RENEW JORDAN CREEK PROJECT – MAIN TO BOONVILLE

DRAFT ENVIRONMENTAL INFORMATION DOCUMENT

Clean Water State Revolving Fund

Prepared for:

Missouri Department of Natural Resources

Project Sponsor:

City of Springfield, Missouri

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Olsson Project No. 020-2978

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ACRONYMS AND ABBREVIATIONS

ACHP ..... Advisory Council on Historic Preservation
Amsl ..... Above Mean Sea Level
APE ..... Area of Potential Effects
ARC ..... Achaeological Research Center
ARPA ..... American Rescue Plan Act
BMP ..... Best Management Practice
CAR ..... Center for Archaeological Research
CFR ..... Code of Federal Regulations
COC ..... Contaminants of Concern
CSR ..... Code of State Regulations
CWSRF ..... Clean Water Act State Revolving Fund
EID ..... Environmental Information Document
EPA ..... Environmental Protection Agency
FC ..... Federal Candidate
FE ..... Federally Endangered
FEMA ..... Federal Emergency Management Agency
FT ..... Federally Threatened
IPaC ..... Information for Planning and Consultation
MDC ..... Missouri Department of Conservation
MDNR ..... Missouri Department of Natural Resources
MGS ..... Missouri Geological Survey
MMP ..... Materials Management Plan
NHPA ..... National Historic Preservation Act
NRHP ..... National Register of Historic Places
OHWM ..... Ordinary High Water Mark
PAH ..... Polycyclic Aromatic Hydrocarbon
SE ..... State Endangered
SHPO ..... State Historic Preservation Office
SWPPP ..... Storm Water Pollution Prevention Plan
USACE ..... U.S. Army Corps of Engineers
USC ..... U.S. Code
USFWS ..... U.S. Fish and Wildlife Service

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1. GENERAL INFORMATION

Table 1. General Project Information.

Applicant:	City of Springfield	
Project Name:	Renew Jordan Creek – Main to Boonville	
SRF Project No:	xxx	
City:	Springfield	
County:	Greene	
Total Estimated Project Costs:	$32 million	
Other Funding Source(s):	Clean Water Act Section 319 Grant Fund American Rescue Plan Act (ARPA) Fiscal Recovery Fund City of Springfield Level Property Tax Fund City of Springfield ¼-cent Capital Improvement Sales Tax Fund Community Revitalization Grant by the Missouri Department of Economic Development	
Primary Contact for Questions Concerning the Environmental Information Document (EID):	Company:	City of Springfield Department of Public Works – Stormwater
	Contact Person:	Kirkland Preston, PE
	Mailing Address:	P.O. Box 8368 840 N. Boonville Avenue Springfield, Missouri 65802
	Phone:	417.864.1990
	Email:	kpreston@springfieldmo.gov
Project Engineer (leave blank if same as above):	Company:	
	Contact Person:	
	Mailing Address:	
	Phone:	
	Email:	
List of Preparers: 1. Kirkland Preston, PE, Project Manager, City of Springfield 2. Chris Dunnaway, PE, Principal Engineer, City of Springfield 3. Jared Rasmussen, PE, Project Manager, Olsson 4. Julie Smith, Environmental Lead, Olsson		

2. PROJECT BACKGROUND

The City of Springfield, Missouri, proposes to restore a portion of Jordan Creek between North Main Avenue and North Boonville Avenue. The Renew Jordan Creek Project – Main to Boonville (Project) would daylight approximately 1,200 linear feet of creek that is currently enclosed in concrete box culverts and create a mixed-use urban park adjacent to the creek that would serve as a community gathering space. Daylighting refers to the practice of restoring buried or culverted streams to more natural conditions.

2.1 Background

Jordan Creek flows through the Project site from east to west and is almost entirely enclosed within double 11-by-9-foot concrete box culverts. Approximately 80 feet east of North Main Avenue Bridge, the concrete box culverts discharge into a concrete-lined channel. For decades, downtown Springfield has faced flooding and water quality issues from Jordan Creek because the existing box culverts have insufficient capacity during storm events and provide little instream habitat (USACE 2013). This deficiency in capacity leads to flooding within the area between Phelps Street and Water Street. The primary objectives of this redevelopment project are to reduce flooding within the Project area, improve water quality associated with urban runoff that contributes to the Jordan Creek system, and create a public amenity to promote resident and visitor interaction.

The Project is part of the Renew Jordan Creek Master Plan (City of Springfield 2021), which includes concepts for the redevelopment of three underutilized downtown sites along Jordan Creek – Main to Boonville, Founders Park, and 404 North Jefferson Avenue – and details what future connectivity between the sites might look like. The Project represents the first phase of a comprehensive planning effort and other large-scale improvements in the downtown area, largely focused on flood reduction and water quality improvement (City of Springfield 2022a).

2.2 Project Location

The Project is located in the urbanized core of the City of Springfield in an area that is regionally identified as being part of Jordan Valley Park (Appendix A, Figure 1 and Figure 2). The approximately 9.6-acre Project site is generally bound by West Mill Street to the north, West Water Street and the BNSF railroad to the south, North Boonville Avenue to the east, and North Main Avenue to the west. A portion of the Project site (approximately 1 acre) extends east of North Boonville Avenue and spans both north and south of the BNSF railroad that parallels West Mill Street. The Project area includes commercial, industrial, and institutional properties that have a large impervious footprint because of the structures, ancillary parking lots, and dedicated pedestrian and vehicular pathways.

