first on the river islands, most recently on Louisville Zoo grounds (outside project area). Also recorded at Sand and Shipping Port Islands, and the Water Treatment Plant at Clarksville. Found along Harrods Creek, Goose and Little Goose Creeks during field surveys. No nest colonies found.
<i>Passerculus sandwichensis</i>	Savannah Sparrow	Hayfields, pastures, and other grassy areas, where it nests on the ground.	Kentucky -S	Recorded in the project area near Anchorage, Kentucky. None found during field surveys.
<i>Podilymbus podiceps</i>	Pied-billed Grebe	Ponds, lakes, and marshes where it attaches nests to reeds, grasses, or bushes in water.	Kentucky-E	Recorded at Caperton's Swamp in Beargrass Creek basin and Riverfields Park area. None found during field surveys.
<i>Rallus elegans</i>	King Rail	Floodplain sloughs and marshes along large rivers. Nests in cattails, rushes or other aquatic vegetation 6 to 18 inches above the water or ground.	Indiana-E Kentucky-E	Recorded at Beargrass and Falls of the Ohio area. None found during field surveys.
<i>Riparia riparia</i>	Bank Swallow	River and stream banks, or vertical banks of gravel quarries, for nesting.	Kentucky-S	Recorded in Six Mile Island area. Found during field surveys in Utica Pike area near Martin-Marietta ponds, and in Lentzier Creek Drainage area.
<i>Thryomanes bewickii</i>	Bewick's Wren ²	Semi-open areas. Nests in any suitable cavity ranging from woodpecker holes and fence posts, to tin cans and automobiles.	Indiana-E Kentucky -S	Recorded in the Anchorage area. None found during field surveys.
<i>Tyto alba</i>	Barn Owl	Semi-open and open areas; nest in tree cavities or old buildings and houses.	Indiana-E Kentucky-S	Historically found at Anchorage and near Worthington. More recently recorded at a residential area just northwest of the Standiford Field Airport. Found in the Lancassange Creek drainage area during field surveys.
MAMMALS				
<i>Nycticeius humeralis</i>	Evening Bat ³	Abandoned or low activity buildings, tree cavities, or sometimes under the sloughing bark of trees (during summer).	Indiana-E Kentucky-T	Found on Goose Creek drainage during field surveys.
SNAILS				
<i>Leptoxis praerosa</i>	Onyx Rocksnail	Rocks and boulders in riffles of large rivers.	Kentucky- S	Recorded at Falls of the Ohio. None found during field surveys.
<i>Lithasia verrucosa</i>	Varicose Rocksnail	Pools and recently exposed bars with sand, gravel, and rock bottoms.	Kentucky-S	Recorded at northern end of Six Mile Island.
<i>Webbhelix multilineata</i>	Striped Whitelip	Wet marshes, floodplains, meadows, and around lakes and ponds under leaf litter or grass blades and weeds in summer.	Kentucky-T	Recorded just outside project area.
MUSSELS				
<i>Cumberlandia monodonta</i>	Spectaclecase ¹	Low flow areas in large swiftly flowing rivers, with patches of sand, cobble, and gravel in rocky areas.	Kentucky-E	Recorded at Falls of the Ohio. Considered to be extirpated in Indiana.
<i>Epioblasma triquetra</i>	Snuffbox ¹	Medium to large rivers with low sedimentation and gravel riffles.	Kentucky- S Indiana- E	Recorded at Falls of the Ohio.
<i>Fusconaia subrotunda</i>	Long-solid	Large rivers with areas of gravel bottoms.	Indiana-E Kentucky-S	Recorded in the Ohio River at Louisville.
<i>Plethobasus cyphus</i>	Sheepnose	Medium to large rivers with swift currents, in mud, sand or gravel substrates.	Indiana-S Kentucky-T	Recorded at Falls of the Ohio area.
<i>Pleurobema rubrum</i>	Pyramid Pigtoe	Medium to large rivers with gravel or sand bottoms.	Indiana-E Kentucky-E	Recorded in the Ohio River at Louisville.

Scientific Name	Common Name	Habitat	Status	Potential for Occurrence
MUSSELS				
<i>Quadrula cylindrica</i>	Rabbitsfoot	Medium to large rivers with sand or gravel substrates.	Indiana-S Kentucky-T	Recorded in the Ohio River at Louisville.
<i>Simpsonaias ambigua</i>	Salamander Mussel	Medium to large rivers, where it remains under rocks and slabs over a mud or gravel substrate. Host species is mud puppy (<i>Necturus maculosus</i>).	Indiana -S Kentucky-T	Recorded at Falls of the Ohio.
<i>Villosa lienosa</i>	Little Spectaclecase	Small to medium streams with sand or gravel bottom.	Indiana -S Kentucky- S	Recorded at the Indiana side of the Ohio River, 12 miles upstream of Louisville.
CRUSTACEANS				
<i>Gammarus bousfieldi</i>	Spring Amphipod	Bottom of streams and springs frequently abundant in drift.	Indiana-E	Recorded in Falls of the Ohio area. Has potential to occur in project area, since related species were found in both the Lentzier and Lancassange Creek drainages and the Goose Creek, Muddy Fork and Wolf Pen Branch drainages during field surveys.
<i>Orconectes jeffersoni</i>	Louisville Crayfish	Flat cobble and boulder strewn streams.	Kentucky-E	Recorded in the project area at many locations in Beargrass Creek basin and in Harrods Creek basin. Found during field surveys in Goose Creek drainage.
INSECTS				
<i>Pseudanopthalmus troglodytes</i>	Louisville Cave Beetle	Caves.	Kentucky-T	Recorded in the Louisville east quadrangle, Beargrass Creek basin.
PLANTS				
<i>Aristida ramosissima</i>	Branched Three-awn Grass	Open grounds, prairies, or glades, with well-drained soils, or wet soils near populations in adjacent dry soil.	Kentucky-Historic Species	Recorded at Poplar Level Road in east Louisville. None found during field surveys.
<i>Cabomba caroliniana</i>	Carolina Fanwort	Ponds, swamps and still waters in streams.	Kentucky-T	Recorded at the Cave Hill Cemetery area in Louisville. None found during field surveys.
<i>Castanea pumila</i>	Allegheny Chinkapin	Pine and oak-pine woods, in relatively dry soil.	Kentucky-T	Recorded at Cherokee Park in the Beargrass Creek basin. Found in Wolf Pen drainage area and the cliff lines north of Utica during field surveys.
<i>Heteranthera dubia</i>	Grassleaf mud-plantain	Ponds and streams in calm shallow waters, and mud flats near water.	Kentucky-S	Recorded at the Falls of the Ohio area near Clarksville. None found during field surveys.
<i>Melanthium woodii</i>	Wood Bunchflower	Rich dry or mesic woods.	Kentucky-T	Recorded at the Audubon Park area in east Louisville and the Harrods Creek drainage basin. None found during fields surveys.
<i>Podostemum ceratophyllum</i>	Threadfoot	Swiftly moving water in larger streams and rivers.	Kentucky-S	Historically found in Falls of the Ohio area. None found during field surveys.
<i>Pontederia cordata</i>	Pickereel-weed	Muddy banks of shallow water, sloughs, oxbow lakes, swamps, ditches and marshes.	Kentucky-T	Recorded in Louisville near Cave Hill Cemetery. None found during field surveys.
<i>Potamogeton illinoensis</i>	Illinois Pondweed	Quiet waters of lakes, streams, ponds, and ditches.	Kentucky-S	Recorded at the municipal harbor near Towhead Island.
<i>Rubus centralis</i>	Illinois Blackberry	Wooded slopes and openings.	Indiana-E	Recorded approximately 2 miles north of Jeffersonville. None found during field surveys.
<i>Sagittaria graminea</i>	Grass-leaf Arrowhead	Shallow waters or mud of swamps, drainage ditches, small steams, sloughs, ponds or lakeshores.	Kentucky-T	Recorded on the Indiana side of the Falls of the Ohio area. None found during field surveys.
<i>Sedum telephioides</i>	Allegheny Stonecrop	Rocks and cliffs generally at higher elevations.	Indiana-T Kentucky-T	Recorded on the cliff lines north of Utica. None found during field surveys.
<i>Thalictrum pubescens</i> formerly <i>Thalictrum polygamum</i>	Tall Meadowrue	Low ground of floodplain woods and thickets.	Indiana-T	Recorded about 3 miles north of Jeffersonville, Indiana. Found in Goose Creek drainage area during field surveys.
<i>Vallisneria americana</i>	Eel-grass	Major streams near their banks; submerged plant.	Kentucky-S	Recorded in the Ohio River at Cox Park, on the southeast side of Six Mile Island, and at Falls of the Ohio. None found during field surveys.

Legend

T = threatened species

E = endangered species

S = species of special concern

1. Candidate for federal threatened or endangered status.

2. Under status review, i.e. being monitored for change in status by USFWS.

3. Not documented in project area, but sighted during field surveys as part of this project.

4.7.4 Natural Areas

State nature preserves are those areas that are declared by a particular state to merit legal protection because of their unique natural features, such as providing habitat for rare species. Although the public is encouraged to visit these areas, they must abide by strict rules during their visit.

Indiana

The IDNR manages the nature preserves in Indiana. There are currently no dedicated nature preserves within the project area in Indiana.

Kentucky

One dedicated nature preserve exists in the project area in Kentucky. Six Mile Island Nature Preserve, which is managed by the KSNPC, is an 81 acre island located in the Ohio River in Jefferson County near Louisville. It was protected in 1979 so it could return to its natural state. It is largely forested and is noted for its variety of waterbirds. Access is only by boat. Fishing, nature study and bird watching are permitted, but collecting, hunting and trapping are prohibited.

4.8 Water Resources

Water resources within the project area include groundwater and surface water, such as aquifers, wetlands, streams, rivers and ponds. These resources provide a potential supply of water for wildlife and plant habitat, human consumption and hygiene, industrial and agricultural productions and recreation. Sources of pollution leading to degradation in overall water quality include sedimentation, organic wastes, industrial wastewater discharges, agricultural and urban runoff and hazardous substance spills.

Specific groundwater sources in the project area include deep wells in the gravelly outwash areas along the Ohio River. However, not enough water can be obtained from dug wells, drilled wells or springs to supply all the needs for domestic and farm uses. Most of the water supply is surface water, which is stored in reservoirs, lakes and ponds. In many parts of the project area, water for farm use is also supplied by rural water lines that run from the Ohio River.

Water quality is regulated under the Clean Water Act (CWA) of 1977, as amended (33 U.S.C. 1251-1376). The CWA safeguards the quality of water resources and mandates water pollution control. The quality of drinking water is regulated under the Safe Drinking Water Act (SDWA) of 1974 (42 U.S.C. 300(f), et. seq.) and, in Kentucky, by the Kentucky Water Quality Parameters (administered by KNREPC). Project-related activities impacting water resources must be in compliance with these standards.

Section 303(d) of the CWA requires states to list impaired state water resources every other year. Several of the water resources located within the project area have been listed as impaired by Indiana and Kentucky. Water resources are listed by severity of contamination; the reason for

impairment is identified. A stream is listed as “impaired” when it is unfit for its intended use. In Indiana, neither Lancassange Creek nor Lentzier Creek are listed as impaired streams. According to the Kentucky Division of Water Resources (KDOWR) Section 303 (d) listings (Draft 2002), the following streams are listed:

- **Goose Creek** – In 1998, Goose Creek was listed as a first priority impaired stream with respect to aquatic life and swimming. In 2002, Goose Creek is proposed for listing as a second priority impaired stream. Swimming use is now partially supported.
- **Little Goose Creek** – In 1998, Little Goose Creek was listed as a first priority impaired stream for aquatic life and swimming. In 2002, the stream supports aquatic life, but is still impaired for swimming due to pathogens. Little Goose Creek is proposed for listing as a second priority impaired stream.
- **Muddy Fork** – In 1998, Muddy Fork was listed as a second priority impaired stream for swimming due to pathogens (partially supporting). In 2002, Muddy Fork is proposed for listing as a first priority impaired stream for swimming due to pathogens (non-supporting).
- **Beargrass Creek** – In 1998, Beargrass Creek was listed as a first priority impaired stream for aquatic life. In 2002, Beargrass Creek will be listed again as a first priority impaired stream.
- **Harrods Creek** – The stream was removed as an impaired stream and added to Total Maximum Daily Load (TDML) program in 1995. In 2002, the TMDL for low DO and organic enrichment has been approved.
- **Ohio River** – In 1998, the Ohio River was listed as a second priority impaired stream for fish consumption and swimming. A reduction in chlordane has been noted and the impairment for chlordane contamination will be proposed to the U.S. EPA in 2002.

4.8.1 Surface Water

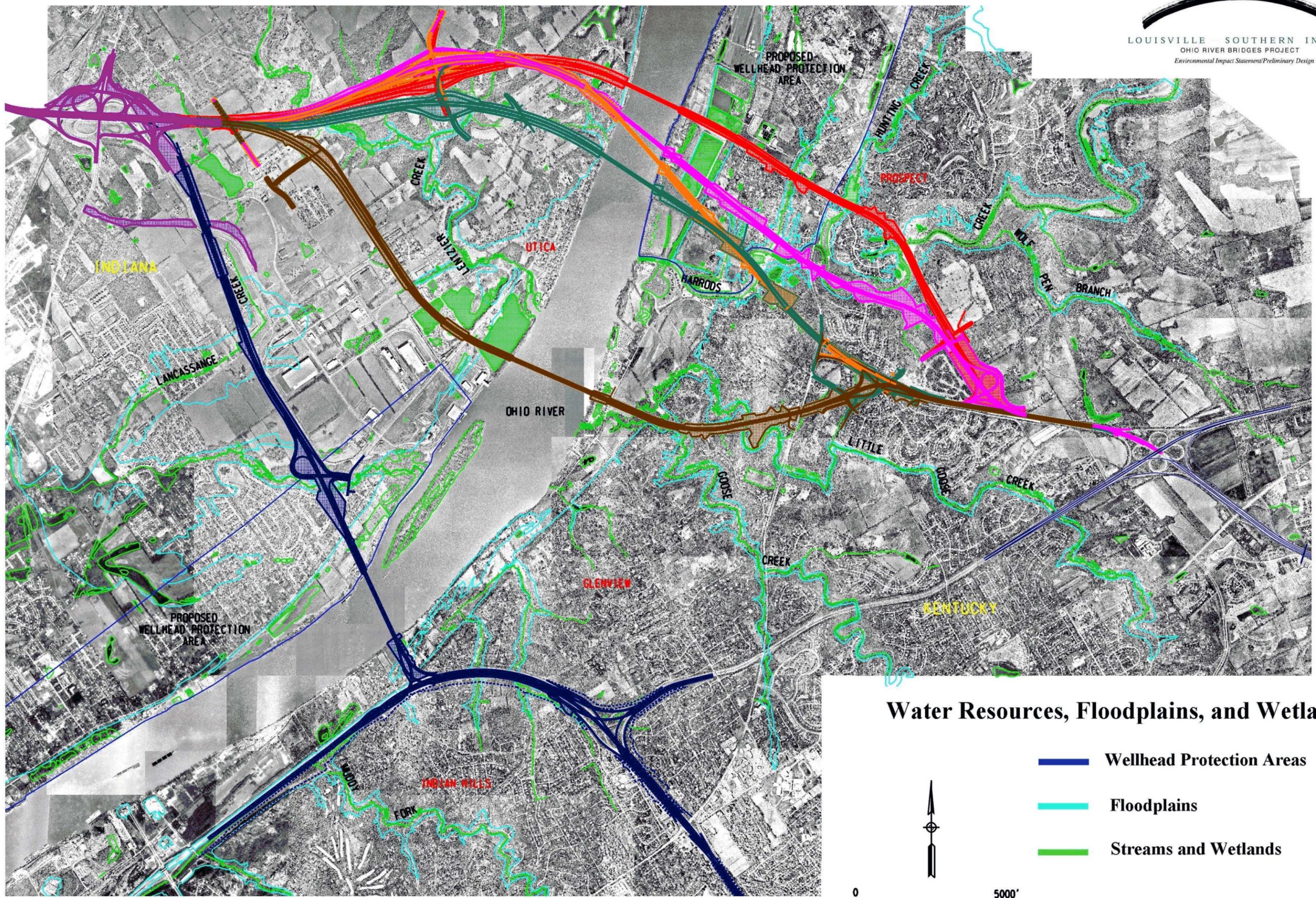
Surface water resources may include oceans, rivers, lakes, streams, tributaries, estuaries and impoundments. Ten surface water bodies were identified for evaluation in the project area: Goose Creek; Little Goose Creek; Wolf Pen Branch; Hunting Creek; Muddy Fork; Beargrass Creek and Harrods Creek in Kentucky; Lancassange Creek and Lentzier Creek in Indiana and the Ohio River. These resources are shown on Figures 4.8-1a and 4.8-1b. The entire project area is within the Ohio River drainage basin. Beneficial uses of surface waters include, but are not limited to, aquatic habitat, drinking water, flood control, transport of goods, agricultural and industrial water supplies and recreational uses.

