Draft Integrated Feasibility Report
Ohio Riverfront – Cincinnati, Ohio (Phase 2)

September 2024

US Army Corps
of Engineers®
Louisville District

DRAFT FINDING OF NO SIGNIFICANT IMPACT

Ohio Riverfront – Cincinnati, Ohio (Phase 2)

The U.S. Army Corps of Engineers, Louisville District (USACE) has conducted an Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, for the Ohio Riverfront – Cincinnati, Ohio Phase II Feasibility Study, which addresses recreation enhancements at Smale Park, as outlined in the Section 1202(b) of the Water Infrastructure Improvements for the Nation Act of 2016 (P.L. 114-322, 130 Stat 1684).

The Draft EA, incorporated herein by reference, evaluated various alternatives that would provide solutions for the feasibility of recreation components along the riverfront. The Tentatively Selected Plan (TSP) is Alternative 1, which consists of:

- Enhanced Americans with Disabilities Act (ADA) accessible walkways along the riverfront to allow for high-quality interaction with the water's edge.
- River stairs that lead users to a kayak launch
- Terraced boulders around the kayak launch
- Concrete seat walls
- Native plantings

In addition to Alternative 1 (TSP), a "no action alternative" and six other action alternatives were initially evaluated. Alternatives 2A, 2B, and 2C, consisted of all hardscaped shorelines with pedestrian access. Alternatives 3A and 3B consisted of natural riverbanks with either native plantings or a seat wall respectively. Lastly, Alternative 4 consisted of building the park out into the river with a wall at the river's edge. After two criteria screenings, these preliminary alternatives were focused into four main options; thereafter, called Alternatives 1–4. The preliminary and focused alternatives and screening criteria are described in Sections 3.4 and 3.5 of this report.

For all alternatives, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the TSP are listed in Table i.

Table i Summary of Potential Effects of the TSP

	Insignificant effects	**Insignificant effects as a result of mitigation**	**Resource unaffected by action**
Recreation, Scenic, and Aesthetic Resources	☒	☐	☐
Air quality	☒	☐	☐
Wetlands	☐	☐	☒
Aquatic habitat/Water quality	☒	☐	☐
Invasive species	☐	☐	☒
Terrestrial habitat	☐	☐	☒
Threatened/Endangered species/critical habitat	☐	☐	☒
State Listed Species	☒	☐	☐

Historic properties	☐	☐	☒
Other cultural resources	☐	☐	☒
Floodplains	☒	☐	☐
Hazardous, toxic & radioactive waste	☐	☐	☒
Groundwater	☐	☐	☒
Noise levels	☒	☐	☐
Socioeconomics	☐	☐	☒
Environmental justice	☐	☐	☒
Soils	☒	☐	☐
Climate	☒	☐	☐
Prime and unique farmland	☐	☐	☒
Transportation and traffic	☐	☐	☒
Health and Safety	☐	☐	☒

All practical and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the TSP. Best management practices (BMPs) as detailed in Section 5.0 of the Draft EA will be implemented, as appropriate, to minimize impacts.

No compensatory mitigation is required as part of the Recommended Plan.

Public review of the draft EA and Finding of No Significant Impact (FONSI) was completed on [PENDING]. All comments submitted during the public review period will be responded to in the Final EA and FONSI, and any necessary changes incorporated.

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, USACE determined that the TSP would have no effect on the following federally listed species or their designated critical habitat: sheepnose (*Plethobasus cyphyus*), fanshell (*Cyprogenia stegaria*), pink mucket (*Lampsilis abrupta*), snuffbox (*Epioblasma triquetra*), northern long-eared bat (*Myotis septentrionalis*) and the Indiana bat (*Myotis sodalis*), and the proposed endangered Tricolored bat (*Perimyotis subfalvus*). Additionally, USACE has determined that the TSP would have no effect on the monarch butterfly (*Danaus plexippus*), a candidate species.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, USACE determined that historic properties would not be adversely affected by the TSP. The Ohio State Historic Preservation Officer (OH-SHPO), Kentucky Heritage Council (KHC), National Park Service (NPS), and Osage Nation concurred with the determination between June 4-11, 2024 (see Appendix H for concurrence letters).

Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the TSP has been found to be compliant with section 404(b)(1) Guidelines (40 CFR 230). The Clean Water Act Section 404(b)(1) Guidelines evaluation is found in Appendix C of this report.

A water quality certification pursuant to section 401 of the Clean Water Act will be obtained from the Ohio Environmental Protection Agency (OHEPA) prior to construction. In a letter dated [PENDING], the OHEPA stated that the TSP appears to meet the requirements of the water quality certification, pending confirmation based on information to be developed during the pre-construction, engineering, and design phase. All conditions of the water quality certification will be implemented to minimize adverse impacts to water quality.

All applicable environmental laws have been considered and coordination with appropriate agencies and officials has been completed.

Technical, environmental, and economic criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on this report, the reviews by other federal, State and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the TSP would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

Date	L. Reyn Mann Colonel, U.S. Army District Commander

EXECUTIVE SUMMARY

In 1999 the City of Cincinnati completed the Cincinnati Central Riverfront Urban Design Master Plan (Master Plan). The Master Plan documents the City of Cincinnati's plan to enhance the Ohio riverfront to reflect the historic importance of the riverfront as the front door to the City of Cincinnati, including the reconnection of downtown to the Ohio River by transforming the existing isolated parks into a riverfront park system. The Master Plan further describes that by reclaiming the riverfront for public use, the City of Cincinnati will have an opportunity to establish the proper urban relationship at the river.

In support of realizing the vision outlined in the 1999 Master Plan, the City of Cincinnati partnered with the U.S. Army Corps of Engineers (USACE) in 2010 to construct a section of the park. This section of the park is referred to as Phase 1 in this feasibility study and was authorized by the Water Resources Development Act of 2007 (Public Law 110-114), Section 5116. The total project cost for Phase 1 was $30,167,000 and included construction of recreational features located east of the John A. Roebling Bridge including the Walnut Street stairway, the Schmidlapp Event Lawn, and an interactive playground area as well as lighting, signage, and other utilities. Phase I was completed in 2014.

Phase 2 of the project was then authorized in Section 1202(b) of the Water Resources Infrastructure Improvements for Nation (WIIN) of 2016. Funding to perform a feasibility study for Phase 2 was received in 2022. Phase 2 continues the partnership between the City of Cincinnati and USACE and is authorized to explore additional recreation, flood risk management, and ecosystem restoration features at the Cincinnati riverfront. Phase 2 addresses park features west of the John A Roebling Bridge.

Phase 2 was broken out into Phase 2a and 2b. Phase 2a is a raised park space with parking at ground level. Phase 2a contains roughly 1.5 acres to the north of Mehring Way bordered by the Andrew J. Brady Music Center to the west and the Anderson Pavilion to the east. The raised park space includes an event lawn with stage, walkways, planters, and landscaping. Phase 2a is complete and was constructed by the Non-Federal Sponsor (NFS) under a 2019 Memorandum of Understanding between USACE, the City of Cincinnati, and Hamilton County, Ohio that documented certain features which would be constructed by the NFS and later submitted for work in kind (WIK) and reviewed and potential crediting.

Phase 2b represents new project features that are evaluated through this feasibility study. Phase 2b contains approximately 2.6 acres on the Ohio Riverfront within Smale Park south of the existing sidewalk, bounded by Paycor Stadium to the west and the John A. Roebling Bridge to the east.

As of September 2024, a Tentatively Selected Plan has been identified, which includes all project features described as Phase 2a, as well as new features referred to as Phase 2b. Phase 2b includes terraced boulders, seatwalls, native flood tolerant plantings, river stairs, kayak launch, and a boat dock landing.

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1.1 INTRODUCTION

The first phase of this project was authorized by the Water Resources Development Act of 2007 (Public Law 110-114), Section 5116 and was completed by the US Army Corps of Engineers (USACE) in partnership with the City of Cincinnati in 2014 at a cost of $30,167,000. It included construction of recreational features located east of the John A. Roebling Bridge including the Walnut Street stairway, the Schmidlapp Event Lawn, and an interactive playground area as well as lighting, signage, and other utilities. The concept map from Phase 1 is shown below in Figure 1.

The Feasibility Study for the Ohio Riverfront Cincinnati, Ohio (Phase 2) Project, herein known as the “Project” is focused on Phase 2 of the project. Phase 2 continues the partnership between the City of Cincinnati and USACE and is authorized to explore additional recreation, flood risk management and ecosystem restoration features at the Cincinnati riverfront. Both Phase 1 and Phase 2 have resulted from the 1999 Cincinnati Central Riverfront Urban Design Master Plan which guides the development of the Cincinnati Riverfront and is discussed in more detail later in this section.

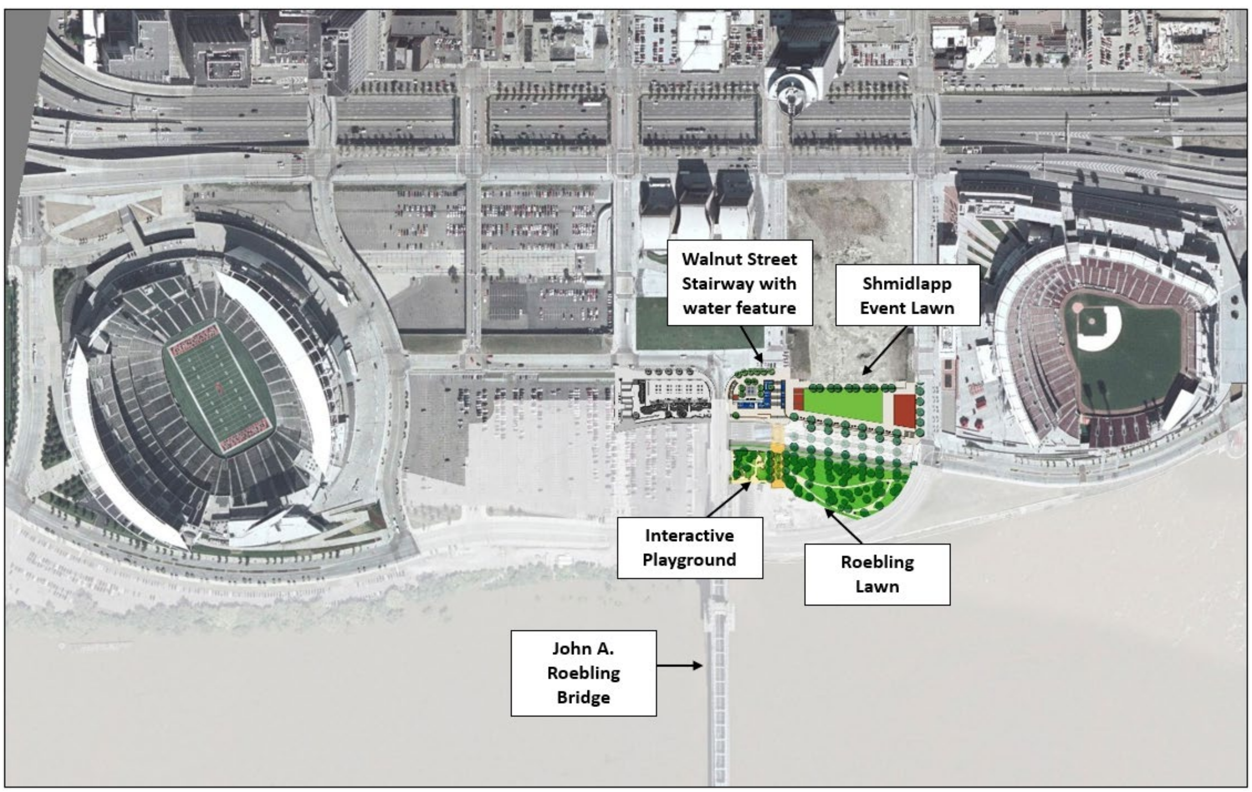


Figure 1. Ohio Riverfront, Cincinnati Phase 1 concept map.

1.2 USACE PLANNING PROCESS

The USACE planning process, which was used in this study, follows the six-step process defined in the USACE Principles, Requirements, and Guidelines (PR&G). This process is a structured approach to problem solving which provides a rational framework for sound decision making. The six-step process is used for all planning studies conducted by USACE. The six steps are:

Step 1 - Identifying Problems and Opportunities

Step 2 - Inventorying and Forecasting Conditions

Step 3 - Formulating Alternative Plans

Step 4 - Evaluating Alternative Plans

Step 5 - Comparing Alternative Plans

Step 6 - Selecting Recommended Plan

USACE decision-making is generally based on the accomplishment and documentation of all these steps. It is important to stress the iterative nature of this process. As more information is acquired and developed, it may be necessary to reiterate some of the previous steps. The six steps, though presented and discussed in a sequential manner for ease of understanding, usually occur iteratively and sometimes concurrently. Iterations of steps are conducted as necessary to formulate efficient, effective, complete, and acceptable plans.

In addition, this feasibility study includes an integrated Environmental Assessment (EA), in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended. Fundamental to the USACE planning process is the identification of the Problems, Opportunities, Objectives and Constraints (POOCs). These elements of the study have been developed by the Project Delivery Team (PDT) through the initial scoping effort in coordination with local stakeholders during the kickoff charette.

1.3 STUDY AUTHORITY

The study is authorized under Section 1202(b) of Water Infrastructure Improvements for the Nation Act (WIIN) of 2016 (P.L. 114-322, 130 Stat 1684) (also known as the Water Resources Development Act (WRDA) of 2016) which states:

The Secretary shall review the Central Riverfront Park Master Plan, dated December 1999, and the Ohio Riverfront Study, Cincinnati, Ohio, dated August 2002, to determine the feasibility of carrying out flood risk reduction, ecosystem restoration, and recreation components beyond the ecosystem restoration and recreation components that were undertaken pursuant to section 5116 of the Water Resources Development Act of 2007 (Public Law 110-114; 121Stat.1238) as a second phase of that project.

The Project authorized under section 5116 of the Water Resources Development Act of 2007 (Public Law 110-114; 121 Stat. 1238) is modified to authorize the Secretary to undertake the additional flood risk reduction and ecosystem restoration components, at a total cost of $30,000,000, if the Secretary determines that the additional flood risk reduction, ecosystem restoration, and recreation components, considered together, are feasible.

1.4 STUDY AREA (PLANNING AREA)

The Project is located in downtown Cincinnati, Ohio (Figure 2). The Project study area was narrowed down through scoping discussions to include two subparts: Phase 2a and Phase 2b (Figure 3).

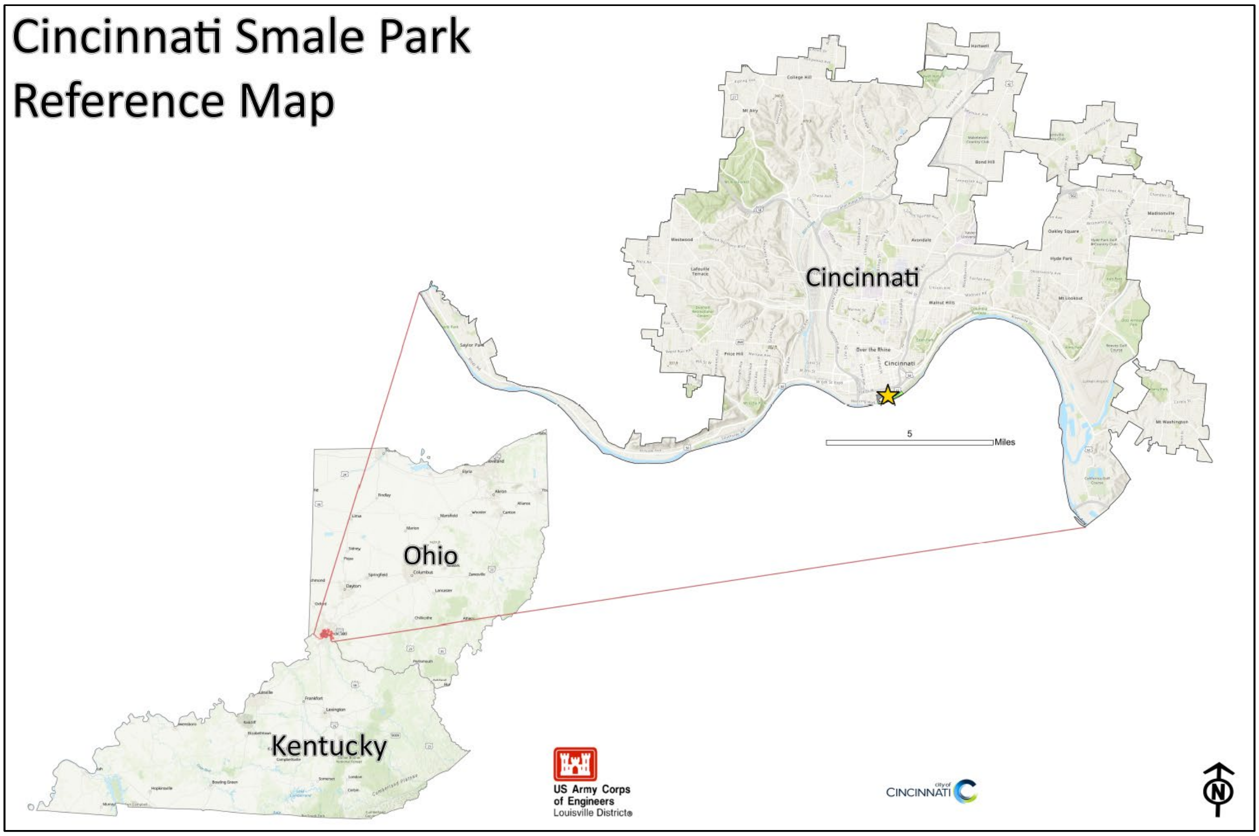


Figure 2 General location map for the Ohio Riverfront Project, Cincinnati, Ohio (marked as a yellow star).

Phase 2a contains roughly 1.5 acres to the north of Mehring Way bordered by the Andrew J. Brady Music Center to the west and the Anderson Pavilion to the east. After the completion of Phase 1, this phase was constructed by the Non-Federal Sponsor (NFS) under a 2019 Memorandum of Understanding (MOU) (Appendix I) between the Department of the Army represented by the U.S. Army Corps of Engineers Louisville District and the City of Cincinnati, Ohio and Hamilton County, Ohio. This 2019 MOU allowed the NFS to continue construction of certain recreational features at this portion of the Ohio Riverfront prior to initiation of the Phase 2 study in an effort to potentially receive credit for the costs. This 2019 MOU references a letter prepared by the NFS that outlines proposed work to be completed in support of the Phase 2 Project included in Appendix I. The 2019 MOU lays out the process for work in kind crediting of this proposed work. Phase 2a is a raised park space with parking at the ground level. The park space includes an event lawn with stage, walkways, planters, and landscaping. While this area does get closed off for certain events, it is generally an open recreational space.

Phase 2b (hereafter, Project Area) consists of the Ohio Riverfront of Smale Park south of the existing sidewalk, bounded by Paycor Stadium to the west and the John A. Roebling Bridge to the east.

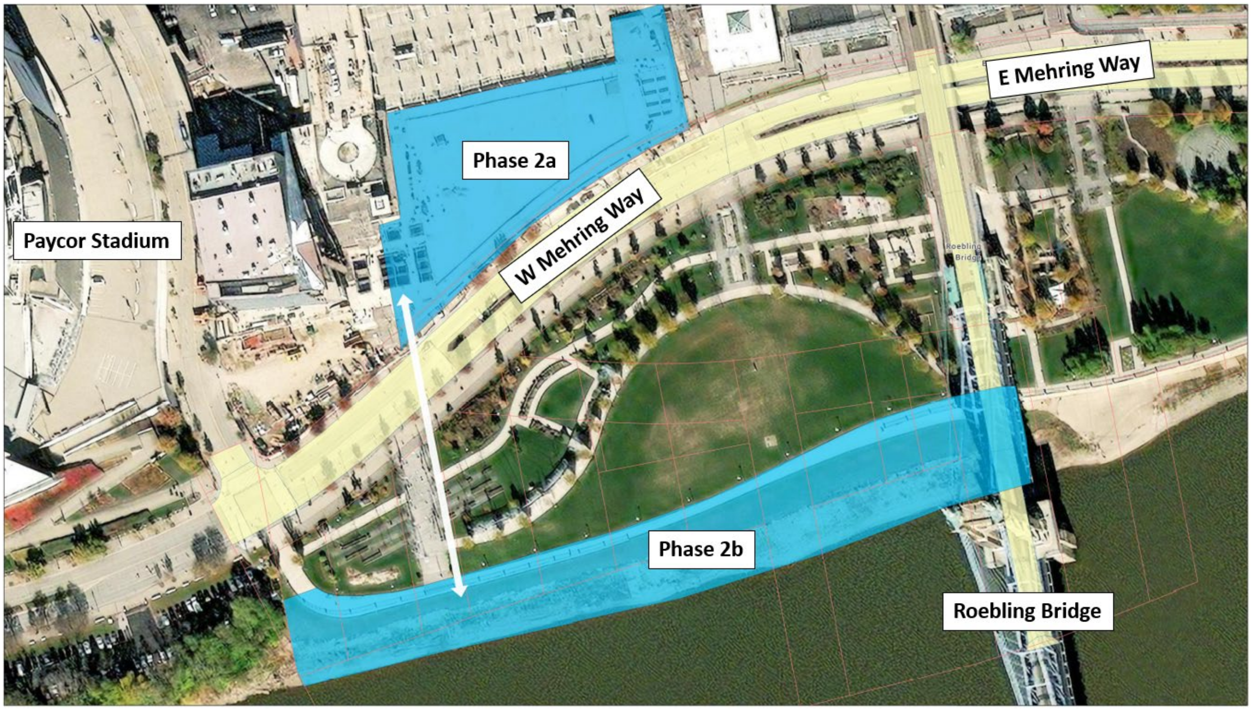


Figure 3 Phase 2 Study Area for the Ohio Riverfront Project, Cincinnati, Ohio.

1.5 Background and History

There have been several documents prepared in support of this Project. A list of these previous plans and studies is below.

- Cincinnati Central Riverfront Urban Design Master Plan. Prepared by Urban Design Associates for Hamilton County/Cincinnati. April 2000 (Phase 1 and Phase 2). This Master Plan is the result of a planning process, led by the City of Cincinnati and Hamilton County, that included site work, data collection, public outreach, advisory panels, and focus groups beginning in 1996. A concept plan was completed in 1997 that included possible locations for the two riverfront stadiums and a framework plan for the development blocks between the stadiums. From there, the master plan was developed. This is the document that has guided the riverfront development in Cincinnati since its completion and is referenced in the WIIN Act of 2016 authorization. It is referenced in WIIN Act of 2016 as the 1999 Master Plan but was updated in 2000 to the document name referenced above.
- Project Report Ohio Riverfront and Environmental Assessment – Cincinnati, Ohio. USACE. 2009 (Phase 1). This study was authorized by Section 5116 of the Water Resources Development Act (WRDA) of 2007 (Public Law 110-114, 121 Stat. 1238) and describes the USACE Project known throughout this report as Phase 1. This Project included the construction of the Walnut Street Stairs and Event Lawn and the Roebling

Lawn, shown previously in Figure 1. The EA for Phase 1 included the footprint from the Master Plan, which encompasses the footprint of the Phase 2a work. This EA concluded that the Project would have no negative impacts but required the NFS to obtain a National Pollutant Discharge Elimination System (NPDES) permit for work on the Project.

- Determination of Adverse Effect Statement to Historic Properties Resulting from the Central Cincinnati Riverfront Park Project (CCRP) in Hamilton County, Ohio 2009 (Phase 1). This document was a task that was required by the Phase 1 EA in order to obtain Section 106 compliance under the National Historic Preservation Act (NHPA). The document outlined the determination made of "no adverse effect" of the Master Plan implementation on the John A. Roebling Bridge or the Covington Riverfront.
- River Edge at Smale Riverfront Park Conceptual Ideas. KZF Design and Sasaki. 2021 (Phase 2). A conceptual level design, developed for the NFS by a private design firm. This document provided conceptual designs for the shoreline of Smale Park. It provided a reference for certain measures and guided discussions during the scoping phase of the Project.

1.6 Purpose and Need

This study involves the activities and tasks required to identify and evaluate alternatives and will recommend a coordinated and implementable solution for the feasibility of recreation components similar to and beyond what was completed in Phase 1.

While the Project authority outlined in Section 1202(b) of WRDA 2016 allows for flood risk reduction, ecosystem restoration, and recreation, this study will focus on quantifying recreational benefits and will look at flood risk reduction and ecosystem restoration qualitatively. Scoping, which included PDT meetings, a planning charette with agencies and stakeholders, and public outreach, determined there was no significant flood risk management (FRM) opportunities within the Project Area due to the current land use and hydrology of the Ohio River. Additionally, limited opportunities for ecosystem restoration are present because of the relatively small footprint and location of the park in an urban area with no connections to other habitat such as forested areas or wetlands.

A vision statement which established the overarching purpose for this study was developed with input from the PDT, sponsor, stakeholders, and agencies :

The Cincinnati Riverfront will be a welcoming, safe, sustainable park that serves as a gateway to connect people to their heritage, community, and the natural environment for generations to come.

1.7 Problems and Opportunities

Figure 4. Erosion of the shoreline along the Ohio River at Smale Park.

The problems and opportunities were identified in coordination with the NFS, via a Planning Charrette held on 16 May 2023 (detailed in Section 7.1), and through public outreach.

Problems:

1. Lack of a safe recreational connection at the shoreline creates a barrier between Smale Park users and the Ohio River
2. Lack of native riparian vegetation in the Project Area
3. Erosion decreases Smale Park usability
4. Sediment deposition occurs along the shoreline decreases Smale Park usability

Opportunities:

1. Developing rentable facilities, adding concession areas, and increasing event space within Smale Park, once the proposed Project is complete
2. Interpretation and communication of historic and contemporary communities that have occupied or interacted with the Project Area.

1.8 Objectives and Constraints

The objectives and constraints were developed in coordination with the NFS, via a Planning Charrette held on 16 May 2023 (detailed in Section 7.1), and through public outreach.

1.8.1 Planning Objectives

1. Enhance Smale Park by creating a safe, resilient recreational connection between the usable areas of Smale Park and the Ohio River

2. Provide new and increase recreational experiences for Smale Park users
3. Increase vegetative diversity of shoreline riparian zone to support native species and aesthetic value

1.8.2 Planning Constraints/Considerations

A constraint is a restriction that limits the extent of the planning process, while a consideration is a factor that can direct the planning process. Successful identification of study constraints and considerations helps to avoid undesirable outcomes and achieve project goals. The following study specific constraints and considerations were identified:

Constraints

1. Avoid/minimize impacts to viewshed of the waterfront
2. Avoid/minimize any negative impacts to the John A. Roebling Bridge
3. Avoid impacts to navigation channel
4. Minimize impacts from flooding (resiliency) (see Figure 5)

Considerations

- Cost of flood maintenance such as debris removal or walkway sediment removal
- Hydrology of the Ohio River
  - High velocity flows
  - Geotechnical stability of bank
- Impacts of bridge abutment on flows near Project Area
- American with Disabilities Act (ADA) Accessibility
- Avoid or mitigate impacts to cultural resources
- Avoid or mitigate inducing flooding downstream

Figure 5 below shows two flood events that took place at Smale Park in 2024. These events illustrate the importance of flood resiliency for any features constructed at the riverfront, given the frequency of inundation and associated sediment deposition.

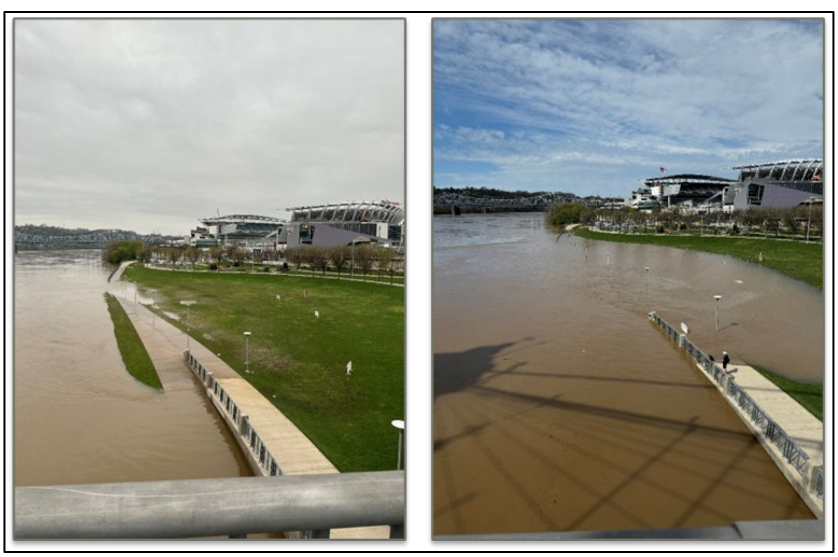


Figure 5 An estimated 2 to 5-year flood event in Smale Park on April 7, 2024 (left) and April 9, 2024 (right)

1.9 Study Scope

The scope of this study involves the activities and tasks required to identify and evaluate alternatives and will recommend a coordinated and implementable solution for the feasibility of recreation components similar to and beyond what was completed in Phase 1. The scope included the development of the primary and secondary objectives, plan formulation, identification of measures that met the project objectives, elimination of measures that did not meet project objectives, and the combining of measures to create a full array of alternatives. The alternatives were then comprehensively evaluated based on the four accounts, cultural, environmental, hydraulic and hydrology, climate, and economic analysis. The alternatives were designed following the collection of geotechnical data and the cost of construction was estimated.

2 EXISTING AND FUTURE WITHOUT PROJECT CONDITIONS

This chapter outlines the existing conditions and provides a forecast for the "Future Without Project" (FWOP) condition. The existing conditions encompass the general environment, including relevant factors such as climate, flooding, and socioeconomic conditions that could influence or be impacted by the potential project alternatives. The FWOP condition represents the expected state if no federal action is taken (the "No Action Alternative"). The information presented in this chapter establishes the baseline for evaluating the alternatives.

2.1 PERIOD OF ANALYSIS

The planning horizon encompasses the planning study period, project implementation, period of economic analysis, and the effective life of the project. The period of analysis for this feasibility study is 50 years as required by ER 1105-2-103, Chapter 2, Section 2-4.

2.2 GENERAL SETTING

2.2.1 Climate

Climate data were gathered from the National Oceanic and Atmospheric Administration website for Cincinnati, Ohio (U.S. Climate Data 2023). Historical weather data was obtained for the years 1981-2010. The climate of the Project Area exhibits strongly marked seasons where winters are often cold, and summers are often hot. The average annual high temperature is 65 degrees Fahrenheit (F) while the average annual low temperature is 44 degrees F. The warmest month is July with an average high of 87 degrees F and an average low of 66 degrees F. January is the coldest month with an average high temperature of 39 degrees F and an average low of 22 degrees F. On average the Project Area experiences 132 days with precipitation, that totals 42.24 inches annually.

A winter may be unusually cold or a summer cool if the influence of polar air is persistent. Similarly, a summer may be unusually warm or a winter mild if air of tropical origin predominates. The interaction between these two air masses of contrasting temperature, humidity, and density favors the development of low-pressure centers that move generally eastward and frequently pass over or close to the Project Area, resulting in abundant rainfall.

A qualitative climate assessment was conducted to satisfy the requirements of Engineering and Construction Bulletin (ECB) 2018-14, and provide helpful information to the decision process about current and projected climatological trends in the project area along the Ohio River at Cincinnati, Ohio and can be found in Appendix B.

The climate data and toolsets used in this study indicate a statistically significant increasing trend in observed average, maximum, and minimum yearly temperatures. Small but statistically significant Increasing trends were also observed in monthly total precipitation and maximum daily precipitation per month. Annual maximum streamflow also showed a small increasing trend but was not determined to be statistically significant. A potentially significant nonstationarity (a point in time indicating a trend change) in annual maximum flows was identified in recent years, but additional effort is recommended to extend the period of record to confirm whether the abrupt changes in flows are truly significant in the longer term. An analysis of a longer period of stage data at Cincinnati was performed and additional nonstationarities were identified, but one may be explained by the implementation of FRM regulation within the watershed. Unregulated stages and flows were not readily available.

Future projections utilizing models of mid-range and extreme greenhouse warming scenarios show increasing trends in annual maximum mean monthly streamflow and annual cumulative precipitation. Greater increases are expected in annual mean one-day temperatures. All of these trends were identified by the USACE Climate Hydrology Tool (CHAT) as statistically significant. Streamflow and precipitation showed substantial variability in the projections with minimal difference between climate scenarios. The interquartile ranges of the modeled temperatures were smaller in magnitude than the modeled streamflow and precipitation ranges. Residual risks to the project primarily are anticipated as a result of increased frequency and/or duration of inundation by increased flooding from greater precipitation on the watershed, whether it be from increased frequency of intense storms, or increasing annual precipitation totals. Increased velocities may also be a side effect of these more intense flows, increasing the potential for damage of the facilities.

2.2.2 Soils and Geology

2.2.2.1 Geology and Physiography

According to the United States Geological Survey (USGS), the Project Area is in the Northern Bluegrass Ecoregion and is underlain with strata dating to the Ordovician period (~460 million years ago) and is part of the Point Pleasant Formation which contain interbedded limestone and shale (Woods et al. 1998). Further, the Project Area lies within the Ohio River Floodplain directly across from the confluence of the Licking River. The elevation for the site is approximately 474-485 feet above sea level with the elevation increasing as you move north of the Ohio River.

2.2.2.2 Soil Associations

An abbreviated soil report (NRCS 2023) of the Project Area is included (Appendix C) to provide information about the soils present in the Project Area. This report details soil locations, properties, and limitations affecting various uses. Soils are mapped according to the boundaries of major land resource areas (MLRAs), which are geographically associated land resource units that share common characteristics shaped by local and regional physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA 2006). The objective of soil mapping is to delineate and organize the landscape into landform segments that have similar use and management requirements. Predictions about soil behavior are based on soil properties but also on abiotic and biotic variables such as climate and biological activity. In this way, soils occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area (NRCS 2023). Soil conditions are predictable over long periods of time and can be used to develop resource management plans. For example, Chapter 2 of USACE Engineering Manual (EM) 1110-1-400 recommends avoiding development on slopes greater than 15 % unless there is no other acceptable alternative.

All soil associations with the Project Area are listed as Urban land due to the high level of development in this area. None of the soils are classified as prime or unique farmland. The soils listed in the soil report are also prone to flooding and have a mild slope (< 15%). No soils are listed as hydric soils.

2.3 NATURAL ENVIRONMENT

2.3.1 Surface Water and Other Aquatic Resources

2.3.1.1 Surface Water

The only surface water present in the proposed Project Area is the Ohio River. The Ohio River has an average depth of 24 feet with an average width of 0.5 miles (ORSANCO 2022). The Project Area is within the Markland Pool which extends 95.3 miles behind the Markland Locks and Dam. The target upper pool height is 455 feet above sea level and the lower pool below the dam is 420 feet. The ordinary high-water mark is 467.7 feet (USACE 2003). Across the Ohio River from this site is the confluence of the Ohio River and Licking River, which drains 3,600 square miles (representing 10% of the Commonwealth of Kentucky).

The Greater Cincinnati Water Works (GCWW) supplies water to the Project Area and obtains 88% of its drinking water from the Ohio River with the other 12% of drinking water coming from the Great Miami Aquifer. Drinking water is obtained from the Ohio River at the Richard Miller Treatment facility, located approximately seven river miles upstream from the Project Area. GCWW routinely tests water from the Ohio River before it enters the treatment plant and participates in a first-of-its-kind early warning organic detection system which warns downstream water treatment facilities of a spill before the spill reaches the intake of the treatment plant. The Ohio Environmental Protection Agency (OHEPA) classifies the Ohio River as “highly susceptible to contamination,” since the Ohio River is an open environment, and once pollution enters the water system, it could spread easily downstream (City of Cincinnati 2023).

2.3.1.2 Water Quality

USACE’s authority to address water quality is identified in the Federal Water Pollution Control Act (FWPCA) of 1948 and its amendments including the Clean Water Act of 1972 and the Water Quality Act of 1987. Executive Order 12088, Federal Compliance with Pollution Control Standards (1978), requires federal facilities to comply with applicable pollution control standards in the same manner as any non-federal entity. Engineering Regulation (ER) 1110-2-8154 stipulates USACE policy to develop and implement a holistic, environmentally sound water quality management strategy for all projects. Furthermore, the USACE goal is to responsibly manage our projects to maximize environmental compliance.

The Ohio River is 981 miles long and borders or runs through six states in the eastern region of the United States. The Ohio River begins in Pittsburgh, Pennsylvania at the confluence of the Allegheny and Monongahela rivers and flows southwesterly to its confluence with the Mississippi River in Cairo, Illinois. The Ohio River basin encompasses 203,940 square miles, and includes parts of New York, Pennsylvania, Ohio, Indiana, Kentucky, Illinois, Maryland, Virginia, North Carolina, Tennessee, Georgia, Alabama, and Mississippi. Numerous major tributaries feed the Ohio River including the Allegheny, Cumberland, Green, Kanawha, Monongahela, Tennessee, and Wabash Rivers. Approximately 10% of the U.S. population resides in the Ohio River basin, equating to more than 30 million people, with five million people relying on the Ohio River as a source of drinking water (ORSANCO 2022).

The Ohio River Valley Water Sanitation Commission (ORSANCO) is an interstate agency created to monitor and control water pollution in the Ohio River Basin. Member states and entities include Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Virginia, West Virginia, and the federal government. ORSANCO was created in 1948 with the signing of the Ohio River Valley Water

Sanitation Compact which commits each member State to, "…place and maintain the waters of the basin in a satisfactory sanitary condition, available for safe and satisfactory use by public and industrial water supplies after reasonable treatment, suitable for recreation, capable of maintaining fish and other aquatic life…" (ORSANCO 2022).

ORSANCO operates a number of monitoring programs that are used to assess water quality and include bi-monthly sampling of nutrients/ions, clean metals sampling, temperature and dissolved oxygen monitoring, fish and macroinvertebrate population monitoring, contact recreation bacteria monitoring, longitudinal and tributary bacteria surveys, fish tissue sampling, high volume PCBs and dioxin sampling, algae sampling, and nutrients sampling (ORSANCO 2022). ORSANCO conducts water quality monitoring and assessments on behalf of the Ohio River main stem states of Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia. ORSANCO completes an assessment and report on the Ohio River water quality conditions every two years.

This data is compiled into a 305b Report, which is compared to water quality criteria to determine if the Ohio River meets its four designated uses of warm water aquatic life, public water supply, contact recreation, and fish consumption. To this end, three classifications are used in ORSANCO's assessments to describe the attainment of designated uses: *Fully Supporting* (good water quality), *Partially Supporting* (fair water quality), and *Not Supporting* (poor water quality). The Ohio River within the planning area of this study is partially supporting the fish consumption life use designation (based on the presence of polychlorinated biphenyls and dioxin in fish tissue samples), partially supporting the recreation life use designation (as a result of E. coli and fecal coliform bacteria contamination), and fully supporting the public water supply life use designation (ORSANCO 2022).

A bioassessment of the fish assemblages conducted in the Markland Pool in 2014 resulted in a rating of "Good", which is more reflective of the conditions near the Project Area. Macroinvertebrate data was not available for the Markland Pool assessment unit (ORSANCO 2022).

Point and Non-point Pollution

Because the Ohio River receives input from the entire Ohio River basin, the list of potential sources of point and nonpoint pollution is extensive. For example, there are approximately 580 permitted discharges into the Ohio River (ORSANCO 2022). Point sources are confined and discrete conveyances such as pipes, ditches, channels, and tunnels or conduits by which pollution is transported directly to a water body. Potential point sources contributing to the water quality of the Ohio River and the Project Area include wastewater treatment plants, straight pipe systems, sanitary sewer overflows, and regulated stormwater sources.

Nonpoint source pollution come from diffuse sources. Potential non-point pollution sources include stream bank erosion and urban stormwater runoff and can affect water quality near the Project Area.

2.3.1.3 Floodplains

Executive Order (EO) 11988 later amended by EO 13690, requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. Federal Emergency Management Agency (FEMA) defines the floodway and floodplain as follows:

Regulatory Floodway: The regulatory floodway is the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

100-year Floodplain: Also known as the base flood, a flood having a 1% (1 in 100) chance of being equaled or exceeded in any given year.

500-Year Floodplain: A flood having a 0.2% (or 1 in 500) of being equaled or exceeded in any given year. Analysis of the United States Environmental Protection Agency (EPA) NEPAssist website and FEMA floodplain maps indicate that the majority of the project area is within the floodway of the Ohio River. The remaining project area falls within the 100-year and 500-year floodplain. (USEPA, 2023c; FEMA, 2023a).

2.3.1.4 Wetlands

According to the United States Fish and Wildlife Service's (USFWS) National Wetlands Inventory (NWI), no wetlands are present on this site. A site visit on October 19, 2023, by a USACE biologist confirmed that no wetlands are present within the Project Area.

2.3.2 Fish and Wildlife Habitats

Habitat refers to the living space of an organism or community of interacting organisms and can be described by its physical or biotic properties, such as substrate, woody debris, or a depression. Communities are naturally occurring groups of species that live and interact together as a relatively self-contained unit, such as a floodplain forest. Ecosystems may contain many habitat types. Habitats are usually assessed by describing and/or quantifying the physical structure, quality and/or present organism community contained in the area of interest. They may also be assessed at various scales, depending on the level of resolution needed to answer specific questions.

2.3.2.1 Existing Terrestrial and Aquatic Habitats

The proposed Project Area lies within the Ohio River Floodplain of the Cincinnati Lowlands of Ohio. Using the National Land Cover Database (NLCD) from 2019, the Project Area is primarily developed land characterized in one of three categories (i.e., low intensity, medium intensity, or high intensity). A small sliver of the Project Area is characterized as Hay/Pasture which corresponds to the large, mowed lawn present at Smale Park to the west of the John A. Roebling Bridge. Given most of the Project site is developed, little terrestrial wildlife habitat is present in the Project Area.

On October 19, 2023, USACE biologists conducted a botanical inventory along the shoreline within the Project Area. In all, 62 plant species were observed. The plant community was highly disturbed due to continued erosion, and only those species that could recolonize quickly after heavy disturbance were able to persist in the area. High rates of disturbance paired with heavy invasive plant pressures and poor soils have resulted in a low-quality flora, with over 40% of the species present being exotic. Further, the majority of native plant species that were present were species that are very common in urban disturbed areas and can persist in low-quality conditions.

A 2013 mussel survey conducted in support of a separate action but encompassing the Project Area (see Appendix C for the full report) provides a comprehensive account of the aquatic habitat. The substrates in the area are relatively heterogeneous containing all substrate categories including silt, sand, gravel, cobble, and boulders. Additionally, urban rubble is common along the shoreline and riverbed. Only five individual mussels were found within the survey area and consisted of two species including the threeridge (*Amblema plicata)* and the pink heelsplitter (*Potamilus alatus*). The low mussel numbers and poor species richness indicates that the habitat quality in the Project Area is relatively poor and does not support a significant mussel population.

Cultivated Crop/Grasslands/Herbaceous

As this is an urban environment, the Project Area does not contain cultivated crops and is mainly pavement with some short turf grass. However, adjacent to the Project Area and within Smale Riverfront Park, a pollinator habitat that is managed for flowering plants to attract insects and other pollinators to the area is present.

Deciduous Forest/Mixed Forest

No forests are located within the proposed Project Area. A few trees are present in a small urban woodlot (~0.75 acres) located in Smale Park adjacent to the Project Area, but that habitat is outside of the proposed Project Area.

2.3.2.2 Existing Fauna

Faunal diversity is low within the proposed Project Area. Little habitat suitable for wildlife exists at the Project Area. Animals likely to use the area are most likely transient and only occupy the area for a short period of time. Species observed during an October 19, 2023, site visit include the eastern cottontail (*Sylvilagus floridanus*) and various songbirds. Other species that would be expected to use the Project Area would be animals that are commonly found in urban areas including the Virginia opossum (*Didelphis virginiana*), northern raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), garter snake (*Thamnophis sirtalis*), and other common species. Most species would not be expected to use the limited habitat available to survive or thrive.

Aquatic fauna would consist of fish and mussel species. An inventory of fish species that occupy the near shore habitat at the site has not been conducted to know which fish species utilize the Project Area. The 2013 mussel survey referenced in section 2.4.1 suggests the Project Area does not support a significant mussel population. The 2013 mussel survey report can be found in Appendix C.

2.3.3 Endangered and Threatened Species

Lists of threatened, endangered, and species of special concern are maintained by the United States Fish and Wildlife Service (USFWS). Under the Endangered Species Act (ESA) of 1973 (16 U.S.C. §§ 1531-1544), endangered species are generally defined as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is any species likely to become endangered in the foreseeable future. The ESA defines critical habitat of Federally listed species as a geographic area that contains the physical or biological features that are essential to the conservation of a particular species and that may need special management or protection.

2.3.3.1 Federally Listed Species

Information on federally listed species was obtained from the USFWS Information for Planning and Consultation (IPaC) tool (USFWS 2023) to determine the potential presence of federally listed species within the Project Area. Eight federally listed species have ranges that overlap with the Project Area. Additionally, no designated Critical Habitat exists within the Project Area.

Endangered freshwater mussel species potentially affected by activities associated with the Cincinnati Riverfront Project include sheepnose (*Plethobasus cyphyus*), fanshell (*Cyprogenia stegaria*), pink mucket (*Lampsilis abrupta*), and snuffbox (*Epioblasma triquetra*). These mussel species have been experiencing decades of decline due to habitat modification or loss, over harvesting, and pollution. However, given the findings of the prior mussel survey discussed in section 2.4, the listed species are unlikely to occur within the Project Area. The mussel survey report can be found in Appendix C.

Endangered mammals potentially affected by the proposed Project include the northern long-eared bat (*Myotis septentrionalis*) and the Indiana bat (*Myotis sodalis*), and the proposed endangered Tricolored bat (*Perimyotis subfalvus*). Because these bat species have large ranges, their presence in the Project Area is assumed by USFWS. However, no trees greater than 3-inches Diameter at Breast Height (DBH) are present within the Project Area.

The Monarch butterfly (*Danaus plexippus*) is a candidate species for listing under the ESA and is also known to occur in the Project Area.

2.3.3.2 State Listed Species

The Ohio Department of Natural Resources (ODNR) completed an interdisciplinary review of the proposed Project on March 22, 2024. The ODNR provided comments under the authority of the Fish and Wildlife Coordination Act and the NEPA. See Appendix C for the complete review. All state listed species that were identified as potentially being present in the Project Area are listed in Table 1.

Table 1. State listed species with potential to occur within the proposed Cincinnati Riverfront Project Area (ODNR 2024).

Type	Common Name	Scientific Name
Clams	Butterfly mussel	*Ellipsaria lineolate*
	Monkeyface	*Quadrula metanerva*
	Ebonyshell	*Fusconaia ebena*
	Ohio pigtoe	*Pleurobema cordatum*
	Elephant-ear	*Elliptio crassidens crassidens*
	Wartyback	*Quadrula nodulata*
	Long-solid	*Fusconaia maculate maculata*

	Washboard	*Megalonaias nervosa*
	Black sandshell	*Ligumia recta*
Fish	Blue sucker	*Cycleptus elongatus*
	Paddlefish	*Polyodon spathula*
	Channel darter	*Percina copelandi*
	River darter	*Percina shumardi*
	Mountain madtom	*Noturus eleutherus*
Reptiles	Kirtland's snake	*Clonophis kirtlandii*
Plants	Smooth buttonweed	*Spermacoce glabra*

No state listed mussel species were identified during the mussel survey conducted in the Project Area in September 2013. A single state listed washboard mussel (Megalonaias nervosa) was found upstream of the proposed Project Area during the 2013 mussel survey. Given the results of the survey, the presence of other state listed mussel species listed in Table 1 in the proposed Project Area is unlikely. The mussel survey report can be found in Appendix C.

No formal inventory of the state listed fish species has been conducted to determine the presence of state listed fish within the proposed Project Area. Based on the habitat assessment conducted in the above referenced mussel survey for the site, the quality of instream habitats is low in the section of the Ohio River directly adjacent to the Project Area suggesting that state listed fish species listed in Table 1 are unlikely to utilize the Project Area.

The state threatened Kirtland's snake is a non-venomous small secretive snake that resides in wet meadows, which make it difficult to observe in the wild. The Kirtland's snake is known to live within urban settings and has historically been found within the City of Cincinnati. No Kirtland's snakes were documented during the bioassessment conducted of the Project Area by USACE biologists on October 19, 2023.

Smooth buttonweed (potentially state threatened) is an herbaceous plant that is within the coffee plant family. The species can be found in a variety of wet habitats including stream banks, pond edges, sloughs, bottomland forest, wet meadows, ditches, and roadsides (ODNR 2024). On October 19, 2023, USACE biologist conducted a botanical inventory of the shoreline within the proposed Project Area. Smooth buttonweed was not documented.

2.3.3.3 Designated Critical Habitat

There is no designated critical habitat within or near the project area.

2.4 Physical Environment

2.4.1 Recreational, Scenic, and Aesthetic Resources

Smale Park on the banks of the Ohio River provides attraction for visitors in downtown Cincinnati and is included on lists of "Things-to-do" in the City of Cincinnati. It contains parts of the Ohio River Trail and is located between the Great American Ballpark and Paycor Football Stadium, which is home of to the Cincinnati Reds baseball team and Cincinnati Bengals football team, respectively. Additionally, Smale Park contains a splashpad and playground areas for kids, a carousel, a music venue, and multiple historical monuments. Therefore, this area receives large amounts of traffic throughout the year for events, tourism, and general recreation. The Project Area contains the Ohio River shoreline of Smale Park, part of the Riverfront Loop Trail, and the parking area for Smale Park.

2.4.2 Cultural Resources

A background check was conducted within a 0.5-mile radius of the Project Area. Multiple sources of information were researched including: the National Register of Historic Places (NRHP) online database; Ohio History Connection Online Mapping System; Corps Geographic Information System (GIS); historic maps; and previous cultural resources reports. The Ohio History Connection Online Mapping System was searched on November 15, 2023, and an online request for data was sent on December 6, 2023. The online search identified one known above ground structure located within the Project: The John A. Roebling Bridge, which is a National Historic Landmark (NHL) and listed in the NRHP. No previously recorded archaeological sites are located within the Project Area. Two previously recorded archaeological sites were also located within a 0.5-mile radius of the Project. Site 33HA0002 is described as a Middle Woodland Affiliation open site mound group that is unassessed for the NRHP. Site 33HA0780 is a historic site that is considered eligible for the NRHP by the Ohio State Historic Preservation Officer (OH-SHPO).

A visit to the Cincinnati Main Public Library and Cincinnati History Library and Archives at the Cincinnati Museum Center at Union Terminal was conducted on February 22, 2024, to build an understanding of early life in the Project Area. Mr. Chris Smith, Librarian from the Genealogy and Local History Department, explained that the Project Area was known as "The Bottoms," and the Project Area was used as a place to dump fill, left over construction debris, and burnt bricks and other garbage to build up the Ohio Riverbank (personal communication 2024).

USACE conducted deep testing within the Project Area along the shoreline of Smale Park to determine if deeply buried archaeological sites were present. No buried archaeological sites were found. USACE archaeologists monitored the excavation of thirteen randomly placed mechanically excavated trenches to document the condition of the soils in the Project Area and to identify any deeply buried features or archaeological deposits. The subsurface archaeological report was coordinated with OH-SHPO, Kentucky Heritage Council (KHC), National Park Service (NPS), and Federally Recognized Indian Tribes, and Consulting Parties on May 15, 2024.

Three archaeological surveys were conducted within a 0.5-mile radius of the Project Area. In 1985, Arrow Enterprises conducted an archaeological survey for proposed improvements of the Kentucky Route 27 bridge approaches at Newport, Kentucky and Cincinnati, Ohio (Schock 1986). The entire survey was located in an urban area that was previously disturbed. No archaeological sites were recorded during the survey. Miami Purchase Associates raised concerns about the historic archaeological potential and wanted to see the final design plans to determine if additional historic archaeological work was necessary. It is unclear if any additional historic archaeological work was conducted in association with the Kentucky Route 27 bridge approaches project.

A preliminary archeological assessment of the Cincinnati Riverfront Park was completed in 2000 by Gray & Pape, Inc. on behalf of the City's Parks Department. The resulting report (Miller and Miller 2000) defined a general historic context for the Project Area, including an assessment of the potential for the Project Area to contain prehistoric and historic archeological resources, the research potential of these resources, and recommendations for additional investigation. The investigation did not include on-site reconnaissance but concluded that near surface prehistoric sites probably would have been destroyed by cutting and filling of the Project Area during the historical development of the Cincinnati Ohio Riverfront. The Gray and Pape, Inc. assessment did state that deeply buried prehistoric sites may have survived and may occur in such contexts along this section of the Ohio River. The cutting and filling noted above in the Gray and Pape, Inc. assessment was the result of successive occupations, abandonment, and re-occupation of the area during the development of the Cincinnati Ohio Riverfront since the eighteenth century. The assessment concluded that this process may have encapsulated and preserved some of the remains of this historic occupation in intact deposits buried under artificial fill at varying depths and locations.

In 2001, BHE Environmental, Inc (BHE) developed a cultural resources management plan for the proposed Phase I Cincinnati Central Riverfront Park Project (CCRP)(BHE 2001). This plan was prepared for the Cincinnati Parks Board assessing impacts to cultural resources within the CCRP. At the time, the proposed development included a great lawn, great lawn fountains, and reconfiguring the Ohio riverbank, including relocating Mehring Way towards I-71 and the Cincinnati Business District. In consultation with the OH-SHPO, it was determined that no excavation was necessary along the Ohio River since fill was used to create the downslopes. The Cincinnati Parks Board did agree to active monitoring during construction and intensive archaeological excavation at site 33HA0780.

More extensive archaeological investigations were undertaken in early 2002 by BHE for the proposed development of the CCRP, which is outside of the Project Area. These excavations resulted in the identification of three successive building episodes with intact stone floors, walls, and distinct rooms. The site, designated 33HA0780, exhibited the potential to contain archaeological remains of considerable research potential and is considered eligible for listing on the NRHP. The site appears to be as wide and deep as the Riverfront. This work resulted in the completion of a draft report of BHE's investigations (BHE 2002) that concluded that the archaeological fieldwork for the Project was complete. A final report was prepared by BHE in January 2003 (BHE 2003).

USACE, through a partnership with the City of Cincinnati, developed a riverfront park along the Ohio River in Downtown Cincinnati (USACE 2009). The riverfront park was under the Phase I Central Cincinnati Riverfront Park Project (CCRP) that was located between the Brent Spence Bridge and the Great American Ballpark. It extended northward from the Ohio River to the National Railroad Freedom Center and Theodore M. Berry Way in Cincinnati, Hamilton County, Ohio. The proposed development included the relocation of Mehring Way, reconfiguration of the Ohio riverbank, extending the eight acre "Great Lawn Park", adding decorative foundations, and a series of walking/bike paths through the park. The Project construction authority and appropriations were through the WRDA of 2007 (WRDA Public Law 110-114). USACE developed a Determination of Adverse Effects Statement for the historic properties identified within the CCRP and determined that the CCRP will not have an adverse effect to historic properties under 36 Code of Federal Regulation (C.F.R.) 800.5(d)(1).

In 2011, Gray & Pape, Inc was contracted by the City of Cincinnati to conduct an archaeological Phase II/III for the HAM-The Banks Street Grid Project in the City of Cincinnati (Garrard and Burden 2011). The Project was part of the Cincinnati Central Riverfront Urban Design Master Plan which was designed to support public works projects in downtown Cincinnati including the Paul Brown Stadium (now Paycor Stadium), the Great American Ballpark, and the National Underground Railroad Freedom Center (Garrard and Burden 2011). The excavations revealed intact basement remnants along historic Water Street dating between 1850 and 1900. The report is unclear on whether the intact basement remnants were determined eligible for listing to the NRHP.

Thirteen above ground structures (HAM662443 [Hilltop Basic Resource], HAM553344 [Castellini Company], HAM144443 [Cincinnati Terminal Warehouse], HAM5553243 [Second Street Saloon], HAM553143 [Simpson Building], HAM553043 [Old Spaghetti Factory], HAM553544 [Sanzone-Palmisano], HAM553444 [Cincinnati New Orleans Texas], HAM206044 [Caddy's], HAM552944 [Flanagan's Annex], HAM205944 [Flanagan's], HAM624644 [PJC Building], and HAM 205844 [Skyline Chili]) have been previously recorded within a 0.25-mile radius of the Project. None of these above ground structures will be affected by the proposed Project.

The records review of the NRHP database found thirteen previously recorded historic properties listed on the NRHP within a 0.50-mile radius of the Project. They include the West Fourth Street Historic District [HAM], Hooper Building, First National Bank, East Fourth Street Historic District, Union Trust Building, Lawton Building, Ingalls Building, Derby H.W. Building, Lombary Apartment Building, Carew Tower, Traction Company Building, Mercantile Library, United States Post Office and Courthouse, and the Formica Corporation-Crystal Arcade-Contemporary Art Center Building. None of these NRHP listed properties will be affected by the proposed Project.

2.4.3 Air Quality

The EPA Office of Air Quality Planning and Standards has set National Ambient Air Quality Standards (NAAQS) for six principal pollutants, called "criteria" pollutants. They are carbon monoxide, nitrogen dioxide, ozone, lead, particulates of 10 microns or less in size (PM-10 and PM-2.5), and sulfur dioxide. Ozone is the only parameter not directly emitted into the air but forms in the atmosphere when three atoms of oxygen (O_3) are combined by a chemical reaction between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents are some of the major sources of NO_x and VOC, also known as ozone precursors. Strong sunlight and hot weather can cause ground-level ozone to form in harmful concentrations in the air. As of May 22, 2024, the Project Area is in full attainment for all criteria pollutants as listed in the United States Environmental Protection Agency (EPA) Greenbook (USEPA 2023).

2.4.4 Invasive species

Invasive species possess characteristics that allow them to spread easily into native communities and often displace and outcompete native flora and fauna. The Ohio Invasive Plant Council provides a list of exotic plant species' that are designated as invasive (Table 2). Under to the Ohio Administrative Code (Chapter 901:5-30-01), no person shall sell, offer for sale, propagate, distribute, import or intentionally cause the dissemination of any invasive plant in Ohio. A botanical inventory was conducted of the Project Area, and several invasive species were found to occur (see Table 2). Two invasive species were documented on the October 19, 2023 site visit by USACE biologists and marked with an * in Table 2, including purple loosestrife (*Lythrum salicaria*) and white mulberry (*Morus alba*).

Table 2. Plant species classified as invasive in Ohio (Ohio Invasive Plant Council).

Scientific Name:	Common Name:
Ailanthus altissima	Tree-of-heaven
Alliaria petiolata	Garlic mustard
Ampelopsis brevipedunculata	Porcelain berry
Berberis vulgaris	Common barberry
Botomus umbellatus	Flowering rush
Celastrus orbiculatus	Oriental bittersweet
Centaurea stoebe ssp. micranthos	Spotted knapweed
Dipsacus fullonum	Common teasel
Dipsacus laciniatus	Cutleaf teasel
Egeria densa	Brazilian waterweed
Eichhornia azurea	Anchored water hyacinth
Elaeagnus angustifolia	Russian olive
Elaeagnus umbellata	Autumn olive
Epilobium hirsutum	hairy willowherb
Fallopia japonica	Japanese knotweed
Ficaria verna	lesser celandine
Heracleum mantegazzianum	Giant hogweed
Hesperis matronlis	Dames rocket
Hydrilla verticillata	hydrilla
Hydrocharis morsus-range	European frogbit
Hygrophila polysperma	Indian swampweed
Iris pseudocorus	Yellow flag iris
Lagarosiphon major	African oxygen weed
Ligustrum vulgare	Common privet
Limnophila sessiliflora	Asian marshweed
Lonicera japonica	Japanese honeysuckle
Lonicera maackii	amur honeysuckle
Lonicera morrowii	Morrow's honeysuckle
Lonicera tatarica	Tatarian honeysuckle
Lythrum salicaria*	purple loosestrife*
Lythrum virgatum	European wand loosestrife
Marsilea guadrifolia	European water-clover
Microstegium vimineum	Japanese stiltgrass

Monochoria hastata	Arrowleaf false pickerelweed
Monochoria vaginalis	Heartshape false pickerelweed
Morus alba*	White mulberry*
Myriophyllum aquaticum	Parrot feather watermilfoil
Myriophyllum spicatum	Eurasian watermilfoil
Najas minor	Brittle waternymph
Nymphoides peltata	Yellow floating heart
Ottelia alismoides	Duck lettuce
Paulownia tomentosa	Princess tree
Persicaria perfoliate	Mile-a-minute
Phalaris aruninacea	Reed canary grass
Phragmites australis ssp. australis	Common reed
Pistia stratiotes	Water lettuce
Potamogeton crispus	Curly pondweed
Pueraria montana var. lobata	Kudzu
Pyrus calleryana	Callery pear
Rhamnus cathartica	European buckthorn
Rosa multiflora	Multiflora rose
Sagittaria sagittifolia	Arrowhead
Salix fragilis	Crack willow
Salvinia minima	Common salvinia
Salvinia molesta	Giant salvinia
Sparganium erectum	Simple bur-reed
Stratiotes aloides	Water soldier
Trapa natans	Water chestnut
Typha angustifolia	Narrowleaf cattail
Typha x glauca	Hybrid cattail
Ulmus pumila	Siberian elm
Vincetoxicum nigrum	Black swallowort

Species marked with an asterisk (*) are known to occur within the project area.

2.4.5 Noise

Noise is measured as Day Night average noise levels (DNL) in "A-weighted" decibels that the human ear is most sensitive to (dBA). There are no federal standards for allowable noise levels. According to the Department of Housing and Urban Development Guidelines, DNLs below 65 dBA are normally acceptable levels of exterior noise in residential areas. The Federal Aviation Administration (FAA) denotes a DNL above 65 dBA as the level of significant noise impact. Several other agencies, including the Federal Energy Regulatory Commission, use a DNL criterion of 55 dBA as the threshold for defining noise impacts in suburban and rural residential areas. The USACE Safety and Health Requirements Manual (EM 385-1-1) provides criteria for short term permissible noise exposure levels (Table 3), for consideration of hearing protection or the need to administer sound reduction controls (USACE 2014).

Table 3. Permissible Non-Department of Defense Noise Exposures for the Project (USACE 2024).

Duration/day (hours)	Noise level (dBA)
8	85
4	88
2	91
1	94
0.5 = 30 min	97
0.25 = 15 min	100

Because the proposed Project is located in an urban area, the primary sources of anthropogenic noise within the Project Area are numerous, including traffic and road noise, noise from the Great American Ballpark and Paycor Stadium, movement of barges and pleasure craft up and down the Ohio River, aircraft, and music from the Smale Riverfront Park. Noise ranging from approximately 10 dBA for the rustling of leaves to as much as 115 dBA for the sound of a rock band at 5 meters (the upper limit for unprotected hearing exposure established by the Occupational Safety and Health Administration) may occur in and around the Project Area. Due to the urban nature of site, the potential for large quantities of park visitors to be affected by noise in the Project Area is possible. However, the Project Area is not residential, and no residences are present within 0.25 miles of the Project Area.

2.4.6 Hazardous and Toxic Substances

This section addresses the identification and assessment of Hazardous, Toxic, and Radioactive Waste (HTRW) resources within the Project Area. HTRWs encompass a wide array of substances that pose significant risks to human health and the environment due to their inherent toxicity, flammability, corrosiveness, or potential for contamination. These substances are subject to stringent regulations aimed at safeguarding public health and the environment.

At the federal level, the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, are the primary legislative frameworks governing the management and cleanup of hazardous substances. RCRA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste, while CERCLA provides the authority and funds for the cleanup of hazardous waste sites, including those posing imminent threats to public health or the environment.

Additionally, state regulations play a crucial role in overseeing HTRW management and remediation efforts. In Ohio, OHEPA administers regulations and programs related to hazardous waste, contaminated sites, and underground storage tanks (USTs). These regulations complement federal laws and ensure that HTRW resources are properly managed and remediated to protect human health and the environment.

No currently listed Superfund Sites are located at or within 1.0 mile of the Project Area (USEPA 2024b). Three CERCLA sites are within 0.5 miles of the Project Area: Potter Steward U.S. Courthouse, Stone Oil Company, and Anchor White Lead Company (USEPA 2024b). Of the three CERCLA sites, Stone Oil Company and Anchor White Lead Company are categorized as No Further Action (NFA). No Corrective Actions Sites are identified within 1.0 mile of the Project Area (USEPA 2024b). Three RCRA Treatment, Storage, and Disposal Facilities (TSDFs) sites were identified within 0.5 miles of the Project Area (USEPA 2024b). No RCRA generators are located within the proposed Project Area (USEPA 2024b). No RCRA Institutional or Engineering Control Sites are within the proposed Project Area (USEPA 2024b).

No Solid Waste Facilities, OHEPA Voluntary Action Program sites, or Ohio state-listed Institutional or Engineering Control sites are located on or within 0.5 mile of the proposed Project Area (Ohio EPA 2024a). No Ohio listed Brownfield sites are located within 0.5 mile from the proposed Project Area (Ohio EPA 2024b). No USTs (active or inactive) were identified within the proposed Project Area (Ohio Department of Commerce 2024). Fifteen facilities with USTs are located within 0.5 miles of the site, and facility reports for each can be found in Appendix C (Ohio Department of Commerce 2024).

2.5 BUILT ENVIRONMENT

In accordance with riverfront master planning efforts dating back to 1997, the Cincinnati riverfront has been developed to include the Paycor Stadium on the west side of the riverfront, the Great American Ballpark to the east, the National Underground Railroad Freedom Center, mixed-use development, parking, and nearly 70 acres of park space. This park space includes the USACE Phase I work completed in 2014 that included recreational features located on the east side of the John. A Roebling Bridge including the Walnut Street stairway, the Schmidlapp Event Lawn, and an interactive playground area as well as lighting, signage, and other utilities (shown in Figure 1).

2.6 ECONOMIC ENVIRONMENT

2.6.1 Socioeconomic and Environmental Justice

EO 12898, Federal Actions to Address Environmental Justice in Minority Population and Low-Income Populations (EO 1994), directs federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority population and low-income populations. When conducting NEPA evaluations, USACE incorporates Environmental Justice (EJ) considerations into both the technical analyses and the public involvement in accordance with the EPA and the Council on Environmental Quality (CEQ) guidance (CEQ 1997).

The CEQ guidance defines “minority” as individual(s) who are members of the following population groups: American Indian or Alaskan native, Asian or Pacific Islander, Black, not of Hispanic origin, and Hispanic (CEQ 1997). The CEQ defines these groups as minority populations when either the minority population of the affected area exceeds 50% of the total population, or the percentage of minority population in the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis (CEQ 1997).

Low-income populations are identified using statistical poverty thresholds from the Bureau of the Census Current Population Reports, Series P-60 on Income and Poverty (Smega et al. 2020). In identifying low-income populations, a community may be considered either as a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect. The 2021 poverty threshold for an individual was $14,880 and $29,950 for a family of four (USCB 2021). These values represent weighted poverty thresholds based on family size in 2021.

The CEQ's Climate and Environmental Justice Screening Tool (CEJST) was used to identify tracts which contained disadvantaged communities at or near (within 1 mile) of the Project Area center. The tract where the Project Area is located (Tract #39061026500) is not considered disadvantaged since it does not meet the CEJST's thresholds for burdened or socioeconomically challenged populations. However, the two tracts across the Ohio River from the Project site in Covington (#21117067000) and Newport (#21037050100), Kentucky are considered disadvantaged. These tracts contain 2,986 and 1,518 people, respectively. Both meet the criteria thresholds for Health, Housing, and Transportation, and the Newport tract also meets the thresholds for Legacy Populations and Workforce Development. On the Cincinnati side of the Ohio River, only the Queengate neighborhood (#39061026300) is within 1-mile of the Project site and considered disadvantaged for Energy, Health, Housing, Legacy population, Transportation, and Workforce development.

Further analysis was done using the EPA's online EJScreen environmental justice mapping tool to assess the environmental and demographic indicators within a 10-mile radius of the proposed Cincinnati Riverfront Project Area. The area encompasses approximately 319 square (sq.) miles and contains portions of Hamilton County in Ohio and Campbell and Kenton counties in Kentucky. With a total population of 803,820 people (2021), the area has a population density of approximately 2,519 people/sq. mile. Table 4 contains select EJ Index variables within the proposed Cincinnati Riverfront Project Area and a 10-mile buffer around the Project Area (USEPA 2024). The full EJScreen Report is located in Appendix C.

Table 4. Selected EJ Screen values for the 10-mile buffer area around the Cincinnati Riverfront Project Area, with values compared to state and national averages.

Selected Variable	Value (%)	State Average (%)	USA Average (%)
People of color	31	24	39
Low Income	33	33	31
Unemployment rate	5	6	6
Limited English-speaking households	1	1	5
Less than high school education	9	10	12
Under the age of 5	6	6	6
Over the age of 64	14	18	17
Low life expectancy	21	21	20

Within the 10-mile radius of the proposed Project Area, the population consists of 33% low-income individuals, 31% communities of color, 5% unemployment, and a per capita income of $36,486. Because the percentage of minority population in the area is below 50% and is lower than the national average minority population, the CEQ guidance does not consider the area to include a "minority population."

2.6.2 Executive Order 13045 Protection of Children

EO 13045, titled "Protection of Children from Environmental Health Risks and Safety Risks," was issued in 1997 to ensure that federal agencies consider the potential health and safety risks to children when setting environmental standards or implementing policies. The order requires agencies to assess and mitigate risks to children from environmental factors such as pollution, toxins, and hazardous substances. In the context of a federal construction project, this executive order would necessitate thorough assessments related to impacts on children's health and safety necessitating modifications to design or implementation to minimize risks to this vulnerable population.

Children would be frequent visitors of Smale Park, and the park has attractions specifically designed to attract and entertain children. Safeguards that would be implemented to protect these children and meet full compliance with EO 13045 is outlined in section 4.11.

2.7 Most Probable Future Without Project (FWOP) Condition

The most probable future without Project (FWOP) conditions will be the further loss of Smale Park space from erosion and associated decreased visitation, decreased cultural and natural resources, and decreased economic value (Table 5). The results of the Climate Assessment (see Appendix B) indicate tendency for increasing annual mean monthly streamflow and annual cumulative precipitation, which may be manifested as increased in park inundation frequency and/or duration and potentially increased flood velocities. Without a plan to increase the flood resiliency of the riverbank, no safe access to the water will be available resulting in possible injuries to Smale Park users and a decreased recreational experience at Smale Park. A lack of flood resiliency could also lead to loss of park assets such as the adjacent walkway, which increases the costs of rebuilding. Additionally, increased maintenance costs could become a burden to the City of Cincinnati.

Table 5. Summary of existing and FWOP conditions that affect the formulation and evaluation of alternative plans.

Consideration	Current Conditions	FWOP Conditions
Natural Environment	The Project Area does not contain any wetlands, designated critical habitat, or known populations of endangered species. The Ohio River borders Smale Park on its south side and is partially impaired for fish consumption and partially impaired for contact recreation. Soils at the site are made up of urban udorthents and there is no prime or unique farmland at the site.	The natural environment would be expected to remain under the FWOP condition. Continued erosion would not have a significant impact on natural resources.
Physical Environment	The Project Area contains the Ohio River shoreline of Smale Park and part of the Riverfront Loop Trail which provides recreational opportunities. No cultural resource	Continued erosion along the Ohio River shoreline in Smale Park would result in the loss of recreational areas as well as the loss of portions of the Riverfront Loop Trail. Continued erosion will also lead to increased maintenance costs and

	sites are known along the shoreline. No HTRW sites are known to occur within the Project Area.	additional financial burden on the City of Cincinnati. Additionally, there will remain no safe access to the water, resulting in a decreased recreational experience.
Economic Environment	The average household income within 10-miles of the study area is $36,486. Several census tracts in the area are considered disadvantaged according to the CEJST tool.	The continued degradation of the shoreline due to repeated floods will reduce the quality of experiences at the existing adjacent park and decrease recreation opportunities currently available to disadvantaged communities in the area.
Built Environment	The Project Area containing the Cincinnati riverfront has been developed to include the Paycor Stadium on the west side of the riverfront, the Great American Ballpark to the east, the National Underground Railroad Freedom Center, mixed-use development, parking, and nearly 70 acres of park space. This park space includes the USACE Phase I work completed in 2014 that included recreational features located on the east side of the John. A Roebling Bridge including the Walnut Street stairway, the Schmidlapp Event Lawn, and an interactive playground area as well as lighting, signage, and other utilities	Continued erosion along the Ohio River shoreline in Smale Park would result in the loss of the built environment including recreational areas and portions of the Riverfront Loop Trail.

3 Plan Formulation And Evaluation

This chapter describes the development, evaluation, and selection of alternative plans that address the study objectives. Alternative plans are made up of individual or combinations of management measures.

3.1 Planning Framework

A general overview of the plan formulation sequence and strategy for this study is presented in the following approach.

1. Management Measure Identification – Initial management measures were identified through collaboration between project stakeholders and the study team. These measures were initially developed to address recreation features along shorelines, leveraging the expertise of USACE while adhering to policy and authority constraints.
2. Management Measure Screening – Screening determined which management measures should be included in the preliminary array based on how well they met each of the three planning objectives presented in Section 1.8.1 (resilient recreational connection, new recreational experience, and increased diversity of riparian zone).
3. Preliminary Array Formulation and Evaluation – The remaining measures were combined into a preliminary array of alternatives. The initial array was evaluated based on the following evaluation criteria: effectiveness, efficiency, completeness, acceptability, identified planning objectives (Section 1.8.1), operation and maintenance (O&M) costs, and resilience and sustainability. Alternatives in the preliminary array were either retained for further consideration/reformulation in the focused array or screened from further consideration.
4. Focused Array Formulation and Comparison – Alternatives retained for further consideration were reformulated into the focused array of alternatives. The focused array was evaluated for the extent to which alternatives met the planning objectives and evaluation criteria.

The analysis of comprehensive benefits across the four PR&G accounts: National Economic Development (NED), Regional Economic Development (RED), Environmental Quality (EQ), and Other Social Effects (OSE) was performed following identification of the focused array of Alternatives to assist with selection of a Tentatively Selected Plan (TSP) and is discussed in Chapter 5.

3.2 Assumptions

Throughout plan formulation, assumptions were made related to risks in order to determine mitigation strategies. One assumption was that the Work In Kind (WIK) described in the 2019 MOU would be integral to the project and would be credited to the sponsor's portion of the implementation cost share. This assumption limits the amount of cash available for project implementation. In order to mitigate the risk of this assumption, the team coordinated early review and approval of the Integral Determination Report (IDR).

Another major assumption in plan formulation was that the failure mode of the bank would not constrain the type of recreational features that could be built. An early geotechnical survey of the bank provided information to increase confidence in this assumption.

Lastly, the team assumed that the site conditions would remain relatively the same from design to the time of construction. To mitigate risks associated with this assumption, the recreational features will be designed for flood resiliency. The Climate Assessment (Appendix B) cites locally observed and recorded trends of increased precipitation and temperature, increasing the likelihood of flood events and the need for flood resiliency.

3.3 Management Measures

The PDT built a list of initial measures to address the problems and opportunities listed for the study. Input was considered from the NFS, as well as stakeholders at the Planning Charrette that was held on May 16, 2023. This initial list of measures was screened based on the extent to which each measure met the three planning objectives outlined in 1.8.1.

- Terraced Boulders- Large, rectangular rocks at the water's edge along a portion of the shoreline,
- Overlook- Concrete platform extending from the Castelinni Esplanade with railing,
- Concrete Seatwalls (terraced concrete walls running parallel to the shoreline that can be used for seating),
- Pier- Extending out above the Ohio River from the Castellini Esplanade,
- Beach with Dikes- Sloped, sandy area with rock dikes for erosion protection,
- Native Flood Tolerant Planting- Variety of native plant species along shoreline,
- Enhanced Paths (Terraced Walkways)- Concrete walkways in addition to existing river walk,
- River Stairs- Concrete stairs leading from walkway into River,
- Lawn Terrace- Terraced greenspace creating an amphitheater-like area,
- Kayak Launch- Tie off area on west side of site, accessible from the walkway,
- Boat Dock Landing- Addition of mooring mechanisms at east end of site,
- Serpentine Wall- Sheetpile wall with concrete platform below,
- Marina at Great American Ballpark- Upgrade old wharf just south of Great American Ballpark, and
- Pedestrian Bridge over Mehring Way- Connect Smale Park to spaces north of Mehring Way with a raised pedestrian bridge.

Measures were given a score based on whether the implementation of such action met the Project objectives as follows:

1- Does not meet objective,
2- Meets objective with some limitations/concerns, and
3- Fully meets objective.

The scoring table for each measure is listed below (Table 6):

Table 6. Initial measures screening for the proposed Project.

Recreation Feature	Meets Objective 1	Meets Objective 2	Meets Objective 3	Total
Terraced Boulders	3	3	3	9
Overlook	3	3	2	8
Concrete Seatwalls	3	3	2	8
Pier	3	3	2	8
Beach with Dikes	3	3	2	8
Native Flood Tolerant Planting	2	2	3	7
Enhanced Paths (Terraced Walkways)	3	2	2	7
River Stairs	3	3	1	7
Lawn Terrace	2	2	3	7
Kayak launch	2	3	1	6
Boat Dock Landing	2	3	1	6
Serpentine/Sheetpile Wall	3	2	1	6
Marina at Great American Ballpark	1	3	1	5
Pedestrian Bridge over Mehring Way	1	2	1	4

The lowest scoring measures, the Marina at the Great American Ballpark and the Pedestrian Bridge over Mehring way, were not carried forward. While the marina fully meets the objective of providing new recreational experiences, it does not meet the objective of providing a safe, resilient connection between Smale Park and the Ohio River because of its location outside of the footprint of the park. The pedestrian bridge also does not meet objective one because it does not include any element of connection to the river and it only partially meets the second objective since there are existing walkways and pedestrian connections within the park. Neither the marina nor the pedestrian bridge meet objective three because neither would increase native diversity or the aesthetic value of the park.

3.4 ARRAYS OF ALTERNATIVES

The twelve screened measures were then combined to create alternatives that addressed three main themes:

1. Maximize diversity of recreational activities - measures that offer unique and diverse recreational experiences for park users,
2. Natural features - measures that focus on habitat and natural space, and
3. Maximization of public space – measures that extend usable park space and areas for gathering.

A no action or FWOP alternative was also included for comparison.

3.4.1 Preliminary Alternative Plan Descriptions

In collaboration with the NFS, the PDT evaluated the applicability of combinations of measures against meeting the intent of the three main themes. Discussions included contributions from the public that the NFS provided within that meeting, as well as incorporation of the general directive of the Cincinnati Central Riverfront Urban Design Master Plan. For example, for the diverse recreation activities theme, each of the three alternatives includes a different measure that connects the park to the water (i.e. riverstairs, pier, overlook). Table 7 shows the matrices of measures included in each alternative. Table 8 below provides descriptions of each of the seven alternatives developed, as well as the FWOP alternative.

Table 7. Alternative matrices with included measures for the proposed Project.

Alternative #	Alternative Name	Description	Terraced Boulders	Overlook	Concrete Seatwalls	Pier	Beach with Dikes	Native Flood Tolerant Planting	Enhanced paths(Terraced Walkways)	River Stairs	Lawn Terrace	Kayak launch	Boat Dock Landing	Serpentine/Sheetpile Wall
1	**Combination Concept**	Mixture of measures to incorporate both natural and hardscape features, offer a diverse recreational experience and allow park users to safely access water.	x		x			x	x	x		x	x	
2a	**Hardscaped shoreline with pedestrian access**	Use of rip rap as foundation with walkways branching off existing walk and down to river			x	x			x			x		
2b	**Hardscaped shoreline with pedestrian access and stairs to river**	Use of rip rap as foundation with walkways branching off existing walk and down to river and river stairs.			x				x	x		x		
2c	**All Hardscape with Serpentine Wall**	Serpentine wall along shoreline with walkways above and below.		x					x			x		x
3a	**Natural riverbank with plantings**	Natural sloping lawn down to bank with mixture of native plantings and beach					x	x			x	x		
3b	**Natural bank with seatwall**	Natural sloping lawn down to bank with seatwall and reflection areas			x			x			x	x		
4	**Build out Smale Park to riverbank with wall support**	Utilization of fill material to build out park to bank with wall support		x							x			x

Color Code Key

Mix
Diversity of Rec Activities
Natural
Max Public Space

Table 8. Narrative descriptions of alternatives for the proposed Project.

Alternative #	Alternative Name	Description
0	Future without Project	No action
1	Combination Concept	A mixture of measures to incorporate both natural and hardscape features, offer a diverse recreational experience, and allow park users to safely access the Ohio River.
2a	Hardscaped shoreline with pedestrian access	Use of rip rap as foundation with walkways branching off existing walkways and leading down to the Ohio River.
2b	Hardscaped shoreline with pedestrian access and stairs to river	Use of rip rap as foundation with walkways branching off existing walkways and leading down to the Ohio River and river Stairs.
2c	All Hardscape with Serpentine Wall	Serpentine wall along shoreline with walkways above and below the wall.
3a	Natural riverbank with plantings	Natural sloping lawn down to riverbank with mixture of native plantings and a beach.
3b	Natural bank with seatwall	Natural sloping lawn down to riverbank with seatwall and reflection areas.
4	Build out Smale Park to riverbank with wall support	Utilization of fill material to build out Smale Park to riverbank with wall support.

Color Code Key

Mix
Diversity of Rec Activities
Natural
Max Public Space

3.4.2 Principles, Requirements & Guidelines Criteria Comparison

Each alternative was then screened based on the PR&G criteria for completeness, effectiveness, efficiency, and acceptability. In addition to the PR&G criteria, O&M as well as environmental sustainability were also used as criterion for screening. O&M refers to regular ongoing maintenance such as mowing or debris and trash removal. Environmental sustainability refers to the resilience of the features to flooding and climate change. Below is Table 9 which outlines the scoring table. The scores were assigned as follows:

Red - Does not meet the criteria
Orange - Meets the criteria with some limitations / concerns
Green - Fully meets the criteria

Table 9. Alternative screening for the proposed Project.

Alternative #	Alternative Name	Completeness	Effectiveness	Efficiency	Acceptability	O&M	Sustainability and Resilience
0	No Action Alternative	-	-	~	-	-	-
1	Combination Concept	+	+	~	+	~	+
2a	Hardscaped shoreline with pedestrian access	+	~	~	~	~	+
2b	Hardscaped shoreline with pedestrian access and stairs to river	+	~	~	+	~	+
2c	All hardscape with serpentine wall	+	~	~	+	+	+
3a	Natural riverbank with plantings	+	+	~	~	-	~
3b	Natural bank with seatwall	+	+	~	+	~	+
4	Build out Smale Park to riverbank with wall support	+	~	-	~	+	+

Three alternatives were screened from this exercise, resulting in the focused array of alternatives:

- Alternative 2a (Hardscaped shoreline with pedestrian access) was screened due to lack of physical connection to the Ohio River, which affected the alternative's ability to meet the study objectives.
- Alternative 3a (Natural bank with plantings) was screened due to high O&M costs associated with establishing and maintaining large amounts of plantings. It also scored low on sustainability and resilience due to the impact that frequent flooding would have on establishment of a natural bank.
- Alternative 4 (Build out Smale Park to riverbank with wall) was screened due to inefficiency. Large amounts of fill required would significantly increase costs. It additionally did not score well on effectiveness because of a lack of connection with the water.

3.5 Focused Array of Alternatives

The focused array represents a list of alternatives that have been through two iterations of plan formulation: (1) screening measures against the study objectives and (2) screening the alternatives created from those measures against the PR&G criteria, O&M requirements, and Sustainability/Resilience criteria. The four alternatives which made it through the two screening iterations are listed below and have been renamed with simplified numbering:

- Alternative 1 (Alternative 1) - Combination Concept
- Alternative 2b (Alternative 2) - Hardscaped shoreline with pedestrian access and stairs to Ohio River
- Alternative 2c (Alternative 3) - All hardscape with serpentine wall with integrated accessibility
- Alternative 3b (Alternative 4) - Natural Bank with seatwall

The team developed renderings of the focused array to be utilized for team discussions and public input. Each of the plan renderings are presented below with descriptions:

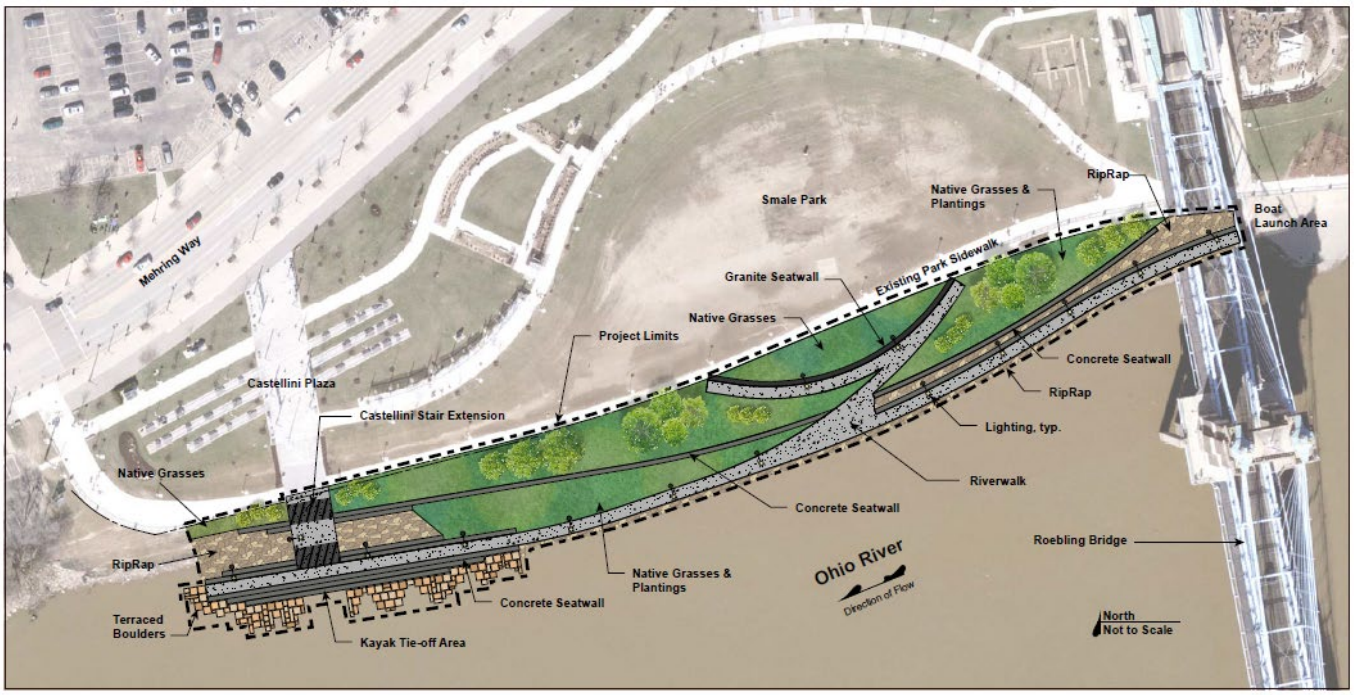


Figure 6 Alternative 1- Combination Concept

Alternative 1 (Figure 6): This concept ties enhanced, ADA accessible walkways in with the existing riverfront sidewalk to allow high-quality interaction with the water's edge. In addition to the walkways, the Castellini Esplanade will be extended to the Ohio River and will transition into river stairs that lead users to a kayak launch and terraced boulders into the Ohio River. Concrete seatwalls will stretch across the riverfront as well as native grasses and vegetation providing a natural but varied landscape. Alternative 1 fully meets all three planning objectives by providing diverse recreation features allowing users to interact with the water. Additionally, the terraced boulders and native plantings increase the quality of the riparian zone. Features will be constructed for flood resiliency.

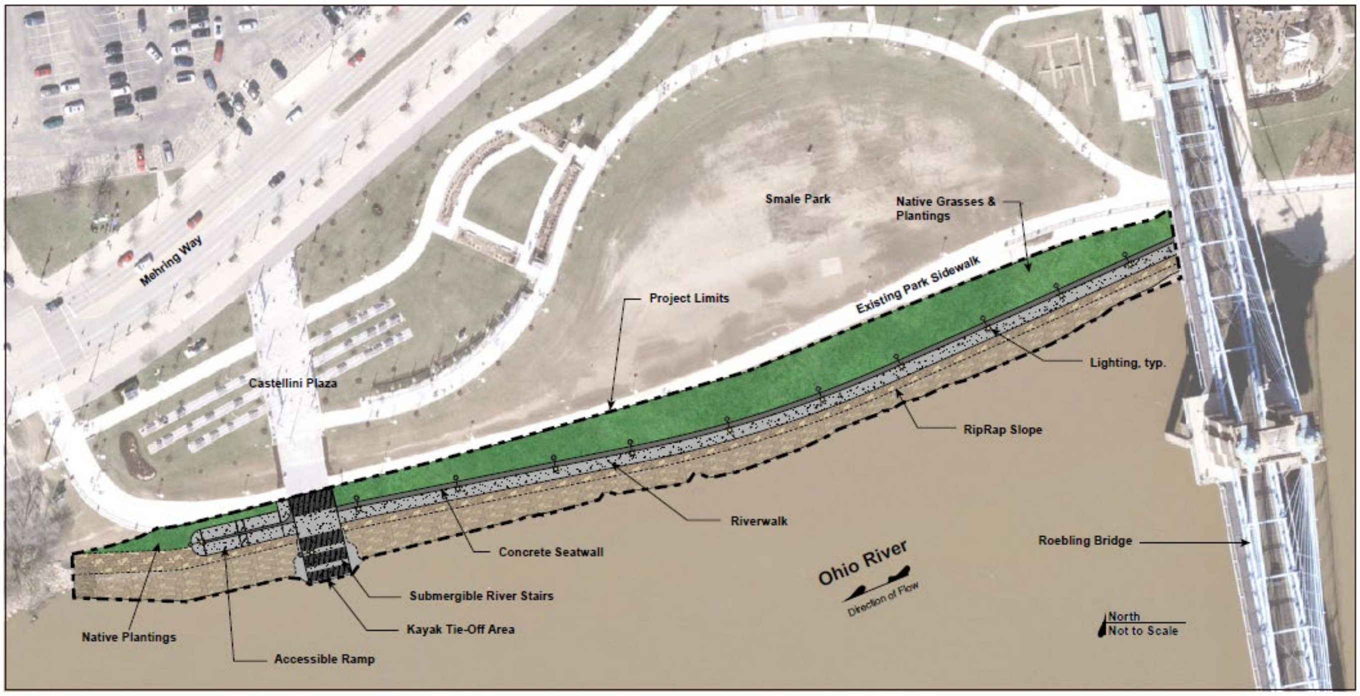


Figure 7 Alternative 2- Hardscaped Shoreline with Pedestrian Access and Stairs to Ohio River

Alternative 2 (Figure 7): This concept will provide pedestrian access and river stairs to the Ohio River from the Castellini Esplanade with a hardscaped shoreline above an ADA accessible lower river walk. A kayak tie off area will be located at the river stairs, and a native grass lawn will lead to the lower river walk, supported by rip rap. Alternative 2 fully meets the planning objectives one and two by providing diverse recreation features such as a kayak tie-off and a riverwalk allowing users to access the water and partially meets objective three by providing some native plantings.

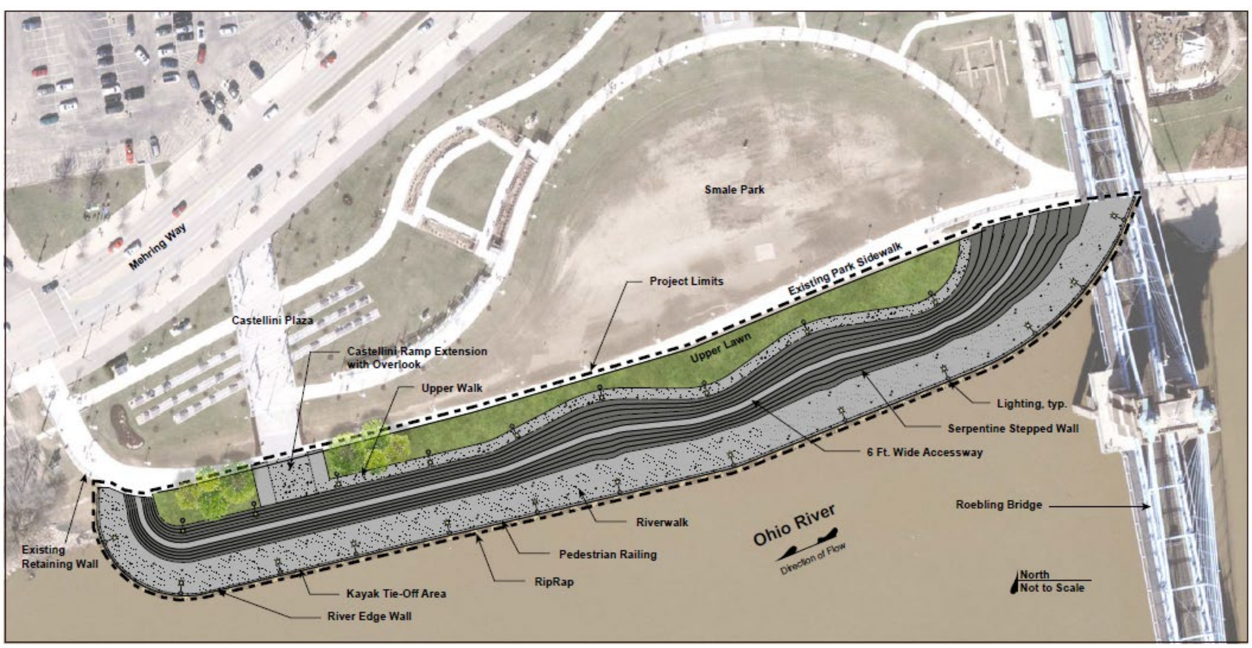


Figure 8 Alternative 3- All Hardscape with Serpentine Wall with Integrated Accessibility

Alternative 3 (Figure 8): This concept will contain an upper lawn and overlook area from the Castellini Plaza and serpentine wall similar to what is found at the Sawyer Point Park, which is located less than a half mile east of Smale Park along the Ohio River. The stepped wall will lead down to a wide lower river walk along the Ohio River's edge, and kayak tie off area will be on the west side of the Project Area. Alternative 3 partially meets the three objectives by providing park users with the ability to walk along the water's edge, providing diversity in recreational experiences with the serpentine wall, and providing some native plantings. This alternative is also very flood resilient due to the types of materials used.