2.3 Project Purpose and Need

In the 1930s, Jordan Creek was confined to a concrete box culvert through much of downtown Springfield. For decades, downtown Springfield has faced flooding and water quality issues from Jordan Creek because the existing box culverts have insufficient capacity during storm events and provide little instream habitat (USACE 2013).

The purpose of the Project is to reduce flooding in downtown Springfield, which would provide water quality benefits to Jordan Creek and create a high-quality community gathering place.

The Project is needed because flood events often occur quickly and unpredictably and cause significant damage to downtown buildings and infrastructure. The time to peak flood heights for a critical 1-hour storm is 30 minutes. This means that almost simultaneously, water rises in the urban areas as the rain falls. Water backs up along the creek and spreads throughout the floodplain rapidly. During large flood events, the city has to block major thoroughfares, disrupting general traffic movement and delivery of emergency services (USACE 2013).

The Project is also needed to improve the ecological conditions of Jordan Creek. Currently, there is little instream habitat in Jordan Creek throughout the Project site because most of the creek is contained in an underground concrete box culvert. By daylighting the creek and creating a natural riparian corridor, flows would be reduced, water residence time increased, and stormwater exposed to sunlight and vegetation, allowing the natural stream processes to improve water quality and aquatic habitat (USACE 2013).

Finally, the Project is needed to further the city's goals identified in its recently adopted Comprehensive Plan (City of Springfield 2022a). The Comprehensive Plan is intended to guide growth and development in the community for the next two decades, establishing policies that help city leaders make substantive planning decisions. The "Downtown Plan" is a component of the Comprehensive Plan and serves as a guide for the revitalization of downtown Springfield. "Goal 3: Renew Downtown's identity by creating quality public places for events, programming, and marketing" specifically highlights the overall Renew Jordan Creek effort and describes how it furthers this goal by creating an urban amenity that provides connectivity across the downtown area, provides improved greenspace, and serves as an economic catalyst and quality of place enhancement.

Daylighting Jordan Creek creates an opportunity for a sustainable, multifaceted solution to improve the health of the creek, mitigate flood hazards, develop a visually pleasing downtown feature, and stimulate economic growth and development.

3. RECOMMENDED ACTION ALTERNATIVE

This section provides a description of the Project (recommended action alternative) and its specific components; identifies estimated Project costs; provides a rationale for the selection of the preferred alternative; and describes other considerations affecting the Project. Refer to Appendix A, Figure 3 which depicts the concept design for the Project.

3.1 Project Description

The Project would restore a portion of Jordan Creek between North Main Avenue and North Boonville Avenue in downtown Springfield. The Project would daylight approximately 1,200 linear feet of creek that is currently enclosed in concrete box culverts and create a mixed-use urban park adjacent to the creek that would serve as a community gathering space. This redevelopment project is intended to reduce flooding within the Project area, improve water quality associated with urban runoff that contributes to the Jordan Creek system, and create a public amenity to promote resident and visitor interaction.

3.2 Project Components

The Project is designed to balance riparian corridor needs required to meet the water quality and daylighting goals with the needs of the pedestrian spaces, which were both defined as priorities during the master planning effort. Key components and features of the Project include the following:

- Demolition and Removals – Demolition and removal of two existing buildings, along with parking lots, pedestrian sidewalks, vegetation, miscellaneous lighting, paving, and utilities within the Project site. In addition, starting just east of North Main Avenue, approximately 340 feet of the downstream end of the concrete box culvert and an additional 80 linear feet of concrete-lined channel would be removed.
- Riparian Corridor – Excavation and removal of existing soils to achieve the line and grade for the approximately 1,200 linear feet daylighting of Jordan Creek. Along the creek alignment streamside, wetland areas would be provided for stream health and water quality. In addition to the streamside wetland areas, the riparian corridor would be enhanced with aquatic plantings native to the region to mirror the natural stream environment.
- Site Improvements West of North Campbell Avenue
    - North of Creek – This area would consist of turf seeded with native vegetation in conjunction with overstory and understory trees. Below-grade storm systems would be provided to collect runoff from within and north of the Project that would discharge to the streamside wetland areas.

  - Retaining Walls – To negotiate grade changes, a retaining wall would be installed adjacent to North Campbell Avenue.
  - South of Creek – Similar to north of the creek, this area would consist of turf seeded with native vegetation in conjunction with overstory and understory trees. A shared-use bike path would extend from North Main Avenue to North Campbell Avenue. In addition, a dedicated dog park would be located near the intersection of the creek and North Campbell Avenue.
- Site Improvements East of North Campbell Avenue
  - North of the Creek
    - A pedestrian esplanade would be constructed underlaid with water quality features to promote drainage infiltration and to support the trees planted within the area.
    - Pedestrian scale lighting and convenience electrical would be included to activate the space for events and community gatherings.
    - Retaining walls would be installed to negotiate grade changes adjacent to the eastern and western ends of the area. In addition, retaining walls would extend into the streamside greenspace to allow for educational and viewing opportunities.
  - South of the Creek
    - Continuing from the north, a pedestrian patio would flank the eastern limit of the Project to connect to the southern portion. This patio would connect into a dedicated pedestrian space and the continuation of a shared-use bike trail that extends to the western limits of the Project site.
    - Within this hardscaped area, a combination of belowground and aboveground water quality features would be constructed to treat drainage. Both on-site and off-site drainage from the south would be collected via bioretention areas before being discharged to the existing box culvert.
    - Pedestrian-scale lighting and convenience electrical would be included to activate the space for events and community gatherings.
    - A combination of new retaining walls and extensions to existing retaining walls would be required to accommodate grade transition.
- Box Culvert Extension Upstream of North Boonville Avenue
  - From the discharge point to the new creek alignment just west of North Boonville Avenue, a new four-cell 9-by-8-foot box culvert would extend easterly before crossing under the existing BNSF rail line.
  - Roadway replacement for North Boonville Avenue would be required to accommodate the box culvert installation.