To assess existing water quality in the project area, each of these water bodies was sampled. Water samples were evaluated to determine the pH, conductivity, total dissolved solids (TDS), temperature, alkalinity, acidity, dissolved oxygen, nitrogen ammonia, nitrates, turbidity, reactive phosphorus, sulfates, color, chloride, hardness and discharge. All samples, while in compliance with Kentucky water quality standards, showed elevated levels of nitrates and sulfates, which are most likely, the result of fertilizer run-off or sewage. Conductivity, a measurement of the current carried by ions in the water, also is an indicator of the total dissolved solids in a sample and indicates changes in water quality. It was found to be elevated in Muddy Fork, Beargrass Creek,



Hunting Creek, Lancassange Creek, Lentzier Creek, Harrods Creek and the Ohio River. Typically, conductivity measures from 250 to 500 microSiemens per centimeter in the Ohio River.

To obtain further information on water quality in Jefferson and Clark Counties, the Louisville and Jefferson County Metropolitan Sewer District (MSD) "Water Quality Report" (2000) and the Indiana "State of the Environment Report" (1999, 2000) were reviewed. The MSD report gives stream-specific information on contaminants such as bacteria (pathogens), nutrients such as nitrogen, phosphorus and metals. The Indiana report discusses the Ohio River basin in general.

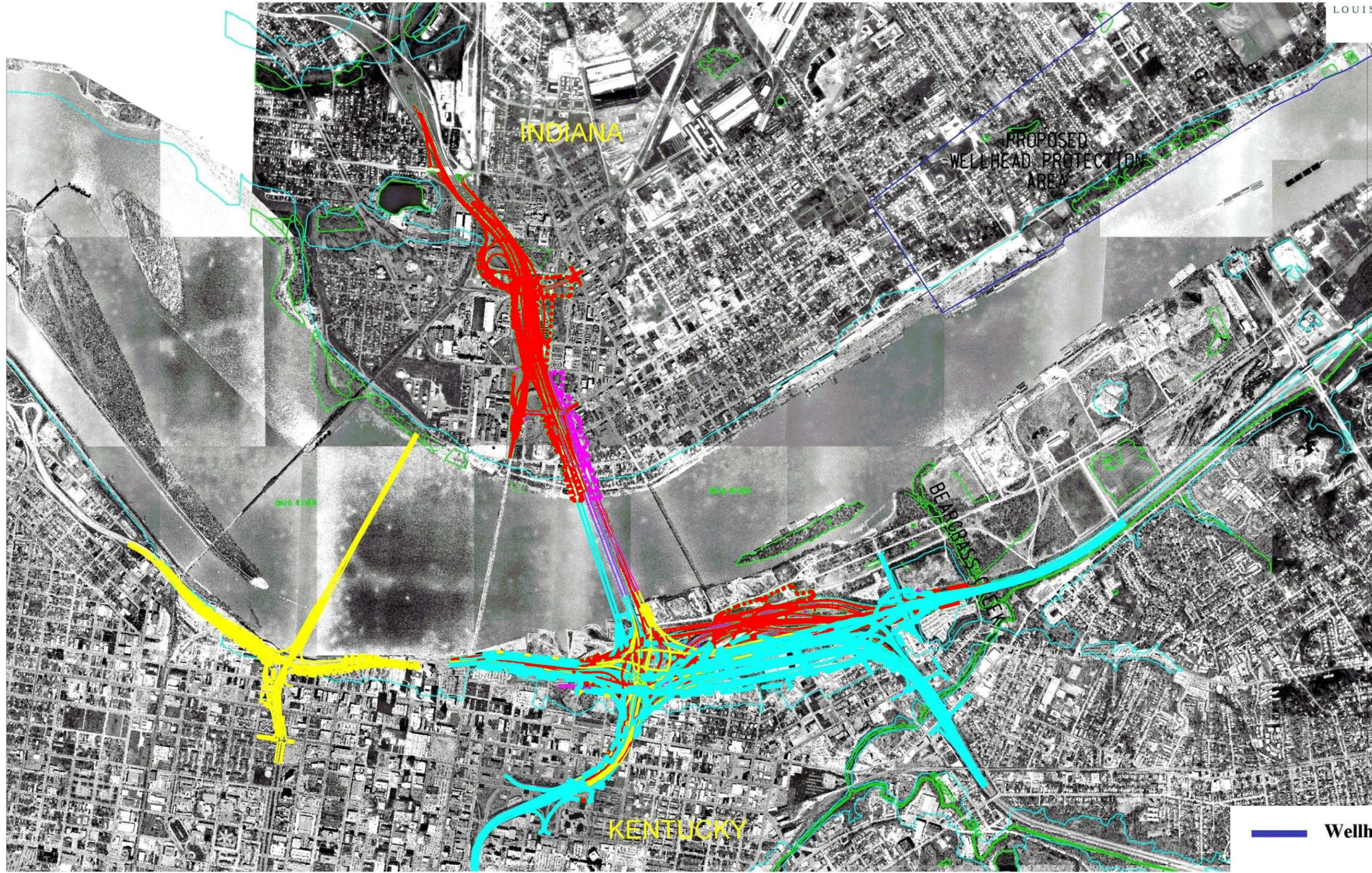


Water Resources, Floodplains, and Wetlands

- Wellhead Protection Areas
- Floodplains
- Streams and Wetlands



Figure 4.8-1a



- Wellhead Protection Areas
- Floodplains
- Streams and Wetlands

Water Resources, Floodplains, and Wetlands

Figure 4.8-1b

Fecal coliform bacteria, found within the intestines and feces of warm-blooded animals, can indicate disease-causing contamination from sewage. The KDOWR has reported that elevated levels of fecal coliform bacteria have caused 15 segments of Jefferson County streams to be regarded as unfit for recreation involving contact with the water. Therefore, the County Board of Health recommended avoiding such recreation in all county streams.

Macroinvertebrate and fish populations, further indicators of water quality, were sampled in project area creeks and streams. However, Beargrass Creek, Harrods Creek and the Ohio River were not sampled to assess fish populations because of their size and the ample amount of reliable data available from previous studies conducted on these bodies of water. Archival data regarding these resources was obtained from the Louisville and Jefferson County MSD, the Kentucky Department of Fish and Wildlife Resources (KDFWR) and the Ohio River Valley Water Sanitation Commission (ORSANCO).

Macroinvertebrates are larger invertebrates that are visible with the unaided eye. Macroinvertebrates are sampled for the purpose of observing the occurrence of organisms or changes in predominance among species or groups so that subtle changes in aquatic habitats can be detected. A body of water with good quality usually supports a diverse macroinvertebrate population with no overabundance of any one group. Three orders of macroinvertebrates – Plecoptera (stoneflies), Ephemeroptera (mayflies) and Trichoptera (caddisflies) – are sensitive to pollutants and can be indicators of good water quality.

In contrast, a polluted stream supports a less diverse macroinvertebrate population and contains an overabundance of one or more groups since the organisms that cannot tolerate the stress from contamination are destroyed. Typically, there is a reduction in the total number of species present and an increase in the number of species tolerant of degraded water quality.

Macroinvertebrate field specimens were identified in a laboratory, and the biological diversity and equitability indices were calculated. The Biological Diversity Index (d) is a method used to determine the diverse macroinvertebrate populations within a stream. It ranges from 1 to 10, but a d-value of 3 or higher is considered a good reading, showing high diversity and relatively good water quality. Equitability (e) is a measure of the taxa distribution in the stream. It ranges from 0 to 1, with a reading greater than 0.6 considered good, indicating a healthy distribution of species.

Fish are usually present in all but the most polluted waters. Some fish are more tolerant of different types of pollution than other types. Fish tolerant of turbidity and silt include shad, goldfish, carp, Bluntnose minnow, Bullhead catfish, crappie, White perch (drum), Green sunfish, Bigmouth buffalo, White sucker, some minnows and shiners. Fish tolerant of low dissolved oxygen include Bowfin, gar, Mosquitofish, Common carp, Bullhead catfish and pickerel. Depending on the species, darters are either pollution-tolerant or intolerant.

A summary of the water quality and the results of the macroinvertebrate and fish sampling conducted for this project is provided below for each body of water. Detailed listings of water quality survey results are contained in the Terrestrial and Aquatic Baseline Report. The report is available for public inspection at the local project office.

Goose Creek

Water Quality

Goose Creek is listed as a first priority impaired stream with respect to aquatic life and swimming, because it contains low dissolved oxygen levels and pathogens. The Goose Creek watershed, which covers approximately 19 square miles in northeastern Jefferson County, has undergone substantial development, but still has areas of good quality natural habitat. Construction and development have caused erosion, runoff and sedimentation. The creek has high nutrient levels, and fecal coliform levels exceed water quality standards by 33 percent.

Macroinvertebrates

The diversity ($d=2.54$) and equitability ($e=0.57$) values for the Goose Creek sample indicate that the stream has degraded water quality. The sample yielded only one mayfly, and no stoneflies or caddisflies. Only three taxa of aquatic insects were identified from the sample, with representatives of Chironomidae accounting for 95 percent of the total.

Fish

Twelve fish species were observed, including pollutant-tolerant species such as shad, drum and bluegill, and other less tolerant species such as darters, hogsucker, Sand shiner and Rosefin shiner. The Creek chub was the dominant species in the sample taken. The Fantail darter, found in all major drainages in Kentucky, was also common.

Little Goose Creek

Water Quality

Little Goose Creek is listed as a first priority impaired stream for aquatic life and swimming because it contains low dissolved oxygen and pathogens. As a sub-basin of the Goose Creek watershed, Little Goose Creek is subject to many of the same contamination sources that contribute to the poor water quality of Goose Creek.

Macroinvertebrates

The Little Goose Creek sample included an insufficient number of total individuals to accurately employ diversity and equitability indices. Therefore, its overall water quality is unknown with respect to macroinvertebrates. Taxa present in the sample were pollution-tolerant.

Fish

Eight species were observed, of which the Rosefin shiner was dominant. Also abundant were Creek chubs and Bluntnose minnows as well as Common darters. All of the species documented in Little Goose Creek are common and are considered somewhat pollutant-tolerant.

Wolf Pen Branch

Water Quality

Wolf Pen Branch is not listed as an impaired stream. Wolf Pen Branch, part of the Harrods Creek watershed, is located upstream of Harrods Creek and is therefore not necessarily subject to the water quality problems of Harrods Creek.

Macroinvertebrates

The diversity ($d=2.59$) and equitability ($e=0.33$) indices for Wolf Pen Branch were negatively influenced by the large number of Amphipods, Isopods and Physids included in the sample. These species indicate the presence of spring water flows and are facultative species. The stream is in the vicinity of a natural spring, and, therefore, these species were not included in the diversity and equitability value calculations to more accurately reflect water quality of the stream. Discounting these three groups and recalculating, the values for each index improved. While the recalculated diversity value improved to 3.27, suggesting reasonably good water quality, the improved equitability ($e=0.58$) continues to indicate unevenness across the taxa within the sample.

Fish

Eleven species were observed, with the most numerous being the Creek chub and the Rosefin shiner, bluegill and common darters. All species identified were common to the area and are considered somewhat pollution-tolerant.

Hunting Creek

Water Quality

Hunting Creek is not listed as an impaired stream. Hunting Creek, also part of the Harrods Creek watershed, and a Harrods Creek tributary, is located upstream of Harrods Creek and is therefore not necessarily subject to the water quality problems of Harrods Creek. Hunting Creek has been previously modified with the placement of a dam at Putney's Pond. The dam resulted in upstream sedimentation. Measured conductivity levels were elevated in Hunting Creek.

Macroinvertebrates

The diversity ($d=2.25$) and equitability ($e=0.38$) indices indicated poor water quality. The macroinvertebrate community in the Hunting Creek sample was dominated by hydroptychid caddisflies. Mayflies and stoneflies were completely absent from the samples. Recalculation of the indices by discounting the hydroptychids was not possible because the number of individuals (i.e., less than 100) fell below the threshold for meaningful interpretation of diversity and equitability.

Fish

Twelve species were observed. The Bluntnose minnow was the most common. Also abundant were Mosquitofish, an introduced fish found typically in warm, shallow waters and the Common carp. These species can tolerate considerably adverse environments.

Muddy Fork

Water Quality

Muddy Fork is listed as a second priority impaired stream with respect to swimming due to organic enrichment, metals, low dissolved oxygen, unknown toxicity and pathogens. Muddy Fork is contained within the Beargrass Creek watershed that covers approximately nine square miles. Water quality problems in this watershed are considered moderate to severe, due to a high number of failing septic tanks and the widespread use of lawn chemicals. Much of the area consists of paved surfaces, and fast-moving storm water, which scours stream banks, causing erosion and sedimentation. Muddy Fork also receives backwater from the Ohio River resulting in increased sedimentation. Fecal coliform levels exceed water quality standards by 33 percent. Measured conductivity levels were also elevated in Muddy Fork.

Macroinvertebrates

Diversity and equitability calculations indicate degraded water quality ($d=2.64$ and $e=0.45$). Large populations of Isopods and Amphipods in the sample influenced both indices. The Muddy Fork macroinvertebrate community did not include mayflies or stoneflies and contained only two taxa of larval caddisflies. Only 16 percent of the individuals included in the sample were aquatic insects, further indicating impaired water quality. Recalculating diversity and equitability, by discounting the large number of Isopods and Amphipods, increased the diversity value to 3.29 and equitability value to 0.70. However, these recalculated values should be interpreted with caution based on the sample's small number of aquatic insects.

Fish

Only four species were observed, indicating degraded water quality. The Creek chub and Bluntnose minnow were the most common species observed.

Beargrass Creek

Water Quality

Beargrass Creek (including the Middle and South Forks) is listed as a first priority impaired stream with respect to aquatic life due to low dissolved oxygen levels and the presence of heavy metals and organic enrichment. Its poor water quality is primarily associated with high levels of development in the vicinity. Fecal coliform levels exceed water quality standards by 33 percent. Measured conductivity was elevated as well.

Beargrass Creek at its confluence with the Ohio River is located within the Beargrass Creek watershed, possibly the most diverse watershed in terms of geographic area and land usage. The entire area covers approximately 61 square miles and is divided by three major sub-basins: the Muddy Fork, the Middle Fork and the South Fork.

Macroinvertebrates

There were an insufficient number of individuals within the Beargrass Creek sample to conduct meaningful analysis of macroinvertebrates.

Fish

According to archival data, 15 species have been observed, all of which are common and relatively pollution-tolerant.

Lancassange Creek

Water Quality

Lancassange Creek is not listed as an impaired stream. It is located within the Silver-Little Kentucky watershed in Indiana. Because IDEM sampled no stream-specific data or watershed data, Indiana streams including Lancassange Creek are discussed based on the Ohio River basin and on the Silver-Little Kentucky watershed. The Ohio River basin, which has a listed water quality of "medium," received an 87 percent quality rating for supporting aquatic life, and a 13 percent quality rating for availability of fish for human consumption. The Silver-Little Kentucky watershed was evaluated in the Indiana "State of the Environment Report" as a three (on a scale from one to six, where one is the best) in 1997, and as a four in 1998. Measured conductivity levels were elevated in Lancassange Creek.