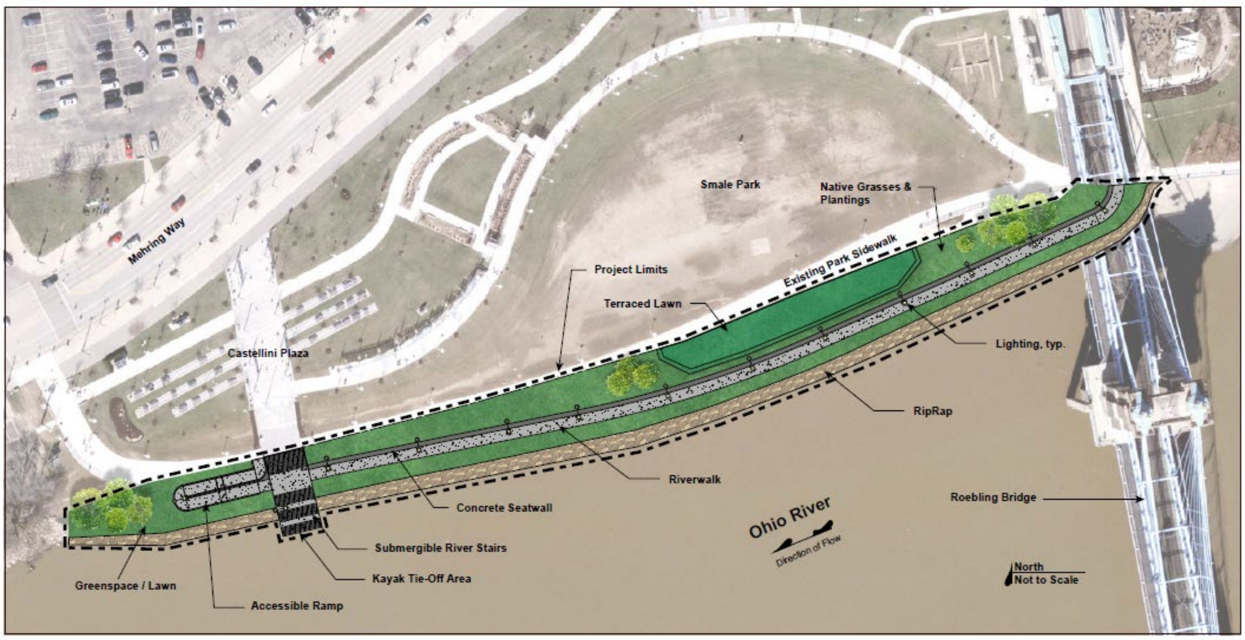


Figure 9 Alternative 4- Natural Bank with seatwall

Alternative 4 (Figure 9): This concept will provide native plantings and lawns including a terraced lawn on the east side of the Project Area. The Castellini Esplanade will extend down to the Ohio River's edge with river stairs with kayak tie offs. A universally accessible riverwalk and concrete seatwall will extend across the site. Alternative 4 fully meets the three planning objectives by providing diverse native plantings on a natural bank that will allowing users to access the water through the river stairs.

4 ENVIRONMENTAL EFFECTS AND CONSEQUENCES

The CEQ's NEPA Implementing Regulations require that an EA identify the likely environmental effects of a proposed project and that the agency determine whether those impacts may be significant. Effects (or impacts) are changes to the human environment from the alternatives being studied that are reasonably foreseeable and include direct effects, indirect effects, and/or cumulative effects, as defined by 40 C.F.R. § 1508.1(g). Effects may include ecological, aesthetic, historic, cultural, economic, social, or health effects, and can be either beneficial or adverse.

In considering whether the effects of the focused array of alternatives (Alternatives 1–4) are significant, agencies shall analyze the potentially affected environment and degree of the effects of the action (40 C.F.R. § 1501.3(b)). In considering the potentially affected environment, agencies should consider the affected area and its resources, understanding that significance varies with the setting of the alternatives being studied. Agencies should consider connected actions including actions that automatically trigger other actions, that cannot or would not proceed unless other actions are taken previously or simultaneously or are independent parts of a larger action and depend on the larger action for their justification (40 C.F.R. § 1501.3(b)). In considering the degree of the effects of the action, agencies should consider both short-term and long-term effects, both beneficial and adverse effects, effects on public health and safety, and effects that would violate laws protecting the environment. The term "degree" is not defined in the governing regulations, but generally refers to the magnitude of change that would result from the alternatives evaluated herein.

All potentially relevant resource areas were initially considered for analysis in this EA. Some resource topics are not discussed, or the discussion is limited in scope, due to the lack of anticipated effect from the alternatives on the resource or because that resource is not located within the affected environment, including critical habitat, wetlands, wild and scenic rivers, and traffic.

This section presents the adverse and beneficial environmental effects of the No Action Alternative as well as all action alternatives that were carried forward to the focused array of alternatives considered for the project. When action alternatives have been determined to have the same effects to the environment, they are discussed together in a single section labeled "Action Alternatives". Conversely, when an action alternative has been determined to have effects that are different than the other action alternatives considered, it is discussed separately under a section labeled by the alternative name. This section does not include any analysis of impacts caused by the implementation of Phase 2a of the Project because NEPA compliance was documented in a separate NEPA document and can be found in Appendix C.

The section is organized by resource topic, with the effects of alternatives discussed under each resource topic. Impacts are quantified whenever possible. Qualitative descriptions of impacts are explained by accompanying text where used.

Qualitative definitions/descriptions of impacts as used in this section of the EA include:

Degree:

- No Effect, or Negligible – a resource would not be affected, or the effects would be at or below the level of detection, and changes would not be of any measurable or perceptible consequence.
- Minor – effects on a resource would be detectable, although the effects would be localized, small, and of little consequence to the sustainability of the resource. Mitigation measures, if needed to offset adverse effects, would be simple and achievable.
- Moderate – effects on a resource would be readily detectable, localized, and measurable. Mitigation measures, if needed to offset adverse effects, would be extensive and likely achievable.
- Significant – effects on a resource would be obvious and would have substantial consequences. The resource would be severely impaired so that it is no longer functional in the Project Area. Mitigation measures to offset the adverse effects would be extensive, and success of the mitigation measures would not be guaranteed.

Duration:

- Short-term – temporary effects caused by the construction and/or implementation of a selected alternative.
- Long-term – caused by an alternative after construction has been completed and/or when it is in full and complete operation.

4.1 Affected Environment (40 C.F.R. 1502.15) and Environmental Consequences (40 C.F.R. 1502.16)

4.1.1 Climate

The USACE has developed numerous policies that require civil works projects to consider climate change during the planning and selection of projects. This includes the 2024-2027 Climate Adaptation Plan (USACE 2024a) as well as a Climate Preparedness and Resilience Policy Statement (USACE 2024b). These policies represent the USACEs commitment to increase the nations resilience to climate change related effects as well as reduce greenhouse gas (GHG) emissions, where possible, in supply chains, the workforce operations, and construction projects.

4.1.1.1 Climate-Affected Hydrology

A climate assessment was conducted to satisfy the requirements of Engineering Construction Bulletin (ECB) 2018-14 and provide helpful information to the decision-making process about current and projected climatological trends in the Project Area. The complete climate assessment can be found in Appendix B.

The climate data and toolsets indicate a statistically significant increasing trend in observed average, maximum, and minimum yearly temperatures. Small but statistically significant increasing trends were also observed in monthly total precipitation and maximum daily precipitation per month. Annual maximum streamflow also showed a small increasing trend but was not determined to be statistically significant.

No Action Alternative

The No Action Alternative could result in Smale Park being less resilient to climate change related impacts. Specifically, the potential for increased runoff from intense storms resulting in higher river velocities would increase the Project Area's potential for bank erosion, which is already occurring at the Project Area. Increased erosion is a long-term minor climate change related adverse effects for the No Action Alternative.

Action Alternatives

Given that all action alternatives have nearly identical project footprints and incorporates similar project features, it has been assumed that all the action alternatives would have the same effects to climate change resiliency for Smale Park.

These alternatives would result in long-term minor beneficial effects to climate change resiliency for Smale Park. They would provide a stabilized armored bank that would make increased erosion from higher stream velocities unlikely. Additionally, all alternatives would align with floodplain values, including allowing water infiltration, flood mitigation, nutrient cycling, recreation, and cultural heritage. Further, the potential for longer durations of flood waters caused by climate change would not impact the features included in the alternatives.

4.1.1.2 Greenhouse Gas Emissions

The CEQ's NEPA Implementing Regulations require that, where applicable, climate change-related effects, including, where feasible, quantification of greenhouse gas emissions, from the proposed action and alternatives and the effects of climate change on the proposed action and alternatives be analyzed (40 C.F.R. § 1502.16(a)6).

Climate change is inherently a cumulative global issue. This means that one molecule of a GHG released anywhere on Earth has been assumed to have the same impact on climate regardless of its location. Consequently, the geographic scope for analyzing the effects of GHG emissions is vast, and it is best to evaluate these effects in relation to state and federal GHG emission goals and standards. The state of Ohio currently has no GHG emission goals or standards. EO 14057: Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability, sets specific federal goals for GHG emissions including:

- 100% carbon pollution-free electricity on a net annual basis by 2030, including 50% 24/7 carbon pollution-free electricity.
- 100% zero-emission vehicle acquisitions by 2035, including 100% zero-emission light-duty vehicle acquisitions by 2027.
- A net-zero emissions building portfolio by 2045, including a 50% emissions reduction by 2032.
- A 65% reduction in scope 1 and 2 greenhouse gas emissions, as defined by the Federal Greenhouse Gas Accounting and Reporting Guidance, from federal operations by 2030 from 2008 levels.

- Net-zero emissions from federal procurement, including a Buy Clean policy to promote use of construction materials with lower embodied emissions.
- Climate resilient infrastructure and operations
- A climate- and sustainability-focused federal workforce.

According to the EPA (USEPA 2024), five sectors of the U.S. economy produce the majority of the GHG's that are emitted each year. They include:

1. Energy – The energy sector, particularly the combustion of fossil fuels for electricity generation, is a major contributor to GHG emissions. This includes emissions from power plants and other energy-related activities necessary to power commercial and residential buildings for lighting, heating, cooling, and operation of appliances.

2. Transportation – The transportation sector is a significant source of GHG emissions, primarily from the combustion of gasoline and diesel fuels in cars, trucks, airplanes, ships, and trains.

3. Industry – Industrial processes, including manufacturing, construction, and chemical production, release GHGs through activities such as burning fossil fuels for energy, chemical reactions, and the use of industrial equipment.

4. Agriculture – Agricultural activities contribute to GHG emissions through practices such as livestock digestion, manure management, use of gas- and diesel-powered machinery, and the use of synthetic fertilizers.

The relative amounts of GHG emissions produced by each sector can vary depending on the methodology of the analysis, as well as factors such as changes in technology and policy over time. However, as of recent assessments, a rough breakdown of GHG emissions by sector in the United States is as follows (EPA 2024):

- Energy: Approximately 28-30%
- Transportation: Approximately 27-29%
- Industry: Approximately 22-24%
- Agriculture: Approximately 9-10%

No Action Alternative

The No Action Alternative would have no effect on the local, regional, or global climate. It has been assumed that the No Action Alternative would result in no additional GHG emissions given that no construction would take place. It was taken into consideration that continued operations and maintenance of Smale Park does result in GHG emissions, but these emissions would continue to occur regardless of the construction of an action alternative. It was also taken into consideration that the area floods regularly, but major evacuations and cleanup efforts are not necessary during and after flooding events, and any flood cleanup that does currently occur would continue to occur with the construction of any action alternative; therefore, no additional GHG emissions are expected to occur due to flooding events.

Alternative 1

Direct emissions from the construction of Alternative 1 were quantified from estimations of gallons of fuel that would be used during construction and social costs were estimated using the Net Emissions Analysis Tool (NEAT). Other maintenance emissions from mowing and tree-trimming were considered but not included in the analysis as these emissions would not differ from the No Action Alternative when compared to action alternatives considered for the Project. Carbon sequestration from the plantings established as a result of Alternative 1 were considered as a potential carbon sink; however, the small area designated for plantings and incomplete plans regarding tree density made quantification of potentially sequestered carbon infeasible. The results of the GHG emissions analysis are provided in Table 10.

Table 10. Greenhouse Gas Emissions Analysis Results.

	Total GHG Emissions (metric tons)				**Social Cost**
	CO_2	**CH_4**	**N_2O**	**CO_2e**	**Dollars ($)**
No Action Alternative	0	0	0	0	0
Alternative 1	437.74	0.018	0.004	439.24	57,735
Alternative 2	187.33	0.008	0.002	187.97	24,707
Alternative 3	192.02	0.008	0.002	192.68	25,324
Alternative 4	878.88	0.036	0.007	881.89	115,919

CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalent; CH_4 = methane; N_2O = nitrous oxide

The environmental effects of 439.24 tons of carbon dioxide equivalents being released, resulting in $57,735 in social costs over the 50-year planning period are considered to be negligible. These emissions are not expected to impact the federal government reaching GHG emissions goals or standards that are currently in place. Further, no reoccurring or ongoing emissions are expected from the implantation of Alternative 1.

Alternative 2

Direct emissions from the construction of Alternative 2 were quantified from estimations of gallons of fuel that would be used during construction and social costs were estimated using NEAT. Other maintenance emissions from mowing and tree-trimming were considered but not included in the analysis as these emissions would not differ from the No Action Alternative when compared to action alternatives considered for the Project. Carbon sequestration from the plantings established as a result of Alternative 2 were considered as a potential carbon sink; however, the small area designated for plantings and incomplete plans regarding tree density made quantification of potentially sequestered carbon infeasible. The results of the GHG emissions analysis are provided in Table 10.

The environmental effects of 187.33 tons of carbon dioxide equivalents being released, resulting in $24,707 in social costs over the 50-year planning period are considered to be negligible. These emissions are not expected to impact the federal government reaching GHG emissions goals or standards that are currently in place. Further, no reoccurring or ongoing emissions are expected from the implantation of Alternative 2.

Alternative 3

Direct emissions from the construction of Alternative 3 were quantified from estimations of gallons of fuel that would be used during construction and social costs were estimated using NEAT. Other maintenance emissions from mowing and tree-trimming were considered but not included in the analysis as these emissions would not differ from the No Action Alternative when compared to action alternatives considered for the Project. Carbon sequestration from the plantings established as a result of Alternative 3 were considered as a potential carbon sink; however, the small area designated for plantings and incomplete plans regarding tree density made quantification of potentially sequestered carbon infeasible. The results of the GHG emissions analysis are provided in Table 10.

The environmental effects of 192.02 tons of carbon dioxide equivalents being released, resulting in $25,324 in social costs over the 50-year planning period are considered to be negligible. These emissions are not expected to impact the federal government reaching GHG emissions goals or standards that are currently in place. Further, no reoccurring or ongoing emissions are expected from the implantation of Alternative 3.

Alternative 4

Direct emissions from the construction of Alternative 4 were quantified from estimations of gallons of fuel that would be used during construction and social costs were estimated using NEAT. Other maintenance emissions from mowing and tree-trimming were considered but not included in the analysis as these emissions would not differ from the No Action Alternative when compared to action alternatives considered for the Project. Carbon sequestration from the plantings established as a result of Alternative 4 were considered as a potential carbon sink; however, the small area designated for plantings and incomplete plans regarding tree density made quantification of potentially sequestered carbon infeasible. The results of the GHG emissions analysis are provided in Table 10.

The environmental effects of 878.88 tons of carbon dioxide equivalents being released, resulting in $115,919 in social costs over the 50-year planning period are considered to be negligible. These emissions are not expected to impact the federal government reaching GHG emissions goals or standards that are currently in place. Further, no reoccurring or ongoing emissions are expected from the implantation of Alternative 4.

4.1.2 Soils and Geology

No Action Alternative

The No Action Alternative would have no effect on soils as there will be no construction associated with the implementation of the proposed Ohio Riverfront Project. Geologically, there could be a small, negligible effect due to the continued erosion of the riverbank in this area. However, over the span of the entire watershed and main river course of the Ohio River, these adverse effects would be negligible.

Action Alternatives

Given all action alternatives have nearly identical construction footprints and the same estimated construction period, it is anticipated that impacts to soils and geology would be the same for all action alternatives considered.

These alternatives would have a long-term positive effect on soil erosion because it would reduce the current erosion occurring at the site through the stabilization and armoring of the shoreline. Because of this, bank sloughing from the rise and fall of the Ohio River levels would decrease. Temporary, negligible adverse effects to soils during the disturbance caused by construction would occur; however, these adverse effects would be mitigated through best management practices (BMPs) as outlined in section 4.2.

4.1.3 Surface Water and Other Aquatic Resources

No Action Alternative

The No Action Alternative will have no effect on surface water as the site would be left as is and no construction activities would take place.

Alternative 1

Alternative 1 would have long-term minor adverse effects to surface waters due to the placement of fill below the ordinary high-water mark (OHWM), which is located at 467 feet above mean sea level (MSL). Fill would consist of riprap stone, filter stone, and clean granular fill to achieve the required grades. Additionally, concrete sidewalks, concrete stairs, concrete seatwalls, and subdrainage stone below the concrete features would be present. In all, Alternative 1 would create an estimated 10,710 cubic yards of fill below the OHWM. A 404(b)1 analysis has been completed to fully assess the impacts from fill materials, and Alternative 1 was determined to be compliant with the restrictions outlined within section 404 of the Clean Water Act. The complete 404(b)1 analysis can be found in Appendix C.

Alternative 1 would also have short-term minor adverse effects to surface waters during construction of the proposed Project. Effects would be caused by increased sedimentation due to runoff during soil disturbance. These effects would be mitigated through the implementation of BMPs, as outlined in section 4.2, to reduce erosion and reduce the risk of high water impacting the site during construction. A 401 Water Quality Certification would be obtained from the State of Ohio prior to any construction activities.

Other Action Alternatives

The impacts to surface waters would be the same for Alternatives 2, 3, and 4 are expected to be similar to Alternative 1, given all action alternatives have nearly identical construction footprints and the same estimated construction period. As such, it would be expected that alternatives 2, 3, and 4 would have long-term minor adverse effects to surface waters due to the placement of fill below the OHWM. They would also be expected to have short-term minor adverse effects to surface waters during construction of the proposed Project. Effects would be caused by increased sedimentation due to runoff during soil disturbance. These effects would be mitigated through the implementation of BMPs outlined in section 4.2.

4.1.4 Groundwater

No Action Alternative

The No Action Alternative would have no effect on groundwater as the site would be left as is, and no construction would take place.

Action Alternatives

Given all action alternatives have nearly identical construction footprints and the same estimated construction period, it is expected that impacts to ground water would be the same for all action alternatives considered.

These alternatives would consist of bank grading and the placement of clean fill to achieve the appropriate land contour required for a stable bank and placement of armoring. These activities would not affect groundwater. Additionally, best management practices, including the proper maintenance of equipment away from soils, would be employed to avoid surface and groundwater contamination.

4.1.5 Floodplains

No Action Alternative

The No Action Alternative would have no effect on the floodplain as the site would be left as is, and no construction associated with the proposed Project would take place.

Action Alternatives

Given all action alternatives have nearly identical construction footprints and the same estimated construction period it is expected the impacts to floodplains would be the same for all action alternatives considered.

These alternatives would have long-term negligible adverse effects to the floodplain. These effects would be caused by the placement of fill materials within the floodplain that would displace water during flooding events. However, the amount of fill compared to the volume of water the Ohio River conveys is relatively minimal, and flows are not expected to measurably change. Additionally, for all alternatives considered much of the proposed Project Area would be developed as greenspace and would properly function as a floodplain, and all features would be designed to be regularly flooded. An 8-step floodplain evaluation has been completed for the project and it has been determined that there is no other practicable alternative that could satisfy the purpose and need of the project without causing some impacts to the floodplain. Steps taken to minimize impacts to the floodplain and provide opportunity for public input include:

1. The public and stakeholders have been notified of the Project through various outreach methods, including a Planning Charrette, social media, signs posted in the Project Area, and news publications. Additionally, the public will be given the opportunity to review and comment on this draft EA and the 8-step floodplain evaluation included in Appendix B.

2. A range of measures and alternatives that could address the purpose and need of the project have been identified and evaluated.
3. The potential direct and indirect effects associated with the proposed development in the floodplain have been identified.
4. Alternatives were designed to minimize adverse effects to the floodplain and to align with the natural values of floodplains. No aspects of the designs would inhibit the flow of water over the floodplain during flood events, and all features are designed to be fully inundated without damage.

The complete floodplain evaluation is provided in Appendix B.

4.1.6 Terrestrial and Aquatic Habitats

No Action Alternative

The No Action Alternative would have a long-term moderate adverse effect on terrestrial and aquatic vegetation as the site would remain as is, and no construction associated with the proposed Project would take place. Riverbank erosion occurring at the site would continue unabated. Ongoing erosion has the potential to prevent the establishment of a permanent native plant community and result in continued degradation of shoreline at the site.

Action Alternatives

Given all action alternatives have nearly identical construction footprints and the same estimated construction period, it is expected that all action alternatives would have the same impacts to terrestrial and aquatic vegetation.

These alternatives would have minor long-term beneficial effects on terrestrial and aquatic vegetation. The benefits would be achieved through the halting of erosion and the establishment of native plant gardens within the proposed Project Area. Although the gardens would be maintained features and not necessarily "natural communities", gardening with native plants has many documented benefits (USEPA 2016), including:

- Native plants do not require fertilizer and require fewer pesticides than lawns or traditional gardens.
- Native plants require less watering and irrigation.
- Native plants have deeper and more complex root systems that help to prevent erosion.
- Native plants help to reduce air pollution, as they do not require mowing, and they do sequester carbon into their deep root systems.
- Native plants provide shelter and food for wildlife including pollinators/insects, migrating birds, and small mammals that would otherwise not be able to utilize the urban Cincinnati landscape.
- Native plants provide an opportunity for public engagement to promote biodiversity and stewardship of our natural heritage.

4.1.7 Fauna

No Action Alternative

The No Action Alternative would have no effect on fauna, as the site will be left as is, and no construction would take place that could impact animal species.

Action Alternatives

Given all action alternatives have nearly identical construction footprints and the same estimated construction period, it is expected that all action alternatives would have the same impacts to terrestrial and aquatic vegetation.

These alternatives would have a negligible adverse effect on fauna. These impacts would be caused by the temporary retreat of fauna that use the site during construction, and the potential impacts to instream habitats and animals living in the Project Area.

Very little terrestrial habitat is present, except for some sparse low-quality vegetation located in the area of erosion directly on the riverbank. As such, the proposed Project Area does not hold many animal species. The species that do use the Project Area are transient (*i.e.,* birds and small mammals that move through but do not nest or dwell permanently). These species are expected to move out of the Project Area during construction and would use the area again after construction has ceased.

A complete inventory of fish that utilize the near shore area has not been conducted. However, construction would not occur between March 15 through June 30 to avoid impacting fish that could be spawning in the area. Direct effects to spawning fishes will be avoided by this seasonal restriction, and any fish in the area are expected to leave during construction and return after construction is complete.

The 2013 mussel survey that was conducted in the Project Area (Appendix C) indicates that very few individual mussels use the Project Area. The species documented during this survey are common across the central United States and are listed as having a conservation status of "secure" by NatureServe. Coordination with the ODNR resulted in a recommendation to perform a mussel survey and mussel relocation prior to the start of construction to avoid any take of mussel species (See Appendix C for coordination). This recommendation has been incorporated into the project plans. As such there is expected to be no impact to mussel fauna as a result of the implementation of any of the action alternatives.

4.1.8 Federally Listed Species

No Action Alternative

The No Action alternative would have no effect on endangered and threatened species as the site will be left as is, and no construction will take place.

Action Alternatives

Given all action alternatives have nearly identical construction footprints and the same estimated construction period, it is expected that all action alternatives would have the same impacts to federally listed species.

These alternatives would have no effect on federally listed threatened and endangered species or designated critical habitat.

The proposed Project Area does not contain suitable habitat for any of the listed bat species. Additionally, no trees greater than 3-inches DBH would be removed; therefore, no potential roost trees would be impacted by the Project. Further, no caves were observed at or near the proposed Project Area.

The USFWS was contacted during early scoping for the Project on February 27, 2024, to provide input on alternatives that were being considered. The USFWS responded by providing the 2013 mussel survey and stated, "A mussel survey was conducted in this Project Area in 2013. No federally listed mussels were found and only 18 live individuals of 5 species were found. Based on the low density and diversity of mussels, no federally listed mussels are expected to be present in the Project Area". As such, federally listed mussels are not expected to be impacted by the Project. USFWS correspondence can be found in Appendix C.

The proposed Project Area does not contain suitable habitat for monarch butterfly. The area consists of lawn and disturbed river shoreline that contains limited plant resources for adult butterflies to feed. During the botanical survey, no milkweed (*Asclepias* spp.) species were observed, which are necessary for monarch reproduction. As such, the proposed Project would have no effect on the monarch butterfly.

4.1.9 State Listed Species

No Action Alternative

The No Action Alternative would have no effect on state listed species as the site will be left as is and no construction would take place.

Action Alternatives

Given all action alternatives have nearly identical construction footprints and the same estimated construction period, it is expected that all action alternatives would have the same impacts to state listed species.

These alternatives would have no effect on state listed species. Early coordination with the ODNR indicates that a number of state listed species have the potential to be present within the Project Area (see Table 1).

The 2013 mussel survey provided by the USFWS shows that no state listed mussel species were found within the Project Area. A single individual washboard mussel was found upstream of the Project Area but is not likely to be impacted by downstream construction activities. Additionally, a mussel survey and relocation would occur prior to construction of any proposed alternative, per a comment provided by the ODNR. As such, there would be no effect to state listed mussel species.

Data regarding the presence or absence of state listed fish occupying the near shore habitat within the proposed Project Area is currently unavailable. To prevent impact to potentially present state listed fish species, the ODNR recommends that no in-water work be conducted from March 15 through June 30. This recommendation would be implemented into Project construction timeframes. As such, these alternatives would have no effect on state listed fish species.

Data regarding the presence of Kirtland's snake within the proposed Project Area is currently unavailable. Although habitat quality is poor, species could occur at the site. Given the limited life history information known about this species, the importance of urban shorelines like the Cincinnati Riverfront to the snake's existence is unclear. Further coordination will be conducted with the ODNR to identify any necessary measures to reduce or eliminate potential impacts to this species. However, the type of disturbed Ohio River shoreline habitat being impacted is common in the area, so it would be unlikely that these alternatives would cause a threat to the existence of the species.

A botanical survey was conducted on October 19, 2023. No smooth buttonweed was observed during the survey. As such, the species is not expected to occur at the site; therefore, these alternatives would not have the ability to affect the species.

4.1.10 Recreational, Scenic, and Aesthetic Resources

No Action Alternative

The No Action Alternative will have no effect on recreational, scenic, and aesthetic resources in the near future as the site will be left as is, and no construction will take place. Given the progressive degeneration of the site, however, a negative long-term effect could be present as the site continues to erode depending on how far inland the erosion intrudes. If allowed to intrude into the center of Smale Park, the erosion could yield a loss of recreational, scenic, and aesthetic resources.

Action Alternatives

Given all action alternatives have nearly identical construction footprints and the same estimated construction period, it is expected that all action alternatives would have the same impacts to recreational, scenic, and aesthetic resources.

These alternatives would have a significant beneficial effect on recreation, scenic, and aesthetic resources. There are no similar parks nearby that would allow this type of access to the Ohio River, especially when considering the proximity of professional sports stadiums. The nearest somewhat-comparable urban waterfront parks would be in Louisville, Kentucky, and Jeffersonville, Indiana, one to two hours away.

4.1.11 Cultural Resources

No Action Alternative

Under the No Action Alternative, shoreline along the Project would continue to erode. These effects would not impact historic properties since none exist in the Project Area.

Action Alternatives

Given all action alternatives have nearly identical construction footprints and the same estimated construction period, it is expected that all action alternatives would have the same impacts to cultural resources.

Based on the results of the subsurface archaeological survey of the Project Area, USACE has determined that no adverse effect to the NHL and NRHP listed John A. Roebling Bridge or other historic properties by the alternatives considered. The USACE, in accordance with 36 C.F.R. Part 800.5(b) of the NHPA, has reached a determination of no adverse effect.

4.1.12 Air Quality

No Action Alternative

The No Action Alternative will have no effect on air quality as the site will be left as is, and no construction will take place.

Action Alternatives

Given all action alternatives have nearly identical construction footprints and the same estimated construction period, it is expected that all action alternatives would have the same impacts to air quality.

These alternatives would produce short-term minor adverse effects to air quality. Temporary construction activities, including the operation of heavy equipment with diesel engines, would release carbon monoxide and ozone into the atmosphere. Additionally, some dust and other particulate matter could be released during construction. However, activities would only occur during daylight hours, allowing air quality to return to baseline during nighttime hours. Given that Hamilton County is in attainment for all criteria pollutants, short-term adverse effects to air quality are not expected to be significant or require mitigation.

4.1.13 Invasive Species

No Action

The No Action Alternative would have no effect on invasive species. The project area is urban and invasive species are present. However, it is not expected that the FWOP condition would exacerbate invasive species issues above the level they are currently at. Additionally, the project area is not a natural area where it would be expected that invasive species could damage natural plant or wildlife communities.

Action Alternatives

Given all action alternatives have nearly identical construction footprints and the same estimated construction period, it is expected that all action alternatives would have the same impacts to invasive species.

These alternatives would have no effect to invasive species. The area would be maintained as a park so plants in the area would be restricted to maintained lawn and maintained native gardens.

No invasive species, as specified by the ODNR, would be planted or otherwise promoted during the construction or maintenance of the project.

4.1.14 Noise

N*o Action Alternative*

The No Action Alternative will have no effect on noise as the site will be left as is, and no construction will take place.

Action Alternatives

Given all action alternatives have nearly identical construction footprints and the same estimated construction period, it is expected that all action alternatives would have the same impacts to noise.

These alternatives would have short-term minor adverse effects to noise. Construction activities would create higher levels of noise for the Park. However, noise levels would not be expected to be significantly higher than typical noises found in urban communities. Construction activities would only occur during daylight hours; thus, limiting the disturbance caused to community members.

4.1.15 Hazardous and Toxic Substances

No Action Alternative

The No Action Alternative would have no effect on hazardous or toxic substances as no recognized environmental conditions were identified at Smale Park, and the No Action Alternative would not impact the known sites that are within 0.5 miles of Smale Park. Erosion would continue at the site, but it would not impact HTRW sources.

The Tentatively Selected Plan

Given all action alternatives have nearly identical construction footprints and the same estimated construction period, it is expected that all action alternatives would have the same impacts to HTRWs.

These alternatives would have no effect on HTRWs as no recognized environmental site conditions were identified at the proposed Project Area. In addition, these alternatives would not impact the known HTRW sites that are within 0.5 miles of the proposed Project Area, as construction and soil disturbing activities would only occur within the proposed Project Area.

4.1.16 Socioeconomic and Environmental Justice

No Action Alternative

The No Action Alternative will have no effect on socioeconomics and EJ as the site will be left as is, and no construction would take place.

Action Alternatives

These alternatives would have long-term positive socioeconomic effects with a free recreational Riverfront area to surrounding EJ communities. The improvements made to recreation by the alternatives would increase visitation in the area and provide an economic benefit to the surrounding community by bringing in business that might not otherwise have occurred. See Appendix E for a complete review of the economic analysis of the alternatives. For a complete review of EJ outreach and consideration see section 7.2.

4.2 Mitigation, Monitoring, and Adaptive Management

Mitigation can include avoiding, minimizing, rectifying, reducing over time, and/or compensating for impacts to the human environment. One significant mitigation action that will be performed, as recommended by the ODNR, includes a mussel survey and relocation to avoid any impact to mussel fauna. In addition to this action, BMPs would be employed to avoid, minimize, and reduce impacts to the human environment during the construction of Alternative 1 would include:

Stabilization practices

- A Storm Water Pollution Prevention Plan (SWPPP) would be developed and implemented.

- Disturbed portions of the site where construction activity stops for 7 days or more will be stabilized with temporary seed or straw mulch no later than 7 days from the last construction activity in that area (portion) of the site.

- Disturbed portions of the site where construction activities are completed will be stabilized with permanent seed no later than 7 days after completion of grading in that area.

- Protect disturbed soils with erosion control blankets under the following conditions:
  - On slopes and disturbed soils where mulch anchoring is difficult and other methods such as crimping or tackifying are not feasible nor adequate.
  - On slopes steeper than 3H:1V.
  - In drainage channels with slopes of 2% or more.
  - On steep, long slopes, generally steeper than 3H:1V and longer than 50 feet.
  - On any slopes where erosion hazards are high.
  - On critical slopes adjacent to sensitive areas such as streams and wetlands.
  - On disturbed soil areas where planting is likely to be slow in providing adequate protective cover.

Structural practices

- *Silt Fence* – will be installed downhill from bare soils to allow sediment laden runoff to pond; thus, allowing the sediment to settle out of suspension and separate from the runoff. Silt fence will also permit seepage through the fabric, filtering larger sediment particles.

- *Fiber Rolls* – will be installed where non-concentrated flows occur, parallel to contours along long slopes, at specific intervals. Biodegradable fiber rolls may remain permanently in-place to incorporate within the permanent vegetated ground cover.

- *Sediment Traps* – will be sited and constructed as needed, and through field adaptations to changing grades and emergence of gullies that need to be controlled. Traps will consist of rock berms across concentrated flow areas and will be designed to intercept, detain, and settle out these flows.

- *Inlet Protection Measures* – will be used to filter (or settle) out sheet and concentrated flows moving toward curb, drop, or other inlets. Inlet protection structures will consist of filter bags, filter tubes, rock bags, #2 rock berms, or other commercial devices.

- *Outlet Protection Measures* – will be used where storm pipe discharge to ditches or slopes and consist primarily of pipe end walls/headwalls with riprap consistent with the Ohio DNR Rainwater and Land Development Standards for Stormwater Management Land Development and Urban Stream Protection.

- *Ditch Check Dams* – will be installed as needed to control ditch downcutting, trap sediment, and stabilize ditches.

- *Rock Overflow* – will be installed in local low points along silt fence where concentrated filtered flows can safely exit the silt fence line of protection.

- *Turbidity Curtain* – launched parallel to the edge of water and surrounding the slope regrading and riprap placement to contain sediments which may be carried into the water by construction site runoff.

- *Slope Interruption* – natural, biodegradable fiber rolls (wattles, tubes, etc.) serve as slope interruption to slow excess runoff and allow permanent stabilization of the vegetative cover. Install fiber rolls parallel to the long hillside slope intended to receive sod or seed.

Spill Prevention

- A Spill Prevention, Control, and Countermeasure Plan would be developed and implemented.

- Equipment maintenance would be performed away from streams, water bodies, and ditch lines.

- Fuel and other liquids would be stored in a secure location.

Waste Disposal

- *Waste Materials* – All waste materials that may leach pollutants (paint and paint containers, caulk tubes, oil/grease containers, liquids of any kind, soluble materials, etc.)

will be collected and stored in a covered metal dumpster rented from a licensed solid waste management company. The dumpster will meet all local and state solid waste management regulations. Construction debris and other wastes that do not leach pollutants would be recycled or deposited in a covered or open-topped dumpster. The dumpster would be emptied when full, and the contents will be hauled to an approved disposal site. No construction waste materials would be buried onsite. All personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices would be posted in the office trailer, and the individual who manages the day-to-day site operations would be responsible for ensuring that these procedures are followed.

- *Hazardous Waste* – All waste materials will be disposed of in the manner specified by local or state regulation or by the manufacturer. Site personnel would be instructed in these practices, and the individual who manages day-to-day site operations would be responsible for ensuring that these practices are followed.

- *Concrete Waste Management* – Concrete washout structures or areas should be designated and used to prevent discharge of highly alkaline wash water to the storm sewer or surface streams. Use bermed areas created with strawbales and anchored liner, block and liner, or commercially available portable bin—do not dispose of concrete wastes in excavated holes in areas with high groundwater tables. Commercial, portable washout units must be serviced and maintained in accordance with manufacturer's recommendations. Do not allow washout facilities to overflow.

- *Sanitary Waste* – Portable toilets will be used on site for sanitary wastes. All sanitary waste would be collected from the portable units as needed to prevent excessive odors and overflows by a licensed sanitary waste management contractor, as required by local regulation. Portable units will be placed away from storm drain inlets, ditches, creeks, and other water bodies.

5 Plan Comparison and Selection

5.1 Plan Comparison

The four alternatives that comprise the Focused Array were screened based on comprehensive benefits. These include criteria from the NED, the RED, the EQ, and the OSE account.

5.1.1 Comparison of Focused Array of Alternatives

In the memorandum from the Assistant Secretary of the Army (Civil Works) January 5, 2021, “Comprehensive Documentation of Benefits in Decision Document” policy, USACE Headquarters office issued direction on the comprehensive assessment and documentation of benefits in the conduct of USACE water resources development project planning. In compliance with this memorandum, USACE conducted an evaluation of alternatives based on the NED, RED, EQ, and OSE accounts.

5.1.1.1 National Economic Development Account

NED benefits from recreation opportunities created by a Project are measured in terms of the recreation users’ ‘willingness to pay’ for the recreation opportunity. The Unit Day Value (UDV) method relies on informed opinion and judgment, considering both the quality of recreation experience and visitation rates, and uses the ‘unit day values for recreation’ contained in USACE Economic Guidance Memorandum (EGM) 24-02.

To score alternatives, point values are assigned based on measurement standards described for five criteria: recreational experience; availability of opportunity; carrying capacity; accessibility; and environmental quality. The FWOP condition was evaluated for each of the four alternatives. A subsequent elicitation was conducted with representatives from the City of Cincinnati to validate the scoring.

Once scored, the total points for each alternative can be converted to a dollar value, known as the UDV, representing the value of the proposed features per visitor per day. A value is also assigned through scoring the same criteria for FWOP conditions. Annual benefits are quantified by multiplying the increase in annual visitation and the increase in UDV.

The table below (Table 11) summarizes the total scores each alternative received for all five criteria, as well as the assigned value, total recreation benefits, and net benefit. Net benefits represent the difference in benefits between the FWOP and the given alternative. In order to calculate benefits for all of Phase 2, the total recreation benefits and net benefits include the visitation per square foot for the Phase 2a and Phase 2b area.

Table 11. Unit Day Value Analysis of the focused array of alternatives.

Alternative #	Total Recreation Points	Value	Total Recreation Benefits	Net Benefits
Future Without Project	11	$6.06	$17,816	-
Alternative 1- Combination Concept	87	$14.24	$4,895,874	$4,878,058
Alternative 2- Hardscaped Shoreline with Pedestrian Access and Stairs to Ohio River	64	$11.93	$4,101,669	$4,083,853
Alternative 3- All Hardscape Like Serpentine Wall with Integrated Accessibility	50	$10.73	$3,689,096	$3,671,280
Alternative 4- Natural Bank with Seatwall	72	$12.56	$4,318,270	$4,300,455

Net recreation benefits were used to estimate a Benefit Cost Ratio (BCR) for each of the alternatives (Table 12). Construction costs were annualized over 50 years (base year 2027) using the Fiscal Year (FY) 24 discount rate of 2.75% with an assumed construction duration of 24 months.

For the economic analysis, the estimated credit amount for the Phase 2a work was added to the overall costs for each of the four alternatives. This amount was estimated to be $11,541,000 but was escalated to FY24 dollars within the analysis for comparison. The result of the analysis is in Table 12 below.

Table 12. Summary of annual benefits and costs of the focused array of alternatives.

Ohio Riverfront - Cincinnati, Ohio
Phase 2
Summary of Annual Benefits and Costs
FY 2024 Price Levels
2.75% Interest Rate

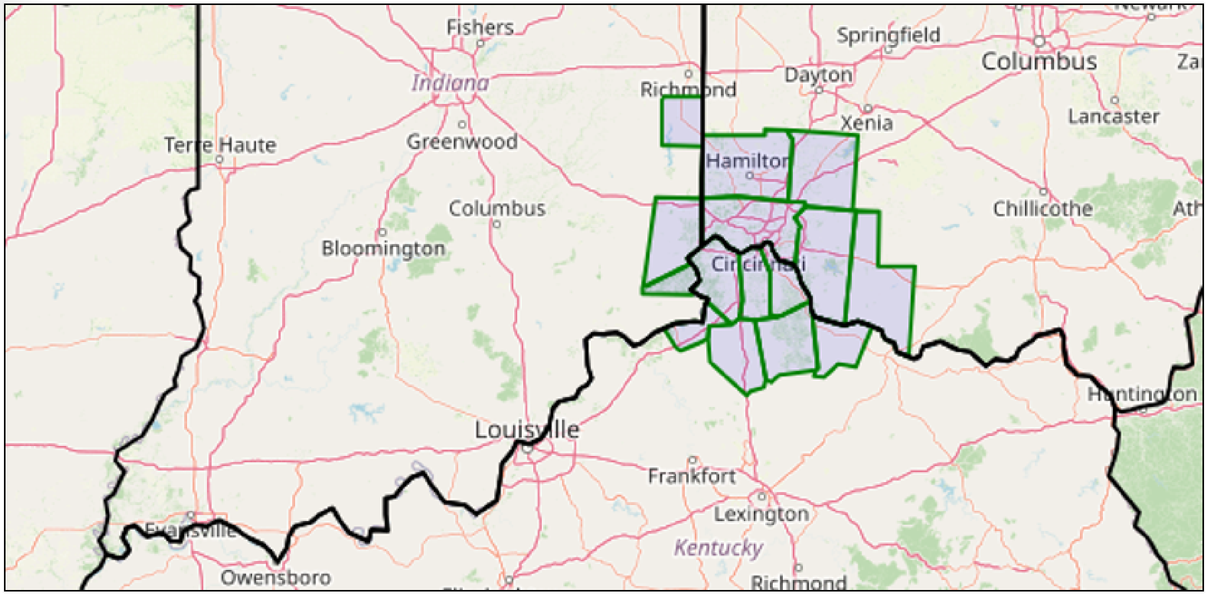
Investment Cost	**Phase 2a ($15,166,420) + Phase 2b Alternative 1 ($15,200,000)**	**Phase 2a ($15,166,420) + Phase 2b Alternative 2 ($6,600,000)**	**Phase 2a ($15,166,420) + Phase 2b Alternative 3 ($51,200,000)**	**Phase 2a ($15,166,420) + Phase 2b Alternative 4 ($6,500,000)**
Construction First Cost	30,366,420	21,766,420	66,366,420	21,666,420
Interest During Construction	838,897	601,315	1,833,427	598,553
Total Investment Cost	31,205,317	22,367,735	68,199,847	22,264,973
Annual Charges				
Interest & Amortization	1,155,874	828,521	2,526,185	824,715
Operation & Maintenance	5,000	5,000	5,000	5,000
Total Annual Charges	1,160,874	833,521	2,531,185	829,715
Annual Benefits				
Recreation	4,878,058	4,083,853	3,671,280	4,300,455
Total Annual Benefits	4,878,058	4,083,853	3,671,280	4,300,455
Benefit vs. Cost Ratio	**4.2**	**4.9**	**1.5**	**5.2**
Net Benefits	3,717,184	3,250,332	1,140,095	3,470,740

Assumptions
$5K O&M for each alternative
24 month construction period for each alternative

All alternatives have positive BCRs and similar net benefits. Alternative 2 (Hardscaped Shoreline with River Stairs) and Alternative 4 (the Natural Bank) have the highest BCRs due to their low cost. However, Alternative 1, the Combination Concept, has the highest net benefits.

5.1.1.2 Regional Economic Development Account

For the RED analysis, the criteria analyzed is employment support, tourism, and events. The number of projected employees and increase in tourism and events were quantified to compare the focused array, as shown in Figure 10 below.



Regional Economic Impact Area	
Local Impact Area	Dearborn (IN), Ohio (IN), Union (IN), Boone (KY), Bracken (KY), Campbell (KY), Gallatin (KY), Grant (KY), Kenton (KY), Pendleton (KY), Brown (OH), Butler (OH), Clermont (OH), Hamilton (OH), Warren (OH)
State Impact Area	Indiana, Kentucky, Ohio

Alternatives and Construction Costs								
	Concept 1, $25,666,420		Concept 2, $19,705,314		Concept 3, $49,897,643		Concept 4, $19,608,950	
Area	Output	Jobs*	Output	Jobs*	Output	Jobs*	Output	Jobs*
Total Local Impact	$48,721,000	300	$37,405,000	230	$94,717,000	580	$37,222,000	230
Total State Impact	$53,764,000	340	$41,277,000	260	$104,522,000	650	$41,076,000	260
Total US Impact	$72,060,000	400	$55,324,000	310	$140,091,000	770	$55,053,000	300
* Jobs are presented in full-time equivalence (FTE)								
Values are presented in FY 2024 price levels.								

Figure 10 Regional Economic Development results summary for the focused array of alternatives

Alternative 3 has the highest RED benefits due to its high construction and labor costs. Alternative 1 has the second highest RED benefits and would create 300 local jobs and has an economic output locally of $48,721,000.

5.1.1.3 Environmental Quality Account

The EQ analysis (Table 13) analyzed habitat creation and cultural/historical resources. Acres of greenspace provided by each plan were quantified to compare plans for ecosystem restoration benefit. The number of significant cultural/historical sites impacted were also analyzed to compare alternatives for those impacts. As shown in Table 13 below, both Alternative 1 and Alternative 4 added green space while Alternative 2 and Alternative 3 decreased the amount of green space. Alternative 1 added less overall greenspace but increased the area of native plantings to provide habitat for species such as butterflies and migratory birds compared to Alternative 4. Therefore, Alternative 1 has the highest EQ benefits.

For the four focused array plans, the archeological survey determined that no cultural sites would be impacted. However, all four plans have potential for cultural and historical benefits by providing cultural/historical education and wayfinding opportunities. These features will be refined in the design phase of the Project.

Table 13. Environmental Quality analysis of the focused array of alternatives.

Alternative	Square Feet of Green Space	Difference from Existing Conditions	Increase in Native Planting Area (Sq Ft)	# of Cultural Sites Impacted	Other Ecological Benefits
FWOP	26,000	0	0	0	None
Alternative 1- Combination Concept	27,765	1,765	25,727	0	Most native plantings for pollinator and migratory bird habitat; Terraced boulders- provide macroinvertebrate habitat
Alternative 2- Hardscaped Shoreline with Pedestrian Access and Stair to Ohio River	23,675	-2,325	17,077	0	Less green space, Riprap - low value habitat
Alternative 3- All Hardscape Like Serpentine Wall with Integrated Accessibility	19,370	-6,630	19,370	0	Less green space, Concrete has no habitat value
Alternative 4- Natural Bank with Seatwall	34,827	8,827	17,077	0	Most greenspace but less native plantings; limited habitat for pollinators and birds

5.1.1.4 Other Social Effects Account

The OSE account was analyzed for a set of criteria meant to look at the impacts to the community outside of economic or environmental impacts. Each alternative was scored from Poor (0) up to Optimal (4) based on three metrics: Safety Risk and Lighting, Aesthetics, and Community Identification. Table 14 below shows the total OSE scores. Based on this analysis, Alternative 1 has the highest OSE benefits due to its optimal provision of recreational features that will provide the best quality recreational experience of the four alternatives. No acreage component was considered for this analysis since all alternatives will have the same footprint.

Table 14. Other Social Effects analysis for the proposed Project.

Alternative	Safety Risk and Lighting	Aesthetics	Community Identification	OSE Score
Alternative 1: Combination Concept	4	4	4	12
Alternative 4: Natural Bank with Seatwall	4	3	4	11
Alternative 3: All Hardscape Like Serpentine Wall with Integrated Accessibility	3	2	3	8
Alternative 2: Hardscaped Shoreline With Pedestrian Access and Stairs to Ohio River	2	2	2	6
FWOP	1	0	0	1

An additional consideration within the OSE account is EJ. The CEJST did not identify the Project Area as an EJ community. However, several EJ communities are adjacent to the general Project Area. The CEJST identified burdens for these communities as lack of green space and traffic volume. All of the alternatives will increase access to greenspace for the surrounding communities, as well as increase the quality of the park. Additionally, more plantings and trees absorb sound and pollutants created by traffic. Therefore, all four alternatives have the potential to improve burdens identified by the CEJST tool.

5.2 Identification of The NED Plan

Alternative 1, the Combination Concept, has a BCR for 4.2 and has the highest net benefits of the four plans with $3,717,184.

5.3 Plan Selection

Alternative 1 – Combination Concept was chosen as the TSP because it provided the most cumulative benefits across all four accounts. It had the highest net benefits in the NED analysis with $3,717.184. It had the second highest benefits in the RED analysis and would create 300 local jobs and has an economic output locally of $48,721,000. Alternative 1 also had the highest EQ benefits due to the creation of 25,727 square feet of native plants. Its OSE score was also the highest due to its optimal provision of recreational features that will provide the best quality recreational experience of the four alternatives.

6 The Tentatively Selected Plan

6.1 Plan Accomplishments

The TSP is Alternative 1, Combination Concept (Figure 11). The TSP did not have the highest BCR (4.2) (calculated at current FY discount rate) but it did have the highest annual net benefit ($3,717,184) and recreation benefit ($4,878,058) when compared with the other alternatives (see Table 11). Currently, there is no access to the Ohio River to launch kayaks and canoes. The TSP provides that opportunity for the public. The TSP through the higher recreation benefit, also creates meaningful opportunities for the public to interact and use the Ohio River through the creation of the terraced boulders, concrete seatwalls, and kayak tie off area. The selection of this TSP is also supported by the positive benefits shown in the RED account through job creation and economic output locally, state-wide, and nationally. The TSP would create 300 local jobs and had an economic output locally of $48,721,000. This new addition to Smale Park along the riverfront would create a welcoming greenspace that would attract regional visitors to the Cincinnati area which would support both the local and regional economy through tourism. With the addition of the kayak tie off area, terraced boulders, and concrete seatwalls, Smale Park becomes a destination for visitors to Cincinnati. The TSP also improves the environment as shown through the EQ analysis. The TSP has the highest square footage of native plantings when compared to the other alternatives (25,727 sq ft). These native plantings will increase habitat for pollinators and migratory birds. It also provides habitat for macroinvertebrates through the construction of the terraced boulders along the Ohio River. The TSP also had the highest OSE score when compared with the other alternatives, scoring a 12. The TSP will improve safety and lighting at Smale Park and especially along the riverfront, which was a concern expressed by residents through the public engagement signage placed at Smale Park. The TSP will also improve the aesthetic of the area. Currently the Ohio River shoreline at Smale Park is eroding, covered with gravel, rock, and large pieces of concrete. The TSP will create an addition to Smale Park that will open up the Ohio River for the community to enjoy and make it a focal point of the park. It also will improve community identification by creating additional park space along the Ohio River that is located between downtown Cincinnati, Paycor Stadium, and the Great American Ballpark. The TSP will also improve community identification by providing opportunities for historical and cultural education and improved aesthetics.

6.2 TSP Component Descriptions

The TSP consists of an interactive park along the Ohio River. Project features include ADA accessible walkways which ties into the existing riverfront sidewalk, extension of the Castellini Esplanade to the River, concrete river stairs at the end of the Castellini Esplanade, terraced boulders at the end of the Castellini Esplanade, a kayak launch, concrete and granite seatwalls that will extend along the riverfront, areas of native grasses and vegetation, lighting, and riprap.

Mitigation for the TSP will require a mussel survey prior to the start of construction. In addition to the mussel survey, the USACE is committed to the implementation of BMPs to reduce and/or avoid adverse impacts to the environment as outlined in section 4.2.

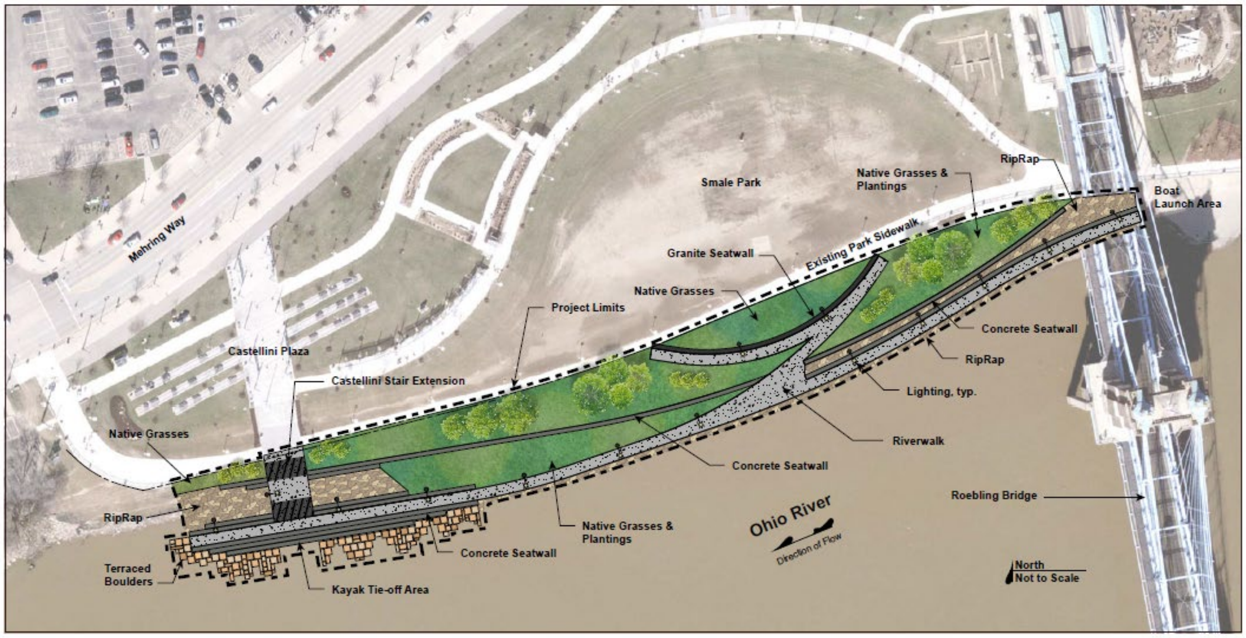


Figure 11 Tentatively Selected Plan rendering (Alternative 1- Combination Concept)

6.3 Cost Estimate

After the TSP was selected, a more detailed cost estimate was completed, including updated contingencies based on the Cost and Schedule Risk Analysis. Table 15 presents a breakdown of the estimated fully funded Project cost in FY24 dollars. Table 15 presents the fully funded Project cost and apportionment for design and construction in FY24 dollars. The Cost Certification in Appendix D provides a breakdown of all costs.

Table 15. Cost summary for the Tentatively Selected Plan

Description	**Project First Cost (FY24)**
Feasibility Study	$1,840,000
Phase 2a (FY19)	
Construction Costs (Work In Kind)	$11,076,000*
Phase 2b	
Recreation Facilities	$8,208,000
Bank Stabilization	$5,281,000
Lands and Damages	$5,109,,000
Fish and Wildlife Facilities (Env Mitigation)	$17,000
Cultural Resource Preservation	$31,000
Planning, Engineering, and Design	$2,720,000
Construction Management	$1,039,000

Total Phase 2b Cost (FY24)	$22,406,000
TOTAL Phase 2 Cost (2a + 2b)	$30,000,000
TOTAL Federal Cost (50%)	$15,000,000
TOTAL Non-Federal Cost (50%)	$15,000,000

**This number is estimated from the sponsor's WIK documentation and is the maximum amount of in-kind credit based on the fully funded cost estimate for the TSP. The estimate will be refined during the IDR review.*

6.4 Project Schedule

Execution of the Project Partnership Agreement (PPA) and completion of subsequent Project phases are contingent upon available funding. Design is expected to take six months with Contract Award occurring two months after Design completion. Implementation is expected to be completed in one construction season. Table 16 provides the actual and future estimated schedule for the remaining key milestones for the feasibility phase.

Table 16. Feasibility Schedule for the Project.

Activity	Milestone	Scheduled	Actual
Model Feasibility Cost Share Agreement (FCSA) Executed	CW130	27 Jan 2023	27 Jan 2023
Required 90-day Interagency Meeting	CW142	21 Aug 2023	21 Aug 2023
Charrette MFR	CW060	15 Jun 2023	15 Jun 2023
Conduct Alternatives Milestone Meeting	CW261	18 Oct 2023	18 Oct 2023
Alternatives AMM Vertical Team Alignment Memo (VTAM)	CW143	19 Feb 2024	19 Feb 2024
TSP Milestone Meeting	CW262	02 Jul 2024	07 May 2024
Release Draft Integrated Feasibility Report/NEPA for Concurrent Reviews	CW250	09 Sept 2024	
ADM Milestone	CW263	28 Feb 2025	
District Engineering Transmittal of Final Report	CW160	24 Sept 2025	
Major Subordinate Command (MSC) Transmits Report to HQUSACE	CW260	17 Oct 2025	
Chief's Report	CW270	30 Dec 2025	

6.5 Lands, Easements, Rights-of-Way, Relocations and Disposal Areas

In accordance with ER 405-1-12, fee title is required for recreation or ecosystem restoration features. All Phase 2b features will be constructed entirely within approximately 2.6 acres of Smale Park, which is owned in fee by the NFS. In addition to the park, a laydown area as well as a borrow area will be necessary to support Project construction. Roughly half an acre of an adjacent parking lot owned by Hamilton County, Ohio has been identified as a laydown area. The NFS has indicated that Hamilton County, Ohio is open to making the parking lot available during construction. The NFS will acquire a temporary work area easement from the County for the duration of Project construction. The NFS has identified Glenway Park as a potential borrow site. They own the park in fee and would like to have a large amount of fill removed from the park for a planned improvement project. The park is roughly 2.5 acres and approximately 5 miles from the Project site. If later investigations determine the park is unsuitable as a borrow site, another will be identified in coordination with the NFS. A temporary work area easement is the minimum interest the NFS would need to acquire for a borrow site, should they not already own a suitable site.

Phase 2a is located just northwest of Phase 2b on approximately 1.5 acres of land owned in fee by Hamilton County, Ohio. For the NFS to receive WIK and Lands, Easements, Relocations, Rights-of-Way and Disposals (LERRDs) credit for Phase 2a, they will need to acquire the site in fee from Hamilton County, Ohio. Alternatively, Hamilton County, Ohio could elect to become a Project sponsor and co-sign the PPA with the City of Cincinnati.

USACE owns flowage easements associated with the Markland Lock and Dam in Smale Park. The NFS holds a Consent to Easement (CTE) from the Louisville District Real Estate Office (LRL-RE) granting permission to construct certain park features within the USACE flowage easements. When the Project design is finalized, LRL-RE will either amend the NFS's existing CTE or issue a new one that includes all the features constructed within the USACE flowage easements.

No public utilities have been identified within the Project boundaries, and no utility relocations are anticipated as a result of the Project.

6.6 Operation, Maintenance, Repair, Replacement, and Rehabilitation

An Operation and Maintenance Manual will be developed by USACE upon completion of construction of the Project. All operation and maintenance responsibilities will be given to the NFS in perpetuity after completion of construction. The NFS should reserve $5,000 yearly for the continued maintenance of the Project. These funds are to be used on an as-needed basis, with the assumption that this amount exceeds the cost of typical yearly maintenance, and any surplus funding should be reserved for future larger repairs.

6.7 Project Risks

Project risks are documented and maintained in the e-Risk Register. Key risks for the study are:

- The Sponsor's WIK credit does not count towards the cost share as described in the 2019 MOU. While this risk is moderate, early coordination with the Sponsor to understand the features to be credited and submission of the IDR with the Draft Feasibility Report will decrease the chance that this risk will occur.

- The failure mode of the bank could indicate slope instability and constrain the type of recreation features that can be constructed. Early data collection and a geotechnical survey in February 2024 has shown no indication of slope instability, which decreases this risk to low.

- The site conditions could change from time of design to time of construction and require the design to be modified. The team will work to reduce this risk by designing the Project for flood events and flood resiliency.

6.8 Cost Sharing

Table 17 presents the breakout of the cost sharing.

Table 17. Project costs with apportionment for the Tentatively Selected Plan.

	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	
Feasibility Study Costs							
FED share (50%)	$520,000	$400,000					
Non-FED (50%)	$520,000	$400,000					
Design & Implementation Costs							
Design Analysis, Plans and Specs			$900,000	$1,820,000			
Construction Management				$20,000	$509,500	$509,500	
Construction					$6,744,500	$6,744,500	
LERRDs*				$1,627,000			
Fish & Wildlife Facilities				$17,000			
Cultural Resource Preservation				$31,000			
							Total
FED share (50%)			$450,000	$1,757,500	$6,395,750	$6,395,750	$15,000,000
Non-FED (50%) - WIK			$450,000	$130,500	$858,250	$858,250	$2,297,000
Non-FED LERRD				$1,627,000			$1,627,000
Total Project Cost			$900,000	$3,515,000	$7,254,000	$7,254,000	$18,924,000

**Lands, Easements, Rights-of-Way, Relocations, and Disposals*

6.9 Design and Construction

The PPA is scheduled to be signed in June of 2026, which documents the final crediting of the in-kind contribution credits from the design and construction of Phase 2a. Preparation of the plans and specifications for the project is scheduled to begin June 2026 and end June 2027. Contract Ready To Advertise is scheduled to start on June 2027. Construction contract award and notice to proceed is scheduled for September 2027. Construction for the Project is scheduled to start on September 2027 and end September 2029. Additional details regarding the design and construction schedule are found in Appendix A Engineering and Appendix D Cost Estimate.

6.10 ENVIRONMENTAL COMMITMENTS

Coordination with Ohio Department of Natural Resources as required by the Fish and Wildlife Coordination Act resulted in a recommendation that a mussel survey and potential relocation be conducted in accordance with the Ohio Mussel Survey Protocol prior to the occurrence of construction activities below the ordinary high water mark. See Appendix C for a copy of the Ohio Mussel Survey Protocol.

In addition to the mussel survey, the USACE is committed to the implementation of BMPs to reduce and/or avoid adverse impacts to the environment as outlined in section 4.2.

6.11 ENVIRONMENTAL OPERATING PRINCIPALS

- Foster sustainability as a way of life throughout the organization.
- Proactively consider environmental consequences of all USACE activities and act accordingly.
- Create mutually supporting economic and environmentally sustainable solutions.
- Continue to meet our corporate responsibility and accountability under the law for activities undertaken by USACE, which may impact human and natural environments.
- Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.
- Leverage scientific, economic and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.
- Employ an open, transparent process that respects views of individuals and groups interested in USACE activities.

The TSP aligns with the USACEs environmental operating principles by embedding sustainability throughout the planning process. The PDT has proactively assessed and addressed the environmental consequences of our activities, ensuring that all actions are in line with both economic and ecological goals. By maintaining rigorous corporate responsibility and adhering to legal standards, we safeguard both human and natural environments. Throughout the project's lifecycle, we have utilized a risk management and systems approach, integrating scientific, economic, and social knowledge to understand and mitigate environmental impacts. Our commitment to an open, transparent process has facilitated meaningful engagement with all stakeholders, respecting diverse perspectives and fostering collaborative solutions.

6.12 VIEWS OF THE NON-FEDERAL SPONSOR AND RESPONSIBILITIES

The City of Cincinnati, the NFS, expresses continued interest in participating in the proposed project and has acknowledged their responsibilities as outlined below.

The NFS will perform all necessary steps to complete and execute a PPA for the design and implementation phase of the project. In addition, the NFS will provide the required non-federal contribution. The NFS is also working to clarify in-kind contribution for project implementation by providing all necessary documentation required for the IDR.

The NFS actively participated in the development of alternatives and the selection of the TSP. USACE has actively reached out to the NFS throughout the duration of the feasibility phase. In addition, the NFS met with representatives from USACE at the project site and attended the Planning Charrette to discuss alternatives.

Once the project has been completed, the NFS will accept the project, along with their O&M responsibilities, including monitoring and performing routine maintenance to maintain its function.

The total project costs for design and construction of the project will be shared 50% federal and 50% non-federal, as presented in the estimated costs in Table 17 above. Additionally, during the design and implementation phase, the NFS shall:

- Provide all lands, easements, rights-of-way, relocations and disposal areas.

- Provide, during construction, any additional costs as necessary to make the total non-federal contributions equal to 50% of the total project costs. The NFS may provide work in-kind during final design and construction. The non-federal share is estimated at $14,125,432 which does not include the estimated value of the LERRDs.

- Operate, maintain, repair, replace, and rehabilitate the completed project or functional portion of the completed project at no cost to the federal government, in accordance with the applicable federal and State laws and any specific directions prescribed by the federal government for so long as the project is authorized.

- Hold and save the federal government harmless from damages due to the construction and operation and maintenance of the project, except where such damages are due to the fault or negligence of the federal government or its contractors.

- Grant the federal government a right to enter, at reasonable times and in a reasonable manner, upon land which the NFS owns or controls for access to the project for the purpose of inspection, and, if necessary, for the purposes of completing, operating, maintaining, repairing, replacing, or rehabilitating the project.

- Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs for a minimum of three years after completion of the project construction for which such books, records, documents, and other evidence are required.

- Perform, or cause to be performed, any investigations for hazardous substances regulated under CERCLA, 42 U.S. Code (USC) 9601-9675, as amended, that may exist in, on, or under lands, easements, or rights-of-way necessary for construction, operation, and maintenance of the project; except that the NFS shall not perform such investigations on lands, easements, or rights-of-way that the federal government determines to be subject to the navigation servitude without prior specific written direction by the federal government.

- Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA-regulated materials located in, on, or under lands, easements, or rights-of-way that the federal government determines are necessary for construction, operation, and maintenance of the project.

- Agree that, as between the federal government and the NFS, the NFS shall be the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.

- Prevent obstructions of, or encroachments on, the Project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) that might reduce the TSP, hinder its operation and maintenance, or interfere with the proper function such as any new development on project lands or the addition of facilities that would degrade the benefits of the project.

- Not use federal funds to meet the NFS's share of total project costs unless the federal granting agency verifies in writing that the expenditure of such funds is authorized.

- Assume the financial responsibility for the construction, operation, maintenance, repair, replacement, and rehabilitation of the completed betterments outside of the Project Area.

7 ENVIRONMENTAL COMPLIANCE

7.1 CUMULATIVE EFFECTS OF TSP

USACE must consider the cumulative effects of the proposed Project Area on the environment as stipulated by NEPA. Formally defined, cumulative effects are “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions”. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 C.F.R. § 1508.1(g)).

The cumulative effects analysis is based on the potential effects of the proposed Project when added to similar impacts from other projects in the region. An inherent part of the cumulative effects analysis is the uncertainty surrounding actions that have not yet been fully developed. The CEQ regulations provide for the inclusion of uncertainties in the analysis and states that “when an agency is evaluating reasonably foreseeable significant adverse effects on the human environment… and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking” (40 C.F.R. § 1502.21).

Temporal and geographical limits for this Project must be established in order to frame the analysis. The temporal limits for assessment of impacts would initiate in 1970 with the passing of the NEPA and would end 50 years after the completion of the TSP. The geographical extent considered is the census tract (39061026500) that the proposed Project is within, which encompasses the most immediate community that utilizes Smale Park and the proposed Project Area.

Section 2.0 of this Integrated Feasibility Report (IFR)/EA documents the existing environment within the area, and section 4.0 documents potential environmental effects of the TSP and No Action Alternative. As outlined in the analysis provided in section 4.0, the effects of the TSP would be largely benign with limited environmental impacts. Impacts that were evaluated include no effects to cultural resources, minor adverse effects to surface waters and floodplains, as well as negligible adverse effects to state listed species, and negligible adverse effects to climate, soils, air quality, and noise. The proposed Project Area is also expected to generate beneficial effects to terrestrial habitats, recreational, scenic and aesthetical resources, and socioeconomics.

One future project that is known upstream of the Project Area is the construction of a marina just east of the John A. Roebling Bridge. Although exact details of the project are not known, the construction of a marina is not expected to have significant impacts to the environment. The Ohio River shoreline area is primarily urban with little to no wildlife habitat. Additionally, given that most marinas are designed to float, the project is not expected to cause significant effects to the Ohio River bottom or aquatic habitats and fauna.

Currently, no other construction related projects are known to be planned in the area of analysis. This limits the ability to evaluate the cumulative impacts of the TSP when combined with potential future actions. However, given the minimal environmental impact of the TSP, the TSP would not result in significant cumulative adverse effects when and if future projects are undertaken.

Impacts that have occurred historically within the temporal and geographic frames specified are numerous and significant. The Riverfront has experienced many developmental changes. These changes include the removal of a rail yard northwest of the Project Area (circa 1980), the removal of riparian vegetation and construction of a large boat landing (circa 1993), the construction of the Paycor stadium (circa 2000), the construction of several parking lots and garages (circa 2000), and the construction of the current Smale Park (circa 2015). A review of historical imagery from 1970 to the present reveals continuous and drastic changes to the proposed Project Area and surrounding riverfront. From review of historical imagery, very little habitat was present in 1970, and significant ongoing disturbances to soils have occurred, resulting in the urban soil complex that is currently present.

Although historical impacts to the environment in this region from human activities have been severe, the implementation of the TSP is not expected to cause additional harm to the environment. Effects from the TSP would not significantly affect aquatic habitats and would have beneficial effects to terrestrial environments. As such, the Project would not cause significant cumulative adverse effects to the environment.

7.2 Environmental Compliance Table

The TSP is in full compliance with all local, state, and federal statutes as well as Executive Orders [PENDING]. No local zoning laws or public planning ordinances are in place in the Project Area that would impact the TSP. Compliance is documented below in Table 18.

Table 18. Compliance table for the Tentatively Selected Plan.

Statute/Executive Order	Full	Partial	N/A
National Environmental Policy Act (considered partial until the Finding of No Significant Impact (FONSI) is signed)		X	
Fish and Wildlife Coordination Act		X	
Endangered Species Act	X		
Clean Water Act		X	
National Historic Preservation Act	X		
Wild and Scenic Rivers Act			X
Clean Air Act	X		
Comprehensive, Environmental Response, Compensation and Liability Act	X		
Bald and Golden Eagle Protection Act	X		
Migratory Bird Treaty Act	X		
Resource Conservation and Recovery Act	X		
Toxic Substances Control Act	X		
Quiet Communities Act	X		
Farmland Protection Act	X		
Executive Order 11988 Floodplain Management	X		

Executive Order 11990 Protection of Wetlands	X		
Executive Order 12898 Environmental Justice in Minority Populations and Low-Income Populations	X		
Executive Order 13045 Protection of Children from Environmental Health Risks and Safety Risks	X		
Executive Order 13122 Invasive Species	X		
Executive Order 14008 Tackling the Climate Crisis at Home and Abroad	X		

7.3 PUBLIC INVOLVEMENT

The IFR and EA with the Finding of No Significant Impact (FONSI) was made available for public review and comment for a period of 30 days beginning on [PENDING]. All federal, state, and local agencies, as well as non-governmental organizations (NGO's), and Federally Recognized Indian Tribes contacted for public review are listed in Table 19. All groups and individuals listed in Table 19 also received a copy of the draft IFR for review. All public review comments received will be included in Appendix G. Additionally, the public was involved during EJ outreach efforts as described in Section 7.2.

Table 19. Stakeholder list for the Project.

Stakeholder Type	Stakeholder
Federal	U. S. Fish and Wildlife Service, Ohio Field Office
	U. S. Environmental Protection Agency, Region 5 Office
State	Ohio DNR Division of Water
	Ohio DNR Division of Wildlife
	Ohio DNR Office of Real Estate and Land Management
	Ohio Heritage Council
Local	Hamilton County Genealogical Society
	Hamilton County Commissioners President
	Hamilton County Engineer
	Hamilton County Planning and Development Office
NGO	The Nature Conservancy of Ohio
	Ohio River Foundation
	Rivers Unlimited
Federally Recognized Indian Tribes	Miami Tribe of Oklahoma

	Absentee-Shawnee Tribe of Oklahoma
	Eastern Shawnee Tribe of Oklahoma
	Shawnee Tribe of Oklahoma
	Citizen Potawatomi Nation
	Forest County Potawatomi
	Hannahville Indian Community Eastern Band of Cherokee Indians
	Match-E-Be-Nash-She-Wish Band of Potawatomi Indians
	Nottawaseppi Huron Band of Potawatomi
	Pokagon Band of Potawatomi
	Saginaw Chippewa Indian Tribe of Michigan
	Lac Vieux Desert Band of Lake Superior
	Lac du Flambeau Band of Lake Superior
	Sault Ste Marie Tribe of Chippewa
	Bad River Band of Lake Superior Chippewa
	Keweenaw Bay Indian Community
	Lac Courte Oreilles Band of Chippewa
	Red Cliff Band of Lake Superior Chippewa
	Red Lake Chippewa
	St. Croix Chippewa Community
	Fon du lac Band of Chippewa
	Bois Forte Band of Chippewa
	Grand Portage Band of Lake Superior Chippewa
	Leech Lake Band of Ojibwe
	Mille Lacs Band of Ojibwe
	Grand Traverse Band of Ottawa and Chippewa
	Little River Band of Ottawa
	Ottawa Tribe of Oklahoma
	Little Traverse Bay Band of Odawa
	Peoria Tribe of Oklahoma
	Sac and Fox Tribe of Mississippi in Iowa
	Sac and Fox Nation of Oklahoma

	Oneida Nation of New York
	Oneida Nation of Wisconsin
	Delaware Nation of Oklahoma
	Delaware Tribe of Indians Oklahoma
	Wyandotte Nation of Oklahoma
	Osage Nation
	Seneca Nation

7.3.1 Scoping

During the Project, three public engagements were held. A Planning Charrette was held on May 16, 2023 at Anderson Pavilion in Cincinnati, Ohio, an interagency meeting was held via teleconference between state and federal agencies on August 21, 2023, three news stories (including the Cincinnati Enquirer, WCPO Channel 9, and WXIX Channel 19) have been published in the local media that feature the Project since it began in September 2022, and public engagement yard signs were placed at Smale Park from August 2023 to April 2024 seeking input from the public.

7.3.2 Planning Charette

A Planning Charrette took place on May 16, 2023, during the scoping phase. It was held at the Anderson Pavilion in Cincinnati, which is adjacent to the Project Area. For a feasibility study applying the principles of Specific, Measurable, Attainable, Risk-Informed and Timely (SMART) Planning, a charette allows the convening of the PDT and the Vertical Team (VT), along with local and agency stakeholders, to make decisions critical to the study. The purpose of the charrette was to establish a common understanding of the planning process used by USACE to study Civil Works projects. The underlying objective of the charrette is to help the PDT move towards completion of a SMART feasibility study and ensure that the VT and the NFS are aligned with the proposed direction. During the Planning Charrette, those in attendance participated in a stakeholder mapping activity which was used to develop a list of other stakeholders who were not present who should be invited to future events related to the Project. Those personnel that attended the charrette also visited the Project Area and were able to assess the existing condition and gather information that might inform the future with Project condition for the Cincinnati Riverfront.

The Planning Charrette participants included the PDT which was comprised of USACE staff and the NFS. Additional attendees were the Miami Nation Tribe, ODNR, the Ohio History Connection, the Kentucky Heritage Council, the Ohio River Way, the Cincinnati Reds and Bengals, and the National Underground Railroad Freedom Center.

7.3.2.1 Outcome of Key Charrette Discussions

Key discussions included existing conditions, problems, opportunities, objectives and constraints, risks and uncertainties, and stakeholder mapping. The outcomes of the meeting were: a joint understanding of the planning process and study scope, established relationships with stakeholders, established a constructive approach to the study, provision of a solid foundation for future iterations of the planning process, and information on additional stakeholders potentially impacted by the Project.

7.3.3 Environmental Justice

The strategy for environmental justice outreach was developed according to the Interim Environmental Justice Guidance for Civil Works Planning Studies (January 2023). During the scoping process, the PDT conducted EJ analysis and stakeholder mapping. This included using the CEJST to gain a better understanding of the community and spending time during the Planning Charrette to identify potential groups and strategies for outreach. Additionally, the team developed a Communication Plan which outlines the objectives of outreach efforts and is included as an Appendix in the Project Management Plan (PMP). This strategy involves continuing to develop an understanding of the community landscape outside of the local stakeholders that had participated in the Planning Charrette. The PDT and NFS developed a method to reach users of the park and to give park users a way to give comment throughout the study. Yard signs like the one shown in Figure 12 below were placed at Smale Park in the Fall of 2023. These signs contained a QR code that led the public to a website with information on the Project background and allowed the public to type in comments on their ideas to improve the park. Once the team developed the renderings for the final array, the page was updated with these renderings, and the public were asked to provide their input for the alternatives. This input was considered throughout plan formulation and was specifically utilized when scoring the alternatives for OSE benefits. Social media was also utilized to reach EJs including the use of USACE's Facebook and webpage as well as the NFS's Facebook page and webpage.

Figure 12. Public engagement yard sign posted in Smale Park in Fall of 2023.

7.3.4 Stakeholder Agency Coordination State and Federal Agencies

Coordination with state and federal resource agencies was conducted in conjunction with the preparation of the Draft IFR and EA. An interagency meeting, with state and federal agencies listed in Table 19 above, was held on August 21, 2023, to discuss known Project details and to acquire agency specific knowledge of the potential Project Area. Follow-up scoping letters were sent to agencies on February 27, 2024, to communicate the final array of alternatives being considered and to acquire any additional information prior to selection of the TSP. All correspondence can be found in Appendix C.

USACE initiated consultation under Section 106 of the NHPA with the OH-SHPO and KHC in a letter dated December 14, 2022. The OH-SHPO responded in a letter dated January 11, 2023, stating USACE should contact Tim Schilling and Rachel Franklin-Weekley at the National Park Serve to be a consulting party since the Covington and Cincinnati Suspension Bridge/John A. Roebling Bridge, which is listed in the NRHP and is a NHL is located within the Project Area. On January 4, 2023, the KHC suggested USACE consider the City of Covington to be a consulting party since the John A. Roebling Bridge abutments are in Kenton County, Kentucky. USACE also coordinated the Project Area and Level of Effort (LOE) with both OH-SHPO and KHC on December 7, 2023. Both KHC and OH-SHPO agreed that the LOE is appropriate for the Project. USACE coordinated the results of the subsurface archaeological survey of the Tentatively Selected Plan and USACE's determination of no adverse effect to historic properties with the OH-SHPO, KHC, and Tribal Nations in an email on May 10, 2024. The OH-SHPO, KHC, and Tribal Nations have 30 calendar days to review and concur with USACE determination. Once concurrence is received from OH-SHPO, KHC, and Federally Recognized Indian Tribes, the TSP can proceed as planned. See Appendix H for Cultural Resources correspondence.

7.3.5 Local Agencies

Local agencies listed in Table 18 will be provided with the Draft IFR/EA for review on [PENDING]. Any correspondence received from local agencies will be provided in Appendix C and responded to in the Final IFR/EA.

7.3.6 Public Comments Received and Responses

The public comments have been continuously recorded since the Planning Charrette took place on May 16, 2023. Public comments have also been collected from public engagement yard signs that were placed throughout Smale Park starting in August 2023 through April 2024. The intensity of the public comments received was low and most were positive and in favor of the Project. Comments and concerns received regarding the project included:

- climate change, erosion (TSP provides erosion control through riprap and terraced boulders)
- effects downstream of Project (TSP addresses any impacts (none were identified) from Project through hydraulic analysis during study)
- flooding (TSP prevents future erosion in Smale Park and proposed infrastructure is flood resistant)
- planting of native plants/trees (TSP includes planting of native plants)
- need for a boat launch/dock or marina (TSP does not address this)
- vegetated armoring (TSP does provide native grasses; proposed armoring is riprap)
- safety (TSP provides additional lighting along riverbank)
- more seating (TSP provides additional seating along riverbank)

- parking (TSP does not address this)
- dog friendly/dog park (TSP provides additional greenspace for dogs)
- playgrounds (TSP does provide interactive boulders along riverbank)
- kayak launch (TSP provides an area for kayak launches)
- educational signage (TSP provides areas where future educational signage could be installed)
- more restrooms (TSP does not address this)
- trash cans/litter (TSP designed to make it easier for staff to pick up/remove litter at park)
- more shade trees (TSP does not address)
- large number of geese (TSP does not address)
- homeless (TSP does not address)
- noise (TSP provides for the planting of native grasses may help reduce noise around riverbank)
- fishing access (TSP provides additional areas for fishing access)
- cost of the study (TSP does not address)

Public comments also included support for some of the alternatives studied including Alternative 1 (which was the most preferred), Alternative 4 (second most preferred), and Alternative 3.

7.3.7 Non-Governmental Organizations (NGO)

NGOs listed in Table 18 will be provided with the Draft IFR/EA for review on [PENDING]. Any correspondence received from NGOs will be provided in Appendix C and responded to in the Final IFR/EA.

7.3.8 Federally Recognized Indian Tribes

USACE initiated consultation under Section 106 of the NHPA with the Federally Recognized Indian Tribes in a letter dated December 14, 2022. Cherokee Nation responded in an email on December 15, 2022, stating this Project Area is outside the Cherokee Nations Area of Interest and defer to Federally Recognized Indian Tribes that have interest in this Project Area. The Forest County Potawatomi Community responded in an email dated December 15, 2022, stating they have no issues or concerns regarding cultural resources of significance to the tribe within the footprint or proximity of the Project Area. The Match-E-Be-Nash-She-Wish Band of Pottawatomi responded in a letter dated January 20, 2023, that they have no information concerning cultural resources significant to their Tribe, but submitted their timeline if discoveries of artifacts, human remains, or funerary objects are observed during the Project. The Seneca Nation responded in an email dated January 5, 2023, stating they will not take part in any meeting on this Project based on the buildup of the Ohio River area, and the development that has occurred within Smale Park in Cincinnati. However, Seneca Nation would like to be contacted if cultural material is uncovered during the Project. The Miami Tribe of Oklahoma in a letter dated December 16, 2022, stated the Project is within the Miami Ancestral Homelands and part of the Tribes removal route and request further consultation and development and signage explaining their cultural history, ancestral ties to the area, and indigenous knowledge of the area. Miami Nation also accepts the invitation to serve as a consulting party. The Nottawaseppi Huron Band of the Potawatomi in an email dated January 5, 2023, stated they have no objection to the Project. The United Keetoowah Band of

Cherokee Indians in an email dated December 16, 2022, stated they have no comments or questions about the proposed Project.

USACE held an interagency meeting on August 21, 2023, to discuss the proposed Project. During the meeting, the proposed Project schedule, measures, and alternatives being considered for the Project were briefed along with the known environmental permitting requirements and listed species. Stakeholders and Federally Recognized Indian Tribes provided input on the Project Area. The Miami Nation, Osage Nation, OH-SHPO, and KHC along with ODNR Division of Wildlife attended the virtual meeting. Overall, the Osage Nation asked that USACE share the Project Area and LOE before the phase I survey. KHC and OH-SHPO want to ensure the NPS is aware of the Project, since the NPS has jurisdiction over the bridge. USACE coordinated the results of the subsurface archaeological survey of the TSP and USACE's determination of no adverse effect to historic properties with NPS. The report with formal letter was coordinated via mail on May 15, 2024.

USACE also coordinated the Project Area and LOE with Federally Recognized Indian Tribes and both OH-SHPO and KHC on December 7, 2023. No Federally Recognized Indian Tribes comments were received. USACE coordinated the results of the subsurface archaeological survey of the TSP and USACE's determination of no adverse effect to historic properties with Federally Recognized Indian Tribes in an email on May 9, 2024. Osage Nation responded in an email June 4, 2024, stating the proposed Project most likely will not adversely affect any sacred properties and/or properties of cultural significance to the Osage Nation. OH-SHPO responded in an email June 5, 2024, concurring with USACE's determination of no adverse effect to historic properties. KHC responded in an email dated June 11, 2024, concurring with USACE's no adverse effect determination. Since concurrence was received, the TSP can proceed as planned. See Appendix H for correspondence to and from the Federally Recognized Indian tribes.

8 DISTRICT ENGINEER RECOMMENDATION

After considering the engineering, economic, environmental, and social aspects relative to the construction of the proposed recreation Project in the City of Cincinnati, Hamilton County, Ohio, I approve this report and recommend that the selected plan be authorized and constructed as a federal Project under the authority of Section 1202(b) of WRDA 2016.

The estimated total Project cost is $30,000,000, in accordance with Section 1202(b) of WIIN 2016. The estimated federal share of 50% is $15,000,000 and the non-federal 50% share is $15,000,000. Approximately $11,076,000 in creditable in-kind contributions is estimated for NFS Phase 2a work under the 2019 MOU. I further recommend that the Project be funded and constructed subject to cost-sharing and financing arrangements acceptable to the Chief of Engineers and the Secretary of the Army.

The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the national civil works construction program nor the perspective higher review levels within the Executive Branch. Consequently, these recommendations may be modified before implementation. However, the NFS, the State, interested federal agencies, and other parties would be advised of any modifications and would be afforded an opportunity to comment further.

Date	L. Reyn Mann Colonel, U.S. Army District Commander

9 REFERENCES AND LIST OF PREPARERS

9.1 REFERENCES

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9.2 List of Preparers

Table 20. Project Delivery Team

PROJECT DELIVERY TEAM		
Name	**Office**	**Position**
Aaron Steele	PMC-M	Project Manager
Laura Mattingly	PMC-P	Lead Planner, Responsible modeler for FRM NS Matrix, C-BEST Tool
Bill Dorsch	EDC-C	Civil Engineer
Ken Lamkin	ED-H	H&H Engineer, Responsible modeler for HEC-HMS, HEC RAS
Andrew Esarey	EDT-R	Risk Team Lead, Responsible modeler for HEC-SSP
Sarah Mattingly	PMC-P	Economist, Responsible modeler for HEC-FDA, RECONS, LifeSim, & TotalRisk
Jennifer Guffey	PMC-E	Archaeologist
Steele McFadden	PMC-E	Biologist
Neal Ralston	EDM-C	Cost Engineer, Responsible modeler for MII
Matt Scholl	EDT-G	Geotechnical
Ken Lamkin	ED-H	Risk
Ken Lamkin	ED-H	Climate Assessment
Lance Filiatreau	EDC-G	Geospatial GIS
Carrie A. Fry	RE-A	Real Estate
Heather Fox	OC	Office of Counsel

Table 21. DQC Team

DISTRICT QUALITY CONTROL		
Name	**Position**	**Minimum Experience**
Jared Barrett	DQC Lead / Archaeologist	6 years USACE Experience involvement on 3 prior studies,
Ken Meffert	Planner/Economist	5 years USACE Experience involvement on 3 prior studies
Stephen Hornback	Structural	3 Years USACE Experience

Robert Harris	Civil	3 Years USACE Experience
Jessica Fox	H&H	3 Years USACE Experience Responsible reviewer for HEC-HMS, HEC RAS
Lauren Alexander	Risk	3 Years USACE Experience Responsible reviewer for HEC-SSP
Jeff Hawkins	Environmental Resources	3 Years USACE Experience
Joseph Thomas	Cost	3 Years USACE Experience, Responsible checker for MII
Samantha Schardein	Geotechnical	3 Years USACE Experience
Jason Meyer	Real Estate	3 Years USACE Experience
Jessica Fox	Climate Assessment	3 Years USACE Experience

Appendix A
Engineering Appendix

Appendix A - Engineering Appendix

1 INTRODUCTION

1.1 ENGINEERING APPENDIX PURPOSE

This engineering appendix describes the five alternatives that were analyzed in determining the Tentatively Selected Plan.

1.2 PROJECT AUTHORIZATION

Section 1202(b) of WRDA 2016 authorizes the Secretary to review the Central Riverfront Park Master Plan, dated December 1999, and the Ohio Riverfront Study, Cincinnati, Ohio, dated August 2002 to determine the feasibility of carrying out flood risk reduction ecosystem restoration, and recreation components beyond the ecosystem restoration and recreation components that were authorized, undertaken, and completed pursuant to Section 5116 of WRDA 2007.

1.3 PROJECT SCOPE

The project scope includes the development of a feasibility study that will determine the viability of carrying out flood risk management reduction, ecosystem restoration, and recreation components at Smale Park in Cincinnati, OH. An approximate 2500-foot-long stretch of park that abuts the Ohio River between the Great American Ball Park and Paycor Stadium lacks resilient recreational features. The feasibility study will research available recreation measures and generate alternatives that meet the objectives of the study, conduct financial analysis, and provide recommendations for the optimal solutions for users of Smale Park in Cincinnati, OH.

1.4 LOCATION

1.4.1 Project Area

The project site is in Cincinnati, Ohio along the Ohio River at Smale Park. Smale Park is a national award-winning public park located between the Cincinnati Bengals Paycor Park stadium and the Cincinnati Reds All American Ballpark. The Cincinnati Parks Department manages and maintains Smale Park and considers the park the gateway to Cincinnati.

Smale Riverfront Park on the banks of the Ohio River provides attraction for visitors in downtown Cincinnati and is regularly included on lists of "Things-to-do" in Cincinnati. The park contains parts of the Ohio River Trail and is located between the Great American Ballpark and Paycor Stadium, home of the Cincinnati Reds and Cincinnati Bengals, respectively. Additionally, the park contains a waterpark and play areas for kids, a carousel, a music venue, and multiple historical monuments. Therefore, this area receives large amounts of traffic throughout the year for both events, tourism, and general recreation. The project area contains the Ohio River shoreline of Smale Riverfront Park, part of the Riverfront Loop Trail, and the parking area for Smale Riverfront Park.

The City of Cincinnati, OH is located at approximately mile 470 on the Ohio River. The city has been developing the riverfront area south of downtown Cincinnati, in accordance with the 1999 Central

Riverfront Master Plan and has established a world-class park, Smale Park, that was recognized by USA Today as the 2nd best riverfront park in the country (2022). In addition, the Cincinnati Park System was ranked 6 out of 100 best city parks in the U.S. by the Trust for Public Land (2023).

Currently the area of Smale Park along the shoreline west of the Roebling Bridge is underutilized, lacks recreational opportunities, and is experiencing erosion issues which threaten the park's assets. This project will establish a plan to maximize the park space in Smale Park, ensure safe connections to the river and offer diverse recreational experiences for park users.

1.5 RELEVANT PRIOR STUDIES AND REPORTS

The Phase I Riverfront project was completed in 2014 and utilized Cincinnati's 1999 master plan. The 1999 master plan can be found in the Feasibility Report references.

2 ALTERNATIVE PLANS EVALUATED

2.1 Alternative Plans

Five plans were evaluated for expanding Smale Park at the Ohio River's edge to meet the following planning objectives:

- Enhance Smale Park by creating a safe resilient recreational connection between the useable areas of the park and the water.
- Provide new and increased recreational experiences for park users.
- Increase diversity of shoreline riparian zone to support native species and aesthetic value.

The five plans were selected from an array of seven alternatives, with two being eliminated without further evaluation.

The five plans include:

1. Combination Concept - Alternative 1.
2. Hardscaped shoreline with pedestrian access and stairs to water - Alternative 2 (Old Alt 2b).
3. Natural bank with seat wall - Alternative 3 (Old Alt 3b).
4. All hardscape with Serpentine Wall plan - Alternative 4 (Old 2c).
5. Build out park to bank with wall - Alternative 5 (Old 4).

2.2 Discussion of Each Alternative Plan

2.2.1 Combination Concept - Alternative 1 and Tentatively Selected Plan

The Combination Concept was developed from a conceptual park expansion plan provided from the Cincinnati Parks Board. This alternative includes concrete seat walls at the Ohio River shoreline that allow patrons to have safe connectivity with the water. The concrete seat walls essentially act as stairs that extend down into the water. To enhance the safe water connection, terraced boulders adjacent to the concrete seat walls permit one to walk into the water. At the upstream end of the project just east of the Roebling bridge exists an existing concrete path that extends into the Ohio River, and this path provides the ability to launch a kayak. Riprap stone will protect the lower portions of the shoreline from erosive forces, while at higher elevations native flood tolerant plantings will be incorporated into the slope to provide softer shoreline protection. A riverwalk will extend from the upstream kayak launch to the concrete seat wall and terraced boulder water interaction area. And all along the riverwalk will be a concrete seat wall. The Castellini Plaza area will be connected to the concrete seat wall and terraced boulder water interaction area by a widened stairway. Kayaks will be able to tie off on anchor points embedded in the concrete seat walls at the water interaction area. At the existing park edge, an upper walkway will act as an overlook area. The upper walkway will be connected to the riverwalk with a connecting walkway. All walkways will be accessible routes with ample exterior lighting.

2.2.2 Hardscaped shoreline with pedestrian access and stairs to water – Alternative 2

This alternative like the combination concept extends the Castellini Plaza to the rivers edge utilizing stairs that extend to the waters edge. Adjacent to the stairs is a handicapped access ramp that connects the Castellini Plaza to a riverwalk that parallels the river. Unlike alternative 1, alternative 2 has only one river walk level. The river walkway will be flanked on the river side by a riprap shoreline that will help mitigate erosion, and the park side will feature flood-tolerant native plantings and lawn space. Rain Garden plantings will be taken into consideration for this area. Higher elevation plantings could be cultivated in a prairie or meadow-like fashion encouraging wildlife habitats and pollinator grounds. Similar to alternative 1, the Castellini stairs at the downstream end of the park extension will be extended into the river beyond the riprap slope. At the upstream end under the Roebling Bridge, the existing walkway will again be used as a kayak launch area.

2.2.3 Natural bank with seat wall – Alternative 3

This alternative is like alternative 2, but more native flood tolerant planting areas are incorporated along the bank between the riverwalk and the riprap shore toe protection.

2.2.4 All hardscape with serpentine wall plan – Alternative 4

This alternative is similar to the existing Serpentine Wall at Sawyer Point Park and Yeatman's Cove further upstream on the Ohio River in Cincinnati. The existing Serpentine Wall was constructed in the early 1970's. Construction photos depicting construction progress of the existing Serpentine wall can be found in Attachment [2].

2.2.5 Build out park to bank with wall – Alternative 5

This alternative expands the Smale Park lawn area to the river's edge utilizing imported fill material. The bank at the river's edge would consist of a sheet pile wall. A pedestrian path would be constructed along the top of the wall with a safety rail. The walkway would essentially be a continuous overlook area along the raised shoreline.

Although this alternative was developed to a conceptual plan level, the alternative to build out the park to a sheet pile wall was dropped from further development prior to the Alternative Milestone Meeting (AMM). Therefore, this alternative is not further evaluated in this engineering appendix beyond mention.

3 ENGINEERING DISCIPLINE DISCUSSIONS

3.1 HYDROLOGY AND HYDRAULICS

3.1.1 Project Area

The project is located on the right descending bank of the Ohio River at Cincinnati, Ohio, spanning the short distance between approximately river mile (RM) 470.5 and 470.6[1]. The project is upstream of Markland Locks and Dam (L&D) at RM 531.5 and downstream of Captain Anthony Meldahl L&D at RM 436.2; the purpose of these projects is to maintain minimum depths for commercial navigation traffic. Being upstream of Markland L&D, the water surface elevations at the project are primarily controlled by the "normal pool" elevations maintained at that project combined with the amount of flow in the river system that creates the slope in the river between the navigation projects. Markland L&D maintains a minimum pool elevation of 455 ft referencing the Ohio River Datum (ORD). Assuming no flow in the river and a perfectly "flat pool" this translates to a minimum stage at the Cincinnati gauge of 25.4 feet. A river stage of 30 feet is equivalent to elevation 459.6 ORD. The contributing drainage area of the Ohio River at the project site below the confluence with the Licking River is approximately 76,380 square miles.

The project is located within the commercial business and recreation space in downtown Cincinnati. The project purpose is to repair an existing erosion area along the existing park space, while also improving recreational access to the waterline and other public use enhancements.