    - Retaining and box culvert headwalls paralleling North Booneville Avenue would receive a natural stone facing.
- Bridge Work
    - A new, approximately 55-foot single-span arch bridge would be constructed for North Campbell Avenue over the new creek alignment.
    - Retaining and bridge headwalls paralleling North Campbell would receive a natural stone facing.
    - Roadway replacement for North Campbell would be required to accommodate the new bridge.
- Existing Box Culvert Improvements
    - An existing bridge would be removed beneath North Campbell Avenue at the intersection of the existing box culvert. This bridge would be replaced with a new box culvert in the same alignment as the existing box culvert.
    - To accommodate the creek daylighting alignment, a section of new box culvert would be constructed at the end of the remaining existing box culvert.

3.3 Project Costs

The estimated cost to construct the Project is $32 million.

3.4 Project Schedule

Construction is planned to start in the summer of 2024, with the goal of completion by the beginning of 2026.

3.5 Rationale for Selection of Preferred Alternative

The proposed Project was determined to be the preferred alternative because it best accomplishes the purpose and need while also considering other economic, environmental, and technical factors. The preferred alternative meets the purpose and need by including a stream daylighting design that mitigates flood hazards in the Project area. It also meets the purpose and need by improving ecological conditions in Jordan Creek through creation of a natural riparian corridor that provides aquatic habitat and facilitates improved water quality. Finally, the preferred alternative is consistent with and furthers the goals in the city's Comprehensive Plan to create an urban amenity that achieves the primary objective of flood reduction and water quality improvement while serving as an economic catalyst and quality of place enhancement. Other alternatives that were considered are described in Section 4.

3.6 Other Considerations

Other considerations that may affect the viability, schedule, or funding of the Project, or that may require additional coordination include the following:

- Issuance of a Clean Water Act Section 404 Permit.
- Implementation of a Deep Trenching Plan to determine the extent of two archaeological sites located within the construction footprint of the project could result in schedule delays depending on findings and any required mitigation. Refer to Section 5.2.2.1 for additional details on the Deep Trenching Plan.

4. ALTERNATIVES ANALYSIS

Several alternatives to the Project were studied prior to determining the final preferred solution. This section provides a summary of the alternatives considered for the Project and the reasons they were rejected.

4.1 No Action Alternative

The No Action Alternative represents the continuation of existing conditions without the implementation, or in the absence of the proposed project. The purpose of describing a no action alternative is to allow decision-makers to compare the impacts of approving/funding a proposed project with the impacts of not approving/funding a proposed project.

Under the No Action Alternative, the City of Springfield would not make any improvements to Jordan Creek between North Main Avenue and North Boonville Avenue as described in Section 3 and the site would remain unchanged from current conditions. In the absence of the Project, impacts from flooding in the Project area would not be reduced; ecological and water quality conditions of Jordan Creek would not be improved; and no outdoor amenity would be constructed offering public open space and recreational opportunities. The No Action Alternative does not meet the Project's purpose and need, nor does it fulfill the goals identified in the City of Springfield's Comprehensive Plan for this area.

4.2 Action Alternative 1

Complete removal of the existing box culvert from North Main Avenue to North Boonville Avenue.

Though this option would have provided the best benefit from a daylighting perspective, removal of the existing box culvert was not chosen because of the following factors:

- Cost – There is a significant change in grade from the southern boundary of the Project site to the flowline of the new channel. To accommodate this grade change after removal of the box culvert, a new 20-foot retaining wall would have been required along the majority of the existing box culvert alignment. The removal of the box culvert and construction of the retaining wall added approximately $2 million to the Project costs.

- Existing Utilities – Two existing sanitary sewers, multiple communication duct banks, and buried electrical are present just south of the existing box culvert. Removal of the box culvert would have created an additional hardship for these utilities.

4.3 Action Alternative 2

Utilizing the existing north face of the box culvert as exposed retaining wall.

Next to completely removing the existing box culvert, this option provided the best opportunity for the riparian corridor while maintaining the pedestrian space to the north of the creek alignment. This alternative was deemed infeasible for the following reason:

- Existing Box Culvert Stability – To accommodate the large grade change previously discussed, the initial design studied options to use the north face of the existing box culvert as an exposed retaining wall. However, because of the original design of the existing box culverts, it was determined that structural integrity would be compromised if in-place soils were removed from the north face of the box culvert.

4.4 Action Alternative 3

Bracing the existing north face of the box culvert.

In an effort to further study Alternative 2, two options were considered to determine if stabilizing the existing box culvert was feasible, including the following:

- Stabilizing the Box Culvert from the Inside – In this option, internal structural bracing was studied. However, it was determined that any internal bracing would reduce the conveyance capacity of the box culvert while also limiting access to the structure for future maintenance.
- Stabilizing the Box Culvert from the Outside – In this option, an exterior reinforcing wall structure was studied. However, it was determined the cost of this wall, at nearly $1.5 million, was too costly for the Project to support.