Macroinvertebrates

The diversity ($d=2.98$) and equitability ($e=0.58$) suggest that it is likely that the diversity of macroinvertebrates has been negatively impacted by a reduction in overall water quality. The macroinvertebrate community did not include representatives of mayflies or stoneflies and was dominated by hydropsychid caddisflies. While the sample was taken post-emergence for some mayfly and stonefly taxa, evidence of both orders should have been present. The dominant taxa are at least somewhat pollution-tolerant.

Fish

Twelve species were observed, including the predominant Rosyface shiner and abundant bluegill. One darter was also discovered. All are common to the area and are somewhat pollution-tolerant.

Lentzier Creek

Water Quality

Lentzier Creek, located within the Silver-Little Kentucky watershed, is not listed as an impaired stream. Measured conductivity levels were elevated in this stream.

Macroinvertebrates

The diversity and equitability for the Lentzier Creek sample suggests that the large population of Chironomids within the macroinvertebrate community negatively impacted both indices. The diversity index ($d=2.73$) suggests some degradation of overall water quality, but more significant is the unevenness of individuals across the taxa as indicated by the equitability index ($e=0.27$). If the large population of Chironomids were discounted from the diversity and equitability calculations, both indices would improve ($d=4.17$, $e=0.82$), which would indicate good water quality at the location sampled. The macroinvertebrate community is dominated by taxa that are at least somewhat pollution-tolerant.

Fish

Eleven species were observed, with four of those being darters. There were equal numbers of Johnny darters and Central stonerollers. Rosefin shiners and Fantail darters were also abundant in the samples.

Harrods Creek

Water Quality

Harrods Creek was previously listed as an impaired stream. In 1995, it was added to Kentucky's Total Maximum Daily Load (TMDL) program. A TMDL study conducted by the EPA and Kentucky Division of Water found that about three miles of lower Harrods Creek, which is largely backwater from the Ohio River, is in severe violation of water quality standards. According to the Kentucky Division of Water, the creek exhibits organic enrichment and also has low dissolved oxygen levels, which is attributed to packaging plant discharges. Another source may be the wastewater treatment plants located within and just upstream of the backwater areas. The TMDL program uses a watershed management scheme to control both point source and non-point source pollution.

The Harrods Creek watershed covers approximately 92 square miles primarily in Oldham County, but a small portion is contained within northeastern Jefferson County. Storm water runoff from construction sites and agricultural and commercial development has degraded the stream quality and greatly reduced available habitat. High nutrient levels are evident as well as fecal coliform levels exceeding water quality standards by 33 percent and elevated conductivity. In 2000, MSD was authorized by the city of Prospect to close the small wastewater treatment

plants serving that area and direct the flow to the Morris Forman Wastewater Treatment Plant. Water quality is expected to improve.

Macroinvertebrates

The number of total individuals included in the Harrods Creek sample was insufficient to calculate biological diversity and equitability. However, the distribution of taxa within the sample is typical of most dredged grab samples taken from bottom sediments in Kentucky streams. Without knowing the depth of the water at the sample site and type of bottom sediments, it is difficult to assess the expected diversity of the macroinvertebrate community within these samples.

Fish

According to archival data, 32 species have been observed, many of which were game fish. Darters were present as well.

Ohio River

Water Quality

The Ohio River is listed as a second priority impaired stream with respect to fish consumption and swimming, due to elevated levels of pathogens, priority organics and PCB's. Indiana lists it as a medium priority impaired stream due to elevated lead and E. coli levels. The entire length of the river bordering Kentucky is listed as partially supporting fish consumption due to a limited fish consumption advisory. Fish tissue levels of PCBs are considered too high for unrestricted fish consumption. Chlordane, a persistent pesticide no longer in use in the U.S., has been listed as a pollutant of the Ohio River. Recent data from ORSANCO has indicated a downward trend in PCB and chlordane concentrations found in fish from the river. The Kentucky Division of Water, Water Quality Report to Congress (2002) also indicates that chlordane levels have subsided. Conductivity was elevated in the river.

Macroinvertebrates

Samples were attempted from the Ohio River. Due to the tremendous depth of silt deposits, the samples collected held insufficient numbers of specimens to calculate the diversity and equitability of the river.

Fish

According to archival data, 84 species have been observed in the project area, many of which were game fish. Because of elevated pollutants in the river, periodic advisories have been issued on fish consumption.

4.8.2 Groundwater

Groundwater, which occurs in water-bearing units called aquifers, is a source of drinking water for many people. Groundwater quality can be directly influenced by surface water quality. Therefore, when surface waters become contaminated with pollutants, groundwater may also be impacted.

The Sole Source Aquifer Protection Program authorized by Section 1424(e) of the SDWA protects sole source aquifers. The USEPA has not identified any principal or sole source aquifers within the project area.

Wellhead protection areas (WHPA) were authorized by the 1986 Amendment to the SDWA (Title II, Section 205, Subsection 1428) to sustain drinking water quality in groundwater that recharges wells and wellfields used for public drinking water supplies. A WHPA includes the surface and subsurface areas delineated by a fixed radius that contribute water to the public water supply, and through which contaminants may enter the well, ultimately contaminating drinking water.

Currently, one WHPA occurs in the project area. The Southern Indiana Operations of Indiana-American Water Company, Inc. (INAWC) Wellhead Protection Management Plan designates a protection area containing two individual well sites, the Hertzsch wellfield and the Babb wellfield. These areas draw groundwater from 19 well sources within the two identified wellfields. The WHPA is bounded by Utica Pike on the north, the Ohio River on the south, Main Street on the east and the access road just west of the Nugent Sand and Gravel quarry on the west. This active system serves approximately 29,200 water customers in Clarksville, Jeffersonville, New Albany, Jeffersonville Township and New Albany Township. Average daily demand is 12.7 million gallons a day. Refer to Figures 4.8-1a and 4.8-1b for the location of this WHPA.

The Hertzsch wellfield is located in the Jeffersonville community of Arctic Springs, between Utica Pike and the Ohio River. This wellfield consists of six wells constructed from 1968 to 1999. The Babb wellfield is located upstream from the Hertzsch wellfield between Utica Pike and the Ohio River. This wellfield consists of 13 wells constructed from 1975 to 1999. In the east end of the WHPA, there are wells owned by the state of Indiana. These wells are not included in the WHPA.

In Kentucky, the Louisville Water Company (LWC) has proposed one WHPA. Harrods Creek, the Oldham County/Jefferson County line, the Indiana shore of the Ohio River and a rock ledge east of Brownsboro Road bound this area. The LWC provides a supply of water to more than 715,000 people in Louisville and Jefferson County, and parts of Oldham and Bullitt Counties. Average daily demand is 124 million gallons a day.

Community water systems are required to submit a strategy for managing potential sources of contamination. Systems are also required to have a public outreach component to their wellhead protection program. At a minimum, all potential contamination sources must be informed of their

location within a WHPA, about the consequences of groundwater contamination, and the methods available to prevent contamination. Systems are required to develop plans that document procedures to follow in case of contamination (e.g., spills, unpermitted releases, etc.). Each plan must provide a list of emergency contacts and proposed alternate water supplies in the event of an emergency.

4.8.3 Special Status Streams

Wild and Scenic Rivers

The Wild and Scenic Rivers Act of 1968 (as amended) defines a “Wild River” as those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. A “Scenic River” is a river, or section of a river, that is free of impoundments, with watersheds or shorelines still largely undeveloped, but accessible in places by road. None of the rivers in the project area are officially identified as either “Wild” or “Scenic” by either the federal government or the states of Indiana or Kentucky.

Navigable Waters

Navigable waters of the US are administratively defined waters that have been used in the past, are now used, or are susceptible to use, as means to transport interstate or foreign commerce up to the head of navigation. Navigable waters in the project area include the Ohio River and the following creeks: Harrods, Goose, Little Goose, Lancassange and Beargrass. The U.S. Coast Guard, a cooperating agency of the project, has been coordinated with throughout the development of the project. Section 7 of the Rivers and Harbors Act identifies the regulations governing navigable waters and lock safety.

4.9 Floodplains

A floodplain is a lowland area adjacent to lakes, streams and rivers that is covered by water during a flood. The rapid rise in the water level inundates the flat, low-lying areas near the water body for extended periods. Besides the flat topography, flooding problems increase due to urban development. Urban development increases surface water runoff, leads to construction in channels (such as bridges) that may “back-up” flood waters, and reduces the natural floodway due to construction of levees and channelization, particularly where no compensatory flood storage construction has occurred.

Floodplains often contain wetlands and other areas vital to a diverse and healthy ecosystem. The values and benefits of land located in floodplains include the provision of habitat for plants and animals, maintenance of water quality and groundwater recharge, and preservation of open and outdoor recreational spaces.

The Federal Emergency Management Agency (FEMA) has mapped areas that would be affected by flooding for the major waterways in the project area. National Flood Insurance Program

(NFIP) maps from FEMA were used to identify the 100-year floodplains that contain portions of the project area. The identified floodplains are shown on Figures 4.8-1a and 4.8-1b and are associated with the bodies of water listed below.

- Ohio River
- Goose Creek
- Little Goose Creek
- Harrods Creek
- Tributary to Harrods Creek
- Beargrass Creek
- Lancassange Creek
- Lentzier Creek
- Tributaries to Lentzier Creek
- Hunting Creek

A series of floodwalls have been constructed along the Ohio River in both Indiana and Kentucky to protect the adjacent environs from flooding. In Indiana, a system of floodwalls and levees was constructed during the first half of the 1940s. The system extends from eastern Jeffersonville to southwestern New Albany and includes Clarksville. In Kentucky, a series of concrete floodwalls and earthen levees extends from eastern Louisville to southwestern Jefferson County and was constructed in several phases between 1948 and 1994. They include floodgates and pumping stations designed to return floodwater from streams, creeks and storm drains to the river.

The construction of these floodwalls along the Ohio River has altered the natural boundaries of that floodplain. In essence, the width of the floodplain has been reduced not only by the construction of the floodwalls, but by the adjacent development that has encroached upon it as well. It is because of this development that the floodwalls were constructed for protection.

Construction in a floodway requires the issuance of a permit. These permits must be coordinated with the IDNR, Division of Water as well as the KDOWR, Floodplain Management Section.

4.10 Wetlands

4.10.1 Wetland Classification

The U.S. Army Corps of Engineers (USACE) defines wetlands as areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated conditions. According to the 1987 “Corps of Engineers Wetlands Delineation Manual,” the following three conditions must be present in order for an area to be classified as a wetland under Section 404 of the CWA: 1) contain a dominance of vegetation adapted to growth in low-oxygen soils (i.e., hydrophytic vegetation); 2) have soils that have developed over time in a low oxygen environment (i.e., hydric soils); and 3) hydrology that saturates or inundates the soil for five to 12 percent of the vegetative growing season.

This project is located within the Louisville District of the USACE. The Louisville District does not exercise jurisdiction over farm ponds built in non-hydric soil units and not containing a stream channel. Therefore, farm ponds within the project area were not classified as jurisdictional wetlands, although they may contain wetland features and perform wetland functions. Furthermore, the Louisville District does not consider active water/waste water treatment plant ponds jurisdictional wetlands.

The Natural Resources Conservation Service (NRCS) is responsible for wetlands occurring on, or surrounded by, agricultural lands. These wetlands are primarily “farmed” and “prior converted cropland” wetlands. Farmed wetlands are areas placed under cultivation after the passage of the Food Security Act of 1985. Farmed wetlands are regulated under Section 404 if they are not being actively cultivated or if they are being used for purposes other than agriculture. Wetlands converted to agricultural production prior to the passage of the Food Security Act are not regulated under Section 404. The NRCS has not delineated any farmed wetlands in the project area.

4.10.2 Wetland Characteristics

Hydrophytic vegetation consists of plants typically adapted to life in areas that are permanently or periodically inundated or saturated by surface or ground water. Vegetation found in a wetland may consist of more than one plant community. Although many factors influence the presence and character of hydrophytic vegetation, hydrologic factors exert an overriding influence on the plant species that occur in wetlands.

Hydric soils are soils that are formed under conditions of saturation, flooding or ponding, long enough during the growing season to develop anaerobic conditions in the upper portion. A hydric soil may be drained or undrained, and a drained hydric soil may not continue to support hydrophytic vegetation. Therefore, not all areas having hydric soils will qualify as wetlands. Hydric soil is referred to as a “wetland soil” in areas where it supports hydrophytic vegetation and has additional wetland indicators.

Wetland hydrology includes all hydrologic conditions that cause an area to be periodically inundated or saturated to the surface at some time during the growing season. Evidence such as inundated or saturated soils, watermarks, drift lines, sediment deposits and water stained leaves indicates that water has an overriding influence on area vegetation and soils. Factors, which influence hydrology, include precipitation, stratigraphy, topography, soil texture and evapotranspiration. Generally, the sources of water for wetlands within the project area consist of direct precipitation, headwater or backwater flooding, or groundwater.

Wetland functions are defined as a process or series of processes that take place in a wetland. Various functions performed by wetlands within the project area include:

- Groundwater recharge/discharge;
- Flood control;
- Sediment stabilization and retention of toxic chemicals;

- Nutrient removal and transformation;
- Decomposition;
- Wildlife habitat;
- Aquatic habitat.

Wetlands provide various benefits at different levels of scale. Wetlands can perform one or several functions. Not all wetlands perform all functions nor do they perform all functions equally well. A variety of characteristics determine what functions wetlands perform, including geographic location and size.

Wetland values can be subjective, non-site specific benefits. Values may include but are not limited to open space, recreation, plant and animal refuges, peat production, aesthetics and education and/or research. Not all wetlands possess the same values. According to the USACE Wetland Function and Value Handbook, the “value of a particular wetland function, or combination thereof, is based on human judgement or the worth, merit, quality or importance of those functions.”

4.10.3 Wetland Delineation Methods

Prior to conducting preliminary field surveys, wetland biologists reviewed existing wetland data within the project area and coordinated with agency personnel from the USACE, Louisville District. Approximately 269 potential jurisdictional wetlands within the overall project area were identified and located on aerial mapping. Aerial mapping was also reviewed to identify areas with a history of containing wetland complexes, such as small, isolated wood lots. Data sources used to identify and analyze potential jurisdictional wetlands within the project area included the following:

- Anchorage, New Albany and Jeffersonville NWI maps;
- “Clark County and Floyd County Soil Surveys;”
- “Jefferson County Soil Survey;”
- “National List of Plant Species that Occur in Wetlands, Region 3;”
- “National List of Plant Species that Occur in Wetlands, Region 2;”
- “Hydric Soils of the United States;”
- Local hydric soils lists for Clark County, Indiana and Jefferson County, Kentucky;
- City of Louisville Department of Public Works, Metropolitan Sanitary District, Geographical Information System (GIS).

Field delineations were conducted in July, August and October 1999, and in March 2000 in accordance with the 1987 “Corps of Engineers Wetlands Delineation Manual.” The wetland delineations were conducted within a 1,000 foot wide corridor along each of the bridge/highway alternative alignments identified in Chapter 3. Of the 269 potential jurisdictional wetlands, 118 sites were delineated within these corridors. (See Figures 4.8-1a and 4.8-1b.) During preliminary design, an additional 31 headwater streams were identified. The additional headwater streams were considered potentially jurisdictional in the wetland impact analysis.

4.10.4 Potential Jurisdictional Wetlands

Of the 118 sites delineated, 51 were determined to be potentially jurisdictional wetlands. Additionally, the 31 headwater streams (not delineated) were included as potentially jurisdictional wetlands bringing the total number of potentially jurisdictional wetlands in the project area to 82. Information on the number, type, and size (or length) of the jurisdictional wetlands identified is listed in Table 4.10-1. The locations of these wetlands within the project area are shown on Appendices A.1 through A.4, inclusive.