The overall project encompasses 2.6 acres (0.004 square miles) of land that is already currently used as public park space. The final design of the project is ongoing, but the change in impervious area within the project footprint is not expected to significantly change from the current conditions. Runoff for the project will drain directly to the Ohio River, which is the same as current conditions.

3.1.2 Climate Assessment

A climate assessment was conducted to satisfy the requirements of Engineering Construction Bulletin 2018-14 (ECB 2018-14). ECB 2018-14 requires consideration of both past observed and potential future changes to hydrologic variables as related to the projects intended performance. The climate assessment is included as Appendix B to the Main Report.

3.1.3 Ohio River Discharges

As can be interpreted from the above description of the project, Ohio River discharges will not be significantly impacted due to the miniscule project size relative to the overall Ohio River drainage area, and the fact that the site use and imperviousness is not anticipated to significantly change from current conditions.

The best available information regarding frequency discharges for the Ohio River are values developed in 1976 as part of larger analysis of the comprehensive flood risk management system for the Ohio River

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[1] River miles on the Ohio River are measured from the origin point at Pittsburgh, PA (confluence of the Allegheny and Monongahela Rivers), and increasing downstream, contrary to the normal convention of measuring from the confluence of the stream with a larger downstream water body ("mouth") and increasing upstream.

watershed, which included the construction of 78 Federal reservoirs throughout the basin[2] (U.S. Army Corps of Engineers, 2024). A comprehensive update of Ohio River discharges has not been formally conducted since that time. These flows in the vicinity of the project as applied to the modeling of project impacts are discussed further in Section 3.1.4.1 below.

3.1.4 Hydraulic Analysis

As part of the alternative evaluation process, an analysis was performed to determine if Alternative 1 would impact water surface elevations (WSEL) for the Ohio River, specifically for the 0.01 annual exceedance probability (AEP) event, also known as the 1/100 or 1% annual chance exceedance (ACE) or "100-year" event. The 0.01 AEP event was historically chosen by the Federal Emergency Management Agency (FEMA) as the base event for the National Flood Insurance Program (NFIP), so ensuring the alternative did not create adverse impacts for this storm event was important.

The USACE Hydrologic Engineering Center River Analysis System (HEC-RAS) v6.4.1 was used, which was the most current version available when the analysis was initiated. Existing models were used and updated with project site specific information for both the existing and proposed conditions.

3.1.4.1 Model Discharges

The models utilized steady state flows shown in Table 3--1, also commonly referred to as the 1976 Update discharges. No newer discharge frequency data is available.

Table 3--1

Flow change location (River Mile)	Design Discharges (cfs)				
	0.10 AEP	0.04 AEP	0.02 AEP	0.01 AEP	0.002 AEP
436.75	520,000	563,000	604,000	653,000	775,000
464.50	524,600	580,000	626,600	677,900	800,700
470.50	532,000	608,000	663,000	718,000	844,200
491.50	565,000	645,000	705,000	760,000	890,000

3.1.4.2 Existing Model Geometry

Two existing model geometries were initially considered for this analysis:

1. Great Lakes and Ohio River Division (LRD), Water Management forecast model: Also known as the "Community" or "Consortium" model, this Ohio River model geometry was originally created by an interagency team including members from the LRD Water Management team, the U.S. Geological Survey (USGS), and the National Weather Service (NWS). This model is one-

[2] Excluding the Tennessee River system of multipurpose reservoirs operated by the Tennessee Valley Authority on that sub-watershed.

dimensional, intended for unsteady flow forecast modeling. The initial model was built with supplied model geometry data from the Louisville District, Huntington and Pittsburgh Districts, and USGS digital terrain models for the overbank geometry. Prior to this analysis, it was understood that all geometry inputs had been converted to reference the North American Vertical Datum of 1988 (NAVD88), however upon further inspection of the Markland pool reach in the vicinity of this project, the channel geometry elevations matched exactly with the FIS "official" model (see below). A more recent version of the geometry completed in 2022 was later supplied by LRD Water Management that had bathymetry updated from individual district Dredging and Mapping Team products archived in the USACE eHydro repository (https://navigation.usace.army.mil/Survey/Hydro/). The eHydro bathymetry raw data is point depths measured below the project normal pool elevation which references Ohio River Datum (ORD). A preliminary inspection suggests that the new bathymetry data may have been converted to reference NAVD88, but this could not be unequivocally confirmed. For reference, the vertical adjustment to convert NAVD88 elevations to National Geodetic Vertical Datum of 1929 (NGVD29) is +0.65 feet at the project site. Due to the uncertainty surrounding this geometry data and the datum conversion, albeit based upon more updated information, the results were compared to an older but accepted model.

2. Louisville District flood insurance study (FIS) "official" model, Markland Locks & Dam Pool: The Louisville District (LRL) has been the caretaker for models used as the basis for the Federal FEMA Flood Insurance Studies (FIS) for the Ohio River within its District area of responsibility (AOR), as this large tributary crosses multiple state boundaries and because the District played an integral part in their development. These models were initially developed as HEC-2 models, anecdotally based upon surveyed bathymetry circa the 1960's (also known as "Ohio River Reach Mapping"), and USGS topographic contour maps for overbank areas. The original HEC-2 model geometry referenced the Ohio River Datum, with individual models for each upper pool of the modern navigation dams on the Ohio River within the LRL AOR. The proposed project is in the upper pool of Markland Locks and Dam, so the corresponding model was used. The original HEC-2 model had later been converted to HEC-RAS and the geometry adjusted to reference the NGVD29, with minor calibration adjustments due to differences in computation schemes between HEC-2 and HEC-RAS. The model is one-dimensional and designed for steady flow analysis. The modeler reached out to the Kentucky Division of Water and to FEMA Contractor, AECOM; both confirmed that no updated models existed as part of the NFIP program for the Ohio River.

3.1.4.3 Project Geometry update

Both existing models in the area of interest have cross section information spaced at approximately every 0.5 river miles. The project is located immediately downstream of the Covington and Cincinnati Highway (John A. Roebling) Bridge, which is located at approximately river mile 470.5 (See Figure 3-1 Project Extents).

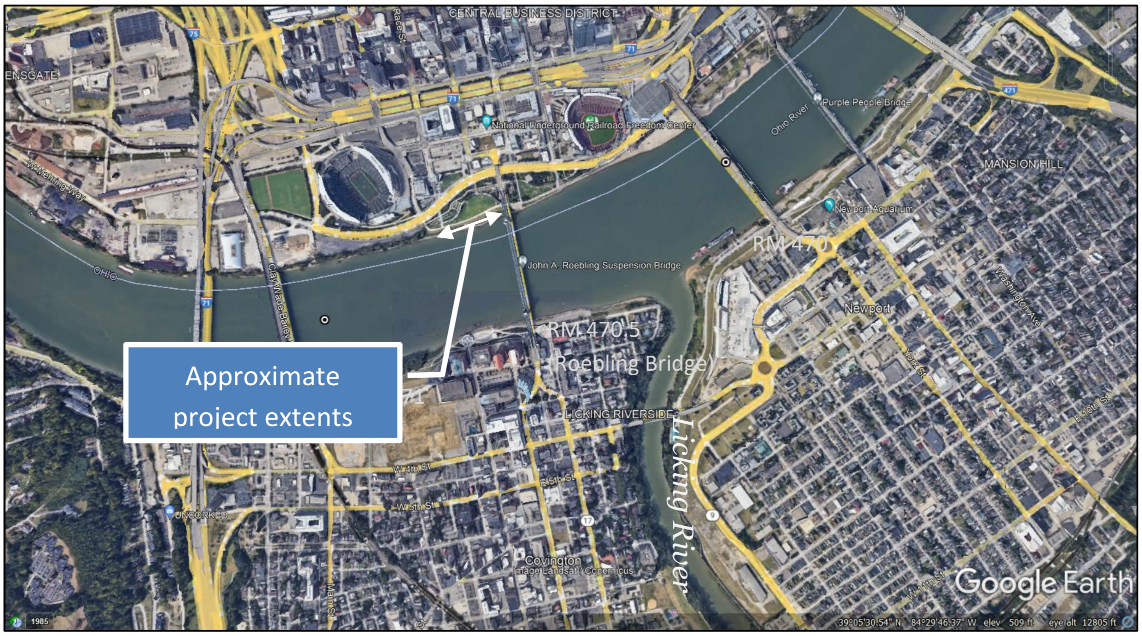
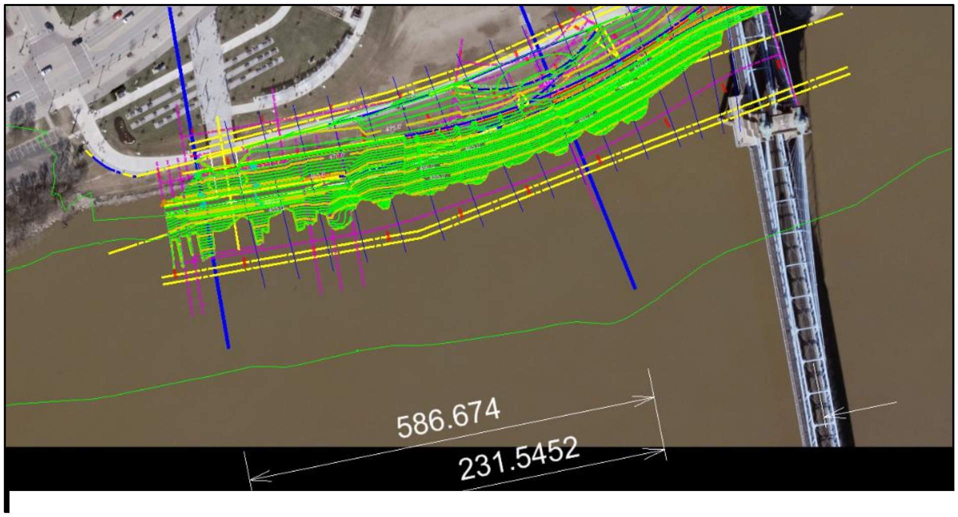


Figure 3-1 Project Extents

Two cross sections were selected at representative locations within the project boundary at approximately 230 feet and 815 feet downstream from the Roebling Bridge, representing RM 470.52 and 470.58 respectively. Using automated tools within HEC-RAS, new cross sections were interpolated between existing cross sections at RM 470.5 and 471 at 230 feet and 815 feet downstream of RM 470.5 as shown in Figure 3-2, Graded Plan. Geometry data was also cut at these locations using the civil design terrain model data for current ("existing") and preliminary proposed conditions for Alternative 1. The existing terrain data for the project area was provided by the local sponsor and references NGVD29. This data was merged with the HEC-RAS interpolated cross section data, replacing the HEC-RAS interpolated points with the points within the project terrain boundary. Judgement was used to adjust stationing of the new project terrain point data to visually align the section data from the two sources. Figure 3--3 and Figure 3--4 are relative comparisons of the cross section geometry at RM 470.52 and 470.58 respectively for both the FIS geometry and the LRD 2022 geometry (adjusted to NGVD29 for relative comparison purposes) within the channel, to show the relative changes to existing and proposed conditions at these locations as defined by the project terrain. The right bank stationing defining where Manning's *n* changes was slightly adjusted based upon the revised section and expected land use. The Manning's value of 0.11 was used for the overbank to be the same as the FIS model. Approximate frequency profile water surface elevations are shown for reference.



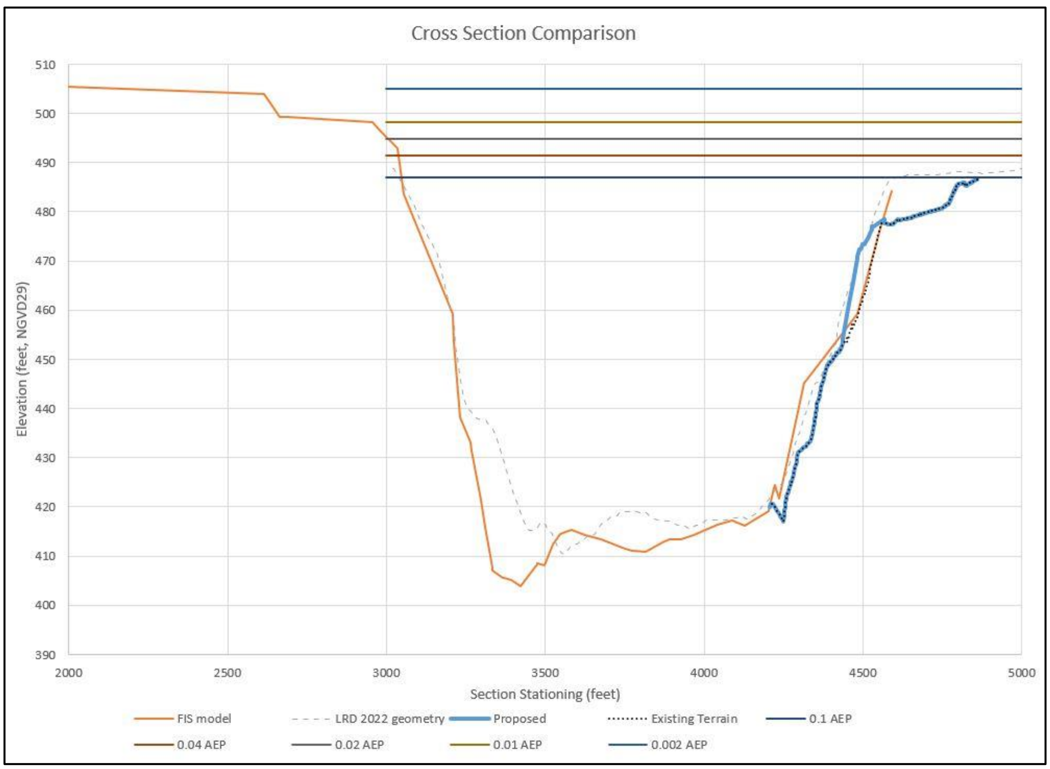


Figure 3--3 Section at RM 470.52

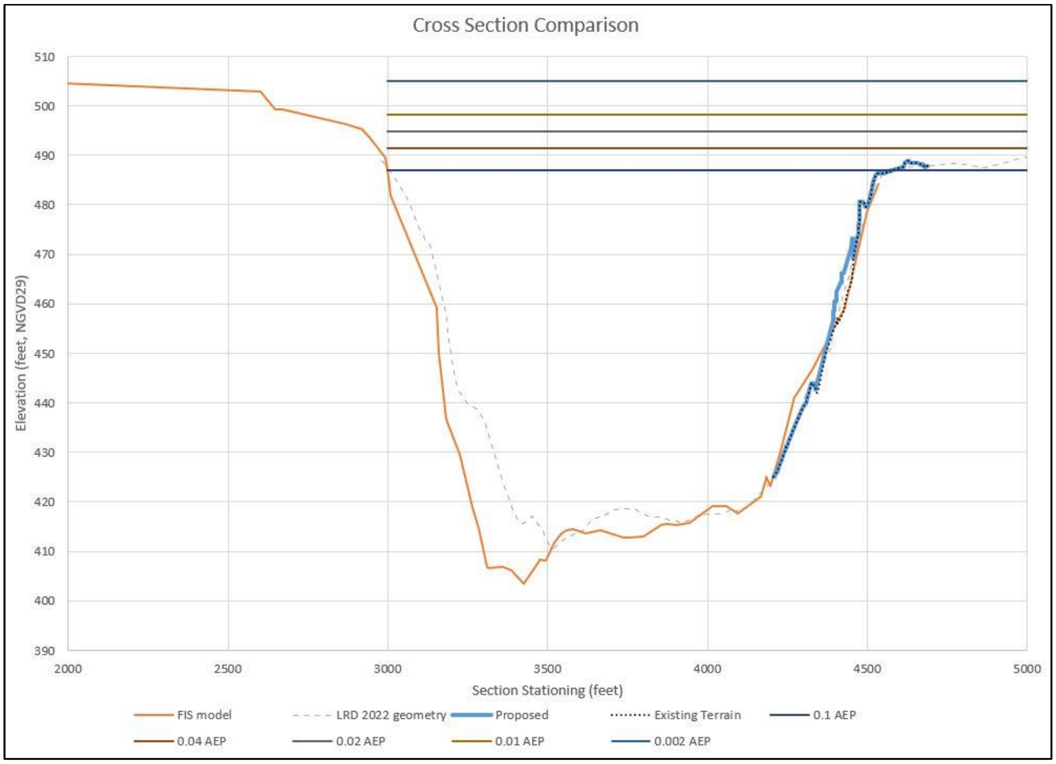


Figure 3--4 Section at RM 470.58

3.1.4.4 Model Results

Both the FIS geometry and the LRD 2022 geometry were analyzed with the steady flow 1976 Discharges for both existing and proposed conditions reflecting the Alternative 1 plans. For the purposes of clarity, this documentation focuses on the results of the FIS model due to the uncertainty around proper datum conversion for the LRD 2022 model geometry. Table 3-2 shows the relative computed water surface elevations within the vicinity of the project for the 0.01 AEP event. As can be seen, the addition of the limited fill results in negligible decreases in WSEL between the existing and proposed conditions at each section, which is well below the model limits of uncertainty and accuracy, indicating the project has no effective impact to water surfaces. The minor decreases are the result of negligible velocity increases at the project area. (As discussed above regarding river mile convention, the RM are shown as negative values in the model in order to “increase” downstream.)

Table 3-2 Comparison of Computed Water Surface Elevations

RM		WSEL (ft)	Difference in WSEL (ft)	Channel Velocity (ft/s)	RM		WSEL (ft)	Difference in WSEL (ft)	Channel Velocity (ft/s)
-436.75	Existing	507.426		5.079	-442.5	Existing	506.105		5.794
-436.75	Proposed	507.423	-0.003	5.079	-442.5	Proposed	506.103	-0.002	5.795
-437.25	Existing	507.342		4.915	-442.75	Existing	506.037		5.895
-437.25	Proposed	507.34	-0.002	4.916	-442.75	Proposed	506.035	-0.002	5.896
-438	Existing	507.097		5.47	-443	Existing	505.997		5.785
-438	Proposed	507.095	-0.002	5.471	-443	Proposed	505.995	-0.002	5.786
-438.25	Existing	507.045		5.472	-444	Existing	505.852		5.393
-438.25	Proposed	507.043	-0.002	5.473	-444	Proposed	505.849	-0.003	5.394
-438.5	Existing	507.034		5.173	-444.75	Existing	505.73		5.253
-438.5	Proposed	507.031	-0.003	5.173	-444.75	Proposed	505.728	-0.002	5.254
-438.75	Existing	506.97		5.258	-445.25	Existing	505.648		5.162
-438.75	Proposed	506.968	-0.002	5.258	-445.25	Proposed	505.645	-0.003	5.162
-439	Existing	506.822		5.753	-446	Existing	505.34		5.946
-439	Proposed	506.82	-0.002	5.753	-446	Proposed	505.337	-0.003	5.947
-439.25	Existing	506.752		5.875	-447	Existing	505.164		5.451
-439.25	Proposed	506.75	-0.002	5.876	-447	Proposed	505.161	-0.003	5.451
-439.5	Existing	506.689		5.889	-447.25	Existing	505.135		5.179
-439.5	Proposed	506.687	-0.002	5.89	-447.25	Proposed	505.132	-0.003	5.179
-440.5	Existing	506.496		6.26	-447.5	Existing	505.106		4.984
-440.5	Proposed	506.494	-0.002	6.26	-447.5	Proposed	505.103	-0.003	4.984
-441	Existing	506.45		5.743	-447.75	Existing	504.999		5.354
-441	Proposed	506.448	-0.002	5.743	-447.75	Proposed	504.996	-0.003	5.355
-441.75	Existing	506.327		5.487	-448.75	Existing	504.859		4.784
-441.75	Proposed	506.324	-0.003	5.488	-448.75	Proposed	504.856	-0.003	4.784
-442.25	Existing	506.139		6.016	-449.38	Existing	504.65		5.194
-442.25	Proposed	506.137	-0.002	6.016	-449.38	Proposed	504.648	-0.002	5.194

Table 3-2 Comparison of Computed Water Surface Elevations

RM		WSEL (ft)	Difference in WSEL (ft)	Channel Velocity (ft/s)	RM		WSEL (ft)	Difference in WSEL (ft)	Channel Velocity (ft/s)
-450.5	Existing	504.354		5.473	-460	Existing	502.585		4.661
-450.5	Proposed	504.352	-0.002	5.473	-460	Proposed	502.582	-0.003	4.662
-451	Existing	504.317		5.068	-460.5	Existing	502.489		4.608
-451	Proposed	504.314	-0.003	5.068	-460.5	Proposed	502.486	-0.003	4.608
-452	Existing	504.078		5.244	-461	Existing	502.386		4.55
-452	Proposed	504.075	-0.003	5.244	-461	Proposed	502.384	-0.002	4.55
-452.63	Existing	503.954		5.135	-462	Existing	501.929		5.789
-452.63	Proposed	503.951	-0.003	5.136	-462	Proposed	501.926	-0.003	5.789
-453	Existing	503.876		5.161	-462.75	Existing	501.465		6.692
-453	Proposed	503.873	-0.003	5.161	-462.75	Proposed	501.462	-0.003	6.693
-453.25	Existing	503.848		5.004	-462.8	Existing	501.437		6.711
-453.25	Proposed	503.845	-0.003	5.004	-462.8	Proposed	501.434	-0.003	6.711
-454	Existing	503.762		4.678	-463	Existing	501.39		6.208
-454	Proposed	503.759	-0.003	4.679	-463	Proposed	501.387	-0.003	6.209
-455	Existing	503.602		4.609	-463.25	Existing	501.34		6.039
-455	Proposed	503.599	-0.003	4.609	-463.25	Proposed	501.336	-0.004	6.039
-456	Existing	503.432		4.562	-463.5	Existing	501.324		5.599
-456	Proposed	503.429	-0.003	4.562	-463.5	Proposed	501.321	-0.003	5.599
-457	Existing	503.2		4.865	-464	Existing	501.157		5.746
-457	Proposed	503.197	-0.003	4.865	-464	Proposed	501.153	-0.004	5.746
-458	Existing	502.936		5.323	-464.5	Existing	500.878		6.329
-458	Proposed	502.933	-0.003	5.323	-464.5	Proposed	500.875	-0.003	6.329
-459	Existing	502.778		4.845	-465	Existing	500.636		6.499
-459	Proposed	502.775	-0.003	4.845	-465	Proposed	500.633	-0.003	6.499
-459.5	Existing	502.659		5.027	-465.25	Existing	500.541		6.569
-459.5	Proposed	502.656	-0.003	5.027	-465.25	Proposed	500.538	-0.003	6.569

Table 3-2 Comparison of Computed Water Surface Elevations

	RM		WSEL (ft)	Difference in WSEL (ft)	Channel Velocity (ft/s)
	-466	Existing	500.299		6.375
	-466	Proposed	500.296	-0.003	6.376
	-467	Existing	499.911		6.459
	-467	Proposed	499.907	-0.004	6.459
	-468	Existing	499.246		7.447
	-468	Proposed	499.243	-0.003	7.447
	-469	Existing	498.87		6.948
	-469	Proposed	498.866	-0.004	6.948
	-469.5	Existing	498.553		7.303
	-469.5	Proposed	498.549	-0.004	7.304
	-470	Existing	498.365		7.094
	-470	Proposed	498.361	-0.004	7.094
Project Area	-470.5	Existing	498.128		7.252
Project Area	-470.5	Proposed	498.124	-0.004	7.252
Project Area	-470.52	Existing	498.141		7.075
Project Area	-470.52	Proposed	498.116	-0.025	7.225
Project Area	-470.58	Existing	498.073		7.173
Project Area	-470.58	Proposed	498.061	-0.012	7.262
	-471	Existing	497.956		7.078
	-471	Proposed	497.956	0	7.078
	-471.5	Existing	497.113		8.847
	-471.5	Proposed	497.113	0	8.847
	-471.75	Existing	496.906		8.971
	-471.75	Proposed	496.906	0	8.971
	-472	Existing	496.864		8.418
	-472	Proposed	496.864	0	8.418

RM		WSEL (ft)	Difference in WSEL (ft)	Channel Velocity (ft/s)
-472.25	Existing	496.748		8.373
-472.25	Proposed	496.748	0	8.373
-472.75	Existing	496.761		7.111
-472.75	Proposed	496.761	0	7.111
-473	Existing	496.577		7.51
-473	Proposed	496.577	0	7.51
-473.5	Existing	496.144		8.299
-473.5	Proposed	496.144	0	8.299
-474	Existing	496.175		6.778
-474	Proposed	496.175	0	6.778
-474.5	Existing	496.023		6.71
-474.5	Proposed	496.023	0	6.71
-475	Existing	495.711		7.308
-475	Proposed	495.711	0	7.308
-476	Existing	495.619		5.738
-476	Proposed	495.619	0	5.738
-476.5	Existing	495.201		6.99
-476.5	Proposed	495.201	0	6.99
-477	Existing	495.047		6.915
-477	Proposed	495.047	0	6.915
-477.5	Existing	494.941		6.504
-477.5	Proposed	494.941	0	6.504
-479.5	Existing	494.319		6.331
-479.5	Proposed	494.319	0	6.331
-480.25	Existing	494.132		6.053
-480.25	Proposed	494.132	0	6.053

Table 3-2 Comparison of Computed Water Surface Elevations

RM		WSEL (ft)	Difference in WSEL (ft)	Channel Velocity (ft/s)	RM		WSEL (ft)	Difference in WSEL (ft)	Channel Velocity (ft/s)
-480.75	Existing	493.805		6.793	-489	Existing	491.103		5.855
-480.75	Proposed	493.805	0	6.793	-489	Proposed	491.103	0	5.855
-481.25	Existing	493.627		6.703	-489.5	Existing	490.932		6.016
-481.25	Proposed	493.627	0	6.703	-489.5	Proposed	490.932	0	6.016
-482	Existing	493.397		6.541	-490.25	Existing	490.485		6.959
-482	Proposed	493.397	0	6.541	-490.25	Proposed	490.485	0	6.959
-482.5	Existing	493.215		6.591	-490.75	Existing	490.431		6.271
-482.5	Proposed	493.215	0	6.591	-490.75	Proposed	490.431	0	6.271
-483.25	Existing	493.016		6.35	-491.5	Existing	490.028		6.898
-483.25	Proposed	493.016	0	6.35	-491.5	Proposed	490.028	0	6.898
-483.75	Existing	492.85		6.363	-492	Existing	489.907		6.373
-483.75	Proposed	492.85	0	6.363	-492	Proposed	489.907	0	6.373
-484.75	Existing	492.587		6.024	-492.75	Existing	489.455		7.1
-484.75	Proposed	492.587	0	6.024	-492.75	Proposed	489.455	0	7.1
-485.25	Existing	492.439		6.03	-493	Existing	489.293		7.215
-485.25	Proposed	492.439	0	6.03	-493	Proposed	489.293	0	7.215
-486	Existing	492.22		6.024	-493.5	Existing	489.136		6.869
-486	Proposed	492.22	0	6.024	-493.5	Proposed	489.136	0	6.869
-486.75	Existing	491.753		7.045	-494	Existing	488.75		7.555
-486.75	Proposed	491.753	0	7.045	-494	Proposed	488.75	0	7.555
-487.5	Existing	491.338		7.579	-494.75	Existing	488.455		7.419
-487.5	Proposed	491.338	0	7.579	-494.75	Proposed	488.455	0	7.419
-488	Existing	491.248		7.009	-495	Existing	488.301		7.511
-488	Proposed	491.248	0	7.009	-495	Proposed	488.301	0	7.511
-488.5	Existing	491.163		6.476	-496.5	Existing	487.867		6.611
-488.5	Proposed	491.163	0	6.476	-496.5	Proposed	487.867	0	6.611

Table 3-2

RM		WSEL (ft)	Difference in WSEL (ft)	Channel Velocity (ft/s)	RM		WSEL (ft)	Difference in WSEL (ft)	Channel Velocity (ft/s)
-497.25	Existing	486.595		9.948	-508.75	Existing	482.761		6.327
-497.25	Proposed	486.595	0	9.948	-508.75	Proposed	482.761	0	6.327
-498	Existing	486.775		6.897	-509.5	Existing	482.196		7.479
-498	Proposed	486.775	0	6.897	-509.5	Proposed	482.196	0	7.479
-498.5	Existing	486.736		5.931	-510.5	Existing	481.762		7.386
-498.5	Proposed	486.736	0	5.931	-510.5	Proposed	481.762	0	7.386
-500	Existing	485.701		7.915	-510.75	Existing	481.504		7.951
-500	Proposed	485.701	0	7.915	-510.75	Proposed	481.504	0	7.951
-501	Existing	485.546		6.413	-512.5	Existing	481.105		6.331
-501	Proposed	485.546	0	6.413	-512.5	Proposed	481.105	0	6.331
-501.5	Existing	485.498		5.516	-513.75	Existing	480.676		6.395
-501.5	Proposed	485.498	0	5.516	-513.75	Proposed	480.676	0	6.395
-502	Existing	485.243		5.988	-514.5	Existing	480.313		6.753
-502	Proposed	485.243	0	5.988	-514.5	Proposed	480.313	0	6.753
-502.25	Existing	485.117		6.181	-515	Existing	479.875		7.697
-502.25	Proposed	485.117	0	6.181	-515	Proposed	479.875	0	7.697
-503.75	Existing	484.613		6.314	-516	Existing	479.515		7.382
-503.75	Proposed	484.613	0	6.314	-516	Proposed	479.515	0	7.382
-504.75	Existing	484.198		6.555	-516.75	Existing	479.537		5.464
-504.75	Proposed	484.198	0	6.555	-516.75	Proposed	479.537	0	5.464
-506	Existing	483.868		5.813	-517.5	Existing	479.029		6.744
-506	Proposed	483.868	0	5.813	-517.5	Proposed	479.029	0	6.744
-507.25	Existing	483.312		6.481	-518.25	Existing	478.788		6.448
-507.25	Proposed	483.312	0	6.481	-518.25	Proposed	478.788	0	6.448
-508.25	Existing	482.869		6.842	-519.25	Existing	478.41		6.508
-508.25	Proposed	482.869	0	6.842	-519.25	Proposed	478.41	0	6.508

Table 3-2 Comparison of Computed Water Surface Elevations

RM		WSEL (ft)	Difference in WSEL (ft)	Channel Velocity (ft/s)
-519.75	Existing	477.935		7.575
-519.75	Proposed	477.935	0	7.575
-521.25	Existing	477.196		7.525
-521.25	Proposed	477.196	0	7.525
-521.75	Existing	477.055		7.04
-521.75	Proposed	477.055	0	7.04
-522.5	Existing	476.892		6.269
-522.5	Proposed	476.892	0	6.269
-523.25	Existing	475.974		8.661
-523.25	Proposed	475.974	0	8.661
-524.25	Existing	475.645		7.612
-524.25	Proposed	475.645	0	7.612
-525	Existing	475.565		6.124
-525	Proposed	475.565	0	6.124
-526	Existing	475.078		6.764
-526	Proposed	475.078	0	6.764
-527	Existing	474.933		5.255
-527	Proposed	474.933	0	5.255
-527.75	Existing	474.397		6.71
-527.75	Proposed	474.397	0	6.71
-528.75	Existing	474.076		6.373
-528.75	Proposed	474.076	0	6.373
-529.25	Existing	473.963		5.924
-529.25	Proposed	473.963	0	5.924
-530	Existing	473.75		5.738
-530	Proposed	473.75	0	5.738

3.2 SURVEYING, MAPPING, AND OTHER GEOSPATIAL DATA REQUIREMENTS

3.2.1 For Feasibility

Aerial photographs and LiDAR were utilized during the feasibility study to create 3-dimensional design models of the various site alternatives. The LiDAR and aerial photography were provided by Cincinnati Parks Department from the Cincinnati Area Geographic Information System (CAGIS). The META Data sheet for the 2020 LiDAR can be found in Attachment 6. The Horizontal Datum is Ohio State Plane South (U.S. Survey FT) North American Datum 1983. The Vertical Datum is NGVD29.

3.2.2 For Design

At the more detailed design phase of the project, a topographic field survey will need to be performed for the project area and a more up to date river floor scan will be required to ensure the designed components tie into the river floor and existing park elements.

3.3 GEOTECHNICAL

3.3.1 Site Observations

A site reconnaissance to observe and document surface conditions at the site and layout borings was conducted on February 14, 2024, by Matt Scholl, P.E. and Mark Brooks of the Louisville District Geotechnical Design Section. The Geotechnical Site Photos included in Attachment 3 depict the general site conditions at the time of the site reconnaissance. The site reconnaissance included an area of approximately 1.5 acres running along roughly 900 feet of the northern bank of the Ohio River in Cincinnati, Ohio. See Section 1.4 for more details on the project location. Included below is a summary of selected pertinent observations from the site reconnaissance.

The site generally sloped from north to south and consisted of an upper bank and a lower bank separated by an area of erosion with a near vertical eroded face. The height of the eroded face varied along the riverfront ranging from approximately 1 to 5 feet. See Figure 3-5 below for general site conditions, as well as for general locations of the various eroded face heights.

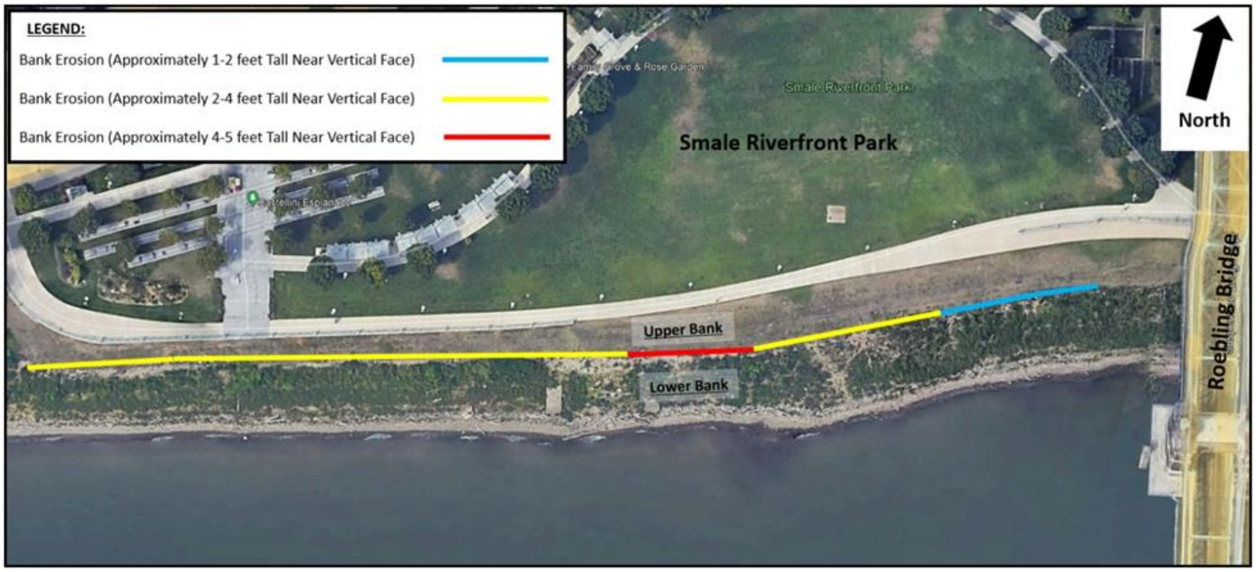


Figure 3-5: General Site Conditions

The upper bank consisted of grass-covered areas with an erosion control product (green plastic mesh material) visible directly beneath the grass in some areas. The upper bank appeared to have grades ranging between 3 horizontal to 1 vertical (3H:1V) and 5H:1V. The lower bank had a grade of approximately 5H:1V and was primarily covered with debris (boulders, cobbles, chunks of brick/asphalt/concrete, and trash) and driftwood (sticks and logs) with areas of vegetation consisting primarily of saplings with stem diameters of less than ½ inch.

The exposed soils observed on the eroded face of the upper bank consisted primarily of clay material with fine and coarse gravel and brick fragments. No evidence of global slope stability issues was noted along the areas exhibiting erosion. However, localized areas of past bank sloughing (natural progression of erosion) were observed in several locations along the base of the eroded face.

3.3.2 Site Geology

According to the *Surficial Geology of the Ohio Portions of the Cincinnati and Falmouth 30x60 Minute Quadrangles*, published by the Ohio Division of Geological Survey in 2004 (Shown in Figure 3-6), the project site consists of Holocene-aged Alluvium surficial material. This Alluvium is described as having a wide variety of textural classes from silt to boulders with disseminated or concentrated organics; generally, not compact; rarely greater than 20 feet thick. Found within floodplains of modern streams throughout the entire map area. The Alluvium is shown to be underlain by interlayered medium-fine to fine grained materials consisting predominantly of fine sand but includes clay, silt, and thin gravel interbeds; variable in thickness and sequence of lithologies; up to 150 feet thick. This medium-fine to fine grained material is shown to be underlain by intermixed and interbedded Wisconsinan-age sand and gravel with thin, discontinuous layers of silt, clay, and till; up to 250 feet thick. This sand and gravel layer is shown to be underlain by sand, generally Wisconsinan-age. Containing minor amounts of disseminated gravel and thin lenses of silt and gravel; locally may contain organics as disseminated particles or sticks and logs; up to 50 feet thick.

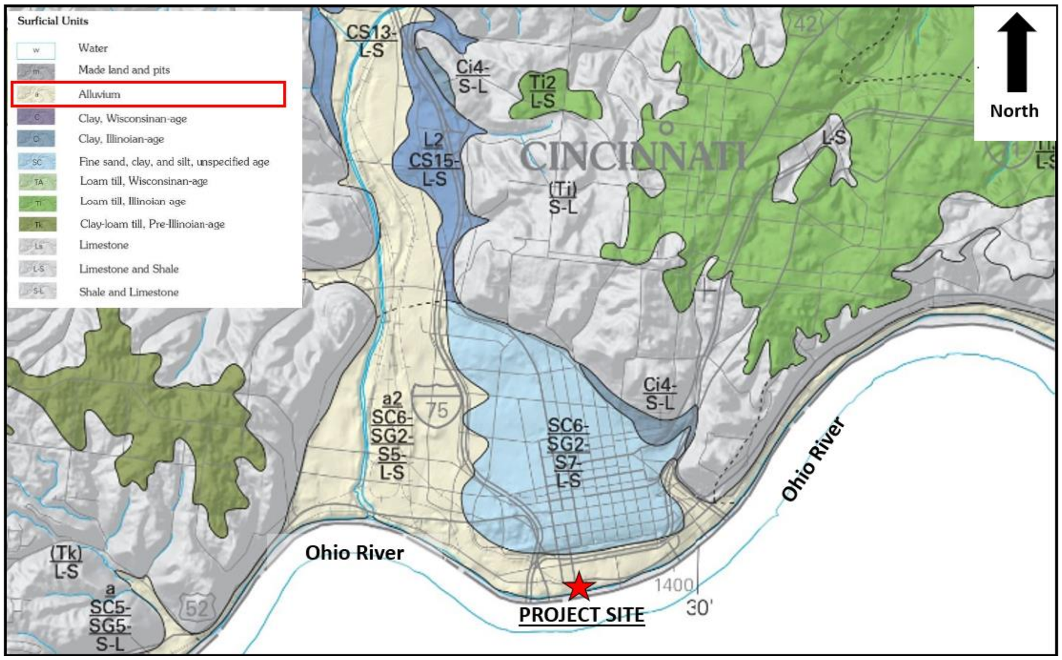


Figure 3-6: ***Surficial Geology of the Ohio Portions of the Cincinnati and Falmouth 30x60 Minute Quadrangles***

According to the *Bedrock Geology of the Covington, KY-Ohio, Quadrangle (Ohio Portion),* Digital Map Series BG-2, published by the Ohio Division of Geological Survey in 1996 (shown in Figure 3-7), the project site is underlain by the Point Pleasant Formation. The Point Pleasant Formation is described as limestone (60 percent) and shale, interbedded; gray to bluish gray; contains thin to medium, planar to lenticular bedding.

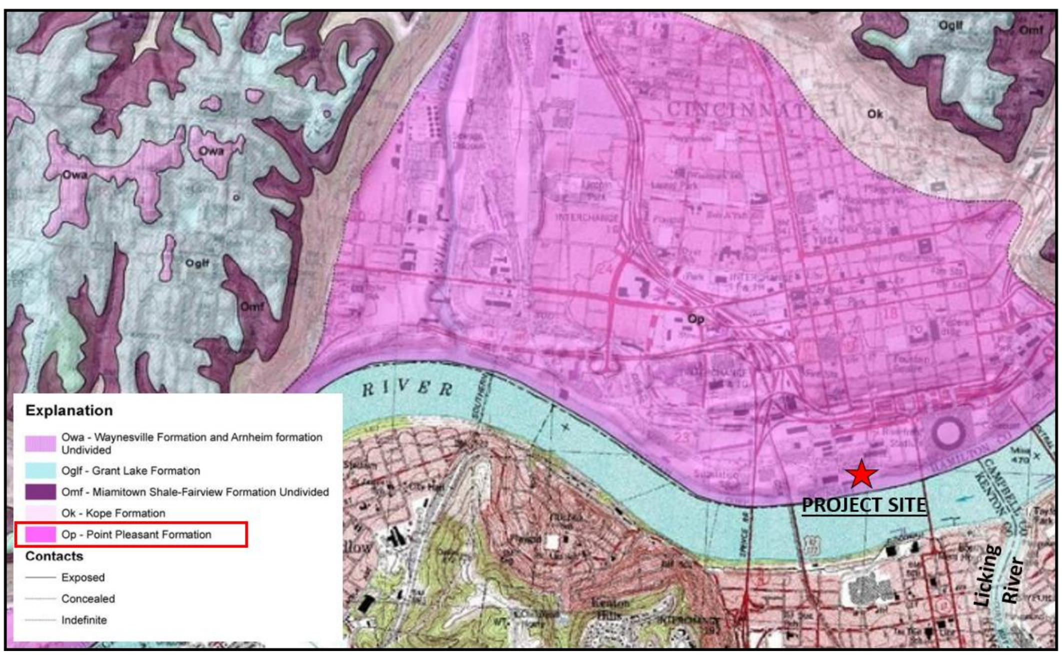


Figure 3-7: Site Geology (Source: *Bedrock Geology of the Covington, KY-Ohio, Quad (Ohio Portion)*

Additionally, the project site lies within the Ohio River Floodplain directly across from the confluence of the Licking River. The elevation for the site is approximately 474-485 feet above sea level with the elevation increasing as you move north of (away from) the river.

3.3.3 Subsurface Conditions

Subsurface conditions at the site were evaluated by advancing 12 borings and 13 test pits across the project site to the depths indicated in Table 3-3. The approximate location of the borings and test pits are shown in Figure 3-8. The generalized strata encountered in the borings are summarized in Table 3-4. The strata encountered in the borings generally were consistent with visual observations in test pits and along areas of the eroded face. For the specific subsurface conditions encountered at each boring, refer to the Boring Logs included in Attachment 4. The results of laboratory testing (moisture content, sieve/hydrometer, and Atterberg limits) are included in Attachment 5.

Figure 3-8: Boring and Test Pit Location Plan

Table 3-3: Boring/Test Pit Termination Depths

BORINGS		TEST PITS		
Boring No.	Termination Depth (feet)	Test Pit No.	Termination Depth (feet)	Refusal Depth[1] (feet)
B-01	20.5	TP-01	-	4.5
B-02	10.5	TP-02	-	6.7
B-03	10.5	TP-03	8.0	-
B-04	36.5	TP-04	8.0	-
B-05	10.0	TP-05	-	7.0

Table 3-3: Boring/Test Pit Termination Depths

BORINGS		TEST PITS		
Boring No.	Termination Depth (feet)	Test Pit No.	Termination Depth (feet)	Refusal Depth[1] (feet)
B-06	10.0	TP-06	-	5.3
B-07	15.5	TP-07	-	5.5
B-08	10.0	TP-08	-	4.8
B-09	10.5	TP-09	8.0	-
B-10	10.5	TP-10	8.0	-
B-11	23.0	TP-11	-	6.0
B-12	10.5	TP-12	7.0[2]	-
		TP-13	-	6.0

[1] – Refusal encountered on debris in the fill (typically on concrete slab at bottom of test pit.
[2] – Test pit terminated before pre-determined termination depth of 8 feet due to groundwater causing sidewall sloughing/collapse.

Table 3-4: Generalized Subsurface Conditions

Depth (ft)	Stratum	Material Description	Typical N_{60}
0-27	FILL	Predominantly brown to gray, stiff to medium stiff, lean clay. Included areas of: - Brown to gray, medium stiff to hard, sandy lean clay. - Brown, loose to medium dense, poorly graded sand. - Gray to dark gray, loose to dense, crushed aggregate. FILL material was encountered in all borings and all test pits. Where penetrated, extended to depths of 16.5 feet (boring B-01), 27.0 feet (boring B-04), and 21.5 feet (boring B-11). FILL material having a petroleum odor was encountered in test pits TP-11 (approximately 5 feet below grade) and TP-12 (approximately 6 feet below grade).	8-21
27-36.5	CL	Predominantly gray, stiff to very stiff SANDY LEAN CLAY (CL). Included areas of: - Gray, loose to dense, poorly graded sand. - Gray, stiff, silt with sand.	9-29

3.3.4 Evaluation

Based on the site observations, global slope stability does not appear to be an issue at the riverbank. Instead, slope issues appear to be primarily driven by erosional losses (sloughing). Erosional losses of soil along the slope, especially near the toe of the slope, removes material that provides resistance to the movement of the upper portions of the slope. This loss of material can be due to the actions of water directly to the soil surface or can be the result of water acting on and dislodging vegetation along the surface of the slope. The result is often a steepened slope that is unable to support itself when exposed to additional water (e.g., rain or rising river levels).

Once failure of the slope occurs, a "bulge" of material from the slope failure is often observed at the toe of the slope along the failure plane. This material may or may not be visible depending on the water level. The toe bulge acts as a berm providing a resisting force against additional slope failure. Often the toe bulge is eventually removed due to erosion, triggering additional slope failures.

Therefore, the single most important measure to address the slope issues observed on-site is to protect the exposed face of the slope from erosion, which the proposed concrete seat wall and riprap arrangement will achieve.

As part of the project feasibility study, five different plans were evaluated for expanding Smale Park along the Ohio River's edge to meet the planning objectives described in Section 2.1 and to help mitigate slope erosion. See Section 2.2 for a description of each of the alternative plans evaluated. These plans were rated for cost-effectiveness, environmental/economical acceptability, sustainability, and the ability to enhance Smale Park by creating a safe resilient recreational connection between the usable areas of the park and the river. See the Integrated Feasibility Report for more details describing the method used for assessing each alternative plan and the reasoning for eliminating each alternative plan not selected as the tentatively selected plan.

The tentatively selected plan "Alternative 1 (Combination Concept)" will consist of concrete seat walls, concrete river-walks, terraced boulders, rip rap armoring, and native flood tolerant plantings. Riprap armoring is planned to protect the proposed steeper graded lower portions of the shoreline slopes from the damaging forces of erosion observed at the site while native flood tolerant plantings are planned to protect the proposed less steep upper portions of the shoreline slopes. The proposed slopes of the tentatively selected plan range from approximately 8.5H:1V to 2.5H:1V for the lower shoreline and nearly flat to approximately 7.5H:1V for the upper shoreline. A slope stability analysis to be conducted during the design phase is expected to confirm the stability of the proposed slopes since (1) the soil slopes observed in the eroded areas were steeper than 2.5H:1V and (2) the soil types encountered in the borings and observed in the eroded face typically are capable of supporting the proposed slopes.

During the subsurface exploration, undocumented existing fill was encountered in all borings and test pits to depths as great as 27 feet below existing site grading. Existing fill material is likely associated with construction/grading improvements along the riverbank throughout the years. The existing fill material was considered "uncontrolled fill" since no information was available to document the fill composition and compaction.

3.5 CIVIL DESIGN

3.5.1 Site Selection and Project Development

The site was preselected by the Cincinnati Parks Board as a logical extension of Smale Park to better engage the park patron with the Ohio River.

3.5.2 Transportation and Traffic

The project will mostly experience pedestrian traffic. However, the pathways will be designed to accommodate occasional food trucks and maintenance vehicles such as pickup trucks and side-by-side utility vehicles (UTV's). The pathways will be a minimum 10 feet wide. The pathways are to be designed to accommodate the American Barriers Act and be accessible. To meet the requirements of an accessible route the horizontal slope of the sidewalks will be less than 5.0%. The sidewalk slopes will have a maximum transverse slope of 2.0%.

3.5.3 General Site Grading

The grading of the site will be very much dependent on the pathway design to meet accessibility requirements. Riprap slopes are not expected to be greater than 3 ft horizontal to 1 ft vertical. Lawn and naturally vegetated slopes will be kept to 4 ft horizontal to 1 ft vertical or flatter to accommodate maintenance such as mowing.

3.5.4 Relocations

The project does not require any relocations.

3.5.5 Real Estate

The project is entirely located on lands owned by the Sponsor. Permits will be required from the City of Cincinnati to gain access to the site from the city owned and maintained Mehring Way. A temporary easement will need to be acquired to stage and laydown construction in the existing parking lot to the west of Smale Park on the south side of Mehring Way.

3.6 STRUCTURAL

The design life of this project will be 50 years. The tentatively selected plan does not include any structural components since the concrete seat walls and river walkway are considered nonstructural. No stability calculations have been completed by structures on the concrete seat walls because of the relatively small difference in backfill elevations. Only preliminary calculations have been performed to estimate the sizes and quantity of steel reinforcement as well as the self-weights of each wall type. The concrete seat walls are assumed to be founded on soil that is capable of providing adequate bearing.

3.6.1 Steel Reinforcement Requirements

The required reinforcement in the concrete seat walls is controlled by ACI 224R-01 in Chapter 3.5.2. ACI 224R states that minimum reinforcement to satisfy the Temperature and Shrinkage requirements in mass concrete are 0.6% of the area compared to the typical 0.18% as most concrete. Reinforcement will be spaced evenly around the perimeter of the concrete to limit cracking. The best methods of crack control are by modifying the materials and mix proportions to have a higher tensile-strain capacity, as well as controlling the factors that produce tensile-strain. The first can be done by using minimal cement content and restricting maximum aggregate size. The second can be accomplished by pre-cooling, post-cooling, or insulating the concrete, or by heating the exposed surfaces of the concrete prior to pouring. The reinforcement will require a 4-inch clear cover as well as corrosion protection around the outer reinforcement.

3.7 ELECTRICAL AND MECHANICAL REQUIREMENTS

3.7.1 Electrical

Site lighting has been included in the project. Light poles are to be designed for removal during high water river events per the recommendation of the Cincinnati Parks Department. The Cincinnati Parks Department will be responsible for removal, temporary storage, and reinstallation. Light fixtures shall be solar LED type so as not to require solid infrastructure that could be damaged during Ohio River elevated surface conditions.

3.7.2 Mechanical

The project does not include any mechanical systems.

3.8 HAZARDOUS and TOXIC MATERIALS

3.8.1 During Construction

During construction the control of hazardous and toxic materials will be the responsibility of the Contractor.

3.8.2 Post-Construction

The completed project will not include any hazardous and toxic material.

3.9 CONSTRUCTION PROCEDURES AND WATER CONTROL PLAN

During construction the river is expected to impact work. The project will not require dewatering efforts or cofferdams. The Construction Schedule will need to account for periods of time when the river is up and work cannot be completed.

3.10 INITIAL RESERVOIR FILLING AND SURVEILLANCE PLAN

This does not apply to this feasibility study.

3.11 FLOOD EMERGENCY PLANS FOR AREAS DOWNSTREAM OF CORPS DAMS

This does not apply to this feasibility study.

3.12 ENVIRONMENTAL OBJECTIVE AND REQUIREMENTS

This does not apply to this feasibility study.

3.13 RESERVOIR CLEARING

This does not apply to this feasibility study.

3.14 OPERATION AND MAINTENANCE

Operation and maintenance after construction completion will be the sole responsibility of the Cincinnati Parks Department.

3.15 ACCESS ROADS

Access to the project site will be from Mehring Way. From Mehring Way, construction traffic will need to traverse the sidewalk/access way at the southern edge of Smale Park. Damage to the accessway can be expected, therefore, the project should expect to replace that sidewalk.

To gain access, a permit will need to be acquired by the Contractor from the City of Cincinnati.

3.16 CORROSION MITIGATION

3.16.1 Electrical

No buried electrical infrastructure is anticipated since the light fixtures will be solar powered LED fixture types.

3.16.2 Storm Systems

Any storm or subdrain systems will be constructed of Polyvinyl Storm Pipe to avoid corrosion.

3.17 PROJECT SECURITY

3.17.1 During Construction

During construction security will be the responsibility of the Contractor.

3.17.2 Post-Construction

Similar to the existing Smale Park, security will be maintained by the City of Cincinnati Police Department.

3.18 COST ESTIMATES

The project conceptual cost estimate can be found in Feasibility Appendix [z]

3.19 SCHEDULE FOR DESIGN AND CONSTRUCTION

The conceptual schedule for design and construction can be found in Feasibility Appendix [v].

3.20 SPECIAL STUDIES

No special studies are being considered.

3.21 PLATES, FIGURES AND DRAWINGS

3.21.1 Conceptual Site Renderings

Conceptual site renderings were developed from the conceptual engineering drawings for the purpose of obtaining input from the public as the project progressed thru feasibility. The conceptual site renderings can be found in Feasibility Appendix [y].

3.21.2 Conceptual Engineering Plans

Conceptual engineering site plans were developed using Bentley Open Roads Designer. The designs are developed using 3-D cadd modeling techniques. The conceptual engineering site plans can be found in Engineering Attachment [1].

3.22 DATA MANAGEMENT

3.22.1 Planning Division

Planning Division documents developed or received in completing this feasibility study can be found on the Louisville District network at: O:\PM\Public\PMC\PROJECTS\112807 - Ohio Riverfront Cincinnati OH

3.22.2 Engineering Division

Engineering Division documents developed or received in completing this feasibility study can be found on the Louisville District network at: O:\ED\Public\CAD\Civil\112807 - Cincinnati Riverfront II

3.23 USE OF METRIC SYSTEM MEASUREMENTS

In considering the use of metric measurements, the non-federal sponsor prefers U.S Customary measurements be used for design to better communicate the project with their constituents.

4 IMPLEMENTATION REQUIREMENTS

4.1 LANDS, EASEMENTS, RIGHTS-OF-WAY, RELOCATIONS AND DISPOSAL AREAS

Phase 2a is located on land owned in fee by Hamilton County and Phase 2b is entirely located on lands owned by the Sponsor. Permits will be required from the City of Cincinnati to gain access to the site from the city owned and maintained Mehring Way. A temporary easement will be acquired for laydown and staging in an existing parking lot west of Smale Park on the south side of Mehring Way. Additionally, a portion of the great lawn area adjacent to the project site will be used for project staging and laydown. The area will be fenced off and secured during construction to keep the public out of the construction zone. The area will be restored to pre-construction conditions upon project completion. Disposal will be limited to concrete sidewalk demolition, drift removal, and miscellaneous garbage removal due to garbage and drift that settles along the bank after storms. These items will go to a local landfill. No soil is expected to leave the site but will be utilized in construction.

4.2 OPERATION, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION

The project Sponsor, Cincinnati Parks Department, will be responsible for maintenance, repair, replacement, and rehabilitation upon project construction completion. The project will be subject to rising Ohio River water surface elevations. As the Ohio River recedes after a flooding event it is expected that significant drift and silt will be deposited upon the project, like other park properties along the Ohio River. The Sponsor is familiar with the cleanup associated with those other park facilities and understands that similar operations will be required at this project site.

4.3 REGULATORY REQUIREMENTS

4.3.1 Clean Water Act 401/404 Permitting

Both 401 and 404 permits are expected to be acquired since the project will be constructed along the northern bank of the Ohio River. The Tentatively Selected Plan (TSP) will place approximately 10,710 cubic yards of select granular fill, concrete paths, concrete seat walls, and shoreline protective stone along the bank below the 10 year flood elevation.

4.3.2 NPDES Permitting

The project will disturb approximately 2.6 acres. Since more than one acre of land will be disturbed to construct the project, an NPDES permit will be acquired from the State of Ohio Environmental Protection Agency. It is anticipated that the permit will be acquired by the Designer of Record (DOR) prior to a construction contract award. The Contractor will then be added to the permit as a co-signer on the permit responsible for maintaining erosion control during construction.

5 REFERENCES

U.S. Army Corps of Engineers. (2024, May 13). *RIVER AND RESERVOIR LEVELS*. Retrieved from Great Lakes and Ohio RIver DIvision: https://www.lrd.usace.army.mil/Rivers-and-Reservoirs/

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https://www.cincinnati-oh.gov/water/water-quality-and-treatment/water-sources-resource-protection/

Ohio River Valley Water Sanitation Commission (ORSANCO). 2022. Assessment of Ohio River Water Quality Conditions.

6 ENGINEERING ATTACHMENTS

1. Concept Engineering Site Plans
2. Existing Yeatman's Cove Serpentine Wall Construction Photos
3. Geotechnical Site Photos
4. Boring Logs
5. Laboratory Testing
6. Survey META Data Sheet

Attachment 1 – Concept Engineering Site Plans

Appendix B: Climate Assessment

This climate assessment was performed in support of the Cincinnati Waterfront Feasibility study to satisfy the requirements of Engineering Construction Bulletin 2018-14 (ECB 2018-14). ECB 2018-14 requires consideration of both past observed and potential future changes to hydrologic variables relevant to the study being conducted. The results of this assessment should be included in the planning risk register of the study and can be used to justify the identification of added resilience to climate change impacts and adaptation pathways. The project purpose is to repair an existing erosion area located in downtown Cincinnati along the Ohio River right descending bank along the existing park space, while also improving recreational access to the waterline and other public use enhancements. As the project is within the Ohio River floodplain, the most important climate variables are expected to be the depths, duration, and annual exceedance probability of flooding of the project area, and the associated hydrodynamic forces upon project features.

For this climate assessment, the nearest stream gauge to the project site is (“Markland L&D”). The gauge has a record of annual peak flows from 1970 to 2020 published by the USGS; hourly data for Water Years (WY) 2018, 2021, 2022, and 2023 were analyzed to manually determine the peak flows for those years, to complete a 53 period of record for annual peaks. Precipitation and temperature data was obtained through the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information Climate Data Online tool. Annual temperature average, minimum, and maximum data from the weather data station at CINCINNATI NORTHERN KENTUCKY INTERNATIONAL AIRPORT, KY US (USW00093814) was available from 1949 through 2023. Monthly maximum daily precipitation and cumulative monthly precipitation from this station beginning January 1948 was combined with another station CINCINNATI SUS BRIDG, OH US (USC00331571) located near the project area which had these same precipitation statistics from January 1905 through August 1948; where the monthly data overlapped in 1948, the data from CINCINNATI SUS BRIDG was used since it was an established gauge closer to the project site.

Observed Trends

Locally Observed Trends in Precipitation and Temperature

The historical precipitation and temperature data was analyzed for observed trends. Data analyzed included: annual daily average maximum, annual daily average minimum, and annual daily average temperature, annual cumulative precipitation, and monthly maximum precipitation.

Annual daily average, average daily maximum and average daily minimum temperature data are shown in Figure 1. Note the increasing trends in average, maximum and minimum temperature are relatively consistent, with the average minimum temperature apparently increasing at a slightly faster average rate of 0.03 degrees Fahrenheit per year. These parameters are considered statistically significant, with calculated p-values of 2.75×10^{-4}, 0.017 and 1.22×10^{-5} for the average, maximum, and minimum temperature data respectively, all of which are less than the statistical standard of less than or equal to 0.05.

Figure 2 shows monthly total precipitation, while Figure 3 shows maximum daily precipitation in each month. Monthly total precipitation shows a general trend upwards but at a very slow rate (2×10^{-5} inch per month). The daily maximum precipitation each month is also generally stable, although comparing the data from the two gages (prior to September 1948 at the Cincinnati Suspension Bridge vs September 1948 through 2023 at the Cincinnati Northern Kentucky Airport), it is noted that the rate of change has increased. Both parameters are considered statistically significant.

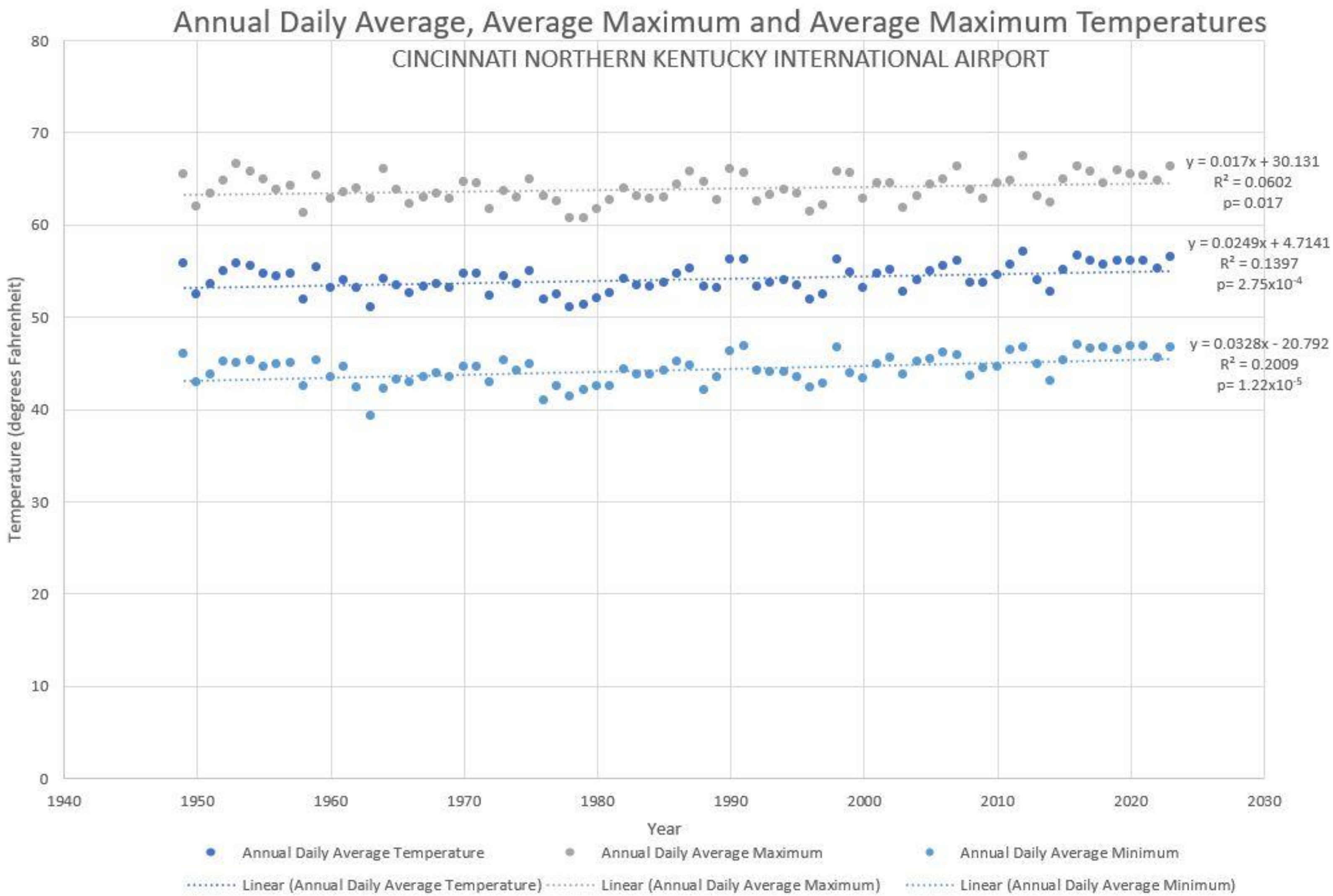


Figure 1: Current trends in average, maximum, and minimum temperature

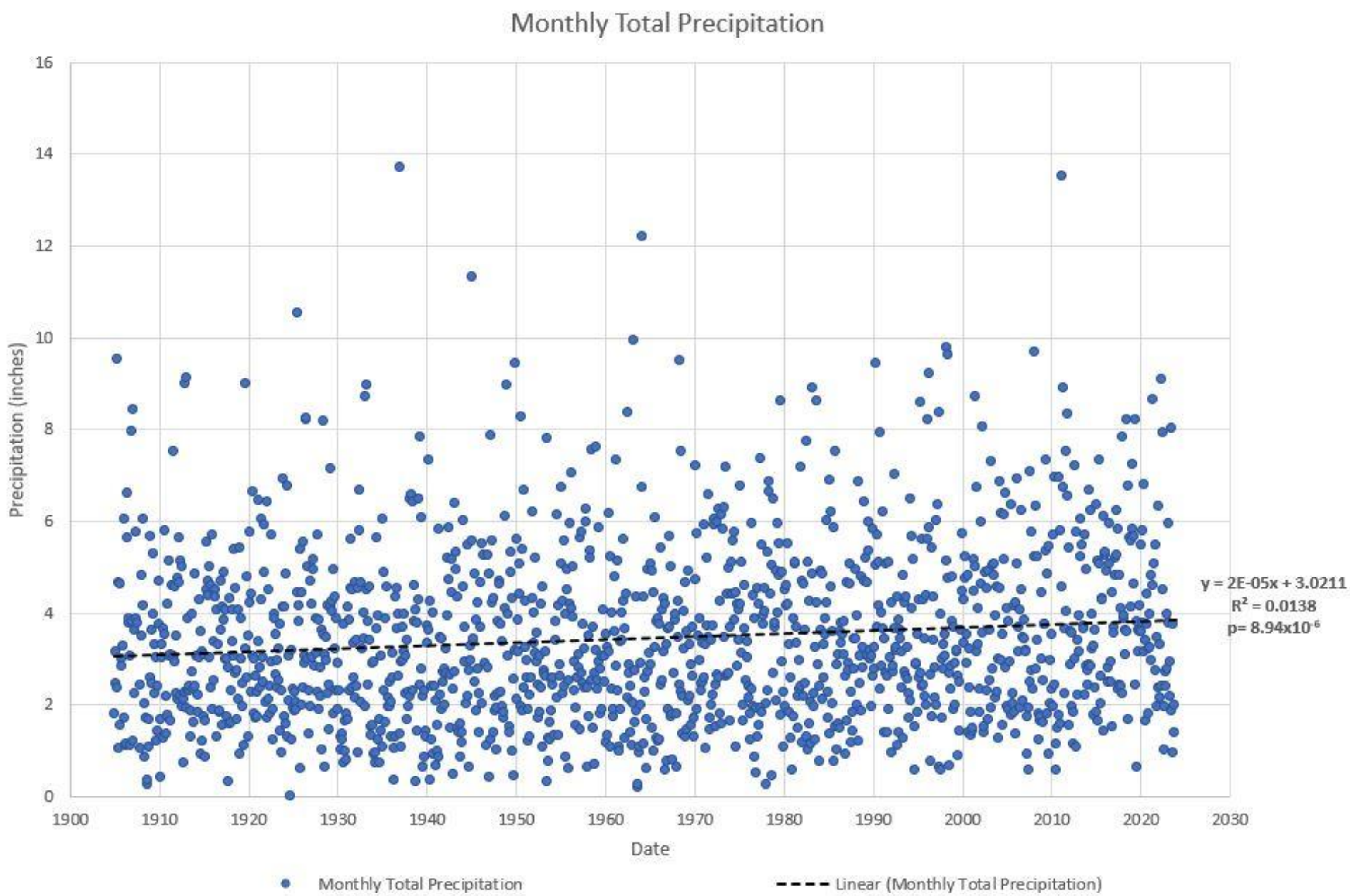


Figure 2: Current trends in monthly total precipitation

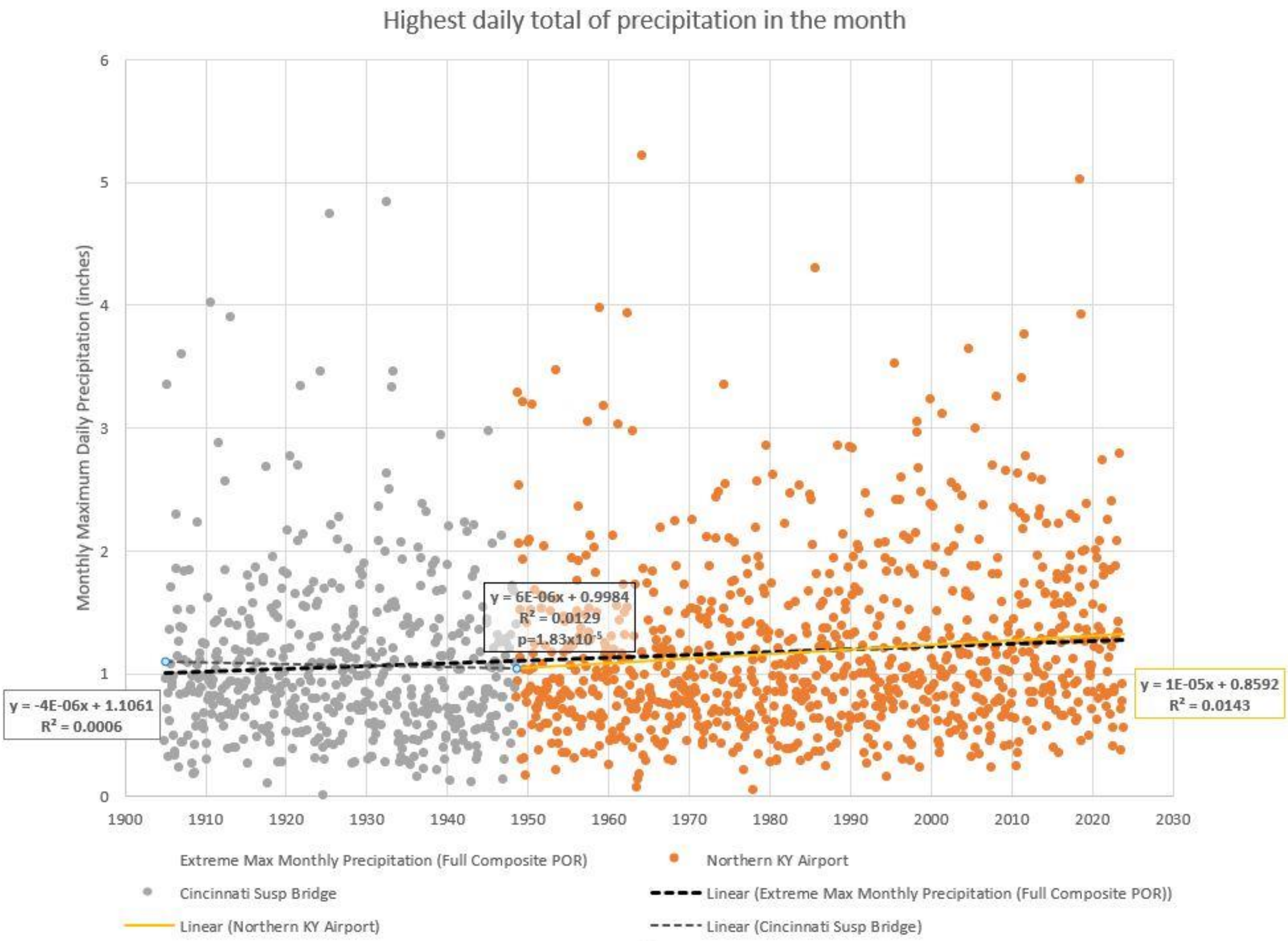


Figure 3: Maximum Daily precipitation each month

Literature Review

According to the "Historical Climate and Climate Trends in the Midwestern USA" (Andresen, Hilberg and Kunkel 2012), mean temperatures have increased overall in the Midwest since 1900, increasing "approximately 0.059°C per decade during 1900-2010 period, increased 0.12°C per decade for the period 1950-2010, and 0.26°C per decade for the period 1979-2010" which is similar to overall global trends. During the Dust Bowl years in the early 20th century, precipitation generally decreased through the late 1930s, but a general increasing trend has been noted since that time. Mean annual snowfall was also noted as decreasing when comparing the 30 year periods of 1961-1990 versus 1981-2010.

Climate Hydrology Assessment

The Model-Based Analysis tool in the Time Series Toolbox was used to analyze trends in the annual maximum flows on the Ohio River at Markland L&D for the period of 1971 to 2023. The data contained regulated flows due to the system of flood risk management (FRM) reservoirs constructed throughout the basin. The data shows a slight positive trend, but nothing that was determined to be statistically significant. This data with the trendline is shown in Figure 4.

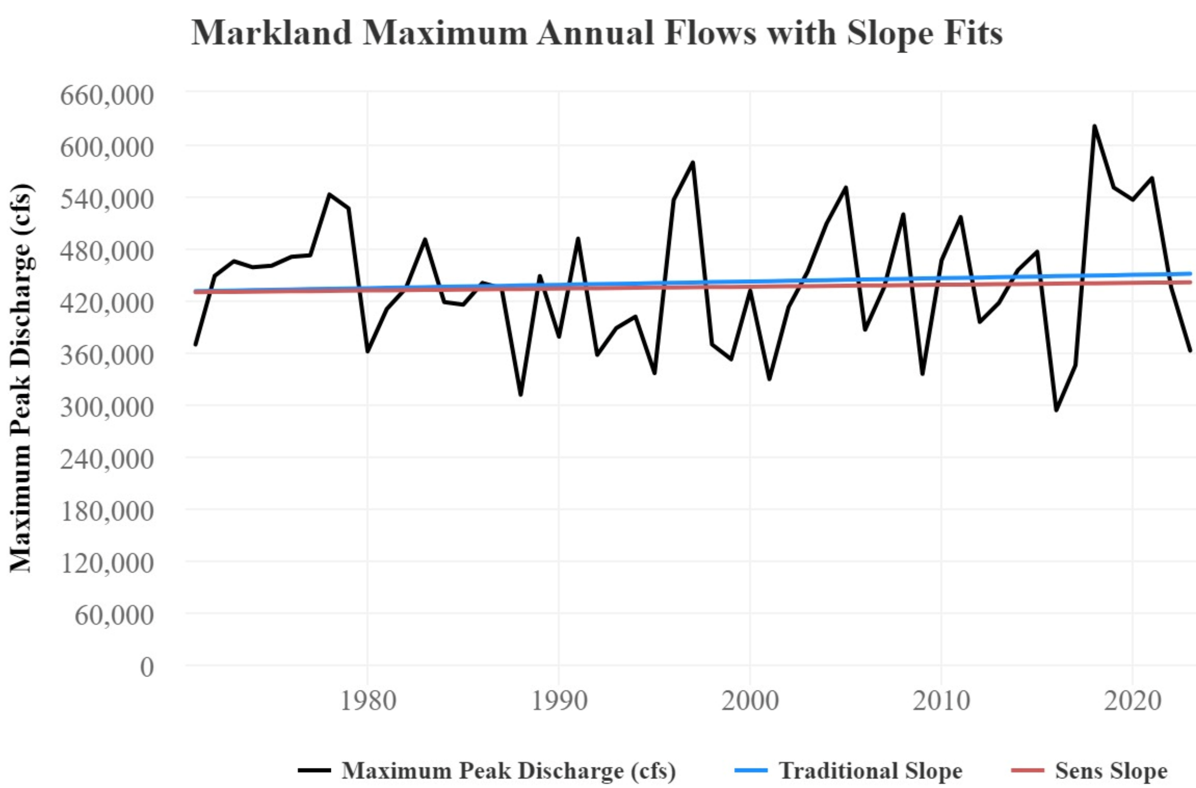


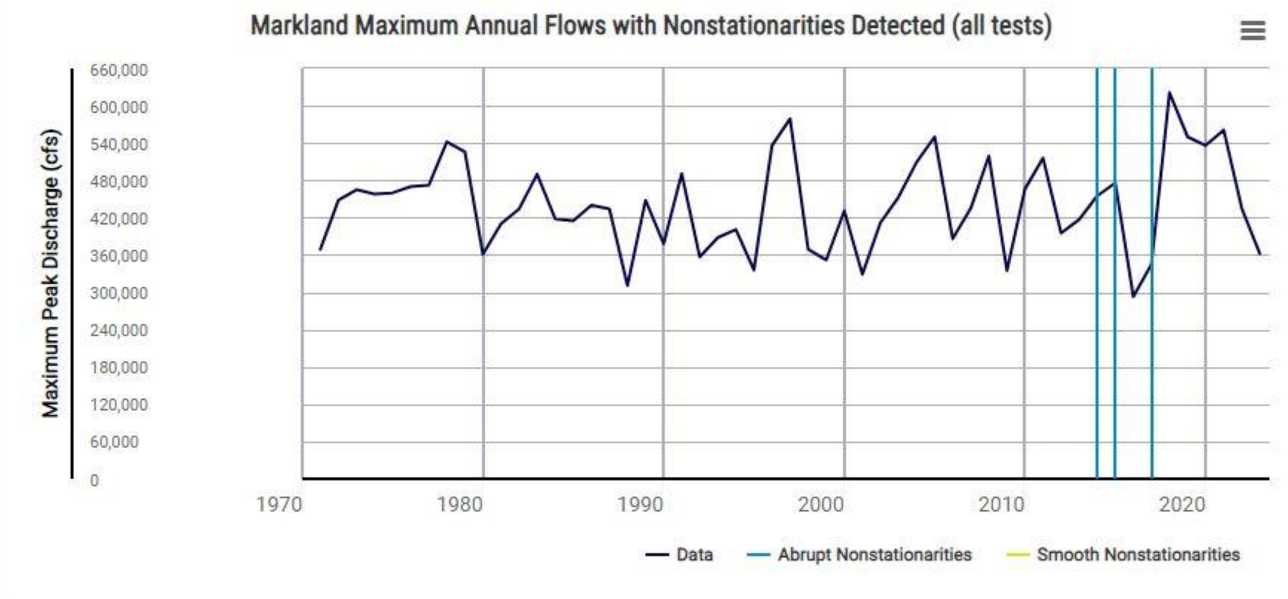
Figure 4: Current trends in annual maximum streamflow

Nonstationarity Detection

The USACE nonstationary detection tool in the Time-Series Toolbox (TST) was applied to the Ohio River at Markland L&D. This tool assesses if the assumption of stationarity is valid. Stationarity is the assumption that variations and trends in the data are caused randomly as opposed to a particular variable. It must be noted that multiple flood risk management reservoirs were constructed upstream of the gauge both before and during the period of record at this site. Individually, each reservoir constructed would have minimal impact to flow on the Ohio River at Markland; the drainage to the Markland L&D site is approximately 83,170 square miles, whereas the drainage area of the largest upstream reservoir (Bluestone Lake) is approximately 4,620 square miles, and is significantly remote from the project area. The tool identified three non-stationarities across multiple methods. The results from the tool are shown in Figure 5: Results of the Nonstationarities Detection Tool on the Markland L&D maximum annual flowsFigure 5. Note the blue vertical lines in the figure which indicate the detected nonstationarities. The nonstationarities are identified primarily by the Lombard Smooth and Smooth tests, and Kolmogorov-Smirnov, LePage and Bayesian tests which are at least in part oriented to detect abrupt changes of the series statistics, as evident by the significant variation in annual maximum flows in 2014 through 2018. This indicates consensus between the tests for a nonstationarity to have occurred.

As multiple tests recognized the irregularity in this data, based upon different statistical parameters (mean, variance, and distribution), it is considered robust. Showing both consensus and robustness indicates some possibility that the nonstationarity could be strong. However, as this irregularity appears very late in the dataset, its significance could be determined by additional near-future values. Additional efforts to extend the period of record farther back to include other historic events may also affect the significance of this irregularity.

As a result of concern over the short period of record potentially affecting the results of these tests, a second analysis was conducted. There are no other flow gauges in the project vicinity that are considered representative, but the National Weather Service (NWS) published Annual Ohio River Stage Extremes at the Cincinnati gauge on the Ohio River (National Weather Service 2023), which contains the extreme peak and low stages recorded from 1858 to 2023. For these purposes, it was assumed that stage would be a fair proxy for flow, despite the fact that the relationship is not generally linear as the channel widens more and the floodplain is involved to a greater extent at extreme flows. It is also noted that construction of levees in the immediate vicinity of Cincinnati as well as other FRM infrastructure (e.g., reservoirs) were implemented throughout the watershed. This NWS data was refined to include only the highest peak stage per year when multiple events were listed, and the TST was again utilized. The results are shown in Figure 6. Nonstationarities are identified in 1881, 1897, and the 1968-1969 timeframe. The 1881 nonstationarity has some consensus and robustness since both the LePage and Mood tests identified different statistical parameters of interest. It is noted that peak stages steadily increased annually from 1881-1884 and the standard deviation and variance increased. The 1897 nonstationarity was only identified by the Energy Decisive Method, therefore is not considered significant. The nonstationarity in the 1968-1969 period may be considered both robust and having achieved some consensus across multiple tests and statistical variables. For consideration, it is understood that many of the Ohio River FRM system were completed during the 1960's, the purpose of which is to reduce downstream flood stages and impacts. With the exception of this change that can be attributed to the development of the flood risk management system of reservoirs, no nonstationarities are identified in the time frame when climate change effects are normally expected.



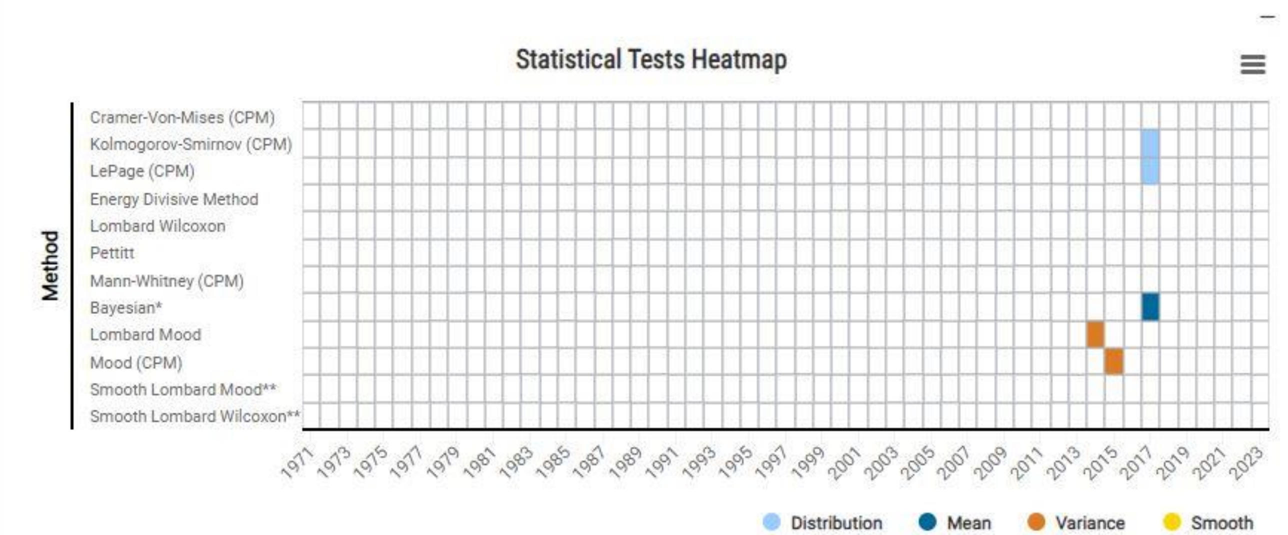
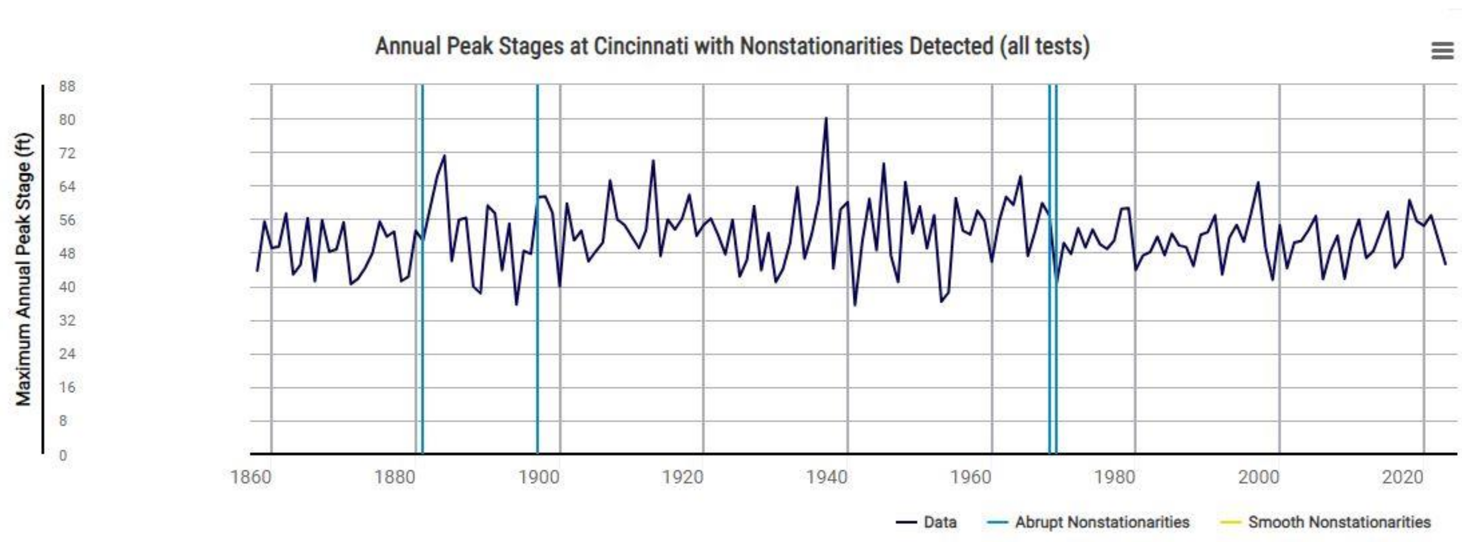


Figure 5: Results of the Nonstationarities Detection Tool on the Markland L&D maximum annual flows



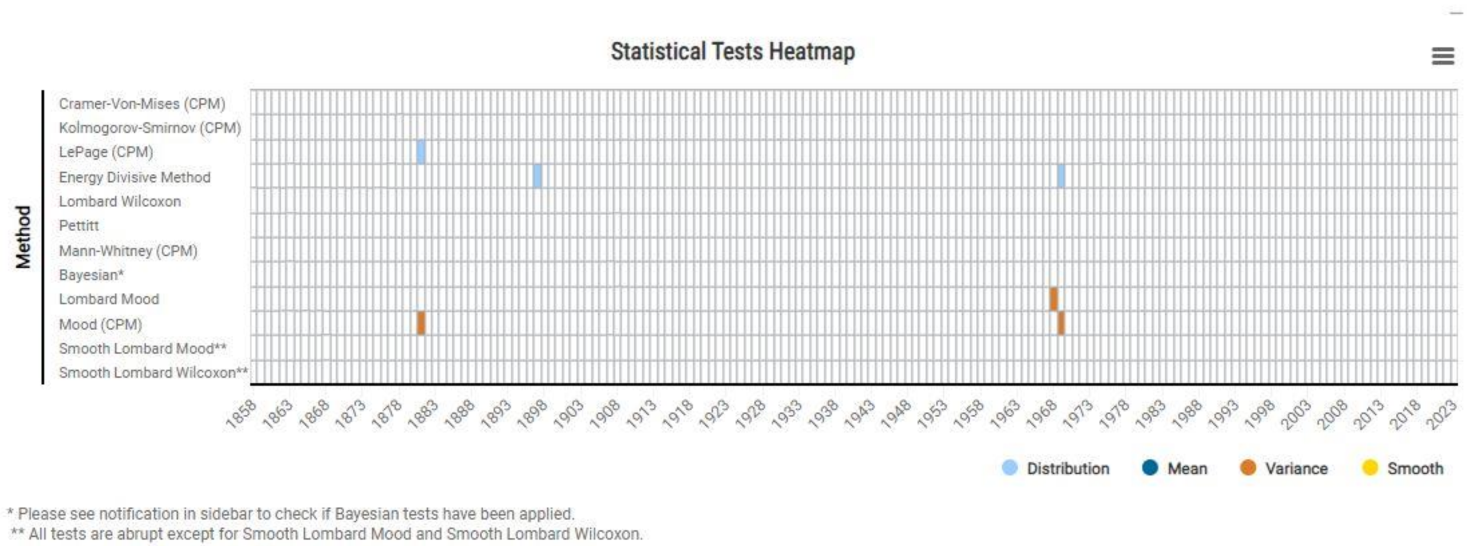


Figure 6: Results of Nonstationarity Dectection Tool on Cincinnati Maximum Annual Stages

Projected Trends

Literature Review

The 5th National Climate Assessment (NCA 5), published in 2023, is a congressionally mandated interagency effort providing a scientific foundation for informed decision-making regarding climate change impacts, responses, and risks in the United States. The NCA 5 chapters on water and general climate trends were reviewed for this effort. Because the project site is along the Ohio River at Cincinnati, it lies along the boundary between the NCA5 Midwest and Southeast regions, and the Ohio River drains a large portion of the Northeast Region; therefore, the chapters associated with these regions were also reviewed.

The greatest impacts to the project area, being within the Ohio River floodplain, is expected to be a result of precipitation extremes experienced within the watershed with greater frequency. Flooding or drought is the result of complex interactions of the different stages of the water cycle and the timing of complementary or diminishing events, relative to soil moisture, interception, evapotranspiration, solar heating, and a host of other factors. The Northeast and Southeast Regions which include the headwaters of the Ohio River and subsequent large tributaries, like the Kanawha, Big Sandy, and Licking Rivers, are expected to see continuing trends in short-duration, high intensity rainfall events as a result of convective thunderstorms and increase temperatures. The Northeast has most notably seen increases in annual precipitation, while the Midwest has been warming since the first half of the 20th century bringing an increase in annual precipitation Atlantic Ocean tropical events along the East and Gulf Coasts are also more commonly observed to carry significant moisture inland into the watershed. The number of extreme precipitation days in the Midwest has increased by about 45%, with a 10% increase in annual maximum daily precipitation. Temperatures have risen 2.5° Fahrenheit in the continental United States (CONUS) since 1970. In contrast, the increasing temperature and increasing demand for water due to population growth, especially in the Southeast, are affecting land use and in turn affecting interception and retention capacity of soils.

Specific to the project's proximity to the Ohio River and being upstream of Markland Locks and Dam, which maintains a minimum upper pool elevation for the purposes of commercial navigation, the project will be somewhat less affected by increasing drought risk as compared to flooding. While strides have been made to improve pollution from direct sources into the Ohio River, extreme precipitation events leading to localized flooding of developed areas may diminish water quality due to contamination from non-point-source runoff. Combined with increased temperatures and periods of low flow, conditions may create greater risk of conditions supporting harmful algal blooms and decreased oxygen content for aquatic species.

Climate Hydrology Assessment Tool

The USACE Climate Hydrology Tool (CHAT) was used to assess projected, future trends within the Ohio River Basin watershed, HUC 0509; the reach of the Ohio River in which the project site resides is specifically HUC 05090203 – Middle Ohio-Laughery. The tool displays a range of data from 1951 to 2099, with 1951-2006 representing simulated hindcast data and 2006-2099 being forecasted projections. Two scenarios can be viewed reflecting differing projected amounts of greenhouse gas emissions emitted into the atmosphere during that projected timeframe ("representative concentration pathways", RCP). RCP 4.5 assumes that radioactive forcing levels stabilize at 4.5 Watts/square meter (W/m^2 (National Oceanic

Atmospheric Administration 2013), peaking around 2040 before declining (Cal-Adapt n.d.). RCP 8.5 continues to increase radioactive forcing levels throughout the analysis period to 2100 (Cal-Adapt n.d.)

Both RCP scenarios project that annual maximum mean monthly streamflow will increase. The p-value associated with these trends is less than 0.001 which is a strong indication that the trend is statistically significant. Figure 7 shows the range and mean of the projected annual maximum mean monthly streamflow. It is noted that the range of projections can be quite wide, ranging over 120,000 cfs between minimum and maximum at several projected years.

Annual accumulated precipitation is also projected to increase in both scenarios with p-values ranging from 0.0147 to less than 0.001 all of which are statistically significant (less than 0.05). Figure 8 shows the mean and range of annual accumulated precipitation for both RCP scenarios.

The mean and range projections for annual mean 1-day temperatures are shown in Figure 9. Similar increasing trends were projected for annual mean, maximum, and minimum temperature all of which also had p-values less than 0.001, so those trends are statistically significant as well. The range of projections is more consistent than the previous two metrics. Note the comparatively pronounced diversion in the RCP 4.5 and RCP 8.5 projections because of the greenhouse heating associated with the two radioactive forcing level assumptions.

An important caveat to note is that the CHAT is assuming an unregulated watershed. The regulation of flows from the upstream flood risk management system can be expected to have some impact on the annual maximum monthly streamflow trend, although the reservoir system only controls approximately 30% of the watershed, and capability of one or more reservoirs to reduce flows could be impacted by the timing of repeated events in close succession.