5. ENVIRONMENTAL CONSIDERATIONS

This section summarizes consultation with government agencies and potential impacts and benefits associated with implementation of the Project.

5.1 Agency Consultation

On March 10, 2023, the City of Springfield submitted environmental clearance letters to various agencies seeking input on the Project. Agency responses are provided in Appendix B – Agency Clearance Letters and are summarized below. In addition, as part of the Clean Water Act

Section 404 Nationwide Permit authorization process and related agency and intergovernmental coordination, the U.S. Army Corps of Engineers (USACE; federal lead agency) initiated National Historic Preservation Act (NHPA) Section 106 consultation with the Missouri Department of Natural Resources State Historic Preservation Office (SHPO) and Native American Tribes that may have an interest in the project.

5.1.1 Missouri Department of Natural Resources State Historic Preservation Office

On July 2, 2021, the City of Springfield submitted a Section 106 Project Information Form to the SHPO requesting consultation for the Project area. On July 28, 2022, the SHPO provided a response that indicated project number 055-GR-21 was established for the Renew Jordan Creek Project.

Subsequently, as part of the Section 404 Nationwide Permit authorization process and related agency and intergovernmental coordination, the USACE initiated consultation activities with the SHPO as a means to solicit comment on the Project. The USACE has conducted multiple meetings with the SHPO and on November 1, 2023, the SHPO was provided with the Deep Trenching Plan, Monitoring Plan, and Memorandum of Agreement for the property at 351 North Boonville for review and comment. SHPO consultation is ongoing, and this EID will be updated to reflect the results of consultation once it is complete.

5.1.2 Tribal Consultation

As part of the Section 404 Nationwide Permit authorization process and related agency and intergovernmental coordination, the USACE initiated tribal consultation for the Project as a means to solicit comment from Native American tribes who may have an interest in the Project area. The USACE issued letters on August 22, 2022, inviting each tribe to comment on any tribal interests that may be affected by the proposal to daylight the section of Jordan Creek between North Main Avenue and North Boonville Avenue. Based on prior project interests and historic tribal locations, the following tribes were sent information regarding the Project.

- Cherokee Nation
- Delaware Nation
- Delaware Tribe of Indians
- Eastern Shawnee Tribe of Oklahoma
- Kickapoo Tribe of Indians of the Kickapoo Reservation in Kansas
- Kickapoo Tribe of Oklahoma
- The Osage Nation
- Shawnee Tribe
- United Keetoowah Band of Cherokee Indians in Oklahoma

To date, the Cherokee Nation, Delaware Nation, and Osage Nation have requested to be consulting parties on the Project. The USACE has conducted multiple meetings with the consulting parties and on November 1, 2023, the consulting parties were provided with the Deep Trenching Plan, Monitoring Plan, and Memorandum of Agreement for the property at 351 North Boonville for review and comment. Tribal consultation is ongoing, and this EID will be updated to reflect the results of consultation once it is complete.

5.1.3 U.S. Fish and Wildlife Service

As part of the Section 404 Nationwide Permit authorization process and related agency and intergovernmental coordination, the USACE reviewed the Project to determine whether Endangered Species Act Section 7 consultation with the U.S. Fish and Wildlife Service (USFWS) was required. Based on a query of the USFWS' Information for Planning and Consultation (IpaC) system and the known habitat in the Project area, the USACE determined that the Project would have "No Effect" on listed species. Therefore, through its agreement with the USFWS, USACE did not complete additional consultation.

In addition, on March 10, 2023, the City of Springfield submitted a request for environmental clearance to the USFWS. In a response dated March 10, 2023, the USFWS stated its review of the Project site did not find any nearby records of listed species and it does not have any concerns about impacts to species listed under the Endangered Species Act.

5.1.4 Missouri Department of Conservation

On March 10, 2023, the City of Springfield submitted a request for environmental clearance to the Missouri Department of Conservation (MDC). In a response dated March 21, 2023, the MDC provided a Natural Heritage Review Report that indicated there were no records of occurrence for species or natural communities tracked by the Natural Heritage Program. The report further stated that the MDC has no additional recommendations regarding the project.

5.1.5 U.S. Army Corps of Engineers

The USACE has jurisdiction over all waters of the U.S. and is the regulating authority for decisions regarding the occurrence of wetlands and waters of the U.S. on subject properties. Discharges of dredged or fill materials in waters of the U.S., including wetlands, require prior authorization from the USACE under Section 404 of the Clean Water Act (33 USC 1344).

The City of Springfield conducted a preapplication meeting with the USACE on March 2, 2022, to discuss the Project, permitting, and required consultations. On March 24 and 25, 2022, an evaluation was completed to identify jurisdictional waters of the U.S. within the Project area (Habitat Architects 2022). Based on desktop reviews and field investigations, one jurisdictional perennial tributary (Jordan Creek) was identified within the Project area.

Because Jordan Creek is considered jurisdictional under Section 404 of the Clean Water Act, a permit from the USACE is required for potential impacts caused by Project implementation. On May 4, 2022, the City of Springfield submitted a request to the USACE for authorization for construction activities under Nationwide Permit 27 (Aquatic Habitat Restoration, Establishment, and Enhancement Activities). Prior to issuance of the permit verification, an update to the proposed design was completed to accommodate the ability to daylight Jordan Creek while preserving the structural integrity of the existing concrete box culverts that currently carry the stormwater conveyance associated with Jordan Creek. As a result of this design change, the USACE recommended the city withdraw its original request and resubmit an updated request. The updated request for nationwide permit verification was submitted to USACE on February 21, 2023.