TABLE 4.10-1
SUMMARY OF POTENTIALLY JURISDICTIONAL WETLANDS DELINEATED IN
THE PROJECT AREA

Type	Number	Size Acres	Length Miles
Palustrine Forested	8	23.33	
Palustrine Scrub-Shrub	2	1.66	
Palustrine Emergent	8	4.28	
Palustrine Unconsolidated Bottom	15	36.13	
Lacustrine	3		15.37
Riverine	46		32.17
TOTAL	82	65.4	47.54

Appendix B.3 (Table I) lists the 149 sites considered potentially jurisdictional and the Ohio River; this table also provides the following information for each: Cowardin Classification (if identified on the NWI map), field determination (wetland or non-wetland), field classification (if different from the NWI map), the lacking indicator (if a non-wetland) and additional notes. Table II in Appendix B.3 lists the 82 potentially jurisdictional wetlands delineated by type and provides the following information for each wetland: Cowardin classification, field classification, size and primary function.

The wetlands identified are generally less than five acres in size. Palustrine unconsolidated bottom wetlands are the predominant wetland type delineated in the project area. This is consistent with the agricultural history of the project area. Other wetland types found in the study area include palustrine forested, palustrine scrub-shrub, palustrine emergent, lacustrine and riverine.

Palustrine Forested Wetlands (PFO)

Forested wetland areas are commonly known as swamps and are largely covered by persistent trees greater than 20 feet tall. Forested wetlands within the project area consist of broad-leaved deciduous trees including maple, ash, box elder, sycamore and cottonwood. The eight PFO wetlands within the project area are predominantly within floodplains and adjacent to stream corridors. The forested areas determined to be wetlands are generally under five acres, but

ranging from 0.35 acres to 7.51 acres. The largest forested wetland identified (IE-WE-35) is adjacent to Lentzier Creek and is the result of a beaver dam. The area includes ash, sycamore, cottonwood and maple trees, with many large trees with exfoliated bark.

Palustrine Scrub-Shrub Wetlands (PSS)

Scrub-shrub wetlands are dominated by woody vegetation less than 20 feet tall. The two PSS sites delineated total 1.66 acres. Vegetation within these sites includes American elm, Black willow, sycamore and Eastern Red cedar. One of the sites is located adjacent to Lancassange Creek (IE-WE-69); the other retains runoff from a wastewater treatment pond (KE-WE-46).

Palustrine Emergent Wetlands (PEM)

Palustrine emergent wetlands are dominated by erect, herbaceous vegetation and often appear as grasslands or stands of reedy growth. Eight small, isolated PEM wetlands were identified totaling approximately 4.28 acres. They range in size from 0.07 acres to 1.80 acres. Generally, the sites were smaller than 0.20 acres. Vegetation includes aster, River cane, Barnyard grass, smartweeds, sedges, mints, ironweed, Fogfruit and ryegrass.

Palustrine Unconsolidated Bottom (PUB)

Unconsolidated bottom wetlands generally function as habitat for terrestrial and aquatic wildlife. Due to the drought conditions late in the summer of 1999, ponds within the region at the time of investigation contained little or no standing water and were nearly dry. Fifteen PUB wetlands were delineated varying in size from 0.10 acres to 18.11 acres. Five of the quarry sites previously listed on the wetland tables were removed based on correspondence from the USACE. Quarries are not regulated by the USACE as jurisdictional wetlands.

Lacustrine Wetlands

Lacustrine wetlands consist of the following characteristics:

- Situated in a topographic depression or a dammed river channel;
- Lacking trees, shrubs, persistent emergent, emergent mosses or lichens with greater than 30 percent aerial coverage; and
- Having a total area exceeding 20 acres

Wetlands under 20 acres may also be listed as lacustrine systems when an active wave-formed or bedrock shoreline is present, or if the water depth in the deepest part exceeds 6.6 feet at low water.

Within the project area, three lacustrine wetlands were identified: Goose Creek, Beargrass Creek and the Ohio River. Two abandoned quarries previously included on the wetland tables as lacustrine systems were removed based on correspondence with the USACE. Goose Creek, Beargrass Creek and the Ohio River are classified as lacustrine systems on the NWI map due to the fact that they have active wave-formed or bedrock shoreline, or a depth exceeding 6.6 feet at low water.

Lacustrine wetlands have been evaluated as jurisdictional wetlands and as stream crossing impacts. Both perspectives have been evaluated to afford consideration of all types of anticipated impacts. Please refer to Appendix B.3 (Table II) for jurisdictional wetland impacts by type and Appendix B.3 (Table IV) for potential water body modifications to lacustrine systems.

Riverine Wetlands

Riverine systems include all wetland and deep-water habitats contained within a channel, except areas dominated by trees, shrubs, persistent emergents, emergent mosses or lichens. Fourteen riverine systems were delineated within the project area. A majority of these systems consist of named streams or rivers.

Additionally, there are 31 headwater streams that are included as riverine wetlands. The acres of stream and river corridors within the project area were not calculated due to their linear nature. However, the approximate length (in miles) of the streams/rivers (within the project limits only) was determined. This information is included in Appendix B.3 (Table II). Riverine wetlands have been evaluated as jurisdictional wetlands and as stream crossing impacts. Both perspectives have been evaluated to afford consideration of all types of anticipated impacts.

4.11 Visual and Aesthetic Resources

4.11.1 Regional Landscape Character

The Ohio River, with its associated tributaries and adjacent landforms, is the dominant physical feature of the project area, and directly defines the region's aesthetic character. The broad, flat floodplain becomes a network of open, upland plateaus with wooded ravines. The tributaries connect the uplands to the river below. The transition from floodplain to upland is relatively gentle in the western portion of the project area, but more abrupt in the east, creating numerous vertical bluffs with visible limestone escarpments. Land cover varies from open agriculture and parklands on open flat areas, to wetlands along the floodplain, to dense upland forest along the ravines.

Aesthetically, the regional landscape can be divided into three distinct regions – Far East, Downtown and Mid-East Indiana (see Figure 4.11-1). The Far East, an area containing the towns/cities of Harrods Creek, Prospect, Glenview, Indian Hills and Utica, has maintained much of its original natural character. Much of the development in this region, including large rural estates and residential subdivisions, is woven harmoniously into the terrain, which still has large, intact natural areas. Residential development in Utica's floodplain areas is an exception, displaying less sensitivity to the natural landscape with gridded streets and sparsely vegetated lots. Overall, high quality views of the river and its bend to the north are virtually uninfluenced by development in the Far East.

Conversely, Downtown and Mid-East Indiana are considered “built” landscapes, displaying virtually no natural terrain, with the exception of scattered pockets of public open space such as Falls of the Ohio State Park or protected lands such as Six Mile Island and Tow Head Island.

In Downtown, consisting of Louisville, Jeffersonville and Clarksville, most of the area's natural topography has been altered or obscured by dense urban development, interstate highways and

floodwalls. While there are numerous areas displaying high quality aesthetic character, this character is predominantly architectural. Dramatic views relating to the river do exist, all of which are influenced by the existing bridges or riverfront structures.

Mid-East Indiana has maintained more of its original topographic character than Downtown, although the landscape contains development such as the Clark Maritime Center, a series of mining and quarry operations, and wellheads in the river floodplain.

4.11.2 Viewshed

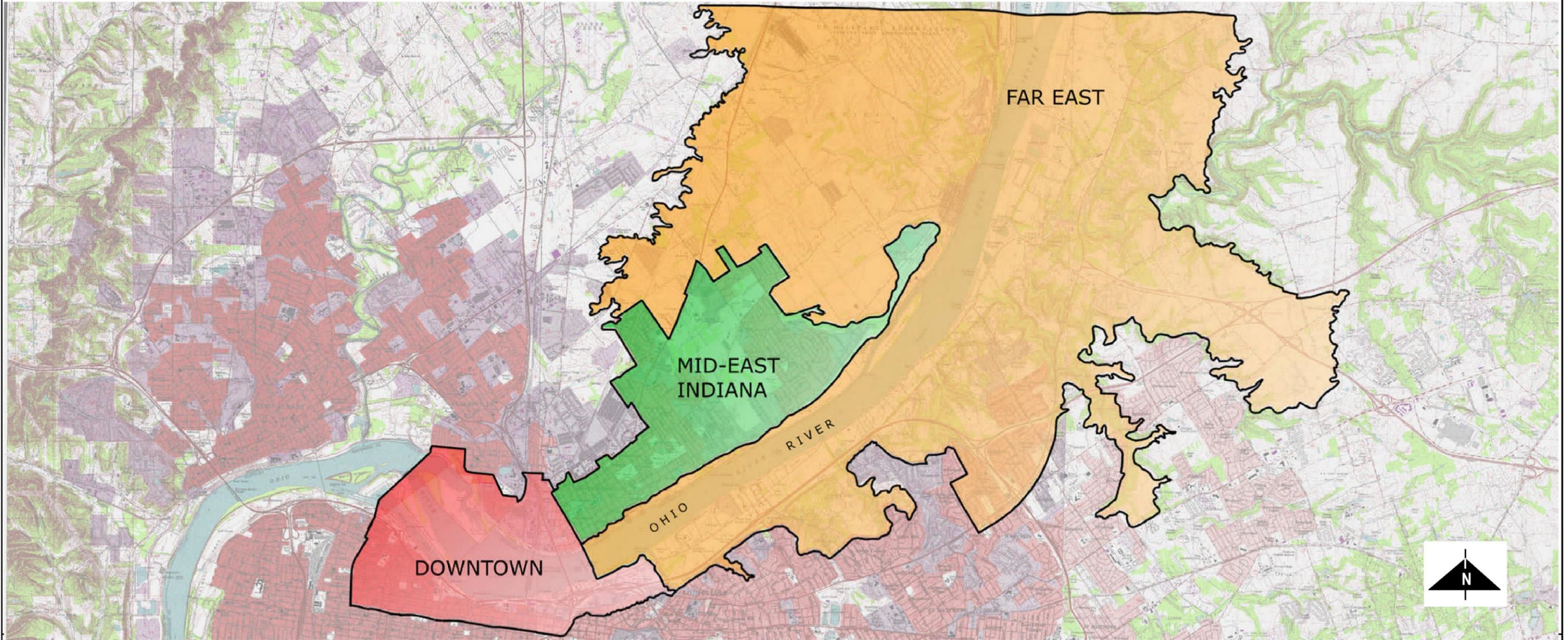
To focus the analysis of visual resources on areas that may potentially be affected by the project, the viewshed of the project was defined. A viewshed is the surface area visible to and from a given point or collection of points. The edge of the viewshed for this project area represents the limit of the view from the project alternatives, as well as the perimeter from which these roads can be viewed. The viewshed was defined based on a review of the area's topography and land cover. For example, the view from an open hilltop would be quite large whereas the view from a low-lying position towards a nearby woodlot or structure would be quite short. Figure 4.11-2 outlines a composite viewshed that generally describes what can be viewed from multiple points along the proposed network of alignments. From a particular point, the actual viewshed may be slightly larger or smaller than shown, due to irregularities in topography or land cover.

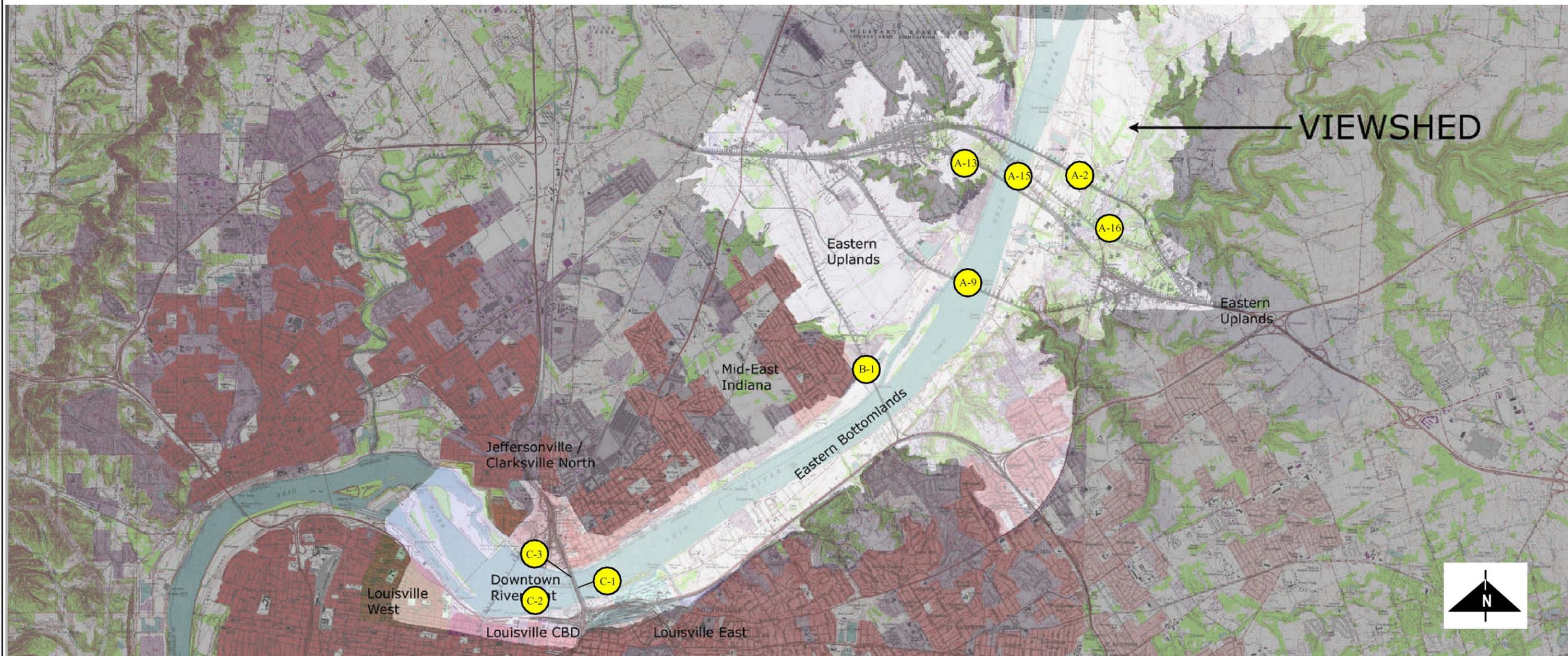
There is a great diversity of views in the project viewshed, ranging from wide panoramic views of the Ohio River from upland and bottomland areas to narrow and filtered views defined by the dense vegetation and topography of ravines and the river's tributaries. There is also a range of viewers, including motorists using interstate highway system and rural routes, residents of rural estates and subdivisions in the Far East, tenants of high rise office buildings and riverfront commercial establishments in the Downtown corridor and patrons of parks and open spaces.

4.11.3 Landscape Units and Urban Districts

Within the project area, each region was subdivided into landscape units according to aesthetic setting, land use or landform. Similarly, urban areas were divided into urban districts. As shown in Figure 4.11-3, the project area contains three landscape units, Downtown Riverfront, Eastern Uplands and Eastern Bottomlands, and five urban districts, Louisville Central Business District (CBD), Louisville East, Louisville West, Jeffersonville-Clarksville North and Mid-East Indiana. Table 4.11-1 indicates the relationship of the landscape regions to the landscape units and urban districts.

Evaluation of the visual quality of each landscape unit and urban district is based on four criteria typically used to evaluate visual quality on highway projects (USDOT, 1981). These criteria, which are based on proven methods and community values, are as follows: 1) uniqueness – spectacular visual quality that is uncommon within the region; 2) vividness – visual power or memorability of the scene due to diversity or distinctiveness of patterns in the landscape and architectural components; 3) intactness – extent to which the landscape is free from visual encroachment and disruption, either natural or man-made; and 4) unity – how well landscape components join together to form a single, harmonious, cohesive scene.