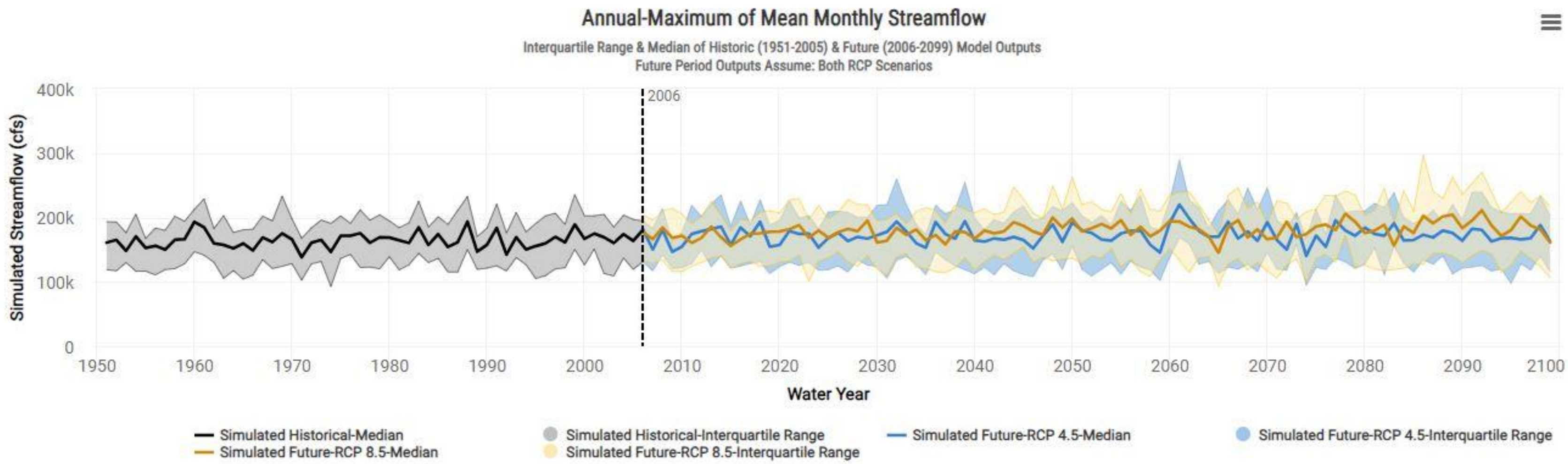


Figure 7: Projected trends in annual maximum mean monthly streamflow for RCP 4.5 and 8.5

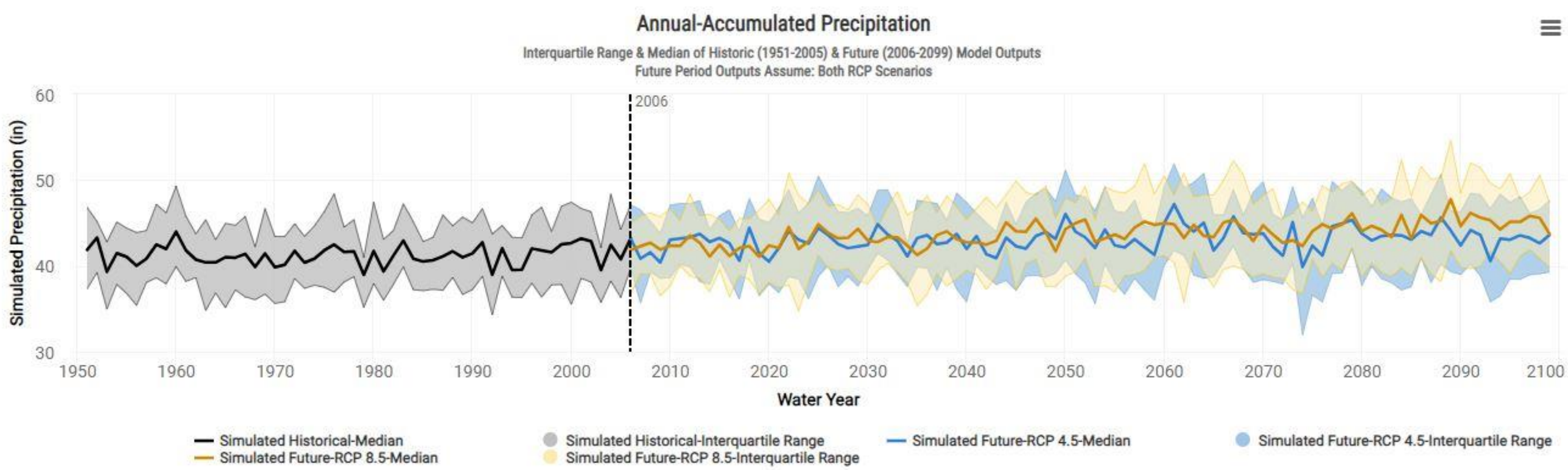


Figure 8: Projected trends in annual accumulated precipitation for RCP 4.5 and 8.5

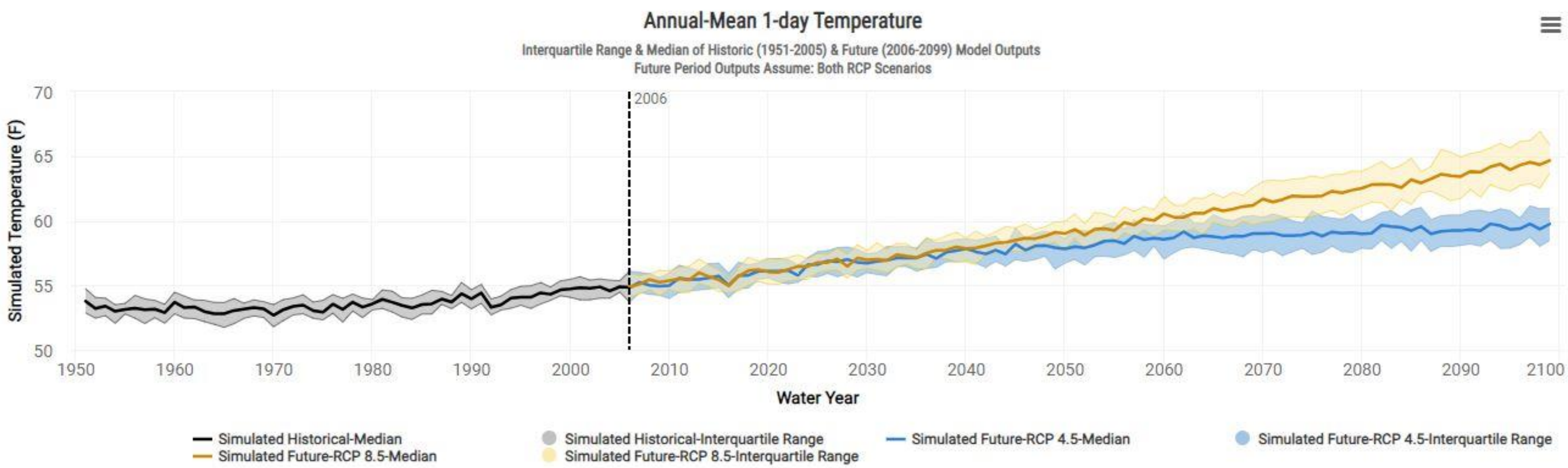


Figure 9: Projected trends in annual mean one day temperature for RCP 4.5 and 8.5

Vulnerability Assessment

The USACE watershed Vulnerability Assessment Tool (VA) facilitates screening level comparative assessment of how vulnerable a given HUC-4 watershed is to the impacts of climate change relative to the other 201 HUC-4 watersheds across the country. HUC-4 0509 (Middle Ohio River) was analyzed within the VA tool and was not identified as being within the top 20% of vulnerable watersheds for Flood Risk Reduction, although this does not mean that the watershed isn't vulnerable. The main indicator driving the Flood Risk Reduction business line in all scenarios is Flood Magnification (568C). Flood magnification is the projected change in how much the monthly flow that is exceeded 10% of the time will change. A value greater than one indicates an expected increase. It should be noted that the VA tool is looking at the watersheds at the HUC-4 scale, which is a very coarse overview; therefore, these projections may not fully apply in the AOI which is much smaller in comparison. VA tool predictions for HUC-4 have significant uncertainty when applied at finer scales.

Summary and Conclusion

This qualitative climate assessment was conducted to satisfy the requirements of ECB 2018-14, and provide helpful information to the decision process about current and projected climatological trends in the project area along the Ohio River at Cincinnati, Ohio.

The climate data and toolsets used in this study indicate a statistically significant increasing trend in observed average, maximum, and minimum yearly temperatures. Small but statistically significant Increasing trends were also observed in monthly total precipitation and maximum daily precipitation per month. Annual maximum streamflow also showed a small increasing trend but was not determined to be statistically significant. A potentially significant nonstationarity in annual maximum flows was identified in recent years, but additional effort is recommended to extend the period of record to confirm whether the abrupt changes in flows are truly significant in the longer term. An analysis of a longer period of stage data at Cincinnati was performed and additional nonstationarities were identified, but one may be explained by the implementation of FRM regulation within the watershed. Unregulated stages and flows were not readily available.

Future projections utilizing models of mid-range and extreme greenhouse warming scenarios show increasing trends in annual maximum mean monthly streamflow and annual cumulative precipitation. Greater increases are expected in annual mean one-day temperatures. All of these trends were identified by the CHAT as statistically significant. Streamflow and precipitation showed substantial variability in the projections with minimal difference between climate scenarios. The interquartile ranges of the modeled temperatures were smaller in magnitude than the modeled streamflow and precipitation ranges. Residual risks to the project primarily are anticipated as a result of increased frequency and/or duration of inundation by increased flooding from greater precipitation on the watershed, whether it be from increased frequency of intense storms, or increasing annual precipitation totals. Increased velocities may also be a side effect of these more intense flows, increasing the potential for damage of the facilities. See Table 1 for a summary of project residual risks related to potential climate changes.

Table 1

Feature of Measure	Trigger	Hazard	Harm	Qualitative Likelihood
Erosion Risk Reduction	Increased precipitation volume from more intense or more frequent storms	Increased volume of runoff from intense storms results increases risk of higher river velocities more frequently	Higher velocities increase potential for surface erosion and erosive damage to recreational features, resulting in larger Operations & Maintenance (O&M) costs.	Possible, but not likely
Educational / Recreational River access	Increased precipitation volumes lead to longer duration of flood inundation at project	Increased duration of inundation diminishes use and damages educational / recreational features	Reduced public use	Possible, but not likely

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Ohio River - Cincinnati, Ohio
(Phase 2)
Appendix C: Environmental

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ohio Ecological Services Field Office
4625 Morse Road, Suite 104
Columbus, OH 43230-8355
Phone: (614) 416-8993 Fax: (614) 416-8994

In Reply Refer To: August 30, 2023
Project Code: 2023-0123388
Project Name: Cincinnati Riverfront Project

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

To Whom It May Concern:

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

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

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

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

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

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

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

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

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

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

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

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

This species list is provided by:

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

PROJECT SUMMARY

Project Code: 2023-0123388
Project Name: Cincinnati Riverfront Project
Project Type: Shoreline Stabilization
Project Description: Complete Smale Park by creating a safe recreational connection between the usable areas of the park and the water while also reducing erosion potential. Erosion around Smale Park shore is threatening park investment and there is no safe connection between the park and the river posing a hazard to public safety. Additionally there is a desire to increase access to the park for diverse user groups such as making the park more ADA accessible. Further, there are a lack of trees and native vegetation along the waterfront that could help serve as an attractant for more wildlife species. Therefore, the Corps wants to address these concerns to make the park safer and more recreation and wildlife friendly.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@39.09578805,-84.50684823490931,14z

Counties: Hamilton County, Ohio

ENDANGERED SPECIES ACT SPECIES

There is a total of 8 threatened, endangered, or candidate species on this species list.

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

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

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

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

MAMMALS

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

CLAMS

NAME	STATUS
Fanshell *Cyprogenia stegaria* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4822	Endangered
Pink Mucket (pearlymussel) *Lampsilis abrupta* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7829	Endangered
Sheepnose Mussel *Plethobasus cyphyus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6903	Endangered
Snuffbox Mussel *Epioblasma triquetra* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4135	Endangered

INSECTS

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

CRITICAL HABITATS

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

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

IPAC USER CONTACT INFORMATION

Agency:	Army Corps of Engineers
Name:	Jonathan Matthews
Address:	600 Martin Luther King Jr. Place
Address Line 2:	Room 722
City:	Louisville
State:	KY
Zip:	40202
Email	jonathan.a.matthews@usace.army.mil
Phone:	5023156866

United States Department of Agriculture

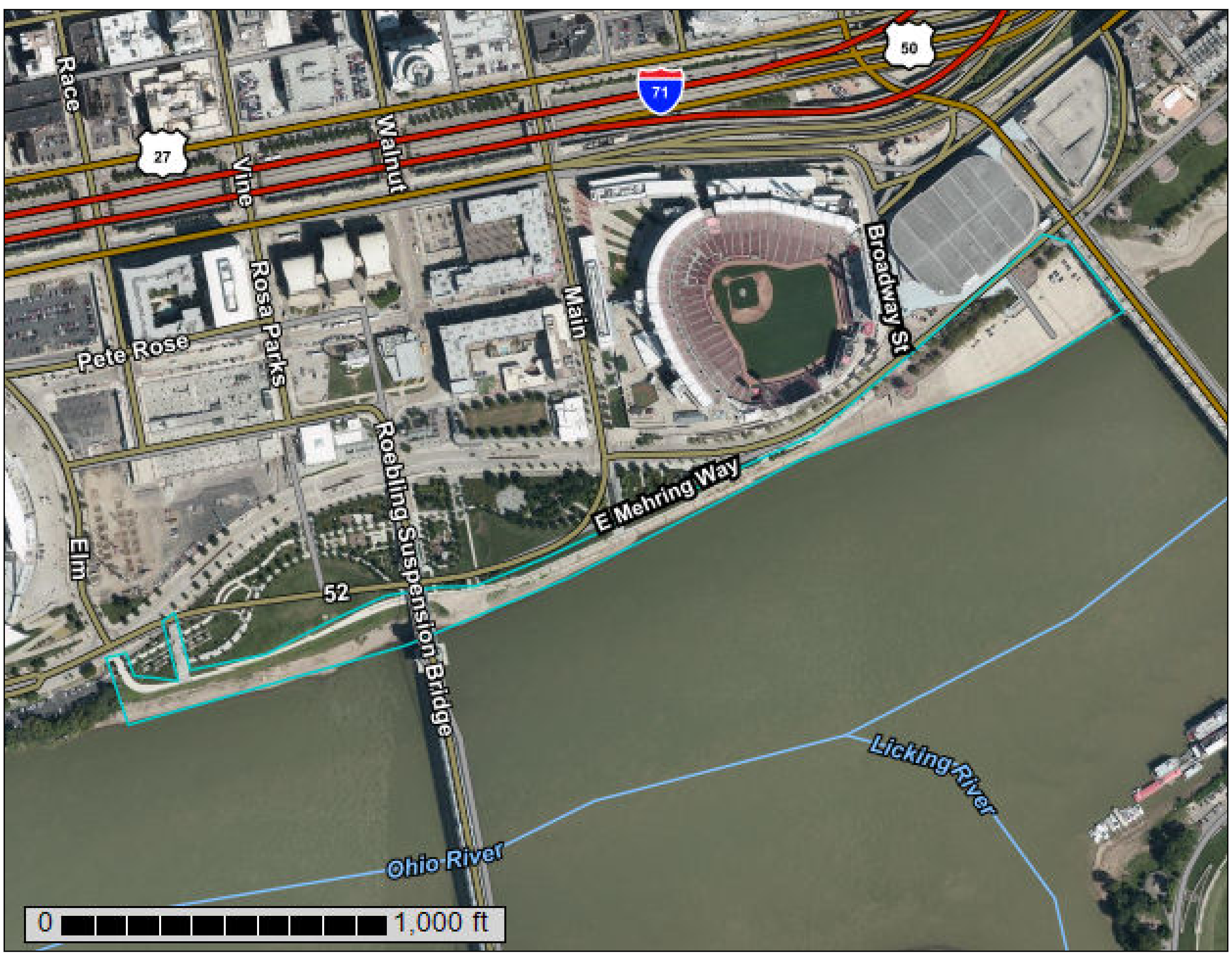
NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for

Hamilton County, Ohio



August 30, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

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

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

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

Soil Survey Area: Hamilton County, Ohio
Survey Area Data: Version 22, Sep 9, 2022

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

Date(s) aerial images were photographed: Aug 24, 2019—Sep 18, 2019

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
UrO	Urban land, 0 to 12 percent slopes, occasionally flooded	2.0	19.9%
UrUXCO	Urban land-Udorthents complex, 0 to 12 percent slopes, occasionally flooded	1.9	18.3%
UUWXFF	Urban land-Udorthents-Wheeling complex, 2 to 75 percent slopes, frequently flooded	4.4	42.5%
W	Water	2.0	19.3%
Totals for Area of Interest		**10.3**	**100.0%**

Map Unit Descriptions

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

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

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

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

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

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

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

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

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

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

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

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

Hamilton County, Ohio

UrO—Urban land, 0 to 12 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2q6yz
Elevation: 380 to 600 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 172 to 204 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land, occasionally flooded: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Minor Components

Udorthents, occasionally flooded

Percent of map unit: 10 percent
Hydric soil rating: No

UrUXCO—Urban land-Udorthents complex, 0 to 12 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2q6yy
Elevation: 480 to 1,000 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 172 to 204 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land, occasionally flooded: 60 percent
Udorthents, occasionally flooded, and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Occasionally Flooded

Properties and qualities

Slope: 0 to 12 percent
Depth to restrictive feature: More than 80 inches
Runoff class: High
Depth to water table: More than 80 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None

UUWXFF—Urban land-Udorthents-Wheeling complex, 2 to 75 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2qh22
Elevation: 480 to 1,000 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 172 to 204 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land, frequently flooded: 50 percent
Udorthents, frequently flooded, and similar soils: 30 percent
Wheeling, frequently flooded, and similar soils: 15 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Frequently Flooded

Properties and qualities

Slope: 0 to 75 percent
Depth to restrictive feature: More than 80 inches
Runoff class: High
Depth to water table: More than 80 inches
Frequency of flooding: NoneFrequent
Frequency of ponding: None

Description of Wheeling, Frequently Flooded

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fine-loamy alluvium

Typical profile

Ap - 0 to 6 inches: loam
Bt - 6 to 49 inches: loam
C - 49 to 85 inches: stratified sandy loam

Properties and qualities

Slope: 2 to 75 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: NoneFrequent

Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 12.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F121XY016KY - Well Drained & Moderately Well Drained Terrace
Hydric soil rating: No

Minor Components

Chagrin, frequently flooded

Percent of map unit: 3 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Nelse, frequently flooded

Percent of map unit: 2 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

W—Water

Map Unit Composition

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

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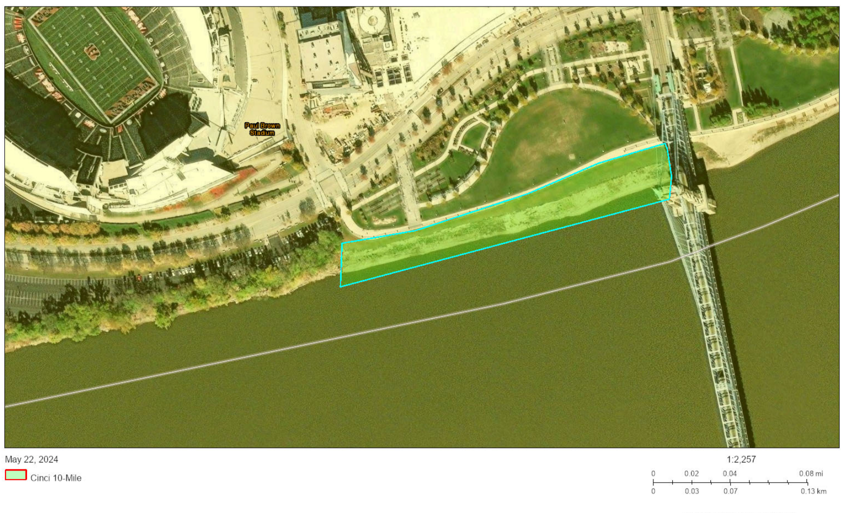
EJScreen Community Report

This report provides environmental and socioeconomic information for user-defined areas, and combines that data into environmental justice and supplemental indexes.

Cincinnati, OH

10 miles Ring around the Area
Population: 789,342
Area in square miles: 318.21

A3 Landscape



COMMUNITY INFORMATION

Low income: 34 percent

People of color: 31 percent

Less than high school education: 9 percent

Limited English households: 1 percent

Unemployment: 5 percent

Persons with disabilities: 14 percent

Male: 49 percent

Female: 51 percent

76 years
Average life expectancy

$36,629
Per capita income

Number of households: 335,410

Owner occupied: 56 percent

BREAKDOWN BY RACE

White: 69%

Black: 22%

American Indian: 0%

Asian: 2%

Hawaiian/Pacific Islander: 0%

Other race: 0%

Two or more races: 4%

Hispanic: 4%

LANGUAGES SPOKEN AT HOME

LANGUAGE	PERCENT
English	93%
Spanish	2%
French, Haitian, or Cajun	1%
Other Indo-European	1%

BREAKDOWN BY AGE

Other and Unspecified	1%
Total Non-English	7%

From Ages 1 to 4	6%
From Ages 1 to 18	23%
From Ages 18 and up	77%
From Ages 65 and up	15%

LIMITED EN I E KIN BRE KDOWN

Speak Spanish	31%
Speak Other Indo-European Languages	31%
Speak Asian-Pacific Island Languages	16%
Speak Other Languages	22%

Notes: Numbers may not sum to tota s due to rounding. Hispanic popu ation can be of any race.
Source: U.S. Census Bureau, American Community Survey (ACS) 2017 -2021. Life expectancy data comes from the Centers for Disease Contro .

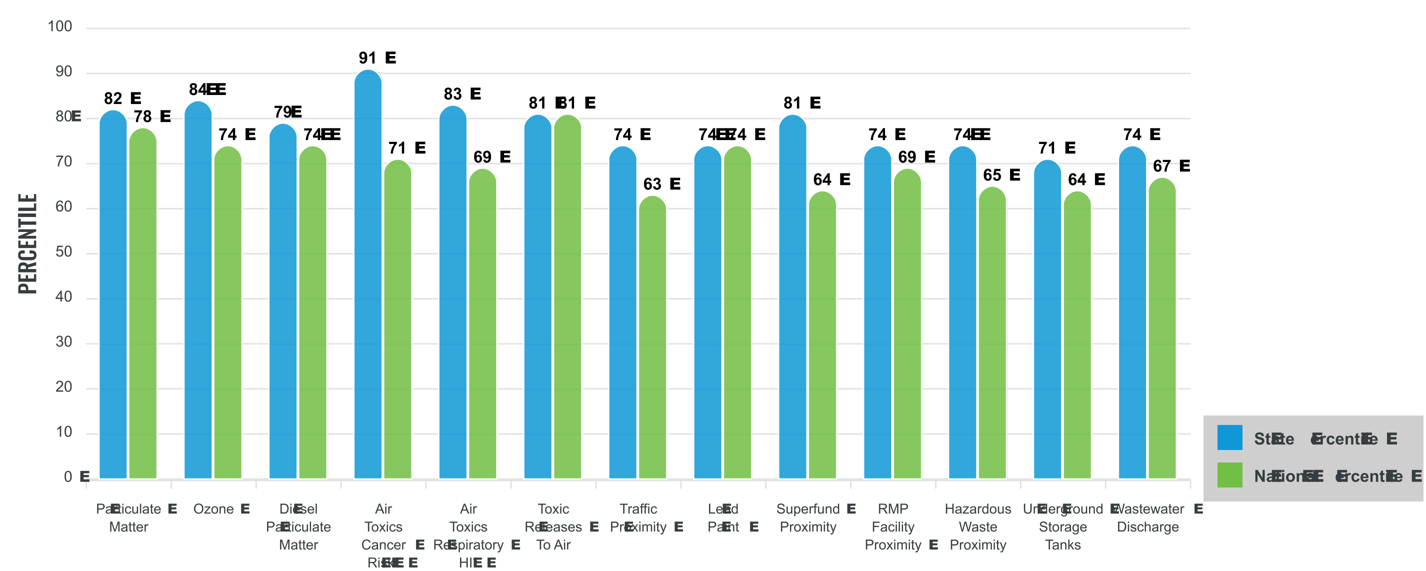
Environmental Justice & Supplemental Indexes

The environmental justice and supplemental indexes are a combination of environmental and socioeconomic information. There are thirteen EJ indexes and supplemental indexes in EJScreen reflecting the 13 environmental indicators. The indexes for a selected area are compared to those for all other locations in the state or nation. For more information and calculation details on the EJ and supplemental indexes, please visit the EJScreen website.

EJ INDEXES

The EJ indexes help users screen for potential EJ concerns. To do this, the EJ index combines data on low income and people of color populations with a single environmental indicator.

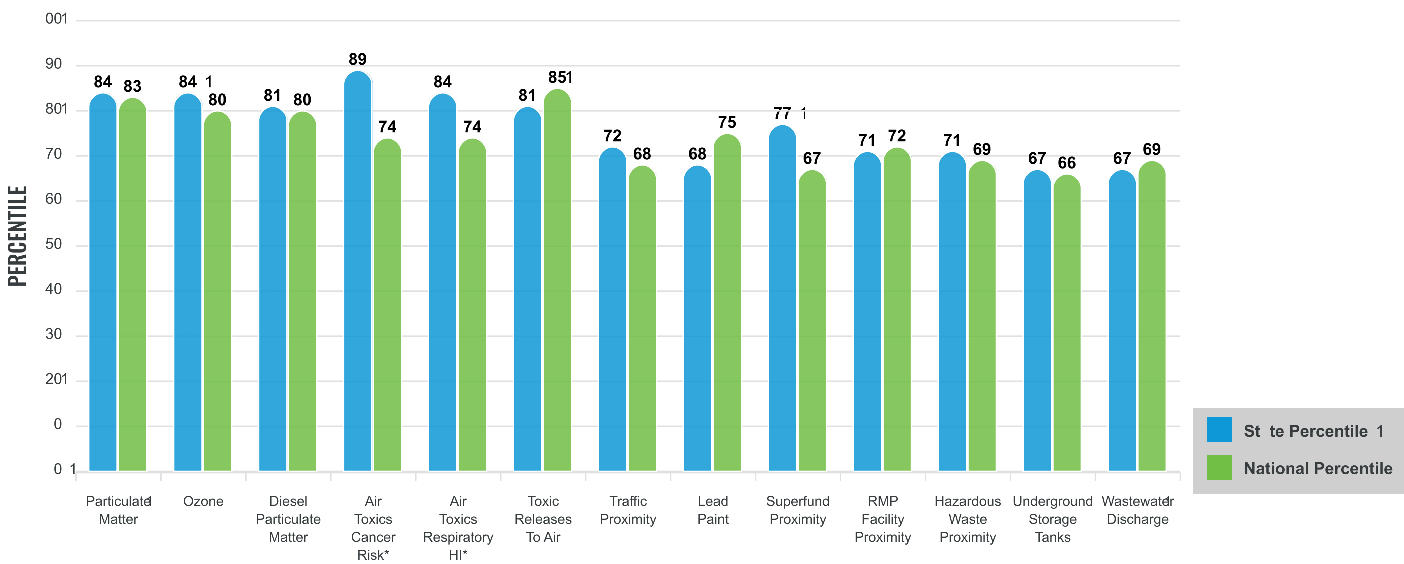
EJ INDEXES FOR THE SELECTED LOCATION



SUPPLEMENTAL INDEXES

The supplemental indexes offer a different perspective on community-level vulnerability. They combine data on percent low-income, percent linguistically isolated, percent less than high school education, percent unemployed, and low life expectancy with a single environmental indicator.

SUPPLEMENTAL INDEXES FOR THE SELECTED LOCATION1



These perce es pr v de perspec ve h w he se ec ed b ck gr up r buffer area c mpares he e re s a e r a . 1

Report for 0 miles Ring around the Area 1

EJScreen Environmental and Socioeconomic Indicators Data w

SELECTED VARIABLES	VALUE	STATE AVERAGE	PERCENTILE IN STATE	USA AVERAGE	PERCENTILE IN USA
POLLUTION AND SOURCES					
Particulate Matter (μg/m^3)	9.94	9.18	87	8.08	90
Ozone (ppb)	65.7	61.4	87	61.6	79
Diesel Particulate Matter (μg/m^3)	0.435	0.261	92	0.261	87
Air Toxics Cancer Risk* (lifetime risk per million)	30	22	0	25	5
Air Toxics Respiratory HI*	0.35	0.25	51	0.31	31
Toxic Releases to Air	21,000	10,000	92	4,600	96
Traffic Proximity (daily traffic count/distance to road)	200	110	85	210	74
Lead Paint (% Pre-1960 Housing)	0.52	0.44	61	0.3	75
Superfund Proximity (site count/km distance)	0.086	0.094	72	0.13	62
RMP Facility Proximity (facility count/km distance)	0.67	0.49	78	0.43	81
Hazardous Waste Proximity (facility count/km distance)	2.1	1.3	80	1.9	75
Underground Storage Tanks (count/km^2)	3.6	2.9	72	3.9	70
Wastewater Discharge (toxicity-weighted concentration/m distance)	0.029	0.47	73	22	75
SOCIOECONOMIC INDICATORS					
Demographic Index	32%	28%	69	35%	54
Supplemental Demographic Index	14%	14%	58	14%	58
People of Color	31%	24%	73	39%	51
Low Income	33%	33%	57	31%	60
Unemployment Rate	5%	6%	62	6%	60
Limited English Speaking Households	1%	1%	80	5%	61
Less Than High School Education	9%	10%	58	12%	54
Under Age 5	6%	6%	63	6%	64
Over Age 64	14%	18%	41	17%	45
Low Life Expectancy	21%	21%	48	20%	63

*Diesel particulate matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's Air Toxics Data Update, ich is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https:// .epa.gov/haps/air-toxics-data-update. w

Sites reporting to EPA within defined area:

Superfund 0
Hazardous Waste, Treatment, Storage, and Disposal Facilities 40

Other community features within defined area:

Schools 205
Hospitals 55

Water Dischargers	969
Air Pollution	396
Brownfields	162
Toxic Release Inventory	204

Places of Worship	969

Other environmental data:

Air Non-attainment	Yes
Impaired Waters	Yes

Selected location contains American Indian Reservation Lands*	No
Selected location contains a "Justice40 (CEJST)" disadvantaged community	Yes
Selected location contains an EPA IRA disadvantaged community	Yes

Report for es R ng around the Area

EJScreen Env ron nt l nd Soc oecono c Ind c tors t m

HEALTH INDICATORS					
INDICATOR	VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Low Life Expectancy	21%	21%	48	20%	63
Heart Disease	6.4	7.2	26	6.1	58
Asthma	11.2	10.7	69	10	81
Cancer	6	6.6	28	6.1	45
Persons with Disabilities	12.9%	14.8%	41	13.4%	52

CLIMATE INDICATORS					
INDICATOR	VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Flood Risk	7%	7%	68	12%	54
Wildfire Risk	0%	0%	0	14%	0

CRITICAL SERVICE GAPS					
INDICATOR	VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Broadband Internet	12%	15%	51	14%	54
Lack of Health Insurance	6%	7%	54	9%	44
Housing Burden	Yes	N/A	N/A	N/A	N/A
Transportation Access	Yes	N/A	N/A	N/A	N/A
Food Desert	Yes	N/A	N/A	N/A	N/A

Report for es R ng around the Area **m** www.epa.gov e een

SURVEY FOR FRESHWATER MUSSELS IN THE OHIO RIVER
PHYLLIS W. SMALE RIVERFRONT PARK
CINCINNATI, OHIO

Prepared for:

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Prepared by:

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PO Box 1851
Powell, TN 37849

September 2013

DBC Project 1253

SECTION 1

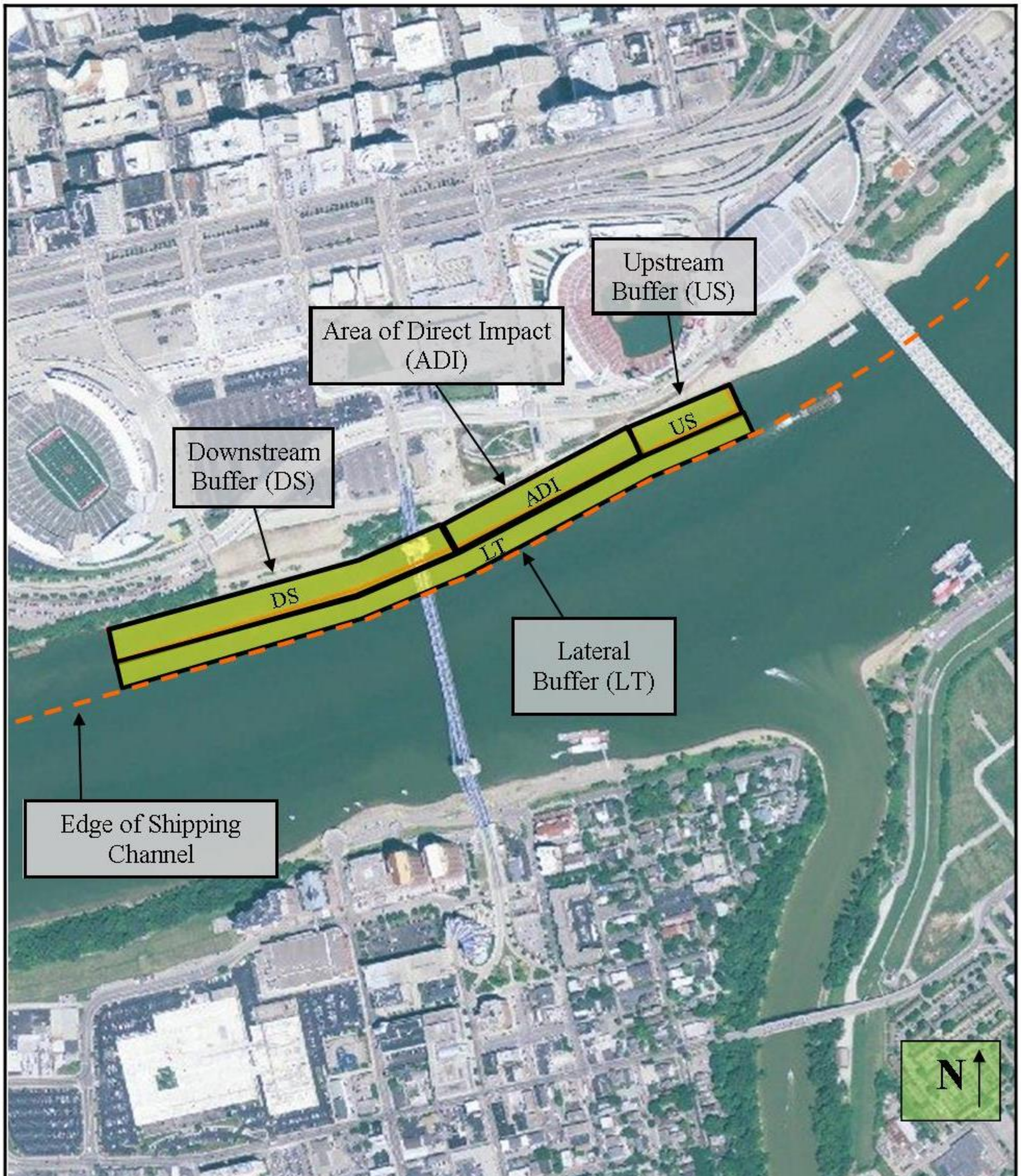
INTRODUCTION

The proposed expansion of the Phyllis W. Smale Riverfront Park in Cincinnati, Ohio will include approximately 340 linear meters (m; 1,120 ft) of substrate disturbance (dredging, emplacement of steel sheet piling, and construction of concrete bulkheads) along the right descending bank of the Ohio River at approximate River Mile (RM) 470. Substrate disturbance will extend riverward between approximately 37 and 42 m (120 and 138 ft) from the existing shoreline.

In conversations with Ms. Angela Boyer of the U.S. Fish and Wildlife Service (USFWS), it was determined a freshwater mussel survey was required for the project. Further, the mussel survey was to follow guidelines for a Linear Project (New Facility) per the Ohio Department of Natural Resources and the USFWS Ohio Ecological Services Field Office's *Ohio Mussel Survey Protocol* (Protocol) released in May 2013. The Ohio River at RM 470 is considered a Group 4 stream (Large River, Federally Listed Species expected) according to Appendix A of the Protocol. As such, a mussel survey was to be conducted in the Area of Direct Impact (ADI), which includes all of the river channel where substrate disturbance (dredging, emplacement of steel sheet piling, etc.) would occur plus upstream (US), downstream (DS), and lateral (LT) buffer areas. The Protocol gives the following dimensions for the buffer areas on a Linear Project (New Facility) constructed in a Group 4 stream:

- US (150 m)
- DS (500 m)
- LT (150 m)

The Protocol defines the LT buffer as an additional 150 m riverward from the outside edge of the substrate disturbance. The project substrate disturbance extends between 37 and 42 m. Therefore, application of the LT buffer would extend the mussel survey area between 187 and 192 m riverward and approximately midway across the Ohio River channel, well into the shipping channel. Due to safety concerns and the unlikely occurrence of significant mussel resources in areas of the river where frequent and heavy shipping traffic occurs, USFWS advised the LT should extend from the ADI only to the approximate edge of the shipping channel (A. Boyer, pers. comm.). Based on a review of aerial photographs and observing actual barge traffic from the shoreline at the project site in the vicinity of RM 470, the edge of the shipping channel along the right descending bank is approximately 60 m offshore. Thus, the dimensions of the survey area are defined as 990 m long (340 m + 150 m + 500 m) x 60 m wide (= 59,400 m^2). The ADI, US, DS, and LT areas are shown in Figure 1-1.



Photograph Source: Mapcard Photograph Date: 15 June 2012	Figure 1-1 Survey Areas on Ohio River at Phyllis W. Smale Riverfront Park
Dinkins Biological Consulting PO Box 1851 Powell, TN 37849	1,000 ft (305 m)

1-2

SECTION 2

METHODS

Fieldwork was conducted 4 – 7 September 2013. During this period, the U.S. Geological Survey (USGS) gage on the Ohio River at Cincinnati reported the river ranged from 26.3 to 27.2 ft. According to Mr. Barry Vessels of the U.S. Army Corps of Engineers (COE), the COE does not allow the Ohio River at Cincinnati to fall below a gage height of 26.0 ft so as to maintain sufficient depth for commercial traffic. Thus, during the survey period, the river was at or just above minimum river flow conditions. A graph taken from the USGS gage on the Ohio River at Cincinnati for the survey period is provided in Appendix A.

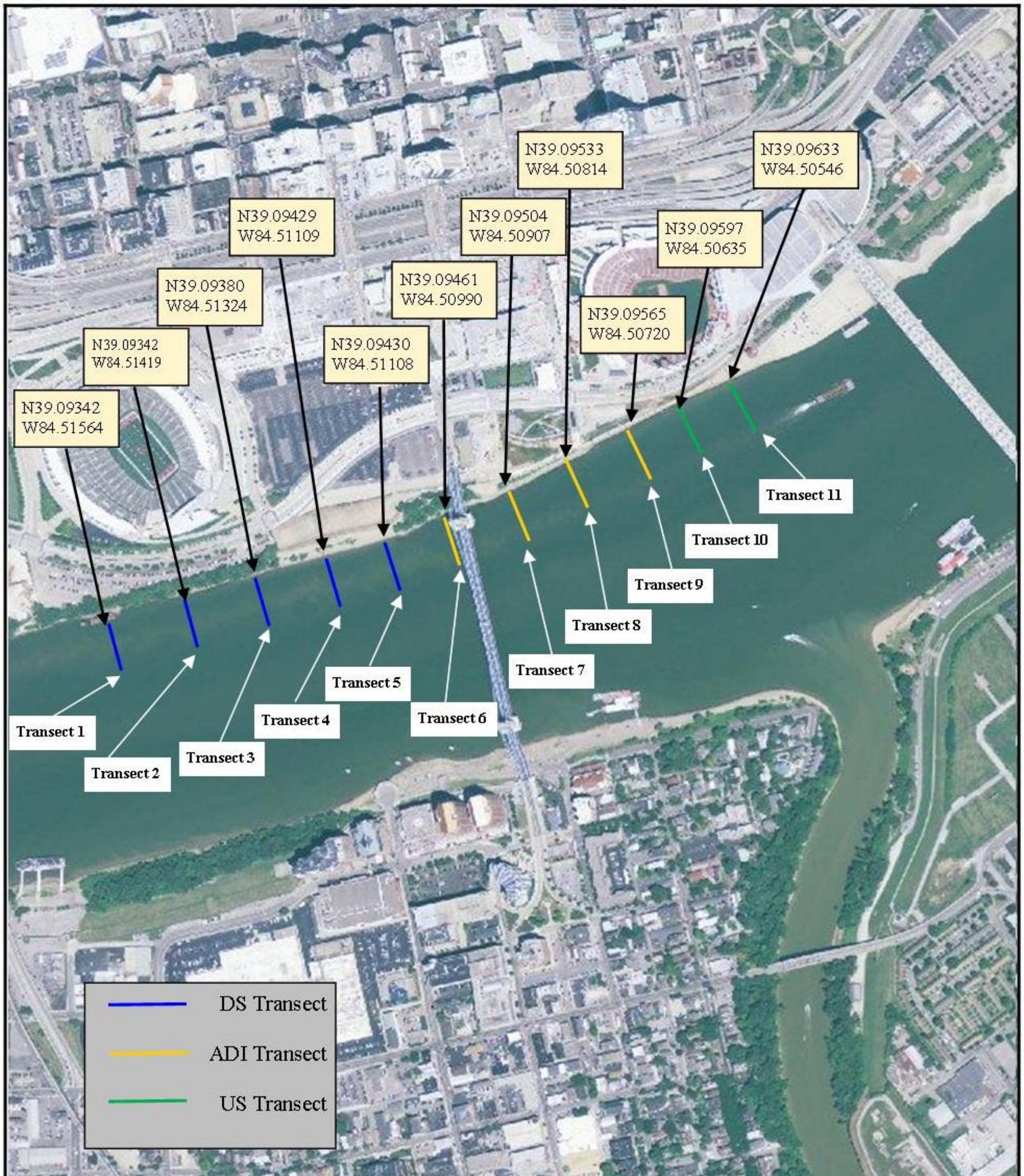
Transect Sampling

The Phase 1 survey for native mussels in the four search areas (ADI, US, DS, and LT) was conducted using transects placed along the river bottom starting at the shoreline and emanating riverward perpendicular to the shoreline to the edge of the shipping channel (Figure 2-1, Table 2-1). Based on guidance provided by USFWS, transects in the DS search area were placed 100 m apart. The ADI and US buffer were not evenly divisible into 100 m increments; therefore, in these areas the transects were spaced slightly less than 100 m apart. There were five transects in the DS zone, four transects in the ADI zone, and two transects in the US zone. The length of each transect was sufficient to span the width of the ADI, DS, and US zones plus the LT buffer. Each transect was 60 m in length and was sub-divided into 10-m segments. Along each transect, two surveyors searched an area 1-m wide for mussels.

In each 10-m segment, all mussels found within 0.5 m of either side of the transect were bagged and brought to the surface for further processing and positive identification. Mussels were kept in water at all times, except for the brief period needed to be measured or photographed. Mussels observed along each transect were recorded as occurring in a particular segment. Appropriate information describing the depth and habitat conditions along each transect segment, such as depositional areas, silt, mud, detritus, hard-pan, sand, and scoured areas where mussels cannot burrow (bedrock, boulder, etc.), were recorded for each segment. The beginning point of each transect was recorded using a hand-held Global Positioning System (GPS).

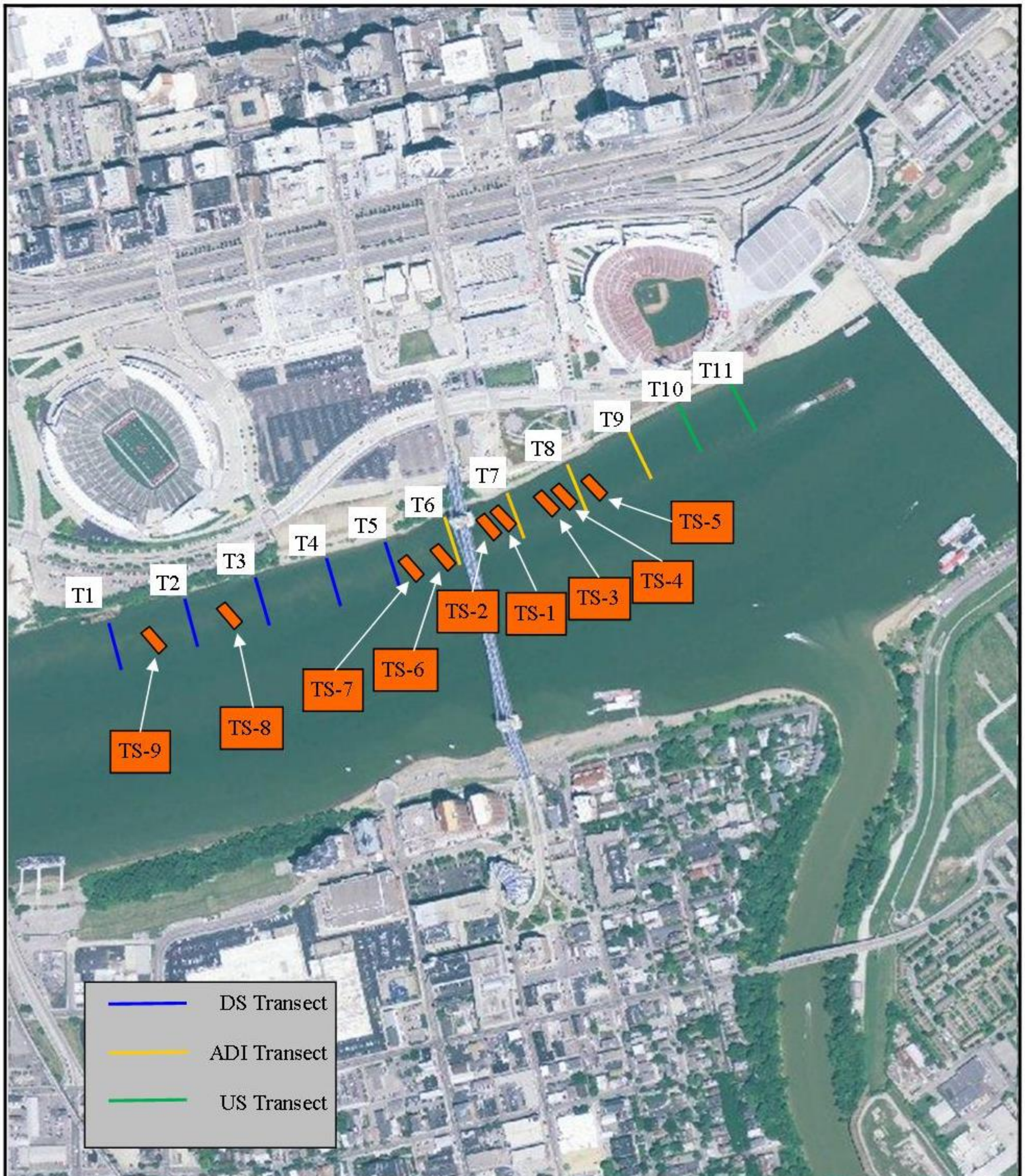
Timed Surveys

There is no recent data on the mussel resources of the Ohio River in the vicinity of RM 470 (A. Boyer, pers. comm.). For this reason, data from the transects was used to determine areas where mussels were most frequently encountered, and a series of timed searches, consisting of 10 to 20 minute increments, was conducted in these areas. Timed searches were conducted until at least 6 samples were collected with the addition of no new species. In all, nine timed searches were conducted (Figure 2-2).



Photograph Source: Mapcard Photograph Date: 15 June 2012	Figure 2-1 Locations of Mussel Transects in Ohio River at Phyllis W. Smale Riverfront Park
Dinkins Biological Consulting PO Box 1851 Powell, TN 37849	1,000 ft (305 m)

2-2



Photograph Source: Mapcard Photograph Date: 15 June 2012	Figure 2-2 Locations of Timed Searches in Ohio River at Phyllis W. Smale Riverfront Park
Dinkins Biological Consulting PO Box 1851 Powell, TN 37849	1,000 ft (305 m)

Table 2-1. Location of Mussel Transects in Ohio River in Proposed Phyllis W. Smale Riverfront Park, Cincinnati, Ohio Survey Area (4-7 September 2013)

Transect	Latitude	Longitude	Date and Time	Location*
01	N39.09342	W84.51564	04-SEP-13 0913	Lower DS Zone
02	N39.09342	W84.51419	04-SEP-13 1047	Mid-lower DS Zone
03	N39.09380	W84.51324	04-SEP-13 1300	Middle DS Zone
04	N39.09429	W84.51109	04-SEP-13 1422	Mid-upper DS Zone
05	N39.09430	W84.51108	05-SEP-13 0904	Upper DS Zone
06	N39.09461	W84.50990	05-SEP-13 1011	Lower ADI Zone
07	N39.09504	W84.50907	05-SEP-13 1304	Mid-lower ADI Zone
08	N39.09533	W84.50814	05-SEP-13 1428	Mid-upper ADI Zone
09	N39.09565	W84.50720	06-SEP-13 0837	Upper ADI Zone
10	N39.09597	W84.50635	06-SEP-13 0938	Lower US Zone
11	N39.09633	W84.50546	06-SEP-13 1053	Upper US Zone

*DS = Downstream, ADI = Area of Direct Impact, US = Upstream

Table 2-2. Location of Timed Searches in Ohio River in Proposed Phyllis W. Smale Riverfront Park, Cincinnati, Ohio Survey Area (4-7 September 2013)

Timed Search	Date (Start Time)	Location	Visibility (ft.)	Depth (ft.)	No. of Searchers	Man Hours (hr.)
TS-1	07 Sept 2013 (0907)	Just downstream of Transect 7. Worked diagonally upstream. Began timed search at depth where mussels were found on Transect 7	1.5	18-26	2	0.33
TS-2	07 Sept 2013 (0940)	Just upstream of TS-1; closer to Transect 7	2.0	15-20	2	0.17
TS-3	07 Sept 2013 (1009)	Just upstream of TS-2; midway between Transects 7 and 8	2.0	14-15	2	0.17
TS-4	07 Sept 2013 (1030)	Just below Transect 8; angled slightly upstream toward Transect 9	2.0	15-18	2	0.17
TS-5	07 Sept 2013 (1100)	Started just above Transect 8; angled toward channel then turned upstream at 17ft.	2.0	17-18	2	0.17
TS-6	07 Sept 2013 (1140)	Started at Transect 6; went straight out and angled upstream; began approximately 15 ft. upstream of Roebling Bridge pier.	1.0	20-26	2	0.17
TS-7	07 Sept 2013 (1354)	Started at 200 ft. downstream of Roebling Bridge; angled upstream towards bridge	0.5	13-15	1	0.17
TS-8	07 Sept 2013 (1427)	Between Transects 2 and 3; approximately 800 ft. downstream of Roebling Bridge	1.0	12-15	1	0.17
TS-9	07 Sept 2013 (1457)	Between Transects 3 and 4	0.5	8-12	1	0.17
					Total Time:	1.7

SECTION 3

SUMMARY OF RESULTS

A summary of substrate characteristics and depths encountered along each transect is provided in Table 3-1. Maximum depths ranged from 21 to 34 ft (Table 3-1). In general, substrates in the survey area were heterogeneous with most substrate types being represented. Zebra Mussels were present in abundance and thickly covered all hard substrate types. Along most transects, depths increased gradually toward the center of the channel. The concrete brick-like material that has been placed below the retaining wall adjacent to the ADI and US zones extends 20 meters out into the river along the three most upstream transects (Transects 9, 10, and 11).

A total of 18 live mussels representing five species was found along all transects combined (Tables 3-2 and 3-3). No federally listed species were observed. A single live individual of *Quadrula nodulata* (Wartyback) was found along Transect 7 (Segment 5). *Quadrula nodulata* is listed by the Ohio Division of Wildlife as State Endangered. The species is known to occur in the Ohio River at Cincinnati and historically occurred as far upstream in the Ohio as Portland (Watters, et al.; 2009). The two most common species found during transect searches were *Potamilus alatus* (Pink Heelsplitter) (N = 10 individuals) and *Amblema plicata* (Threeridge) (N = 5 individuals). The greatest number of live mussels (N = 4) and live species (N = 3) was observed along Transect 8. No live mussels were found along Transects 4, 5, 6, and 11, and no live mussels were found in the first segment of any transect (Table 3-4).

A summary of the results of the timed searches is provided in Table 3-5. The purpose of timed searches is to focus a search effort in habitat that has been shown to harbor the greatest number of species, either through historical data or through the results of transect sampling. Using this method of focused search effort optimizes the likelihood that all species occurring in the survey area will be discovered. To that end, timed searches were concentrated around transects in the ADI and the DS zones. A total of only three live mussels representing one species (*Amblema plicata*, Threeridge) were found during the timed searches.

These findings were the result of a Phase 1 survey. No Phase 2 survey was required according to the guidelines established in the Protocol. A Phase 2 survey would have been required if a trigger had been met because avoidance of the mussel community in the Phase 1 survey area was not an option. Phase 1 survey results that would have triggered a Phase 2 survey were:

1. Five live individuals/10-m segment in any area of the Phase 1 survey and/or
2. Presence of at least three live species not listed in Table 1 of the Protocol along any one transect or within a qualitative (i.e., timed) survey conducted between transects.

No more than three live individuals were found on any 10-m transect segment. A total of five live species were found during transect searches; however, no more than two live species were found on any given transect, and only one species was found in the timed searches.

Table 3-1. Substrate Characteristics and Depths in Ohio River in Proposed Phyllis W. Smale Riverfront Park, Cincinnati, Ohio Survey Area (4-7 September 2013)

Transect	**Substrate**	**Segment**					
		1	2	3	4	5	6
1	Silt	10	10	10	10	10	10
	Sand	30	30	10	10	10	10
	Gravel	30	30	40	40	40	40
	Cobble	30	30	40	40	40	40
	Boulder						
	Bedrock						
	Wood Debris						
	Depth (ft)	**9**	**10**	**21**	**26**	**29**	**28**
	Time Period (min)	**41 (x 2 people)**					
2	Silt	50	10	10	10	10	10
	Sand		20	20	10	10	10
	Gravel	50	50	50	40	40	40
	Cobble		20	20	40	40	40
	Boulder						
	Bedrock						
	Wood Debris						
	Depth (ft)	**9**	**14**	**19**	**23**	**25**	**28**
	Time Period (min)	**28 (x 2 people)**					
3	Silt	100	30	10	10		10
	Sand		30	40	40	30	30
	Gravel		30	40	40	30	40
	Cobble		10	10	10	30	20
	Boulder					10	
	Bedrock						
	Wood Debris						
	Depth (ft)	**8**	**13**	**16**	**22**	**25**	**29**
	Time Period (min)	**41 (x 2 people)**					
4	Silt	90	90	30	10	10	10
	Sand				30	30	30
	Gravel	10	10	70	30	30	30
	Cobble				30	30	30
	Boulder						
	Bedrock						
	Wood Debris						
	Depth (ft)	**6**	**10**	**17**	**25**	**29**	**34**
	Time Period (min)	**18 (x 2 people)**					

Table 3-1 (Continued)

5	Silt	70	60	60	60	30	30
	Sand					20	20
	Gravel						
	Cobble	30	40	40	40	20	20
	Boulder					30	30
	Bedrock						
	Wood Debris						
	Depth (ft)	**6**	**6**	**11**	**17**	**26**	**27**
	Time Period (min)	**24 (x 2 people)**					
6	Silt	60	60	20	30	60	20
	Sand						10
	Gravel	10	30	40	10		10
	Cobble	30	10	20	30	20	30
	Boulder			20	30		30
	Bedrock					20	
	Wood Debris						
	Depth (ft)	**6**	**10**	**14**	**22**	**25**	**29**
	Time Period (min)	**28 (x 2 people)**					
7	Silt	30	10	10	20	10	10
	Sand		30	30		30	10
	Gravel		30	30	70	30	80
	Cobble	70	30	30	10	30	
	Boulder						
	Bedrock						
	Wood Debris						
	Depth (ft)	**8**	**12**	**18**	**24**	**26**	**29**
	Time Period (min)	**34 (x 2 people)**					
8	Silt	20	10	10	10	10	
	Sand				30	20	
	Gravel	20	70	70	30	70	
	Cobble	60	20	20	20		
	Boulder						
	Bedrock						100
	Wood Debris				10		
	Depth (ft)	**6**	**12**	**17**	**20**	**23**	**26**
	Time Period (min)	**32 (x 2 people)**					

Table 3-1 (Continued)

9	Silt			40	30	20	20
	Sand				20	30	30
	Gravel			30	30	30	30
	Cobble			30	20	20	20
	Boulder						
	Bedrock						
	Wood Debris						
	Man-made Stone Substrate	100	100				
	Depth (ft)	**5**	**9**	**15**	**19**	**22**	**23**
	Time Period (min)	**29 (x 2 people)**					
10	Silt			50	50	50	10
	Sand			30	30	30	40
	Gravel			20	20	20	50
	Cobble						
	Boulder						
	Bedrock						
	Wood Debris						
	Man-made Stone Substrate	100	100				
	Depth (ft)	**5**	**10**	**13**	**18**	**22**	**22**
	Time Period (min)	**28 (x 2 people)**					
11	Silt				**50**	**50**	**50**
	Sand				**50**	**50**	**50**
	Gravel						
	Cobble						
	Boulder						
	Bedrock			**100***			
	Wood Debris						
	Man-made Stone Substrate	**100**	**100**				
	Depth (ft)	**5**	**9**	**14**	**15**	**15**	**21**
	Time Period (min)	**22 (x 2 people)**					

*May have been concrete

Table 3.2 Native Freshwater Mussels Found in Ohio River in Proposed Phyllis W. Smale Riverfront Park, Cincinnati, Ohio Survey Area (4-7 September 2013)

Scientific Name	**Common Name**	**Federal Status[1]**	**State Status[2]**	**Condition**
Amblema plicata	Threeridge	None	None	Live
Ligumia recta	Black Sandshell	None	None	Live
Obliquaria reflexa	Threehorn Wartyback	None	None	Live
Potamilus alatus	Pink Heelsplitter	None	None	Live
Quadrula quadrula	Mapleleaf	None	None	Weathered shells
Quadrula nodulata	Wartyback	None	Endangered	Live

[1]USFWS 2005
[2]Ohio Division of Wildlife, 1988

Table 3-3. Summary of Mussel Transects in Ohio River in Proposed Phyllis W. Smale Riverfront Park, Cincinnati, Ohio Survey Area (4-7 September 2013)

Species		Transects									**Total (Live)**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	
Amblema plicata	2							1	2			5
Ligumia recta								1				1
Obliquaria reflexa								1(W)		1		1
Potamilus alatus	1	2	1			1(FD)	1	2	1	2	1(W)	10
Quadrula nodulata							1					1
Quadrula quadrula								1 (W)				0
Total Live Individuals	**3**	**2**	**1**	**0**	**0**	**0**	**2**	**4**	**3**	**3**	**0**	**18**
Total Live Species	**2**	**1**	**1**	**0**	**0**	**0**	**2**	**3**	**2**	**2**	**0**	**5**

FD = Fresh dead shell
W= Weathered dead shell

Table 3-4. Summary of live mussels found on each transect and segment in Proposed Phyllis W. Smale Riverfront Park, Cincinnati, Ohio Survey Area (4-7 September 2013)

Transect	**Segment**						**Total Live Mussels**	**Total Live Species**
	1	**2**	**3**	**4**	**5**	**6**		
1		3(2)					3	2
2		1(1)	1(1)				2	1
3			1(1)				1	1
4							0	0
5							0	0
6							0	0
7			1(1)		1(1)		2	2
8		1(1)		1(1)		2(2)	4	2
9					2(1)	1(1)	3	2
10					3(2)		3	2
11							0	0
Total Live Mussels	0	5	3	1	6	3	18	5
Total Live Species	0	2	1	1	4	2	18	5
Amblema plicata		√			√	√		
Ligumia recta				√				
Obliquaria reflexa					√			
Potamilus alatus		√	√		√	√		
Quadrula nodulata					√			

Table 3-5. Summary of Timed Searches in Ohio River in Proposed Phyllis W. Smale Riverfront Park, Cincinnati, Ohio Survey Area (4-7 September 2013)

Species	Timed Search									**Total (Live)**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
Amblema plicata	1W	2W	1 (3W)	1(1W)	1(1W)					3
Lampsilis ovata						(1W)				0
Obliquaria reflexa	(1W)		(1W)							0
Potamilus alatus	(1W)									0
Quadrula quadrula	(1W)				(1W)					0
Total Live Mussels:	0	0	1	1	1	0	0	0	0	3
Total Live Species	0	0	1	1	1	0	0	0	0	1
Effort (hours)	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	1.7
Catch/unit effort (CPUE)	**0.0**	**0.0**	**6.0**	**6.0**	**6.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.8**

SECTION 4

REFERENCES

Ohio Department of Natural Resources, Division of Wildlife and U.S. Fish and Wildlife Service. May 2013. Ohio Mussel Survey Protocol.

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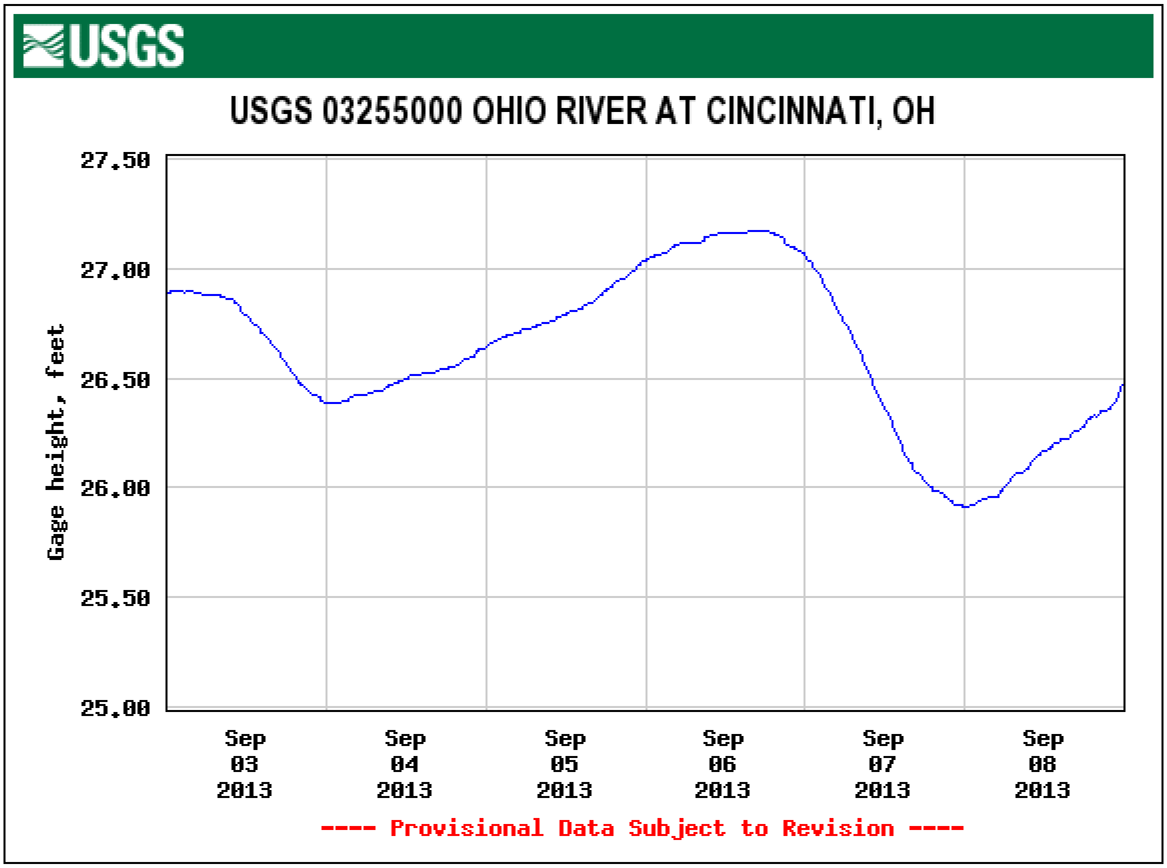
U. S. Fish and Wildlife Service. 2005. Endangered and threatened wildlife and plants. Federal Register 50 CFR Ch. 1 (10-1-2005 Edition).

Watters, G. Thomas, Michael A. Hoggarth, and David H. Stansberry. 2009. The freshwater mussels of Ohio. The Ohio State University Press, Columbus.

APPENDIX A

U.S. GEOLOGICAL SURVEY GAGE DATA


USGS
USGS 03255000 OHIO RIVER AT CINCINNATI, OH
Gage height, feet
27.50
27.00
26.50
26.00
25.50
25.00
Sep 03 2013
Sep 04 2013
Sep 05 2013
Sep 06 2013
Sep 07 2013
Sep 08 2013
---- Provisional Data Subject to Revision ----

Ohio Mussel Survey Protocol

April 2023

Ohio Department of Natural Resources (ODNR), Division of Wildlife and U.S. Fish and Wildlife Service (USFWS), Ohio Ecological Services Field Office

Introduction: All native mussels are protected in the State of Ohio (Section 1533.324 of the Ohio Revised Code). In addition, twelve federally listed species occur in the State and are protected by the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). Impacts to State and federally protected mussels and their habitats should be avoided and minimized to the maximum extent practicable. If impacts cannot be avoided, all streams which contain mussels or potential mussel habitat must be surveyed prior to any proposed stream disturbance. When any survey criteria cannot be met, additional consultation with the appropriate State or Federal agency will be required. As a general reference for mussels in Ohio, please refer to *The Freshwater Mussels of Ohio* (Watters et al. 2009).

As such, the protocols herein are designed to determine the presence or probable absence of federally listed mussel species (FLS) as well as provide for the protection of all native mussels within Ohio. Furthermore, this protocol will help assess the size of mussel populations within the project area. These protocols were developed to provide standardized guidance to project applicants about acceptable survey methods and levels of effort for a variety of common project types. These protocols are adapted for Ohio from "West Virginia Mussel Survey Protocols, April 2015, by Clayton *et al.*" These protocols are applicable to all rivers, streams, and Lake Erie that may harbor mussels. This protocol is divided into four sections: A) General Guidelines, B) Stream Group-specific Considerations, C) Relocations, and D) Project-specific Considerations.

A) General Guidelines

Stream Classification: Survey protocols in this document are based, in part, on stream size and the potential presence of FLS. Accordingly, for purposes of determining survey effort and protocols, Ohio streams have been divided into the five categories listed below (Appendix A). Appendix A will be updated as new location and mussel data information becomes available so please check the ODNR Division of Wildlife website for the latest information:

https://ohiodnr.gov/buy-and-apply/special-use-permits/collecting-research/ohio-mussel-surveyor

- Unlisted: Streams not listed in Appendix A with watersheds >5 mi^2 with the potential for mussels but FLS not expected.
- Group 1: Small to mid-sized streams, FLS not expected.
- Group 2: Small to mid-sized streams, FLS expected.

- Group 3: Large Rivers, FLS not expected.
- Group 4: Large Rivers, FLS expected.

Reconnaissance Guidelines: Reconnaissance of Group 1 streams and Unlisted streams with a drainage area over five mi^2 may be assessed using the *Reconnaissance Survey for Unionid Mussels* (Appendix B) to determine if mussels are present. A study plan for the reconnaissance survey is not required. Reconnaissance surveys can only be conducted in streams where the entire bottom is visible from the surface and the substrate is not obscured by leaf litter. The results of the reconnaissance survey (both positive and negative) will be sent to the ODNR Division of Wildlife Contact (Appendix C). Reconnaissance surveys in unlisted and smaller Group 1 streams may be conducted outside the seasonal window if conditions are within those described in the limitations section of Appendix B, water temperatures are greater than 50 degrees Fahrenheit, and permission via email is requested and received. Consideration for a seasonal waiver will be given to requests at the tail ends of the survey window and emergency situations (ex. human safety). The mussel habitat assessment using the *Ohio Mussel Habitat Assessment Form* (Appendix B) must be conducted by someone that has met the minimum qualifications as described in Appendix D. If after review by ODNR it is determined that mussels are not present in the study area, then no mussel survey will be required. If it is determined that mussels are present, then the *Ohio Mussel Survey Protocol* will be followed. You may forgo a reconnaissance survey and conduct a full mussel survey as described below if desired. The reconnaissance protocols cannot be used to assess mussel presence/absence in Group 2, 3, and 4 streams. See USGS site for watershed size tool:

http://water.usgs.gov/osw/streamstats/ohio.html.

Project Justification: Various laws, regulations, and policies require that impacts to aquatic resources, including freshwater mussels and endangered species, be avoided, and minimized to the maximum extent practicable. For example, Clean Water Act 404(b)(1) Guidelines state that "no discharge of dredged or fill material shall be permitted if there were a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem." The Guidelines further specify that the evaluation of practicable alternatives should include alternative construction methods that do not involve dredge or fill material into waters of the U.S. and alternative locations including "areas not presently owned by the project proponent, but which could reasonably be obtained, utilized, expanded or managed to fulfill the basic purpose of the proposed activity" (§ 230.10 (a)(2)). The General Conditions that apply to all nationwide permits in Ohio also specify that "no activity may occur in areas of concentrated shellfish populations," unless the activity is related to various shellfish harvesting or restoration activities. The Endangered Species Act, through the section 7 consultation process, requires that Federal agencies and their permit applicants consult with the USFWS to identify and implement measures to avoid or minimize adverse effects to listed species, prior to issuing any permits for the incidental take of listed species.

Project proponents can frequently save time and money and avoid delays in their project permitting by developing project alternatives early in their planning process. In addition, during previous project consultations involving impacts to mussel populations, the USFWS and ODNR have found that practicable alternatives to avoid and minimize impacts can be developed for all projects.

Avoidance: Accordingly, to ensure that projects are implemented in a manner consistent with these regulations and to minimize project delays, all survey proposals submitted to the USFWS and ODNR should include evidence that avoidance is not possible and address potential alternatives. Survey permits may not be approved if the applicant does not provide adequate justification that instream impacts cannot be avoided. Discussion of alternatives and how impacts will be avoided and minimized shall be included in the scope of work if the applicant wishes to proceed directly from a Phase 1 to a Phase 2 survey.

Alternative Construction Methods: Projects should first be designed to avoid and minimize impacts to waters of the U.S. including impacts to streams containing mussel populations. For example, where possible, road crossings should be designed to completely span streams containing mussels. Routes for pipelines should be designed to avoid crossing streams containing mussels and minimize the number of stream crossings.

Activities such as pipeline/waterline crossings shall address alternative methods such as horizontal directional drilling (HDD). Using HDD practices shall be the priority over open trenching to avoid impacts to mussels and avoid habitat degradation and fragmentation. A response plan for an inadvertent release shall be provided along with a notation on the potential for such an event. If HDD are not being proposed, documentation as to why this alternative is not practicable should be provided. This documentation should include detailed information on project constraints, and engineering and/or geologic evaluations enough to justify why this construction method cannot be implemented or would have a high likelihood of failure.

Alternative Locations: Moving project locations slightly upstream or downstream or making minor modifications to project designs is often enough to avoid and minimize impacts to mussel populations including endangered species and may allow projects to proceed with minimal delays. Any project that has potential alternative locations for activities (example bridge alignments, pipeline crossings) should include surveys for alternative locations. We recommend a phased approach to prioritize sites with follow-up surveys within the least impacting project site selected. All proposals shall include survey areas large enough to include all alternative locations.

Surveyor Qualifications: For Group 1 and Group 3 streams, surveyors must pass the *Standardized Freshwater Mussel Identification Test* (Appendix E) administered by The Ohio State University's Museum of Biological Diversity (Contact in Appendix C), and have the minimum qualifications described in Appendix D. A Federal permit from the USFWS is required to conduct surveys in streams that may harbor FLS (Groups 2 and 4).

Prior Notification: Even though standardized protocols are established; survey plans must be provided to appropriate State (all streams) and Federal (Group 2 and Group 4 streams) agencies. This is to ensure that the appropriate protocol is being applied for the given stream type and construction activity and to allow time for agency staff to review existing data from the proposed survey area and work with the applicant to design the appropriate survey extent as described below. Appropriate State and Federal agencies shall be notified at least 15 days prior to the time the actual survey will occur and be given at least 30 days to review survey results prior to the anticipated start of any construction activities. State and Federal contact information is provided in Appendix C. Activities to be conducted in Group 2 or Group 4 streams must have received written concurrence from the USFWS prior to conducting any project activities including surveys, relocations, and/or construction activities.

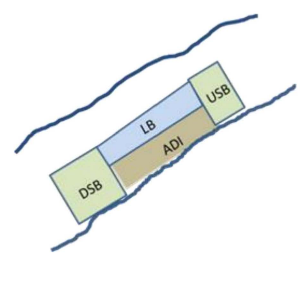
Survey Season: The survey season is from May 1 to October 1. Surveys may be conducted outside the seasonal window if conditions are within those described in the limitations section of Appendix B, water temperatures are greater than 50 degrees Fahrenheit, and permission via email is requested and obtained from the appropriate State and/or Federal agencies prior to conducting the work and may require a revised protocol. Consideration for a seasonal waiver will be given to requests at the tail ends of the survey window and emergency situations (ex. human safety).

Workable flow requirements: If the area cannot be effectively surveyed under existing flow conditions, then the survey must be re-scheduled. The appropriate State and Federal agencies must approve any variance.

Visibility requirements: Surface searches must have a minimum visibility of one-half meter (approximately twenty inches), with or without lights at depth of survey. When recording visibility along with other data, report the actual visibility rather than just noting that it met the minimum requirement. If suitable visibility is not present at the intended time of survey, then the survey must be re-scheduled, or a different protocol must be employed in consultation with the appropriate State and Federal agencies (more extensive quantitative surveys with excavations may be required or increased time for surface searching above minimum requirements). If the normal flow conditions offer low visibility, the visibility requirement may be lifted in consultation with the appropriate State or Federal agency.

Data Longevity: Survey data will be considered valid for five years from the date of the survey. If a survey is negative, these results are valid for five years. Please see the section of the protocol on mussel salvage surveys for information on the longevity of mussel salvage/relocations. Areas that have been dredged within the previous five-year period do not need to be resurveyed unless the impact area is to be expanded or moved.

Survey Area: The survey extent shall include the area of direct impact (ADI) and all applicable buffers upstream (US), downstream (DS), and laterally (LT), as indicated in Appendix G. If the project may affect stream hydrology, such as hydropower projects or installation of in-stream structures, the area of hydrologic impact shall be included in the ADI. Hydraulic modeling may be required to determine the extent of hydraulic changes. If modeling is not conducted prior to surveying, the survey shall extend at least 1.6km (1mi) downstream. Additional surveys may be required if subsequent modeling determines hydraulic changes will extend farther downstream. Likewise, the mixing zone of an outfall shall be included within the ADI. The lateral buffer (LB) applies to the length of the ADI. Where a project does not span the width of the stream, the survey widths of the US Buffer (USB) and the DS Buffer (DSB) shall be equal to the width of the ADI and associated LT (example at right).



Minimum Data Requirement: See Appendix F (Report Checklist and Reporting Form) for a checklist of data that must be included in the survey report for Group 1 and 3 systems. Data must also be reported electronically in accordance with your State and Federal permits and any site authorization conditions. **A photo voucher of each species collected needs to be included in the report for quality control** and vouchered shells should be sent to the Museum of Biological Diversity at The Ohio State University, 1315 Kinnear Rd., Columbus, OH 43212.

Salvage Zone: The salvage zone (or area) includes the ADI and all applicable buffers.

Survey Techniques: Except for streams with watersheds five mi^2 above the ADI, all streams require mussel surveys of the ADI plus buffers US, DS, and LT, if applicable unless the results of the *Reconnaissance Survey for Unionid Mussels* (Appendix B) indicates that mussels are not present in Unlisted and Group 1 streams.

Surface Searches include moving cobble and woody debris; hand sweeping away silt, sand, and/or small detritus; and disturbing/probing at least the upper two inches of loose substrate to better observe the mussels which may be there.

Timed Search Surveys consist of surface searches throughout a larger defined area (such as ADI, US buffer, DS buffer, and LB buffer or mussel concentration) for 20 minutes per $100m^2$. If mussels are found, then thirty additional minutes of visual searching shall be expended per $100m^2$. This type of search can be used in Group 1 streams to determine if mussels are present and to define the limits of a mussel concentration or generate a species richness curve in Group 2 and 4 streams. At a minimum, data shall be provided for each area (ADI, US buffer, DS buffer, LB buffer, and/or mussel concentration) separately.

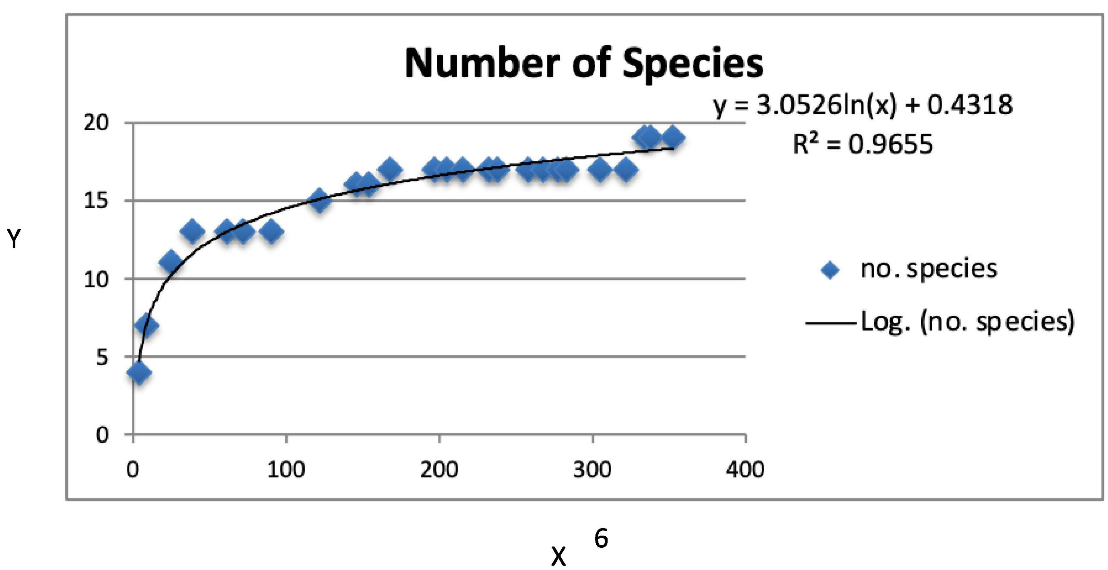
Transect Surveys are required for Group 2 (greater than 20m wide), 3 and 4 streams unless conducting a complete coverage survey using cells (described below). Transects shall be established throughout the proposed site perpendicular to the river. Each transect will be sub-divided into 10m segments for Group 3 and 4 streams and 5m segments for Group 2 streams. Along each transect, surveyors shall search an area 1m wide for mussels at a minimum search rate of 1 minute/m^2 in heterogeneous substrates. If using transects, a Phase 1 survey for Group 2 and 4 streams must include a Timed Search Survey for development of a species richness curve as previously discussed. All data is recorded separately for each segment and defined area (i.e., ADI, US buffer, DS buffer, and LB buffer).

Moving Transect is a method used for mussel salvage whereby a defined section is cleared, and then the line is moved to define a new area for clearing. For example, a 1m area upstream of an established transect line is marked off, searched and mussels salvaged. A minimum effort of 0.5 minute/m^2 is required per pass if mussels are observed. Successive passes are to be made through the area until two or fewer mussels or less than 5 percent of the original number of mussels observed on the first pass is recovered on the last pass. Once the area is cleared, the transect is moved upstream in 1m increments, and the new areas are cleared sequentially. The process is repeated until the entire salvage area is cleared of mussels.

Cells may be used in lieu of transects and are encouraged except in those areas with extensive ADI and buffer areas. In these large areas, the mussel concentrations are best delineated using transects. The establishment of cells is more appropriate for small to mid-sized Group 2 streams and is required on Group 2 streams 20m wide or less. Rather than transects spaced throughout each of the three designated areas, each area would be divided into a series of cells in which each would be surveyed. The maximum acceptable cell size is $100m^2$, with the dimensions determined by the surveyor based on the stream channel morphology. The minimum level of search effort per cell shall be 20 minutes per $100m^2$. If any mussels are found, an additional 30 minutes per cell is required; equivalent to a total search rate of 0.5 minutes/m^2. All data are recorded separately for each cell and defined area (i.e., ADI, US buffer, DS buffer, and LB buffer).

Quantitative Samples are required as part of Phase 2 surveys on Group 2 streams within the salvage zone only and as a Quality Assurance measure on Group 4 streams. These samples shall consist of $0.25m^2$ systematic quadrats using the three random start methodology as described by Smith et al. (2001). Substrate shall be excavated to a depth of 15cm (6in) or hardpan. The material shall be collected and taken to the surface and sorted, removing all live and dead shell material.

Species Richness Curves shall be developed in addition to transect surveys for all streams listed as Groups 2 and 4. Surveys using cells do not need to conduct additional timed search surveys for development of a curve as the entire area has already been searched. The searches for curve development should be limited to the area of mussel concentrations (as determined in previous surveys). Enough searches should be conducted (typically 5 to 10-minute increments) such that a plateau is reached on a plot of cumulative number of individuals (x-axis) vs. cumulative number of species (y-axis). Searches shall be conducted until at least six samples are collected with the addition of no new species. If permission was received to conduct Phase 2 at the same time as a Phase 1 then the qualitative sampling should be completed after the quantitative sampling. Conducting qualitative sampling first could impact the results of the quantitative sampling. A chart depicting the curve and associated regression line should be provided. The number of individuals required to be collected for recovery of an additional species should be calculated. In the example below, a total of 352 individuals comprised nineteen species. Using the regression formula, it would take a total of 611 individuals to find one additional species.



Mussel Processing: In each segment or cell, any mussels observed will be bagged and brought to the surface for further processing and positive identification, unless the appropriate State and Federal agency representative both agree to allow some mussel identification to occur at the survey depth. However, any species which may resemble a FLS must be brought to the surface for positive identification. Mussels should be kept in water always, except for the brief period that they must be out of the water to be measured or photographed, but no longer than 1 minute at a time. Mussels observed along the transect or within a cell will be recorded as occurring in a segment or cell. Appropriate information describing the depth and habitat conditions along each transect and within each cell, such as depositional areas, silt, mud, detritus, hard-pan, sand, and scoured areas where mussels cannot burrow, gravel, cobble, etc., shall be recorded for each segment or cell.

Vouchering Specimens: A representative of each species collected requires a photo voucher be submitted to The Ohio State University's Museum of Biological Diversity (Appendix C) at the end of the survey season. Contact the Curator of Mollusks, Nate Shoobs (shoobs.1@osu.edu) for further details on vouchering.

- Each photo voucher specimen should include a scale bar in inches or millimeters (or object of known size).
- Photo vouchers of live specimens should consist of a lateral photo of both valves, and a shot of the umbo/beak. Photo vouchers of dead specimens not collected should include both interior and exterior shots of both valves, and a shot of the umbo/beak.
- At least one dead collected individual of each species of mussel not represented in the live collection should also be sent to OSU MBD to be vouchered.
- Dead collected vouchers must be cleaned and dried before deposition.
- All voucher specimens, whether photo vouchers or physical specimens, must be accompanied by an excel spreadsheet containing the collecting data from the project reporting forms, and copies of all applicable state and federal collecting permits.
- Voucher specimens will not be accessioned into the OSU MBD Mollusk Collection until the above-mentioned data and permit copies have been received by the Curator.

Mussel Concentrations and Potential FLS: Failure to detect FLS during a survey does not confirm their absence. In Group 2 and Group 4 streams, the detection of a mussel concentration and/or diverse mussel bed during Phase 1 surveys (as described below) indicates that FLS may be present. See survey protocols below for Group 2 and Group 4 streams for criteria that demonstrate a mussel concentration or diverse bed for these stream types. When an initial survey finds a diverse bed/mussel concentration, thus indicating presence of FLS, the project proponent should, wherever possible, develop/modify project plans to avoid impacts to mussels. If impact avoidance is not possible, the project proponent should submit justification for this determination to ODNR and USFWS. If avoidance is not possible, the project proponent must then submit a quantitative survey (i.e., Phase 2 survey, described below) proposal to ODNR and USFWS for approval. The project proponent must receive approval for the Phase 2 survey before work may begin.

- **Note:** In some instances, the project proponent may anticipate the presence of a diverse bed/mussel concentration prior to conducting Phase 1 surveys, and impact avoidance may not be possible. In these cases, a justification of non-avoidance and a Phase 2 survey proposal may be submitted concurrently with a Phase 1 proposal. Alternatively, a Phase 2 survey may be conducted in lieu of a Phase 1 survey if enough justification of why the proposed project cannot be modified to avoid stream impacts has been provided to ODNR and USFWS.

B) Stream Group-specific Considerations:

Group 1 Streams:

Timed Search Surveys are acceptable. At a minimum, data shall be reported for each area (ADI, US buffer, DS buffer, and LB buffer) separately. It is preferred that relocations (see Relocation section below) occur at time of initial survey so that mussels are not disturbed twice. If FLS are found during the survey, relocation activities must stop, and USFWS contacted for guidance on how to proceed (see Relocation Section C, below).

Group 2 Streams:

Phase 1: A Phase 1 survey consists of a surface search of 1m wide transects, spaced a maximum of 10 m apart or a visual search by cells. If the stream width is 20m or less, the survey design shall consist of complete cell coverage. For streams greater than 20m wide, the preferred survey method is by cells; however, transects may be used to delineate the habitats that require further survey effort by cells. Data is recorded by 5m segments along each transect or by cell position. If one or both following triggers are met, FLS may be present, and the project proponent shall either (1) avoid impacts to mussels or, (2) if avoidance is not possible, conduct a Phase 2 survey in the area(s) where trigger(s) are met, to determine whether FLS are present:

- Mussel density of $0.5/m^2$ within any 5m segment along each transect or within any area of a cell and/or
- Observation of at least two species, live or fresh dead, not listed in Appendix H.

Phase 2: If a trigger is met and avoidance is not an option, then a Phase 2 survey shall be conducted within the salvage zone as described in Appendix G. The objective of Phase 2 is to collect enough data to determine if FLS are present within the mussel concentration defined in Phase 1. The Phase 2 survey for a Group 2 stream consists of a quantitative survey using excavations as described by Smith (2001). This survey shall be conducted using the three random start methodologies throughout the area meeting the trigger criteria within the salvage zone areas connected by similar habitat plus a 10m buffer surrounding it. Multiple areas may be surveyed only if they are separated by more than 20m of dissimilar habitat or unsuitable habitat. The number of quantitative samples to be collected shall be calculated at the rate of one quadrat per 5m of transects or one quadrat per $5m^2$ cell area. The boundary of the Phase 2 should not exceed the salvage area.

If qualitative surveys for species richness curve development were not conducted during Phase 1, they must be conducted as part of Phase 2.

Quality Assurance: The objective of conducting a quality assurance effort in Group 2 streams is to use an independent search method (quantitative searches) on survey sites to support findings and data collection accuracy. Because many federal and state listed species are small or could be present as only juveniles at a site, quantitative searches are an alternative search method that will detect small mussels and help calibrate qualitative search data. A minimum of 10 ($0.25m^2$) quantitative samples should be collected (as described above) in areas of highest mussel concentration observed during Phase 1. Sample results should be recorded separately for each quadrat, including subsample data of surface counts and excavated counts for each sample. This data is important to assess the efficiency of qualitative sampling (i.e., % mussels at the surface vs. buried). If mussels are sparse and a concentration does not appear to exist, quantitative samples should be collected from the area exhibiting the most suitable habitat. All quality assurance samples must be collected from the ADI and within the salvage zone limits. While not required, sizes of mussels to the nearest mm within quadrats can be recorded to support comparison of qualitative and quantitative samples. If any FLS or two or more additional species are detected in quadrats, or, a larger density of mussels than expected from quadrats compared to the qualitative survey is observed, then a Phase II may be required following agency coordination.

Group 3 streams:

Survey of Group 3 streams may consist of transects or timed surface search methods. Buffers in Group 3 streams vary by project type, as indicated in Appendix G. When using cells in lieu of transects, timed search surveys are conducted for each area (ADI, US buffer, DS buffer, and LB buffer) at a minimum. When transects are used, the survey design shall consist of transects, 1m in width, spaced no more than 100m apart, and placed perpendicular to stream flow. Where cells are used, cells cannot exceed $100m^2$ in size. Data shall be compiled for each of the survey areas (ADI, US buffer, DS buffer, and LB buffer) separately. Record data by 10m segment along the transect or by cell position. It is preferred relocation (see Relocation Section C, below) to occur at time of initial survey, provided no FLS are found. If FLS are found during the survey or warranted relocation activities, then USFWS must be contacted for guidance on how to proceed (see Relocation Section C, below).

Group 4 streams:

Phase 1: The objective of Phase 1 is to determine if a diverse mussel community is present and to delineate the area(s) with a mussel concentration. The survey design shall consist of transects, 1m in width, spaced no more than 50m apart, placed perpendicular to stream flow or cells not to exceed $100m^2$ in size. If transect spacing is greater than 10m and no mussels are observed in two adjacent transects, with at least one of the transects containing apparent suitable mussel habitat, then a qualitative search for a minimum of 10 minutes must occur between the two transects in suitable mussel habitat. If any live and/or fresh dead mussels are found between the two transects during the search, then an additional transect will be placed there and a search conducted as previously described. Data shall be compiled separately for each survey area (ADI, US Buffer, DS Buffer, and LB Buffer). Record data by 10m segment along the transect or by cell position. If a trigger is met (see below) and avoidance is not an option, then a Phase 2 survey shall be conducted. If the entire area was surveyed during Phase 1 using cells, a Phase 2 survey is not required. Regardless of a trigger being met, all Group 4 streams require a quality assurance effort (see below) to supplement survey data.

Survey results that trigger avoidance or a Phase 2 survey include:

- Five individuals/10m segment in any area of the survey and/or
- Presence of at least three species not listed in Appendix H along any transect or within a qualitative survey conducted between transects.

Phase 2: The objective of Phase 2 is to collect enough data to determine if FLS are likely to be present within the mussel concentration defined in Phase 1. A Phase 2 survey shall consist of additional transects placed between the original surveyed transects within the targeted area. The targeted area is defined as an area encompassing all triggered areas connected by similar habitat plus a 10m buffer surrounding it. The boundary of the Phase 2 area should not exceed the Phase 1 area.

Quality Assurance: The objective of conducting a quality assurance effort in Group 4 streams is to use an independent search method (quantitative searches) on survey sites to support findings and data collection accuracy. Because many federal and state listed species are small or could be present as only juveniles at a site, quantitative searches are an alternative search method that will detect small mussels and help calibrate qualitative search data. A minimum of 10 (0.25m2) quantitative samples should be collected (as described above) in areas of highest mussel concentration observed during Phase 1. Sample results should be recorded separately for each quadrat, including subsample data of surface counts and excavated counts for each sample. This data is important to assess the efficiency of qualitative sampling (i.e., % mussels at the surface vs. buried). If mussels are sparse and a concentration does not appear to exist, quantitative samples should be collected from the area exhibiting the most suitable habitat. All quality assurance samples must be collected from the ADI and within the salvage zone limits. While not required, sizes of mussels to the nearest mm within quadrats can be recorded to support comparison of qualitative and quantitative samples. If any FLS or two or more additional species are detected in quadrats, or, a larger density of mussels than expected from quadrats compared to the qualitative survey is observed, then a Phase II may be required following agency coordination.

C) Mussel Relocations

All native mussels are protected within the state of Ohio (ORC Section 1533.324) and if avoidance options are exhausted, mussels must be relocated from the ADI and appropriate buffer areas (Salvage Zone – Appendix G). No mussels are to be moved without prior authorization from appropriate State and/or Federal authorities. If mussels are assumed to be present at a Group 1 or Group 3 stream that will be impacted, a relocation plan can be developed without a mussel survey through coordination with the state regulatory agency (Appendix C). Coordination with the USFWS must occur prior to any relocation efforts on Group 2 and Group 4 streams. Relocation of any federally listed mussels will require formal consultation. This consultation process requires that the project applicant develop a Biological Assessment (BA) that quantifies the potential impacts to the species and that an incidental take authorization is issued by the USFWS prior to conducting any activities that could adversely affect these species. This process may take up to 135 days from the time that a completed BA is submitted to the USFWS. Impacts to federally listed mussel species and their habitats must be avoided and minimized to the maximum extent practicable. Additional conservation measures beyond relocations may be required if the proposed project may adversely affect federally listed species.

1. For Group 1 and Group 3 streams, relocations can take place at the same time as the survey.
2. For Group 2 and Group 4 streams, relocations shall not be conducted until a review of findings by the USFWS has been conducted and approved. On Group 1 and 3 streams, prior approval by the ODNR to relocate at time of initial survey may be granted.
3. Multiple passes shall be made through the area until two or fewer mussels or less than 5 percent of the number collected on the original pass is recovered on the final pass.
4. Relocation effort shall be systematically conducted by a "moving transect" or establishing cells not to exceed $100m^2$.
5. Relocation efforts shall meet the same standards as surveys (i.e., visibility requirements, workable streamflow conditions, and mussel survey period).
6. Relocation sites shall be located upstream (preferred) in an area of equal or better habitat, or to an approved relocation site in a discrete area recommended by the ODNR and USFWS. At a minimum, conduct a 15-minute qualitative survey of the relocation site and note all observations of resident mussels. These shall be reported, including coordinates in decimal degrees, to the responsible agency (ODNR for all mussels, USFWS for FLS). If relocation efforts are likely to occur, mussel surveyors may scope out potential relocation sites during the initial Phase I or Phase 2 survey. Survey proposals should include any potential scoping activities for suitable relocation sites.
7. If any FLS are found during relocation efforts for projects where no FLS were found during previous survey efforts, and no incidental take authorization from the USFWS has been received, then relocation efforts must be stopped and the USFWS should be immediately contacted.
8. Relocations may only be conducted during the mussel survey season (May 1 – October 1), unless the appropriate resource agencies approve a variance. Relocations for Group 2 and 4 systems shall be done within the same field season as the expected in-stream activities, or if activities are to be conducted before June 15, relocations may be conducted in the previous field season. If relocation activities occur during the previous field season, additional effort may be required just prior to construction activities depending on the results of earlier relocation efforts. For Group 1 and 3 systems, relocations are good for two field seasons.

Salvage zones vary by stream Group and project type, and are listed in Appendix G. On streams with FLS, consultation with the USFWS must occur prior to any relocation. This formal consultation process requires that the Federal action agency (or project applicant on behalf of the Federal agency) develop a Biological Assessment (BA) that quantifies the potential impacts to the species and that an incidental take authorization is issued by the USFWS prior to conducting any activities that could adversely affect these species. This process may take up to 135 days from the time that a completed BA is submitted to the USFWS by the Federal action agency. Impacts to federally listed mussel species and their habitats must be avoided and minimized to the extent practicable.

D) Project-specific Considerations

In addition to the survey and relocation criteria described above; the following criteria apply to the project types. The layout of buffer zones and survey areas, organized by stream group and potential project type are available in Appendix G. These project types and special considerations are discussed in more detail below.

Dredging in Group 3 and Group 4 streams: If less than five years has elapsed since the last dredging and if there will be no expansion or movement of the dredged area then no additional surveys are required. If more than 5 years has elapsed or the previously dredged area is being expanded or moved, mussel surveys shall be required. For Group 4 streams only, mussel beds shall be protected during dredging activities by a buffer of 500m US, 150m DS and 150m LB (Note: This protection buffer should not be confused with the survey area buffers in Appendix G). Instream disposal of dredge material is not covered under these buffers and will require additional coordination with the ODNR and USFWS.

Linear Projects in Group 3 and Group 4 streams (e.g., barge loading facility with mooring structures): If the location of new mooring structures is known, transects shall bisect these locations or be placed as close to them as possible. If structures are 50m apart, transects shall be placed 50m apart, not to exceed maximum transect spacing for Group 3 (100m) and Group 4 (50m) streams.

Log Jam Removal: For log jam removals in Group 1 and 3 systems, a mussel survey and relocation is not required if the area impacted is localized and heavy equipment is used outside the stream channel or if hand removal is used. Log jam removals in Group 2 and 4 systems need to be coordinated with the USFWS contact in Appendix C. Large projects that include multiple log jam removals and/or a conglomeration of log jams in proximity may require a mussel survey and relocation. Questions related to the log jam exemption should be directed to the state representative in Appendix C.

Dam Removal: For dam removals on Group 1 and 3 streams, mussel surveys will not be required prior to removal. While the dam is breached and the dam pool is lowered, we request that enough staffing is available to recover stranded mussels. If multiple teams are used in the rescue operation, at least one qualified malacologist (Group 1 and 3 systems - Appendix D) should be present as a team leader. Others on the rescue team do not have to be a qualified malacologist but will be briefed by the team leader on what to look for and how to handle stranded mussels. If a mussel survey is conducted in the project area and the entire dam pool prior to dam removal and no mussels are found, then no relocation will be necessary when the dam is removed. All recovered mussels should be recorded and moved to an appropriate relocation site as described in Section C. Group 2 and 4 systems will be handled on a case-by-case basis.