The USACE is expected to issue its verification that the Project qualifies under Nationwide Permit 27 in January 2024. Nationwide permit general conditions and any special conditions identified by USACE will be implemented as part of the Project.

5.1.6 Missouri Federal Assistance Clearinghouse

On March 10, 2023, the City of Springfield submitted a request for environmental clearance to the Missouri Federal Assistance Clearinghouse. In a response dated March 21, 2023, the Missouri Federal Assistance Clearinghouse stated that none of the agencies involved in the review of the project had comments or recommendations to offer.

5.1.7 Missouri Geological Survey

On March 10, 2023, the City of Springfield submitted a request for environmental clearance to the Missouri Geological Survey (MGS). In a response dated June 15, 2023, the MGS stated that since a geohydrologic site evaluation is not required, they have no comment on the proposed project at this time.

5.1.8 Missouri Department of Natural Resources Division of State Parks

On March 10, 2023, the City of Springfield submitted a request for environmental clearance to the Missouri Department of Natural Resources Division of State Parks. In a response dated March 17, 2023, Missouri Department of Natural Resources Division of State Parks provided its determination that the project will have no impact to the state parks or federally funded parks located in the area.

5.1.9 Other Consultation

BNSF maintains lines both north and south of the Project site. The City of Springfield consulted with BNSF regarding project design and implementation. This consultation has included meetings and submittals of engineering design; the most recent submittal of 90 percent plans

occurred in March 2023. The City of Springfield will continue coordination with BNSF throughout construction.

5.2 Summary of Impacts

Primary (direct) and secondary (indirect) impacts to the physical, human, and biological environment as a result of implementation of the Project are summarized in this section. In addition, this section includes discussion of potential construction and cumulative impacts associated with the Project.

5.2.1 Physical Environment

5.2.1.1 Hydrology and Water Quality

Jordan Creek is a perennial tributary that traverses north central (downtown) and southwest Springfield. Because of its location within the highly developed portions of the city, the stream has a long history of manipulation and human intervention attempting to tame the stream to control urban flooding, which frequently affected Springfield in the late 19th and early 20th centuries. Historically, Jordan Creek would lose hydrology within the channel during dry times because of the cavernous karst limestone below the creek bed. Now, with the amount of impervious surfaces within the watershed and the manipulation of the stream itself, the tributary is considered a perennial stream with the presence of baseflow throughout the year (Habitat Architects 2022).

The stream originates in the heart of downtown with the convergence of the North and South branches of Jordan Creek near Jordan Valley Park. The urban stream has been relocated underground in a large concrete culvert through most of its stretch within downtown Springfield and in places is found within high-wall concrete channels, averaging 20 feet wide (Appendix A, Figure 4). Similarly, the South Branch of Jordan Creek has also been relocated underground through most of its course downtown as has the lower portion of the North Branch before its connection with the South Branch. The portion of the North Branch just upstream of the underground section has been widened and contained within gabion walls where the stream averages approximately 10 feet at the ordinary high water mark (OHWM). The lower portion of Jordan Creek, southwest of downtown Springfield, appears to have been historically straightened and widened to an average width of approximately 30 feet at the OHWM. Despite these manipulations, the creek appears to have retained much of its natural bed, which contains gravel and sand substrate with stretches of large limestone rock shelves (Habitat Architects 2022).

Impervious surfaces associated with urbanization reduce infiltration and increase surface water runoff, altering the pathways by which water, and any associated contaminants, reach urban streams. Jordan Creek is identified on the Missouri Department of Natural Resources 303(d) list

for not meeting federal or state water quality standards, identified by the Clean Water Act, because of the level of polycyclic aromatic hydrocarbons (PAHs) in the water (MDNR 2022). PAHs are a class of chemicals that occur naturally in coal, crude oil, and gasoline. They also are produced when coal, oil, gas, wood, garbage, and tobacco are burned and are widely distributed in the air, water, and soil (CDC 2009).

Jordan Creek flows from east to west through the Project site and is enclosed in double 11-by-9-foot concrete box culverts across the majority of the Project site. The westernmost extent of the creek is confined to a concrete-lined channel (approximately 80 linear feet) just upstream of North Main Avenue. Elevations at the Project site range from 1,275 feet above mean sea level (amsl) at the highest point to the east along North Boonville Avenue to 1,265 feet amsl near the western limits of the site along North Main Avenue.

The Project includes creation of a natural channel to restore Jordan Creek that involves the excavation of material to create a riparian corridor across the Project site. Following mass grading activities across the site, the channel would be graded north of the existing concrete box culverts to create sinuosity and length, which are more reflective of a natural stream channel. Newbury weirs would be installed at strategic locations. Combined with the addition of gravel, cobble, and limestone block, the weir structures would provide a riffle and pool habitat and improved water quality benefits to the stream channel. Additional habitat restoration would include in-channel and stream-edge boulder clusters, herbaceous native vegetative plantings, overstory plantings, and created wetlands throughout the Project site. The use of native plants would further establish the riparian/streamside corridor while aiding in creating habitat, protecting from erosion, and providing both short-term and long-term water quality benefits.

Funding for the Project includes a Clean Water Act Section 319 Nonpoint Source Management Program Grant. As part of the Section 319 grant, both instream and riparian corridor diversity would be created and monitored to assess the water quality and riparian benefits of the newly created streamway.