LEGEND

 Alignment Identification

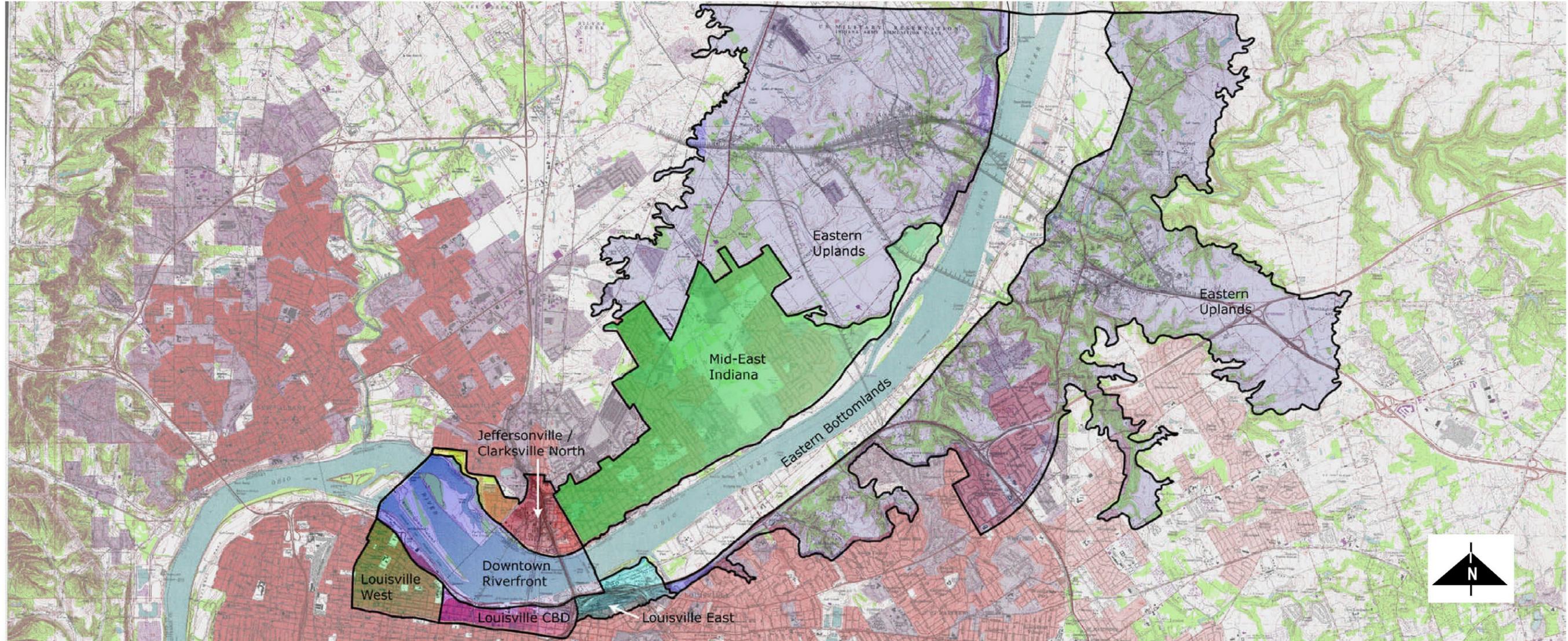


TABLE 4.11-1
LANDSCAPE REGIONS, UNITS AND URBAN DISTRICTS

Landscape Region	Landscape Unit	Urban District
Downtown	Downtown Riverfront	Louisville CBD Louisville East Louisville West Jeffersonville-Clarksville North
Mid-East Indiana	None	Mid-East Indiana
Far East	Eastern Uplands Eastern Bottomlands	None

While these criteria tend to overlap and are somewhat subjective, the scoring as shown in the Visual Quality Evaluation Matrix (Table 4.11-2) provides a tool to evaluate visual quality for each landscape unit.

Both the definition of visual quality and evaluation of potential impacts to the visual environment are influenced by those who view the project area. By understanding the issues related to viewer groups, their response to changes in the visual environment could be more fully understood and, to a certain extent, predicted. Viewers were categorized according to their activities, lifestyles, and/or purpose for being in the project area, and are listed below, approximately from most to least sensitive to change:

- Rural residents of unincorporated rural areas on large lots adjacent to or overlooking the proposed alignments.
- Suburban residents of subdivisions at the edges of the developed areas adjacent to or overlooking the alignments.
- Urban residents who live adjacent to or overlooking the alignments.
- Other residents who live outside the viewshed of the project, but may view the alignments in their regular travels through the area, or from their place of employment.
- Tourists who visit the areas for a limited time on an irregular basis.

All of these viewers are sensitive to changes in the visual environment, although to different degrees. Sensitivity to change is generally proportionate to the amount of “ownership” a group has for an area. “Ownership” refers to a combination of financial investment in the land and emotional investment in its scenic quality.

The number of viewers can be more objectively quantified. Table 4.11-2 estimates the relative number of viewers by viewer group for each landscape unit or urban district, with respect to the presence of that viewer group in the other units or districts. As with the evaluation of visual quality, this information is intended to demonstrate an overall pattern within each unit or district. Viewer sensitivity in terms of quality is generally higher in units or districts, which can be viewed from an area adjacent to or overlooking interstate highways and major county roads (e.g., U.S. 42).

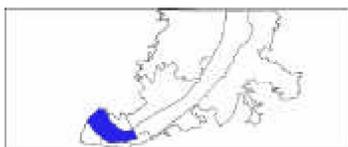
Landscape Units

Downtown Riverfront

From a visual perspective, the riverfront in downtown Louisville, Jeffersonville and Clarksville has been considered as a single landscape unit bounded by the western boundary of Falls of the Ohio State Park on the west, a line from Cabe Street in Louisville to Spring Street in Jeffersonville on the east, the Clarksville/Jeffersonville floodwall on the north, and the Louisville floodwall and elevated interstate expressways on the south. It typically extends 250 to 330 feet from the river’s edge. Figure 4.11-4a includes a photographic summary of the landscape unit.

The Ohio River, while physically dividing the riverfront unit, is the single most important unifying element aesthetically. Other contributing aesthetic elements include the downtown Louisville skyline, waterfront development in Jeffersonville, the large clock on the façade of Clarksville’s Colgate building on 6th Street, Falls of the Ohio State Park and the network of four steel truss bridges that cross the river. While not identical, the existing bridges do create a consistent aesthetic setting and are vital components of the unit, appearing as foreground architecture or “borrowed landscape” from both sides of the river. They form part of the Louisville skyline when viewed from Indiana and frame elements of Jeffersonville and Clarksville’s riverfronts when viewed from Kentucky. The bridges also greatly contribute to the visual setting and define long views when looking east or west from the riverfront on both sides of the river. The height of the existing bridges and their approaches, coupled with the simplicity of their piers, allow unobstructed views east and west from the riverfront, roads and trails. This view does, however, expose the viewer to the utilitarian architecture of the undersides of the downtown bridges.

High quality views are present from a majority of the riverfront, including to motorists and pedestrians (including those on Clark Bridge), and from riverboats, riverfront restaurants, high-rise developments and residences along Riverside Drive in Clarksville and Jeffersonville. Riverside Park in Clarksville has high quality, unobstructed views of downtown Louisville, including the Clark, Kennedy and Big Four Bridges. Motorists along Riverside Drive also enjoy



KEY PLAN


LOUISVILLE - SOUTHERN INDIANA
OHIO RIVER BRIDGES PROJECT

Figure 4.11-4a

**EXISTING CHARACTER PHOTOGRAPHS:
DOWNTOWN RIVERFRONT - LANDSCAPE UNIT**

high quality views. (The exception is the industrial area in Clarksville between the Clark Bridge and Woerner Avenue.) Louisville's riverfront parks, including Waterfront Park, also have high quality riverfront-related views of the river and bridges, as well as views of the Clarksville/Jeffersonville Riverfront.

The majority of the downtown riverfront landscape unit is flat with approximately 23 feet in elevation change occurring 100 to 165 feet from the river at normal pool elevations. A concrete floodwall protects floodplain development on both sides of the river and is a highly visible component of the landscape setting. The grade change on the Indiana side is typically accommodated by grassy slopes followed by a concrete floodwall, while the Louisville grade changes are typically accommodated by built structures including the floodwall and dense developments along Main Street in the CBD and Portland neighborhoods, and industrial developments in Butchertown.

Most of the downtown region is considered a built landscape. While the Kentucky side of the river contains few structures inside the floodwall and is used mainly for parks, roadways, railroad, and parking, the Indiana side has a significant amount of development inside or south of the floodwall. Jeffersonville includes a historic residential district, contemporary commercial structures along the riverfront, a high-rise residential building, and Riverfront Park at the south end of Spring Street. Areas east of the Kennedy Bridge in Jeffersonville are predominantly single family residential, with some commercial development closer to I-65 and expressway exits at Court Street and 10th Street. Clarksville contains a row of wood frame residences on the north side of Riverside Drive, industrial land uses along the river between the Clark Bridge and Woerner Avenue and riverfront parkland that extends from Woerner Avenue to the Falls of the Ohio State Park. The riverfront of Clarksville and Jeffersonville between the Clark and Kennedy Bridges is predominantly commercial, although sections are used as "back of house" space with parking lots, eroded riverbanks and service functions (such as loading and garbage collection) for the commercial developments. These commercial establishments do capitalize on river views with outdoor decks and windows facing the river.

Both sides of the river contain public open spaces. In Kentucky, Louisville has Waterfront Park, an event-oriented riverfront park constructed in the late 1990s. It also has a riverwalk that extends westward from Waterfront Park past the 9th Street interchange. There are high quality views of downtown Louisville and the Indiana riverfront, including Falls of the Ohio State Park from the riverfront parkland west of 9th Street and north of the floodwall. However, the aesthetic quality of this area is somewhat degraded by the presence of the elevated expressway (I-64) and its associated shade. The riverfront in the Butchertown neighborhood contains numerous industrial land uses and has been severed from the residential areas to the south by these uses along with the floodwalls and the Kennedy Interchange. Paved promenades and riverboat docking areas make up the remainder of Louisville's riverfront between Waterfront Park and the 9th Street interchange.

In Indiana, Jeffersonville contains a series of facilities for smaller pleasure craft boating on its riverfront; the city has expanded Riverfront Park to include an amphitheater and waterfront paths. The remainder of Jeffersonville's Riverfront is lined with single-family residences that are

part of the Old Jeffersonville Historic District. South of Riverside Drive, Clarksville's Riverfront contains Riverside Park, which begins near Woerner Avenue and extends west to the Falls of the Ohio State Park. The remainder of Clarksville's Riverfront is in a developed state, containing commercial and industrial uses. It should be noted that plans have been developed by Jeffersonville, Clarksville and New Albany for a riverfront greenway that would span the entire landscape unit.

While roads on the Kentucky side are primarily interstate highways and service roads, the Indiana side contains an aesthetically pleasing riverfront road named Riverside Drive in Clarksville and Market Street in Jeffersonville. The Indiana side also includes the elevated interstate expressways that run perpendicular to the Ohio River and form the boundary between Clarksville and Jeffersonville. A motorist on I-65 and the Clark Bridge experiences high quality, unobscured, long views of the Kennedy Bridge, Clark Bridge, Big Four Bridge, Falls of the Ohio State Park and downtown Louisville.

Eastern Uplands

This landscape unit consists primarily of open, upland plateaus up to 250 feet above the Ohio River with steep wooded ravines. It contains tributaries to the river, including Harrods, Little Goose and Lentzier Creeks. Roadways are typically winding two lane rural routes, rarely having curb and gutter and, on the Kentucky side of the river, often lined with steep embankments of trees and other vegetation as well as exposed limestone outcroppings. Many of these scenic roads are lined with the white or black wood fencing of rural estates or horse farms. Figure 4.11-4b includes a photographic summary of the landscape unit.

The Kentucky side, which is the area between Twelve Mile Island on the east and Beargrass Creek on the west, includes portions of Glenview, Indian Hills, Harrods Creek and Prospect, with a mix of development ranging from large estates to subdivisions. Twelve Mile Island is an undeveloped island on the far eastern edge of the project area. Wooded ravines aesthetically define much of the Kentucky uplands. Views of the river and other natural settings from private lands, public open spaces and roadways tend to be picturesque and are rarely influenced by development.

The Indiana side includes an area from Twelve Mile Island on the east to Lancassange Creek on the west. It includes Utica and surrounding unincorporated Jefferson County communities. Residential development ranges from large to small and closely spaced. The upland plateaus are expansive with wooded ravines and bluffs limited to the areas west of Utica.

Eastern Bottomlands

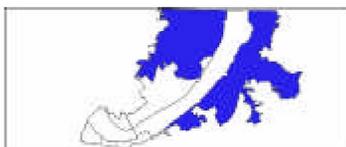
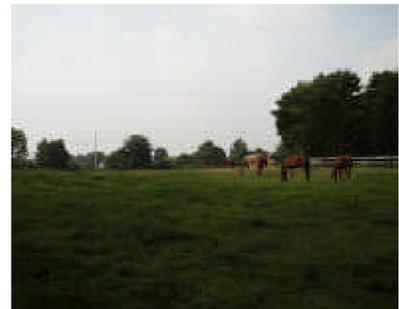
This unit is defined by the relatively flat, expansive floodplain adjacent to the river that ranges from approximately 2,625 feet in width between Harrods Creek and Downtown to approximately 5,250 feet east of Harrods Creek. The landscape is occasionally punctuated by a vegetation-lined stream (e.g., Harrods, Little Goose or Lentzier). Roads are typically two lane rural routes, sometimes lined with fencing of rural estates or horse farms. River Road in Kentucky and Utica



Pike offer views of the river, its floodplain and adjacent uplands. Picturesque long views across and along the river exist on both the Kentucky and Indiana sides. Figure 4.11-4c includes a photographic summary of this unit.

On the Kentucky side of the unit, the predominant land use is horse farm/agriculture. A motorist traveling along the riverfront on River Road views a mix of single-family and multi-family residences, as well as a series of riverfront parks at the western end, including Eva Bandman Park, Cox Park, Twin Park, Riverfields Park and Hays Kennedy Park. Also in the unit is City Soccer Park, located east of Beargrass Creek between River Road and I-71.

In Indiana, the unit contains a mix of residential, agricultural, industrial uses and wellheads. Utica Pike is located at the top of the bluff that defines this unit. West of Utica, the unit narrows as the bluffs become steeper and more heavily wooded with exposed limestone escarpments. The majority of the bottomland in this area is residential or industrial.



KEY PLAN

Figure 4.11-4b


LOUISVILLE - SOUTHERN INDIANA
OHIO RIVER BRIDGES PROJECT

*EXISTING CHARACTER PHOTOGRAPHS:
EASTERN UPLANDS - LANDSCAPE UNIT*



KEY PLAN

Figure 4.11-4c

LOUISVILLE - SOUTHERN INDIANA
OHIO RIVER BRIDGES PROJECT

EXISTING CHARACTER PHOTOGRAPHS:
EASTERN BOTTOMLANDS - LANDSCAPE UNIT

Urban Districts

Louisville Central Business District

Although the actual CBD extends further to the south, for the purposes of this project, I-64 and the floodwalls on the north, 9th Street on the west, Jefferson Street on the south and the Kennedy Bridge on the east bound it. This district contains a range of architectural styles and development scales. The central portion, roughly bounded by 2nd Street on the east and 6th Street on the west, contains numerous high-rise office buildings developed in the late twentieth century. The buildings in the eastern and western portions of the district, by contrast, are lower in scale and many date from the mid to late nineteenth century. Much of the western portion, in particular Main Street from 6th Street to 9th Street, has been redeveloped into such uses as the Louisville Slugger Museum and the Louisville Science Center. In the eastern portion near the Kennedy Bridge are located the recently constructed Louisville Slugger Field stadium, Louisville Art Museum, and Waterfront Park along the river between the Clark and Kennedy Bridges. Figure 4.11-4d includes a photographic summary of the urban district.

Roads in this district vary from two and four lane curb and gutter with parking, to elevated interstate expressways that run parallel to the Ohio River. Views of the river are uncommon, confined to breaks in the floodwall that typically occur at the end of north-south streets. A motorist traveling on I-64/71 in the Kennedy Interchange area enjoys high and moderate quality foreground views of downtown architecture and parks, with unobstructed, long views of the Kennedy, Clark and Big Four Bridges and the Indiana Riverfront.