Discharge Outfalls: Depending on discharge composition of outfall, relocation of mussels from the mixing zone may be required.

HDD: If the impacts to the stream channel are minimized using HDD technology, then a mussel survey is not required. When HDD or other sub-surface installation techniques are utilized on

Group 2 and 4 streams then enough geotechnical data should be developed for all proposed stream and river crossing sites showing the soils, geology, and stratification of the proposed crossing locations. Such data can be extremely important to facilitate successful subsurface crossings, especially in areas where rivers flow through glaciated regions of the state and have channels and river valleys composed of unconsolidated glacial materials (sand, gravel, cobble, and boulder mix). Such stream/riverbeds can be highly susceptible to frac-outs, upward migration, and discharge of drilling fluids as well as stream/riverbed subsidence. In such areas enough geotechnical analysis should be performed to identify a possible confining layer (bedrock, clay, etc.) that may limit the upward migration of drilling fluids thus reducing the risk of frac-outs. All geotechnical data and the Frac-Out Contingency plan should be sent to the appropriate contact (Appendix C). Please contact the appropriate agencies if there is an accidental stream bed disturbance during HDD operations.

Bridge Projects: Unless cells are used for Group 2, 3, and 4 streams, a minimum of three transects shall be surveyed within the ADI (Note: hydrologic changes can occur with bridge and causeway construction, demolition, and design. The area of hydrologic change shall be considered as a potential impact area, and therefore included in the ADI). Relocations are allowed at the time of the survey on Group 1 and 3 streams. For new bridges, initial surveys shall include all areas that can be used for alternative construction sites. If the project is confined to the channel edge (ex. encasing piers and abutment work) then the mussel survey/relocation will also be confined to the channel edge.

Waterline/Pipeline and other Corridor Disturbances: Three timed search surveys, one search for each area (ADI, US buffer and DS buffer) shall be conducted at a minimum. Data shall be recorded separately for surveys within the DS buffer, ADI, and US buffer. A minimum of three transects shall be surveyed within the ADI. One of these three should occur exactly where the proposed corridor construction (i.e., pipeline) will cross the stream.

Projecting Dike Structures (Group 3 and 4 streams only, finger dikes, zipper dikes, not parallel to shore): If trigger is reached, as previously identified, on a Group 4 stream, then a Phase 2 survey is required.

Shoreline Protection (example riprap, gabion baskets, longitudinal dikes, etc.): For Groups 1 streams, and when using cells in lieu of transects for Group 3 streams, timed search surveys are conducted in each area (ADI, US buffer, DS buffer, and LB Buffer) shall be conducted at a minimum. Please refer to Appendix G for ADI, US buffer, LB buffer, and DS buffer for Group 2 and 4 streams.

Non-Commercial Docks in Group 3 and 4 streams do not require a mussel survey if they meet the following criteria:

1. Do not extend riverward more than 10m from low water mark (water's edge),
2. Do not contain any fill material other than pilings or post, and any shoreline protection material such as riprap, is only placed above the low water mark,
3. Contain four or fewer pilings or posts that have a combined area less than 1m^2,
4. Are less than 10m (32.8ft) in length,
5. If within 500m (1,640ft) of an island, must receive clearance from USFWS.

References

Smith, D. R., R. F. Villella, and D. P. Lemarié. 2001. Survey protocol for assessment of endangered freshwater mussels in the Allegheny River. J. N. Am. Benthol. Soc 20(1):118-132.

Clayton, J.L, B. Douglas, and P. Morrison. 2015. West Virginia Mussel Survey Protocols, April 2015. Unpublished document.

Watters, G., M. Hoggarth, and D. Stansbery. 2009. The Freshwater Mussels of Ohio. The Ohio State Press.

Appendix A: Ohio Mussel Stream List

County	Stream	Group
Adams	Beasley Fork (Ohio Brush Creek)	1
Adams	Cedar Fork (Scioto Brush Creek)	1
Adams	Cherry Fork	1
Adams	Crooked Creek (Ohio Brush Creek)	1
Adams	East Fork Eagle Creek (Eagle Creek)	1
Adams	Lick Fork (Ohio Brush Creek)	1
Adams	Middle Branch (Mill Creek)	1
Adams	Middle Fork (Ohio Brush Creek)	1
Adams	Ohio Brush Creek	1
Adams	Ohio River	4
Adams	Rogers Run	1
Adams	Scioto Brush Creek	2
Adams	South Fork Scioto Brush Creek	2
Adams	West Fork Ohio Brush Creek	1
Allen	Auglaize River	1
Allen	Buck Run	1
Allen	Camp Creek	1
Allen	Hog Creek	1
Allen	Jennings Creek	1
Allen	Little Hog Creek	1
Allen	Miami-Erie Canal	1
Allen	Pike Run	1
Allen	Ottawa River	1
Allen	Plum Creek	1
Allen	Wrestle Creek	1
Allen	Riley Creek	1
Ashland	Black Fork Mohican River	1
Ashland	Buck Creek	1
Ashland	Clear Fork Mohican River	1
Ashland	Jamison Creek	1
Ashland	Jerome Fork	1
Ashland	Lake Fork Mohican River	1
Ashland	Mohican River	1
Ashland	Muddy Fork Mohican River	1
Ashland	Vermilion River	1
Ashland	West Fork (East Branch Black River)	1
Ashtabula	Ashtabula River	1
Ashtabula	Coffee Creek	1

Ashtabula	Conneaut Creek	1
Ashtabula	Cowles Creek	1
Ashtabula	Grand River	2
Ashtabula	Lake Erie	1
Ashtabula	Mill Creek	2
Ashtabula	Phelps Creek	1
Ashtabula	Pymatuning Creek	2
Ashtabula	Rock Creek	1
Ashtabula	West Branch Ashtabula River	1
Athens	East Branch Shade River	1
Athens	Federal Creek	2
Athens	Hocking River	1
Athens	Long Run	1
Athens	Margaret Creek	1
Athens	McDougall Branch	1
Athens	Middle Branch Shade River	1
Athens	Mud Fork	1
Athens	Ohio River	4
Athens	Sharps Fork	1
Athens	Strouds Run	1
Athens	Sugar Creek	1
Athens	Sunday Creek	1
Auglaize	Auglaize River	2
Auglaize	Clear Creek	1
Auglaize	Koop Creek (aka Kopp Creek)	1
Auglaize	Miami-Erie Canal	1
Auglaize	St. Marys River	1
Auglaize	Twomile Creek	1
Belmont	Captina Creek	1
Belmont	Stillwater Creek	1
Belmont	Ohio River	3
Brown	Cloverlick Creek	1
Brown	Eagle Creek	1
Brown	East Fork Little Miami River	2
Brown	East Fork White Oak Creek	1
Brown	East Fork Eagle Creek	1
Brown	Fivemile Creek	1
Brown	Honey Run	1
Brown	Flat Run	1
Brown	Indian Creek	1
Brown	Ohio River	4
Brown	Solomon Run	1

Brown	Sterling Run	1
Brown	West Fork Eagle Creek	1
Brown	West Fork Ohio Brush Creek	1
Brown	North Fork White Oak Creek	1
Brown	White Oak Creek	1
Butler	Dicks Creek	1
Butler	Fourmile Creek	1
Butler	Great Miami River	4
Butler	Millers Creek	1
Butler	Sevenmile Creek	1
Carroll	Conotton Creek	1
Carroll	Indian Fork	1
Carroll	Still Fork	1
Carroll	Sandy Creek	1
Champaign	Kings Creek	1
Champaign	Little Darby Creek	1
Champaign	Macochee Ditch	1
Champaign	Mad River	1
Champaign	Mosquito Creek	1
Champaign	Pleasant Run	1
Champaign	Proctor Run	1
Champaign	Spain Creek	1
Champaign	Treacle Creek	1
Clark	Beaver Creek	1
Clark	Buck Creek	1
Clark	Little Miami River	2
Clark	Mad River	1
Clark	Medway Creek	1
Clark	North Fork Deer Creek	1
Clark	North Fork Little Miami River	1
Clermont	Cloverlick Creek	1
Clermont	East Fork Little Miami River	2
Clermont	Indian Creek	1
Clermont	Little Miami River	2
Clermont	O'Bannon Creek	1
Clermont	Ohio River	4
Clermont	Poplar Creek	1
Clermont	Stonelick Creek	1
Clermont	Ten Mile Creek	1
Clinton	Anderson Fork (Caesar Creek)	1
Clinton	Caesar Creek	1

Clinton	Cowan Creek	1
Clinton	East Fork Little Miami River	1
Clinton	Grassy Branch	1
Clinton	Little East Fork	1
Clinton	Todd Fork (Little Miami River)	1
Clinton	West Branch Rattlesnake Creek	1
Clinton	West Fork of East Fork (East Fork Little Miami River)	1
Columbiana	Beaver Run	1
Columbiana	Bull Creek	1
Columbiana	Brush Creek	1
Columbiana	Cold Run	1
Columbiana	East Fork Stateline Creek	1
Columbiana	Little Beaver Creek	1
Columbiana	Little Bull Creek	1
Columbiana	Mahoning River	1
Columbiana	Middle Fork Little Beaver Creek	1
Columbiana	North Fork Little Beaver Creek	1
Columbiana	Ohio River	3
Columbiana	Patterson Creek	1
Columbiana	Sandy Creek	1
Columbiana	West Fork Little Beaver Creek	1
Coshocton	Killbuck Creek	2
Coshocton	Kokosing River	1
Coshocton	Little Wakatomika Creek	1
Coshocton	Mill Creek	2
Coshocton	Mohican River	2
Coshocton	Muskingum River	4
Coshocton	Trib. to Tuscarawas R. (RM 3.78)	1
Coshocton	Tuscarawas River	4
Coshocton	Wakatomika Creek	2
Coshocton	Walhonding River	2
Coshocton	Wills Creek	1
Crawford	Broken Sword Creek	1
Crawford	Buckeye Creek	1
Crawford	Little Scioto River	1
Crawford	Mud Run	1
Crawford	Olentangy River	1
Crawford	Sandusky River	1
Crawford	Shumaker Ditch	1
Cuyahoga	Big Creek	1
Cuyahoga	Chagrin River	1
Cuyahoga	Chippewa Creek	1

Cuyahoga	Cuyahoga River	3
Cuyahoga	Doan Brook	1
Cuyahoga	East Branch Rocky River	1
Cuyahoga	Lake Erie	3
Cuyahoga	Ohio and Erie Canal	1
Cuyahoga	Rocky River	1
Cuyahoga	Sagamore Creek	1
Cuyahoga	Sulphur Spring Brook	1
Cuyahoga	Tinkers Creek	1
Cuyahoga	West Branch Rocky River	1
Darke	Boyd Creek	1
Darke	Dismal Creek	1
Darke	Dividing Branch	1
Darke	Grays Branch	1
Darke	Greenville Creek	1
Darke	Indian Creek	1
Darke	Millers Fork	1
Darke	Mississinewa River	1
Darke	Mud Creek	1
Darke	North Fork Stillwater River	1
Darke	South Fork Stillwater River	1
Darke	Wabash River	1
Darke	Stillwater River	2
Darke	Swamp Creek	1
Defiance	Auglaize River	1
Defiance	Big Run	1
Defiance	Gordon Creek	1
Defiance	Lick Creek	1
Defiance	Lost Creek	1
Defiance	Maumee River	3
Defiance	Miami-Erie Canal	1
Defiance	Middle Fork Gordon Creek	1
Defiance	Mud Creek	1
Defiance	North Powell Creek	1
Defiance	Powell Creek	1
Defiance	South Fork Gordon Creek	1
Defiance	St. Joseph River	2
Defiance	Sulphur Creek	1
Defiance	Tiffin River	1
Delaware	Alum Creek	2
Delaware	Bartholomew Run	1
Delaware	Big Run	1

Delaware	Big Walnut Creek	1
Delaware	Blues Creek	1
Delaware	Bokes Creek	1
Delaware	Brondige Run	1
Delaware	Culver Creek	1
Delaware	Delaware Run	1
Delaware	Duncan Run	1
Delaware	Fulton Creek	1
Delaware	Kebler Run	1
Delaware	Long Run	1
Delaware	Mill Creek	2
Delaware	North Fork Rattlesnake Creek	1
Delaware	Olentangy River	2
Delaware	Ottawa Creek	1
Delaware	Perfect Creek	1
Delaware	Scioto River	1
Delaware	Smith Run	1
Delaware	South Fork Rattlesnake Creek	1
Delaware	Sugar Creek	1
Delaware	Turkey Run	1
Delaware	West Branch Alum Creek	1
Delaware	Whetstone Creek	1
Erie	Chappel Creek	1
Erie	Huron River	1
Erie	Lake Erie	3
Erie	Sugar Creek	1
Erie	Old Woman Creek	1
Erie	Plum Brook	1
Erie	Rattlesnake Creek	1
Erie	Sandusky Bay	3
Erie	Sawmill Creek	1
Erie	East Fork Vermilion River	1
Erie	Vermilion River	1
Fairfield	Arney Run	1
Fairfield	Baldwin Run	1
Fairfield	Blacklick Creek	1
Fairfield	Clear Creek	1
Fairfield	Dunkle Run	1
Fairfield	Hocking River	1
Fairfield	Hunters Run	1
Fairfield	Little Rush Creek	1
Fairfield	Pawpaw Creek	1

Fairfield	Pleasant Run	1
Fairfield	Rush Creek	1
Fairfield	Sand Run	1
Fairfield	South Fork Licking River	1
Fairfield	Sycamore Creek	1
Fairfield	Walnut Creek	2
Fayette	Compton Creek	1
Fayette	Crooked Creek	1
Fayette	Deer Creek	1
Fayette	East Fork Paint Creek	1
Fayette	Lees Creek	1
Fayette	Mills Branch	1
Fayette	North Fork Paint Creek	1
Fayette	Paint Creek	1
Fayette	Rattlesnake Creek	1
Fayette	Sugar Creek	1
Fayette	Thompson Creek	1
Fayette	West Branch Rattlesnake Creek	1
Fayette	Wabash Creek	1
Franklin	Alum Creek	2
Franklin	Big Darby Creek	2
Franklin	Big Run	1
Franklin	Big Walnut Creek	2
Franklin	Blacklick Creek	1
Franklin	Clover Groff Ditch	1
Franklin	Georges Creek	1
Franklin	Grant Run	1
Franklin	Hamilton Ditch	1
Franklin	Hellbranch Run	1
Franklin	Little Darby Creek	2
Franklin	Ohio and Erie Canal	1
Franklin	Olentangy River	1
Franklin	Plum Run	1
Franklin	Rocky Fork (Big Walnut Creek)	1
Franklin	Scioto Big Run	1
Franklin	Scioto River	4
Franklin	Sugar Run	1
Franklin	Walnut Creek	2
Fulton	Bad Creek	1
Fulton	Swan Creek	2
Fulton	Tiffin River	1
Gallia	Barren Creek	1

Gallia	Black Fork (Symmes Creek)	1
Gallia	Camp Creek	1
Gallia	Chickamauga Creek	1
Gallia	Dirtyface Creek	1
Gallia	Little Chickamauga Creek	1
Gallia	Ohio River	4
Gallia	Raccoon Creek	1
Gallia	Symmes Creek	1
Geauga	Black Brook	1
Geauga	Bridge Creek	1
Geauga	Chagrin River	1
Geauga	Cuyahoga River	1
Geauga	East Branch Cuyahoga River	1
Geauga	Grand River	1
Geauga	Griswold Creek	1
Geauga	South Branch Phelps Creek	1
Geauga	Spring Brook	1
Geauga	West Branch Cuyahoga River	1
Greene	Anderson Fork (Caesar Creek)	1
Greene	Caesar Creek	1
Greene	Hebble Creek	1
Greene	Little Miami River	2
Greene	Mad River	1
Greene	Massies Creek	1
Greene	North Branch Caesar Creek	1
Greene	North Fork Massies Creek	1
Greene	South Branch Caesar Creek	1
Greene	South Fork Massies Creek	1
Greene	Sugar Creek	1
Greene	Yellow Springs Creek	1
Guernsey	Brushy Fork	1
Guernsey	Buffalo Fork (Wills Creek)	1
Guernsey	Chapman Run	1
Guernsey	Leatherwood Creek	1
Guernsey	Rocky Fork (Sugartree Fork, Salt Fork)	1
Guernsey	Salt Fork	1
Guernsey	Seneca Fork	1
Guernsey	Seneca Lake	1
Guernsey	Sugartree Fork	1
Guernsey	Wills Creek	1
Hamilton	Bloody Run	1
Hamilton	Cooper Creek	1

Hamilton	Great Miami River	4
Hamilton	Little Miami River	2
Hamilton	Miami-Erie Canal	1
Hamilton	Mill Creek	1
Hamilton	Ohio River	4
Hamilton	Town Run	1
Hamilton	West Fork Mill Creek	1
Hamilton	Whitewater River	3
Hancock	Blanchard River (Upstream SR 568)	2
Hancock	Blanchard River (Downstream SR 568)	1
Hancock	Eagle Creek	1
Hancock	East Branch Portage River	1
Hancock	Jacob Burket Ditch	1
Hancock	Oil Ditch	1
Hancock	Ottawa Creek	1
Hancock	Potato Run	1
Hancock	Riley Creek	1
Hardin	Blanchard River	2
Hardin	Cottonwood Ditch	1
Hardin	McDonald Creek	1
Hardin	Panther Creek	1
Hardin	Scioto River	1
Hardin	Silver Creek	1
Hardin	Taylor Creek	1
Hardin	Wildcat Creek	1
Harrison	Clear Fork Little Stillwater Creek	1
Harrison	Conotton Creek	1
Harrison	Laurel Creek	1
Harrison	Little Stillwater Creek	1
Harrison	Skull Fork (Stillwater Creek)	1
Harrison	Stillwater Creek	1
Henry	Bad Creek	1
Henry	Brubaker Creek	1
Henry	Maumee River	3
Henry	Miami-Erie Canal	1
Henry	North Turkeyfoot Creek	1
Henry	South Turkeyfoot Creek	1
Highland	Baker Fork (Ohio Brush Creek)	1
Highland	Clear Creek	1
Highland	Dodson Creek	1
Highland	East Fork Little Miami River	1

Highland	East Fork White Oak Creek	1
Highland	Middle Fork Lees Creek	1
Highland	Lees Creek	1
Highland	North Fork White Oak Creek	1
Highland	Ohio Brush Creek	1
Highland	Paint Creek	1
Highland	Rattlesnake Creek	1
Highland	Rock Lick	1
Highland	Rocky Fork (Paint Creek)	1
Highland	South Fork (Rocky Fork, Paint Creek)	1
Highland	South Fork Lees Creek	1
Highland	Turtle Creek	1
Hocking	Clear Creek	1
Hocking	Hocking River	1
Hocking	Kitchen Run	1
Hocking	Little Monday Creek	1
Hocking	Monday Creek	1
Hocking	Pine Creek	1
Hocking	Rush Creek	1
Hocking	Salt Creek	1
Hocking	Sand Run	1
Hocking	Scott Creek	1
Holmes	Killbuck Creek	1
Holmes	Lake Fork Mohican River	1
Holmes	Mohican River	1
Huron	Cole Creek	1
Huron	East Branch Huron River	1
Huron	East Branch Vermilion River	1
Huron	Honey Creek	1
Huron	Marsh Run	1
Huron	Southwest Branch Vermilion River	1
Huron	Vermilion River	1
Huron	West Branch Huron River	1
Jackson	Buckeye Creek	1
Jackson	Little Salt Creek	1
Jackson	Little Scioto River	1
Jackson	Pigeon Creek	1
Jackson	Sugarcamp Creek	1
Jackson	Symmes Creek	1
Jefferson	Cross Creek	1
Jefferson	Brush Creek	1
Jefferson	Ohio River	3

Jefferson	Short Creek	1
Jefferson	Yellow Creek	1
Knox	East Branch of North Branch (Kokosing River)	1
Knox	Indianfield Run	1
Knox	Kokosing River	1
Knox	Mohican River	1
Knox	North Branch Kokosing River	1
Knox	North Fork Licking River	1
Knox	Otter Fork Licking River	1
Knox	Sycamore Creek	1
Knox	Vance Creek	1
Knox	Wakatomika	2
Lake	Chagrin River	3
Lake	Chagrin River Estuary Channels	1
Lake	Grand River	2
Lake	Lake Erie	3
Lake	Marsh Creek	1
Lake	Ward Brook	1
Lake	Mill Creek	1
Lawrence	Buffalo Creek (Symmes Creek)	1
Lawrence	Caulley Creek	1
Lawrence	Indian Guyan Creek	1
Lawrence	Johns Creek	1
Lawrence	Ohio River	4
Lawrence	Pine Creek	1
Lawrence	Storms Creek	1
Lawrence	Symmes Creek	2
Licking	Beaver Run	1
Licking	Dutch Fork Licking River	1
Licking	East Fork Rattlesnake Creek	1
Licking	Lake Fork Licking River	1
Licking	Licking River	1
Licking	Lobdell Creek	1
Licking	North Fork Licking River	1
Licking	Otter Fork Licking River	1
Licking	Quarry Run	1
Licking	Raccoon Creek	1
Licking	Rocky Fork (Licking River)	1
Licking	South Fork Licking River	1
Licking	Wakatomika	2
Licking	Wilkins Run	1

Logan	Big Darby Creek	1
Logan	Bokes Creek	1
Logan	Flat Branch (Big Darby Creek)	1
Logan	Great Miami River	2
Logan	Hefflefinger Ditch	1
Logan	Macochee Creek	1
Logan	Mill Creek	1
Logan	Muchinippi Creek	1
Logan	Otter Creek	1
Logan	Rush Creek	1
Logan	Stony Creek	1
Lorain	Black River	2
Lorain	Charlemont Creek	1
Lorain	East Branch Black River	1
Lorain	East Fork Vermilion River	1
Lorain	Lake Erie	3
Lorain	Plum Creek	1
Lorain	Vermilion River	3
Lorain	Wellington Creek	1
Lorain	West Branch Black River	1
Lorain	West Branch Rocky River	1
Lucas	Blystone Ditch	1
Lucas	Cedar Creek	1
Lucas	Driftmeyer Ditch	1
Lucas	Duck Creek	1
Lucas	Lake Erie	3
Lucas	Maumee River	3
Lucas	Miami-Erie Canal	1
Lucas	Ottawa River	3
Lucas	Otter Creek	1
Lucas	Swan Creek (Upstream of RM 4.3)	2
Lucas	Swan Creek (RM 4.3 to mouth)	1
Lucas	Ten Mile Creek	1
Lucas	Williams Ditch	1
Madison	Barren Creek	1
Madison	Big Darby Creek	2
Madison	Bradford Creek	1
Madison	Deer Creek	1
Madison	Glade Run	1
Madison	Little Darby Creek	2
Madison	North Fork Deer Creek	1

Madison	North Fork Paint Creek	1
Madison	Oak Run	1
Madison	Paint Creek	1
Madison	Phifer Ditch	1
Madison	South Fork Bradford Creek	1
Madison	Spring Fork (Little Darby Creek)	1
Madison	Sugar Run	1
Madison	Walnut Run	1
Mahoning	Indian Run	1
Mahoning	Mahoning River	1
Mahoning	Middle Fork Little Beaver Creek	1
Mahoning	Morrison Run	1
Mahoning	North Fork Little Beaver Creek	1
Mahoning	West Branch Meander Creek	1
Marion	Brondige Run	1
Marion	Cauquaw Run	1
Marion	Clendenon Ditch	1
Marion	Cusic Ditch	1
Marion	Flat Run	1
Marion	Grave Creek	1
Marion	Honey Creek	1
Marion	Little Sandusky River	1
Marion	Little Scioto River	1
Marion	McDonald Creek	1
Marion	Mud Run	1
Marion	Olentangy River	2
Marion	Pawpaw Run	1
Marion	QuQua Creek	1
Marion	Rockswale Ditch	1
Marion	Rocky Fork (Little Sicoto River)	1
Marion	Rush Creek	1
Marion	Scioto River	1
Marion	Tymochtee Creek	2
Medina	Chippewa Creek	1
Medina	Coon Creek	1
Medina	East Branch Black River	1
Medina	East Branch Rocky River	1
Medina	East Fork (East Branch Black River)	1
Medina	Mallet Creek	1
Medina	Remson Creek	1
Medina	River Styx	1
Medina	West Branch Rocky River	1

Medina	West Fork (East Branch Black River)	1
Meigs	East Branch Shade River	2
Meigs	Leading Creek	1
Meigs	Middle Branch Shade River	2
Meigs	Ohio River	4
Meigs	Oldtown Creek	1
Meigs	Shade River	1
Meigs	Sugarcamp Run	1
Meigs	West Branch Shade River	1
Mercer	Beaver Creek	1
Mercer	Big Run	1
Mercer	Black Creek	1
Mercer	Coldwater Creek	1
Mercer	St. Mary's River	1
Mercer	Twelvemile Creek	1
Mercer	Wabash River	1
Miami	Great Miami River	2
Miami	Greenville Creek	1
Miami	Honey Creek	1
Miami	Little Painter Creek	1
Miami	Lost Creek	1
Miami	Miami-Erie Canal	1
Miami	Mill Creek	1
Miami	Spring Creek	1
Miami	Stillwater River	2
Miami	Trotters Creek	1
Monroe	Clear Fork (Little Muskingum River)	1
Monroe	Cranenest Fork (Little Muskingum River)	1
Monroe	Little Muskingum River	1
Monroe	Ohio River	3
Monroe	Sunfish Creek	1
Monroe	Witten Fork	1
Montgomery	Drylick Run	1
Montgomery	Great Miami River	3
Montgomery	Holes Creek	1
Montgomery	Mad River	1
Montgomery	Stillwater River	2
Montgomery	Toms Run	1
Montgomery	Twin Creek	1
Montgomery	Wolf Creek	1
Morgan	Dyes Fork (Meigs Creek)	1

Morgan	East Branch Sunday Creek	1
Morgan	Little Wolf Creek	1
Morgan	Mans Fork	1
Morgan	Meigs Creek	1
Morgan	Muskingum River	4
Morgan	Olive Green Creek	1
Morgan	West Branch Wolf Creek	1
Morrow	Alum Creek	1
Morrow	Big Walnut Creek	1
Morrow	Bunker Run	1
Morrow	Flat Run	1
Morrow	Kokosing River	1
Morrow	Mill Creek	1
Morrow	Shaw Creek	1
Morrow	West Branch Alum Creek	1
Morrow	Whetstone Creek	1
Muskingum	Bartlett Run	1
Muskingum	Licking River	1
Muskingum	Meigs Creek	1
Muskingum	Miller Creek	1
Muskingum	Muskingum River	4
Muskingum	Salt Creek	1
Muskingum	Wakatomika Creek	2
Muskingum	White Eyes Creek	1
Noble	Barnes Run	1
Noble	Beaver Creek	1
Noble	Buffalo Creek	1
Noble	East Fork Duck Creek	1
Noble	Olive Green Creek	1
Noble	Rannells Creek	1
Noble	Seneca Fork	1
Noble	Seneca Lake	1
Noble	South Fork (Seneca Fork)	1
Noble	West Fork Duck Creek	1
Noble	Wolf Run	1
Ottawa	Lake Erie	3
Ottawa	Crane Creek	1
Ottawa	Magee Marsh	1
Ottawa	Portage River	3
Ottawa	Sandusky Bay	1
Ottawa	Sugar Creek	1
Ottawa	Toussaint Creek	1

Ottawa	Toussaint River	1
Ottawa	Turtle Creek	1
Paulding	Auglaize River	1
Paulding	Blue Creek	1
Paulding	Flatrock Creek	1
Paulding	Gordon Creek	1
Paulding	Hoaglin Creek	1
Paulding	Little Auglaize River	1
Paulding	Marie Delarme Creek	1
Paulding	Maumee River	3
Paulding	Middle Creek	1
Paulding	North Creek	1
Paulding	Prairie Creek	1
Paulding	South Creek	1
Paulding	Zielke Ditch	1
Paulding	Zuber Cutoff	1
Perry	Center Branch Rush Creek	1
Perry	Coal Brook	1
Perry	Dotson Creek	1
Perry	Jonathan Creek	1
Perry	Little Rush Creek	1
Perry	Sunday Creek	1
Pickaway	Big Darby Creek	2
Pickaway	Big Walnut Creek	2
Pickaway	Deer Creek	1
Pickaway	Dry Run	1
Pickaway	Greenbrier Creek	1
Pickaway	Hargus Creek	1
Pickaway	Lick Run	1
Pickaway	Ohio and Erie Canal	1
Pickaway	Opossum Run	1
Pickaway	Peters Run	1
Pickaway	Salt Creek	1
Pickaway	Scioto River	4
Pickaway	Scippo Creek	1
Pickaway	Slate Run	1
Pickaway	Turkey Run	1
Pickaway	Walnut Creek	2
Pickaway	Yellowbud Creek	1
Pike	Beaver Creek	1
Pike	Morgan Fork (Sunfish Creek)	1

Pike	Ohio and Erie Canal	1
Pike	Scioto River	4
Pike	Sunfish Creek	1
Portage	Aurora Branch (Chagrin River)	1
Portage	Breakneck Creek	1
Portage	Cuyahoga River	1
Portage	Eagle Creek	1
Portage	Hinckley Creek	1
Portage	Mahoning River	1
Portage	Plum Creek	1
Portage	Sand Creek	1
Portage	Tinkers Creek	1
Portage	Trib. to Cuyahoga R. (RM 63.82)	1
Preble	Millers Fork	1
Preble	Sevenmile Creek	1
Preble	Twin Creek	1
Putnam	Auglaize River	2
Putnam	Blanchard River	1
Putnam	Jennings Creek	1
Putnam	Little Auglaize River	1
Putnam	North Powell Creek	1
Putnam	Ottawa River	1
Putnam	Plum Creek	1
Putnam	Riley Creek	1
Richland	Black Fork Mohican River	1
Richland	Cedar Fork (Clear Fork Mohican River)	1
Richland	Clear Fork Mohican River	1
Richland	Rocky Fork Mohican River	1
Ross	Buckskin Creek	1
Ross	Compton Creek	1
Ross	Deer Creek	1
Ross	Little Salt Creek	1
Ross	Middle Fork Salt Creek	2
Ross	North Fork Paint Creek	1
Ross	Paint Creek	1
Ross	Poe Run	1
Ross	Salt Creek	2
Ross	Scioto River	4
Ross	Walnut Creek	1
Ross	Yellowbud Creek	1
Sandusky	Green Creek	1

Sandusky	Gries Ditch	1
Sandusky	Lake Erie	3
Sandusky	Little Muddy Creek	1
Sandusky	Muddy Creek	1
Sandusky	Muskellunge Creek	1
Sandusky	Portage River	1
Sandusky	Raccoon Creek	1
Sandusky	Sandusky Bay	1
Sandusky	Sandusky River	1
Sandusky	Sugar Creek	1
Sandusky	Wolf Creek	1
Scioto	Hales Creek	1
Scioto	Little Scioto River	1
Scioto	Ohio River	4
Scioto	Pine Creek	1
Scioto	Rocky Fork Little Scioto River	2
Scioto	Scioto Brush Creek	2
Scioto	Scioto River	4
Scioto	South Fork Scioto Brush Creek	2
Scioto	Turkey Creek	1
Seneca	Beaver Creek	1
Seneca	Honey Creek	1
Seneca	Morrison Creek	1
Seneca	Sandusky River	1
Seneca	Sugar Creek	1
Seneca	Wolf Creek	1
Shelby	Great Miami River	2
Shelby	Loramie Creek	1
Shelby	Nine Mile Creek	1
Shelby	Tawawa Creek	1
Shelby	Turtle Creek	1
Stark	Deer Creek	1
Stark	East Branch Nimishillen Creek	1
Stark	Mahoning River	1
Stark	Middle Branch Nimishillen Creek	1
Stark	Nimishillen Creek	1
Stark	Sandy Creek	1
Stark	Swartz Ditch	1
Stark	Tuscarawas River	1
Stark	West Sippo Creek	1
Summit	Brandywine Creek	1

Summit	Cuyahoga River	1
Summit	Furnace Run	1
Summit	Haskell Run	1
Summit	Metzgers Ditch	1
Summit	Ohio and Erie Canal	1
Summit	Tuscarawas River	1
Summit	Yellow Creek	1
Trumbull	Baughman Creek	1
Trumbull	Eagle Creek	1
Trumbull	Grand River	2
Trumbull	Little Yankee Creek	1
Trumbull	Mahoning River	1
Trumbull	Pymatuning Creek	2
Trumbull	West Branch Mahoning River	1
Tuscarawas	Buckhorn Creek	1
Tuscarawas	Dunlap Creek	1
Tuscarawas	Goettge Run	1
Tuscarawas	Little Stillwater Creek	1
Tuscarawas	Ohio and Erie Canal	1
Tuscarawas	Sandy Creek	1
Tuscarawas	Stillwater Creek	1
Tuscarawas	Sugar Creek	1
Tuscarawas	Tuscarawas River	4
Union	Big Darby Creek	2
Union	Blues Creek	1
Union	Bokes Creek	1
Union	Buck Run	1
Union	Flat Branch (Big Darby Creek)	1
Union	Fulton Creek	1
Union	Little Darby Creek	2
Union	Mill Creek	2
Union	North Branch Crosses Run	1
Union	Powderlick Run	1
Union	Robinsons Run	1
Union	Rush Creek	1
Union	Spain Creek	1
Union	Sugar Run	1
Union	Treacle Creek	2
Van Wert	Jennings Creek	1
Van Wert	Little Auglaize River	1
Van Wert	Black Creek	1
Van Wert	St. Marys River	1

Van Wert	Town Creek	1
Vinton	Little Raccoon Creek	1
Vinton	Middle Fork Salt Creek	2
Vinton	Pigeon Creek	1
Vinton	Raccoon Creek	1
Vinton	Salt Creek	1
Warren	Caesar Creek	1
Warren	Clear Creek	1
Warren	Flat Fork (Caesar Creek)	1
Warren	Great Miami River	2
Warren	Little Miami River	2
Warren	Millers Creek	1
Warren	North Branch Dicks Creek	1
Warren	Simpson Creek	1
Warren	Todd Fork (Little Miami River)	1
Warren	Turtle Creek	1
Warren	Twin Creek	1
Washington	Archers Fork	1
Washington	Danas Run	1
Washington	Davis Creek	1
Washington	Duck Creek	1
Washington	East Branch Little Hocking River	1
Washington	East Fork Duck Creek	1
Washington	Little Hocking River	1
Washington	Little Muskingum River	2
Washington	Muskingum River	4
Washington	Ohio River	4
Washington	Olive Green Creek	1
Washington	West Branch Little Hocking River	1
Washington	West Branch Wolf Creek	1
Washington	West Fork Duck Creek	1
Washington	Whipple Run	1
Washington	Wolf Creek	1
Wayne	Chippewa Creek	1
Wayne	Killbuck Creek	1
Wayne	Little Killbuck Creek	1
Wayne	Muddy Fork Mohican River	1
Wayne	Shreve Creek	1
Wayne	Steele Ditch	1
Wayne	Sugar Creek	1
Williams	Bear Creek	1

Williams	Beaver Creek	1
Williams	Brush Creek	1
Williams	Clear Fork St. Joseph River	1
Williams	Eagle Creek	1
Williams	East Branch St. Joseph River	1
Williams	Fish Creek	2
Williams	Mill Creek	1
Williams	Mill Stream Drain	1
Williams	Nettle Creek	1
Williams	Prairie Creek	1
Williams	Silver Creek	1
Williams	St. Joseph River	2
Williams	Tiffin River	1
Williams	West Branch St. Joseph River	2
Wood	Beaver Creek	1
Wood	Dry Creek	1
Wood	Maumee River	3
Wood	Miami-Erie Canal	1
Wood	Middle Branch Portage River	1
Wood	Needles Creek	1
Wood	North Branch Portage River	1
Wood	Portage River	1
Wood	Rader Creek	1
Wood	Rocky Ford	1
Wood	South Branch Portage River	1
Wood	Tontogany Creek	1
Wyandot	Broken Sword Creek	1
Wyandot	Little Sandusky River	1
Wyandot	Little Tymochtee Creek	1
Wyandot	Negro Run	1
Wyandot	Potato Run	1
Wyandot	Sandusky River	1
Wyandot	Sycamore Creek	1
Wyandot	Tymochtee Creek	2
Wyandot	Warpole Creek	1

Appendix B: Reconnaissance Survey for Unionid Mussels

Objective: To determine the presence or absence of unionid mussels within a project area that will require in-stream work on a Group 1 stream or on streams where the watershed area above the impact point is five mi^2 or larger that contain suitable mussel habitat, which are not listed as a mussel stream by USFWS and ODNR.

Limitations: This protocol is to be used on small wade-able streams that are not known to contain federally listed species, including streams on the Group 1 list in the Ohio Mussel Survey Protocol (Appendix A) or unlisted streams over five square miles with suitable mussel habitat. Reconnaissance surveys in unlisted and smaller Group 1 streams may be conducted outside the seasonal window if conditions are within those described in the limitations section of Appendix B, water temperatures are greater than 50 degrees Fahrenheit, and permission via email is requested and received. Consideration will be given to request at the tail ends of the seasonal window and for emergency situations (ex. human safety). Conditions permitting reconnaissance survey are:

- Water levels at the site must be normal or below normal, and water clarity must be clear to bottom or have a minimum visibility of one-half meter (approx. twenty inches).
- All stream substrates within the survey reach must be visible and able to be surveyed.
- If any reach within the survey area is too deep (greater than one meter [36 inches]), too turbid, or has other issues that preclude searching the entire stream bottom, then the survey reach cannot be surveyed using the reconnaissance protocol. In these instances, a State and/or federally permitted malacologist must survey the site using the Group 1 stream timed search survey protocol as outlined in the Ohio Mussel Survey Protocol.
- The biologists conducting the surveys must have the qualifications stated in Appendix D and must possess an Ohio scientific collector's permit.

Survey Area: The entire area under the existing structure, the area where the proposed structure will be placed (if different), and a buffer area beginning 400 feet downstream of the downstream edge of the existing or proposed structure to 200 feet upstream of the upstream edge of the existing or proposed structure (whichever is the larger survey area) should be surveyed. If the biologist feels that additional buffer is necessary to adequately assess the area for mussels, then the additional area should be searched. If weathered dead shells are observed but no live mussels are found during the upstream and downstream search, an additional 20 minutes should be dedicated to a search of the salvage zone (the salvage zone includes the ADI and all applicable buffers).

A larger buffer area for these surveys is necessary as the surveyor is using only visual methods to determine if mussels are present, and some mussels in an area may not be visible above the stream-bed surface. The longer search area increases the likelihood that mussels will be observed if present in the area.

Methods: Beginning at the downstream end of the buffer zone, the stream substrates, stream banks, and gravel bars should be visually searched for evidence of shells, shell fragments, or live mussels. All stream habitats (not just suitable habitats) must be visually inspected, but special attention should be paid to heterogeneous substrates where living mussels may be difficult to see (e.g., sand and gravel interspersed with cobbles). Mussel viewing tubes or glass-bottom buckets may be used during the survey to aid in viewing the substrates. Live mussels should not be removed from the substrate for identification unless the surveyor is qualified to survey 1 – 4 systems as specified in Appendix D. The entire stream reach as defined above must be surveyed. The site should be searched for at least 60 minutes for smaller streams (10-100) square miles, or 90 minutes for larger streams (above one hundred square miles), unless evidence of a mussel population is found. Once the presence of live mussels or fresh dead shells is confirmed, the survey does not have to continue. If only weathered dead shells or shell fragments are observed, the entire survey time (either 60 or 90 minutes based on stream size) should be used and an additional 20 minutes should be dedicated to a search of the salvage zone to determine if mussels are still present within the survey area. No species list will be generated from these surveys, unless the surveyor is qualified to survey 1 – 4 systems as specified in Appendix D. Representative photos of the survey area, shell material observed, and live mussels (in-situ) should be taken.

Reporting: The surveyor will fill out the *Ohio Mussel Habitat Assessment Form*. Include a project photolog with representative photos of the stream, stream habitats/substrates, and shells/live mussels. If needed or desired, note somewhere on the form or in a separate appendix, information such as:

1. A brief description of the search methods used at the site.
2. Note any obvious pollution or stream stability issues.
3. Approximate numbers and location(s) of shells and live mussels (include species list if biologist has identification expertise).

Submit the form to ODNR contact in Appendix C. ODNR will review and provide concurrence with results if appropriate or respond with comments.

Additional Survey Requirements: The presence of fresh dead mussel shells and live mussels will trigger a mussel survey by a qualified surveyor as described in the *Ohio Mussel Survey Protocol.*

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: ____________________

County: ____________________ Township: ____________________

Latitude (DD.DDDD): ____________________ Longitude (DD.DDDD): ____________________

Stream Name: ____________________ Group # (From Appendix A): ____________________

Methods

Name of Surveyor(s): ____________________

Qualification of Surveyor(s): ☐ USFWS Approved ☐ ODNR Approved ☐ Aquatic Biologist (minimum)

Date of Survey: ____________________ Distance Surveyed (ft.): ____________________

Total Survey Time (min. x people): __________ Scientific Collector's Permit Number(s): ____________________

Note any deviations from the Ohio Mussel Habitat Assessment Methods:

Habitat Description of Survey Area

Drainage Area at Survey Location (mi^2): __________ Water Temp. (^{o}F): __________ Air Temp. (^{o}F): __________

Substrate Types (include %):

☐ Boulder ______	☐ Gravel ______	☐ Bedrock ______	☐ Detritus ______	☐ Silt ______
☐Cobble ______	☐ Sand ______	☐ Hardpan ______	☐ Muck ______	☐ Artificial ______

Water Level: ☐ High ☐ Up ☐ Normal ☐ Low ☐Dry/Interstitial

Visibility: ☐ 0-15 cm ☐ 15-30 cm ☐ 30-50 cm ☐ >50 cm ☐ Visible to Bottom

Average Depth (cm): Riffle ________ Run ________ Pool ________

Max Depth (cm): Riffle ________ Run ________ Pool ________

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

☐ None ☐ Mussel Shell Only - Subfossil ☐ Mussel Shell Only - Weathered Dead ☐ Mussel Shell Only - Fresh Dead ☐ Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.

Required Attachments 1) Location Map and 2) Photo Log

Appendix C: Contact information for State and Federal agencies

State of Ohio Contact John Navarro Ohio Department of Natural Resources Division of Wildlife 2045 Morse Road, G-3 Columbus, Ohio 43229-6693 (614) 265-6346 John.navarro@dnr.state.oh.us
U.S. Fish and Wildlife Service Contact Angela Boyer U.S. Fish and Wildlife Service Ecological Services 4625 Morse Road, Suite 104 Columbus, Ohio 43230 (614) 416-8993, ext.122 angela_boyer@fws.gov
The Ohio State University Contact Nathaniel F. Shoobs Curator of Mollusks The Ohio State University College of Arts & Sciences Dept. of Evolution, Ecology, and Organismal Biology Museum of Biological Diversity 1315 Kinnear Rd., Columbus, OH 43212 614-688-1342 shoobs.1@osu.edu

Appendix D: Qualifications for Mussel Surveys

To work with mussels in Ohio there are three levels of minimum qualifications required based on location and survey type. Satisfaction of a higher qualification level allows the surveyor to work at the lower levels. Work at all three levels require an *Ohio Scientific Collectors Permit* from the Division of Wildlife. The three levels of qualification are as follows:

1) **Survey of Group 2 and 4 Systems:** The minimum qualifications to survey Group 2 and 4 streams, which are likely to have federally listed mussels present, is a federal permit from the USFWS. For information on the requirements for a federal permit, reference the USFWS contact in Appendix C. Applicants must also pass the *Standardized Freshwater Mussel Identification Test* by passing with a score of 100% on all federal species on the exam (Appendix E).

2) **Survey of Group 1 and 3 Systems:** The minimum qualifications to survey Group 1 and 3 systems, which are not likely to have federally listed mussels present, are based upon knowledge of and experience in the performance of mussel surveys.

   Survey Experience: Surveyors must have at least three (3) years of field experience in a position including direct responsibility for and participation in conducting at least ten (10) Group 1 or 3 mussel surveys over that time-period; include copies of qualifying mussel surveys with your application. Surveys in other states will be accepted on a case-by-case basis.

   Qualifying Survey Experience: In lieu of the survey experience above, completion of the Freshwater Mussel Workshop facilitated by The Ohio State University will be accepted. See mbd.osu.edu/musselworkshop for details.

   Proficient in Identification: Applicants must pass the *Standardized Freshwater Mussel Identification Test* (Appendix E).

   Education: Surveyors must have a Bachelor of Science degree in biology, environmental science, natural resources, or related field with at least three 3-hour courses from or related to those in the following list: Aquatic Ecology, Fisheries, Hydrology, Aquatic Entomology, Limnology, Ichthyology, and Plant Taxonomy.

   Qualifying Experience: In lieu of the educational experience listed above, surveyors must have a minimum of four years of experience in a position that includes direct responsibility for and participation in conducting surveys that document aquatic fauna and flora.

3) **Reconnaissance of Group 1 Systems:** Reconnaissance surveys are used to determine if a full mussel survey is required. For reconnaissance of Group 1 streams (or on streams which the watershed is ≥ 5 mi^2) to determine if mussels are present, the surveyor must satisfy the educational or qualifying experience listed above.

Submittal Requirements for category 2 and 3 listed above:

- Resumes and, if applicable, curricula vitae.
- A list of everyone's academic coursework related to aquatic ecology or evidence of qualifying experience surveying for and documenting aquatic fauna and flora.
- Three references including at least one from someone outside your organization.
- Please send your qualifications to the Division of Wildlife contact in Appendix C.

Appendix E: Standardized Freshwater Mussel Identification Test

Anyone who wishes to conduct mussel surveys in Ohio will need to have passed the mussel identification test. This includes individuals with federal permits for freshwater mussels.

Tests are administered by appointment only and at the discretion of the Division of Mollusks of The Ohio State University Museum of Biological Diversity (MBD). Records of scores for each test attempt, successful or unsuccessful, are maintained by the MBD Division of Mollusks and the ODNR Division of Wildlife.

To book your test appointment go to https://go.osu.edu/musseltest

- The test is available twice a day, between 10:30AM and 6PM, Tuesdays, Thursdays, and Fridays by appointment only. Appointments can be made one (1) week to 45 days in advance, using the online booking system linked above.
- You can book time to visit the collection and study for the test using the same booking site.
- The test will be delivered at the Museum of Biological Diversity of The Ohio State University, 1315 Kinnear Rd., Columbus, OH 43212.
- Hourly and daily parking is available, see https://mbd.osu.edu/about/directions for information.

Test format and rules:

1. The test includes Ohio unionid mussel species. Some species may occur more than once.
2. You may return to any previous specimens as needed and may compare specimens freely.
3. For each unidentified specimen on the test, you may request distributional information (i.e., where one might find that specimen in the state of Ohio).
4. Once started, the test must be completed within three (3) hours.
    - Bathroom / snack breaks may be taken at your discretion, without permission.
5. The test can be administered to two people at once, a maximum of four people per day.
6. The test is “open book” so you may bring outside sources (books, notes, photographs, etc.) to the test, provided they are on paper.
7. No outside phones, computers, or tablets are allowed in the room with you while you take the test.
8. To pass the test, you must correctly identify:
    - 100% of federally listed species
    - At least 80% of Ohio threatened & endangered species.
    - At least 80% of the species on the test overall.
9. You may retake the test as many times as you wish, but the entire test must be retaken each time. In general, you must allow at least one (1) week in between attempts, however exceptions may be made for test takers who have traveled long distances to take the test.

10. After passing the test, you will receive a Certificate of Completion, valid for five (5) years from the date of the test.
    - You must schedule and re-take the test within this time-period to continue as an approved mussel surveyor.

Please e-mail the Curator of Mollusks at MBD, Nathaniel Shoobs (shoobs.1@osu.edu) if you have questions about the test.

APPENDIX F: Report Checklist and Reporting Form

<u>INTRODUCTION:</u>

- Description of the stream and watershed including:
  - ✓ Name (if stream is named)
  - ✓ Receiving waters of surveyed stream
  - ✓ Location, including:
    - ▪ Coordinates – at center of ADI
    - ▪ River mile (if available)
    - ▪ Township (if applicable)
    - ▪ County
  - ✓ Drainage area at survey site
  - ✓ Summary of any water quality data or previous mussel survey reports near the area of impact (OEPA Aquatic Life Use designation)
  - ✓ Surrounding land use

<u>METHODS:</u>

- Personnel
- Date(s) of survey
- Area surveyed, including:
  - ✓ Description of survey/buffer areas (e.g., length, bank-to-bank)
  - ✓ Coordinates of survey/buffer areas (ADI, US, DS)
  - ✓ Map delineating survey/buffer areas (ADI, US, DS, LT). Maps can be included within text or in the Figures & Tables section.
- Survey method, including:
  - ✓ Type of mussel survey completed (e.g., Phase I, Phase II, Timed Visual Search)
  - ✓ Length and spacing of transects or size of the cells.
  - ✓ Time searched.
  - ✓ Method of detection (e.g., SCUBA, view bucket, quadrats)
  - ✓ Whether banks were searched for shells
  - ✓ Trigger – for Phase II studies
  - ✓ Description of additional transects (for Phase II studies), including coordinates and delineated map.
- Mussel handling and processing procedures
- Quality Control Procedures (Includes taking representative photos of each species and video of any questionable specimens)

<u>RESULTS:</u>

- Habitat Assessment within each transect, cell, or timed search area, including:
  - ✓ Substrate composition (include information about the stability of the substrates)
  - ✓ In-stream features (e.g., channel alterations, impoundments)

- ✓ Average stream depth
- ✓ Visibility (say what the visibility was, not just that it met the minimum requirements)
- ✓ Water temperature
- ✓ Suitable habitats within the area of the survey
- ✓ Photos of stream and substrate

- An overview of the results, including:
  - ✓ Number of individuals found.
  - ✓ Number of species found.
  - ✓ Any notable species found.
- A description of the results from Phase I and Phase II separately
- Tables of results, including (either within text or attached in Appendix):
  - ✓ Species data for each transect and/or cell.
    - ▪ Relative abundance
    - ▪ Condition (living/fresh dead/weathered/subfossil)
    - ▪ Sex of individuals if determinable
    - ▪ Morphometric data (optional if not required by permit or site-specific authorization)

<u>MUSSEL RELOCATION</u> (This is required for all relocations; however, additional information may be required for Group 2 and 4 systems where federal species may be encountered. For these situations, follow all requirements in the project Biological Opinion):

- Relocation site, including:
  - ✓ Location (coordinates at center)
  - ✓ Map delineating area. Maps can be included within text or in the Figures & Tables section.
  - ✓ Results of required 15-minute qualitative survey (provide coordinates in decimal degrees)
- Method of salvaging mussels from survey area

<u>CONCLUSION: S</u>ummary of findings, and conclusions

<u>PHOTO VOUCHER</u>: A photo voucher for each species collected needs to be included in the report for quality control.

<u>REFERENCES: </u>Include citations for any literature cited within the text of the report (e.g. Smith et al., for excavation methods)

<u>FIGURES & TABLES:</u> If not provided in text, provide a separate section for Figures (including maps and aerial photos showing extent of survey) and Tables (transect and quadrat data, morphometric data)

APPENDICES:

- Photos of stream and substrates
- Representative photos of each mussel species found.
- Video of questionable species
- Raw Data Sheets
  - ✓ Copy of State and/or Federal permits
  - ✓ Site-specific authorization from USFWS for Group 2 and Group 4 stream surveys

PUT TITLE OF REPORT HERE

Reporting Form for Group 1 and 3 Systems

Project:	
Project Identification Number (PID):	
Report Type:	
Report Author(s):	
Affiliation:	
Phone:	
Email:	
Date of Submission:	

GENERAL PROJECT INFORMATION					
Stream Name:		Drainage Area (mi^2):		OEPA River Mile:	
Receiving Waters:		USGS 7.5' Quadrangle(s):		HUC 12:	
Project Area Latitude (dd.ddddd):		Project Area Longitude (-dd.ddddd):			
Relocation Area Latitude (dd.ddddd):		Relocation Area Longitude (-dd.ddddd)			
County:		Township:			
General Project Description:					

SURROUNDING LAND USE
Choose the dominant land uses that surround the project area:
(Choose)
(Choose)
(Choose)
(Choose)
Additional Information:

WATER QUALITY DATA AND HISTORIC SURVEY SUMMARY (optional)

SURVEYOR INFORMATION AND METHODS					
Lead Surveyor:		State Permit #:		Federal Permit #:	
Other Surveyors:					
Survey Type:		Stream Group #:			
Survey Date(s):					
Survey Description (Including deviations from protocol):					
Mussel Handling Procedures:					
QA/QC Methods:					

RESULTS			
Water Temperature (°C):		**Air Temperature (°C):**	
Water Level:		**Visibility (cm):**	
Substrate Type			

☐ Boulder	% ____	☐ Gravel	% ____	☐ Bedrock	% ____	☐ Detritus	% ____	☐ Silt	% ____
☐ Cobble	% ____	☐ Sand	% ____	☐ Hardpan	% ____	☐ Muck	% ____	☐ Artificial	% ____

Average Depth (cm):	Riffle	____	Run	____	Pool	____
Max Depth (cm):	Riffle	____	Run	____	Pool	____

Results Summary:

FIGURES, TABLES, AND APPENDICES (* are optional)				
Tables	**Figures**	**Appendix 1: Photo Log**	**Appendix 2: Data Sheets**	**Appendix 3: Permits and Approvals**
☐ Historic Survey*	☐ Location Map	☐ Photo Loc. Map	☐ Raw Data	☐ State Permit
☐ Results Table	☐ Survey Design	☐ Site Photos	☐ Other	☐ Fed Permit*
☐ Other*	☐ Other*	☐ Specimen Photos	☐ Other	☐ Plan Approval
☐ Other*	☐ Other*	☐ Other*	☐ Other	☐ Other

Group 1 and Group 3 Mussel Survey Report Instructions

Front Cover: The cover shown on this report is the standard Ohio Department of Transportation (ODOT) report cover. The surveyor can use their standard report cover or the cover preferred by their client. Please include the following information on the front cover:

- Project Name
- Report Type (Group 1 or Group 3)
- Author Name
- Author Affiliation
- Author Contact Information (phone number and email)
- Date of Submission

General Project Information: The information in this table is required for the Mussel Collection Database that is currently being kept by ODOT. Please use decimal degrees for the project area location and relocation area location. If the survey did not require relocation, fill the relocation area boxes with N/A. Websites to find drainage area, river mile, and the HUC-12 are linked to the blue text. Hold the CRTL key and click on the text to be taken to the appropriate website. Please include a description of the project associated with the survey.

Surrounding Land-use: This table will summarize the land-use surrounding the project site. The user should click on the word "choose" and a drop-down menu will appear. The "disturbed" land uses are from the National Land Cover Database and the natural land-uses are from Plant Communities of Ohio (Anderson, 1982). Scroll to the appropriate land use and select it. To add rows to the table, click on the "+" symbol to the right of the row (see red circled area below).

SURROUNDING LAND USE
Choose the dominant land uses that surround the project area:
(Choose)
(Choose)
(Choose)
(Choose)
Additional Information:

If the surveyor needs to include more land use information for their client or other regulatory agencies, it should be added to the "Additional Information" row. This row is expandable and does not have a limit to the amount of text that can be added.

Water Quality Data and Historic Survey Summary: This information is optional. If the surveyor's client or another resource or regulatory agency requires information on water quality and/or past mussel surveys from the stream or site, please summarize it in this text box. This box has no character limit.

Surveyor Information and Methods: The lead surveyor should be listed on the collection permit and be present on-site during the survey. Every lead surveyor should have a valid state permit, so the State Permit # box should be filled in. If the surveyor does not have a federal permit, this box can be left blank or filled with "N/A". The "Other Surveyors" list should consist of everyone else that performed the survey, whether they have a permit or not.

The survey type should be one of the survey types listed in Appendix G (e.g., bridge replacement, pipeline, bank stabilization etc.). Use Appendix A to determine the stream group number. If the stream is unlisted, the cell can be filled in with a zero or with N/A. For the survey description, please include details on how the survey was set up, the dimensions of cells and/or transects, and detail any deviations from the protocol. This box does not have a character or word limit.

Mussel handling procedures should include the storage method(s) and handling methods used during the survey. Note if the mussels were measured, aged, and/or tagged. Also include information on how long they were in bags or live wells, and if they were relocated on the same day or stored overnight. Detail any deviations from the protocol. As with the survey description box, this text box does not have a character limit.

The QA/QC box should include information on methods used to ensure that the survey and mussel collection was performed correctly. This can include keeping a permitted malacologist on site for the entire survey, having experienced surveyors supervise less experienced surveyors during collection, performing more tactile searches and/or excavations in areas with dense mussel populations, and other methods. As with the other text boxes, this box does not have a character limit.

Results: For the air temperature and water temperature, please fill in the values. If the survey occurred over multiple days, the box does not have a character limit, so the author can create a list of dates and temperatures. For the water level, this should be high, normal, or low. For visibility, this should be centimeters of visibility. **Please note**: If the water level and/or visibility do not meet the qualifications in the protocol, please note if a waiver to continue the survey was received from ODNR and what methods were used to ensure mussel detection in sub-optimal conditions. This information can be included in the results summary box or in the methods table.

For the substrate table, if the site is small and/or similar in substrate throughout the survey area, the entire site can be summarized in one substrate sub-table. In large sites or sites with truly diverse substrates in different areas, this section of table can be repeated by clicking on the "+" at the right of the table (circled in red below). The surveyor can add the name of the section or cell to the header and note the percent of each substrate for that section. As many sections can be added as necessary.

Photo Voucher: A photo voucher for each species collected needs to be included in the report for quality control. See P. 7 "Vouchering Specimens" for details.

RESULTS			
Water Temp		**Air Temp:**	
Water Level:		**Visibility:**	
Substrate Type			

☐ Boulder	%	☐ Gravel	%	☐ Bedrock	%	☐ Detritus	%	☐ Silt	%
☐ Cobble	%	☐ Sand	%	☐ Hardpan	%	☐ Muck	%	☐ Artificial	%

Average Depth (cm):	Riffle		Run		Pool	
Max Depth (cm):	Riffle		Run		Pool	

Results Summary:

For the depth section, just fill out the average and maximum depths for the riffle, run, and pool areas of the stream. If the stream does not have one or more of the habitat types, the box can be filled as N/A.

The results summary should include information on the number of individuals and species for each survey segment (ADI, salvage buffers, survey buffers). A description of the relocation area and numbers and species found in this area should also be included, if relocation was needed. Problems encountered during the survey can also be discussed in this section.

Figures, Tables, and Appendices: Check the boxes next to the material that is being included in the report. For the tables, the results table is required, but the historic survey table is optional. Example table templates for the historic survey table and the results table can be found in the Group 1 and 3 report form. If the author wants to add other tables, please list them in the checklist. For the figures, the location map and survey design figure are required. If other figures are included, add them to the list. Appendix 1 includes the photo log. The map showing the photo locations and site photos are required. Specimen photos are required if mussels are found. If other photos were taken (e.g., site disturbances, etc.), the description should be added to the list. Appendix 2 is for the raw data forms or field forms. If other forms are included (e.g., QHEI), please add it to the checklist. Appendix 3 contains collection permits and the plan approval email from ODNR. A state permit is required for all surveyors. If the surveyor has a federal permit, please also include a copy of that permit. The plan approval email is required for all projects. If other correspondence is included, add it to the checklist. To add latest items to the figures, tables or appendices lists, replace the "other" placeholder with the name of the item, and click the check box next to it.

Example Tables

Historic survey results table:

Scientific Name	**Common Name**	**OH Mussel DB**	**Ohio EPA 2007**	**EMH&T 2016**	**Current**
Actinonaias l. carinata	Mucket	-	X	-	-
Alasmidonta marginata	Elktoe	X	-	-	-
Alasmidonta viridis	Slippershell	X	X	-	X
Anodontoides ferussicanus	Cylindrical Papershell	X	-	X	X
Elliptio dilatata	Spike	X	X	X	X
Fusconaia flava	Wabash Pigtoe	-	-	X	-
Lampsilis cardium	Plain Pocketbook	X	X	X	X
Lampsilis fasciola	Wavy-rayed Lampmussel	X	-	X	X
Lampsilis radiata luteola	Fat Mucket	X	X	X	X
Lasmigona compressa	Creek Heelsplitter	X	-	-	X
Lasmigona costata	Flutedshell	X	X	X	X
Pleurobema sintoxia	Round Pigtoe	X	-	-	X
Ptychobranchus fasciolaris	Kidneyshell	X	X	X	X
Pyganodon grandis	Giant Floater	X	X	-	-
Strophitus undulatus	Creeper	X	X	-	X
Villosa iris	Rainbow	X	-	X	X
Total Species	**16**	**15**	**9**	**9**	**12**

Example results table with passes included:

	Pass 1	Pass 2	Pass 3
DOWNSTREAM SURVEY			
Strophitus undulatus	3	N/A	N/A
Lampsilis radiatia luteola	12	N/A	N/A
subtotal:	15	0	0
UPSTREAM SURVEY			
Strophitus undulatus	1	N/A	N/A
Lampsilis radiatia luteola	2	N/A	N/A
subtotal:	3	0	0
DOWNSTREAM SALVAGE			
Strophitus undulatus	4	0	0
Lampsilis radiatia luteola	30	3	2
subtotal:	34	3	2
ADI			
Strophitus undulatus	6	5	0
Lampsilis radiatia luteola	38	13	2
subtotal:	44	18	2
UPSTREAM SALVAGE			
Strophitus undulatus	1	0	0
Lampsilis radiatia luteola	4	0	0
subtotal:	5	0	0
grand total:	**137**		
salvage total:	**119**		

Example results tables by survey segment.

Scientific Name	Common Name	UST Surv	UST Salv	ADI	DST Salv	DST Surv	RA
Alasmidonta viridis	Slippershell	0	2	6	1	0	2
Lampsilis r. luteola	Fat Mucket	2	4	53	35	12	5
Strophitus undulatus	Creeper	1	1	11	4	3	1
	TOTALS	**3**	**7**	**70**	**40**	**15**	**8**

Scientific Name	Common Name	DST Survey	DST Salvage	ADI	UST Salvage	UST Survey
Lampsilis radiata luteola	Fatmucket (total)	**6**	**94**	**423**	**222**	**2**
	Male	2	45	184	103	2
	Female	4	45	158	68	0
	Juvenile	0	4	81	51	0
Pyganodon grandis	Giant Floater	15	55	191	90	6
Anodontoides ferussicanus	Cylindrical papershell	0	3	9	2	0
Toxolasma parvum	Lilliput	0	0	2	1	0
TOTAL		**21**	**152**	**625**	**315**	**8**

Appendix G. Summary of survey area buffer distances, salvage area buffer distances, and maximum transect spacing.

(Survey extent shall include the area of direct impact (ADI) and all applicable buffers. After demonstrating need and receiving approval, mussels may be relocated from Salvage Area. Salvage Area includes the ADI and all applicable buffers. Units are in meters.)

	Survey Area Buffers (in addition to ADI)			Salvage Area Buffers (in addition to ADI)		Maximum Transect Spacing
	US	DS	LT	US & LT	DS	
Group 4	Potential Phase 2 Surveys Required					
Dredging (New facility or expansion of an existing facility)	150	500	150	10	10	50[c]
Dredging (Maintenance at an existing facility)	25	25	25	5	10	50[a, c]
Linear Projects: Maintenance at Existing Facility	25	25	25	5	10	50[a, c]
Linear Projects: New Facility or Expansion Downstream	150	500	150	5	10	50[a, c]
Linear Projects: Expansion Upstream	150	150	150	5	10	50[a, c]
Other Projects (Hydropower, dam removal, etc.)	Project Specific					100[c]
Bridge Projects	50	100	BB	5	10	10
Waterline/Pipeline Corridor Disturbances	50	100	BB	5	10	10
Shoreline Protection	10	10	10	5	10	50
Bridge Projects	50	100	BB	5	10	10
Projecting Dike Structures (i.e., not parallel to shore)	10	20	10	5	10	TS
Outfalls	10	MZ + 100	10	PS		PS[c]
Non-Commercial Docks	No Survey Required (see criteria on p. 9)					
Group 3	Relocation at time of survey if approved					
Dredging (Sand and Gravel)	150	500	150	10		50[c]
Dredging (Maintenance)	50	150	50	10		50[c]

Linear Projects	25	25	25	5	10	50[a]
Other Projects (Hydropower, dam removal, etc.)	Project Specific					100
Bridge Projects	10	25	BB	5	10	TS
Waterline/Pipeline Corridor Disturbances	10	25	BB	5	10	TS
Shoreline Protection	10	10	10	5	10	TS
Projecting Dike Structures (i.e., not parallel to shore)	10	20	10	5	10	TS
Outfalls	10	MZ + 20	10	PS		
Non-Commercial Docks	No Survey Required (see criteria on p. 9)					
Group 2	Potential Phase 2 Surveys Required					
Other Projects (Hydropower, dam removal, etc.)	Project Specific					10
Bridge Projects	50	100	BB	5[b]	10	10
Waterline/Pipeline Corridor Disturbances	50	100	BB	5	10	10
Shoreline Protection	10	10	10	5	10	10
Outfalls	10	MZ + 20	10	PS		10
Group 1	Relocation at time of survey if approved					
Other Projects (Hydropower, dam removal, etc.)	Project Specific					TS or 10
Bridge Projects	10	25	BB	5[b]	10	TS
Waterline/Pipeline Corridor Disturbances	10	25	BB	5		TS
Shoreline Protection	10	10	10	5	10	10

a - transects should be placed to bisect instream structures
b - 10 m buffer to clear around culverted causeways
c - A minimum of 500 m of transects shall be surveyed
TS - Qualitative Timed Search Surveys permitted
PS - Project Specific
BB - Bank to Bank
MZ - Mixing Zone
US - Upstream
LT - Lateral
DS - Downstream

Appendix H. Species marked with an “X” should be excluded when defining a diverse mussel bed that may include FLS.

(These species are not used because of their general habitat preference and their common occurrence in silt and sand, and because they are not typically associated with the current list of FLS in Ohio.)

Species	Stream Group 2	Stream Group 4
Anodonta suborbiculata		X
Anodontoides ferussacianus	X	X
Lampsilis radiata luteola (=siliquoidea)	X	X
Leptodea fragilis		X
Potamilus ohiensis		X
Potamilus alatus		X
Pyganodon grandis	X	X
Utterbackia imbecillis	X	X

Appendix I: Formulae to determine area to be searched to detect species presence with a pre-determined probability (with excavation)

Formulae determines area to be searched to detect species presence with a pre-determined probability.
The formulae are Prob (species detection) = 1-exp(-a*b*m), where b is detectability and m is species density.

Input density, search efficiency, and search area or prob of spp detection

Solve for Prob of spp detection

Density or no. per m^2 (m)	Search efficiency (b)	Search area (m^2)	Prob of species detection
0.01	0.1	450	0.362372
0.01	0.6	450	0.932794
			"=1-EXP(-A10*B10*C10)"

Solve for Search area (sq m)

Density or no. per m^2 (m)	Search efficiency (b)	Search area (m^2)	Prob of species detection
0.01	0.4	301	0.7
0.01	0.8	288	0.9
		"=-LN(1-J10)/(G10*H10)"	

Input study area and abundance instead of density

Solve for Prob of spp detection

Study Area (sq m)	Abundance	Search efficiency (b)	Search area (m^2)	Prob of species detection
4500	45	0.4	495	0.861931
4500	45	0.6	450	0.932794
				"=1-EXP(-(B18/A18)*C18*D18)"

Solve for Search area (sq m)

Study Area (sq m)	Abundance	Search efficiency (b)	Search area (m^2)	Prob of species detection
4500	45	0.4	301	0.7
4500	45	0.4	576	0.9
			"=-LN(1-K18)/((H18/G18)*I18)"	

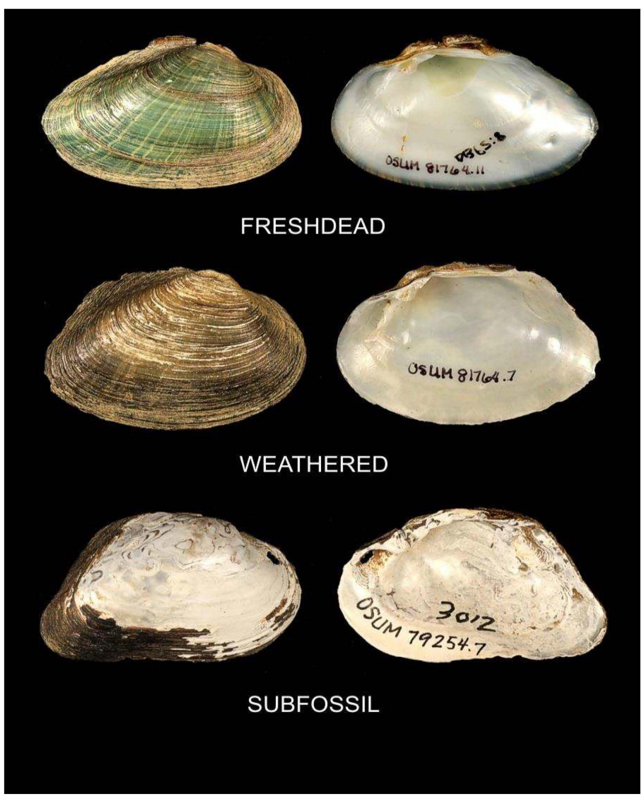
Appendix J: Identification of Mussel Shell Weathering

Objective: It is important to recognize that the weathering process is a continuum and cannot always be assigned to one of the three categories below. Weathering depends on where the shell has been since the animal died. Shells exposed to the sun and elements may weather much faster than a shell buried in a riverbank. Shells in collections may be in excellent condition for hundreds of years. For this reason, it is difficult to say with any certainty how long a shell has been dead.

- Fresh Dead
  - ✓ Periostracum (outer layer) of shells not faded or peeling.
  - ✓ Inner layer still with mother-of-pearl sheen, not flaking or infused with green algae.

- Weathered dead.
  - ✓ Periostracum faded or discolored, often peeling and brittle.
  - ✓ The inner layer no longer lustrous, often dull silver or faded, may be infused with green algae.

- Subfossil
  - ✓ Shell chalky, brittle.
  - ✓ Periostracum is usually absent.
  - ✓ Inner layer faded, may be flaking off in layers.



Ohio Riverfront- Cincinnati, Ohio (Phase 2)

Appendix D: Cost Engineering

TABLE OF CONTENTS

1 INTRODUCTION

This Appendix presents the cost estimate that has been assembled for the an authorized study under Section 1202(b) of WRDA 2016 within Smale Park, in Cincinnati, OH. A discussion regarding cost, schedule and risk is included in this Appendix which contains all appropriate feature accounts. What follows is a discussion regarding the methodology used to develop the cost for the Tentatively Selected Plan (TSP).

The costs provided have undergone District Quality Control (DQC) Review by Louisville District and have yet to go through Agency Technical Review (ATR) at the Walla Walla Cost Center of Expertise (MCX) but is planned for in in the coming weeks and months. These reviews will verify the reasonableness of total project costs, including the construction costs and calculated contingencies using the required Risk Analysis techniques.

2 REFERENCES

- ER 1110-1-1300, Cost Engineering Policy & General Requirements, 26 Mar 1993.
- ER 1110-2-1302, Civil Works Cost Engineering, 30 June 2016.
- ER 1110-2-1150, Engineering & Design for Civil Works Projects, 31 Aug 1999.
- ER 37-2-10 Change 89, Accounting And Reporting – Civil Works Activities, 31 Oct 2000.
- EC 11-2-187, Corps of Engineers Civil Works Direct Program: Program Development Guidance – Fiscal Year 2009, 30 Mar 2007.
- EP 1110-1-8 Volume 2, Construction Equipment Ownership and Operating Expense Schedule – Region II, July 2007.
- EC Bulletin No 2007-17, Application of Cost Risk Analysis Methods to develop Contingencies for Civil Works Total Project Costs, 10 Sep 2007.
- EM 1110-2-1304, Civil Works Construction Cost Index System (CWCCIS), 30 Sept 2021.
- EC 1105-2-410, Review of Decision Documents, 22 Aug 2008
- ETL 1110-2-573, Construction Cost Estimating Guide for Civil Works, 30 Sept 2008.

3 METHODOLOGY

3.1 GENERAL

The cost estimate was prepared using the Micro-Computer Aided Cost Estimating System (MCACES) Second Generation (MII), version 4.4.4 for all feature accounts associated with construction. Applicable crews and equipment were applied in the estimate to correspond with the work being performed. Material prices were developed using the 2023 MII Cost Book and quotes were obtained from suppliers, when available.

3.2 COST METHODOLOGY

3.2.1 Historical Unit Pricing

In some instances, historical cost information was referenced and documented accordingly. These historical references include past contract bid prices for projects of similar design and magnitude and recent government studies and cost estimates.

3.2.2 Quote-in-Place

In some instances, a quote from a subcontractor may have been received that included overhead and profit. In that case, no additional markups were included for subcontractor's overhead.

3.2.3 Detailed MII Cost Estimate

The MII estimating software was used to develop a construction sequence for each item of work and applying detailed line items and crews to perform the work. Crews were developed in correspondence with the work being performed and estimated productivities. Wage rates were taken from the local and latest Davis Bacon rates and as appropriate, escalated based on published information released by the Federal Reserve Economic Data (FRED) ECICONWAG index. The latest MII equipment database was also used and adjusted for current fuel and energy costs. Material prices were obtained through telephone solicitations with vendors, internet suppliers, the MII Cost Book, and RS MEANS.

A summary level report of the MII cost estimate for the TSP, as it is currently understood and defined, can be found in Attachment A.

3.3 DIRECT COSTS

Direct costs are based on anticipated equipment, labor, and materials necessary to construct this project. Following formulation of the direct cost, a determination is made as to whether the work would be performed by the prime contractor or a subcontractor and appropriately assigned within MII.

3.3.1 Labor - Wage Determination

Wage rates were taken from the latest Davis-Bacon wage determination OH20240001, Heavy and Highway Construction updated on https://www.sam.gov as recent as 04/05/2024. Recognizing that Davis Bacon rates for specific trades sometimes lag an update, possibly for years, a labor adjustment tool was utilized which references the Employment Cost Index: Wages and Salaries: Private Construction Workers: Construction (ECICONWAG) index put out by the Federal Reserve Economic Data (FRED) https://www.stlouisfed.org. This index allows labor rates to be escalated to be representative of anticipated growth of labor cost, since the last Davis Bacon update.

3.3.2 Equipment Costs

The 2022 Equipment database, based on EP 1110-1-8, Construction Equipment Ownership and Operation Expense Schedule, Region II, was used and adjusted for current, local fuel and energy costs per https://www.eia.gov. Off-Road diesel costs were determined by removing the state and federal fuel taxes placed on On-Road diesel, an approx. $0.714/gal reduction.

3.3.3 Vendor Quotes

Vendor quotes were acquired and documented for the anticipated cost driving materials. The significant materials associated with this project will be the limestone products (rip rap and other aggregate/fill) and the granite to be included to match the remainder of the existing park.

Rip Rap material is mostly assumed to be used to build out and armor the Smale Park shoreline against the Ohio River. This material is assumed to be brought in by barge and placed with a 2.5 CY clamshell bucket. A quote was able to be obtain from one local supplier who could provide delivery by barge, and another quote is currently in the process of being obtained.

There is also a significant amount of granite to be procured for this project in order to match other areas of the existing Smale Park. Monolithic granite blocks will be needed for the granite seat walls and granite cladding is planned for the concrete stairs. No local quotes could be obtained but referral was maid to a company in the North East part of the country where granite is more commonly produced. Quotes were obtained via email for the various granite types needed – treads, post covers, monoliths, risers, etc.

3.3.4 Crews

Project specific crews have been developed and applied to the detailed line items as appropriate. Crew members consist of selected complements of labor classifications and equipment pieces assembled to perform specific tasks. Productivity has been assigned to each crew reflective of the expected output per unit of measure for the specific activities listed in the cost estimate. In considering the crews and productivities, the engineer typically referenced other, similar work found in national reference manuals such as RS MEANS construction data, the MII Cost book, and other projects developed by USACE.

3.3.5 Quantities

Quantities were developed by USACE for each feature of work. Quantities were checked/verified by the estimator and adjusted to account for construction methodology, shrink, swell, waste, etc. Other associated sub-quantities were also developed by the estimator, as needed. Cut/Fill quantities were provided by LRL Engineering. Provided quantities are known to not address how tying in of the built out slope into existing portions of the park will ultimately look. This was brought up and discussed in the risk analysis.

3.4 INDIRECT COSTS

3.4.1 Contract Acquisition Strategy

Through discussions with the Project Manager (PM) & PDT, it is very likely that the scope of this project, if funded, would be broken into multiple contracts. The acquisition method is assumed to be Full & Open with bidders likely having a strong background or history in large sitework type projects. This leads to an assumption within the estimate that the award Prime Contractor could self-perform much of the work, themselves.

3.4.2 Prime Contractors

3.4.2.1 Job Office Overhead (JOOH)

Job Office Overhead (JOOH) is currently estimated by a running percentage within the estimate for the Prime contractor, using uses 30%, and is based on similar-sized projects and would account for such items as project supervision, contractor quality control, site safety, contractor field office trailer(s) and supplies, personal protective equipment, field engineering, and other incidental field overhead costs.

3.4.2.2 Home Office Overhead (HOOH)

For Home Office Overhead (HOOH) expense the estimate uses 10%. HOOH includes items such as office rental / ownership costs, utilities, office equipment ownership/maintenance, office staff (managers, accountants, clerical, etc.), insurance, and miscellaneous. The range of home office overhead can be quite broad and depends largely on the contractor's annual volume of work and the type of work that is generally performed by the contractor.

3.4.2.3 Profit

Profit was included as a running percentage of 8% for Prime based on Estimator judgment.

3.4.2.4 Bonding

Bond was included as a running percentage of 1.5% (own work and subcontracted work).

3.4.3 Subcontractors

3.4.3.1 Overhead

All subcontractor overhead costs are set to 15% and 8% of direct cost to account their JOOH and HOOH costs, respectively. The exception is where a subcontractor has provided a quoted price including overhead. In that case, no additional markups have been included for subcontractor's overhead.

3.4.3.2 Profit

Sub Profit was included as a running percentage of 8% based on estimator judgement.

3.4.4 Escalation

The contract will be escalated to the mid-point of construction using EM 1110-2-1304, Civil Works Construction Cost Index System (CWCCIS), to account for potential inflation during construction. This will be included in the TPCS file, not the cost estimate in MII.

With the project likely being broken into a design phase and a separate construction phase the mid-points will vary, with construction ultimately anticipated to be complete mid-2029. In the coming refinement period, a better understanding of the execution of the plan will be utilized to develop a more detailed schedule with the currently assumed/high level schedule included in Attachment D of this Appendix.

3.4.5 Construction Contingency

Contingency was applied based on the results of the Cost & Schedule Risk Analysis. A formal risk analysis was performed on June 18th, 2024, to discuss risk and assign appropriate likelihood and impacts. This allows for determining contingencies more accurately. The estimated cost from MII was broken out for the risk analysis so that each constructable element could be discussed as well as the other feature Civil Works Work Breakdown Structure (CWWBS) accounts. Based on the current estimate cost a formal CSRA is not required, and an Abbreviated Risk Analysis could be used. However, because of the complexity of the project a formal CSRA is planned. The results from the CSRA can be seen in Attachment B of this Appendix.

4 PROJECT FEATURE ACCOUNTS AND ASSOCIATED SCOPE

4.1 (01) LANDS & DAMAGES

- This feature includes all costs of acquiring for the project (by purchase or condemnation) real property or permanent interests therein, including Government costs, damages, and costs of disposal of real estate. Government costs include planning expenses for the real estate portion of the General Design Memo and for the detailed Real Estate Memo; and project real estate office administration, surveys, and marking for land acquisition purposes and appraisals.
- The cost estimate for this account was provided by the Real Estate PDT member and inserted into the MII estimate. More information can be found in the RE appendix/tab.

4.2 (06) FISH & WILDLIFE FACILITIES

- This account covers all cost to perform surveys for any potential listed species in the project's area such as mussels, turtles, salamanders, etc. as well as potential mitigation or permitting which might be needed for the project.
- Cost for this account were provided by the Biologist PDT member and account for general in-house expenses which might be needed during the D&I phase as well as permitting. No mitigation or listed species are anticipated in the project area.

4.3 (14) RECREATION FACILITIES

- This account covers all the features associated with creation of a park like space. This currently includes concrete walkways, granite clad concrete steps with stainless steel railing, concrete and granite seat walls, terraced boulders, as well as green spaces which include some native plantings.

- These costs are based on plans and details developed as defined in the main Engineering Appendix. Cut/Fill quantities were provided with the remaining quantities taken off or determined by the Cost Engineer. Assumptions were rarely made in a vacuum and there was close coordination between the designing Civil Engineer and Cost Engineer about intent and other details to develop the most likely and accurate estimate possible at this phase of the project.

4.4 (16) BANK STABILIZATION

- This account covers all cost to stabilize the embankment within Smale Park along the Ohio River. This area has been eroding and losing material for years due to flooding and draw down, pulling material into the river.
- These costs are based on plans and details developed by LRL Civil Engineering and Geotechnical Engineering. The solution proposed involves building out the site with a select granular fill type material sloping towards and into the river. The entire area would then be armored with a bedding type stone and rip rap. The currently assumed gradations for which quotes were obtained are similar to No. 357 stone for a bedding material overlaid with an 18” rip rap.

4.5 (18) CULTURAL RESOURCES PRESERVATION

- This account includes all costs incurred by the government for actions associated with historic preservation, including, but not limited to, the identification and treatment of historic properties, and the mitigation of adverse effects, will be included in construction costs.
- These costs were provided by the Archeological PDT member. Provided cost account for coordination efforts, in house field work, contract management, and mitigation expected during the D&I phase.

4.6 (30) PLANNING, ENGINEERING, AND DESIGN

- The work covered under this account includes project management, project planning, preliminary design, final design, geotechnical investigations, hydraulic modeling, preparation of plans & specifications, engineering during construction, adaptive management, coordination efforts, contract advertisement, opening of bids, all leading to a contract award.
- The cost for this account was estimated as percentage of the anticipated construction cost until a time in which the PDT can provide more accurate estimates for the D&I portion of the project.

4.7 (31) CONSTRUCTION MANAGEMENT (S&A)

- This feature includes such functions as inspection, supervision, project office administration, and distributive costs of area office and general overhead charged to the project. Costs for Office of the Chief of Engineers CE and Division Office Executive Direction and Management are not charged to Construction, General but to the General Expenses appropriation title.

- The cost for this account were estimated with input from the project manager and historical S&A rates from other similar-sized projects.

5 PROJECT SCHEDULE & DURATION

The current project schedule shows the Director's Report being signed for this study on June 16, 2025. Upon discussions with the PDT and leadership a reasonable course of action is to assume the project would be broken up into a design phase and a construction phase, as it is unlikely the full funding would all be appropriated at one time. It has been assumed that approximately one year from the Director's Report before the money could be appropriated and design started. During the design phase it is assumed that the construction money could be appropriated, and a construction contract awarded, after a one-year design period.

Construction duration has been assumed at 24 months, which takes into consideration the downtown environment of the project and logistical issues that may arise with the proximity of the project to two major league sports venues. And taken into considerations as well, is the potential for rising water levels from the Ohio River.

6 TOTAL PROJECT COST SUMMARY (TPCS)

The cost estimate for the Tentatively Selected Plan (TSP) at the FY25 price level (Project First Cost) is $17,311,000. This excludes cost which have been spent to perform the Feasibility Study itself. The fully funded cost, which takes into consideration the potential inflation for the project to their respective mid-points, is $18,924,000. The full TPCS can be found in Attachment B of this Appendix.

ATTACHMENT A

MII SUMMARY REPORT

Standard USACE Report Sections

P2#: 112807

Location(s): Smale Park, Cincinnati, OH
166 W Mehring Way
Cincinnati, OH 45202 (Hamilton County)

Solicitation Type: Full & Open [Assumed], RFP

Solicitation #: TBD

Procurement: Design-Bid-Build (Assumed)

Files located at <O:\ED\Public\MCACES\ED-M-C\0 Civil\FY24\112807 - Ohio Riverfront - Cincinnati Phase II - Feasibility Study\02 - Tentatively Selected Plan (TSP)>

AMENDMENTS:

SCOPE OF WORK:

This study involves the activities and tasks required to identify and evaluate alternatives and will recommend a coordinated and implementable solution for the feasibility of recreation components similar to and beyond what was completed in Phase 1.

While the 2016 Water Resources Development Act (WRDA) authority allows for flood risk reduction, ecosystem restoration, and recreation, this study will focus on quantifying recreational benefits and will look at flood risk management and ecosystem restoration qualitatively. During scoping, it was found that there are no significant flood risk management (FRM) opportunities within the project footprint due to the current land use and hydrology of the Ohio River. Additionally, there are limited opportunities for ecosystem restoration because of the relatively small footprint and location of the park in a very urban area with no connections to other habitat.

The Tentatively Selected Plan (TSP) combines a mixture of measures to incorporate both natural and hardscape features, offer a diverse recreational experience and allow park users to safely access water. This concept ties enhanced, ADA accessible walkways in with the existing riverfront sidewalk to allow high-quality interaction with the water’s edge. In addition to the walkways, the Castellini Esplanade will be extended to the river and will transition into river stairs that lead users to a kayak launch and terraced boulders into the water. Concrete seat walls will stretch across the riverfront as well as native grasses and vegetation providing a natural but varied landscape.

Estimated by Neal Ralston, PE, TCCE
Designed by Feasibility Design (In-House Design Team)
Prepared by Neal Ralston, PE, TCCE
Preparation Date 6/17/2024
Effective Date of Pricing 10/1/2023
Estimated Construction Time Days
Reviewed by: Jay Thomas PE, TCCE

Date	Author	Note

6/20/2024 10:15:30 AM	Markups	**MARK-UPS:**
		
		Contractor Mark-Ups
		· Prime Contractor
		  · PRIME JOOH: 30%
		  · PRIME HOOH: 10%
		  · PRIME PROFIT: 8%
		  · BOND: 1.50%
		
		· Subcontractor Mark-Ups (General)
		  · S/C JOOH - 15%
		  · S/C HOOH - 10%
		  · S/C PROFIT - 8%
		
		Direct Mark-Ups
		· PRODUCTIVITY: 80% - Work area is constrained by park area to remain functional, the OH River, and being in a downtown environment - all likely to affect construction
		· 2023 COST BOOK MARKUP: 4.35% - BASED UPON ENGINEERING NEWS RECORD (ENR) MATERIAL INDEX FACTORS FROM AUG 2022 TO OCT 2023 (6144 / 5888)
		  · Cost to Present Date not included due to set up of TPCS sheet which escalates cost to point in time in which Chief's Report is signed.
		· SALES TAX - 6.50% (Hamilton County, OH)

6/20/2024 10:34:19 AM	Significant Assumptions	**SIGNIFICANT ASSUMPTIONS:** · Fill material needed to bring site to grade will be trucked in – Select Granular Fill · Bank stabilization/armoring materials will be barged in – Bedding Stone & Rip Rap · Materials will be placed, as needed by clamshell, in the river or onshore where other equipment (excavator, dozer, etc.) will move to final position.

Currency in US dollars

Description	Quantity	UOM	DirectCost	ContractCost	Escalation	Contingency	SIOH	ProjectCost
Cost Summary Report			**7,822,845**	**12,374,697**	**0**	**0**	**0**	**12,374,697**
Alternative 01 - Combination Alternative	**1.00**	**LS**	**7,822,845**	**12,374,697**	**0**	**0**	**0**	**12,374,697**
Lands and Damages	**1.00**	**LS**	**1,368,000**	**1,368,000**	**0**	**0**	**0**	**1,368,000**
Fish and Wildlife Facilities	**1.00**	**LS**	**11,000**	**11,000**	**0**	**0**	**0**	**11,000**
Environmental Permitting	**1.00**	**LS**	**11,000**	**11,000**	**0**	**0**	**0**	**11,000**
Recreation Facilities	**1.00**	**LS**	**2,433,673**	**5,211,975**	**0**	**0**	**0**	**5,211,975**
Seat Walls, Concrete & Granite	**1.00**	**LS**	**1,155,738**	**2,475,140**	**0**	**0**	**0**	**2,475,140**
Green Spaces, Plantings & Sod	**26,700.00**	**SF**	**83,692**	**179,235**	**0**	**0**	**0**	**179,235**
Concrete Paths (Sidewalks)	**14,025.00**	**SF**	**139,854**	**299,513**	**0**	**0**	**0**	**299,513**
Concrete Steps, includes granite cladding & stainless steel railing	**2,250.00**	**SF**	**274,500**	**587,872**	**0**	**0**	**0**	**587,872**
Area Lighting	**15.00**	**EA**	**151,668**	**324,814**	**0**	**0**	**0**	**324,814**
Terraced Boulders	**5,000.00**	**SF**	**482,178**	**1,032,637**	**0**	**0**	**0**	**1,032,637**
Other Associated Cost	**1.00**	**LS**	**146,041**	**312,764**	**0**	**0**	**0**	**312,764**
Bank Stabilization	**1.00**	**LS**	**1,579,172**	**3,352,723**	**0**	**0**	**0**	**3,352,723**
Earthwork	**1.00**	**SF**	**758,151**	**1,623,664**	**0**	**0**	**0**	**1,623,664**
Slope Protection & Coverings	**48,200.00**	**SF**	**668,904**	**1,432,530**	**0**	**0**	**0**	**1,432,530**
Mobilization & Preparation	**1.00**	**EA**	**152,117**	**296,529**	**0**	**0**	**0**	**296,529**
Cultural Resource Preservation	**1.00**	**LS**	**20,000**	**20,000**	**0**	**0**	**0**	**20,000**
Planning, Engineering and Design	**1.00**	**LS**	**1,766,000**	**1,766,000**	**0**	**0**	**0**	**1,766,000**
Construction Management	**1.00**	**LS**	**645,000**	**645,000**	**0**	**0**	**0**	**645,000**

Currency in US dollars

ATTACHMENT B

COST & SCHEDULE RISK ANALYSIS (CSRA)

Cost & Schedule Summary for Risk Register Development

Project: Cincinnati Riverfront, Phase II
Project Development Phase: Feasibility (TSP) - For Milestone #2
Meeting Date: 6/18/2024

Schedule Start: June 2024
Schedule Finish: September 2029
Duration: 63.3 Months

Schedule with Contingency (80% Confidence): 84.2 Months
Finish Date with Contingency (80% Confidence): June 2031

	MILCON WBS	Feature of Work	Base Cost	80% Confidence	80% Confidence ($)	80% Total
	Risk Not Included In CSRA					
	01 - LANDS AND DAMAGES	Lands & Incidentals	$1,368,000	10%	$136,800	$1,504,800
	Risk Included In CSRA					
1		Environmental Permitting (401, NPDES, and FloodPlain)	$11,000	39%	$4,290	$15,290
2			$0	0%	$0	$2,475,140
3		Seat Walls, Concrete & Granite	$2,475,140	39%	$69,902	$249,137
4		Green Spaces, Plantings & Sod	$179,235	39%	$69,902	$249,137
5		Concrete Paths (Sidewalks)	$299,513	39%	$116,810	$416,323
6		Concrete Steps, includes granite cladding & stainless steel railing	$587,872	39%	$229,270	$817,142
7		Area Lighting	$324,814	39%	$126,677	$451,491
8		Terraced Boulders	$1,032,637	39%	$402,728	$1,435,365
9		Other Associated Cost	$312,764	39%	$121,978	$434,742
10			$0	0%	$0	$0
11		Earthwork	$1,623,664	39%	$633,229	$2,256,893
12		Slope Protection & Coverings	$1,432,530	39%	$558,687	$1,991,217
13		Mobilization & Preparation	$296,529	39%	$115,646	$412,175
14			$0	0%	$0	$0
15		Cultural Resource Preservation	$20,000	39%	$7,800	$27,800
16			$0	0%	$0	$0
17			$0	0%	$0	$0
18			$0	0%	$0	$0
19			$0	0%	$0	$0
20			$0	0%	$0	$0
21			$0	0%	$0	$0
22			$0	0%	$0	$0
23	30 - PLANNING, ENGINEERING, AND DESIGN	Civil Works only; not included on MILCON Projects.	$1,766,000	39%	$688,740	$2,454,740
24	31 - CONSTRUCTION MANAGEMENT	Civil Works only; not included on MILCON Projects.	$645,000	39%	$251,550	$896,550
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)				$0	$0

TOTALS	Base Cost	80% Confidence	80% Confidence ($)	80% Total
Risk Not Included In CSRA	$1,368,000	10%	$136,800	$1,504,800
Total Construction Estimate	$8,595,698	39%	$3,352,322	$11,948,020
Total Planning, Engineering & Design	$1,766,000	39%	$688,740	$2,454,740
Total Construction Management	$645,000	39%	$251,550	$896,550
Total EXCLUDING Risk Not Included In CSRA	$11,006,698	**39%**	**$4,292,612**	**$15,299,310**
Total INCLUDING Risk Not Included In CSRA	$12,374,698	**36%**	**$4,429,412**	**$16,804,110**
PROGRAMMED AMOUNT (IF KNOWN)				

Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analysis. Must include justification. Does not allocate to Real Estate.