Impact Discussion

By daylighting the creek and creating a natural riparian corridor, flows would be reduced, water residence time increased, and stormwater exposed to sunlight and vegetation, which allows the natural stream processes to improve water quality and aquatic habitat. Riparian plantings adjacent to the stream would provide filtration, and stream restoration would improve ecology. The Project would provide environmental benefits, including reduced flooding, improved habitat for macroinvertebrates, and reduced nutrient and pollutant loading from adjacent nonpoint sources. Monitoring to assess the water quality and riparian benefits of the Project would inform the city and allow it to adaptively manage the site based on results. Therefore, implementation

of the Project would result in a beneficial impact to hydrology and water quality and would reduce urban contaminants that contribute to the creek's impaired status.

5.2.1.2 Floodplain

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps show that the majority of the Project site is located in a "Special Flood Hazard Area" (FEMA 2023a). Specifically, the northern portion of the Project site (generally north of Water Street) is located in Zone AE, which is defined as the area that will be inundated by the flood event having a 1 percent chance of being equaled or exceeded in any given year (also referred to as the base flood or 100-year flood). The portion of the Project site generally located south of Water Street is identified as Zone X, which is defined as areas of minimal flood hazard, usually the area above the 500-year flood level. The area just downstream of the North Main Avenue Bridge (western limit of the Project site) is identified as Zone AE (Regulatory Floodway), which means the channel of a river or other watercourse and the adjacent land areas must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height (FEMA 2023b).

In the early 1900s, Jordan Creek was channelized through downtown Springfield (between North Main Avenue and North Washington Avenue) to alleviate flooding. As urbanization continued and the amount of impervious surface increased, the flooding problem was exacerbated as the original channels were no longer large enough to convey flood flows. Multiple times over the past two decades, the City of Springfield has experienced a flood that caused significant damage to its downtown and infrastructure (USACE 2013).

The Project would restore and create a natural tributary section for Jordan Creek through the Project site that would provide base flow and flood flow conveyance alongside the existing concrete box culverts that currently carry water from east to west across the Project site. The proposed combined system capacity between the remaining box culverts and the restored open channel would allow for approximately 3,600 cubic feet per second (approximate 25-year event) to be conveyed. This is expected to reduce the base flood elevations by two to five feet (Habitat Architects 2023).

Flood conveyance within the proposed channel corridor is a key component to the improvements associated with the Jordan Creek restoration. To accommodate 100-year flood conveyance across the Project site, the existing bridge structure located at North Campbell Avenue must be removed, upgraded, and reconstructed to increase the opening under the roadway. The current configuration at the roadway crossing is restrictive and was only originally designed to accommodate the concrete box culvert that currently carries stormwater across the area. The Project includes the demolition and replacement of the existing stone bridge and

culvert under North Campbell Avenue plus the construction of a new 55-foot single-span bridge north of the existing culverts across the daylighted channel.

Impact Discussion

The Project would mitigate flooding in the Project area and contribute to the restoration of the floodplain by increasing hydraulic storage capacity through ample low-lying areas adjacent to Jordan Creek's restored open channel that would function to convey flood events. In addition, by reducing channelization of the creek, water is slowed. The construction of a geomorphically stable channel with a natural substrate bottom as well as pools, riffles, and native plantings would slow the movement of water, decreasing downstream flooding potential. Finally, the Project would remove choke points, such as undersized culverts and bridges, where water often backs up and causes localized flooding. Therefore, implementation of the Project would result in a beneficial impact to the local floodplain and would mitigate flooding in downtown Springfield.

5.2.1.3 Hazardous Materials

The Project site is mostly vacant with the exception of three existing buildings. The historical use of the Project area consisted of commercial and industrial properties, including underground storage tanks (UST), former gas manufacturing operations, dry-cleaning operations, and rail lines. Asbestos-containing materials from abandoned steam lines and brick casing were also identified within the area. Lead pipes may also be located within the Project site. Several Phase I and Phase II Environmental Site Assessments were conducted throughout the Project area; a ground penetrating radar survey, transformer sampling, and hazardous materials surveys have also been performed. Contaminants of concern identified from these investigations related to the past uses of the Project area include volatile organic compounds, semi-volatile organic compounds, total petroleum hydrocarbons in the diesel/gasoline/oil ranges, PAHs, Resource Conservation Recovery Act 8 Metals, and lead and asbestos contamination.

The Project includes the demolition and removal of two existing buildings, parking lots, pedestrian sidewalks, vegetation, miscellaneous lighting, paving, and utilities within the Project site. Excavation and removal of approximately 90,000 cubic yards of existing soils will need to occur to achieve the line and grade for the daylighting of Jordan Creek.

Impact Discussion

During demolition and excavation activities it is likely that contaminated soil, buried USTs, and lead- and asbestos-containing materials will be encountered. These contaminants pose a negative health risk to construction workers and others in the immediate vicinity of the site. A Materials Management Plan (MMP; Olsson 2022) was prepared for the Project. The MMP includes protocols for minimizing soil disturbance and spreading of contaminants; protocols in the event that additional suspected contaminated soils are encountered; and methods for

decontamination of equipment prior to departing the site. Because of the short-term, temporary nature of potential exposure and by implementing the MMP and other mitigation measures described in Section 6, there would be no adverse effects associated with hazardous materials potentially encountered during construction.