Views to the north and south from the district's east-west roads such as Main Street are terminated by expressway ramps at each end, with the 9th Street ramps at the south and the Kennedy Bridge interchange at the north. The elevated expressway contributes negatively to the district's visual character and, when combined with the floodwalls, physically divides the riverfront from the balance of the district. There is an upper level public plaza and river overlook between 4th and 5th Streets that decks over I-64 and affords panoramic views of the entire riverfront from the Falls of the Ohio State Park on the west to landscapes upstream of Big Four Bridge on the east. The district does include a strong urban gateway to Kentucky where the Clark Bridge ends at 2nd Street and Main Street.

Louisville East

This district includes the Butchertown neighborhood, and is bounded by the river on the north, the Kennedy Bridge on the west, Market Street on the south and Beargrass Creek on the east. The district, which is bisected by the floodwall, contains a range of architectural styles and land uses, from mid-nineteenth century and contemporary residential structures to industrial facilities such as storage tanks and automobile salvage yards. In many instances, these uses are found side by side. Figure 4.11-4e includes a photographic summary of the urban district.

Roads in this district vary from tree-lined, two lane curb and gutter with parking, to elevated interstate expressways that run parallel to the river. While one can drive to the river, it is

separated visually from the district by the floodwall, the Kennedy Interchange and large industrial facilities. In addition, the river is nearly impossible to reach as a pedestrian. A motorist traveling east on I-64/71 experiences poor quality foreground views of Butchertown with its industrial land uses. Traveling west, however, there are higher quality unobscured long views of downtown Louisville, the Kennedy, Clark and Big Four Bridges and the Indiana riverfront.

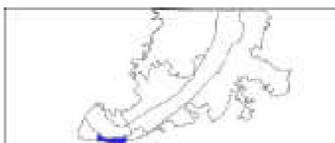
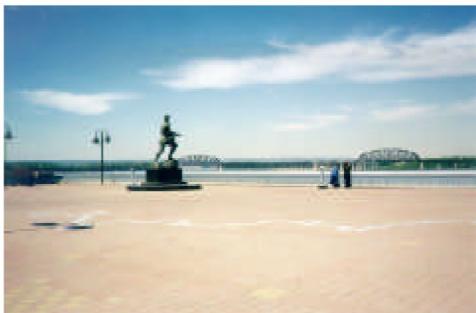
The visual quality of the northern portion of the district, including the riverfront, is very poor and is dominated by the Kennedy Bridge by virtue of its height and location. There are high quality views of downtown Louisville from east-west streets such as Market Street and the riverfront just east of Kennedy Bridge from portions of Waterfront Park.

Louisville West

This district includes the Portland and Russell neighborhoods and is bounded by the concrete floodwall/I-64 on the north, 9th Street on the west, Jefferson Street on the south and 30th Street on the east. This densely developed district contains a range of architectural styles and land uses including early to mid-nineteenth century brick residential, industrial, and commercial structures north of Main Street, and 1960s era public housing south of Main Street near 9th Street. As with Louisville East, the floodwall divides the district in two. Figure 4.11-4f includes a photographic summary of the urban district.

Roads in this district vary from tree-lined, two and four lane curb and gutter with parking, to elevated interstate expressways that run parallel to the river. A motorist traveling east on I-64/71 enjoys high to moderate quality views including unobscured long views of the Falls of the Ohio State Park, the Clark, Kennedy and Big Four Bridges and the Indiana riverfront.

Views of the river are confined to breaks in the floodwall that occur at the end of north-south streets. However, public parking and industrial land uses typically occupy the land between the floodwall and the riverfront park system, degrading the quality of the views. The 9th Street interchange plays a dominant role, with most east-west streets offering clear views of the structure.



KEY PLAN

Figure 4.11-4d


LOUISVILLE - SOUTHERN INDIANA
OHIO RIVER BRIDGES PROJECT

EXISTING CHARACTER PHOTOGRAPHS:
LOUISVILLE CENTRAL BUSINESS DISTRICT (CBD) - URBAN DISTRICT



KEY PLAN

Figure 4.11-4e


LOUISVILLE - SOUTHERN INDIANA
OHIO RIVER BRIDGES PROJECT

EXISTING CHARACTER PHOTOGRAPHS:
LOUISVILLE EAST - URBAN DISTRICT



KEY PLAN


LOUISVILLE - SOUTHERN INDIANA
OHIO RIVER BRIDGES PROJECT

Figure 4.11-4f
**EXISTING CHARACTER PHOTOGRAPHS:
LOUISVILLE WEST - URBAN DISTRICT**

Jeffersonville-Clarksville North

This district includes portions of Jeffersonville and Clarksville and is bounded by 10th Street and Stansifer Avenue on the north, the floodwall on the south, Spring Street on the east and the Conrail railroad tracks on the west. Land use ranges from residential and commercial districts in both Jeffersonville and Clarksville, to industrial in Clarksville, with such major facilities as the Colgate plant and a water treatment plant adjacent to I-65.

Most development consists of two and three story brick and frame structures. One of the project area's most visible landmarks, the clock atop the Colgate-Palmolive administrative building, is found in this district, on 6th Street in Clarksville. Jeffersonville's rejuvenated CBD, located in the vicinity of the intersection of Court Avenue and Spring Street, is also in the district. Figure 4.11-4g includes a photographic summary of the urban district.

Roads in this district vary from two and four lane curb and gutter with parking, to elevated interstate expressways that run perpendicular to the river and form the boundary between Clarksville and Jeffersonville. A motorist on I-65 experiences low quality foreground views of the water treatment plant and Colgate-Palmolive plant. Southbound motorists have obscured long views of the Kennedy and Clark Bridges, and downtown Louisville.

Views of the river are confined to breaks in the floodwall that occur at the end of north-south streets. The elevated expressway contributes negatively to the district's visual character and physically divides the district into smaller subsets. There are few physical or visual breaks in the earthen embankments of the elevated expressways that are approximately 23 feet above street grade, virtually eliminating all east-west visual connections between Clarksville and Jeffersonville. The district includes a strong urban gateway where the Clark Bridge ends at the Indiana Visitors Center in Clarksville, as well as two gateways of low aesthetic quality at the Court Avenue and 10th Street exits.

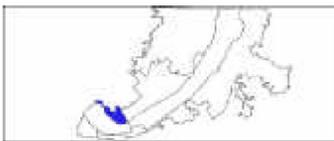
Mid-East Indiana

This district consists of built portions of the bottomlands and uplands on the Indiana side of the river. It is bounded by the river on the south, Spring Street on the west, Lentzier Creek on the east, and the edges of suburban development and S.R. 62 and other major roads on the north.

Land uses include residential, agricultural and/or mining. Although a good part of its natural topographic character remains, the district has been significantly altered by industrial developments such as the Clark Maritime Center and mining operations north of Utica Pike. The floodplain contains a series of wellheads that diminish the visual setting when viewed from the uplands north of Utica Pike. A row of large residences lines the north side of Utica Pike to the west of the Clark Maritime Center and Lancassange Creek, most of which have long, panoramic views to the river. Many of the upland areas have unobstructed views of the Ohio River, while others are obstructed by wellheads and industrial uses in the foreground. Although river views are obscured by floodplain development when viewed from the uplands, they are of high quality and are largely uninfluenced by development, when viewed from residential areas along the banks of the river.



Roads are typically two or four lane subdivision roads or two lane rural routes, sometimes lined with white or black wooden fencerows. Utica Pike is the primary east-west roadway, offering views of the river, its floodplain and adjacent upland areas. Figure 4.11-4h includes a photographic summary of the urban district.



KEY PLAN

Figure 4.11-4g



KEY PLAN

4.12 Hazardous Substances

Potential hazardous waste sites were identified in the project area through a search of all available state, local and federal environmental database records. A Recognized Environmental Conditions (RECs) database was compiled. The reports also provided basic information about the sites and the nature of violations, if any. Historical Sanborn Fire Insurance Rate Maps were also obtained from EDR. These maps provided land use characterizations of properties for various years dating back to 1892.

In accordance with American Society for Testing and Materials (ASTM) standards, these databases were searched:

- **NPL** and De-listed NPL sites - National Priority List
- **CERCLIS** - Comprehensive Environmental Response, Compensation, Liability Information System
- **CERC-NFRAP** – Comprehensive Environmental Response, Compensation, and Liability Information System
- **CORRACTS** – Corrective Action Report
- **RCRIS-TSD** - Resource Conservation and Recovery Information System (Hazardous Waste Treatment, Storage and Disposal sites)
- **RCRIS-LQG** - Resource Conservation and Recovery Information System (Hazardous Waste Large Quantity Generator)
- **RCRIS-SQG** - Resource Conservation and Recovery Information System (Hazardous Waste Small Quantity Generator)
- **SHWS** – State Hazardous Waste System
- **SWF/LF** – Solid Waste Facilities List/Land Fill List
- **UST** – Underground Storage Tank Database
- **FINDS** – Facility Index System/Facility Identification Initiative Program Summary Report.
- **HMRS** – Hazardous Materials Information Reporting System
- **MLTS** – Material Licensing Tracking System
- **PADS** – PCB Activity Database System
- **RAATS** – RCRA Administrative Action Tracking System
- **TRIS** – Toxic Chemical Release Inventory System
- **TSCA** – Toxic Substances Control Act

In addition to the database searches, appropriate state and local regulatory agencies and utility companies were also contacted to determine potential histories of past releases within the study area or on any adjacent properties that may impact a proposed alternative. These include, but are not limited to KYTC, INDOT, Kentucky Division of Waste Management General Files, Kentucky Division of Waste Management Underground Storage Tank Branch and Division of Water, Louisville Fire Department, Louisville Gas and Electric Company, IDEM and Local Emergency Planning Committees.

Phase I Environmental Site Assessments (ESAs) were then conducted on 228 sites – 65 in Indiana and 163 in Kentucky – to determine the potential for the occurrence of hazardous substances. The sites included both operating and former operating facilities, including

junkyards, landfills, automobile repair facilities, refineries, gas stations, underground storage tank sites and manufacturing facilities. During the Phase I ESAs, it was determined that 74 of the 228 properties were located along project alternatives.

In general, a Phase I investigation consists of a review of historical and current documents, an on-site visual reconnaissance, interviews and the identification of site-related RECs. The investigations were performed in accordance with the “Kentucky Environmental Procedures Manual,” of the KYTC DEA, April 1996, which references ASTM E1527-97, the standard for Phase I ESAs.

Each of the 228 properties was categorized by the course of future action recommended by the Phase I ESA as outlined below:

- **Category 1:** Contaminated Sites Not Requiring Phase II Investigation
- **Category 2:** Contaminated Sites Requiring Full Phase II Investigations
- **Category 3:** Suspected Contaminated Sites Requiring Limited Phase II Investigations
- **Category 4:** Sites of No Further Concern

Category 1 sites, although of potential regulatory concern, are not considered to require a Phase II investigation because such an investigation has already been performed for that site. Category 2 sites require a full Phase II investigation to more completely characterize the location and extent of known contamination of those sites. A full Phase II investigation will define the nature and extent of contamination for sites where contamination is known to be present and soils are going to be disturbed. This will be conducted for risk management purposes only, to protect workers, the public and the environment and to assess the soils for appropriate disposition. Category 3 sites require limited Phase II investigations. These initially will consist of limited sampling to determine if potential contaminants are present. If contaminants are in fact present, a full Phase II investigation consisting of additional sampling may be appropriate to ensure proper safety of the worker, the public and the environment and for the appropriate disposal of the waste material. Thus, sites in Categories 1, 2, and 3 may require either further investigation or clean-up prior to or during project construction. Category 4 sites are considered to require no further investigation or clean up.

During the design phase, sites identified in the Phase I investigation will first be characterized to determine if contamination is actually present and if the contaminant concentrations are above acceptable limits based on remediation requirements. If contaminant concentrations are elevated, risk management plans will be followed during construction activities for the protection of workers, the public and the environment. Appropriate disposition of soils will be assured.

Phase II risk management plans, will be developed for specific sites and submitted to KYTC and INDOT after approval of final design. These plans will include selected sites identified in the Phase I investigation. Sample locations will be site specific and for those areas where soils are to be disturbed. Closure of the sites will take place during construction.

A Phase II investigation usually consists of the collection of soil or water samples at a property. These samples are analyzed in a laboratory, to determine if a property contains contaminants above clean-up levels established by regulatory agencies. Agencies governing hazardous substances in the project area include the EPA, the Kentucky Natural Resources and Environmental Protection Cabinet (KNREPC), and the IDEM. Additional file searches and other investigative work are sometimes included in the Phase II. If warranted by Phase I or Phase II findings, Phase III work may be recommended. This typically involves the remediation of contaminated soil or water; however, the main concern with this plan is to develop a risk.

Another element of the Phase II plan is a Quality Assurance/Quality Control Plan. Quality Assurance (QA) ensures that the data meets defined standards of quality with a stated level of confidence; Quality Control (QC) refers to technical activities that reflect error control. Together, QA and QC assist in producing data of known quality, enhancing the credibility of the group in reporting results, and ultimately saving time and money. A QA/QC Plan has been developed and will be submitted along with the Phase II Risk Management Plans.

Forty-four of the 74 properties within the project area corridors were recommended for Phase II investigations (Category 2 or 3). Remediation of these sites prior to project construction would depend on the results of these investigations. See Section 5.12. Three properties were placed in Category 1, and 26 were placed in Category 4. For one property (IN-08), Phase III work is recommended. This site is highly suspected to contain a UST located beneath the sidewalk at 350 Indiana Avenue in Jeffersonville, Indiana. The site was operated as a grocery from the late 1800s to the early 1960s. During this period of time, IDEM maintained no records. Since the early 1960s the property has been vacant. Although there are no records indicating the presence of a UST at this site, since a fill port was located on the property, common practice during that time would dictate that the tank would have been abandoned in place. Any Potential Responsible Party (PRP) for the site would be the individual or entity that signs as owner of the site and ultimate owner of the tank.

Table 4.12-1 lists the 44 sites recommended for further investigation. Figures 4.12-1a through 4.12-1d show the location of these sites. In the Far East Corridor, Phase II investigation was recommended for one site along Alternative A-9. No investigations are recommended for any properties along Alternatives A-2, A-13, **A-15** and A-16. Costs estimates for closure will be provided once final design has been approved and hard lines and utility relocations have been established; in an effort to reduce closure costs, completion of closure activities will occur during the actual construction process. This should occur with minimal delays.