ATTACHMENT C

TOTAL PROJECT COST SUMMARY SHEET (TPCS)

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: **Cincinnati Riverfront, Phase II - Feasibility Study**
PROJECT NO: 112807
LOCATION: Smale Park (Cinannati, OH)

DISTRICT: **Louisville District, LRL**
POC: **CHIEF, COST ENGINEERING, Jim Vermillion, TCCC**
PREPARED: **6/25/2024**

This Estimate reflects the scope and schedule in report; 0

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)			
						Program Year (Budget EC): 2025; Effective Price Level Date: 1 OCT 24									
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	**TOTAL ($K)**	Spent Thru: **1-Oct-23** ($K)	**TOTAL FIRST COST** ($K)	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*		*K*	*L*	*M*	*N*	*O*
06	FISH & WILDLIFE FACILITIES	$11	$4	39.0%	$15	2.9%	$11	$4	$16	$0	$16	10.1%	$12	$5	$17
14	RECREATION FACILITIES	$5,212	$2,033	39.0%	$7,245	2.9%	$5,365	$2,092	$7,458	$0	$7,458	10.1%	$5,905	$2,303	$8,208
16	BANK STABILIZATION	$3,353	$1,308	39.0%	$4,661	2.9%	$3,452	$1,346	$4,798	$0	$4,798	10.1%	$3,799	$1,482	$5,281
18	CULTURAL RESOURCE PRESERVATION	$20	$8	39.0%	$28	2.9%	$21	$8	$29	$0	$29	10.1%	$23	$9	$31
	CONSTRUCTION ESTIMATE TOTALS:	$8,596	$3,352		$11,948	2.9%	$8,849	$3,451	$12,300	$0	$12,300	10.1%	$9,739	$3,798	$13,537
01	LANDS AND DAMAGES	$1,368	$137	10.0%	$1,505	2.7%	$1,405	$141	$1,546	$0	$1,546	5.3%	$1,479	$148	$1,627
30	PLANNING, ENGINEERING & DESIGN	$1,766	$689	39.0%	$2,455	3.4%	$1,826	$712	$2,539	$0	$2,539	7.1%	$1,957	$763	$2,720
31	CONSTRUCTION MANAGEMENT	$645	$251	39.0%	$896	3.4%	$667	$260	$927	$0	$927	12.1%	$748	$292	$1,039
	PROJECT COST TOTALS:	$12,375	$4,429	35.8%	$16,804		$12,747	$4,564	**$17,311**	$0	**$17,311**	9.3%	$13,923	$5,001	$18,924

ESTIMATED TOTAL PROJECT COST: **$18,924**

_____________________________ **CHIEF, COST ENGINEERING, Jim Vermillion, TCCC**

_____________________________ **PROJECT MANAGER, Aaron Steele, PE**

_____________________________ **CHIEF, REAL ESTATE, Ashley Klim**

_____________________________ **CHIEF, PLANNING, Nate Moulder**

_____________________________ **CHIEF, ENGINEERING, Ian Mitchel, PE**

_____________________________ **CHIEF, OPERATIONS, Waylon Humphrey**

_____________________________ **CHIEF, CONSTRUCTION, Kevin Jefferson**

_____________________________ **CHIEF, CONTRACTING, Misty Bock**

_____________________________ **CHIEF, PM-PB, Matt Schueler**

_____________________________ **CHIEF, DPM, John Bock, PE**

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Cincinnati Riverfront, Phase II - Feasibility Study
LOCATION: Smale Park (Cinannati, OH)
This Estimate reflects the scope and schedule in report; 0

DISTRICT: Louisville District, LRL
POC: CHIEF, COST ENGINEERING, Jim Vermillion, TCCC
PREPARED: 6/25/2024

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 25-Jun-24				Program Year (Budget EC): 2025								
		Effective Price Level: 1-Oct-23				Effective Price Level Date: 1 OCT 24								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	RISK BASED CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	PHASE 1 or CONTRACT 1													
06	FISH & WILDLIFE FACILITIES	$11	$4	39.0%	$15	2.9%	$11	$4	$16	2028Q4	10.1%	$12	$5	$17
14	RECREATION FACILITIES	$5,212	$2,033	39.0%	$7,245	2.9%	$5,365	$2,092	$7,458	2028Q4	10.1%	$5,905	$2,303	$8,208
16	BANK STABILIZATION	$3,353	$1,308	39.0%	$4,661	2.9%	$3,452	$1,346	$4,798	2028Q4	10.1%	$3,799	$1,482	$5,281
18	CULTURAL RESOURCE PRESERVATION	$20	$8	39.0%	$28	2.9%	$21	$8	$29	2028Q4	10.1%	$23	$9	$31
	CONSTRUCTION ESTIMATE TOTALS:	$8,596	$3,352	39.0%	**$11,948**		$8,849	$3,451	$12,300			$9,739	$3,798	$13,537
01	LANDS AND DAMAGES	$1,368	$137	10.0%	$1,505	2.7%	$1,405	$141	$1,546	2027Q1	5.3%	$1,479	$148	$1,627
30	PLANNING, ENGINEERING & DESIGN													
1.5%	Project Management	$129	$50	39.0%	$179	3.4%	$133	$52	$185	2027Q1	6.3%	$142	$55	$197
1.0%	Planning & Environmental Compliance	$86	$34	39.0%	$119	3.4%	$89	$35	$124	2027Q1	6.3%	$94	$37	$131
10.0%	Engineering & Design	$860	$335	39.0%	$1,195	3.4%	$889	$347	$1,236	2027Q1	6.3%	$945	$369	$1,313
1.0%	Reviews, ATRs, IEPRs, VE	$86	$34	39.0%	$119	3.4%	$89	$35	$124	2027Q1	6.3%	$94	$37	$131
1.0%	Life Cycle Updates (cost, schedule, risks)	$86	$34	39.0%	$119	3.4%	$89	$35	$124	2027Q1	6.3%	$94	$37	$131
1.0%	Contracting & Reprographics	$86	$34	39.0%	$119	3.4%	$89	$35	$124	2027Q1	6.3%	$94	$37	$131
2.0%	Engineering During Construction	$172	$67	39.0%	$239	3.4%	$178	$69	$247	2028Q4	12.1%	$199	$78	$277
1.0%	Planning During Construction	$86	$34	39.0%	$119	3.4%	$89	$35	$124	2028Q4	12.1%	$100	$39	$139
1.0%	Adaptive Management & Monitoring	$86	$34	39.0%	$119	3.4%	$89	$35	$124	2027Q1	6.3%	$94	$37	$131
1.0%	Project Operations	$86	$34	39.0%	$119	3.4%	$89	$35	$124	2027Q1	6.3%	$94	$37	$131
	Real Estate (All Federal Labor)	$4	$2	39.0%	$6	3.4%	$4	$2	$6	2027Q1	6.3%	$4	$2	$6
31	CONSTRUCTION MANAGEMENT													
6.0%	Construction Management	$516	$201	39.0%	$717	3.4%	$533	$208	$741	2028Q4	12.1%	$598	$233	$831
1.0%	Project Operation:	$86	$34	39.0%	$119	3.4%	$89	$35	$124	2028Q4	12.1%	$100	$39	$139
0.5%	Project Management	$43	$17	39.0%	$60	3.4%	$44	$17	$62	2028Q4	12.1%	$50	$19	$69
	CONTRACT COST TOTALS:	$12,375	$4,429		$16,804		$12,747	$4,564	**$17,311**			$13,923	$5,001	**$18,924**

ATTACHMENT D

CONSTRUCTION SCHEDULE

Appendix E: Economics

1.1 National Economic Development Benefits: Recreation

NED benefits from a project's recreation features are measured in terms of a visitor's 'willingness to pay' for the recreation opportunity.

Based on Engineer Regulation 1105-2-103, the Planning Guidance Notebook, when the expected costs of recreation features exceed 25 percent of expected total projects costs, as in this project, it is recommended to develop a regional model or conduct a site-specific study to determine willingness to pay. However, Economic Guidance Memorandum 24-02, Unit Day Method, specifies that if either of those methods is not feasible or justified, the Unit Day Value method may be used. For this study, it was determined that the time and cost required for proper development of a regional model or site-specific study were not feasible; thus, the UDV method was used.

1.1.1 Phase 2 Background

Note that after the completion of the Phase 1 construction in 2014, the Non-Federal Sponsor (NFS) was ready to move forward with development of the waterfront park in accordance with the Central Cincinnati Riverfront Master Plan. In 2019, USACE, the City of Cincinnati, and Hamilton County signed a Memorandum of Understanding (MOU) that stated construction would continue on "Proposed Work," that is, construction of features to support a raised event lawn. The MOU went on to state that the cost of these features could be credited as in-kind toward the NFS's portion of the cost share for Phase 2. This portion is hereafter referred to as Phase 2a. The agreement laid out the terms for the sponsor to be granted in-kind credit, including environmental coordination and documentation. The concepts being considered for construction along the river's edge are hereafter referred to as Phase 2b.

In the following analysis, the without project condition is understood to mean the state of the project area following completion of Phase 1 and prior to the construction of Phase 2a. Because the elevated lawn will be present in all with-project conditions, it is not described in the recreation value analysis due to the assumption that the lift to value would be equal across alternatives, but the visitation estimate used for benefits calculation is based upon the available recreation space in Phase 2a (elevated lawn) and Phase 2b (riverside park).

1.1.2 Unit Day Value Assessment

1.1.2.1 Scoring Criteria

The UDV method relies on informed opinion and judgment, considering both the quality of recreation experience and visitation rates, and uses the 'unit day values for recreation' contained in EGM 24-02.

To score alternatives, point values are assigned based on measurement standards described for five criteria: recreational experience; availability of opportunity; carrying capacity; accessibility; and environmental quality.

For the proposed concepts, the category of 'general recreation' was used, and the guidelines for assigning points and dollar values in the EGM were followed.

The PDT evaluated the future without project condition and each proposed alternative. A subsequent elicitation was conducted with representatives from the City of Cincinnati to validate the scoring.

The guidelines for assigning points for general recreation are shown in Table 1.

Table 1: Guidelines for Assigning Points for General Recreation

Criteria	Judgement Factors				
Recreation Experience	Two general activities	Several general activities	Several general activities: one high quality value activity	Several general activities; more than one high quality activity	Numerous high quality value activities; some general activities
Point Value	0-4	5-10	11-16	17-23	24-30
Availability of Opportunity	Several within 1-hour travel time; a few within 30 min. travel time	Several within 1-hour travel time; none within 30 min. travel time	One or two within 1 hour travel time; none within 45 min. travel time	None within 1 hour travel time	None within 2-hour travel time
Point Value	0-3	4-6	7-10	11-14	15-18
Carrying Capacity	Minimum facility for development for public health and safety	Basic facility to conduct activity(ies)	Adequate facilities to conduct without deterioration of the resource or activity experience	Optimum facilities to conduct activity at site potential	Ultimate facilities to achieve intent of selected alternative
Point Value	0-2	3-5	6-8	9-11	12-14
Accessibility	Limited access by any means to site or within site	Fair access, poor quality roads to site; limited access within site	Fair access, fair road to site; fair access, good roads within site	Good access, good roads to site; fair access, good roads within site	Good access, high standard road to site; good access within site
Point Value	0-3	4-6	7-10	11-14	15-18
Environmental Quality	Low aesthetic factors that significantly lower quality	Average aesthetic quality; factors exist that lower quality to a minor degree	Above average aesthetic quality; any limiting factors can be reasonably rectified	High aesthetic quality; no factors exist that lower quality	Outstanding aesthetic quality; no factors exist that lower quality
Point Value	0-2	3-6	7-10	11-15	16-20

Once scored, the total points for each alternative can be converted to a dollar value, known as the Unit Day Value, representing the value of the proposed features per visitor per day.

The FY 2024 values for general recreation, shown in Table 2, were applied for this study.

Table 2: Conversion of UDV Points to Dollar Values

Point Values	General Recreation Values (1)	General Fishing and Hunting Values (1)	Specialized Fishing and Hunting Values (2)	Specialized Recreation Values other than Fishing and Hunting (2)
0	$5.05	$7.26	$35.36	$20.52
10	$6.00	$8.21	$36.30	$21.78
20	$6.63	$8.84	$36.93	$23.36
30	$7.58	$9.79	$37.88	$25.25
40	$9.47	$10.73	$38.83	$26.83
50	$10.73	$11.68	$42.62	$30.31
60	$11.68	$12.94	$46.41	$33.46
70	$12.31	$13.57	$49.25	$40.41
80	$13.57	$14.52	$53.03	$47.04
90	$14.52	$14.84	$56.82	$53.67
100	$15.15	$15.15	$59.98	$59.98

The evaluation of each site's proposed recreation features is presented in the following sections.

1.1.2.2 Future Without Project

Figure 1: The study area is heavily eroded and is not suitable for recreation.

Currently the area of Smale Park along the shoreline west of the Roebling Bridge is underutilized, lacks recreational opportunities, and is experiencing erosion issues that threaten the park's assets.

While it is anticipated that a future without project would include measures by the non-federal sponsor to prevent further loss of shoreline to erosion, there is no aesthetic or functional improvement expected in a FWOP condition.

Scoring decisions were made based on the following factors.

> *Recreation Experience*: The condition of the eroding shoreline limits safe participation in recreation activities. There is neither seating nor are there walking paths within the project area. Activities are limited to walking and sight-seeing, and the aesthetic quality of the site is poor. Score: 1

Availability of Opportunity: There is ample opportunity for similar low-quality walking or sight-seeing along the riverbank near Cincinnati and Covington, KY. Score: 0

Carrying Capacity: The study footprint is in an active state of degradation, and there is no development for safe enjoyment of the area. Score: 0

Accessibility: Located in an urban area with a well-developed adjacent park, the site is easily accessible by roads and walking paths, but there is limited, unsafe access within the site itself. Score: 4

Environmental Quality: The site has views of the Ohio River and a high-quality neighboring park along with some presence of native plant species; however, the site is actively degrading and there is a notable presence of non-native and invasive species. Score: 6

The PDT scored the site as shown in Table 3.

Table 3: Unit Day Value estimate for Future Without Project condition

Future Without Project	Future With Project
Recreation Experience	1
Availability of Opportunity	0
Carrying Capacity	0
Accessibility	4
Environmental Quality	6
Total Recreation Points	11
Value	$6.06

1.1.2.3 Concept 1 – Combination Concept

Concept 1, the Combination Concept, ties in enhanced, ADA-accessible walkways with the existing riverfront sidewalk to allow high-quality interaction with the water's edge. In addition to the walkways, the Castellini Esplanade will be extended to the river and will transition into river stairs that lead users to a kayak launch and terraced boulders into the water. Concrete seatwalls will stretch across the riverfront as well as native grasses and vegetation providing a natural but varied landscape.

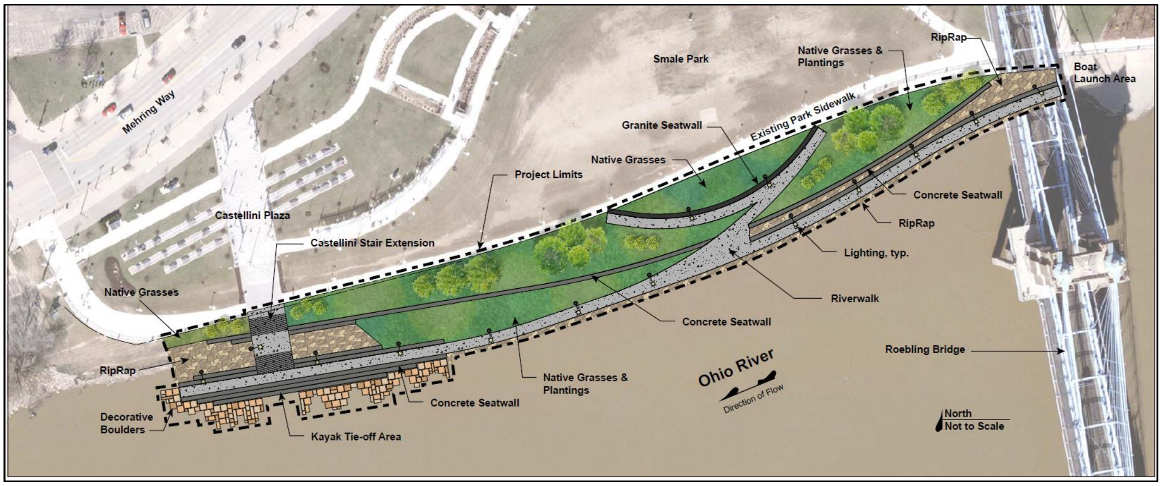


Figure 2: Concept 1 includes a combination of accessible walkways and greenspace allowing for high quality access to the Ohio River.

Scoring decisions were made based on the following factors.

Recreation Experience: The kayak launch, walking path, wide stairs to river, and terraced boulders will allow individuals direct access to the Ohio River. Individuals will be able to bring kayaks directly from Mehring Way to the kayak launch. The concept also allows individuals with limited mobility access to the river level, which is unique among Cincinnati parks. Unique views will allow for photography opportunities. Score: 24

Availability of Opportunity: There are no similar parks nearby that would allow this kind of access to the river, especially when considering the proposed seating, native plantings/landscape, and the proximity of professional sports stadiums. The nearest somewhat-comparable urban waterfront parks would be in Louisville, Kentucky, and Jeffersonville, Indiana, one to two hours away. Score: 15

Carrying Capacity: The site includes various features, including walkways and lighting, that will allow for optimal enjoyment of features and will achieve the objective of the project. There is ample nearby parking, and Smale Park's Great Lawn is adjacent. Score: 12

Accessibility: There are high quality roads and paths to the site, and the concept includes high quality and ADA-accessible paths/walkways within the site. The site contains multiple and varied paths to make full use of site features, and notably ADA access is integrated with traditional access, allowing for an equitable experience throughout the site, including all the way to the water level. Score: 18

Environmental Quality: Terraced boulders provide unusual and high-quality aesthetics. Native plantings and varied enhanced walkways match the outstanding aesthetics of the adjacent park. Viewsheds are unique and appealing. Score: 18

The PDT scored the site as shown in Table 4.

Table 4 Unit Day Value estimate for Concept 1

Concept 1 – Combined Concept	Future With Project
Recreation Experience	24
Availability of Opportunity	15

Carrying Capacity	12
Accessibility	18
Environmental Quality	18
Total Recreation Points	87
Value	$14.24

1.1.2.4 Concept 2 - Hardscaped Shoreline

Concept 2, a hardscaped shoreline, will provide pedestrian access and river stairs to the water from the Castellini Esplanade with a hardscaped shoreline above an ADA-accessible lower river walk. A kayak tie-off area will be located at the river stairs and a native grass lawn will lead to the lower river walk, supported by riprap.

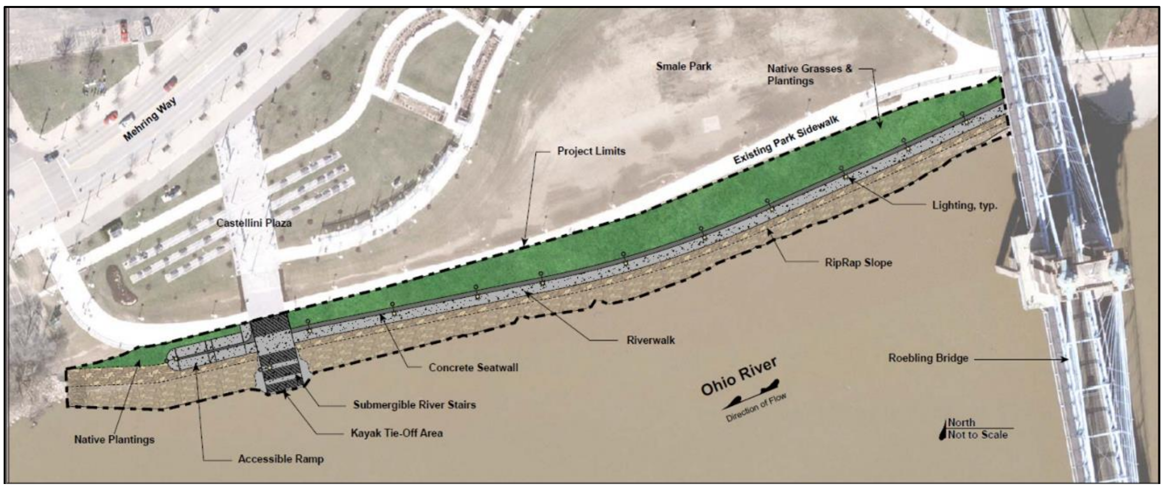


Figure 3: Concept 2 includes a native grass lawn and a lower river walk supported by rip rap.

Scoring decisions were made based on the following factors.

Recreation Experience: The grass lawn would allow for walking, picnicking, and sight-seeing. Some opportunity for fishing may be available from the walkway, depending on the river's elevation. The river stairs and kayak tie-off provide high-quality and unique features. Note that the stairs are narrower than those in Concept 1 and are constrained by riprap. Score: 18

Availability of Opportunity: There is no similar recreation experience within an hour's travel time. Nearby locations are more similar to existing conditions. Score: 12

Carrying Capacity: The open grassy area allows for lawn-based activities, stairs allow for river access that is unlikely to deteriorate. Score: 9

Accessibility: There are fewer walkways than in Concept 1, but there is still good access within site. Note that ADA accessibility would only be from the west side ramp. Score: 14

Environmental Quality: Concept 2 has less visual impact than Concept 1 and fewer interesting features. Score: 11

The PDT scored the site as shown in Table 5.

Table 5: Unit Day Value estimate Concept 2

Concept 2 – Hardscaped Shoreline	Future With Project
Recreation Experience	18
Availability of Opportunity	12
Carrying Capacity	9
Accessibility	14
Environmental Quality	11
Total Recreation Points	64
Value	$11.93

1.1.2.5 Concept 3 – Serpentine Wall

Concept 3, all hardscape with a serpentine wall, will contain an upper lawn and overlook area from Castellini Plaza and a serpentine wall, similar to what is found at the Sawyer Point Park less than one river mile upstream. The stepped wall will lead down to a wide lower river walk along the water's edge and kayak tie-off area on the west side of the site.

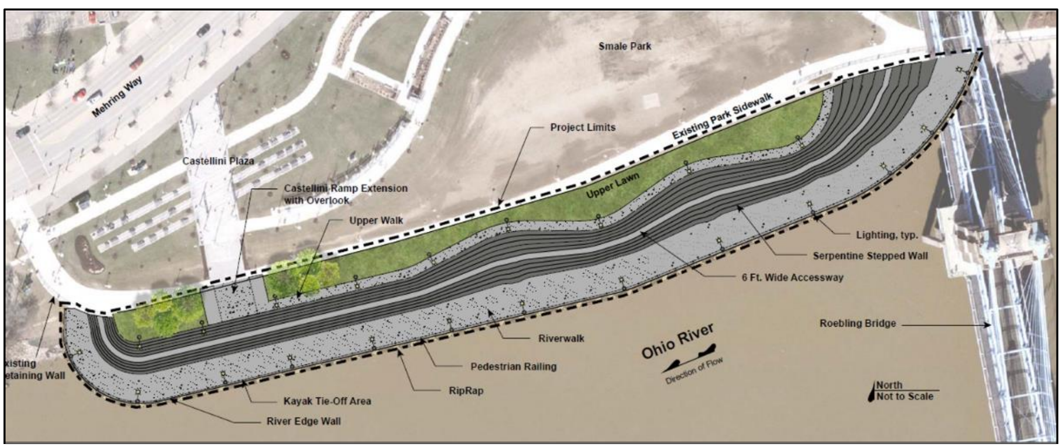


Figure 4: Concept 3 is almost entirely hardscaped with a serpentine wall similar to the one just upstream at Sawyer Point Park.

Scoring decisions were made based on the following factors.

Recreation Experience: A wide walkway along the river allows for accessibility along the river's edge from end to end, creating opportunity for cycling, walking, fishing. The design has the potential to be less inviting than the concepts with more varied features Score: 13

Availability of Opportunity: While this site has an advantage of proximity to nearby stadiums and activities, Cincinnati's Sawyer Pointe Park, which has a similar serpentine wall, is within walking distance upstream. Covington and Newport across the river in Kentucky also have similar concrete based riverside features. Score: 7

Carrying Capacity: The concept's design includes very resilient features, and activities can be conducted with little to no expected degradation. Score: 12

Accessibility: There is good access to and within site; however, the lower walkway is likely to have a grade that is too steep to meet ADA recommendations. Steps are steep and may be difficult to move up and down for those who lack optimal mobility. Score: 10

Environmental Quality: This concept maintains views of river and there is some opportunity for native plantings, but an abundance of concrete diminishes aesthetics. Score: 8

The PDT scored the site as shown in Table 6.

Table 6 Unit Day Value estimate for Concept 3

Concept 3 – Serpentine Wall	Future With Project
Recreation Experience	13
Availability of Opportunity	7
Carrying Capacity	12
Accessibility	10
Environmental Quality	8
Total Recreation Points	50
Value	$10.73

1.1.2.6 Concept 4 – Natural Bank

Concept 4 will provide natural, native plantings and lawns, including a terraced lawn on the east side of the site. The Castellini Esplanade will extend down to the water's edge in river stairs with kayak tie-offs. An ADA-accessible riverwalk and concrete seatwall will extend across the site.

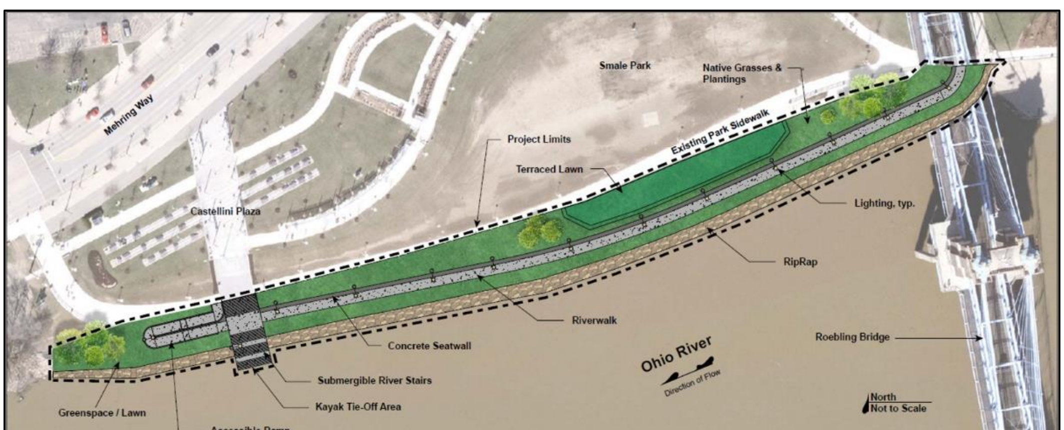


Figure 5: Concept 4 includes natural, native plantings and a terraced lawn.

Scoring decisions were made based on the following factors.

Recreation Experience: This concept has more greenspace than any of the others evaluated, including a terraced lawn. The walkway is accessible from both ends and stairs allow river interaction, albeit constrained by riprap on either side. This concept creates a similar experience to Concept 2, but with more nature-based features. Score: 20

Availability of Opportunity: There is nothing similar within an hour's travel time. Nearby urban parks are more concrete-heavy, as in Concept 3. The nearest similar parks would be in Louisville, Kentucky, and Jeffersonville, Indiana, one to two hours away. Score: 14

Carrying Capacity: The open grassy area allows for lawn-based activities, stairs allow for river access that is unlikely to deteriorate. This concept is less resilient to flooding and foot traffic than Concept 3, and the abundance of green space creates more opportunities for degradation. Score: 8

Accessibility: There are fewer walkways than in Concept 1, but there remains good access within site. There is ADA accessibility on both the west and east sides. Score: 15

Environmental Quality: Among concepts considered, Concept 4 has the most available greenspace and opportunity for native plantings and nature-based features. There is less riprap than Concept 2; however, there are fewer unique features than in Concept 1. Score: 15

The PDT scored the site as shown in Table 6.

Table 7 Unit Day Value estimate for Concept 4

Concept 4 – Natural Bank	Future With Project
Recreation Experience	20
Availability of Opportunity	14
Carrying Capacity	8
Accessibility	15
Environmental Quality	15
Total Recreation Points	72
Value	$12.56

1.1.2.7 Visitation

Due to a paucity of visitation data for Smale Park, the extensive economic analysis conducted for Phase 1 of the Ohio Riverfront project was used as a starting point, and visitation values were scaled based on the estimated project area available for recreation (Bowen Research Center, Indiana University).

In Phase 1, the project area was approximately 468,000 square feet. By comparison, the square footage available for recreation at the elevated lawn in Phase 2a is approximately 75,600 square feet, and the combined square footage of pavement and greenspace for the Phase 2b concepts ranges from approximately 46,000 square feet (9.6% area of Phase 1) to 97,000 square feet (21.1% area of Phase 1).

To ensure a conservative approach, the total area utilized for estimating visitors is the sum of the actual usable square footage of Phase 2a and the square footage for the Phase 2b concept with the smallest usable recreation area (9.6% of the visitors estimated in Phase 1).

Table 8: Estimated Visitation

Study Phase	New Users	Continuing Users	Transferred Users
Phase 1 (468,000 square feet)	*1,148,732*	*11,407*	*635,818*
Phase 2 – Future With Project (120,617 square feet)	296,061	2,940	163,869
Phase 2 – Future Without Project	0	2,940	0

The Phase 1 study also applied an adjusted UDV to represent the value of the site to continuing and transferred visitors: continuing visitors can be assumed to have been already receiving some value from the project area in the without project condition, and transferred visitors would have been receiving recreation value from another site that they are now foregoing to visit the project area.

Phase 1 assumed continuing users would receive 51.3% of the assessed UDV compared to new users, and transferred users would receive 28.2% of the value compared to new users; those proportions were maintained for this effort. The final UDVs by visitor type are displayed in Table 9

Table 9: Unit Day Values by Visitor Type

Study Phase and Alternative	New Users	Continuing Users	Transferred Users
Phase 1	*$8.08*	*$4.15*	*$2.28*
Phase 2 – Concept 1 “Combination Concept”	$14.24	$7.31	$4.02
Phase 2 – Concept 2 “Hardscaped Shoreline”	$11.93	$6.13	$3.37
Phase 2 – Concept 3 “Serpentine Wall”	$10.73	$5.51	$3.03
Phase 2 – Concept 4 “Natural Bank”	$12.56	$6.45	$3.54

1.1.2.8 Benefits Estimation

To tabulate expected recreation benefits, the number of expected annual visitors, whether new, continuing, or transferred is multiplied by its corresponding UDV and then the categories are summed. Net benefits represent the increment between the alternative’s total recreation benefits and the benefits anticipated in a future without project condition.

The recreation benefits for each concept are shown in Table 10.

Table 10: Unit Day Value overall summary for recreation plan

Alternative	Type of User			Total Recreation Benefits	Net Benefits
	New	Continuing	Transferred		
Future Without Project	-	$17,816	-	$17,816	-
Phase 2 – Concept 1 “Combination Concept”	$4,215,912	$21,502	$658,460	$4,895,874	$4,878,058
Phase 2 – Concept 2 “Hardscaped Shoreline”	$3,532,010	$18,014	$551,645	$4,101,669	$4,083,853
Phase 2 – Concept 3 “Serpentine Wall”	$3,176,737	$16,202	$496,157	$3,689,096	$3,671,280
Phase 2 – Concept 4 “Natural Bank”	$3,718,529	$18,965	$580,776	$4,318,270	$4,300,455

While the assumption of equivalent visitation between concepts is likely unrealistic, it does allow for comparison based on quality of the recreation experience.

The expectation of the PDT is that Concept 1, the Combination Concept, with its variety of features would likely attract more visitors than any of the other concepts. While Concept 3, the Serpentine Wall, does have more traversable square footage, due to the use of concrete paths, the lack of natural features and similarity to a nearly adjacent park would be unlikely to attract the same number of people per square foot as the other alternatives.

1.1.2.9 Benefit-Cost Analysis

Net recreation benefits were used to estimate a benefit cost ratio for each of the alternatives. Construction first costs were annualized over 50 years (base year 2027) using the FY24 discount rate of 2.75% with an assumed construction duration of 24 months.

As shown in Table 11, all considered alternatives result in positive net benefits and benefit-cost ratios above unity (1.0); however, the highest net benefits are provided by Phase 1 + Phase 2, Concept 1, the combination concept.

Table 11: Benefits Summary

Ohio Riverfront - Cincinnati, Ohio
Phase 2
Summary of Annual Benefits and Costs
FY 2024 Price Levels
2.75% Interest Rate

	Phase 2a ($15,166,420) + Phase 2b Concept 1 ($15,200,000)	Phase 2a ($15,166,420) + Phase 2b Concept 2 ($6,600,000)	Phase 2a ($15,166,420) + Phase 2b Concept 3 ($51,200,000)	Phase 2a ($15,166,420) + Phase 2b Concept 4 ($6,500,000)
Investment Cost				
Construction First Cost	30,366,420	21,766,420	66,366,420	21,666,420
Interest During Construction	838,897	601,315	1,833,427	598,553
Total Investment Cost	31,205,317	22,367,735	68,199,847	22,264,973
Annual Charges				
Interest & Amortization	1,155,874	828,521	2,526,185	824,715
Operation & Maintenance	5,000	5,000	5,000	5,000
Total Annual Charges	1,160,874	833,521	2,531,185	829,715
Annual Benefits				
Recreation	4,878,058	4,083,853	3,671,280	4,300,455
Total Annual Benefits	4,878,058	4,083,853	3,671,280	4,300,455
Benefit vs. Cost Ratio	**4.2**	**4.9**	**1.5**	**5.2**
Net Benefits	3,717,184	3,250,332	1,140,095	3,470,740

Assumptions
$5K O&M for each alternative
24 month construction period for each alternative

1.2 Regional Economic Development Benefits

The Principles and Guidelines (1983) established the RED account to register changes in the distribution of regional economic activity that result from each alternative plan. In addition to the benefits accounted for within the NED account, the implementation of the Recommended Plan would result in local economic activity which is accounted for within the RED account.

The USACE Regional Economic System (RECONS) is a regional economic impact modeling tool that was developed to provide accurate and defendable estimates of regional economic impacts associated with USACE spending. It is the only USACE certified Regional Economic Development model for agency wide use. RECONS incorporates impact area data, as well as multipliers, direct ratios (jobs to sales, income to sales, etc.), and geographic capture rates to estimate jobs, labor income, and other critical impacts to the local, state, and national economy. The following table provides an overview of the impact areas utilized for the RED analysis.

Streamlined RECONS Definitions:

- Output: Economic output or total industry output is the value of production by industry for a given time period. It is also known as gross revenues or sales.
- Labor Income: Labor income represents all forms of employment earnings.
- Jobs (Employment): The work in which one is engaged; an occupation by which a person earns income. Employment includes both part-time and full-time jobs. All jobs are presented in full-time equivalence (FTE).
- Value Added: These are payments made by industry to workers, which also include interest, profits, and indirect business taxes. Value-added is an estimate of the gross regional or state product.

The alternatives were analyzed for impacts to the regional economy the results of which are presented in Table 12.

Table 12: RED Impact Summary

	Alternatives and Construction Costs							
	Concept 1, $25,666,420		Concept 2, $19,705,314		Concept 3, $49,897,643		Concept 4, $19,608,950	
Area	**Output**	**Jobs***	**Output**	**Jobs***	**Output**	**Jobs***	**Output**	**Jobs***
Local								
Direct Impact	$23,853,159	167.9	$18,313,189	128.9	$46,372,514	326.3	$18,223,632	128.2
Secondary Impact	$24,867,595	129.9	$19,092,019	99.7	$48,344,661	252.5	$18,998,654	99.2
Total Impact	$48,720,754	297.7	$37,405,207	228.6	$94,717,175	578.8	$37,222,286	227.5
State								
Direct Impact	$25,585,643	188.6	$19,643,297	144.8	$49,740,605	366.6	$19,547,237	144.1
Secondary Impact	$28,178,732	147.2	$21,634,134	113.0	$54,781,786	286.1	$21,528,338	112.4
Total Impact	$53,764,375	335.8	$41,277,431	257.8	$104,522,391	652.8	$41,075,574	256.5
US								
Direct Impact	$25,651,105	189.4	$19,693,556	145.4	$49,867,869	368.3	$19,597,249	144.7
Secondary Impact	$46,409,021	208.5	$35,630,381	160.1	$90,222,975	405.3	$35,456,140	159.3
Total Impact	$72,060,126	397.9	$55,323,937	305.5	$140,090,844	773.6	$55,053,389	304.0

* Jobs are presented in full-time equivalence (FTE)
Values are presented in FY 2024 price levels.

Ohio Riverfront
Cincinnati, Ohio (Phase 2)

Appendix F
Draft Real Estate Plan

1. PURPOSE:

This Real Estate Plan (REP) presents the real estate requirements for the Ohio Riverfront – Cincinnati, Ohio (Phase 2) Project (Project) in accordance with ER 405-1-12. This REP supports the Integrated Feasibility Study. It is tentative in nature and preliminary for planning purposes only. The plan includes estimated land values and costs associated with the acquisition of lands, easements, and rights-of-way. It also identifies any facility/utility relocations necessary to implement the project. Anticipated requirements for lands, easements, rights-of-way, relocations and disposal areas (LERRD) are based on information furnished by the project development team. The final real property acquisition lines and estimates of value are subject to change even after approval of the report.

2. PROJECT AUTHORIZATION:

This study is authorized by Section 1202(b) of the Water Infrastructure Improvements for the Nation Act (WIIN) of 2016 (P.L. 114-322, 130 Stat 1684), which authorizes the Secretary to review the Central Riverfront Park Master Plan, dated December 1999, and the Ohio Riverfront Study, Cincinnati, Ohio, dated August 2002 to determine the feasibility of carrying out flood risk reduction, ecosystem restoration, and recreation components beyond the ecosystem restoration and recreation components that were authorized, undertaken, and completed pursuant to Section 5116 of WRDA 2007.

The Non-Federal Sponsor (NFS) is the City of Cincinnati, OH.

3. PROJECT DESCRIPTION:

The Project is located in Cincinnati, OH along the north bank of the Ohio River at approximate river mile 470. This Project consists of two sub-phases: Phase 2a and Phase 2b. Phase 2a was constructed by the NFS under a 2019 Memorandum of Understanding (MOU) between the Department of the Army, represented by the U.S. Army Corps of Engineers Louisville District; the City of Cincinnati, Ohio; and Hamilton County, Ohio. The MOU allowed the NFS to construct recreational features in the Project area prior to the initiation of the Phase 2 study and grants potential work in-kind credit for associated costs. The recreational features constructed under that MOU represent Phase 2a. Because Phase 2a is complete, this REP will focus primarily on Phase 2b. However, the land on which Phase 2a was constructed is included as it is part of the LERRD required to support the Project.

Phase 2b will be constructed entirely within Smale Park between Paycor Stadium and the Great American Ball Park along approximately 1,000 feet of the right descending bank of the Ohio River. The Recommended Plan includes enhanced, ADA accessible walkways that will tie into the existing riverfront sidewalk. Additionally, the existing esplanade will be extended to the Ohio River and will transition into river stairs that lead to a new kayak launch and terraced boulders into the water. Concrete seat walls will also be constructed across the riverfront and native grasses and vegetation planted throughout the Project area to provide a natural but varied landscape.

All Phase 2b features will be constructed entirely within approximately 2.6 acres of Smale Park, which is owned in fee by the NFS. In addition to the park, a laydown area as well as a borrow area will be necessary to support Project construction. Roughly half an acre of an adjacent parking lot owned by Hamilton County has been identified as a laydown area. The NFS has indicated that the County is open to making the parking lot available during construction. The NFS will acquire a temporary work area easement from the County for the duration of Project construction. The NFS has identified Glenway Park as a potential borrow site.

They own the park in fee and would like to have a large amount of fill removed from the park for a planned improvement project. The park is roughly 2.5 acres and approximately 5 miles from the Project site. If later investigations determine the park is unsuitable as a borrow site, another will be identified in coordination with the NFS. A temporary work area easement is the minimum interest the NFS would need to acquire for a borrow site, should they not already own a suitable site. No utility or facility relocations are anticipated to support the Project.

Phase 2a is located just northwest of Phase 2b on approximately 1.5 acres of land owned in fee by Hamilton County, OH. For the NFS to receive work in-kind contribution and LERRD credit for Phase 2a, they will need to acquire the site in fee from Hamilton County. Alternatively, Hamilton County could elect to become a Project sponsor and co-sign the PPA with the City of Cincinnati.

4. ESTATES:

The standard estate Fee Simple is required for public access areas, recreation features, and ecosystem restoration. The NFS owns the entirety of Smale Park in fee.

Fee Simple

The fee simple title to (the Land described in _____ Schedule A) (Tracts Nos.____ , ____and ____), Subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

The standard estate Temporary Work Area Easement is required for both laydown and borrow areas.

Temporary Work Area Easement

A temporary easement and right-of-way in, on, over and across (the land described in Schedule A) (Tract Nos. _____, _____ and _____), for a period not to exceed __________, beginning with date possession of the land is granted to [the grantee], for use by [the grantee], its representatives, agents, and contractors as a (borrow area) (work area), including the right to (borrow and/or deposit fill, spoil and waste material thereon) (move, store and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the ____________ Project, together with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

5. NON-STANDARD ESTATES:

No non-standard estates are required to complete the Project.

6. NON-FEDERAL SPONSOR LANDS:

The NFS owns Smale Park, where all Phase 2b features will be constructed, as well as the proposed borrow site, in fee. The only acquisitions required will be the Phase 2a site and the laydown area, both owned by the County. In lieu of conveying the required real estate instruments for Phase 2a and the laydown area to the NFS, the County may choose to be a Project co-sponsor. In that case, all required Project lands would be owned in fee by a Project sponsor.

7. EXISTING FEDERAL PROJECTS/LANDS:

The Markland Lock & Dam is located approximately 60 river miles downstream of the Project. The USACE owns flowage easements associated with the Markland Lock & Dam along both banks of the Ohio River roughly the entire distance between the Project and the Markland Lock & Dam, including within Smale Park. USACE flowage easement tracts 3373E, 3374E, 3375E, and 3376E run through Smale Park between elevation 471' and the ordinary high water mark. The NFS holds a Consent to Easement (CTE) from the Louisville District Real Estate Office (LRL-RE) granting permission to construct certain park features within the USACE flowage easements. When the design is finalized, LRL-RE will either amend the NFS's existing CTE or issue a new one that includes all the features constructed within the USACE flowage easements.

8. NAVIGATION SERVITUDE:

The Ohio River is a navigable waterway and construction will likely take place below the ordinary high water mark; however, this project is not in aid of commerce or flood control, so navigation servitude does not apply.

9. PROJECT AREA MAPS:

See Exhibit F-1 for the project area mapping.

10. POSSIBLE INDUCED FLOODING:

Induced flooding is not anticipated as a result of project construction or maintenance.

11. BASELINE COST ESTIMATE FOR REAL ESTATE:

A rough order of magnitude cost estimate was prepared by LRL's realty specialist and approved by LRL's staff appraiser. This estimate is based on recent sales of large riverfront properties in Cincinnati and across the Ohio River in Newport, KY. Total LERRD estimate, including Federal and non-Federal administrative expenses is approximately $5.1 million.

01 Lands & Damages

Lands		$4,622,000
Damages		$0
P.L. 91-646 Relocation Benefits		$0
Non-Fed Sponsor Incidental Costs		$24,000
Contingency	10%	$463,000
	Subtotal	$5,109,000
02 Relocations (Utility/Facility)		$0
30 Federal (Real Estate) Administrative Costs		$12,000
LERRD Total		**$5,121,000**

12. RELOCATION ASSISTANCE BENEFITS (P.L. 91-646):

Relocation assistance benefits issued in accordance with Public Law 91-646 are not anticipated to support the proposed project. The Project will not result in the displacement of any persons, businesses, or personal property.

13. MINERAL / TIMBER ACTIVITY:

There is no mineral or timber activity in the project area.

14. SPONSOR CAPABILITY:

The NFS has been deemed fully capable of acquiring the necessary real estate for project purposes. The Sponsor Capability Assessment was completed on 14 May 2024 and is attached as Exhibit F-2.

15. ZONING ORDINANCES ENACTED:

No application or enactment of zoning ordinances is proposed in lieu of, or to facilitate, acquisition in connection with the project.

16. ACQUISITION SCHEDULE WITH MILESTONES:

An acquisition schedule with specific dates is unavailable at this time. The only anticipated acquisition is a temporary work area easement from Hamilton County. The NFS has indicated that negotiating that acquisition could take 6 to 12 months. The NFS is expected to be able to adhere to the following general schedule.

Activity	Duration
Notice to proceed with real estate acquisitions issued	After PPA execution and finalized design
Real estate acquisitions	6 to 12 months
Certification of real estate interests	1 month
Process LERRD credit request	On-going throughout the acquisition phase

17. UTILITIES / FACILITIES TO BE RELOCATED:

No public utilities will be impacted by the proposed Project. There is a storm sewer line owned and operated by the NFS located within the Project footprint. This line only drains a portion of Smale Park and may be moved or eliminated as a result of the Project. As the line is only draining a portion of the park, it does not fulfill a public purpose nor does the NFS have a duty to replace it elsewhere. Any impact on this sewer line would be incidental to construction and not a utility relocation as defined by USACE regulations.

ANY CONCLUSION OR CATEGORIZATION CONTAINED IN THIS REAL ESTATE PLAN, OR ELSEWHERE IN THIS PROJECT REPORT, THAT AN ITEM IS A UTILITY OR FACILITY RELOCATION TO BE PERFORMED BY THE NON-FEDERAL SPONSOR AS PART OF ITS LERRD RESPONSIBILITIES IS PRELIMINARY ONLY. THE GOVERNMENT WILL MAKE A FINAL DETERMINATION OF THE RELOCATIONS NECESSARY FOR THE CONSTRUCTION, OPERATION, OR MAINTENANCE OF THE PROJECT AFTER FURTHER ANALYSIS AND COMPLETION AND APPROVAL OF FINAL ATTORNEY'S OPINIONS OF COMPENSABILITY FOR EACH OF THE IMPACTED UTILITIES AND FACILITIES.

18. HTRW CONSIDERATIONS:

The Hazardous and Toxic Substances section of the environmental assessment addresses the identification and assessment of Hazardous, Toxic, and Radioactive Waste (HTRW) resources within the Project Area. HTRWs encompass a wide array of substances that pose significant risks to human health and the environment due to their inherent toxicity, flammability, corrosiveness, or potential for contamination. These substances are subject to stringent regulations aimed at safeguarding public health and the environment.

The are no currently listed Superfund sites located at or within 1.0 mile of the Project area. There are three Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites within 0.5 miles of the Project area: Potter Steward U.S. Courthouse, Stone Oil Company, and Anchor White Lead Company. All but the Potter Stewart U.S. Courthouse are listed as needing no further remedial action. There are No Corrective Actions Sites identified within 1.0 mile of the project area. Three Resource Conservation and Recovery Act (RCRA) Treatment, Storage, and Disposal Facilities sites were identified within 0.5 miles of the Project Area. There are no RCRA generators located within the Project area. There are no RCRA Institutional or Engineering Control Sites within the Project area.

There are no Solid Waste Facilities, Ohio EPA Voluntary Action Program sites, or Ohio state-listed Institutional or Engineering Control sites located on or within 0.5 miles of the Project area. There is an Ohio listed Brownfield site located within 0.5 miles of the Project area. There is one listed Leaking Underground Storage Tank within 0.5 miles of the Project area; however, the site requires no further action and is over 15 years old. There are no Underground Storage Tanks (active or inactive) identified within the Project area.

19. OWNER ATTITUDE / ISSUES:

The surrounding business and property owners as well as relevant stakeholders have expressed significant support for the Project. No opposition to the Project has been raised.

20. SPONSOR NOTIFIED OF RISK OF ADVANCED ACQUISITIONS:

The NFS was notified in writing of the risk of advance acquisition on 9 May 2024.

21. ANY OTHER REAL ESTATE ISSUE:

None at the time of report writing.

Prepared by:

____

Carrie Fry
Realty Specialist
Louisville District

This REP is in compliance with applicable regulations, policy, and delegations.

____

Ashley N. Klimaszewski
Chief, Real Estate
Louisville District

Ohio River - Cincinnati, Ohio
(Phase 2)

Appendix G: Public Input

Ohio Riverfront - Cincinnati, Ohio (Phase 2)
Appendix H: Cultural Resources

* NOTE: Due to the size, the cultural resources appendix was reduced. The consultation letter dated December 14, 2022, has one complete with enclosures, the following consultation letters with the December 14, 2022 date were reduced by removing the enclosures.

The consultation letter dated December 7, 2023, has one complete with enclosures, the following consultation letters with the December 7, 2023 date were reduced by removing the enclosures.

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Melissa Wiatrolik
Tribal Historic Preservation Officer
Little Traverse Bay Band of Odawa
7500 Odawa Circle
Harbor Springs, MI 49740

Dear Ms. Wiatrolik:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

The study will identify and evaluate alternatives related to food risk reduction, ecosystem restoration, and recreational components along the Ohio Riverfront in downtown Cincinnati. Ideas being discussed for possible alternatives include river stairs, stone layback wall, terraced boulders, concrete seawalls, flood tolerant plantings, future boat dock landing, and castellini esplande (Figures 2 and 3). The Area of Potential Effects for the project measures approximately 4.36 acres along the Ohio River Riverfront (Figure 4).

A preliminary review of records and reports available online through the National Park Service, the Ohio Archaeological Inventory and the Ohio Historic Inventory has identified multiple archaeological sites and historic structures, including The John A. Roebling Bridge (National Historic Landmark) within the proposed project limits.

We invite your participation to be a consulting party for the Undertaking and to provide comments or information on any known cultural resources within or near the Ohio Riverfront Study area. Once the project alternative has been selected, additional coordination will occur.

We are developing a consulting party's list for the project (see Attachment 1). If you know of other consulting parties or members of the public who wish to participate in this process, please let us know. If you have any questions or comments, please contact

Ms. Jennifer Guffey, archaeologist and tribal liaison, by telephone at 502-315-7468, or by email at jennifer.m.guffey@usace.army.mil. Please provide a response within 30 days upon receipt of this letter.

Sincerely,

Ann C. Howard

Ann C. Howard
Chief, Environmental Resources Section

Enclosures

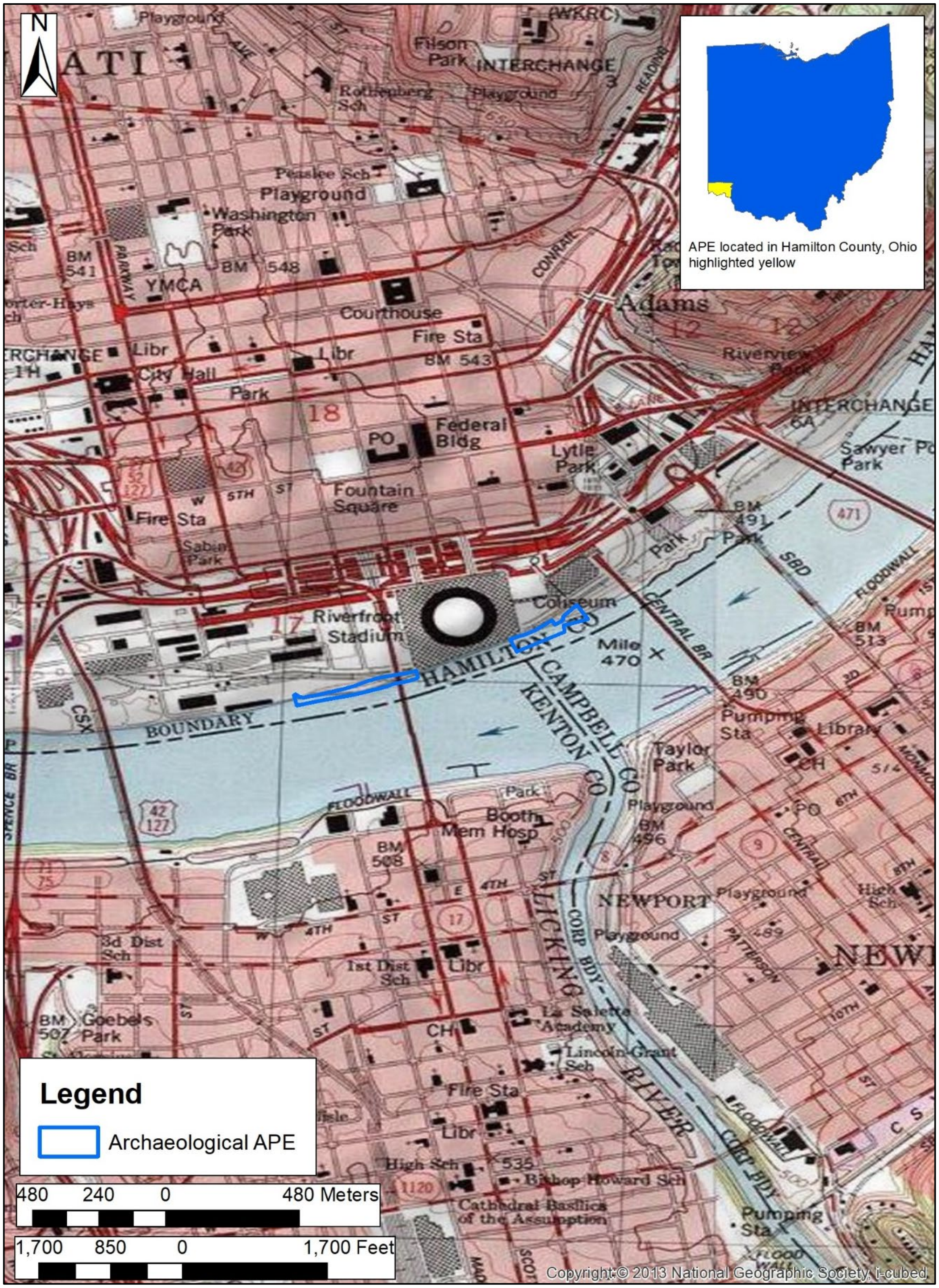


Figure 1. Excerpt of the Covington, KY USGS 7.5" quadrangles showing the location of the APE.

Figure 2. Ideas proposed for possible alternatives at the Ohio River Riverfront, Cincinnati Ohio.

Figure 3. Proposed possible alternatives at the Ohio River Riverfront, Cincinnati Ohio.

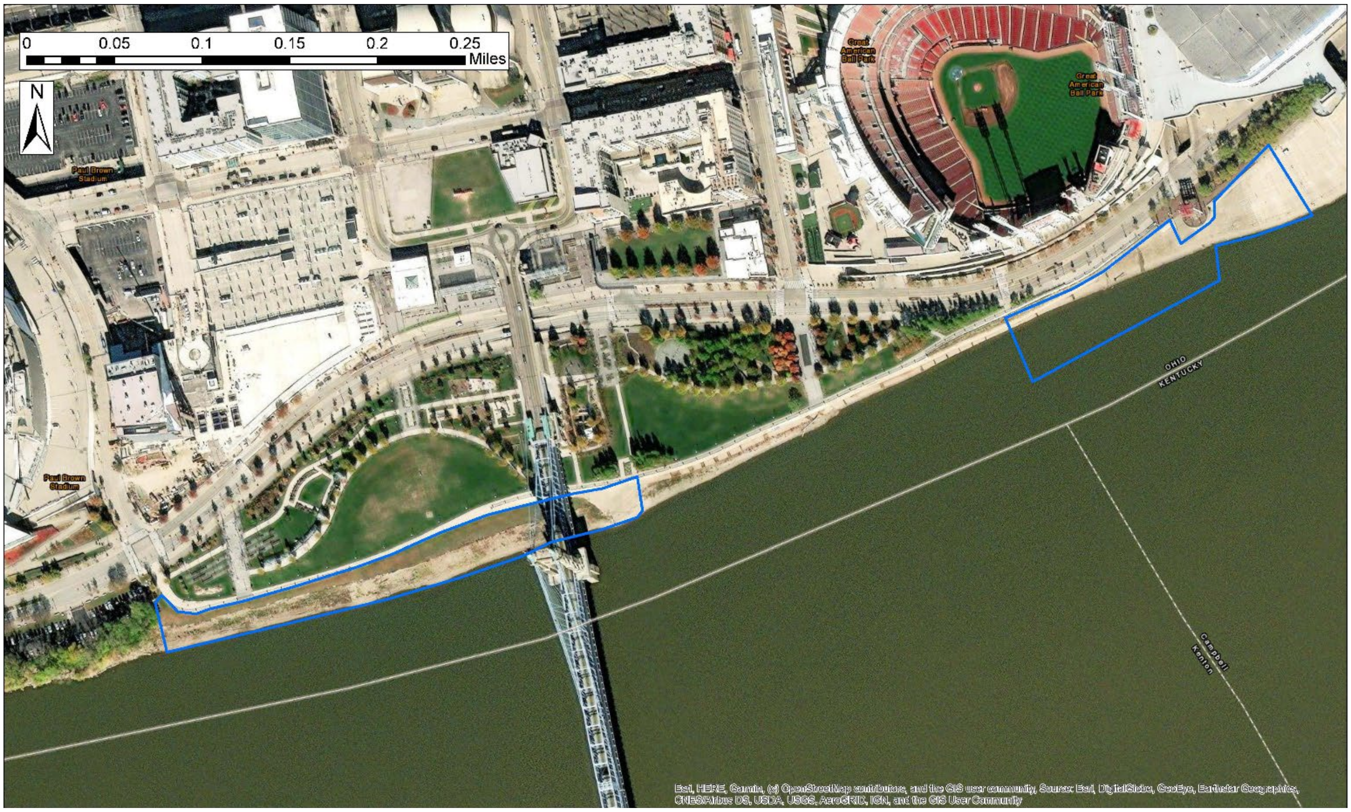


Figure 4. The Area of Potential Effects for the Ohio River Riverfront Project, Cincinnati Ohio.

Attachment 1: Consulting Party List

Diane Hunter, Tribal Historic Preservation Officer
Miami Tribe of Oklahoma
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Kathleen Reed
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Dave Prather
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DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Dave Prather
Smale Riverfront Park
166 W Mehring Way
Cincinnati, Ohio 45202

Dear Mr. Prather:

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A preliminary review of records and reports available online through the National Park Service, the Ohio Archaeological Inventory and the Ohio Historic Inventory has identified multiple archaeological sites and historic structures, including The John A. Roebling Bridge (National Historic Landmark) within the proposed project limits.

We invite your participation to be a consulting party for the Undertaking and to provide comments or information on any known cultural resources within or near the Ohio Riverfront Study area. Once the project alternative has been selected, additional coordination will occur.

We are developing a consulting party's list for the project (see Attachment 1). If you know of other consulting parties or members of the public who wish to participate in this process, please let us know. If you have any questions or comments, please contact

Ms. Jennifer Guffey, archaeologist and tribal liaison, by telephone at 502-315-7468, or by email at jennifer.m.guffey@usace.army.mil. Please provide a response within 30 days upon receipt of this letter.

Sincerely,

Ann C Howard

Ann C. Howard
Chief, Environmental Resources Section

Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Larry Heady
Tribal Historic Preservation Officer
Delaware Tribe of Indians
1929 E. 6th Street
Duluth, MN 55812

Dear Mr. Heady:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

The study will identify and evaluate alternatives related to food risk reduction, ecosystem restoration, and recreational components along the Ohio Riverfront in downtown Cincinnati. Ideas being discussed for possible alternatives include river stairs, stone layback wall, terraced boulders, concrete seawalls, flood tolerant plantings, future boat dock landing, and castellini esplande (Figures 2 and 3). The Area of Potential Effects for the project measures approximately 4.36 acres along the Ohio River Riverfront (Figure 4).

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Enclosures

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Jason Barron
Cincinnati Park Board
950 Eden Park Dr.
Cincinnati, Ohio 45202

Dear Mr. Barron:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Kathleen Reed
Hamilton County Genealogical Society
P.O. Box 15865
Cincinnati, Ohio 45215-0865

Dear Ms. Reed:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Chief, Environmental Resources Section

Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Charla Echohawk
Tribal Historic Preservation Officer
Peoria Tribe of Oklahoma
118 S. Eight Tribes Trail P.O. Box 1527
Miami, Oklahoma 74355

Dear Ms. Echohawk:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Enclosures

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Ace Watt
Tribal Historic Preservation Officer
United Keetoowah Band of Cherokee Indians in Oklahoma
P.O. Box 746
Tahlequah, Oklahoma 74465

Dear Ms. Watt:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Elizabeth Toombs
Tribal Historic Preservation Officer
Cherokee Nation
P.O. Box 948
Tahlequah, Oklahoma 74465

Dear Ms. Toombs:

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Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Earl Meshigaud
Director of Culture
Hannahville Indian Community
N 14911 Hannahville B-1
Wilson, MI 49896

Dear Mr. Meshigaud:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Enclosures

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Matthew Bussler
Tribal Historic Preservation Officer
Pokagon Band of Potawatomi Indians
59291 Indian Lake Road
Dowagiac, MI 49047

Dear Mr. Bussler:

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Chief, Environmental Resources Section

Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Lakota Pochedley
Tribal Historic Preservation Officer
Match-E-Be-Nash-She-Wish Band Potawatomi
2872 Mission Drive
Shelbyville, MI 49344

Dear Ms. Pochedley:

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Enclosures

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Douglas Taylor
Tribal Historic Preservation Officer
Nottawaseppi Huron Band of Potawatomi
1485 Mno-Bmadzwen Way
Fulton, MI 49052

Dear Mr. Taylor:

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Enclosures

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Edith Leosa
Tribal Historic Preservation Officer
Bad River Band of Lake Superior Chippewa Indians
P.O. Box 39
Odanah, WI 54861

Dear Ms. Leosa:

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Enclosures

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Melinda Young
Tribal Historic Preservation Officer
Lac du Flambeau Band Lake Superior Chippewa Indians
P.O. Box 67
Lac du Flambeau, MI 54538

Dear Ms. Young:

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600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Dr. Joe Stahlman
Tribal Historic Preservation Officer
Seneca Nation of Indians of New York
90 Ohi:yo' Way
Salamanca, New York 14779

Dear Dr. Stahlman:

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. William Tarrant
Tribal Historic Preservation Officer
Seneca-Cayuga Nation of Oklahoma
P.O. Box 453220
Grove, Oklahoma 74344

Dear Mr. Tarrant:

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Ms. Jennifer Guffey, archaeologist and tribal liaison, by telephone at 502-315-7468, or by email at jennifer.m.guffey@usace.army.mil. Please provide a response within 30 days upon receipt of this letter.

Sincerely,

Ann C Howard

Ann C. Howard
Chief, Environmental Resources Section

Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Darren Bonaparte
Tribal Historic Preservation Officer
St. Regis Mohawk Tribe
71 Margaret Terrance Memorial Way
Akwesasne, New York 13655

Dear Mr. Bonaparte:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Dr. Kelli Mosteller
Tribal Historic Preservation Officer
Citizen Potawatomi Nation
1899 S. Gordon Cooper Drive
Shawnee, Oklahoma 74801

Dear Dr. Mosteller:

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Enclosures

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Benjamin Rhodd
Tribal Historic Preservation Officer
Forest County Potawatomi
8130 Mishkowswen Dr. P.O. Box 340
Crandon, WI 54520

Dear Mr. Rhodd:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Enclosures

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Amy Burnette
Tribal Historic Preservation Officer
Leech Lake Band of Ojibwe
190 Sailstar Dr NW
Cass Lake, MN 56633

Dear Ms. Burnette:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Enclosures

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Terry Kemper
Tribal Historic Preservation Officer
Mille Lacs Band of Ojibwe
43408 Oodena Dr
Omamia, MN 56359

Dear Terry Kemper:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Johnny "Jay" Sam II
Director Historic Preservation
Little River Band of Ottawa Indians
2608 Government Center Dr
Manistee, MI 49660

Dear Mr. Sam:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Enclosures

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Rhonda Dixon
Tribal Historic Preservation Officer
Ottawa Tribe of Oklahoma
13 S 69A, P.O. Box 110
Miami, OK 74355

Dear Ms. Dixon:

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Enclosures

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Raphael J Taylor
Tribal Council Member
Prairie Band of Potawatomi Indians
16281 Q Rd
Mayetta, KS 66509

Dear Honorable Wahwassuk:

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Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Dr. Andrea Hunter
Tribal Historic Preservation Officer
Osage Nation
627 Grandview Avenue
Pawhuska, Oklahoma 74363

Dear Dr. Hunter:

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Sherri Clemons
Tribal Historic Preservation Officer
Wyandotte Nation of Oklahoma
64700 E. HWY 60
Wyandotte, Oklahoma 74370

Dear Ms. Clemons:

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Corina Williams
Tribal Historic Preservation Officer
Oneida Nation of Wisconsin
P.O. Box 365
Oneida, Wisconsin 54155

Dear Ms. Williams:

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Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Stephen Yerka
Tribal Historic Preservation Officer
Eastern Band of Cherokee Indians
P.O. Box 1927
Cherokee, North Carolina 28719

Dear Mr. Yerka:

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Megan Wood
Director
Ohio History Connection
800 E. 17th Ave
Columbus, Ohio 43211

Dear Ms. Wood:

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U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Craig Potts
Executive Director and
State Historic Preservation Officer
410 High Street
Frankfort, Kentucky 40601

Dear Mr. Potts:

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Ms. Jennifer Guffey, archaeologist and tribal liaison, by telephone at 502-315-7468, or by email at jennifer.m.guffey@usace.army.mil. Please provide a response within 30 days upon receipt of this letter.

Sincerely,

Ann C Howard

Ann C. Howard
Chief, Environmental Resources Section

Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Gary Loonsfoot, Jr
Director Tribal Preservation Officer
Keweenaw Bay Indian Community
16429 Beartown Rd
Baraga, MI 49908

Dear Mr. Loonsfoot:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

The study will identify and evaluate alternatives related to food risk reduction, ecosystem restoration, and recreational components along the Ohio Riverfront in downtown Cincinnati. Ideas being discussed for possible alternatives include river stairs, stone layback wall, terraced boulders, concrete seawalls, flood tolerant plantings, future boat dock landing, and castellini esplande (Figures 2 and 3). The Area of Potential Effects for the project measures approximately 4.36 acres along the Ohio River Riverfront (Figure 4).

A preliminary review of records and reports available online through the National Park Service, the Ohio Archaeological Inventory and the Ohio Historic Inventory has identified multiple archaeological sites and historic structures, including The John A. Roebling Bridge (National Historic Landmark) within the proposed project limits.

We invite your participation to be a consulting party for the Undertaking and to provide comments or information on any known cultural resources within or near the Ohio Riverfront Study area. Once the project alternative has been selected, additional coordination will occur.

We are developing a consulting party's list for the project (see Attachment 1). If you know of other consulting parties or members of the public who wish to participate in this process, please let us know. If you have any questions or comments, please contact

Ms. Jennifer Guffey, archaeologist and tribal liaison, by telephone at 502-315-7468, or by email at jennifer.m.guffey@usace.army.mil. Please provide a response within 30 days upon receipt of this letter.

Sincerely,

Ann C. Howard

Ann C. Howard
Chief, Environmental Resources Section

Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Brian Bisonette
Tribal Historic Preservation Officer
Las Courte Oreilles Band of Lake Superior Chippewa Indians
13394 W. Trepania Rd
Haywood, WI 54843

Dear Mr. Bisonette:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Ms. Jennifer Guffey, archaeologist and tribal liaison, by telephone at 502-315-7468, or by email at jennifer.m.guffey@usace.army.mil. Please provide a response within 30 days upon receipt of this letter.

Sincerely,

Ann C Howard

Ann C. Howard
Chief, Environmental Resources Section

Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Kade Ferris
Tribal Historic Preservation Officer
Red Lake Chippewa Indians
P.O. Box 274
Red Lake, MN 56671

Dear Mr. Ferris:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Ms. Jennifer Guffey, archaeologist and tribal liaison, by telephone at 502-315-7468, or by email at jennifer.m.guffey@usace.army.mil. Please provide a response within 30 days upon receipt of this letter.

Sincerely,

Ann C. Howard
Chief, Environmental Resources Section

Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Michael LaRonge
Tribal Historic Preservation Officer
Sokaogon Chippewa Community
3051 Sand Lake Rd
Crandon, WI 54520

Dear Mr. LaRonge:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Ms. Jennifer Guffey, archaeologist and tribal liaison, by telephone at 502-315-7468, or by email at jennifer.m.guffey@usace.army.mil. Please provide a response within 30 days upon receipt of this letter.

Sincerely,

Ann C Howard

Ann C. Howard
Chief, Environmental Resources Section

Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Wanda McFaggen
Tribal Historic Preservation Officer
St. Croix Chippewa Indians of Wisconsin
24663 Angeline Ave
Webster, WI 54893

Dear Ms. McFaggen:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Ms. Jennifer Guffey, archaeologist and tribal liaison, by telephone at 502-315-7468, or by email at jennifer.m.guffey@usace.army.mil. Please provide a response within 30 days upon receipt of this letter.

Sincerely,

Ann C. Howard

Ann C. Howard
Chief, Environmental Resources Section

Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Cindy Winslow
Tribal Historic Preservation Officer
Grand Traverse Band of Ottawa and Chippewa Indians
2605 N. West Bay Shore Dr.
Peshawbestown, MI 49682

Dear Ms. Winslow:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Ms. Jennifer Guffey, archaeologist and tribal liaison, by telephone at 502-315-7468, or by email at jennifer.m.guffey@usace.army.mil. Please provide a response within 30 days upon receipt of this letter.

Sincerely,

Ann C Howard

Ann C. Howard
Chief, Environmental Resources Section

Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Mr. Evan Schroeder
Tribal Historic Preservation Officer
Fond du Lac Band of Lake Superior Chippewa Indians
1270 Big Lake Rd
Cloquet, MN 55720

Dear Ms. Schroeder:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Ms. Jennifer Guffey, archaeologist and tribal liaison, by telephone at 502-315-7468, or by email at jennifer.m.guffey@usace.army.mil. Please provide a response within 30 days upon receipt of this letter.

Sincerely,

Ann C Howard

Ann C. Howard
Chief, Environmental Resources Section

Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Jaylen Strong
Tribal Historic Preservation Officer
Bois Forte Band of Chippewa
5344 Lakeshore Dr
Nett Lake, MN 55772

Dear Ms. Strong:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Ms. Jennifer Guffey, archaeologist and tribal liaison, by telephone at 502-315-7468, or by email at jennifer.m.guffey@usace.army.mil. Please provide a response within 30 days upon receipt of this letter.

Sincerely,

Ann C Howard

Ann C. Howard
Chief, Environmental Resources Section

Enclosures

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 14, 2022

Planning, Programs and
Project Management Division

Ms. Mary Ann Gagnon
Tribal Historic Preservation Officer
Grand Portage Band of Lake Superior Chippewa
P.O. Box 428
Grand Portage, MN 55605

Dear Ms. Gagnon:

The U.S. Army Corps of Engineers, Louisville District (Corps) is in the feasibility phase for the Cincinnati Ohio Riverfront Study (Undertaking), at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). We invite your agency to consult on the Undertaking under Section 106 of the National Historic Preservation Act (as amended) and assist us in the identification and evaluation of historic properties that could be affected by the proposed undertaking.

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Sincerely,

Ann C. Howard

Ann C. Howard
Chief, Environmental Resources Section

Enclosures

Miami Tribe of Oklahoma

3410 P St. NW, Miami, OK 74354 • P.O. Box 1326, Miami, OK 74355
Ph: (918) 541-1300 • Fax: (918) 542-7260
www.miamination.com

Via email: jennifer.m.guffey@usace.army.mil

December 16, 2022

Jennifer Guffey
Archaeologist & Tribal Liaison
Environmental Resources Section,
Louisville District

Re: Cincinnati Ohio Riverfront Project, Hamilton County Ohio – Comments of the Miami Tribe of Oklahoma

Dear Ms. Guffey:

Aya, kikwehsitoole – I show you respect. The Miami Tribe of Oklahoma, a federally recognized Indian tribe with a Constitution ratified in 1939 under the Oklahoma Indian Welfare Act of 1936, respectfully submits the following comments regarding the Cincinnati Ohio Riverfront Project, Hamilton County Ohio.

The Miami Tribe wishes to inform you that this project is along the Cincinnati Public landing which was used in our removal route. We request further consultation and signage with content we can provide in consultation with other interested tribes. The project area in Hamilton County, Ohio is within the Miami ancestral homelands. Given the Miami Tribe's deep and enduring relationship to its historic lands and cultural property within present-day Ohio, if any human remains or Native American cultural items falling under the Native American Graves Protection and Repatriation Act (NAGPRA) or archaeological evidence is discovered during any phase of this project, the Miami Tribe requests consultation within 48 hours with the entity of jurisdiction for the location of discovery. In such a case, please contact me at 918-541-8966 or by email at thpo@miamination.com to initiate consultation.

The Miami Tribe accepts the invitation to serve as a consulting party to the proposed project. In my capacity as Tribal Historic Preservation Officer I am the point of contact for all Section 106 consultation.

Respectfully,

Diane Hunter

Diane Hunter
Tribal Historic Preservation Officer

From:	Benjamin Rhodd
To:	Guffey, Jennifer M CIV USARMY CELRL (USA)
Subject:	[Non-DoD Source] RE: Cincinnati Ohio Riverfront Project, Hamilton County Ohio
Date:	Thursday, December 15, 2022 4:35:56 PM

Ms. Guffey,

The Forest County Potawatomi Community of Wisconsin (FCPC) have no issues or concerns regarding cultural resources of significance to the FCPC= within the footprint or in proximity of the project area.

The FCPC requests to remain as a consulting party to this project.

Thank you.

Sincerely,
Ben Rhodd
FCPC Tribal Historic Preservation Officer
Email: Benjamin.Rhodd@fcp-nsn.gov

From: Guffey, Jennifer M CIV USARMY CELRL (USA) <Jennifer.M.Guffey@usace.army.mil>
Sent: Thursday, December 15, 2022 9:33 AM
To: Benjamin Rhodd <Benjamin.Rhodd@fcp-nsn.gov>
Subject: Cincinnati Ohio Riverfront Project, Hamilton County Ohio

Good Morning Mr. Rhodd,

The Louisville District Corps of Engineers, Planning Branch, is initiating Section 106 of the National Historic Preservation Act (as amended) for the Cincinnati Ohio Riverfront Study at Smale Riverfront Park in Hamilton County, Ohio. We are inviting your agency to participate as a consulting party for the study and provide any information on known cultural resources that could be within or near the study area. If you have any questions or comments please don’t hesitate to contact me.

Sincerely,
Jennifer

Jennifer Guffey
Archaeologist & Tribal Liaison
Environmental Resources Section,
Louisville District
U.S.Army Corps of Engineers
Office Phone- 502.315.7468

From:	Caitlin E. Nichols
To:	Guffey, Jennifer M CIV USARMY CELRL (USA); The Osage Nation
Subject:	[URL Verdict: Neutral][Non-DoD Source] RE: Cincinnati Ohio Riverfront Project, Hamilton County Ohio
Date:	Thursday, December 15, 2022 11:12:22 AM
Attachments:	image001.png

Good morning, Ms. Guffey

All project notifications and reports must be emails to the Section 106 email in red below my signature line. Please send this invitation, and any in the future, to the S106 email.

Thanks,

Caitlin Eileen Nichols
Pronouns: She/Her/Hers
Archaeologist, MA, RPA
Osage Nation Historic Preservation Office
627 Grandview Avenue, Pawhuska, OK 74056
Office: 918-287-5427 |
caitlin.nichols@osagenation-nsn.gov
https://www.osagenation-nsn.gov/who-we-are/historic-preservation

Starting October 1, 2022 the Osage Nation Historic Preservation Office is changing the project notification process. **All project notifications and reports must be emailed to s106@osagenation-nsn.gov** Include the Lead Agency, Project Name and Number, and TCNS Number (if available) on the subject line.

From: Guffey, Jennifer M CIV USARMY CELRL (USA) <Jennifer.M.Guffey@usace.army.mil>
Sent: Thursday, December 15, 2022 10:02 AM
To: Andrea Hunter <ahunter@osagenation-nsn.gov>
Cc: Caitlin E. Nichols <caitlin.nichols@osagenation-nsn.gov>
Subject: Cincinnati Ohio Riverfront Project, Hamilton County Ohio

Good Morning Dr.Hunter,

The Louisville District Corps of Engineers, Planning Branch, is initiating Section 106 of the National Historic Preservation Act (as amended) for the Cincinnati Ohio Riverfront Study at Smale Riverfront Park in Hamilton County, Ohio. We are inviting your Tribe to participate as a consulting party for the study and provide any information on known cultural resources that could be within or near the study area. If you have any questions or comments please don't hesitate to contact me.

From: Joe Stahlman
To: Guffey, Jennifer M CIV USARMY CELRL (USA)
Subject: [URL Verdict: Neutral][Non-DoD Source] RE: External: Cincinnati Ohio Riverfront Project Hamilton County Ohio
Date: Thursday, January 5, 2023 8:22:03 AM
Attachments: image001.png

Hi Jennifer,
Call me Joe. I reviewed the project. SNI THPO will not take part in any meetings on this project based on the buildup of the river area and the development in this part of the city. However, if cultural resources are uncovered during the project, we would like to be notified immediately.

Thank you for reaching out.

Be well,

Joe

Dr. Joe Stahlman
Director
Seneca-Iroquois National Museum
Tribal Historic Preservation Office
Onöhsagwë:De' Cultural Center
82 W. Hetzel Street
Salamanca, NY 14779
Phone (716) 945-1760
Cell (716) 277-5580
Joe.Stahlman@sni.org

From: Guffey, Jennifer M CIV USARMY CELRL (USA) <Jennifer.M.Guffey@usace.army.mil>
Sent: Thursday, December 15, 2022 11:14 AM
To: Joe Stahlman <Joe.Stahlman@sni.org>
Subject: External: Cincinnati Ohio Riverfront Project Hamilton County Ohio

Good Morning Dr. Stahlman,

The Louisville District Corps of Engineers, Planning Branch, is initiating Section 106 of the National Historic Preservation Act (as amended) for the Cincinnati Ohio Riverfront Study at Smale Riverfront Park in Hamilton County, Ohio. We are inviting your Tribe to participate as a consulting party for the study and provide any information on known cultural resources that could be within or near the study area. If you have any questions or comments please don't hesitate to contact me.

Sincerely,
Jennifer

Jennifer Guffey
Archaeologist & Tribal Liaison
Environmental Resources Section,
Louisville District
U.S.Army Corps of Engineers
Office Phone- 502.315.7468

From:	Elizabeth Toombs
To:	Guffey, Jennifer M CIV USARMY CELRL (USA)
Subject:	[Non-DoD Source] RE: Cincinnati Ohio Riverfront Project Hamilton County, Ohio
Date:	Thursday, December 15, 2022 12:06:53 PM

Thank you for the invitation, Ms. Guffey. Ohio is outside the Cherokee Nation's Area of Interest. Thus, this Office respectfully defers to federally recognized Tribes that have an interest in this landbase at this time.

Thank you for the opportunity to participate. Please contact me if there are any questions or concerns.

Wado,

Elizabeth Toombs, Tribal Historic Preservation Officer
Cherokee Nation
Tribal Historic Preservation Office
PO Box 948
Tahlequah, OK 74465-0948
918.453.5389

From: Guffey, Jennifer M CIV USARMY CELRL (USA) <Jennifer.M.Guffey@usace.army.mil>
Sent: Thursday, December 15, 2022 9:25 AM
To: Elizabeth Toombs <elizabeth-toombs@cherokee.org>
Subject: <EXTERNAL> Cincinnati Ohio Riverfront Project Hamilton County, Ohio

Good Morning Ms. Toombs,

The Louisville District Corps of Engineers, Planning Branch, is initiating Section 106 of the National Historic Preservation Act (as amended) for the Cincinnati Ohio Riverfront Study at Smale Riverfront Park in Hamilton County, Ohio. We are inviting your Tribe to participate as a consulting party for the study and provide any information on known cultural resources that could be within or near the study area. If you have any questions or comments please don't hesitate to contact me.

Sincerely,
Jennifer

Jennifer Guffey

Archaeologist & Tribal Liaison
Environmental Resources Section,
Louisville District
U.S.Army Corps of Engineers
Office Phone- 502.315.7468

From:	Douglas Taylor
To:	Guffey, Jennifer M CIV USARMY CELRL (USA)
Subject:	[URL Verdict: Neutral][Non-DoD Source] RE: Cincinnati Ohio Riverfront Project Hamilton County Ohio
Date:	Thursday, January 5, 2023 10:22:46 AM
Attachments:	image001.png

Greetings,

Ref: Cincinnati Ohio Riverfront Project Hamilton County Ohio

Thank you for including the Nottawaseppi Huron Band of the Potawatomi (NHBP) in your consultation process. From the description of your proposed project, it does not appear as if any cultural or religious concerns of the Tribe's will be affected. We therefore have no objection to the project. Of course, if the project scope is significantly changed or inadvertent findings are discovered during the course of the project, please contact us for further consultation.

Very Respectfully
Douglas R. Taylor

Douglas R. Taylor | Tribal Historic Preservation Officer (THPO) & NAGPRA Representative
Pine Creek Indian Reservation
1301 T Drive S, Fulton, MI 49052
o: 269-704-8347 | c: 269-419-9434 | f: 269-729-5920
Douglas.Taylor@nhbp-nsn.gov | www.nhbp-nsn.gov

NOTTAWASEPPI HURON BAND OF THE POTAWATOMI
A FEDERALLY RECOGNIZED TRIBAL GOVERNMENT

From: Guffey, Jennifer M CIV USARMY CELRL (USA) <Jennifer.M.Guffey@usace.army.mil>
Sent: Thursday, December 15, 2022 10:57 AM
To: Douglas Taylor <Douglas.Taylor@nhbp-nsn.gov>
Subject: Cincinnati Ohio Riverfront Project Hamilton County Ohio

*** EXTERNAL EMAIL WARNING - USE CAUTION ***

Good Morning Mr. Taylor,

The Louisville District Corps of Engineers, Planning Branch, is initiating Section 106 of the National Historic Preservation Act (as amended) for the Cincinnati Ohio Riverfront Study at Smale Riverfront Park in Hamilton County, Ohio. We are inviting your Tribe to participate as a consulting party for the study and provide any information on known cultural resources that could be within or near the study area. If you have any questions or comments please don't hesitate to contact me.

Sincerely,
Jennifer

Jennifer Guffey
Archaeologist & Tribal Liaison
Environmental Resources Section,
Louisville District
U.S.Army Corps of Engineers
Office Phone- 502.315.7468

From: Diana Welling
To: Guffey, Jennifer M CIV USARMY CELRL (USA)
Subject: [Non-DoD Source] RE: Cincinnati Ohio Riverfront Project, Hamilton County Ohio
Date: Monday, December 19, 2022 10:51:02 AM

Received. We will log in for review.

From: Guffey, Jennifer M CIV USARMY CELRL (USA) <Jennifer.M.Guffey@usace.army.mil>
Sent: Thursday, December 15, 2022 10:59 AM
To: Section106 <Section106@ohiohistory.org>
Subject: Cincinnati Ohio Riverfront Project, Hamilton County Ohio

Good Morning Ms. Wood,

The Louisville District Corps of Engineers, Planning Branch, is initiating Section 106 of the National Historic Preservation Act (as amended) for the Cincinnati Ohio Riverfront Study at Smale Riverfront Park in Hamilton County, Ohio. We are inviting your agency to participate as a consulting party for the study and provide any information on known cultural resources that could be within or near the study area. If you have any questions or comments please don't hesitate to contact me.

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Louisville District
U.S.Army Corps of Engineers
Office Phone- 502.315.7468

OHIO HISTORY CONNECTION

In reply, please refer to:
2022-HAM-56652

January 11, 2023

Ann Howard
U.S. Army Corps of Engineers, Louisville District
600 Dr. Martin Luther King Jr. PL
Louisville, KY 40202

RE: Cincinnati Ohio Riverfront Study at Smale Riverfront Park
Near 8 E Mehring Way, Cincinnati, Hamilton County, Ohio

Dear Ms. Howard:

This letter is in response to your correspondence received on December 15, 2022. The comments of the Ohio State Historic Preservation Office (SHPO) are made in accordance with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (54 U.S.C. 306108 [36 CFR 800]).

The U.S. Army Corps of Engineers, Louisville District (Corps) is conducting a feasibility study for the Cincinnati Ohio Riverfront Study (undertaking), at Smale Riverfront Pak. According to the provided information, the study will identify and evaluate alternatives related to food risk reduction, ecosystem restoration, and recreational components along the Ohio Riverfront in Cincinnati. Potential work could include river stairs, stone layback wall, terraced boulders, concrete seawalls, flood tolerant plantings, boat dock landing, and castellini esplanade. The Corps is seeking comments on known cultural resources within or near the study area, and is asking for additional potential contacts for the consulting party list.

Known extant above ground historic resources include the Covington and Cincinnati Suspension Bridge/John A. Roebling Suspension Bridge (Ref. #75000786) which is listed in the National Register of Historic Places (NRHP) and is a National Historic Landmark (NHL). With its NHL status, the SHPO would highly recommend contacting Tim Schilling and Rachel Franklin-Weekley at the National Park Service to be a consulting party, as they review projects that may affect NHL sites in this region.

The archaeological site 33HA780 is within the footprint of the proposed project and was previously determined eligible for listing in the NRHP. Since the extent of the site is not known, archaeological testing, including deep testing, is recommended. The SHPO also recommends using the existing report for the site as a guide in developing the research design. In addition, the

800 E. 17th Ave., Columbus, OH 43211-2474 • 614.297.2300 • ohiohistory.org

president of the Ohio Archaeological Council, Eric Olson, should be contacted and added to the consulting party list.

If you have any questions, please contact Stephen Biehl at sbiehl@ohiohistory.org or myself at kkoehlinger@ohiohistory.org or (614) 298-2000. Thank you for the chance to comment on this undertaking.

Sincerely,

Kristen Koehlinger

Kristen Koehlinger, Project Reviews Manager
Resource Protection and Review

"Please be advised that this is a Section 106 decision. This review decision may not extend to other SHPO programs."

RPR Serial No: 1096113

Andy Beshear
Governor

Jacqueline Coleman
Lt. Governor

TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL
THE STATE HISTORIC PRESERVATION OFFICE
410 High Street
Frankfort, Kentucky 40601
(502) 564-7005
www.heritage.ky.gov

Michael E. Berry
Secretary

Craig A. Potts
Executive Director &
State Historic
Preservation Officer

01/04/2023

Jennifer Guffey
Archaeologist
USACE, Louisville District
600 Dr. Martin Luther King Jr. Pl.
Louisville, KY 40202

RE: USACE-L, Section 106 Initiation
Proposed Cincinnati Ohio Riverfront Study at the Smale Riverfront Park
Hamilton County, Ohio/Kenton County, Kentucky

Dear Ms. Guffey:

Thank you for your submittal of Section 106 initiation materials for the above-referenced undertaking. We understand USACE-L is in the feasibility phase for the proposed Cincinnati Ohio Riverfront Study at the Smale Riverfront Park in Hamilton County, Ohio. Our office appreciates the opportunity to participate in this undertaking as a consulting party (CP) and accepts this invitation.

As noted in the transmittal letter, the NRHP-Listed, National Historic Landmark (NHL), the Roebling Bridge, is located within the APE in Kenton County, Kentucky and Hamilton County, Ohio. Any potential effects associated with this undertaking should be cognizant of this resource and its significance. Related, as this is an NHL, the NPS NHL team should be contacted for CP participation. Our office also recommends the City of Covington Historic Preservation Officer be invited to participate in the CP process as well. Updated contact information for these groups is provided via email.

We look forward to additional consultation on this undertaking. Should you have any questions, please contact Gabrielle Fernandez of my staff at Gabrielle.Fernandez@ky.gov.

Sincerely,

Craig Potts
Executive Director and
State Historic Preservation Officer

CP: gf, KHC# 220638

January 20, 2023

Ann Howard
Chief, Environmental Resources Section
USACE Louisville
600 Dr. Martin Luther King Jr Pl
Louisville, KY 10202

Re: Cincinnati Ohio Riverfront Study

Dear Ms. Howard:

The Match-E-Be-Nash-She-Wish Band of Pottawatomi Indians' Tribal Historic Preservation Office has received the Section 106 consultation request for comments regarding the feasibility phase and related activities for the Cincinnati Ohio Riverfront Study at Smale Riverfront Park in Hamilton County, OH. At present, we are not providing any additional comments. We have not identified any information concerning the presence of any cultural resources significant to the Match-E-Be-Nash-She-Wish Band of Pottawatomi Indians within the Area of Potential Effect (APE). This is not to say that such a site may not exist, just that this office does not have any available information for the area(s) at this point in time.

This office will be available to assist you in the future or during the course of this project if there is a discovery of human remains, funerary objects, and artifacts. The discovery will require reinitiating Section 106 consultation related to all ongoing and proposed project work and the handling of the inadvertent discovery per the National Historic Preservation Act (NHPA) implementing regulations, 36 CFR Part 800, and, as applicable, the Native American Graves and Repatriation Act (NAGPRA) and its implementing regulations, 43 CFR Part 10. In the event of a discovery of artifacts, human remains, or funerary objects, we request to be notified within 10 days. At that time, the Tribe will determine if further consultation is necessary.

Please keep in mind that there may be other Tribal Nations and Communities that have interest or knowledge that we may not know about. We thank you for including the Match-E-Be-Nash-She-Wish Band of Pottawatomi Indians in your plans.

Sincerely,

Lakota Hobia

Lakota Hobia
THPO
Lakota.Hobia@glt-nsn.gov
Mbpi_thpo@glt-nsn.gov

CC: Jennifer Guffey, Archaeologist, USACE Louisville, Jennifer.M.Guffey@usace.army.mil

Cincinnati Riverfront Interagency Meeting

1. **Meeting Details**
   Date: August 21, 2023

2. **Attendees:**
   U.S. Army Corps of Engineers (USACE)
   a. Aaron Steele
   b. Steele McFadden
   c. Jared Barret
   d. Laura Mattingly
   Becky Crow – ODNR Division of Wildlife
   Gabrielle Fernandez – Kentucky SHPO
   Kristen Koehlinger Ohio SHPO
   Stephen Biehl – Ohio SHPO
   Brett Beatty – ODNR Division of Wildlife
   Colleen A. Bell – Osage Nation
   Logan York – Miami Tribe

3. **Meeting Purpose**
   The purpose of this meeting was to:
   - Provide a brief overview of the project
   - Deliver the proposed schedule and status update for the study
   - Deliver proposed measures and alternatives being considered during the planning process
   - Review already known environmental permitting requirements and listed species we are tracking
   - Have stakeholders provide input on risks to the project
   - Have stakeholders provide input on requirements not mentioned

4. **Presentation**
   The USACE presented a PowerPoint presentation detailing an overview of the project and objectives, updated project schedule, rough overview of alternatives being considered, known environmental concerns and permits, and known cultural resources and expected upcoming section 106 coordination. Feedback was requested on potential project risks and requirements not discussed in the presentation.

5. **Summary of Feedback**:

   Stephen Biehl Question: Is the National Parks Service on your contacts list they have jurisdiction over the bridge. Potential contact may be Tim Schilling.
   USACE Answer: No they are not on this call, but we will reach out and send them the slides and letter from today (sent via email to NPS on 21 August 2023).

   Colleen Bell Question: Can you share survey plans for your phase 1 investigation for review prior to conducting the survey?

USACE Answer: Yes, we will share our phase 1 survey plans to Tribes and the SHPO prior to conducting the survey.

Gabrielle Fernandez comment – Gabrielle has a NPS contact for the historic bridge and can provide.

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 7, 2023

Planning, Programs and
Project Management Division
Planning Branch

Mr. Ben Rhodds
Tribal Historic Preservation Officer
Forest County Potawatomi
5416 Everybody's Rd, P.O. Box 340
Crandon, WI 54520

Dear Mr. Rhodds:

The U.S. Army Corps of Engineers, Louisville District (Corps) is continuing consultation under the Section 106 process for the Cincinnati Ohio Riverfront Study (Undertaking) at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). The Undertaking's area of potential effects (APE) will be the sidewalk located near parking lot E along West Mehring Way, the existing sidewalk and exposed shoreline that runs parallel within Smale Park, and the Ohio River.

Before construction begins, the Corps will conduct a subsurface archaeological investigation. This investigation will include an archaeologist monitoring the excavation of thirteen (13) geotechnical trenches (trenches) and fourteen (14) soil borings located throughout the APE ending near the John A. Roebling Suspension Bridge (Figure 2). The trenches will be approximately 8 feet in length (2.4 meter) by 2-foot-wide (0.60 meters) ranging from 4 to 8 feet (1.2 to 2.4 meters) in depth. The trenches will be spaced out approximately 100 feet. The soil borings will be placed between each trench and will be excavated to 147 feet. There will be no soil borings or trenches near the footers of the John A. Roebling Suspension Bridge. The Corps plans to record any archaeological resources identified during the subsurface investigation and produce a report on our findings. The report will be sent to your office for review and comment. If any human remains or burial or funerary objects are identified during the subsurface archaeological investigations, all work will stop within 300 feet of the find and local law enforcement, the Ohio State Historic Preservation Officer, and Indian tribes will be contacted in regards to next steps. Based on the results of this investigation, the Corps will determine how to resolve adverse effects to any historic properties identified through consultation with your office and consulting parties.

Your review and concurrence on the project APE and level of effort regarding the subsurface archaeological investigation for this portion of the Undertaking is requested no later than 30 days upon receipt of this letter. If you have any questions and comments about this effort, they should be directed to Ms. Jennifer Guffey at (502) 315-7468 or via email Jennifer.m.guffey@usace.army.mil.

Sincerely,

Ann Howard Digitally signed by Ann Howard Date: 2023.12.08 08:26:15 -05'00'

Ann Howard
Chief, Environmental Section

Enclosures

1: The archaeological Area of Potential Effects (APE) for the Cincinnati Riverfront Project.

2: Aerial overview of the of the proposed locations of the geotechnical backhoe trenches and soil borings within the APE.

CC:

Logan York, Tribal Historic Preservation Officer
Miami Tribe of Oklahoma
THPO@miamination.com

Tim Schilling
National Park Service
Tim_schillings@nps.gov

Rachel Franklin-Weekley, Manager, Historic Preservation Partnerships
National Park Service
Rachel_franklin-weekley@nps.gov

Eric Olson
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sbiehl@ohiohistory.org

Frederick Jacko, Jr, Tribal Historic Preservation Officer
Nottawaseppi Huron Band of Potawatomi
Frederick.Jacko@nhbp-nsn.gov

Dr. Andrea Hunter, Tribal Historic Preservation Officer
Osage Nation
s106@osagenation-nsn.gov

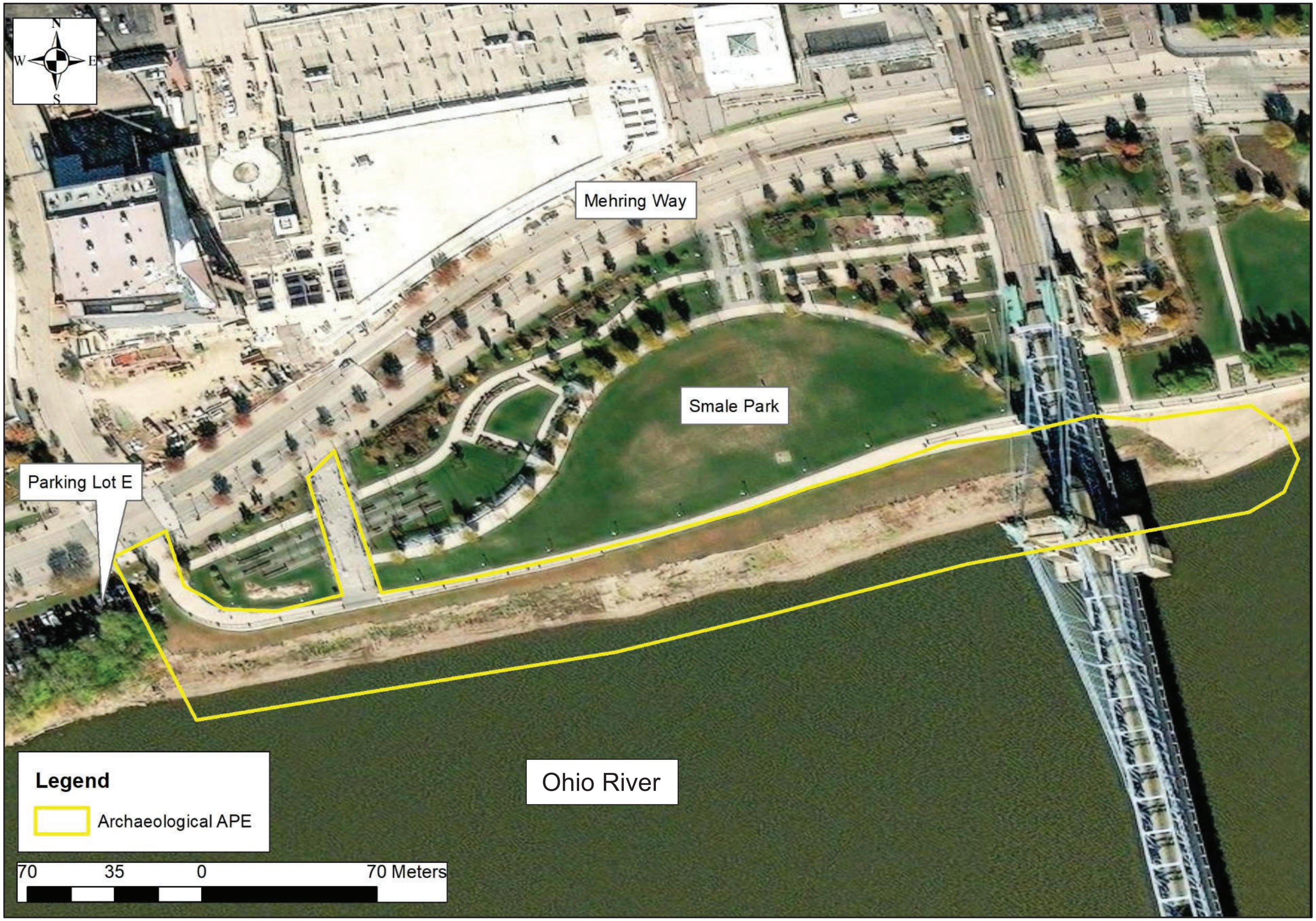

Figure 1: The archaeological Area of Potential Effects (APE) for the Cincinnati Riverfront Project, highlighted in yellow.