5.2.2 Human Environment

5.2.2.1 Cultural Resources

The NHPA of 1966 (16 USC 470f), as amended, sets forth national policy and procedures for historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for listing in the National Register of Historic Places (NRHP). Section 106 of the NHPA requires federal agencies to consider the effects of their undertakings on historic properties and to allow the Advisory Council on Historic Preservation (ACHP) the opportunity to comment on those undertakings, following regulations issued by the ACHP (36 Code of Federal Regulations [CFR] 800).

The USACE determined that the Project will be authorized under Section 404 of the Clean Water Act; therefore, the USACE is the federal lead agency responsible for completion of the Section 106 process. Consultation activities are described below and in Section 5.1.2.

The affected environment for cultural resources is identified as the area of potential effects (APE). The APE is the geographic area where an undertaking may cause changes in the character or use of historic properties (36 CFR 800.16[d]). The USACE, in consultation with Missouri SHPO, established the APE for the Project as the area bounded by West Mill Street to the north, West Water Street and then BNSF railroad to the south, North Boonville Avenue to the east, and North Main Avenue to the west. In addition, there is an approximately 1-acre portion of the APE that extends east of North Boonville Avenue and spans both north and south of the BNSF railroad. The APE is identical to the Project boundary depicted on Figure 2 (Appendix A).

Architectural Resources

An investigation was conducted to identify historical, architectural, and structural resources within the Project area. The *Cultural Resources Survey of the Proposed Renew Jordan Creek Improvements* prepared by the Archaeological Research Center of St. Louis Inc. (ARC 2021) identified previously documented cultural resources that could be affected by the proposed improvements, including precontact and historic archaeological sites, NRHP properties and districts, and potentially significant architectural properties, structures, cultural landscapes, and bridges.

The survey identified three buildings and a stone arch bridge within the APE. The buildings are located at 351 North Boonville Avenue (Building 1), 353 North Campbell Avenue (Building 2),

and 344 North Main Avenue (Building 3). The stone arch bridge is located under North Campbell Avenue. An architectural survey was conducted to determine NRHP eligibility for these structures.

Survey results recommended that Building 1 was not eligible for the NRHP under Criteria A or B because it is not associated with historically significant individuals or events. However, though Building 1 is not individually significant under Criterion C for architecture, it was determined to contribute to the Springfield Warehouse and Industrial Historic National Register District. Therefore, it was recommended that if the structure could not be avoided during construction, the building be documented prior to being razed. Buildings 2 and 3 were recommended not eligible for the NRHP under Criteria A, B, or C. Because Building 2 is less than 50 years old, it was also considered under Criterion G, but was recommended not eligible under this criterion because it is not a fragile resource or considered exceptionally important.

In addition, the remains of a stone arched bridge over Jordan Creek are located under North Campbell Avenue. During the survey, the bridge was found to be partially encased by a covered concrete culvert and that I-beams and rebar had been used to support the current bridge deck. Construction of the culvert and the reinforcement used for the current North Campbell Avenue bridge have affected the integrity of the stone arch. Therefore, the stone arch bridge was recommended not eligible under Criteria A, B, or C.

Impact Discussion

Based on recommendations in the survey report, the USACE determined that the project will have an adverse effect on the Springfield Warehouse and Industrial Historic District, listed on the NRHP on May 12, 1999 (NRHP Ref. No. 99000715), through demolition of 351 North Boonville Avenue, a contributing element under Criterion C to the district.

The USACE consulted with the SHPO pursuant to 36 CFR Part 800, and on October 18, 2022, the SHPO concurred with the USACE finding of adverse effect to the historic district and recommended an agreement document to govern mitigative measures for the resource (SHPO Log Number 055-GR-21).

In accordance with 36 CFR § 800.6(a)(1), the USACE notified the ACHP of its adverse effect determination with specified documentation, and the ACHP has chosen *not to* participate in the consultation pursuant to 36 CFR § 800.6(a)(1)(iii).

A Memorandum of Agreement (USACE 2023; Appendix C) between the USACE and the SHPO was prepared which documents agreement that the project will be implemented in accordance with one stipulation to account for effects on historic properties. The USACE will ensure the following measures are carried out:

- The USACE will ensure recordation of Building 351 North Boonville Avenue with a Missouri Department of Natural Resources, State Historic Preservation Office Architectural/Inventory Form, to include background research, a site map/plan, and photographic documentation of each elevation, at a minimum. All work must be to the standards of the Missouri SHPO.

The USACE provided the Memorandum of Agreement to the consulting parties for review and comment on November 1, 2023. The Memorandum of Agreement was executed by the USACE, SHPO, Cherokee Nation, Delaware Nation, Osage Nation, and the City of Springfield on xxx date xxx.

Archaeological Resources

To identify archaeological sites that may be affected by the Project, an initial survey and site history was completed by the Center for Archaeological Research (CAR) at Missouri State University entitled *Jordan Creek: History, Architectural History, and Archaeology* (CAR 2007). The report documented two archaeological sites: 23GR2023 (Springfield Wagon Shops) and 23GR2024 (Springfield Manufacturing Company) that are located within the APE and would need further testing to ascertain their eligibility status for listing on the NRHP.

The *Cultural Resources Survey of the Proposed Renew Jordan Creek Improvements,* prepared by ARC in October of 2021, concluded that the two archaeological sites identified by CAR in 2007 (23GR2023 and 23GR2024) are comprised of mixed fill with various historical and cultural materials based on exploratory backhoe trenching. The ARC survey recommended that these remains are eligible for Criterion D of the NRHP. The survey report further recommended that if construction activities extend deeper than 90 centimeters (35.4 inches) beneath the modern grade, a Phase II archaeological backhoe trenching be conducted to determine the potential for intact cultural remains or that a team of archaeologists monitor these areas during construction to document any remains that may be exposed.