TABLE 4.12-1

HAZARDOUS MATERIALS INVESTIGATION															
LOUISVILLE-SOUTHERN INDIANA OHIO RIVER BRIDGES PROJECT															
SITE NUMBER	SITE NAME	Site Status and Regulatory Sources	Source of Information	PROPOSED ALIGNMENT											
				C1 _{RC}		C1 _{RL}		C2		C3		B1		A9	
				PHASE II		PHASE II		PHASE II		PHASE II		PHASE II		PHASE II	
				FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED
KY-11	Ohio Street Landfill	In the late 1940's/early 1950's this site was utilized as a "push and burn" landfill. The push and burn landfill operation consisted of pouring coal oil on the trash for (and) burning it. This continued until 1957, when the City of Louisville Built the Louisville Incinerator. This site operated as a landfill from 1950's - 1964. Today this site is operated as the City Auto Tow Yard with I-71 transecting the former landfill. The site was closed in 1996, to the retroactive standards at the time of operation. This site has not been closed in accordance with any updated standards or regulations, VOCs, PAH and metals from former landfill operations and burning coal oil are concerns at this site.	RCRIS-Small quantity generator (I-71 Drums)												
KY-21	City Auto Tow Yard/ Ohio Street Landfill	This site was operated as the Ohio Street Landfill from 1951-1964. According to a 1993 report from SCA Environmental. The landfill was not properly closed in accordance with state guidelines. Recent Sanborn Maps show that this site has been operating as a tow yard from 1988-present. (See Site KY-11)													
KY-23	Allied Ready Mix Co., Inc	Sanborn maps indicate that this site was operated as a junkyard from 1988-1994. This site is currently being used as an equipment storage lot by allied ready mix. Potential contaminants of concern include VOCs, semi-volatiles, PCBs and Metals	FINDS												
KY-24	Allied Ready Mix Co., Inc	A 3,785 l (1,000 gallon) diesel spill was reported on 10/03/94. Evergreen environmental handled the containment and cleanup. This spill was a surface spill caused by allowing a dispenser to run over night. This action was believed to be an act of vandalism. A 37,854 L (10,000 gallon) gasoline tank was closed in place on June 15, 1999. A 22,712 L (6,000 gallon) waste oil tank was removed at the same time of the tank closure. Analytical results were below detectable levels. This action is pending closure by USTB. There are a number of UST's currently in operation on site. Evergreen Environmental was in the process of bringing other tanks into compliance as of June, 2000. Some auto repair and salvage operations have occurred on this site. Waste oil is stored in an UST on site. Potential contaminants of concern include BTEX, PAHs and Metals	UST												
KY-26	Rueff Sign Co.	This site was a school prior to 1951. Sanborn maps indicate that in 1951 this site was operating as a junkyard. Sanborn maps indicate that this site was operated as a machine shop from 1988-1994. Today this site is Rueff Sign Co. This site has been issued a hazardous waste permit for waste petroleum products, naphtha, cadmium, lead, benzene, and parts washer fluid. Potential contaminants of concern include VOCs, semi-volatiles, PCBs and Metals	RCRIS - Small Quantity Generator												
KY-34	Bob Collett Auto Sales	This site has been a used car lot with an auto repair shop since 1988. Currently this site is part of an auto repair shop and a junkyard is behind this complex. Potential contaminants of concern include BTEX, PAHs and lead.													
KY-36	Auto Junk Yard	The Sanborn maps indicate this site was a junk yard from 1988-1994. This site is currently a junk yard. Potential contaminants of concern include VOCs, semi-volatiles, PCBs and Metals													
KY-42	Terry and Steadman contractors yard/Louisville MSD	The Sanborn maps indicate an auto repair shop was in operation at this site in 1951. Currently, Louisville Metro Sewer District (MSD) utilizes this site as a storage lot for various pieces of heavy equipment. Potential contaminants of concern include BTEX, PAHs and metals.													

TABLE 4.12-1

HAZARDOUS MATERIALS INVESTIGATION															
LOUISVILLE-SOUTHERN INDIANA OHIO RIVER BRIDGES PROJECT															
SITE NUMBER	SITE NAME	Site Status and Regulatory Sources	Source of Information	PROPOSED ALIGNMENT											
				C1 _{RC} <small>Reconstructed Kennedy Interchange</small>		C1 _{RL} <small>Relocated Kennedy Interchange</small>		C2 <small>Reconstructed Kennedy Interchange</small>		C3 <small>Relocated Kennedy Interchange</small>		B1		A9	
				PHASE II		PHASE II		PHASE II		PHASE II		PHASE II		PHASE II	
				FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED
KY-44	Challenger Lifts Inc/The Logan Co	<p>The Sanborn maps indicate that from 1905 – 1951 this site was part of a tannery operation. After that, the site was involved in metalworking, galvanizing, enamel painting, and electroplating. From 1968-1990, this site produced package conveyor equipment. The Logan Company ceased operation in 1994. Subsurface contamination exists on this site according to a letter in the DWM file dated August 11, 1995. However, this letter gave no indication of the nature or extent of the contamination on this site. The Challenger Lift Co moved from 1402 W Main St. in 1996 to this location. Challenger Lifts has had many violations that are due to their waste handling practices. However, no Spills or releases were found on record. As of March 31, 1997 this site is no longer listed as a hazardous waste generator.</p> <p>This site is currently operating under a Kentucky Division of Waste Management approved risk based management plan. This plan required that a geotextile material followed by six inches of topsoil with grass sod and other vegetation cap the site. Deed restriction limit uses of this site and are designed to limit exposure to soil and groundwater at this site. Groundwater monitoring is ongoing at this site. The last round of sampling indicated that the contaminant levels were below regulated levels. This site has been fully characterized since the Phase I assessment and</p>	UST/RCRIS Small Quantity Generator/ FINDS	X		X		X		X					
KY-46	Larry Dunn's Auto Parts/Adams Street Imports	<p>The sanborn maps indicate that this site was utilized as a salvage yard in 1988-1994. Currently this site is operating as a junkyard. Field observations indicate that part of this site may be located on previously landfilled materials. Potential contaminants of concern include PAHs, PCBs and metals.</p>					X			X					
KY-47	Former Bollinger Property	<p>Sanborn maps show that this site was utilized as an automotive junkyard in the early 1950's to the late 1980's. According to a 1993 SCA Environmental report, soil samples collected on November 28, 1990 indicated elevated lead and PAH levels exist on site, however, no VOC or PCB concentrations were detected. A lead level of 1,050 mg/kg and a total PAH of 23.2 mg/kg were detected. Currently Waterfront Development Corp owns the site. Potential contaminants of concern include BTEX, PAHs and metals.</p>		X				X							
KY-51	Earl's Welding/Port Leisure Marine.	<p>The Sanborn maps show that this site was Earl's Welding from 1988-1994. A former Shell Oil tank farm area was located to the south of this site, which had a large gasoline release in 1979. As of October 1990 11,356 L (3000 gallons) of free product had been recovered.</p> <p>Soil Samples collected by ETI in 1992 on the south side of the site show slightly elevated levels of lead and TPH. This is presumed to have originated from the Shell-site. There was no evidence that any BTEX samples were collected at that time.</p> <p>An NFA was issued for underground storage tanks located on this site on June 22, 1999 by the USTB. The underground storage tank system consisted of one 2081 L (550 gallon) gasoline tank that was removed on January 12, 1999. Currently, this site is part of Port Leisure Marine. Potential contaminants of concern include BTEX, PAHs and metals.</p>	UST	X				X							

TABLE 4.12-1

HAZARDOUS MATERIALS INVESTIGATION															
LOUISVILLE-SOUTHERN INDIANA OHIO RIVER BRIDGES PROJECT															
SITE NUMBER	SITE NAME	Site Status and Regulatory Sources	Source of Information	PROPOSED ALIGNMENT											
				C1 _{RC}		C1 _{RL}		C2		C3		B1		A9	
				PHASE II		PHASE II		PHASE II		PHASE II		PHASE II		PHASE II	
				FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED
KY-53	KP Oil Inc./ MB Oil Co/Keil Brothers Oil Company	Sanborn Maps show that this site was built in 1964. A portion of this site has been part of a bulk plant loading area for petroleum-based products formerly owned by Amoco and a general storage area for gas station hardware. This site was removed from the waste handler's list on 3/10/98. The permit was issued for short term handling of waste from gas station cleanups. There were some violations due to improper permitting. There are also active tanks on site although they are no longer used. These tanks are composed of steel construction and were installed in 1989. They have not contained product since September 30, 1998. Potential contaminants of concern include VOCs, semi-volatiles and Metals	UST/RCRIS Small Quantity Generator				X					X			
KY-56	Former Halloway Ready mix	Prior to the construction of I-64, this site was the north end of the Louisville veneer mill. This mill used various solvents including MEK, and toluene. After construction of I-64, this site was used as a Ready Mix Plant. Today (as of Summer 2000) this site appears to be used for parking construction trailers and equipment involved with the relocation of River Road. According to a 1993 SCA Environmental report, although the soil appears to be free of hydrocarbon contamination, MEK and toluene are present in groundwater. One 7,571 l (2,000 gallon) gasoline tank and one 7,571 l (2,000 gallon) diesel tank were removed from this site on May 31, 1996. The USTB issued an NFA on December 16, 1996 for the two (2) tanks removed from this site. Hydrocarbon contamination exists about ten feet below the surface. An ETI Report dated July 1996 indicates that the contamination came from an offsite source to the south. Currently Waterfront Development Corporation owns this site. Potential contaminants of concern include VOCs, semi-vols and metals.	UST	X				X							
KY-58	Amoco Oil Company/Able Construction Co	This site was part of the Stoll Oil Refinery from 1919 through at least the late 1940's. Sinclair Refining Co. owned and operated the site as from 1956-1962. Arco operated this site as a bulk terminal until 1980 when it was sold to Amoco. In 1981 and 1982, two (2) gasoline releases occurred on site. One was a 94,635 L (25,000 gallon) release and the other was a 26,497 L (7,000 gallon) release. A slurry wall was constructed to block the migration of product. A pump and treat system was installed and operated from 1982 through 1989, when the slurry wall was breached and free product was observed. On November 16, 1995, Soil Vapor Extraction (SVE) remediation began. On December 11, 1995 Enhanced Fluid Recovery (EFR) remediation began. On March 5, 1996 the KDWM concluded that contamination is migrating off-site toward the north. On March 14, 1997 EFR remediation ceased. Superfund Branch approves a proposal for Phytoremediation. Four (4) UST's were removed in 1986 with the closure of the bulk plant. Two (2) active tanks exist on site and are of FRP construction. Potential contaminants of concern include BTEX, PAH and lead.	RCRIS - Small Quantity Generator SHWS/FINDS	X		X		X		X					
KY-62	Local Contracting Inc.	The Sanborn maps show that in 1941, this site was utilized as a contractor's yard. From 1989-1995 this site was used as an auto repair facility. This site is owned by Trauth Dairy and has two (2) underground storage tanks: a 7,570 L (2,000 gallon) diesel tank and 7,570 L (2,000 gallon) gasoline tank. Both were installed in 1985. Both tanks were removed on August 26, 1997. The USTB issued an NFA on 01/21/98. Underground storage tanks may still exist on site. Potential contaminants of concern include BTEX, PAH and lead.	UST		X		X		X		X				

TABLE 4.12-1

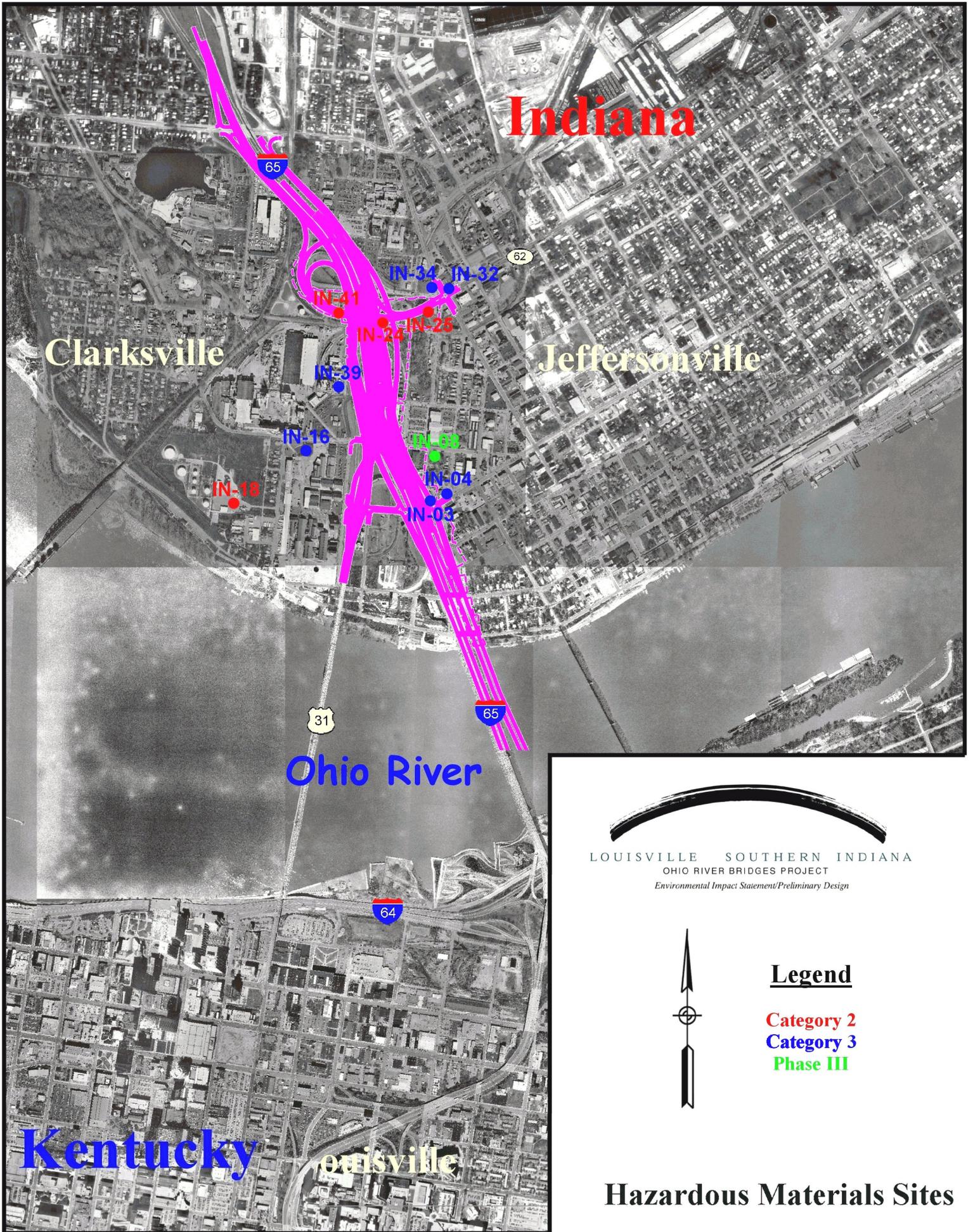
HAZARDOUS MATERIALS INVESTIGATION															
LOUISVILLE-SOUTHERN INDIANA OHIO RIVER BRIDGES PROJECT															
SITE NUMBER	SITE NAME	Site Status and Regulatory Sources	Source of Information	PROPOSED ALIGNMENT											
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				PHASE II		PHASE II		PHASE II		PHASE II		PHASE II		PHASE II	
				FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED
KY-63	Producer Feeds	This site has been a feed mill from 1941-2000. Sanborn maps show that this site sold coal from 1941-1995. The USTB has issued a NFA for a 3,785 l (1,000 gallon) gasoline and 22,713 l (6,000 gallon) diesel tanks that were removed in 1994. These tanks were installed in 1963. The NFA was issued on August 19, 1994. Older tanks existed on this site in the 1940's and 1950's. No records were found for these tanks. This site was a one-time full quantity generator. Waste was generated from the removal of UST's in 1994. This site has an air permit. Potential contaminants of concern include BTEX, PAH and lead.	UST/FINDS RCRIS Small Quantity Generator		X		X		X		X				
KY-65	Former junk Yard	According to the Sanborn maps, from 1941-1995 this site was used as a salvage yard. This site was next to Producer Feeds. Currently this site is vacant. Potential contaminants of concern include VOCs semi volatiles and metals.					X			X					
KY-66	Tally's Sandblasting	According to the Sanborn Maps, this site was a contractors yard and garage from 1941-1950. The Sanborn maps indicate that this site had a UST located near the street at 723 Franklin in 1941. The tanks are not show in 1950. The USTB issued a NFA on January 31, 1996 for one 2120 L (550 gallon) diesel tank at this site. Potential contaminants of concern include BTEX, PAHs and metals.	UST							X					
KY-67	Old OK Storage Lot	Sanborn maps show that this site was utilized as the Ewald Iron works facility in the 1940's and 1950's. From 1950-1995, this site was operated as a contractors yard and storage facility. In addition, automotive repair along with regular body shop work has also occurred on this site. This site was once owned by Kentucky Transportation Cabinet. Used oil was recycled and solvents were removed from this site. Waste paint and MEK were also found on this site. Remediation efforts were completed in May of 1995. Current documentation in DWM file claims that this site has been remediated. This site was removed from Waste Handlers List on May 11, 1995. Some subsurface contamination may still be present on this site. It is believed to be coming from the old Stoll Oil Refinery. Currently this site is now owned by the Waterfront Development Corporation and is undergoing development as part of Waterfront Park. Potential contaminants of concern include VOCs, semi-volatiles, PCBs and metals.	FINDS/RCRIS Small Quantity Generator		X		X		X		X				
KY-68	Ashland Asphalt Terminal	From 1919 -1963 part of this site was utilized as the former Stoll Oil refinery. From 1963-2000, this site has been utilized as the Marathon Ashland Petroleum Co LLC. Asphalt terminal. This site is permitted for NOx emissions. Phenol, benzene, freon, oil and grease are waste concerns at this site. This site has problems with storm water run off. There are records of UST's being removed on December 6, 1988. One (1) 2,082 L (550 gallon) UST still exists on site, however, it is unknown if other USTs are still present on-site. Potential contaminants of concern include VOCs, semi-volatiles and metals.	FINDS		X		X								
KY-69	Louisville Veneer Mills	From 1892 -1963 this site was operated as the Louisville Veneer Mills. This site is contaminated with solvents such as: MEK, Acetone and Toluene. According to a 1993 SCA Environmental report and DWM files, elevated levels of MEK were found in the soil located toward the eastern portion of the lot. Much of this area is now covered by the interstate. The north end of this site was occupied by Holloway Ready Mix and is now owned by Waterfront Development Corp. Mini storage units and small offices now occupy the south end of this site. Potential contaminants of concern include VOCs, semi-volatiles and metals.		X		X		X		X					
KY-72	Part of Former Amoco facility aka Ace Salvage Co.	Prior to 1986, this site was utilized as part of the Amoco Tank Farm facility. Sanborn maps show that this site was utilized as a junkyard between 1989-1995. The site is currently a scrap yard, located directly to the south of the former Amoco Bulk plant. Potential contaminants of concern include VOCs, semi-volatiles and metals.	SHWS/FINDS/R CRIS Small Quantity Generator				X			X					