Figure 2: Aerial overview of the of the proposed locations of the geotechnical backhoe trenches (red rectangles) and soil borings (yellow circles) within the APE.

Planning, Programs and
Project Management Division
Planning Branch

Mr. Craig Potts
Executive Director and
State Historic Preservation Officer
410 High Street
Frankfort, Kentucky 40601

Dear Mr. Potts:

The U.S. Army Corps of Engineers, Louisville District (Corps) is continuing consultation under the Section 106 process for the Cincinnati Ohio Riverfront Study (Undertaking) at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). The Undertaking's area of potential effects (APE) will be the sidewalk located near parking lot E along West Mehring Way, the existing sidewalk and exposed shoreline that runs parallel within Smale Park, and the Ohio River.

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Dr. Andrea Hunter, Tribal Historic Preservation Officer
Osage Nation
s106@osagenation-nsn.gov

Planning, Programs and
Project Management Division
Planning Branch

Ms. Rachel Franklin-Weekley
Manager, Historic Preservation Partnerships
National Park Service
Interior Regions 3, 4, 5
601 Riverfront Drive
Omaha, NE 68102

Dear Ms. Franklin-Weekley:

The U.S. Army Corps of Engineers, Louisville District (Corps) is continuing consultation under the Section 106 process for the Cincinnati Ohio Riverfront Study (Undertaking) at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). The Undertaking's area of potential effects (APE) will be the sidewalk located near parking lot E along West Mehring Way, the existing sidewalk and exposed shoreline that runs parallel within Smale Park, and the Ohio River.

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comments about this effort, they should be directed to Ms. Jennifer Guffey at (502) 315-7468 or via email Jennifer.m.guffey@usace.army.mil.

Sincerely,

Ann Howard
Chief, Environmental Section

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Dr. Andrea Hunter, Tribal Historic Preservation Officer
Osage Nation
s106@osagenation-nsn.gov

Planning, Programs and
Project Management Division
Planning Branch

Mr. Logan York
Tribal Historic Preservation Officer
Miami Tribe of Oklahoma
P.O. Box 1326
Miami, OK 74354

Dear Mr. York:

The U.S. Army Corps of Engineers, Louisville District (Corps) is continuing consultation under the Section 106 process for the Cincinnati Ohio Riverfront Study (Undertaking) at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). The Undertaking's area of potential effects (APE) will be the sidewalk located near parking lot E along West Mehring Way, the existing sidewalk and exposed shoreline that runs parallel within Smale Park, and the Ohio River.

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Dr. Andrea Hunter, Tribal Historic Preservation Officer
Osage Nation
s106@osagenation-nsn.gov

Planning, Programs and
Project Management Division
Planning Branch

Mr. Eric Olson
Ohio Archaeological Council
P.O. Box 82012
Columbus, OH 43224

Dear Mr. Olson:

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Dr. Andrea Hunter, Tribal Historic Preservation Officer
Osage Nation
s106@osagenation-nsn.gov

Planning, Programs and
Project Management Division
Planning Branch

Ms. Kristen Koehlinger
Project Reviews Manager
Resources Protection and Review
Ohio History Connection
800 E. 17th Ave
Columbus, OH 43211-2474

Dear Ms. Koehlinger:

The U.S. Army Corps of Engineers, Louisville District (Corps) is continuing consultation under the Section 106 process for the Cincinnati Ohio Riverfront Study (Undertaking) at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). The Undertaking's area of potential effects (APE) will be the sidewalk located near parking lot E along West Mehring Way, the existing sidewalk and exposed shoreline that runs parallel within Smale Park, and the Ohio River.

Before construction begins, the Corps will conduct a subsurface archaeological investigation. This investigation will include an archaeologist monitoring the excavation of thirteen (13) geotechnical trenches (trenches) and fourteen (14) soil borings located throughout the APE ending near the John A. Roebling Suspension Bridge (Figure 2). The trenches will be approximately 8 feet in length (2.4 meter) by 2-foot-wide (0.60 meters) ranging from 4 to 8 feet (1.2 to 2.4 meters) in depth. The trenches will be spaced out approximately 100 feet. The soil borings will be placed between each trench and will be excavated to 147 feet. There will be no soil borings or trenches near the footers of the John A. Roebling Suspension Bridge. The Corps plans to record any archaeological resources identified during the subsurface investigation and produce a report on our findings. The report will be sent to your office for review and comment. If any human remains or burial or funerary objects are identified during the subsurface archaeological investigations, all work will stop within 300 feet of the find and local law enforcement, the Ohio State Historic Preservation Officer, and Indian tribes will be contacted in regards to next steps. Based on the results of this investigation, the Corps will determine how to resolve adverse effects to any historic properties identified through consultation with your office and consulting parties.

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comments about this effort, they should be directed to Ms. Jennifer Guffey at (502) 315-7468 or via email Jennifer.m.guffey@usace.army.mil.

Sincerely,

Ann Howard
Digitally signed by Ann Howard
Date: 2023.12.08 09:49:19 -05'00'

Ann Howard
Chief, Environmental Section

Enclosures

1: The archaeological Area of Potential Effects (APE) for the Cincinnati Riverfront Project.

2: Aerial overview of the of the proposed locations of the geotechnical backhoe trenches and soil borings within the APE.

CC:

Logan York, Tribal Historic Preservation Officer
Miami Tribe of Oklahoma
THPO@miamination.com

Tim Schilling
National Park Service
Tim_schillings@nps.gov

Rachel Franklin-Weekley, Manager, Historic Preservation Partnerships
National Park Service
Rachel_franklin-weekley@nps.gov

Eric Olson
Ohio Archaeological Council
Eols.eric@gmail.com

Ben Rhodd, Tribal Historic Preservation Officer
Forest County Potawatomi
Benjamin.Rhodd@fcp-nsn.gov

Gabrielle Fernandez
Kentucky Heritage Council
Gabrielle.Fernandez@ky.gov

Stephen Biehl
Ohio History Connection
sbiehl@ohiohistory.org

Frederick Jacko, Jr, Tribal Historic Preservation Officer
Nottawaseppi Huron Band of Potawatomi
Frederick.Jacko@nhbp-nsn.gov

Dr. Andrea Hunter, Tribal Historic Preservation Officer
Osage Nation
s106@osagenation-nsn.gov

Planning, Programs and
Project Management Division
Planning Branch

Dr. Andrea Hunter
Tribal Historic Preservation Officer
Osage Nation
627 Grandview Avenue
Pawhuska, OK 74056

Dear Dr. Hunter:

The U.S. Army Corps of Engineers, Louisville District (Corps) is continuing consultation under the Section 106 process for the Cincinnati Ohio Riverfront Study (Undertaking) at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). The Undertaking's area of potential effects (APE) will be the sidewalk located near parking lot E along West Mehring Way, the existing sidewalk and exposed shoreline that runs parallel within Smale Park, and the Ohio River.

Before construction begins, the Corps will conduct a subsurface archaeological investigation. This investigation will include an archaeologist monitoring the excavation of thirteen (13) geotechnical trenches (trenches) and fourteen (14) soil borings located throughout the APE ending near the John A. Roebling Suspension Bridge (Figure 2). The trenches will be approximately 8 feet in length (2.4 meter) by 2-foot-wide (0.60 meters) ranging from 4 to 8 feet (1.2 to 2.4 meters) in depth. The trenches will be spaced out approximately 100 feet. The soil borings will be placed between each trench and will be excavated to 147 feet. There will be no soil borings or trenches near the footers of the John A. Roebling Suspension Bridge. The Corps plans to record any archaeological resources identified during the subsurface investigation and produce a report on our findings. The report will be sent to your office for review and comment. If any human remains or burial or funerary objects are identified during the subsurface archaeological investigations, all work will stop within 300 feet of the find and local law enforcement, the Ohio State Historic Preservation Officer, and Indian tribes will be contacted in regards to next steps. Based on the results of this investigation, the Corps will determine how to resolve adverse effects to any historic properties identified through consultation with your office and consulting parties.

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Sincerely,

Ann Howard
Digitally signed by Ann Howard
Date: 2023.12.08 08:26:15 -05'00'

Ann Howard
Chief, Environmental Section

Enclosures

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Miami Tribe of Oklahoma
THPO@miamination.com

Tim Schilling
National Park Service
Tim_schillings@nps.gov

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Eric Olson
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Ben Rhodd, Tribal Historic Preservation Officer
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Benjamin.Rhodd@fcp-nsn.gov

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sbiehl@ohiohistory.org

Frederick Jacko, Jr, Tribal Historic Preservation Officer
Nottawaseppi Huron Band of Potawatomi
Frederick.Jacko@nhbp-nsn.gov

Dr. Andrea Hunter, Tribal Historic Preservation Officer
Osage Nation
s106@osagenation-nsn.gov

Planning, Programs and
Project Management Division
Planning Branch

Mr. Frederick Jacko, Jr
Tribal Historic Preservation Officer
Nottawaseppi Huron Band of Potawatomi
1485 Mno-Bmadzwen Way
Fulton, MI 49052

Dear Mr. Jacko, Jr:

The U.S. Army Corps of Engineers, Louisville District (Corps) is continuing consultation under the Section 106 process for the Cincinnati Ohio Riverfront Study (Undertaking) at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). The Undertaking's area of potential effects (APE) will be the sidewalk located near parking lot E along West Mehring Way, the existing sidewalk and exposed shoreline that runs parallel within Smale Park, and the Ohio River.

Before construction begins, the Corps will conduct a subsurface archaeological investigation. This investigation will include an archaeologist monitoring the excavation of thirteen (13) geotechnical trenches (trenches) and fourteen (14) soil borings located throughout the APE ending near the John A. Roebling Suspension Bridge (Figure 2). The trenches will be approximately 8 feet in length (2.4 meter) by 2-foot-wide (0.60 meters) ranging from 4 to 8 feet (1.2 to 2.4 meters) in depth. The trenches will be spaced out approximately 100 feet. The soil borings will be placed between each trench and will be excavated to 147 feet. There will be no soil borings or trenches near the footers of the John A. Roebling Suspension Bridge. The Corps plans to record any archaeological resources identified during the subsurface investigation and produce a report on our findings. The report will be sent to your office for review and comment. If any human remains or burial or funerary objects are identified during the subsurface archaeological investigations, all work will stop within 300 feet of the find and local law enforcement, the Ohio State Historic Preservation Officer, and Indian tribes will be contacted in regards to next steps. Based on the results of this investigation, the Corps will determine how to resolve adverse effects to any historic properties identified through consultation with your office and consulting parties.

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Ann Howard
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Ann Howard
Chief, Environmental Section

Enclosures

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THPO@miamination.com

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National Park Service
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sbiehl@ohiohistory.org

Frederick Jacko, Jr, Tribal Historic Preservation Officer
Nottawaseppi Huron Band of Potawatomi
Frederick.Jacko@nhbp-nsn.gov

Dr. Andrea Hunter, Tribal Historic Preservation Officer
Osage Nation
s106@osagenation-nsn.gov

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

December 7, 2023

Planning, Programs and
Project Management Division
Planning Branch

Mr. Timothy Schilling
Archaeologist, Historic Preservation Partnerships
National Park Service, Interior Regions 3, 4, 5
Denny Federal Building, Room 474
100 Centennial Mall North
Lincoln, NE 68508

Dear Mr. Schilling:

The U.S. Army Corps of Engineers, Louisville District (Corps) is continuing consultation under the Section 106 process for the Cincinnati Ohio Riverfront Study (Undertaking) at Smale Riverfront Park located in Hamilton County, Ohio (Figure 1). The Undertaking's area of potential effects (APE) will be the sidewalk located near parking lot E along West Mehring Way, the existing sidewalk and exposed shoreline that runs parallel within Smale Park, and the Ohio River.

Before construction begins, the Corps will conduct a subsurface archaeological investigation. This investigation will include an archaeologist monitoring the excavation of thirteen (13) geotechnical trenches (trenches) and fourteen (14) soil borings located throughout the APE ending near the John A. Roebling Suspension Bridge (Figure 2). The trenches will be approximately 8 feet in length (2.4 meter) by 2-foot-wide (0.60 meters) ranging from 4 to 8 feet (1.2 to 2.4 meters) in depth. The trenches will be spaced out approximately 100 feet. The soil borings will be placed between each trench and will be excavated to 147 feet. There will be no soil borings or trenches near the footers of the John A. Roebling Suspension Bridge. The Corps plans to record any archaeological resources identified during the subsurface investigation and produce a report on our findings. The report will be sent to your office for review and comment. If any human remains or burial or funerary objects are identified during the subsurface archaeological investigations, all work will stop within 300 feet of the find and local law enforcement, the Ohio State Historic Preservation Officer, and Indian tribes will be contacted in regards to next steps. Based on the results of this investigation, the Corps will determine how to resolve adverse effects to any historic properties identified through consultation with your office and consulting parties.

Your review and concurrence on the project APE and level of effort regarding the subsurface archaeological investigation for this portion of the Undertaking is requested no later than 30 days upon receipt of this letter. If you have any questions and

comments about this effort, they should be directed to Ms. Jennifer Guffey at (502) 315-7468 or via email Jennifer.m.guffey@usace.army.mil.

Sincerely,

Ann Howard Digitally signed by Ann Howard Date: 2023.12.08 09:49:19 -05'00'

Ann Howard
Chief, Environmental Section

Enclosures

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2: Aerial overview of the of the proposed locations of the geotechnical backhoe trenches and soil borings within the APE.

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Logan York, Tribal Historic Preservation Officer
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THPO@miamination.com

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Frederick.Jacko@nhbp-nsn.gov

Dr. Andrea Hunter, Tribal Historic Preservation Officer
Osage Nation
s106@osagenation-nsn.gov

OHIO HISTORY CONNECTION

In reply refer to:
2022-HAM-56652

January 5, 2024

Jennifer Guffey, Archaeologist & Tribal Liaison
Environmental Resources Section
Louisville District
U.S. Army Corps of Engineers
600 Dr. Martin Luther King Jr Pl
Louisville, Kentucky 40202
Email: jennifer.m.guffey@usace.army.mil

RE: Section 106 Review-Cincinnati Riverfront Project at Smale Riverfront Park, Hamilton County, Ohio.

Dear Ms. Guffey:

This letter is in response to correspondence received on December 8, 2023 regarding the above referenced project in Cincinnati, Hamilton County, Ohio. We appreciate the opportunity to comment on this project. The comments of the State Historic Preservation Office (SHPO) are made in accordance with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (54 U.S.C. 306108 [36 CFR 800]). The U.S. Army Corps of Engineers, Louisville District (Corps) is the lead federal agency for the undertaking.

According to the submission, the Corps proposes to conduct archaeological monitoring for thirteen (13) geotechnical trenches, each measuring approximately 2-ft wide by 8-ft long and spaced nearly 100-ft from each other. In addition, fourteen (14) soil borings will be drilled between the trenches and extend to a depth of 147-ft. All proposed work will occur within the defined Area of Potential Effect (APE), as outlined in Figure 1 of the submission. The Corps will produce a report upon completion of the monitoring efforts that will summarize the results and describe any cultural resources encountered. It should be noted that site 33HA780 is located immediately to the north of the APE. It is possible that this site extends into the APE.

The Corps is requesting the SHPO's review and concurrence of the project APE and level of effort regarding the archaeological investigations. The SHPO agrees with the defined APE and level of effort for the investigation. However, we request that the report include detailed descriptions, drawings, and photographs of the trenches, including all natural and, if present, cultural stratigraphic layers. A review and presentation of historic aerials should also compliment these efforts to help better understand the history of the APE. The SHPO looks forward to continued consultation regarding this undertaking. If you have any questions concerning this review, please contact me by email at sbiehl@ohiohistory.org.

Sincerely,

Stephen M. Biehl

Stephen M. Biehl, Project Reviews Coordinator (archaeology)
Resource Protection and Review
State Historic Preservation Office

RPR Serial No. 1100923

"Please be advised that this is a Section 106 decision. This review decision may not extend to other SHPO programs."

ANDY BESHEAR
GOVERNOR

JACQUELINE COLEMAN
LT. GOVERNOR

TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL
THE STATE HISTORIC PRESERVATION OFFICE
410 HIGH STREET
FRANKFORT, KENTUCKY 40601
(502) 564-7005
www.heritage.ky.gov

LINDY CASEBIER
SECRETARY

CRAIG A. POTTS
EXECUTIVE DIRECTOR &
STATE HISTORIC PRESERVATION OFFICER

December 21, 2023

Ann Howard
Chief, Environmental Section
U.S. Army Corps of Engineers, Louisville District
600 Dr. Martin Luther King Jr. Place
Louisville, KY 40202
Via email: Jennifer.M.Guffey@usace.army.mil

RE: USACE-L, Smale Riverfront Park, Cincinnati Ohio Riverfront Study
Near John A. Roebling Suspension Bridge, Cincinnati, Ohio
Extending from Kenton County, Kentucky

Dear Ms. Howard,

Thank you for your submittal of maps and project specifics for the above-referenced undertaking. We understand the USACE-L plans to conduct a subsurface archaeological investigation, which will include an archaeologist monitoring excavation of 13 geotechnical trenches and 14 soil borings within Cincinnati, Ohio.

We understand all ground disturbance will occur on the Ohio side of the Ohio River and of the Kentucky-owned John A. Roebling Suspension Bridge. We appreciate the opportunity to comment on the proposed work. We understand no soil borings or trenches are proposed near the footers of the John A. Roebling Suspension Bridge.

We concur that the proposed area of potential effects and level of effort is appropriate.

Upon completion of the investigation, a pdf version of the report should be submitted to our office via email at khc.section106@ky.gov. Should you have any questions or concerns, please contact Patti Hutchins or Gabrielle Fernandez of my staff at Patricia.Hutchins@ky.gov or Gabrielle.Fernandez@ky.gov.

Sincerely,

Craig Potts
Executive Director and
State Historic Preservation Officer

KHC# 233396
CP: peh, gf

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

May 9, 2024

Planning, Programs and
Project Management Division
Planning Branch

Mr. Ben Rhodds
Tribal Historic Preservation Officer
Forest County Potawatomi
5416 Everybody's Rd, P.O. Box 340
Crandon, WI 54520

Dear Mr. Rhodds:

The U.S. Army Corps of Engineers, Louisville District (USACE) requests your review and comment on the enclosed report entitled *Subsurface Archaeological Survey for the Smale Park Improvement Project, in Downtown Cincinnati, Hamilton County, Ohio.* The proposed undertaking consists of the recreational feature improvements within Smale Park. The archaeological Area of Potential Effects (APE) is approximately 3.60 acres along the shoreline of the Ohio River. Due to the potential of deeply buried sites, USACE conducted deep trenching along the shoreline of the Ohio River. The archaeological deep trenching revealed no evidence of significant prehistoric or historic archaeological resources or deeply buried intact deposits at Smale Park. However, modern trash, historic brick, cobble, concrete, and asphalt chucks were observed along the shoreline.

Even though the subsurface archeological survey didn't reveal any intact archaeological sites, a portion of the National Historic Landmark and National Register of Historic Places listed John Roebling Bridge is located within the project boundaries. Based on the project design, the John Roebling Bridge will not be affected by the proposed recreational feature improvements at Smale Park and will be avoided during the project. These improvements will not affect the original feeling, integrity, design, workmanship, and association of the function of the John Roebling Bridge. Based on the results of the archaeological surfaces testing, USACE has made the determination that the proposed undertaking will have no adverse effect to historic properties eligible for listing to the National Register of Historic Places under 36CFR800.5(b) and no additional surveys are needed for the Smale Park improvements.

Your concurrence on the enclosed report and USACE's determination of no adverse effect to historic properties are requested no later than 30 days upon receipt of this letter. If you have any questions or comments about this effort, they should be directed to me at (502) 315-7468 or via email jennifer.m.guffey@usace.army.mil.

Sincerely,

Jennifer Guffey

Digitally signed by Jennifer Guffey
Date: 2024.05.09 14:10:31 -04'00'

Jennifer Guffey
Tribal Liaison, Environmental Resources Section

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

May 9, 2024

Planning, Programs and
Project Management Division
Planning Branch

Mr. Logan York
Tribal Historic Preservation Officer
Miami Tribe of Oklahoma
P.O. Box 1326
Miami, OK 74354

Dear Mr. York:

The U.S. Army Corps of Engineers, Louisville District (USACE) requests your review and comment on the enclosed report entitled *Subsurface Archaeological Survey for the Smale Park Improvement Project, in Downtown Cincinnati, Hamilton County, Ohio.* The proposed undertaking consists of the recreational feature improvements within Smale Park. The archaeological Area of Potential Effects (APE) is approximately 3.60 acres along the shoreline of the Ohio River. Due to the potential of deeply buried sites, USACE conducted deep trenching along the shoreline of the Ohio River. The archaeological deep trenching revealed no evidence of significant prehistoric or historic archaeological resources or deeply buried intact deposits at Smale Park. However, modern trash, historic brick, cobble, concrete, and asphalt chucks were observed along the shoreline.

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Sincerely,

Jennifer Guffey

Digitally signed by Jennifer Guffey
Date: 2024.05.09 14:17:51 -04'00'

Jennifer Guffey
Tribal Liaison, Environmental Resources Section

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

May 9, 2024

Planning, Programs and
Project Management Division
Planning Branch

Ms. Sherri Clemons
Tribal Historic Preservation Officer
Wyandotte Nation of Oklahoma
64700 E HWY 60
Wyandotte, OK 74370

Dear Ms. Clemons:

The U.S. Army Corps of Engineers, Louisville District (USACE) requests your review and comment on the enclosed report entitled *Subsurface Archaeological Survey for the Smale Park Improvement Project, in Downtown Cincinnati, Hamilton County, Ohio.* The proposed undertaking consists of the recreational feature improvements within Smale Park. The archaeological Area of Potential Effects (APE) is approximately 3.60 acres along the shoreline of the Ohio River. Due to the potential of deeply buried sites, USACE conducted deep trenching along the shoreline of the Ohio River. The archaeological deep trenching revealed no evidence of significant prehistoric or historic archaeological resources or deeply buried intact deposits at Smale Park. However, modern trash, historic brick, cobble, concrete, and asphalt chucks were observed along the shoreline.

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Sincerely,

Jennifer Guffey

Digitally signed by Jennifer Guffey
Date: 2024.05.09 14:18:34 -04'00'

Jennifer Guffey
Tribal Liaison, Environmental Resources Section

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

May 10, 2024

Planning, Programs and
Project Management Division
Planning Branch

Mr. Eric Olson
Ohio Archaeological Council
P.O. Box 82012
Columbus, OH 43224

Dear Mr. Olson:

The U.S. Army Corps of Engineers, Louisville District (USACE) requests your review and comment on the enclosed report entitled *Subsurface Archaeological Survey for the Smale Park Improvement Project, in Downtown Cincinnati, Hamilton County, Ohio.* The proposed undertaking consists of the recreational feature improvements within Smale Park. The archaeological Area of Potential Effects (APE) is approximately 3.60 acres along the shoreline of the Ohio River. Due to the potential of deeply buried sites, USACE conducted deep trenching along the shoreline of the Ohio River. The archaeological deep trenching revealed no evidence of significant prehistoric or historic archaeological resources or deeply buried intact deposits at Smale Park. However, modern trash, historic brick, cobble, concrete, and asphalt chucks were observed along the shoreline.

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Sincerely,

WERNICK.CHRISTOPHER.DAVID.1267052111
Digitally signed by WERNICK.CHRISTOPHER.DAVID.1267052111
Date: 2024.05.10 11:34:03 -04'00'

Chris Wernick
Acting Chief, Environmental Section

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

May 13, 2024

Planning, Programs and
Project Management Division
Planning Branch

Mr. Timothy Schilling
Archaeologist, Historic Preservation Partnerships
National Park Service, Interior Regions 3, 4, 5
Denny Federal Building, Room 474
100 Centennial Mall North
Lincoln, NE 68508

Dear Mr. Schilling:

The U.S. Army Corps of Engineers, Louisville District (USACE) requests your review and comment on the enclosed report entitled *Subsurface Archaeological Survey for the Smale Park Improvement Project, in Downtown Cincinnati, Hamilton County, Ohio.* The proposed undertaking consists of the recreational feature improvements within Smale Park. The archaeological Area of Potential Effects (APE) is approximately 3.60 acres along the shoreline of the Ohio River. Due to the potential of deeply buried sites, USACE conducted deep trenching along the shoreline of the Ohio River. The archaeological deep trenching revealed no evidence of significant prehistoric or historic archaeological resources or deeply buried intact deposits at Smale Park. However, modern trash, historic brick, cobble, concrete, and asphalt chucks were observed along the shoreline.

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Sincerely,

WERNICK.CHRISTOPHER.DAVID.1267052111 Digitally signed by WERNICK.CHRISTOPHER.DAVID.1267052111 Date: 2024.05.10 11:32:06 -04'00'

Chris Wernick
Acting Chief, Environmental Section

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

May 9, 2024

Planning, Programs and
Project Management Division
Planning Branch

Dr. Andrea Hunter
Tribal Historic Preservation Officer
Osage Nation
627 Grandview Avenue
Pawhuska, OK 74056

Dear Dr. Hunter:

The U.S. Army Corps of Engineers, Louisville District (USACE) requests your review and comment on the enclosed report entitled *Subsurface Archaeological Survey for the Smale Park Improvement Project, in Downtown Cincinnati, Hamilton County, Ohio.* The proposed undertaking consists of the recreational feature improvements within Smale Park. The archaeological Area of Potential Effects (APE) is approximately 3.60 acres along the shoreline of the Ohio River. Due to the potential of deeply buried sites, USACE conducted deep trenching along the shoreline of the Ohio River. The archaeological deep trenching revealed no evidence of significant prehistoric or historic archaeological resources or deeply buried intact deposits at Smale Park. However, modern trash, historic brick, cobble, concrete, and asphalt chucks were observed along the shoreline.

Even though the subsurface archeological survey didn't reveal any intact archaeological sites, a portion of the National Historic Landmark and National Register of Historic Places listed John Roebling Bridge is located within the project boundaries. Based on the project design, the John Roebling Bridge will not be affected by the proposed recreational feature improvements at Smale Park and will be avoided during the project. These improvements will not affect the original feeling, integrity, design, workmanship, and association of the function of the John Roebling Bridge. Based on the results of the archaeological surfaces testing, USACE has made the determination that the proposed undertaking will have no adverse effect to historic properties eligible for listing to the National Register of Historic Places under 36CFR800.5(b) and no additional surveys are needed for the Smale Park improvements.

Your concurrence on the enclosed report and USACE's determination of no adverse effect to historic properties are requested no later than 30 days upon receipt of this letter. If you have any questions or comments about this effort, they should be directed to me at (502) 315-7468 or via email jennifer.m.guffey@usace.army.mil.

Sincerely,

Jennifer Guffey
Digitally signed by Jennifer Guffey
Date: 2024.05.09 14:15:47 -04'00'

Jennifer Guffey
Tribal Liaison, Environmental Resources Section

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

May 10, 2024

Planning, Programs and
Project Management Division
Planning Branch

Mr. Stephen Biehl, Project Reviews Coordinator
Resources Protection and Review
State Historic Preservation Office
Ohio History Connection
800 E. 17th Ave
Columbus, OH 43211-2474

Dear Mr. Biehl:

The U.S. Army Corps of Engineers, Louisville District (USACE) requests your review and comment on the enclosed report entitled *Subsurface Archaeological Survey for the Smale Park Improvement Project, in Downtown Cincinnati, Hamilton County, Ohio.* The proposed undertaking consists of the recreational feature improvements within Smale Park. The archaeological Area of Potential Effects (APE) is approximately 3.60 acres along the shoreline of the Ohio River. Due to the potential of deeply buried sites, USACE conducted deep trenching along the shoreline of the Ohio River. The archaeological deep trenching revealed no evidence of significant prehistoric or historic archaeological resources or deeply buried intact deposits at Smale Park. However, modern trash, historic brick, cobble, concrete, and asphalt chucks were observed along the shoreline.

Even though the subsurface archeological survey didn't reveal any intact archaeological sites, a portion of the National Historic Landmark and National Register of Historic Places listed John Roebling Bridge is located within the project boundaries. However, the improvements at Smale Park will not adversely affect the original location, feeling, integrity, design, workmanship, and association of the function of the John Roebling Bridge. Based on the results of the archaeological subsurface testing, USACE has made the determination that the proposed undertaking will have no adverse effect to historic properties eligible for listing to the National Register of Historic Places under 36CFR800.5(b) and no additional surveys are needed for the Smale Park improvements.

Your concurrence on the enclosed report and USACE's determination of no adverse effect to historic properties are requested no later than 30 days upon receipt of this letter. If you have any questions or comments about this effort, they should be directed to archaeologist and Tribal Liaison Jennifer Guffey at (502) 315-7468 or via email jennifer.m.guffey@usace.army.mil.

Sincerely,

WERNICK.CHRISTOPH
ER.DAVID.1267052111

Digitally signed by
WERNICK.CHRISTOPHER.DAVID.
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Date: 2024.05.10 11:29:59 -04'00'

Chris Wernick
Acting Chief, Environmental Section

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

May 9, 2024

Planning, Programs and
Project Management Division
Planning Branch

Mr. Frederick Jacko, Jr
Tribal Historic Preservation Officer
Nottawaseppi Huron Band of Potawatomi
1485 Mno-Bmadzwen Way
Fulton, MI 49052

Dear Mr. Jacko, Jr:

The U.S. Army Corps of Engineers, Louisville District (USACE) requests your review and comment on the enclosed report entitled *Subsurface Archaeological Survey for the Smale Park Improvement Project, in Downtown Cincinnati, Hamilton County, Ohio.* The proposed undertaking consists of the recreational feature improvements within Smale Park. The archaeological Area of Potential Effects (APE) is approximately 3.60 acres along the shoreline of the Ohio River. Due to the potential of deeply buried sites, USACE conducted deep trenching along the shoreline of the Ohio River. The archaeological deep trenching revealed no evidence of significant prehistoric or historic archaeological resources or deeply buried intact deposits at Smale Park. However, modern trash, historic brick, cobble, concrete, and asphalt chucks were observed along the shoreline.

Even though the subsurface archeological survey didn't reveal any intact archaeological sites, a portion of the National Historic Landmark and National Register of Historic Places listed John Roebling Bridge is located within the project boundaries. Based on the project design, the John Roebling Bridge will not be affected by the proposed recreational feature improvements at Smale Park and will be avoided during the project. These improvements will not affect the original feeling, integrity, design, workmanship, and association of the function of the John Roebling Bridge. Based on the results of the archaeological surfaces testing, USACE has made the determination that the proposed undertaking will have no adverse effect to historic properties eligible for listing to the National Register of Historic Places under 36CFR800.5(b) and no additional surveys are needed for the Smale Park improvements.

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Sincerely,

Jennifer Guffey
Digitally signed by Jennifer Guffey
Date: 2024.05.09 14:16:30 -04'00'

Jennifer Guffey
Tribal Liaison, Environmental Resources Section

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

May 10, 2024

Planning, Programs and
Project Management Division
Planning Branch

Mr. Craig Potts
Executive Director and
State Historic Preservation Officer
410 Hugh Street
Frankfort, Kentucky 40601

Dear Mr. Potts:

The U.S. Army Corps of Engineers, Louisville District (USACE) requests your review and comment on the enclosed report entitled *Subsurface Archaeological Survey for the Smale Park Improvement Project, in Downtown Cincinnati, Hamilton County, Ohio.* The proposed undertaking consists of the recreational feature improvements within Smale Park. The archaeological Area of Potential Effects (APE) is approximately 3.60 acres along the shoreline of the Ohio River. Due to the potential of deeply buried sites, USACE conducted deep trenching along the shoreline of the Ohio River. The archaeological deep trenching revealed no evidence of significant prehistoric or historic archaeological resources or deeply buried intact deposits at Smale Park. However, modern trash, historic brick, cobble, concrete, and asphalt chucks were observed along the shoreline.

Even though the subsurface archeological survey didn’t reveal any intact archaeological sites, a portion of the National Historic Landmark and National Register of Historic Places listed John Roebling Bridge is located within the project boundaries. However, the improvements at Smale Park will not adversely affect the original location, feeling, integrity, design, workmanship, and association of the function of the John Roebling Bridge. Based on the results of the archaeological subsurface testing, USACE has made the determination that the proposed undertaking will have no adverse effect to historic properties eligible for listing to the National Register of Historic Places under 36CFR800.5(b) and no additional surveys are needed for the Smale Park improvements.

Your concurrence on the enclosed report and USACE’s determination of no adverse effect to historic properties are requested no later than 30 days upon receipt of this letter. If you have any questions or comments about this effort, they should be directed to archaeologist and Tribal Liaison Jennifer Guffey at (502) 315-7468 or via email jennifer.m.guffey@usace.army.mil.

Sincerely,

WERNICK.CHRISTOPHER.DAVID.1267052111
Digitally signed by WERNICK.CHRISTOPHER.DAVID.1267052111
Date: 2024.05.10 11:31:03 -04'00'

Chris Wernick
Acting Chief, Environmental Section

SUBSURFACE ARCHAEOLOGICAL SURVEY FOR THE SMALE PARK IMPROVEMENT PROJECT, IN DOWNTOWN CINCINNATI, HAMILTON COUNTY, OHIO

Report authored by:

Jennifer Guffey, MA
Archaeologist and Tribal Liaison

Lead Federal Agency:
United States Army Corps of Engineers
Louisville District

May 2024

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
ATTN: PMC-PL
P.O. BOX 59
LOUISVILLE, KENTUCKY 40201-0059
Phone: (502) 315-7468

Email: Jennifer.M.Guffey@usace.army.mil

MANAGEMENT SUMMARY

The United States Army Corps of Engineers, Louisville District (USACE) conducted archaeological subsurface testing of the Area of Potential Effects (APE) for proposed recreational feature improvements (undertaking) within Smale Park in Downtown Cincinnati located in Hamilton County, Ohio. The archaeological APE consists of approximately 3.60 acres (1.45 hectares). The APE is located in an urban area that has been previously modified and disturbed before the development of Smale Park. The area was once known as “The Bottoms”, a river access point between Main Street and Vine Street (north-south) and Water Street (east-west). The landscape within the APE had modern trash, construction debris (i.e. concrete and asphalt chucks), and brick debris that has eroded out from the shoreline. Thirteen backhoe trenches were excavated within the APE. The survey was undertaken to determine if archaeological resources were present within the APE and, if present, to evaluate their National Register of Historic Preservation (NRHP) eligibility status. The backhoe trenches revealed that soils in the area have been heavily disturbed from prior modifications and dumping episodes of construction debris in the area. No archaeological sites or intact subsurface archaeological deposits were identified during the backhoe trenching within the APE. The National Historic Landmark (NHL) John Roebling Bridge is located within the APE and will not be affected by the undertaking.

Given the results of the archaeological subsurface testing, USACE has made the determination that the proposed undertaking will have no adverse effect to historic properties eligible for listing to the NRHP (36CFR part 800.5(b)). Therefore, USACE has made the determination that no additional archaeological survey is needed for the proposed recreational feature improvements at Smale Park in Hamilton County, OH.

Table of Contents

FIGURES

I. INTRODUCTION

The following report describes the results of the archaeological subsurface testing for the proposed recreational features to be constructed along the Ohio River at Smale Park in downtown Cincinnati in Hamilton County, Ohio (Figures 1 and 2). The undertaking is situated on the lower terrace of Smale Park along the Ohio River. The undertaking consists of possible alternatives including river stairs, stone layback wall, terrace boulders, a concrete seawall, flood tolerant plantings and a kayak launch ramp. The area has previously been disturbed due to the area being used as a fill and dumping ground for “The Bottoms” before Smale Park was developed. The landscape consists of manicured lawns along with exposed eroding shoreline with woody saplings, brick fragments, construction debris, and modern trash. The NHL John Roebling Bridge is located within the APE but will not be affected by the undertaking.

The archaeological Area of Potential Effects (APE) for the undertaking will occur within Smale Park along the shore of the Ohio River and measures approximately 3.60 acres (1.45 hectares). The monitoring of the thirteen backhoe trenches was conducted by US Army Corps of Engineers, Louisville District (USACE) archaeologists in compliance with Section 106 of the National Historic Preservation Act (as amended) and its implementing regulations at 36 CFR § 800.

The survey was performed by USACE personnel in compliance with Section 106 of the National Historic Preservation Act of 1966 (as amended). The work conducted follows the professional standards and guidelines outlined in the Secretary of the Interior Standards and Guidelines for Archaeology and Historic Preservation (Secretary of the Interior 1983) and the Ohio State Historic Preservation Office (OSHPO) *Archaeology Guidelines* and *Guidelines for Conducting History/Architecture Surveys in Ohio* (OSHPO 2014; 2022). The OSHPO also concurred with the field methods prior to the start of fieldwork in a letter dating January 5, 2024. USACE also coordinated the field methods with the Forest County Potawatomi, Miami Nation, Nottawaseppi Huron Band of Potawatomi, Osage Nation, Ohio History Connection, National Park Service, and Kentucky Heritage Council on December 8, 2023.

The goal of this survey was to identify any prehistoric and historic archaeological sites that could be eligible for listing in the National Register of Historic Places (NRHP). This was met through a literature review and records search to identify any known archaeological sites and archaeological deep testing to locate any unknown archaeological sites in the APE. USACE archaeologists Jennifer Guffey, Branden Young and Jared Barrett conducted the archaeological deep testing of the APE on February 20-23, 2024. Archaeologist and Tribal Liaison Jennifer Guffey served as Principal Investigator for the survey.

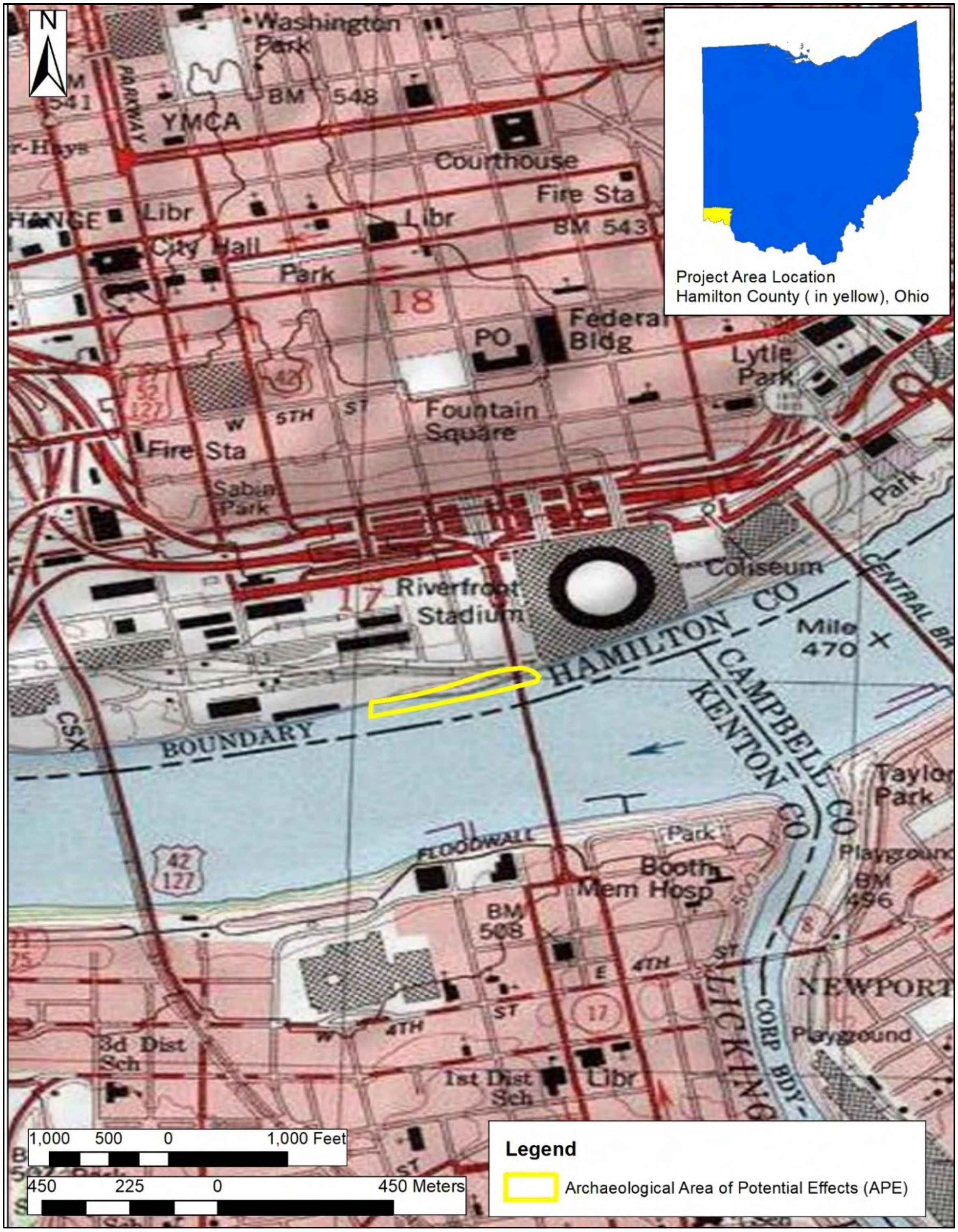

Figure 1: Excerpt of the Covington, Kentucky/Ohio (ed. 1987) USGS 7.5" quadrangle showing the location of the APE.

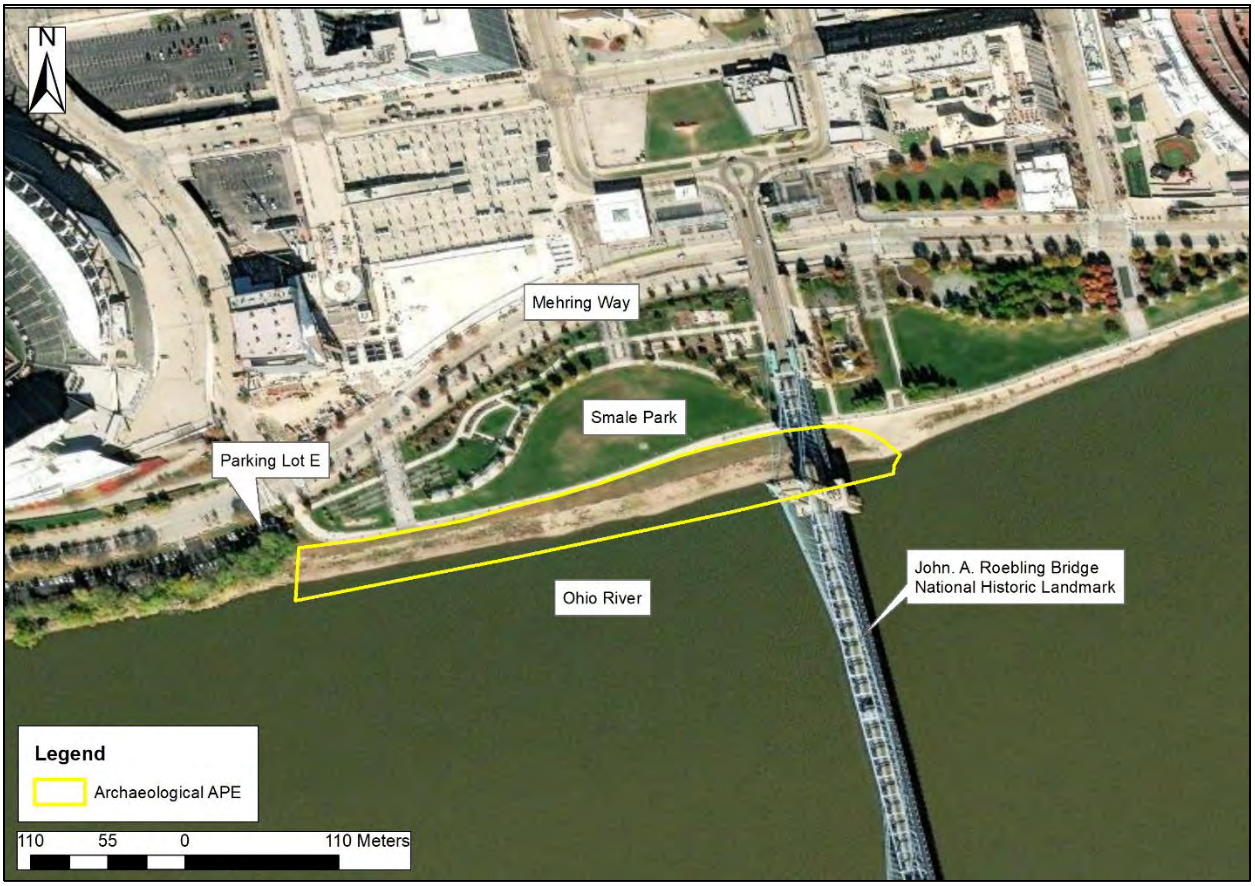

Figure 2: Aerial overview showing the location of the APE.

II. ENVIRONMENTAL SETTING

General Project Area Description

Land use within the APE consists of an eroded shoreline along the Ohio River between the John A. Roebling Bridge and Paycor Stadium (Figures 3 and 4). The APE is drained by the Ohio River which is located immediately south of the APE. Elevations within the APE range from between 530 to 570 feet above mean sea level.

Physiography

The APE lies within the Illinoian Till Plain region of the Till Plains section in the Central Lowland physiographic province. The Illinoian Till Plains are characterized by rolling ground moraines of older till, buried valleys, and moderately low relief (Brockman 1998). The bedrock underlying the APE consists of Silurian sedimentary rocks represented by mainly dolomites and shales (ODGS 2006).

Figure 3: Overview of the eroded exposed shoreline within the APE with John A. Roebling Bridge in the background, facing east.

Figure 4: Overview of the eroded exposed shoreline within the APE, facing west.

Soils

The soils mapped within the APE consist of Urban land – Udorthents Wheeling complex. These soils are located along stream terraces with slopes varying from two to 75 percent (USDA NRCS 2024). The parent material of Urban land-Udorthents-Wheeling is a mixed fine-loamy alluvium.

Climate

The climate of Hamilton County is of the continental type, which can fluctuate between the seasons. Summers are usually warm and humid, whereas winters are usually cold. In Hamilton County, the month of July has the highest average temperature at 87 degrees Fahrenheit and January has the lowest at 39 degrees Fahrenheit. The average yearly precipitation in the area is 42.24 inches (United States Climate Data 2023).

Flora and Fauna

This information has been adapted from Lewthwaite et al. (1997), to provide a background setting for the flora and fauna located within the proposed APE.

Late Pleistocene and Holocene environmental profiles for the Ohio region are of a general nature and apply to a large section of Eastern North America. Pollen profiles for areas in Indiana, Ohio, Pennsylvania, and New England indicate a relatively consistent climatic sequence across the northeast. This sequence originated around 17,000 Before Present (BP) with a moist cool climate. Between 11,000 and 9000 BP a warming trend started lasting until 4000 BP. This warming trend initiated the northern advance of deciduous forests (O’Malley et al. 1983). Around 3000 BP the forests were dominated by the Oak-Chestnut climax forest that is still prevalent in the eastern woodlands today.

Pleistocene fauna were significantly different from modern fauna. The Till Plains supported species such as mammoth, mastodon, musk ox, elk, caribou, moose, wolf, and black bear. With the retreat of the glaciers, the Pleistocene megafauna in the area became less common, species such as the mastodon and mammoth became extinct, and the moose and elk migrated northward. Post-glacial animal species were similar to modern types such as deer, beaver, turkey, and raccoon; the major differences being with their population size and range (O’Malley et al.1983).

III. CULTURAL SETTING

Archaeologists have developed a general chronology for the Eastern United States that provides a useful framework for organizing and describing archaeological data (Griffin 1967; Jennings 1974). The cultural-historical sequence developed for the region is generally divided into the following chronological periods: Paleoindian (12,000 to 10,000 BP); Archaic (10,000 to 3000 BP); Woodland (3000 to 1000 BP); Late Prehistoric and Fort Ancient (1000-250 BP); and Historic period (approximately 250 BP to Present). This span covers more than 12,000 years of human adaptation and re-adaptation to a constantly changing physical and socio-cultural environment.

The prehistoric cultural sequence in Ohio reflects a general trend toward increasing socio-cultural and technological complexity beginning with small mobile bands during the Paleoindian period. The small mobile bands began to develop into larger communities during the Archaic period. These larger communities gradually developed into more sedentary, complex societies throughout the Woodland, Late Prehistoric and Fort Ancient periods. The subsistence activities of the earliest societies focused on hunting and gathering, but by late prehistoric times agricultural economies were based primarily off the cultigens of corn, beans, and squash in the eastern United States. Increases in the size and density of the human population and trends toward increasing sedentism reached their highest levels during the Fort Ancient period. In all, these cultural trends are marked by stylistic differences in artifacts and correspond to major technological, social, cultural, and/or subsistence innovations (Ford 1977). However, there was considerable regional variation in the timing and extent to which these trends were expressed.

IV. HISTORICAL BACKGROUND

European settlers began to move into the area that became Hamilton County after 1789 when the settlement of Losantiville (later renamed Cincinnati) was begun by Israel Ludlow, Matthias Denman, and Robert Patterson (OHC 2022). A year later the name was changed to Cincinnati after the Cincinnati Society that was composed of Revolutionary War Officers and their descendants. Because of its location on the Ohio River, Cincinnati became a commercialized town with homes, stores, taverns and public landings after the end of the Indian War and the signing of the Treaty of Greenville in 1795.

Cincinnati grew fairly rapidly and had one thousand citizens by 1803 and that number jumped to ten thousand by 1820. By 1820, Cincinnati became the main hub for exporting goods since Fort Washington was dismantled in 1808 and the federal land was sold (CHS 1988). Cincinnati was declared a city in 1819, with the amount of rapid growth in population, as well as the number of large homes, courthouse, and churched being constructed (Figures 5 and 6). In the late 1920's raw materials and agricultural good were arriving into Cincinnati through the Miami and Erie Canal. However, portions of the riverfront were wiped out by major flood events and effected by the Cholera outbreak in the early 1930's. It' seemed that the effected riverfront was able to rebuild and population superseded 46,000 (CHS 1988). Over time, the Miami and Erie Canal was filled in 1863 as business and manufacturing firms moved away from the river (OHC 2022).

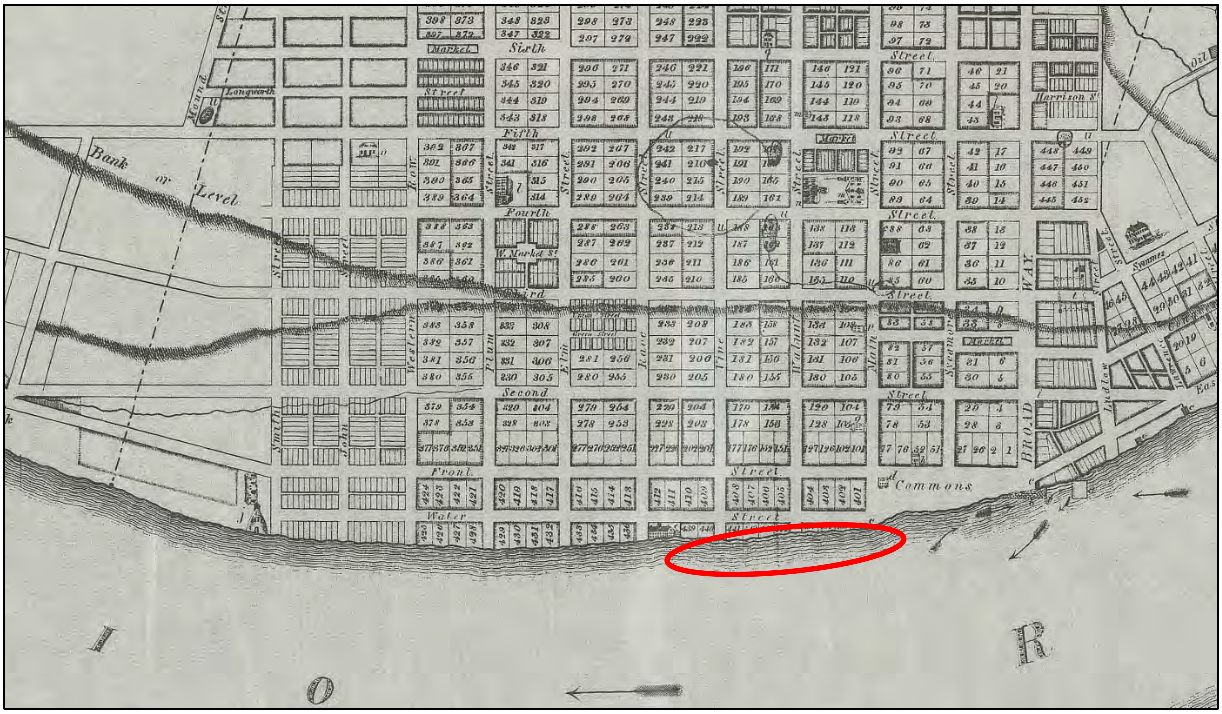

Figure 5: Plan of Cincinnati showing additions and subdivisions in 1819 before the construction of the Roebling Bridge, proposed APE highlighted in red (From the Collection of Cincinnati & Hamilton County Public Library).

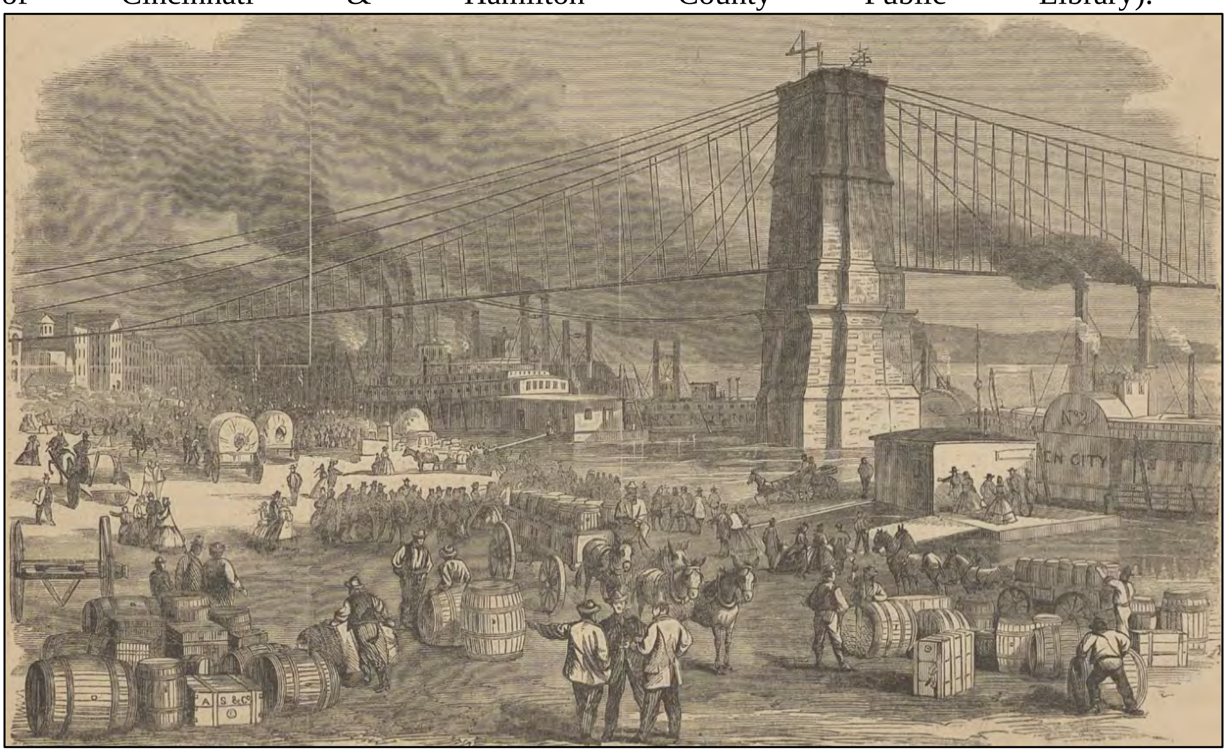

Figure 6: The area of the APE depicted as a river town from the Hapner's Weekly at the Levee in Cincinnati in 1866 in this illustration (From the Collection of Cincinnati & Hamilton County Public Library)

In 1849, the Covington & Cincinnati Bridge Company was appointed by the Ohio legislature to design a bridge across the Ohio River. It wasn't until 1856, when John A. Roebling starts construction of the Covington & Cincinnati Suspension Bridge or the John A. Roebling Bridge. The bridge construction had its hardships through bad winters and then the Civil War. Construction continued during the Civil War and it was used to move troops across the river. The bridge opened to the public in 1867. The Covington and Cincinnati Suspension Bridge (also known as the John A. Roebling Bridge) is listed on the NRHP and is also listed as a National Historic Landmark (NHL) for one of the nation's examples of suspension bridge construction.

Historic maps of Hamilton County from 1819 through the mid 1930's show how the area and land use within the APE has evolved over time (Figures 7–11). The majority of the businesses including banks, breweries, factories, and mills were located parallel along Water Street and perpendicular to Plum, Elm, Race, Vine, Walnut, and Main Streets and the Ohio River. The house lots that bordered the Ohio River and slightly north of the project area are labeled 437 and 438 which is a brewery and house lots 439–444 and 457–459 (Figure 12). In the 1850's Sanborn maps showed a series of businesses that overlooked the Ohio River. The Trinidad Asphalt Company and the Jewett & Dwight Company Bag Factory were located between Race and Vine Street (west-east) and Water Street and the Ohio River (north-south). The J. Weller Peanut & Pickle Company and F.A. Laidley Pork Packer Company were located on the east side of Vine and Race Streets and stops at the bridge pier of the Suspension Bridge (Figure 11). These companies remained in business throughout the 1890s. Modifications were continuously being made on the shoreline of the Ohio River (Figures 13 and 14). It wasn't until 1868 when River Street is shown on the map along with a railroad. The mapping depicts how low the area was and the amount of fill that was needed to build up the area to construct a new street. Even with the new developed street, the riverbank was still a low-lying area that was used for steamboats and barges to unload/load supplies and passengers visiting the area. (see Figure 6 and 12).

Sanborn maps of the early twentieth century reflect the continuous change in businesses that occurred along the Ohio River waterfront. The Kroger Gro & Baking Company replaced the J. Weller Peanut & Pickle Company and F.A. Laidley Pork Packer Company (Figure 15). The Kroger Gro & Baking company was a whole paper and wood working business that operated throughout the 1930's. The area within Smale Park was also used as the Cincinnati's wholesale produce market that stretched along the upper terrace of the Ohio River. This area was known as "The Bottoms" and was lined with cobblestone streets, railroad tracks, and old businesses (Figure 16). The area continued as a produce wholesale market into the late twentieth century but slowly diminished in the late 1990's as stores moved away from the riverfront.

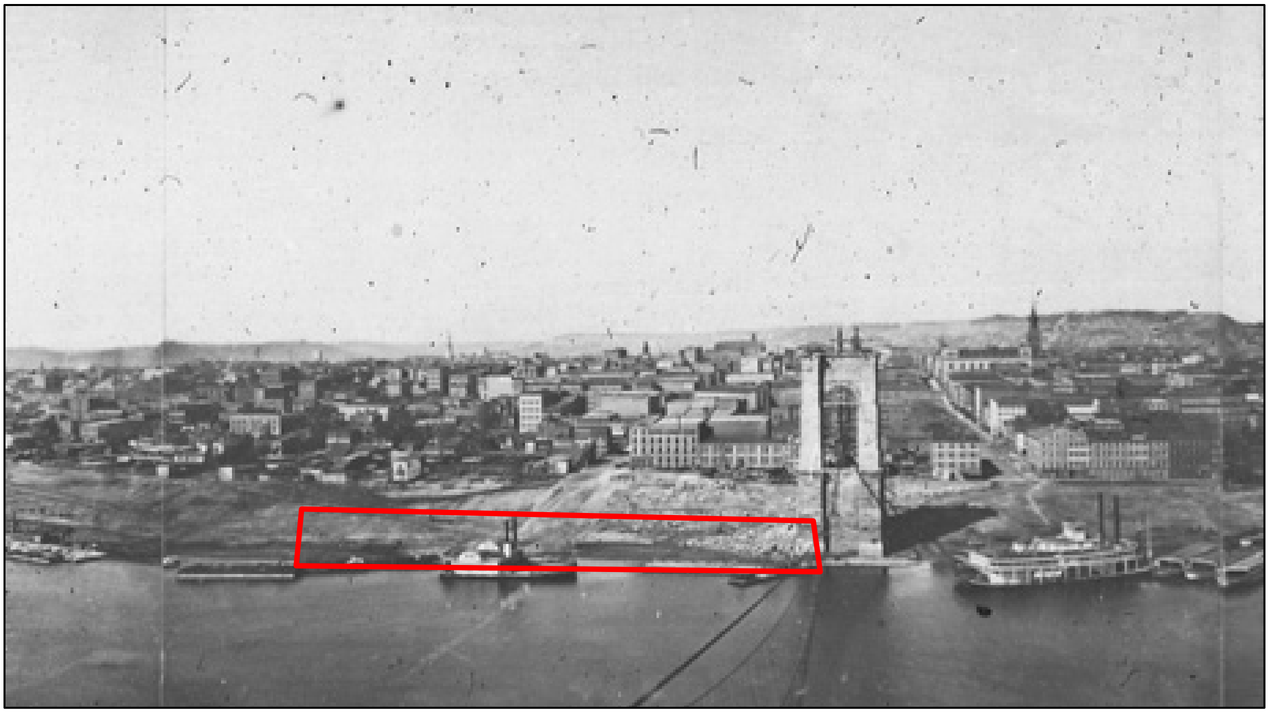

Figure 7: Overall view of the area of Smale Park and APE (in red) as it appeared along the Ohio River in 1861 (From the Collection of Cincinnati & Hamilton County Public Library).

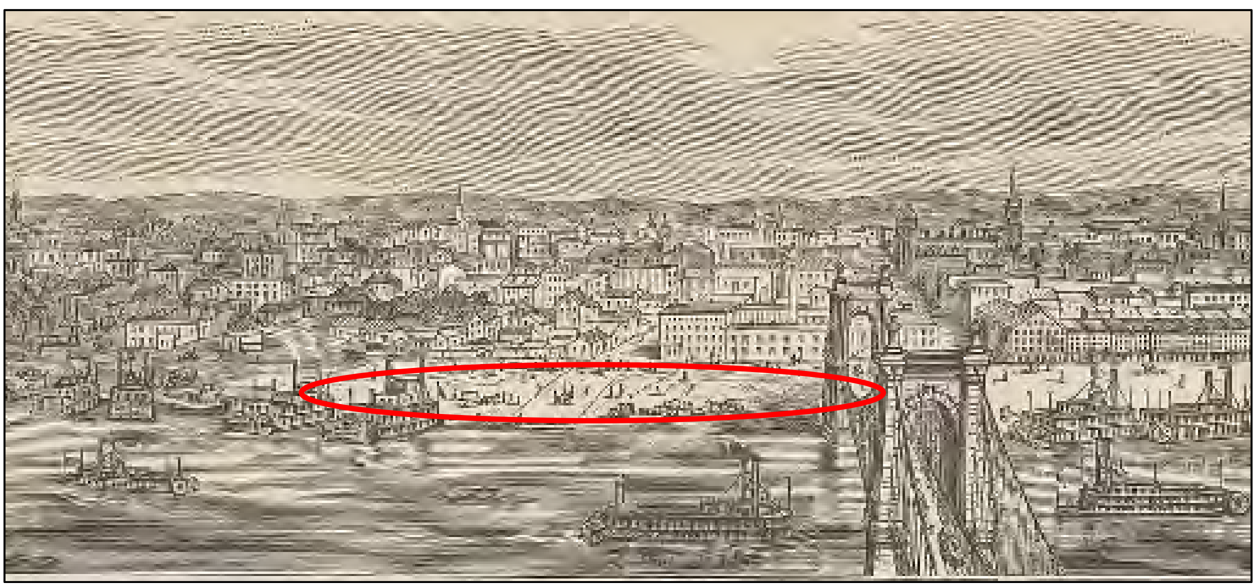

Figure 8: The area of Smale Park and the APE (in red) shown in an illustration depicting daily life along the river in downtown Cincinnati in 1866 (From the Collection of Cincinnati & Hamilton County Public Library).

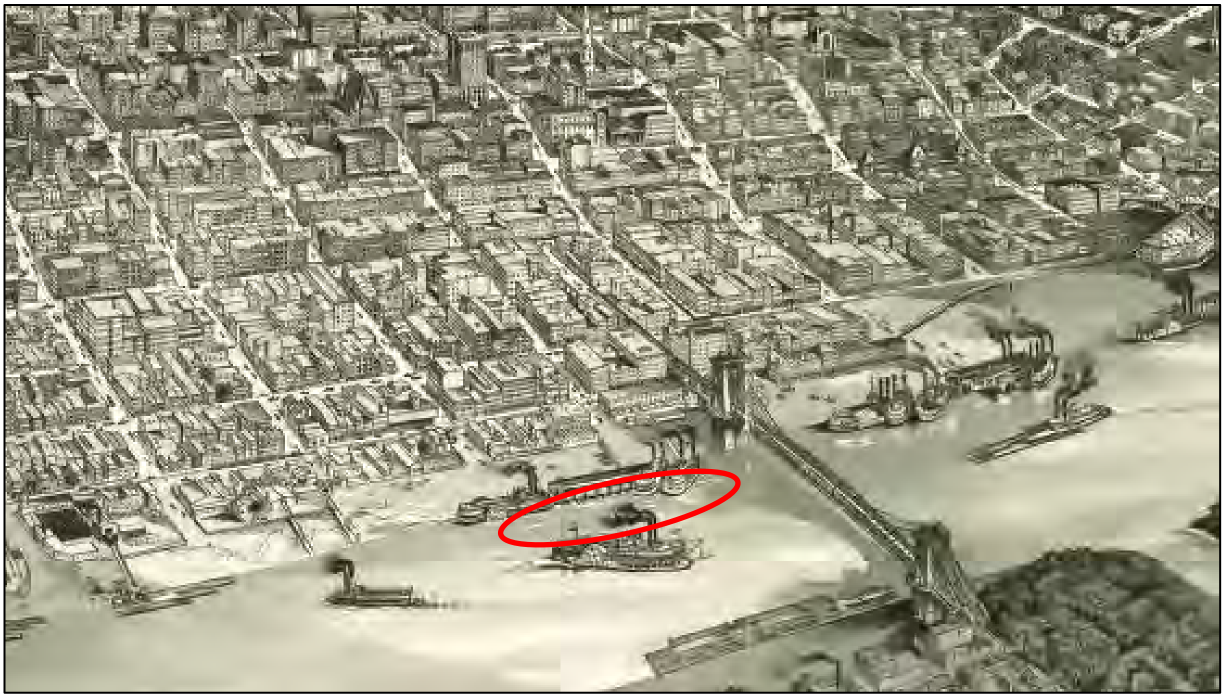

Figure 9: Illustration showing City of Cincinnati in 1900. The APE is highlighted in red. Note the small wharf area with steamboats docked and buildings running perpendicular to the John A. Roebling Bridge.

Figure 10: Undated aerial photograph showing APE (highlighted in red). Note the rail yard slightly north of the Ohio River as well the NHL John Roebling Bridge (From the Collection of Cincinnati & Hamilton County Public Library).

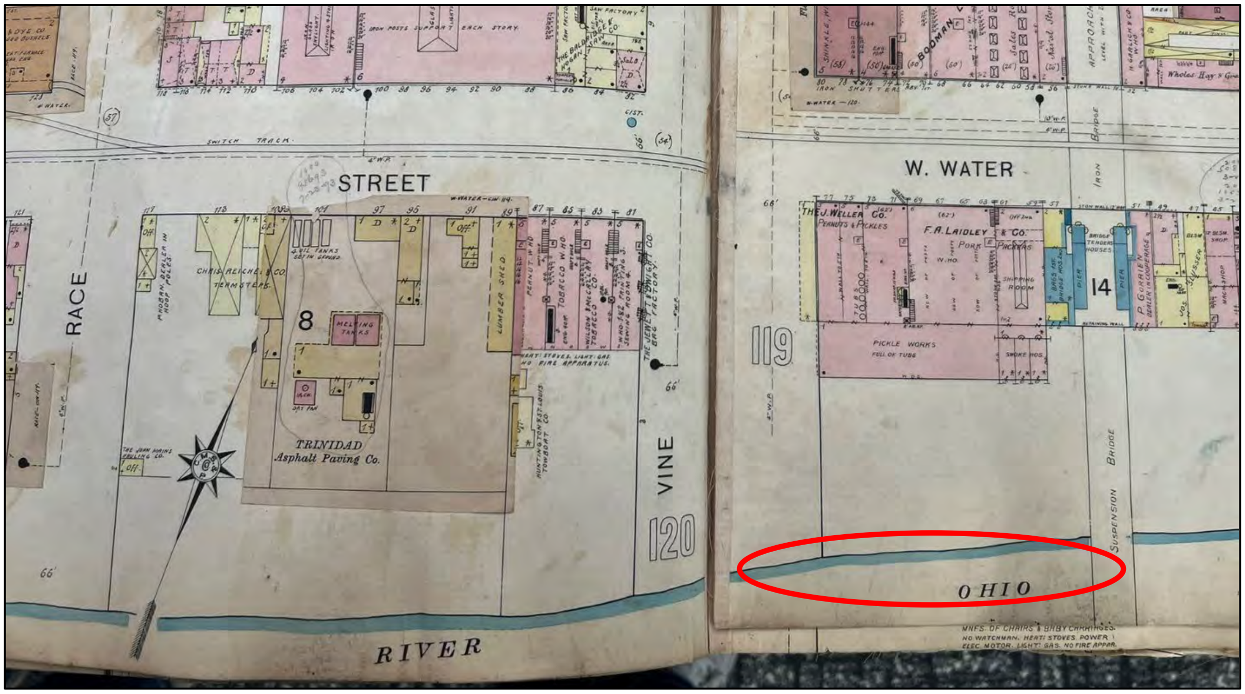

Figure 11: Section of Sanborn Map dating from the 1850's depicting the locations of manufacturing companies located along Water Street (used by permission of the Cincinnati & Hamilton County Historical Society). The APE is hightlighed red.

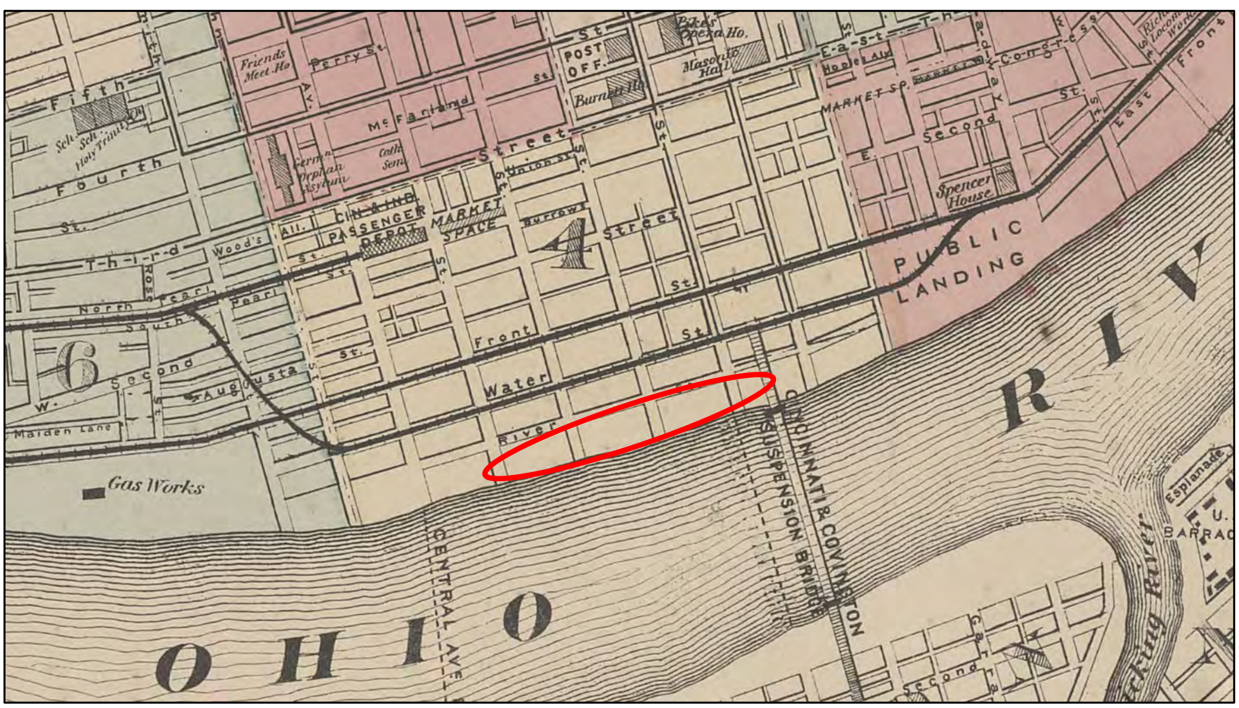

Figure 12: Additional house lots, railroad lines, the newly constructed River Street, and the Cincinnati & Covington Suspension bridge in 1868 (From the Collection of Cincinnati & Hamilton County Public Library).

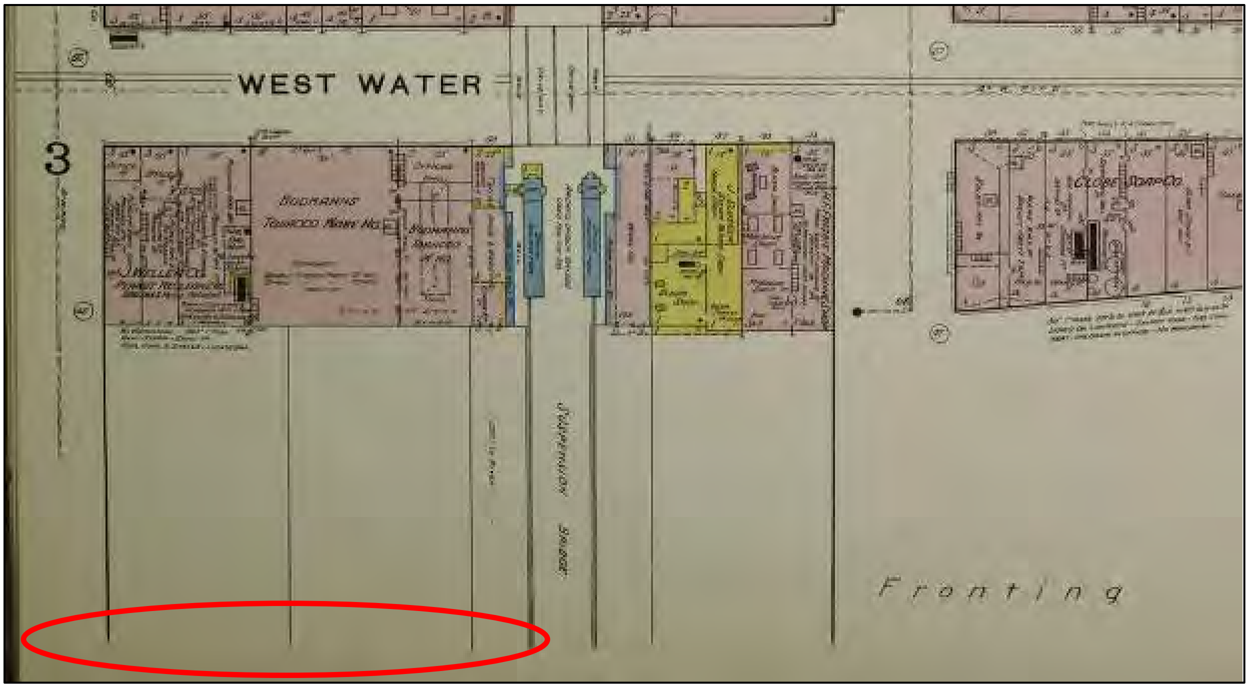

Figure 13: Section of Sanborn Map dating to 1887 showing the John A. Roebling Bridge (labeled suspension bridge) and APE (circled in red) before the creation Smale Park area.

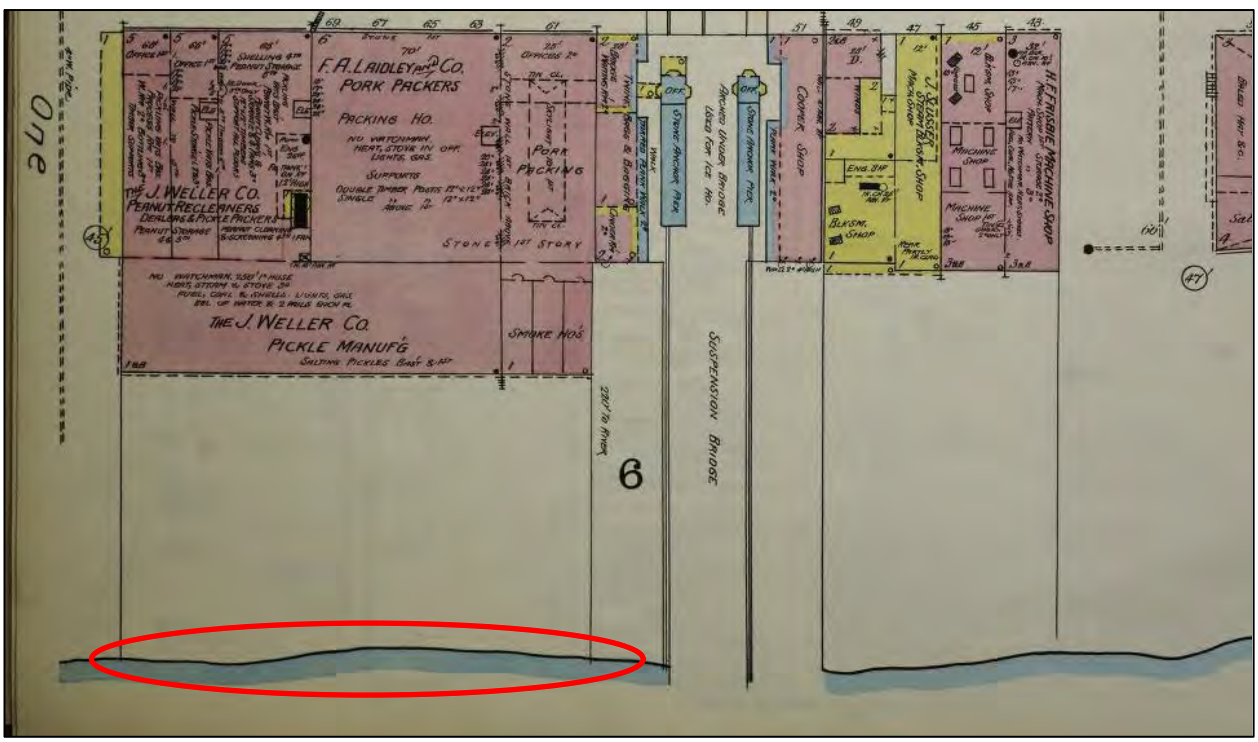

Figure 14: Section of Sanborn Map dating to 1891 showing the Cincinnati waterfront with the APE highlighted in red.

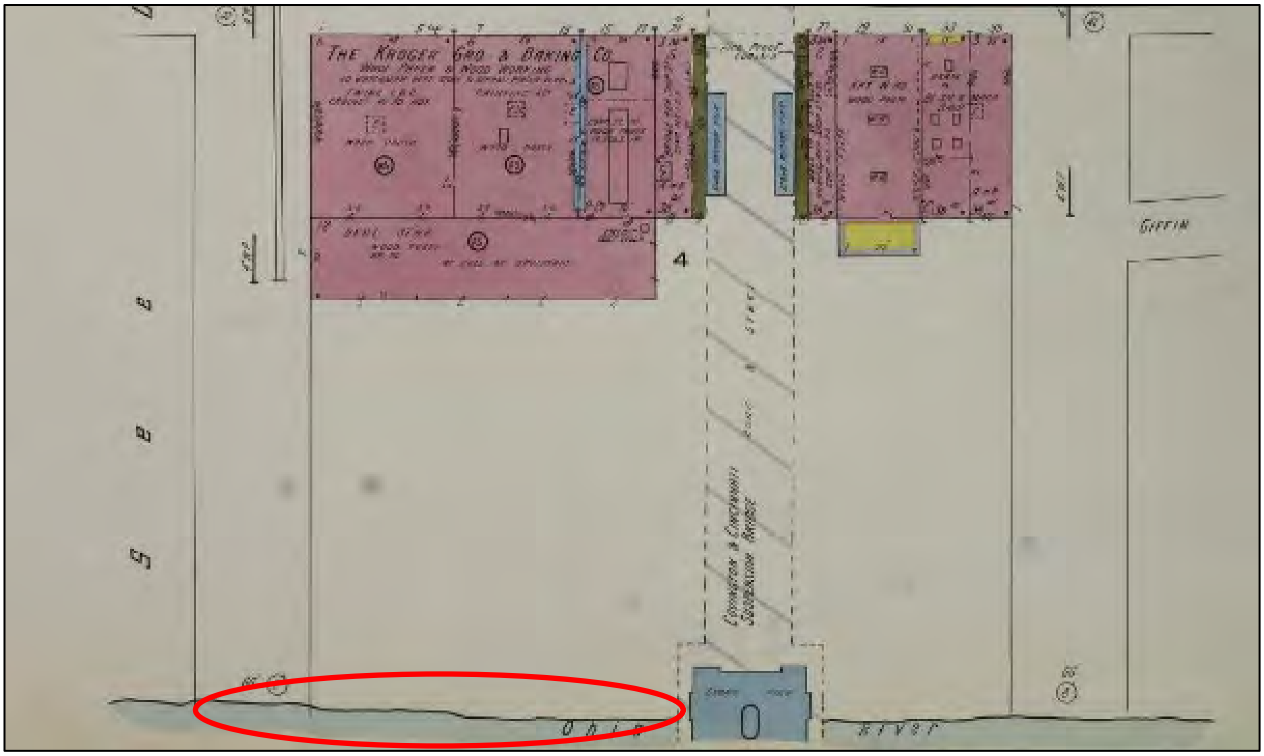

Figure 15: Section of Sanborn Map dating from 1934 to 1937 showing the Kroger Gro & Baking Company north of the APE (highlighted in red).

During the late 1940's, the City of Cincinnati developed a plan to rehabilitate the riverfront through a new master plan. This plan was to bring highways and communities together. This would allow easier access to the riverfront, develop a baseball stadium, a new city hall, convention center, apartment buildings, ample parking, and recreational space (CHS 1996). It wasn't until the 1960's when the City of Cincinnati approved a site of the Cincinnati's Red stadium which was located near the historic Public Landing, as well develop small park systems along the Ohio River within different areas of Hamilton County, Ohio. Smale Park was developed in segments in the early 2000's. Today more than 1 million people visit Smale Park to enjoy its connectivity to the Ohio Riverfront, botanical gardens, and self-guided walking tours.

Figure 16: Sign located at Smale Park near Mehring Way and Elm Street explaining the history of the area (photo taken February 27, 2024).

V. BACKGROUND RESEARCH

A background check was conducted within a 0.5 mile radius of the APE. Multiple sources of information were used: the NRHP online database; Ohio History Connection Online Mapping System; Corps Geographic Information System (GIS); historic maps; and previous cultural resources reports. The Ohio History Connection Online Mapping System was searched on November 15, 2023. An online request for data was sent on December 6, 2023 as well. The online search found one known above ground structure located within the APE: the John A. Roebling Bridge, which is a NHL. No previously recorded archaeological sites are located within the APE. Two previously recorded archaeological sites were also located within a 0.5-mile radius of the APE. Site 33HA0002 is described as a Middle Woodland Affiliation open site mound group that is unassessed for the NRHP. Site 33HA0002 is located 0.48 mi northeast of the APE. Site 33HA0780 is a historic site that is considered eligible for the NRHP by OSHPO. Site 33HA0780 is located approximately 0.09 mi north of the APE. These two archaeological sites will not be affected by the proposed undertaking. No archaeological surveys have been previously conducted with the APE.

A visit to the Cincinnati Main Public Library and Cincinnati History Library and Archives at Cincinnati Museum Center at Union Terminal was conducted on February 22, 2024 to build an understanding of early life in the APE. Mr. Chris Smith, Librarian from the Genealogy and Local History Department, explained that the APE was known as “The Bottoms” and the area was used as a place to dump fill, left over construction debris, and a dumping ground of burnt bricks and other garbage to build up the riverbank (personal communication 2024).

Three archaeological surveys were conducted within a 0.50-mile radius of the APE. In 1985, Arrow Enterprises conducted an archaeological survey for proposed improvements of the Kentucky Route 27 bridge approaches at Newport, Kentucky and Cincinnati, Ohio (Schock 1986). The entire survey was located in an urban area that was previously disturbed. No archaeological sites were recorded during the survey. Miami Purchase Associates raised concerns about the historic archaeological potential and wanted to see the final design plans to determine if additional historic archaeological work was necessary. It is unclear if any additional historic archaeological work was conducted in association with the Kentucky Route 27 bridge approaches project.

A preliminary archeological assessment of the Cincinnati Riverfront Park was completed in 2000 by Gray & Pape, Inc. on behalf of the City's Parks Department. The resulting report (Miller and Miller 2000) defined a general historic context for the project area, including an assessment of the potential for the project area to contain prehistoric and historic archeological resources, the research potential of these resources, and recommendations for additional investigation. The investigation did not include on-site reconnaissance but concluded that near surface prehistoric sites probably would have been destroyed by cutting and filling of the project area during the historical development of the Cincinnati riverfront. The Gray and Pape, Inc. assessment did state that deeply buried prehistoric sites may have survived and may occur in such contexts along this section of the Ohio River.

The cutting and filling noted above in the Gray and Pape, Inc. assessment was the result of successive occupations, abandonment, and re-occupation of the area during the development of the Cincinnati riverfront since the eighteenth Century. The assessment concluded that this process may have encapsulated and preserved some of the remains of this historic occupation in intact deposits buried under artificial fill at varying depths and locations.

In 2001, BHE Environmental, Inc (BHE) developed a cultural resources management plan for the proposed Cincinnati Central Riverfront Park Project (CCRP)(BHE 2001). This plan was prepared for the Cincinnati Park Board assessing impacts to cultural resources within the CCRP. At the time, the proposed development included a great lawn, great lawn fountains, and reconfiguring the Ohio riverbank, including relocating Mehring Way towards I-71 and the Cincinnati Business District. In consultation with the Ohio State Historic Preservation Office (OSHPO), it was determined that the no excavation was necessary along the river since fill was used to create the downslopes. The Cincinnati Park Board did agree to active monitoring during construction and intensive archaeological excavation at site 33HA0780.

More extensive archaeological investigations were undertaken in early 2002 by BHE for the proposed development of the CCRP, which is outside the current project footprint. These excavations resulted in the identification of three successive building episodes with intact stone floors, walls and distinct rooms. The site, designated 33HA0780, exhibited the potential to contain archaeological remains of considerable research potential, and is considered eligible for listing on the NRHP and appears to be as wide and deep as the riverfront. This work resulted in the completion of a draft report of BHE’s investigations (BHE Environmental Inc, 2002) that concluded that the archaeological fieldwork for the project was complete. A final report was prepared by BHE in January 2003 (BHE Environmental, Inc 2003).

The United States Army Corps of Engineers (USACE) through a partnership with the City of Cincinnati developed a riverfront park along the Ohio River in Downtown Cincinnati (USACE 2009). The riverfront park was under the Central Cincinnati Riverfront Park Project (CCRP) that was located between the Brent Spence Bridge and the Great American Ballpark, and extended northward from the Ohio River to the National Railroad Freedom Center and Theodore M. Berry Way in Cincinnati, Hamilton County, Ohio. The proposed development included the relocation of Mehring Way, reconfiguration of the Ohio riverbank, extending the eight acre “Great Lawn Park”, adding decorative foundations and a series of walking/bike paths through the park. The project construction authority and appropriations were through the Water Resources Development Act of 2007 (WRDA Public Law 110-114). USACE developed a Determination of Adverse Effects Statement for the historic properties identified within the CCRP and determined that the CCRP will not have an adverse effect to historic properties under 36CFR800.5(d)(1).

In 2011, Gray & Pape, Inc was contracted by the City of Cincinnati to conduct an archaeological Phase II/III for the HAM-The Banks Street Grid Project in the City of Cincinnati (Garrard and Burden 2011). The project was part of the Cincinnati Central

Riverfront Urban Design Master Plan which was designed to support public works projects in downtown Cincinnati including the Paul Brown Stadium, the Great American Ballpark, and the National Underground Railroad Freedom Center (Garrard and Burden 2011). The excavations revealed intact basement remnants along historic Water Street dating between 1850 and 1900. It is unclear from the report if the intact basement remnants were determined eligible for listing to the NRHP.

Thirteen above ground structures (HAM662443 [Hilltop Basic Resource], HAM553344 [Castellini Company], HAM144443 [Cincinnati Terminal Warehouse], HAM5553243 [Second Street Saloon], HAM553143 [Simpson Building], HAM553043 [Old Spaghetti Factory], HAM553544 [Sanzone-Palmisano], HAM553444 [Cincinnati New Orleans Texas], HAM206044 [Caddy's], HAM552944 [Flanagan's Annex], HAM205944 [Flanagan's], HAM624644 [PJC Building], and HAM 205844 [Skyline Chili]) have been previously recorded within a 0.25-mile radius of the APE. None of these above ground structures will be affected by the proposed undertaking.

The records review of the NRHP database found thirteen previously recorded historic properties listed on the NRHP within a 0.50-mile radius of the APE. They include the West Fourth Street Historic District [HAM], Hooper Building, First National Bank, East Fourth Street Historic District, Union Trust Building, Lawton Building, Ingalls Building, Derby H.W. Building, Lombary Apartment Building, Carew Tower, Traction Company Building, Mercantile Library, United States Post Office and Courthouse, and the Formica Corporation-Crystal Arcade-Contemporary Art Center Building. None of these NRHP listed properties will be affected by the proposed undertaking.

VI. FIELD METHODS AND RESULTS

ARCHAEOLOGICAL FIELD METHODS

Approximately 3.60 acres (1.45 hectares) were subjected to deep testing during field investigations (Figures 17 and 18). The work conducted followed the field methods that were coordinated and concurred with by the OSHPO on January 5, 2024. USACE also coordinated the field methods with, Forest County Potawatomi, Miami Nation, Nottawaseppi Huron Band of Potawatomi, Osage Nation, Ohio Archaeological Council, National Park Service and Kentucky Heritage Council on December 8, 2023. In addition, the professional standards and guidelines outlined in the Secretary of the Interior Standards and Guidelines for Archaeology and Historic Preservation (Secretary of the Interior 1983) and the OSHPO *Archaeology Guidelines* and *Guidelines for Conducting History/Architecture Surveys in Ohio* (OSHPO 2014; 2022) were also followed.

USACE conducted deep testing within the APE along the shoreline to verify no deeply buried archaeological sites were identified and none were found. USACE archaeologists monitored the excavation of thirteen randomly placed mechanically excavated trenches in order to document the condition of the soils in the area and to identify any deeply buried features or archaeological deposits (Figure 19). The excavations carried out at each trench location are described in the results section below. The depth, soils, and general notes for each backhoe trench were recorded by a USACE archaeologist.

Trenching was conducted using a backhoe equipped with 80 centimeters (cm) (2.5 foot [ft]) wide, toothed bucket. The trenches were placed at the discretion of the USACE archaeologist ranging between 50 to 100 ft. Each trench measured at a minimum 3 meter (m) (10 ft) in length and 80 cm (2.6 ft) wide. Each trench was excavated to a minimum depth of 1.22 m (4 ft) and recorded. Exploratory excavations occurred in 10 of the 13 trenches and began at 1.22 m (4 ft) and were excavated to depths up to 2.13 m (7 ft). The exploratory excavations were visually recorded from ground surface as it was deemed unsafe to enter due to the Occupational Safety and Health Administration (OSHA) standards. In addition, a USACE archaeologist took digital photographs and recorded soil profiles of selected segments of each excavated trench during the course of the deep trenching. These selected trench segments each measured 2 m (6.5 ft) in length and recorded the soil profiles of each. All trenches were excavated into either culturally sterile subsoil, exposed bedrock, disturbed soils or refusal was observed and to a minimum depth of 2 m (6.5 ft).

Figure 17: Overview of the exposed and eroded shoreline within the APE where backhoe trenches were excavated, facing west.

Figure 18: Overview of the exposed and eroded shoreline within the APE, facing west.

Figure 19: Placement of backhoe trenches and existing surface conditions along the eroded shoreline of the APE.

EXCAVATED BACKHOE TRENCHES

The survey excavated thirteen backhoe trenches along the eroded and exposed shoreline of the APE (see Figure 19). During the survey, observations were made regarding the heavily littered shoreline. The shoreline was randomly covered with modern trash, concentrations of brick scatters, pieces of concrete and asphalt and piles of cobblestones (Figures 20-21). The scattered brick, pieces of concrete and asphalt and piles of cobblestones were mapped as they were eroding out of the riverbank. Through historic research the shoreline was identified as "The Bottoms" which was used as a dumping ground for demolition debris when surrounding buildings caught fire or fill was brought in to stabilize the erosion occurring along the Ohio River. In addition, the amount of asphalt observed could have resulted from West Mehring Way being relocated to develop present day Smale Park. All the different debris types observed in the area is a reflection of its past use as a dumping ground as well as materials being brought in by flooding events. While trash and construction debris was observed in the backhoe trenches, there were not any intact subsurface archaeological deposits, artifacts, or features identified during the deep testing in the APE. The following section will describe the excavation of the thirteen backhoe trenches.