TABLE 4.12-1

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				PHASE II		PHASE II		PHASE II		PHASE II		PHASE II		PHASE II	
				FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED
KY-73	Marshall's Auto Parts	Sanborn maps show that this site was utilized as a junkyard from 1989 -1995. Today, the site remains an auto junkyard storage facility. Potential contaminants of concern include VOCs, semi-volatiles, PCBs and metals.			X		X		X		X				
KY-74	Bill Board Site/outdoor Systems	According to a 1993 SCA Environmental Report MEK and toluene were found in ground water at this site, however, soil samples appeared to be of free of volatile contaminants. The source was believed to have originated from the former Louisville Veneer Mill. Potential contaminants of concern include VOCs, semi-volatiles and metals.		X				X							
KY-85	American S&W Stocks/Vermont America Corporation	From 1940-1950, this site was American Elevator and Machine Co. From 1989-1995, the Sanborn maps showed this site to be Vermont American Co. This site ceased operation in 1989. A fuel oil tank that was installed in 1969 was removed 9/1/89 according to USTB file review. This building was built in 1905. Currently the building is vacant. Potential contaminants of concern include VOCs, semi-volatiles and metals.	UST/RCRIS Small Quantity Generator FINDS/CERCLI S-NFRAP		X		X		X		X				
KY-99	Hendricks Staebler Tar and Oil Co.	Sanborn maps show a tar and oil company occupied this site in 1941. Today this site is on the edge of river road and part of Waterfront Park. Potential contaminants of concern include VOCs, semi-volatiles, PCBs and metals.			X		X		X		X				
KY-120	Parking	According to the Sanborn maps, this site was an auto service garage in 1950. Today the site is parking. Potential contaminants of concern include VOCs, semi-volatiles, and metals.							X						
KY-136	Rouck Plumbing Co	Sanborn maps show that this site was utilized as an auto repair shop and motor freight station in 1940. Two (2) Underground gasoline Storage Tanks [22,713 L(6,000 gallon) and 30,284 L (8,000 gallon)] were removed from service on August 17, 1998. An NFA was issued by the USTB on December 10, 1998. Currently this site is Rouck Plumbing. Potential contaminants of concern include VOCs, semi-volatiles and metals.	UST						X						
KY-138	Auto Detailing shop/Morgan Chevron SVC	The Sanborn maps indicate that this site was a service station in 1940-1995. Over a 40-year period a total of 11 tanks are known to have been removed from this site. The last three (3) tanks [3 7,571 l (2,000 gallon)] were removed in January 1994. No records were found regarding the first eight tanks. The only records for these tanks are found on the Sanborn maps. This site was listed as small quantity generator due to tank removal. The USTB issued a NFA for this site on February 1, 1995. This site was removed from the waste handler's list on May 25, 1995. As of summer 2000, this site is an auto detail shop. Potential contaminants of concern include VOCs, semi-volatiles and metals.	UST RCRIS - Small Quantity Generator						X						
KY-144	Kentucky Container Service	Sanborn maps show that this site was a warehouse from 1940-1995. Currently the site is a trucking and freight station depot. This site was removed from the waste handler's list on May 25, 1995. Much of this site is covered with truck trailers. Potential contaminants of concern include VOCs, semi-volatiles and metals.	RCRIS						X						

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				PHASE II		PHASE II		PHASE II		PHASE II		PHASE II		PHASE II	
				FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED	FULL	LIMITED
Far East	Clark Nichols Quarry (Indiana)													X	
Near East	Darling Yachts												X		
IN-03	McDonald's Restaurant				X		X								
IN-04	BP Gas Station				X		X		X						
IN-08	Cotton Real Estate LLC				Phase III		Phase III								
IN-16	Logistics								X						
IN-18	Marathon Ashland Petroleum LLC							X							
IN-24	Industrial Waste Water Recycling, Inc.				X		X		X						
IN-25	Hampton's Used Car Lot				X		X			X					
IN-32	Powder Keg					X		X							
IN-34	Fireworks Superstore					X		X							
IN-39	Philadilphia Quartz Corp. (PQ)					X		X							
IN-41	Colgate-Palmolive WWTP				X		X		X						
	Total Kentucky Sites				7	7	5	17	7	10	5	16			
	Total Indiana Sites				3	5	3	5	3	3	3		1	1	
COMBINED TOTALS					10	12	8	22	10	13	8	16	1	1	
					22		30		23		24		1	1	



Indiana

Clarksville

Jeffersonville

Ohio River

Kentucky

Louisville

LOUISVILLE SOUTHERN INDIANA
OHIO RIVER BRIDGES PROJECT
Environmental Impact Statement/Preliminary Design



Legend

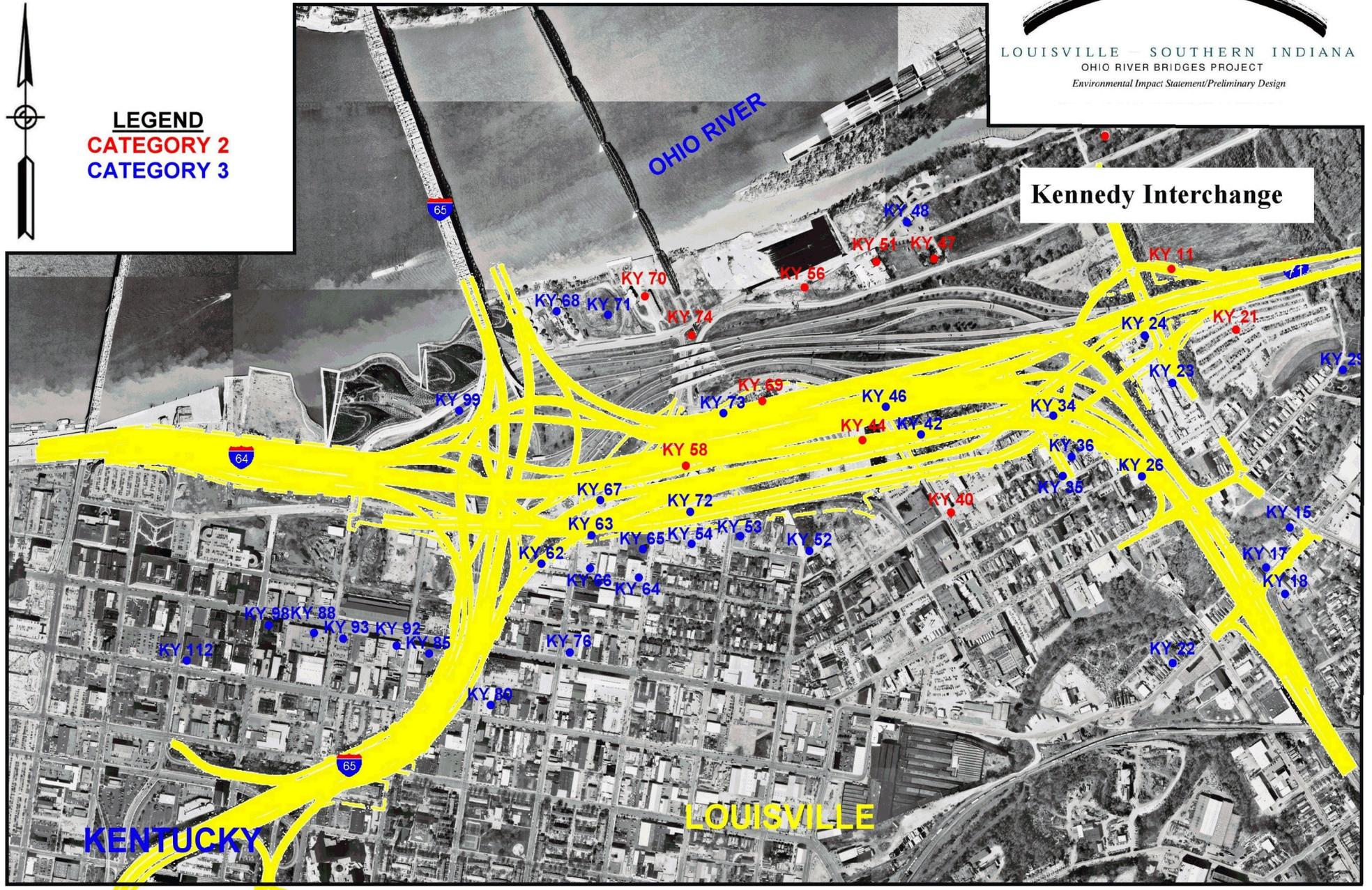
- Category 2
- Category 3
- Phase III

Hazardous Materials Sites

Figure 4.12-1a

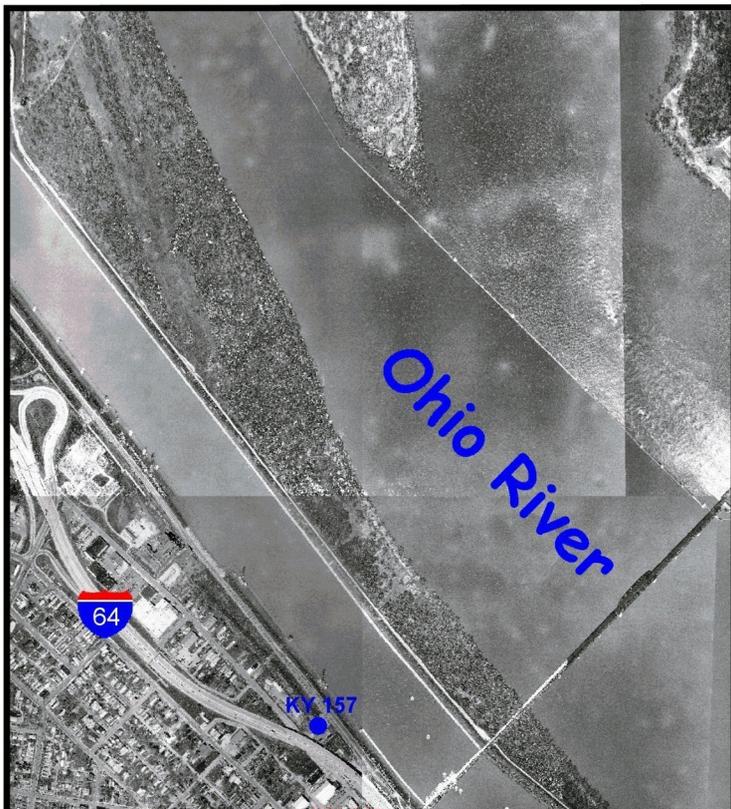


LEGEND
CATEGORY 2
CATEGORY 3



Hazardous Materials Sites

Figure 4.12-1b



Legend

- Category 2**
- Category 3**

Hazardous Materials Sites

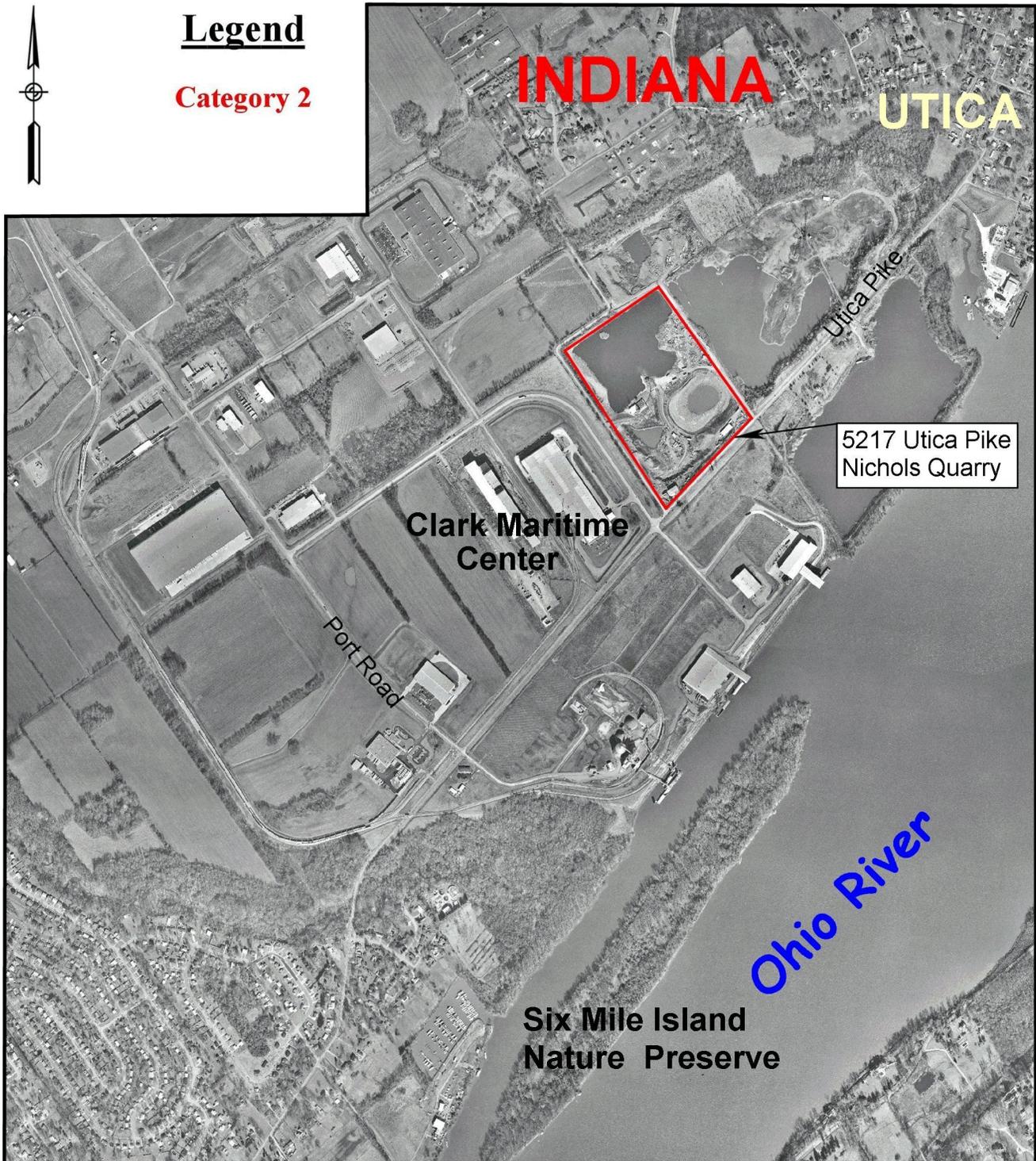


Figure 4.12-1c



Legend

Category 2



Hazardous Materials Sites

Figure 4.12-1d