Figure 20: Overview of granite and brick piles along the shoreline in the APE, view north.

Figure 21: Overview of brick scattered along the shoreline with modern trash and concrete pipe highlighted yellow in the back.

Trench 1

Trench 1 was located in the western most point of the APE near Parking Lot E and the Paycor Stadium, facing east along the eroded shoreline (see Figures 2 and 19). The trench measured 2 m (6.5 ft) deep and 4 m (13 ft) long (Figures 22 and 23). Soils within the trench had three separate layers of disturbance including a top layer of brown 10YR4/3 sand silt mixed with gravel extending to a depth of 50 cm (1.60 ft) below ground surface. A second layer of disturbed soils consisting of a brown 10YR4/3 silt mottled with 10YR3/2 very dark grayish brown silt mixed with gravel and brick fragments was encountered extending to a depth of 1.1 m (3.6 ft). The trench hit the water table at 1.1 m. The exploratory layer started at approximately 1.1 m (3.6 ft) and extended to a depth of 2 m (6.5 ft). This exploratory layer consisted of 2 Gley 3/10B very dark bluish black coarse sand mixed with pea gravel which extended up to 2 m (6.5 ft) below ground surface where the trench was terminated. This layer had a methane gas/decomposing trash smell. The exploratory layer in this trench started at 1.1 m (4 ft) when the trench became unsafe to enter due to its depth.

Figure 22: Section of east wall soil profile within Trench 1 (scale in 10 cm increments).

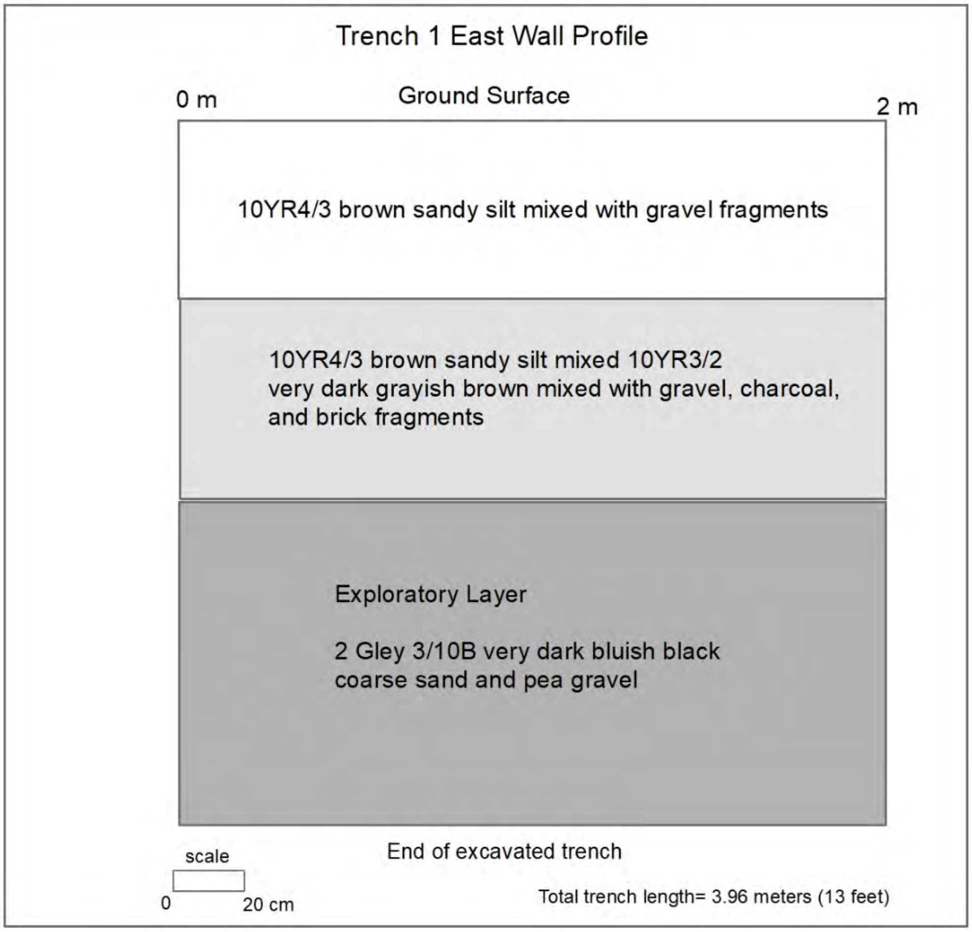

Figure 23: Two-meter section of east wall soil profile within Trench 1.

Trench 2

Trench 2 was located along the shoreline and east of Trench 1 (see Figure 19). The trench measured 2.13 m (7 ft) deep and 3.65 m (12 ft) long (Figures 24 and 25). Soils within the trench had five layers of disturbances. The first layer consisted of a brown 10YR4/3 silt loam mixed with 10YR7/1 gray concrete extending to 60 cm (2 ft) below ground surface. A thin band of dark yellowish brown 10YR3/4 sandy silt was encountered below the first layer and extends 65 cm below ground surface. The third layer consists of a brown 10YR4/3 clay extending to a depth of approximately 1.50 m (5 ft). The fourth layer was located entirely within the exploratory layer and consisted of a brown 10YR4/3 clay extending to 1.75 m (5.75 ft). The last layer observed within the exploratory layer is a very dark bluish black 2 Gley 3/10B clay mixed with gravel and concrete pieces. This disturbed exploratory layer extends to a depth of 2 m (6.5 ft) below ground surface where it hit concrete refusal and the trench was terminated. The exploratory layer had a methane gas/decomposing trash smell.

Figure 24: Section of the west wall soil profile within Trench 2 (scale in 10 cm increments).

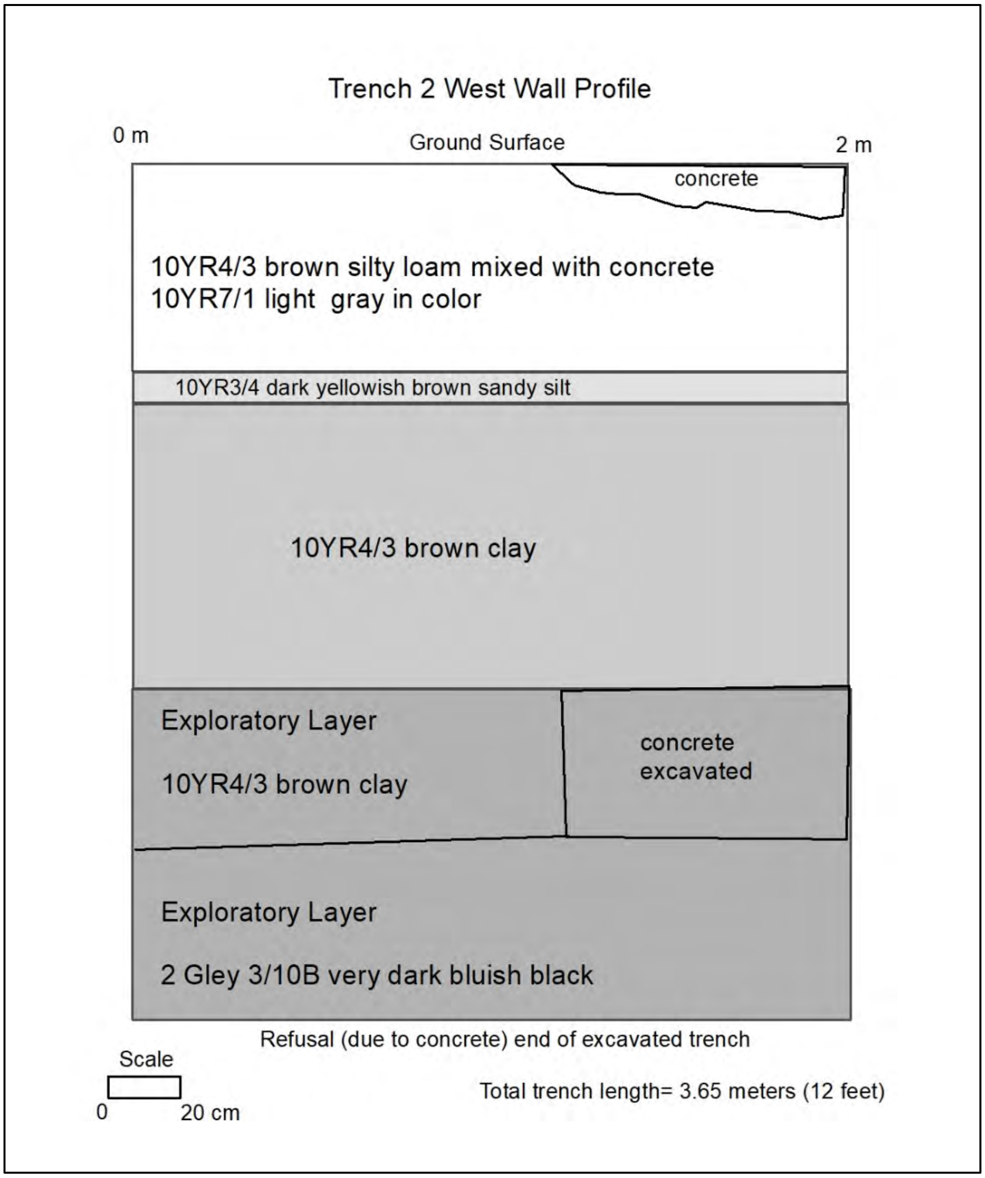

Figure 25: Two-meter section of west wall soil profile within Trench 2.

Trench 3

Trench 3 was located along the eroded shoreline east of Trenches 1 and 2 (see Figure 19). The trench measured 1.2 m (4.0 ft) deep and 3.7 m (12 ft) long (Figures 26 and 27). Soils within this trench consisted of four layers of disturbance. The first layer consisted of a gravel layer located along the surface of the trench extending to a depth 10 cm (0.32 ft) below ground surface. The second layer consisted of a brown 10YR4/3 silt loam mixed with modern trash (Aquafina water bottle and fabric were observed in this layer). Gravel and river pebbles were also encountered within the second layer which extended to a depth of 65 cm (2.10 ft) below ground surface. The third layer was underlain by a dark yellowish brown 10YR3/4 sandy silt. This layer extended to a depth of 80 cm (2.62 ft) below ground surface. The last layer consisted of a brown 10YR4/3 clay mixed with gravel extending to a depth of 1.20 m (4 ft). Concrete was encountered across the entire base of the trench at 1.20 m (4 ft) and was terminated. The last layer had the methane gas/trash decomposing smell.

Figure 26: Section of the east wall soil profile within Trench 3 (scale in 10 cm increments).

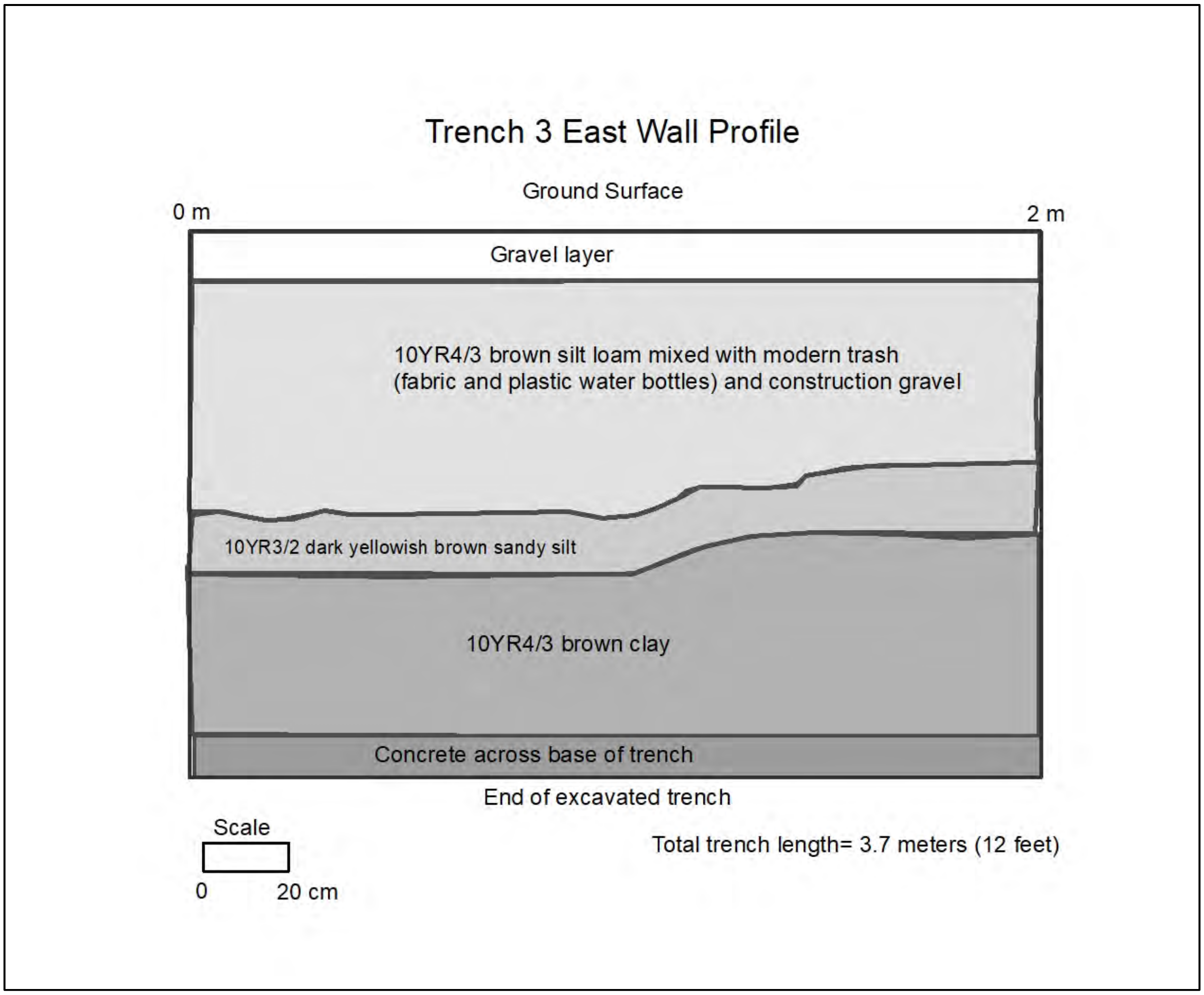

Figure 27: Two-meter section of the east wall soil profile recorded within Trench 3.

Trench 4

Trench 4 was located along the eroded shoreline east of Trench 3 and located within one of the surface brick scatters identified along the shoreline (see Figure 19) and consisted of double wide trench because of a layer of brick debris that was observed between 45 cm (1.5 ft) and 80 cm (2.6 ft) below ground surface. The lack of uniformity and mortar suggests this area was using as a dumping ground instead of brick roadway or structure. The trench measured 1.80 m (5.9 ft) deep and 3.2 m (10.5 ft) long (Figures 28 and 29). Soils within the trench had three separate layers of disturbance including a top layer of brown 10YR4/3 sand silt mixed with brick and gravel extending to a depth of 45 cm (1.4 ft) below ground surface. The second layer of disturbed soils consisted of a brick debris layer. This brick debris layer had no uniformity or mortar present on any of the brick. The brick debris layer extended to a depth of 80 cm (2.6 ft) below ground surface. The brick scatter observed on the surface in this area may be either eroding from or related to this brick debris layer. The third layer consisted of 2 Gley 3/10B very dark bluish black coarse sand mixed with pea gravel and brick fragments which extended to a depth of 1.80 m (5.9 ft) below ground surface where the trench stopped. This layer had a methane gas/decomposing trash smell.

Figure 28: Section of the east wall soil profile within Trench 4 (scale in 10 cm increments).

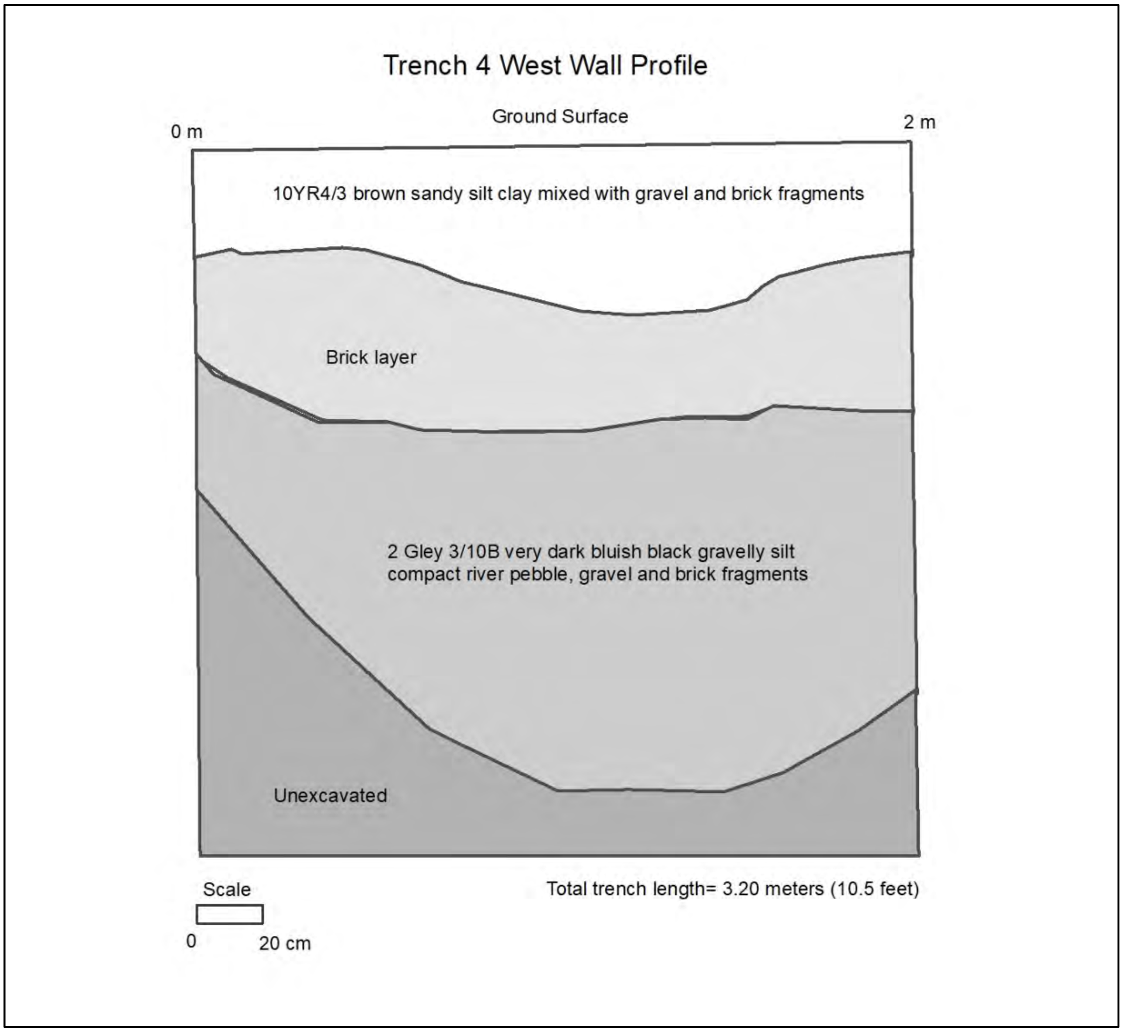

Figure 29: Two-meter section of the soil profile recorded within Trench 4.

Trench 5

Trench 5 was located along the eroded shoreline east of Trench 4 and north of a surface brick scatter (see Figure 19). The trench measured 2 m (6.5.0 ft) deep and 3.3 m (10.8 ft) long (Figures 30 and 31). Soils within the trench had three separate layers of disturbance which included a top layer of brown 10YR4/3 sand silt mixed with gravel which extended to a depth of 60 cm (1.90 ft) below ground surface. A second layer of disturbed soils which consisted of a very dark grayish brown 10YR3/2 silt mixed with gravel and brick fragments was encountered extending beyond a depth of 1.26 cm (4 feet). The third layer was located entirely within the exploratory layer and consisted of 2 Gley 3/10B very dark bluish black coarse sand mixed with pea gravel which extended to 2 m (6.5 ft) below ground surface where the trench was terminated based on reaching the contractors desired geotechnical soil depth. This third layer had a methane gas/decomposing trash smell.

Figure 30: Section of the east wall soil profile within Trench 5 (scale in 10 cm increments).

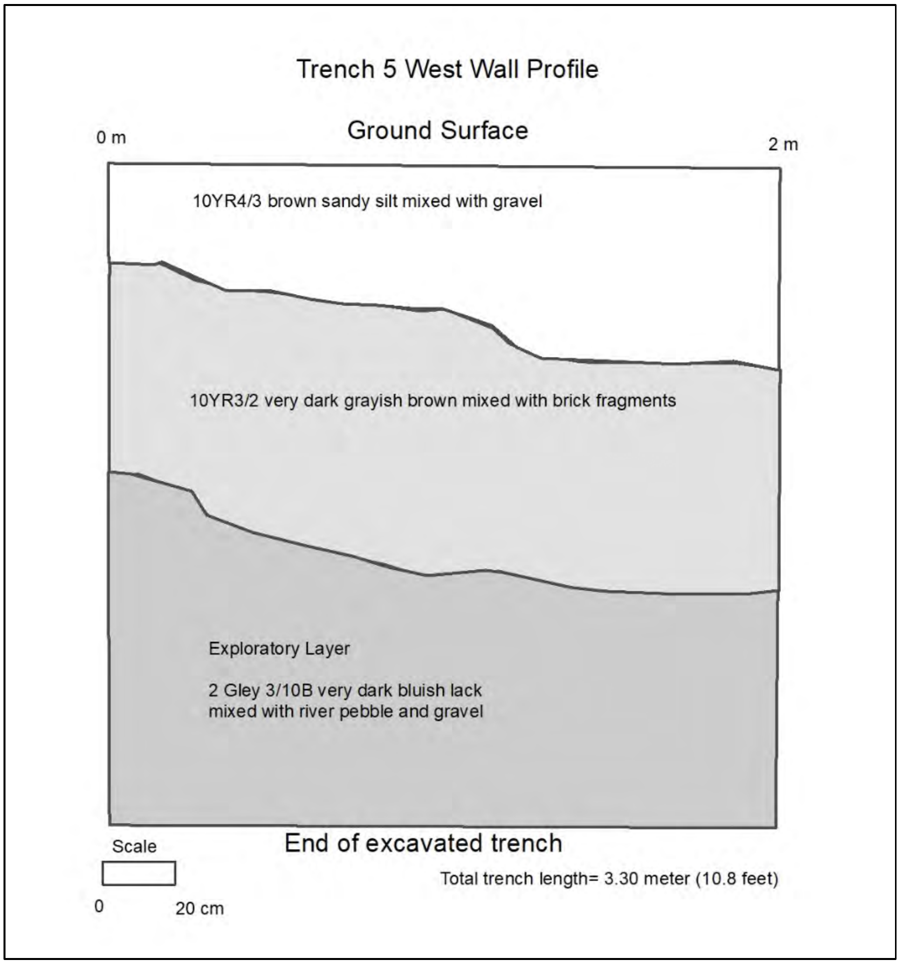

Figure 31: Two-meter section of the west wall soil profile recorded within Trench 5.

Trench 6

Trench 6 was located along the eroded shoreline immediately north of a concrete slab located near the center of the APE (see Figure 19). The trench measured 1.5 m (4.9 ft) deep and 3.5 m (11.4 ft) long (Figures 32 and 33). Soils within the trench had three separate layers of disturbed soils including a top layer of brown 10YR4/3 sand silt mixed with river pea, brick, and concrete fragments extending to a depth of 50 cm (1.60 ft) below ground surface. A second layer consisted of disturbed soil of a greenish black Gley 1 2.5/10Y silt was encountered extending beyond the 1.2 m (4 ft) depth to safely enter the trench. The second layer extended into the exploratory layer to a depth of 1.50 cm (4.9 ft). The third layer was located entirely within the exploratory layer and consisted of a greenish black Gley 1 2.5/10Y clay mixed with pea gravel and cobble fragments which extended to a depth of 2.03 m (6.5 ft) below ground surface where the trench was terminated based on reaching the contractors desired geotechnical soil depth. This exploratory layer had a methane gas/decomposing trash smell.

Figure 32: Section of the east wall soil profile within Trench 6 (scale in 10 cm increments).

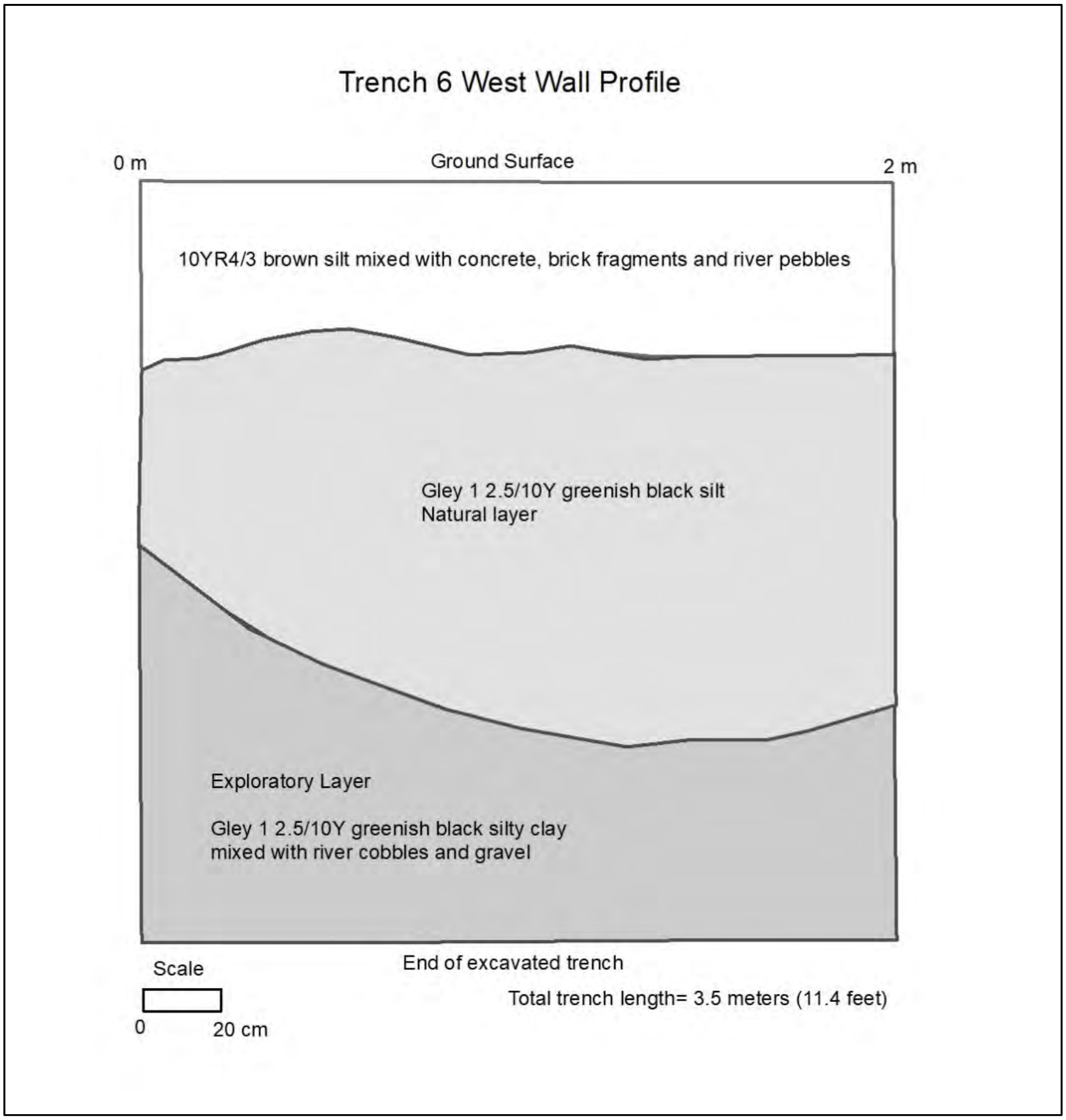

Figure 33: Two-meter section of the west wall soil profile recorded within Trench 6.

Trench 7

Trench 7 was located along the eroded shoreline and placed over a concrete pile identified along the shoreline (see Figure 19). The trench measured 1.2 m (4 ft) deep and 3.6 m (11.8 ft) long (Figures 34 and 35). Soils within the trench had three separate layers of disturbance which included a top layer of brown 10YR4/3 sand silt mixed with modern trash, plastic, fabric, PVC pipe, and brick fragments which extended to a depth of 65 cm (2.1 ft) below ground surface. A section of void was observed between 30 cm (1 ft) and 65 cm in depth, which was created by the backhoe during excavation. A second layer of disturbed soils which consisted of a greenish black Gley 1 2.5/10Y silt was encountered and extended to a depth of 1.30 m (4.3 ft). A portion of the second layer extended into the exploratory layer which were located in depths that exceeded 1.2 m (4 ft) encountered during the deep testing. The third layer consisted of greenish black Gley 1 2.5/10Y clay mixed with pea gravel and concrete fragments which extended to 2.03 m (6.5 ft) below ground surface where the trench stopped. The third layer was located entirely within the exploratory layer. This third layer had a methane gas/decomposing trash smell.

Figure 34: Section of the east wall soil profile within Trench 7 (scale in 10 cm increments).

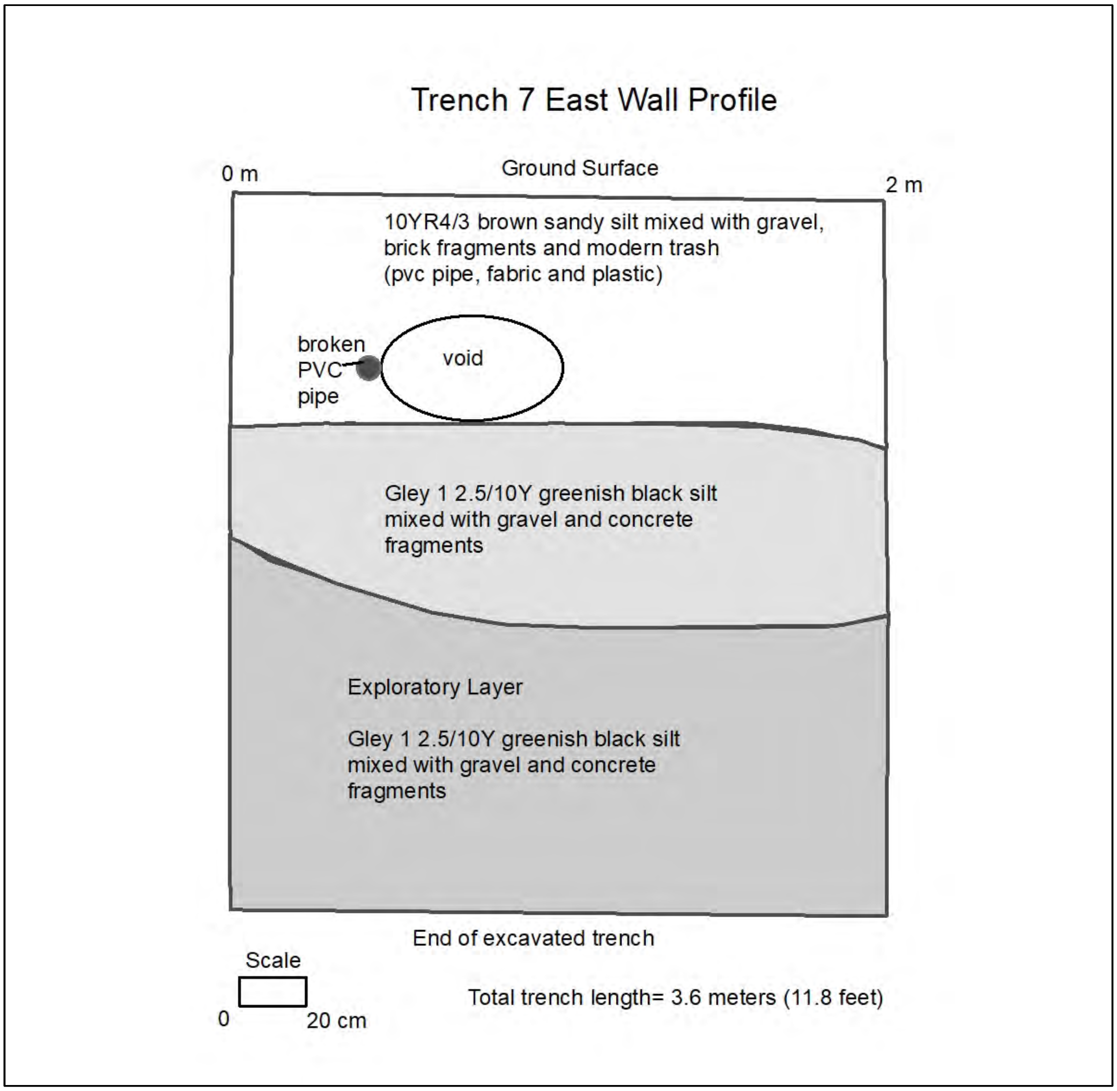

Figure 35: Two-meter section of the east wall soil profile recorded within Trench 7.

Trench 8

Trench 8 was located along the eroded shoreline and placed within one of the brick scatters identified at the surface within the APE (see Figure 19). The trench measured 1.55 m (5 ft) deep and 3.0 m (9.8 ft) long (Figures 36 and 37). Soils within the trench had two separate layers of disturbance which included a top layer of very dark grayish brown 10YR3/2 sandy silt mottled with a brown 10YR4/3 silty clay. This disturbed layer was mixed with cobblestone fragments, gravel, and concrete rubble extending to a depth of 1.60 m (5.2 ft) below ground surface. A portion of the top layer extended into the exploratory layer which included any excavations that extended beyond 1.2 m (4 ft) in depth. The second layer was located entirely within the exploratory layer, which consisted of very dark grayish brown 10YR3/2 sandy silt mottled with a brown 10YR4/3 silty clay mixed with concrete pieces and grave. The second layer extended to a depth of 2.03 m (6.5 ft) below ground surface where the trench hit concrete refusal at the base and was terminated. The second layer of disturbance had a methane gas/decomposing trash smell.

Figure 36: Section of the east wall soil profile within Trench 8 (scale in 10 cm increments).

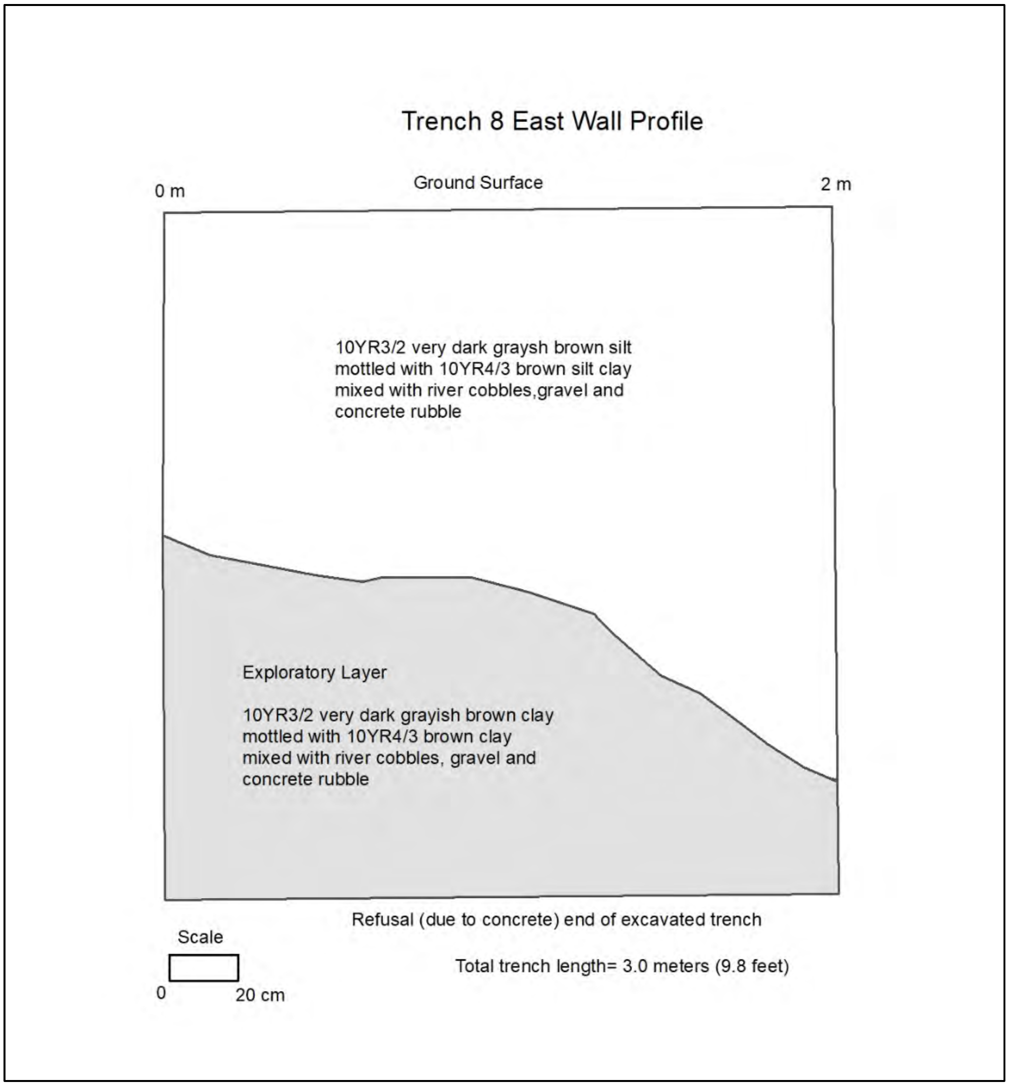

Figure 37: Two-meter section of the east wall soil profile recorded within Trench 8.

Trench 9

Trench 9 was located along the eroded shoreline east of a pile of cobblestones and on the northern edge of a surface brick scatter (see Figure 19). The trench measured 1.3 m (4.7 ft) deep and 3.5 m (11.4 ft) long (Figures 38 and 39). Soils within the trench had three separate layers of disturbed soils including a top layer which consisted of brown 10YR4/3 sandy silt mixed with river pebbles extending to a depth of 80 cm (2.6 ft). Within this layer, a strong layer of charcoal and gravel mixed of a very dark grayish brown 10YR3/2 sandy clay was observed which ranged from 35 cm (1.1 ft) to 90 cm (2.9 ft) in depth. The second layer of disturbed soils consisted of very dark grayish brown 10YR3/2 sand mixed with charcoal and brick which extended to a depth of 1.30 m (4.2 ft) below ground surface. A small portion of the second layer extends into the exploratory layer which included any excavations that extended beyond 1.2 m (4 ft) in depth. The last layer consisted of a brown 10YR4/3 silty clay mixed with brick and charcoal fragments which extended to 1.30 m (4.2 ft) below ground surface where the trench hit refusal and was terminated. The entire third layer was contained within the exploratory layer. This third layer had a methane gas/decomposing trash smell. The brick observed in the soil profile of the backhoe trench may explain the surface scatter of bricks in this area.

Figure 38: Section of the east wall soil profile within Trench 9 detailing soil descriptions and depths (scale in 10 cm increments).

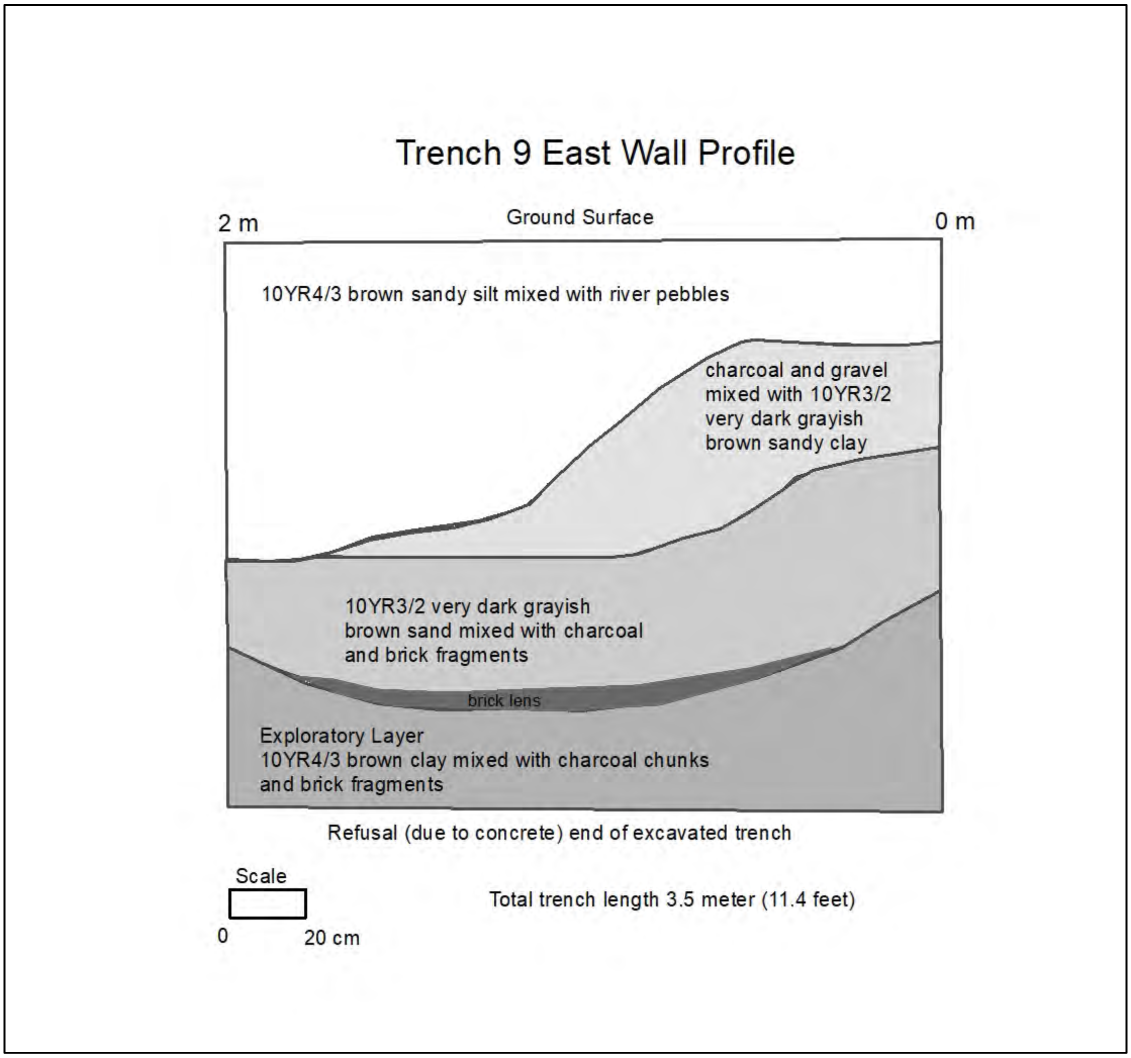

Figure 39: Two-meter section of the east wall soil profile recorded within Trench 9.

Trench 10

Trench 10 was located along the eroded shoreline near the Roebling Bridge (see Figure 19). The trench measured 1.3 m (4.7 ft) deep and 3.3 m (10.8 ft) long (Figures 40 and 41). Soils within the trench had three separate layers of disturbed soils including a top layer which consisted of a brown 10YR4/3 sandy silt mixed with river pebbles and brick fragments that extended to a depth of 60 cm (1.9 ft). During excavation, at a depth of 30 cm below ground surface a whole milk cream machine made clear glass bottle with embossed lettering U.M.B.S, INC, a brown whiteware vase handle, one piece of floral decal whiteware, and a piece of flow blue transfer whiteware were observed with other modern trash (Figure 42). The historic artifacts were photographed, not collected, and left in the trench. The second disturbed layer consisted of a yellowish brown 10YR5/8 sandy silt mottled with a very dark grayish brown 10YR3/2 silt clay mixed with brick fragments and charcoal which extended to a depth of 1.25 m (4.1 ft). Most of the last layer was located within the exploratory layer. It consisted of a brown 10YR4/3 silty clay mixed with brick and concrete chunks which extended to a depth of 1.75 m (5.7 ft) below ground surface where the trench hit refusal (brick and concrete) and was terminated. A brick layer was observed from1.50 m to 1.75 m. The brick layer had no uniformity and no mortar was observed on the brick or mixed within the soil. The lack of those characteristics suggests this area was primarily used as a dumping area instead of a brick roadway or structure. This last layer had a methane gas/decomposing trash smell.

Figure 40: Section of the east wall soil profile within Trench 10 (scale in 10 cm increments).

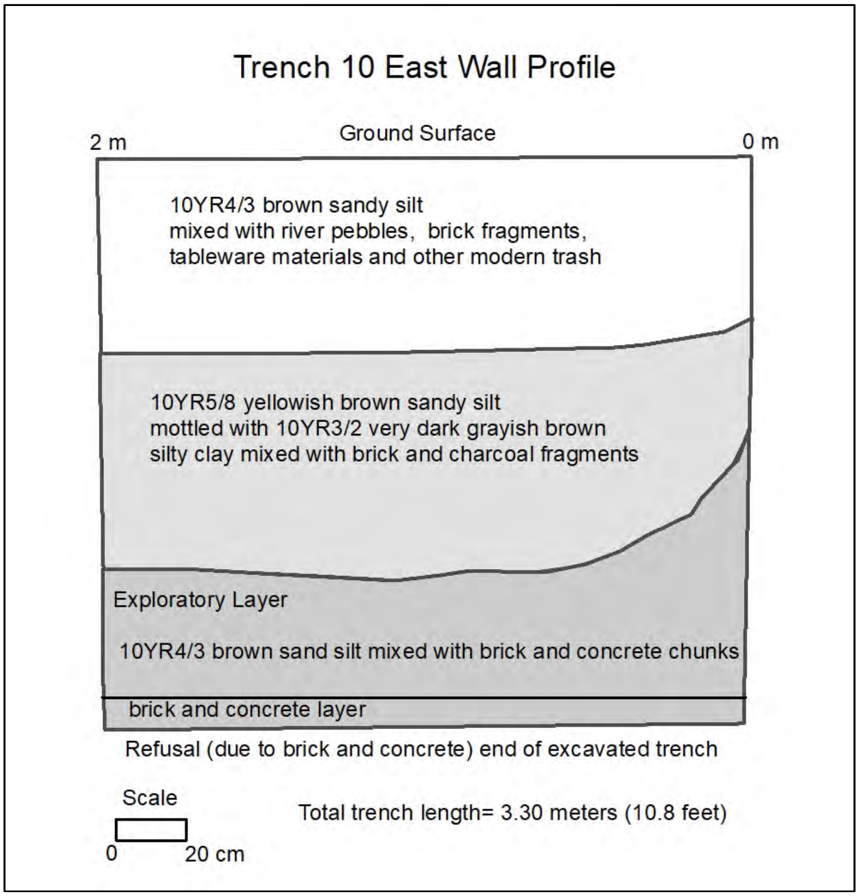

Figure 41: Two-meter section of the east wall soil profile recorded within Trench 10.

Figure 42: Historic artifacts observed from the first layer of disturbance recorded in Trench 10 (scale in cm).

Trench 11

Trench 11 was located along the eroded shoreline under the Roebling Bridge (see Figure 19). The trench measured 1.4 m (4.5 ft) deep and 3.3 m (10.8 ft) long (Figures 43 and 44). Soils within the trench had four separate layers of disturbance including a top layer which consisted of a very dark gray 10YR3/1 silty clay mixed with river pebbles and brick fragments which extended to a depth of 35 cm (1.1 ft). The second layer consisted of a brown 10YR4/3 sand which extended to a depth of 45 cm (1.4 ft). The third disturbed layer consisted of very dark gray 10YR3/1 silty clay mixed with concrete chunks which extended to a depth of 1.10 m (3.6 ft) below ground surface and tapers off at the southern end of the trench. The fourth disturbed layer consists of a dark yellowish brown 10YR4/6 silt mixed with brick fragments which extends to a depth of 1.40 m (4.5ft) where the trench hit refusal (concrete at bash of backhoe trench) and was terminated. This forth layer had a methane gas/decomposing trash smell.

Figure 43: Section of the east wall soil profile within Trench (scale in 10 cm increments).

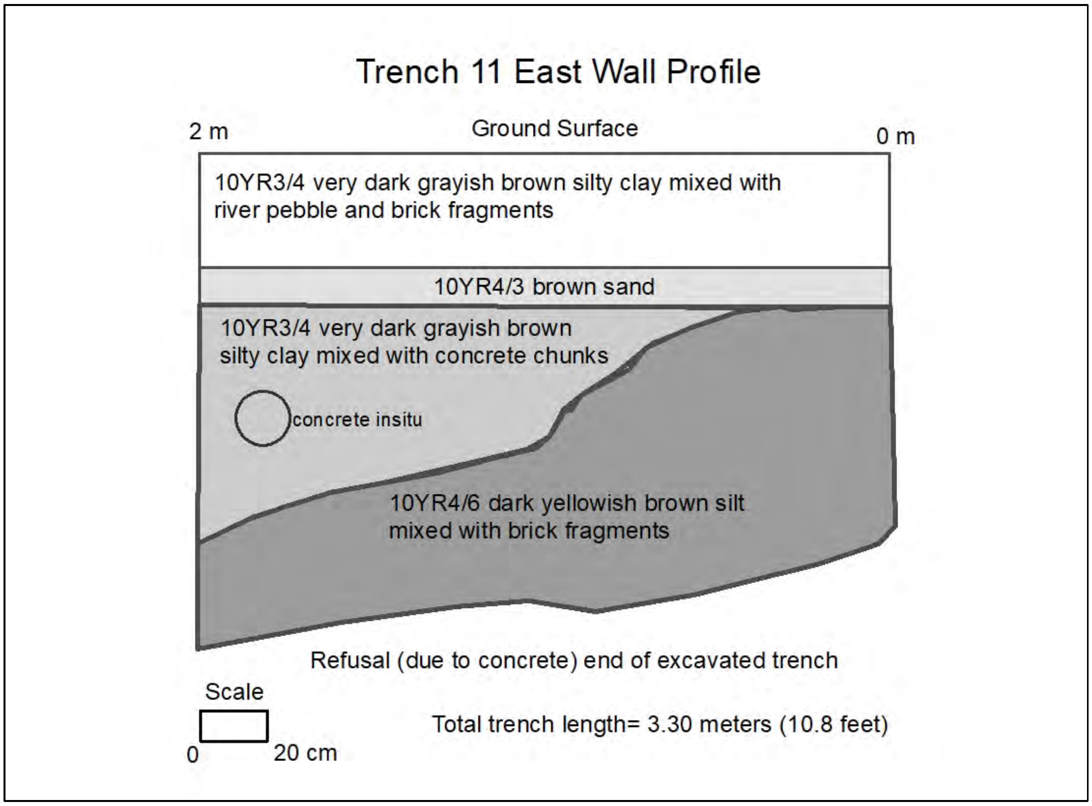

Figure 44: Two-meter section of the east wall soil profile recorded within Trench 11.

Trench 12

Trench 12 was located between the eroded shoreline and the existing lower sidewalk of Smale Park (see Figure 19). The trench measured 1.50 m (4.9 ft) deep and 3.2 m (10.4 ft) long (Figures 45 and 46). Soils within the trench had three separate layers of disturbance which included a top layer of very dark grayish brown 10YR3/2 sandy silt mixed with concrete debris, gravel, brick fragments, and modern trash including a plastic Aquafina bottle extending to a depth of 80 cm (2.6 ft) below ground surface. A second layer of disturbed soils which consisted of a brown 10YR4/3 silt mixed with yellowish brown 10YR5/4 sandy lens was encountered and extended beyond a depth of 1.50 cm (4.9 feet). A portion of the second layer extended into the exploratory layer (below 1.2 m (4 ft). The third layer was located mostly within the exploratory layer and consisted of a brown 10YR4/3 silt mixed with a yellowish brown 10YR5/4 sandy lens and concrete rubble. It extended to a depth of 2 m (6.5 ft) below ground surface where the trench was terminated based on reaching the contractors desired geotechnical soil depth. A small segment of the third layer extended above the exploratory layer (see Figure 44). This third layer had a methane gas/decomposing trash smell.

Figure 45: Section of the east wall soil profile within Trench 12 (scale in 10 cm increments).

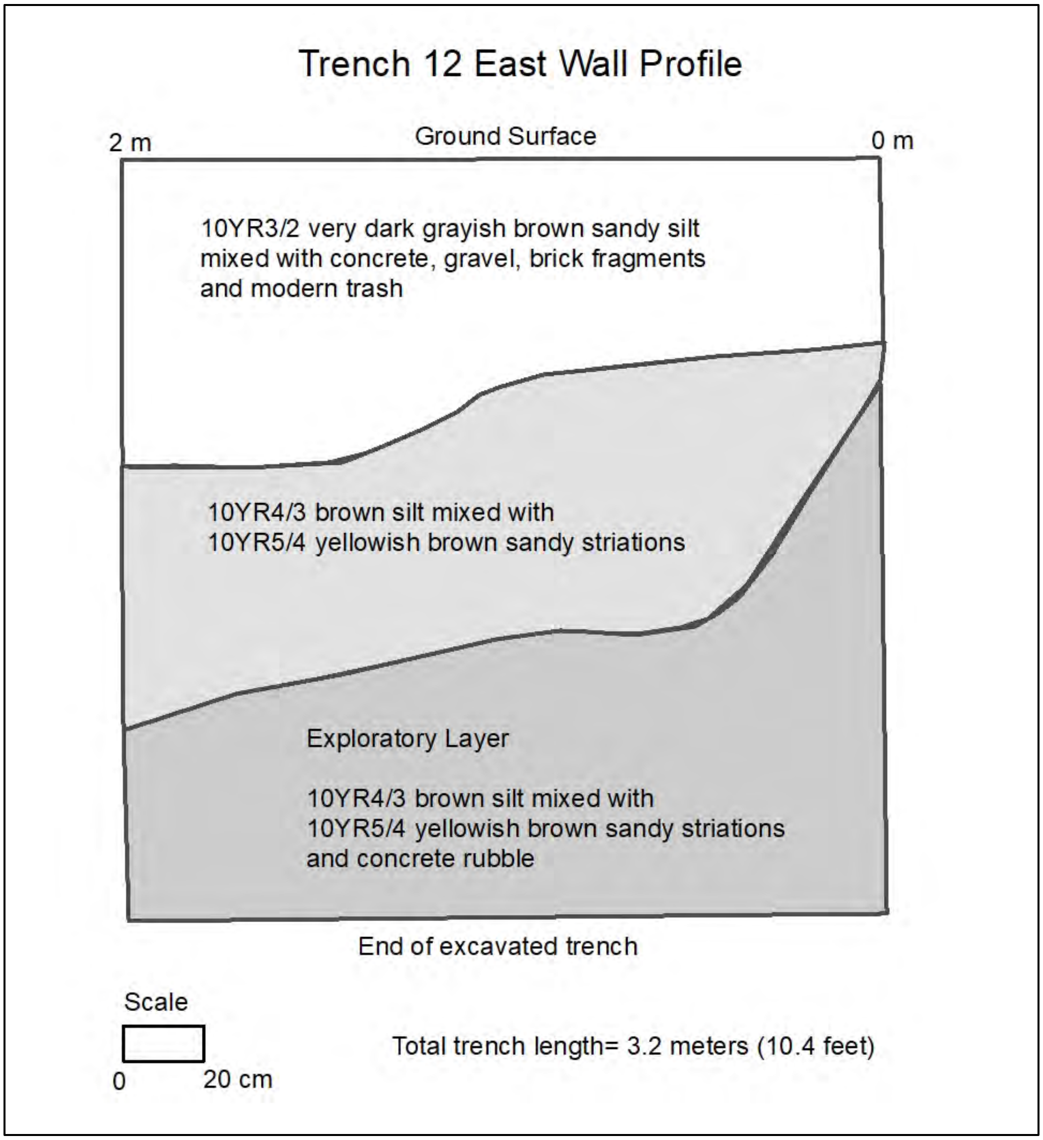

Figure 46: Two-meter section of the east wall soil profile recorded within Trench 12.

Trench 13

Trench 13 was located between the eroded shoreline and the existing lower sidewalk of Smale Park (see Figure 19). The trench measured 1.45 m (4.7 ft) deep and 3.0 m (9.8 ft) long (Figures 47 and 48). Soils within the trench had two separate layers of disturbance. The top layer consisted of a brown 10YR4/3 silt mottled with dark greenish gray Gley 1 4/10Y crushed slate mixed with concrete and asphalt debris, brick fragments, modern trash which included plastic, metal, and fabric pieces extending to a depth of 1.2 m (4 ft) below ground surface. A second layer was identified and is located entirely within the exploratory layer and consisted of a very dark bluish black 2 Gley 3/10B clay mixed with concrete, asphalt, and modern trash which extended to 2.2 m (7.2 ft) below ground surface where the trench was terminated. This second layer had a methane gas/decomposing trash smell.

Figure 47: Section of the east wall soil profile within Trench 13 (scale in 10 cm increments).

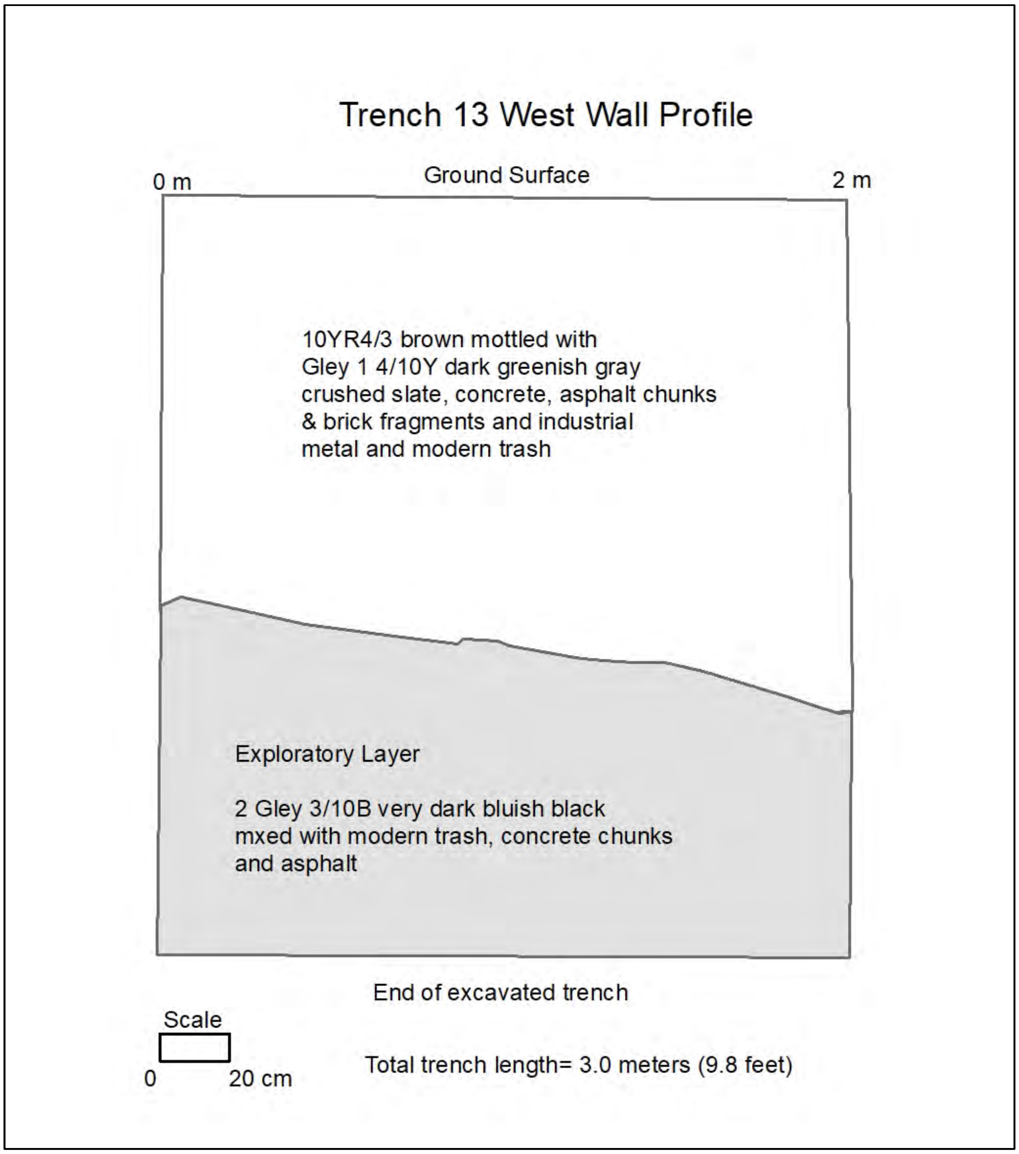

Figure 48: Two-meter section of the soil profile recorded within Trench 13.

VII. SUMMARY AND RECOMMENDATIONS

On February 20–22, 2024, USACE carried out archaeological subsurface testing for the proposed recreational improvements within Smale Park in Downtown Cincinnati, Hamilton County, Ohio. A total of thirteen backhoe trenches were excavated to determine if any intact features, intact deposits, or unknown archaeological resources were present within the APE. The APE for the project measures approximately 3.60 acres (1.45 hectares). While modern trash, concrete, asphalt, and brick scatters were observed along the shoreline, these surface materials support the historic background research of the APE as an area being used as a dump and to place fill to stop the erosion from the Ohio River. Even though brick concentrations were recorded along the shoreline and within trenches, there was no uniformity or mortar present in these piles of brick debris which supports the historic background research of the APE that the area historically used as a dump. No archaeological sites or intact buried deposits or features were identified as a result of the archaeological subsurface testing; therefore, no historic properties will be impacted by the project.

Given the results of the archaeological subsurface testing, USACE has made the determination that the proposed Undertaking will have no adverse effect to the NHL John Roebling Bridge or other historic properties under 33CFR part 800.5(b), and no additional archaeological survey is needed for the Smale Park improvements.

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In reply refer to:
2022-HAM-56652

June 5, 2024

Jennifer Guffey, Archaeologist & Tribal Liaison
Environmental Resources Section
Louisville District
U.S. Army Corps of Engineers
600 Dr. Martin Luther King Jr Pl
Louisville, Kentucky 40202
Email: jennifer.m.guffey@usace.army.mil

RE: Section 106 Review - Archaeological Monitoring for the Cincinnati Riverfront Project at Smale Riverfront Park, Hamilton County, Ohio

Dear Ms. Guffey:

This letter is in response to the receipt on May 10, 2024, of *Subsurface Archaeological Survey for the Smale Park Improvement Project, in Downtown Cincinnati, Hamilton County, Ohio* by the United States Army Corps of Engineers, Louisville District (Corps; Guffey 2024). We appreciate the opportunity to comment on this project. The comments of the State Historic Preservation Office (SHPO) are made in accordance with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (54 U.S.C. 306108 [36 CFR 800]). The Corps is the lead federal agency for the undertaking.

According to the report, Corps archaeologists monitored the excavation of 13 backhoe trenches within the 3.6-acre Area of Potential Effect (APE). These trenches were strategically placed throughout the APE, which is along the immediate shoreline of the Ohio River. In addition, the entire APE was visually inspected. An intensive background research was also conducted for the APE and immediate vicinity. The John Roebling Suspension Bridge, which is listed on the National Register of Historic Places (NRHP; 75000786) and is listed as a National Historic Landmark (NHL), is within the APE. However, the current project plans will not impact or impose onto this resource in a way that would diminish or affect its listing as a NRHP/NHL property.

After careful review of the monitoring results and report, the SHPO agrees that the APE has been significantly impacted by past disturbances, including dumping/filling activities. Furthermore, we agree that no significant, intact archaeological deposits are present within the APE. Therefore, as proposed, the SHPO concurs with the Corps' No Adverse Effect on historic properties determination. No additional archaeological investigations are warranted for the current project location unless the scope of work changes or inadvertent discoveries are made during the course of the project. In such a situation, this office should be contacted as required by 36 CFR § 800.13. If you have any questions concerning this review, please contact me via email at sbiehl@ohiohistory.org. Thank you for your cooperation.

Sincerely,

Stephen M. Biehl

Stephen M. Biehl, Project Reviews Coordinator (archaeology)
Resource Protection and Review
State Historic Preservation Office

RPR Serial No. 1103135

"Please be advised that this is a Section 106 decision. This review decision may not extend to other SHPO programs."

Osage Nation Historic Preservation Office

Date: June 4, 2024 **File No. 2324-7372OH-5**

Louisville District, USACE
Jennifer Guffey
P.O. Box 59
Louisville, KY 40201-0059
Email: jennifer.m.guffey@usace.army.mil

RE: USACE, Louisville, Smale Park Recreation Improvements in Cincinnati, Hamilton County, Ohio

SENT VIA EMAIL
Dear Ms. Guffey,

The Osage Nation Historic Preservation Office has evaluated your submission regarding the proposed USACE, Louisville, Smale Park Recreation Improvements in Cincinnati, Hamilton County, Ohio and determined that the proposed project **most likely will not adversely affect any sacred properties and/or properties of cultural significance to the Osage Nation.** For direct effect, the finding of this NHPA Section 106 review is a determination of **"No Properties"** eligible or potentially eligible for the National Register of Historic Places. The Osage Nation has prepared the following comments for the report

In accordance with the National Historic Preservation Act, (NHPA) [54 U.S.C. § 300101 et seq.] 1966, undertakings subject to the review process are referred to in 54 U.S.C. § 302706 (a), which clarifies that historic properties may have religious and cultural significance to Indian tribes. Additionally, Section 106 of NHPA requires Federal agencies to consider the effects of their actions on historic properties (36 CFR Part 800) as does the National Environmental Policy Act (43 U.S.C. 4321 and 4331-35 and 40 CFR 1501.7(a) of 1969). **The Osage Nation concurs that the U.S. Army Corps of Engineers fulfilled NHPA compliance by consulting with the Osage Nation Historic Preservation Office in regard to the proposed project referenced as USACE, Louisville, Smale Park Recreation Improvements in Cincinnati, Hamilton County, Ohio.**

The Osage Nation has vital interests in protecting its historic and ancestral cultural resources. We do not anticipate that this project will adversely impact any cultural resources or human remains protected under the NHPA, NEPA, the Native American Graves Protection and Repatriation Act, or Osage law. **If, however, artifacts or human remains are discovered during project construction, we ask that work cease immediately and the Osage Nation Historic Preservation Office be contacted.**

Should you have any questions or need any additional information please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Andrea A. Hunter, Ph.D.
Director, Tribal Historic Preservation Officer

Benjamin Bressoud, MSc
Archaeologist

627 Grandview Ave. * Pawhuska, OK 74056 Telephone 918-287-5328 * Fax 918-287-5376
www.osagenation-nsn.gov/who-we-are/historic-preservation * HistoricPreservation@osagenation-nsn.gov

Andy Beshear
Governor

Jacqueline Coleman
Lt. Governor

TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL
THE STATE HISTORIC PRESERVATION OFFICE
410 High Street
Frankfort, Kentucky 40601
(502) 564-7005
www.heritage.ky.gov

Lindy Casebier
Secretary

Craig A. Potts
Executive Director &
State Historic Preservation Officer

June 11, 2024

Jennifer Guffey
Archaeologist & Tribal Liaison
USACE, Louisville District
600 Dr. Martin Luther King Jr. Pl.
Louisville, KY 40202
Jennifer.M.Guffey@usace.army.mil

RE: USACE-L, Smale Park Recreation Improvements in Cincinnati

Dear Ms. Guffey:

Thank you for your submittal of a Determination of Effect, archaeology report, and consulting party comment for the above-referenced undertaking. We understand the Applicant is proposing to improve the existing Smale Park in Cincinnati, Ohio. A portion of the area of potential effect (APE) for this undertaking intersects with the Roebling Bridge, which spans the Ohio River between Cincinnati and Covington, Kentucky.

Archaeologists from the USACE-L conducted an archaeological investigation of the APE. The results are reported in *Subsurface Archaeological Survey for the Smale Park Improvement Project, in Downtown Cincinnati, Hamilton County, Ohio* by Jennifer Guffey. We understand methods included mechanical trenching. The support structure of the Roebling Bridge was not impacted by trenching, and no archaeological sites were identified near the support structure.

Based on the information provided, only small landscaping improvements will occur around the area of the Roebling Bridge, which is a National Historic Landmark. Consulting party comment has been received by the Ohio SHPO, National Park Service, and Osage Nation, and all concur with the Corps recommendations.

Our office does not believe the proposed undertaking will adversely impact the Roebling Bridge, the only Kentucky-specific resource within the project area. Our office concurs with the finding of **No Adverse Effect.**

Should you have any questions, please contact Gabrielle Fernandez or Patti Hutchins of my staff at Gabrielle.Fernandez@ky.gov or Patricia.Hutchins@ky.gov.

Sincerely,

Craig Potts
Executive Director and
State Historic Preservation Officer

CP: gf, peh
KHC# 241442, prev. 241230

From:	Franklin Weekley, Rachel
To:	Guffey, Jennifer M CIV USARMY CELRL (USA)
Cc:	Wernick, Christopher D CIV USARMY CELRL (USA)
Subject:	[Non-DoD Source] Smale Park Improvement Project - Cincinnati OH
Date:	Thursday, June 6, 2024 10:06:26 AM

Jennifer –

I received additional information from Chris Wernick about the riverfront project in Cincinnati, Ohio, pertaining to improvements to Smale Park. The John Roebling Suspension Bridge, a National Historic Landmark (NHL), is within the area of potential effect and is monitored by the National Park Service (NPS) as part of our NHL program responsibilities. We appreciate receiving the archeological survey completed for the park improvement project. As determined by the U.S. Army Corps of Engineers, there appears to be no adverse impact to the Roebling Bridge. Please let us know if this may change as additional phases of this project are implemented.

Thank you for keeping the NPS informed about the riverfront project,

Rachel.

Rachel Franklin-Weekley, PhD.
Manager, Historic Preservation Partnerships
National Park Service
DoI Regions 3, 4, 5 (Midwest)
601 Riverfront Drive
Omaha, Nebraska 68102

402-661-1928 office
rachel_franklin-weekley@nps.gov

Ohio Riverfront - Cincinnati, Ohio (Phase 2)

Appendix I: Memorandum of Understanding

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
600 DR. MARTIN LUTHER KING JR PL
LOUISVILLE, KY 40202

CELRL-PMC-PPM

AUG 6 2019

MEMORANDUM THRU Commander, U.S. Army Corps of Engineers, Great Lakes and Ohio River Division, 550 Main Street, Cincinnati, OH 45202

ROBERT F. WHITTLE, JR., MG, Commanding

MEMORANDUM THRU Commander, HQ, U.S. Army Corps of Engineers, 441 G Street, NW Washington, DC 20314-1000

FOR Assistant Secretary of the Army for Civil Works, 108 Army Pentagon, Washington, DC 20310-0108

SUBJECT: Ohio Riverfront – Cincinnati, Ohio (Phase II) Memorandum of Understanding for In-Kind Credit

1. In accordance with Section 4.d.(1)(a) of ER 1165-2-208 (16 Dec 2015), I request the Assistant Secretary of the Army (Civil Works) approve the non-Federal sponsor's request (Enclosure 1) for the Louisville District to execute the Memorandum of Understanding (MOU) (Enclosure 2) for In-Kind Credit prior to completion of the Tentatively Selected Plan (TSP) milestone.

2. Based on the attached assessment (Enclosure 3), execution of the MOU by the Louisville District at this time does not put the Government at risk. The MOU, as drafted, does not deviate from the model and its execution prior to the TSP milestone will not commit or bind the Government to any future action.

3. If you have any questions, please contact Matt Schueler, Chief, Civil Programs and Project Management Section at (502) 315-6890 or by email at matthew.c.schueler@usace.army.mil.

3 Encls

Antoinette R. Gant
ANTOINETTE R. GANT
COL, EN
District Commander

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE DEPARTMENT OF THE ARMY
AND THE
CITY OF CINCINNATI, OHIO
AND
HAMILTON COUNTY, OHIO
FOR WORK PROVIDED OR PERFORMED
PRIOR TO EXECUTION OF
A
PROJECT PARTNERSHIP AGREEMENT
FOR
OHIO RIVERFRONT – CINCINNATI, OHIO (PHASE II)

THIS MEMORANDUM OF UNDERSTANDING (hereinafter the "MOU") is entered into this 21st day of October, 2019, by and between the Department of the Army (hereinafter the "Government"), represented by the U.S. Army Engineer Louisville District (hereinafter the "District Engineer") and the City of Cincinnati, Ohio represented by the City Manager and Hamilton County, Ohio represented by the County Administrator (hereinafter the "Non-Federal Interests").

WITNESSETH, THAT:

WHEREAS, Section 221(a) of the Flood Control Act of 1970, as amended by Section 2003 of the Water Resources Development Act of 2007, provides that a cost sharing partnership agreement may provide credit for the value of materials or services provided before the execution of such cost sharing partnership agreement if the Secretary and the Non-Federal Interests enter into an agreement under which the Non-Federal Interests shall carry out such work and only work carried out following the execution of such agreement shall be eligible for credit;

WHEREAS, the Non-Federal Interests understand and acknowledge that any credit for eligible in-kind contributions will be afforded only toward the required non-Federal contribution of funds (i.e. cash contribution) under the Project Partnership Agreement for the project or separable element of the project; and

WHEREAS, by letter dated June 3, 2019, the Non-Federal Interests stated their intent to perform certain work (hereinafter the "Proposed Work", as defined in Paragraph 1 of this MOU) prior to the execution of the Project Partnership Agreement for the Ohio Riverfront – Cincinnati, Ohio (Phase II) at Cincinnati, Ohio.

NOW, THEREFORE, the Government and the Non-Federal Interests agree as follows:

1. The Non-Federal Interests shall provide or perform the Proposed Work in accordance with the terms and conditions of this MOU. The Proposed Work shall consist of understructure of piles, pile caps, slabs on grade, columns, beams, and utilities necessary to support a raised event lawn as generally described in the letter from the Non-Federal Interests.

2. The Non-Federal Interests shall develop all necessary engineering plans and specifications for the Proposed Work.

3. The Non-Federal Interests shall complete all necessary environmental coordination and obtain all applicable Federal, State, and local permits required for the performance of the Proposed Work.

4. The Non-Federal Interests shall comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970, Public Law 91-646, as amended (42 U.S.C. 4601-4655), and the Uniform Regulations contained in 49 C.F.R. Part 24, in acquiring lands, easements, and rights-of-way required for construction and subsequent operation and maintenance of the Proposed Work, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

5. Nothing in this MOU creates any duty, obligation, or responsibility for the Government. Any activity undertaken by the Non-Federal Interests for the implementation of the Proposed Work is solely at the Non-Federal Interests' own risk and responsibility.

6. The Non-Federal Interests shall keep books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to this MOU to the extent and in such detail as will properly reflect total costs for the Proposed Work and the Non-Federal Interests shall make such evidence available for inspection and audit by authorized representatives of the Government.

7. The Non-Federal Interests understand that any costs incurred for the clean-up of hazardous material regulated by the Comprehensive Environmental Response, Compensation, and Liability Act (hereinafter "CERCLA"; 42 U.S.C. Sections 9601-9675), that may exist in, on, or under lands, easements, or rights-of-way required for the Proposed Work are a Non-Federal Interests responsibility and that no credit shall be afforded for such clean-up costs. In addition, the Non-Federal Interests understand that as between the Government and the Non-Federal Interests, the Non-Federal Interests shall be considered the operator of the Proposed Work for the purposes of CERCLA liability. To the maximum extent practicable, the Non-Federal Interests shall operate, maintain, repair, replace, and rehabilitate the Proposed Work in a manner that will not cause liability to arise under CERCLA.

8. The parties to this MOU shall each act in an independent capacity in the performance of their respective functions under this MOU, and neither party is to be considered the

officer, agent, or employee of the other.

9. The Non-Federal Interests understand that to be eligible for credit for the costs of the Proposed Work:

a. The Government must make a determination that the Proposed Work is integral to the project;

b. The Proposed Work shall be subject to a review or on-site inspection, as applicable, and certification by the Government that the work was accomplished in a satisfactory manner and in accordance with applicable Federal laws, regulations, and policies;

c. The costs for the Proposed Work that may be eligible for credit shall be subject to an audit by the Government to determine the reasonableness, allocability, and allowability of such costs;

d. The costs incurred for the Proposed Work are not subject to interest charges, nor are they subject to adjustment to reflect changes in price levels between the time the Proposed Work is completed and the time that credit may be afforded;

e. The Non-Federal Interests shall not use Federal program funds (either funds or grants provided by a Federal agency as well as any non-Federal matching share or contribution that was required by such Federal agency for such program or grant) for the Proposed Work unless the Federal agency providing the Federal portion of such funds verifies in writing that expenditure of such funds for such purpose is expressly authorized by Federal law;

f. Only the costs of the Proposed Work that do not exceed the Government's estimate of the cost of such work if the work been accomplished by the Government may be eligible for credit;

g. Any contract awarded for the Proposed Work shall include provisions consistent with all applicable Federal laws and regulations and the Non-Federal Interests shall comply with all applicable Federal and State laws and regulations, including, but not limited to Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army";

h. The Non-Federal Interests must comply with applicable Federal labor laws covering non-Federal construction, including but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*), and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)); and

i. Crediting for the costs of the Proposed Work may be withheld, in whole or in part, as a result of the Non-Federal Interests' failure to comply with the terms of this MOU.

10. If the parties agree to enter into a Project Partnership Agreement for the Ohio Riverfront – Cincinnati, Ohio (Phase II) at Cincinnati, Ohio, then the Project Partnership Agreement will contain provisions regarding affording credit for costs of the Proposed Work, if the Secretary determines that the Proposed Work is integral to the project.

11. Execution of this MOU shall not be interpreted as a Federal assurance regarding later approval of any project; shall not commit the United States to any type of reimbursement or credit for the Proposed Work; does not alter any process to be followed by the Government in making a determination to execute a future Project Partnership Agreement; nor does it provide any assurance that any future agreement will ever be executed for the project, the Proposed Work, or any portion of the project. Further, this MOU shall not be interpreted to signify any Federal participation in or commitment to the project or the Proposed Work. Finally, this MOU shall not be construed as committing the Government to assume any responsibility placed upon the Non-Federal Interests or any other non-Federal entity or as preventing the Government from modifying the project that could result in the Proposed Work performed by the Non-Federal Interests no longer being an integral part of the design of the project.

IN WITNESS WHEREOF, the parties hereto have executed this MOU, which shall become effective upon the date it is signed by the District Engineer.

DEPARTMENT OF THE ARMY

BY: Antoinette R Gant

Antoinette R. Gant
Colonel, U.S. Army
District Commander

DATE: 21 Oct 2019

CITY OF CINCINNATI, OHIO

BY: P A D

Patrick A. Duhaney
City Manager
City of Cincinnati, Ohio

DATE: 10/10/19

HAMILTON COUNTY, OHIO

BY: Jeffrey Aluotto

Jeffrey Aluotto
County Administrator
Hamilton County, Ohio

DATE: 10/10/19

CERTIFICATE OF AUTHORITY

I, Paula Boggs Muething, and I, Joseph Deters, do hereby certify that I am the City Solicitor of the City of Cincinnati, Ohio, and the County Prosecutor of Hamilton County, Ohio, respectively, and that the City of Cincinnati, Ohio, and Hamilton County, Ohio is a legally constituted public body with full authority and legal capability to perform the terms of the MOU between the Department of the Army, the City of Cincinnati, Ohio, and Hamilton County, Ohio in connection with the Proposed Work to be provided or performed prior to execution of a Project Partnership Agreement for the Ohio Riverfront – Cincinnati, Ohio (Phase II) at Cincinnati, Ohio and that the person who has executed this MOU on behalf of the City of Cincinnati, Ohio and Hamilton County, Ohio has acted within their statutory authority.

IN WITNESS WHEREOF, I have made and executed this certification this 10th day of October 2019.

Paula Boggs Muething
City Solicitor
City of Cincinnati, Ohio

Joseph Deters
County Prosecutor
Hamilton County, Ohio
Roger E. Friedmann
Asst. Proc. Atty.

Enclosure 1

June 3, 2019

Colonel Antoinette R. Gant
District Commander
U.S. Army Corps of Engineers, Louisville District
P.O. Box 59
Louisville, KY 40201-0059

Attn: Matt Schueler, Chief, Civil Programs and Project Management Section (PMC-PPM)

Per your request, I am formally submitting a description of the work that we are planning to perform for Phase II of the Ohio Riverfront - Cincinnati, Ohio project. Construction of the items listed below will occur prior to execution of the Project Partnership Agreement between the City of Cincinnati and the U.S. Army Corps of Engineers (USACE). We understand we must comply with the conditions outlined in the Memorandum of Understanding (MOU) and that a determination will be made by USACE on if and how much of the proposed work is eligible for in-kind credit. The work we plan on performing consists of the following:

- Podium waterproofing, podium drainage penetrations, protection board, and related work
- Aggregate fill & planting soil, lightweight fill, Geofoam
- Elevator and elevator head-house
- Understructure of piles, pile caps, slabs on grade, columns, beams
- Shear walls, podium slabs, steps, concrete walls and foundations
- Mechanical, electrical, plumbing and fire suppression systems
- Utilities to and from the site
- Domestic water loop & hose bibs
- Electric service, transformer and receptacles
- Electric panels, lighting and conduit for future additional lighting
- Stage electric service and egress lighting
- Drainage structures, catch basins and drain cleanouts
- Tree pits
- Slot drains and underdrains
- Utility trenches and utility vault covers
- Landscaping, trees, planters, planter seatwalls
- Sod, groundcover and artificial turf
- Irrigation (temp & permanent)
- Concrete paving, sub-slabs and granite pavers
- Shade structure foundations
- Concrete retaining walls (to be clad later)
- Concrete stairs
- Guardrails (permanent and temporary)
- Furnishings (benches, trash cans, bollards)
- Handrails (permanent/temporary)

We also request that the in-kind MOU for construction be executed prior to the Tentative Selected Plan (TSP) Milestone.

Sincerely,

Wade A. Walcutt, Director

950 Eden Park Drive
Cincinnati, Ohio 45202
Phone (513) 352-2604
Fax (513) 352-4096
www.cincinnatiparks.com
#cincyparks

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE DEPARTMENT OF THE ARMY
AND THE
CITY OF CINCINNATI, OHIO
AND
HAMILTON COUNTY, OHIO
FOR WORK PROVIDED OR PERFORMED
PRIOR TO EXECUTION OF
A
PROJECT PARTNERSHIP AGREEMENT
FOR
OHIO RIVERFRONT – CINCINNATI, OHIO (PHASE II)

THIS MEMORANDUM OF UNDERSTANDING (hereinafter the “MOU”) is entered into this ________ day of __________, ______, by and between the Department of the Army (hereinafter the “Government”), represented by the U.S. Army Engineer Louisville District (hereinafter the “District Engineer”) and the City of Cincinnati**,** Ohio represented by the City Manager and Hamilton County, Ohio represented by the County Administrator (hereinafter the “Non-Federal Interests”).

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WHEREAS, the Non-Federal Interests understand and acknowledge that any credit for eligible in-kind contributions will be afforded only toward the required non-Federal contribution of funds (i.e. cash contribution) under the Project Partnership Agreement for the project or separable element of the project; and

WHEREAS, by letter dated June 3, 2019, the Non-Federal Interests stated their intent to perform certain work (hereinafter the “Proposed Work”, as defined in Paragraph 1 of this MOU) prior to the execution of the Project Partnership Agreement for the Ohio Riverfront – Cincinnati, Ohio (Phase II) at Cincinnati, Ohio.

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2. The Non-Federal Interests shall develop all necessary engineering plans and specifications for the Proposed Work.

3. The Non-Federal Interests shall complete all necessary environmental coordination and obtain all applicable Federal, State, and local permits required for the performance of the Proposed Work.

4. The Non-Federal Interests shall comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970, Public Law 91-646, as amended (42 U.S.C. 4601-4655), and the Uniform Regulations contained in 49 C.F.R. Part 24, in acquiring lands, easements, and rights-of-way required for construction and subsequent operation and maintenance of the Proposed Work, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

5. Nothing in this MOU creates any duty, obligation, or responsibility for the Government. Any activity undertaken by the Non-Federal Interests for the implementation of the Proposed Work is solely at the Non-Federal Interests' own risk and responsibility.

6. The Non-Federal Interests shall keep books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to this MOU to the extent and in such detail as will properly reflect total costs for the Proposed Work and the Non-Federal Interests shall make such evidence available for inspection and audit by authorized representatives of the Government.

7. The Non-Federal Interests understand that any costs incurred for the clean-up of hazardous material regulated by the Comprehensive Environmental Response, Compensation, and Liability Act (hereinafter "CERCLA"; 42 U.S.C. Sections 9601-9675), that may exist in, on, or under lands, easements, or rights-of-way required for the Proposed Work are a Non-Federal Interests responsibility and that no credit shall be afforded for such clean-up costs. In addition, the Non-Federal Interests understand that as between the Government and the Non-Federal Interests, the Non-Federal Interests shall be considered the operator of the Proposed Work for the purposes of CERCLA liability. To the maximum extent practicable, the Non-Federal Interests shall operate, maintain, repair, replace, and rehabilitate the Proposed Work in a manner that will not cause liability to arise under CERCLA.

8. The parties to this MOU shall each act in an independent capacity in the performance of their respective functions under this MOU, and neither party is to be considered the

officer, agent, or employee of the other.

9. The Non-Federal Interests understand that to be eligible for credit for the costs of the Proposed Work:

a. The Government must make a determination that the Proposed Work is integral to the project;

b. The Proposed Work shall be subject to a review or on-site inspection, as applicable, and certification by the Government that the work was accomplished in a satisfactory manner and in accordance with applicable Federal laws, regulations, and policies;

c. The costs for the Proposed Work that may be eligible for credit shall be subject to an audit by the Government to determine the reasonableness, allocability, and allowability of such costs;

d. The costs incurred for the Proposed Work are not subject to interest charges, nor are they subject to adjustment to reflect changes in price levels between the time the Proposed Work is completed and the time that credit may be afforded;

e. The Non-Federal Interests shall not use Federal program funds (either funds or grants provided by a Federal agency as well as any non-Federal matching share or contribution that was required by such Federal agency for such program or grant) for the Proposed Work unless the Federal agency providing the Federal portion of such funds verifies in writing that expenditure of such funds for such purpose is expressly authorized by Federal law;

f. Only the costs of the Proposed Work that do not exceed the Government's estimate of the cost of such work if the work been accomplished by the Government may be eligible for credit;

g. Any contract awarded for the Proposed Work shall include provisions consistent with all applicable Federal laws and regulations and the Non-Federal Interests shall comply with all applicable Federal and State laws and regulations, including, but not limited to Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army";

h. The Non-Federal Interests must comply with applicable Federal labor laws covering non-Federal construction, including but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*), and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)); and

i. Crediting for the costs of the Proposed Work may be withheld, in whole or in part, as a result of the Non-Federal Interests' failure to comply with the terms of this MOU.

10. If the parties agree to enter into a Project Partnership Agreement for the Ohio Riverfront – Cincinnati, Ohio (Phase II) at Cincinnati, Ohio, then the Project Partnership Agreement will contain provisions regarding affording credit for costs of the Proposed Work, if the Secretary determines that the Proposed Work is integral to the project.

11. Execution of this MOU shall not be interpreted as a Federal assurance regarding later approval of any project; shall not commit the United States to any type of reimbursement or credit for the Proposed Work; does not alter any process to be followed by the Government in making a determination to execute a future Project Partnership Agreement; nor does it provide any assurance that any future agreement will ever be executed for the project, the Proposed Work, or any portion of the project. Further, this MOU shall not be interpreted to signify any Federal participation in or commitment to the project or the Proposed Work. Finally, this MOU shall not be construed as committing the Government to assume any responsibility placed upon the Non-Federal Interests or any other non-Federal entity or as preventing the Government from modifying the project that could result in the Proposed Work performed by the Non-Federal Interests no longer being an integral part of the design of the project.

IN WITNESS WHEREOF, the parties hereto have executed this MOU, which shall become effective upon the date it is signed by the District Engineer.

DEPARTMENT OF THE ARMY

BY: ____________________

Antoinette R. Gant
Colonel, U.S. Army
District Commander

DATE: ____________________________

CITY OF CINCINNATI, OHIO

BY: ____________________________

Patrick A. Duhaney
City Manager
City of Cincinnati, Ohio

DATE: ____________________________

HAMILTON COUNTY, OHIO

BY: ____________________________

Jeffrey Aluotto
County Administrator
Hamilton County, Ohio

DATE: ____________________________

CERTIFICATE OF AUTHORITY

I, Paula Boggs Muething, and I, Joseph Deters, do hereby certify that I am the City Solicitor of the City of Cincinnati, Ohio, and the County Prosecutor of Hamilton County, Ohio, respectively, and that the City of Cincinnati, Ohio, and Hamilton County, Ohio is a legally constituted public body with full authority and legal capability to perform the terms of the MOU between the Department of the Army, the City of Cincinnati, Ohio, and Hamilton County, Ohio in connection with the Proposed Work to be provided or performed prior to execution of a Project Partnership Agreement for the Ohio Riverfront – Cincinnati, Ohio (Phase II) at Cincinnati, Ohio and that the person who has executed this MOU on behalf of the City of Cincinnati, Ohio and Hamilton County, Ohio has acted within their statutory authority.

IN WITNESS WHEREOF, I have made and executed this certification this ________ day of _____________ 20___.

_________________________	_________________________
Paula Boggs Muething	Joseph Deters
City Solicitor	County Prosecutor
City of Cincinnati, Ohio	Hamilton County, Ohio

1. Reference: ER 1165-2-208 dated 16 December 2015

2. Background: The City of Cincinnati is ready to move forward with construction of additional features in their master plan along the Ohio River near the Paul Brown football stadium. This area is near Phase I of the Federal project (Ohio Riverfront – Cincinnati, Ohio) completed just east of the Roebling Bridge in 2014. Phase I was authorized in Section 5116 of the Water Resources Development Act of 2007. A little over two years after completion of Phase I, Section 1202(b) of the Water Resources Infrastructure Improvements for Nation (WIIN) of 2016 authorized the Secretary to review the Central Riverfront Park Master Plan, dated December 1999, and the Ohio Riverfront Study, Cincinnati, Ohio, dated August 2002, to determine the feasibility of carrying out flood risk reduction, ecosystem restoration, and recreation components beyond the ecosystem restoration and recreation components that were authorized, undertaken, and completed pursuant to Section 5116 of WRDA 2007, as a second phase of that project. Section 1202(b) further authorizes the Secretary to undertake the additional components at a total cost of $30,000,000 if the Secretary determines that the additional components are feasible. Implementation guidance for Section 1202(b) of WIIN 2016 (dated July 6, 2017) directs the Louisville District to prepare a feasibility level of detail decision document to evaluate the Federal interest in implementing the additional components for Phase II of the project. Although Phase II of the Federal project is conditionally authorized, no Federal funds have been appropriated to date to prepare the decision document, which will delineate the limits of the project and determine Federal interest.

The City of Cincinnati and Hamilton County, Ohio (non-Federal sponsors) have requested the Louisville District execute a Memorandum of Understanding (MOU) to officially document construction work they are ready to proceed with for in-kind credit. Based on Section 4.d.(1)(a) of ER 1165-2-208, the Assistant Secretary of the Army (Civil Works) must approve execution of the MOU because construction will occur prior to completion of the Tentatively Selected Plan (TSP) milestone. The TSP milestone is the point at which there is vertical team concurrence on the plan that will be released in the draft report (decision document) for public and agency review.

3. Assessment: The City has requested execution of the MOU prior to the TSP milestone because they currently have the funds to perform the work listed in their June 3, 2019 letter to the Louisville District and they will be awarding the construction contract this year. As stated in their letter, the City understands that they must comply with the conditions outlined in the MOU. They are aware that there is no guarantee that any Federal funds will be appropriated to prepare the decision document and that if such document is prepared, the recommendation could be there is no Federal interest in moving forward with Phase II of the project. They are also aware that if a decision document is prepared and approved for Phase II of the project, in-kind credit may be afforded only if the Secretary determines the work they performed is integral to the Federal project described in the decision document. They estimate the work could cost $5M or more; therefore they desire to have the work documented in the MOU so that there is the possibility of getting in-kind credit in the future.

In addition to the information outlined in the preceding paragraph, Section 11 of the MOU appropriately notifies the non-Federal sponsor that execution of the MOU does not connote future: approval of the project; reimbursement of funding; or execution of a Project Partnership Agreement (PPA).[1]

Lastly, Section 4.d.1.(a) in the referenced ER includes criteria that will be considered in the evaluation of executing the MOU prior to the TSP milestone. The criteria, with preliminary justification, are included below. It should be noted that the evaluation is not limited to these five items.

(i) Whether the proposed work is a modification of an existing Federal project;

The proposed work does not modify any features within the completed Ohio Riverfront – Cincinnati, Ohio (Phase 1) Federal project limits. The proposed work includes new features that will be constructed within the expanded limits of the completed existing project as a second phase.

(ii) Whether the proposed work will follow an existing levee alignment in the case of a flood risk management project;

There is no levee within the existing project limits nor in the proposed work.

(iii) Whether the proposed work balances and integrates the wise use of the flood plain to ensure public safety;

The proposed work does take into consideration the flood plain and land use in the area, as did Phase I of the project. The features will be constructed to ensure public safety.

(iv) Whether the proposed work significantly reduces flood damage risk to human life, property or critical infrastructure;

The proposed work does not include features that will reduce flood damage risk to human life, property, or critical infrastructure. The new features will be constructed, however, to withstand high water events from the Ohio River.

(v) Whether the proposed work will likely be included in the final project recommendation.

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[1] The full language states: "Execution of this MOU shall not be interpreted as a Federal assurance regarding later approval of any project; shall not commit the United States to any type of reimbursement or credit for the Proposed Work; does not alter any process to be followed by the Government in making a determination to execute a future Project Partnership Agreement; nor does it provide any assurance that any future agreement will ever be executed for the project, the Proposed Work, or any portion of the project. Further, this MOU shall not be interpreted to signify any Federal participation in or commitment to the project or the Proposed Work. Finally, this MOU shall not be construed as committing the Government to assume any responsibility placed upon the Non-Federal Interests or any other non-Federal entity or as preventing the Government from modifying the project that could result in the Proposed Work performed by the Non-Federal Interests no longer being an integral part of the design of the project".

It is likely that the majority of the proposed work will be included in the final project recommendation.

4. Recommendation: Based upon the above assessment and taking into consideration that Phase II of the project is conditionally authorized, there is no risk to the Government in executing the MOU for in-kind credit at this time. Execution of the MOU prior to the TSP milestone does not commit or bind the Government to any future action. Therefore, it is recommended the Assistant Secretary of the Army (Civil Works) approve the non-Federal sponsor's request for the Louisville District to execute the MOU for In-Kind Credit prior to completion of the TSP milestone.