Neither CAR nor ARC delineated the sites in their entirety because existing buildings and parking lots prohibited further subsurface investigation.

Impact Discussion

Based on recommendations in the survey report, the USACE determined that although the archaeological sites are not fully delineated, they are located within an area of the City of Springfield that contains significant resources pertaining to the city's early history. Because of the presence of historic and prehistoric deposits and the sites' potential to yield information important to history and prehistory, the sites may likely be eligible for listing on the NRHP at least under eligibility Criterion D. The USACE determined that the Project would impact sites 23GR2023 and 23GR2024 and that further testing was warranted to evaluate their NRHP

eligibility and to aid in designing an appropriate mitigation plan, should either site be determined eligible.

On October 18, 2022, the SHPO agreed with the USACE's recommendations that sites 23GR2023 and 23GR2024 needed additional testing to determine eligibility (SHPO Log Number 055-GR-21).

In accordance with 36 CFR § 800.6(a)(1), the USACE notified the ACHP of its determination that sites 23GR2023 and 23GR2024 would be impacted by the project, and the ACHP has chosen *not to* participate in the consultation pursuant to 36 CFR § 800.6(a)(1)(iii).

Further testing activities to determine the extent of sites 23GR2023 and 23GR2024 include mechanical trenching across the upper floodplain to evaluate the site stratigraphy and determine the potential for intact cultural deposits. Trenching is limited to the area where the proposed construction will conduct deep excavation (i.e., 80 centimeters or greater below grade). Trenching methodology is documented in the Deep Trenching Plan (GeoArch et. al. 2023; Appendix D) prepared by GeoArch Solutions, Archaeological Research Center of St. Louis, and Warren Center for Archaeological Research Missouri State University. Results of these investigations will be documented in a report to be submitted to USACE for review and distribution to the consulting parties for comment prior to any archaeological monitoring.

In addition, during construction, archaeological monitoring will be conducted in the area proposed for deep excavation (an approximately 2.5-acre area within the APE). The methodology for archaeological monitoring is documented in the Monitoring Plan (ARC et. al. 2023; Appendix E) prepared by Archaeological Research Center of St. Louis and Warren Center for Archaeological Research Missouri State University. The plan includes a description of monitoring activities, an inadvertent discovery plan, description of laboratory procedures, and reporting.

The Deep Trenching Plan and Monitoring Plan were provided to the consulting parties for review and comment on November 1, 2023. The plans were approved by the USACE, SHPO, Cherokee Nation, Delaware Nation, and Osage Nation on xxx date xxx.

5.2.2.2 Population

The Project area includes commercial, industrial, and institutional properties. There are no residential properties at the Project site, nor would any be constructed as part of the Project. The Project would construct a high-quality community gathering place that mitigates flooding impacts to buildings in downtown Springfield and provides water quality benefits to the urban watershed. The Project would not result in the relocation of people or structures, nor is it expected to result in significant changes in population trends.

The Project is consistent with the city's Downtown Plan (City of Springfield 2022a), which serves as a guide for the revitalization of downtown Springfield. Daylighting Jordan Creek creates an opportunity for a sustainable, multifaceted solution to improve the health of the creek, mitigate flood hazards, develop a visually pleasing downtown feature, and stimulate economic growth and development.

Impact Discussion

Because the planned site improvements have the desired potential to stimulate economic growth and development, this Project could result in the future construction of commercial and multifamily residential properties in the surrounding area. These future changes to population trends are consistent with the city's vision to revitalize downtown Springfield and are considered a beneficial impact.

5.2.2.3 Land Use and Trends

Existing land uses at the Project site include heavy industrial, commercial, parking lots, and vacant properties. Implementation of the Project would result in replacing the existing land uses with a natural meandering channel, high-quality park and plaza spaces, open greenspace, a dog park, and markers and gateways for placemaking. It would also feature native landscaping, sidewalks and bike trails, a new bridge at North Campbell Avenue, greenspace and parklets, lighting, shade for picnicking, and other placemaking features.

Impact Discussion

The Project would result in changes in land use at the Project site and as stated above, because the planned site improvements have the desired potential to stimulate economic growth and development, this Project could result in changes to surrounding land uses in the future. The immediate and future changes in land use are consistent with the city's vision to revitalize downtown Springfield and are considered a beneficial impact.

5.2.3 Biological Environment

5.2.3.1 Wetlands and Other Waters

The USACE has jurisdiction over all waters of the U.S. and is the regulating authority for decisions regarding the occurrence of wetlands and waters of the U.S. on subject properties. Discharges of dredged or fill materials in waters of the U.S., including wetlands, require prior authorization from the USACE under Section 404 of the Clean Water Act (33 USC 1344).

The *Waters of the United States Jurisdictional Evaluation and Wetland Delineation,* prepared by Habitat Architects in May 2022, identifies jurisdictional waters within the Project area (Habitat Architects 2022). Based on desktop reviews and field investigations completed on March 24 and 25, 2022, one jurisdictional perennial tributary (Jordan Creek) was identified within the Project

area (Appendix A, Figure 5). There were no intermittent tributaries, jurisdiction wetlands, or jurisdictional impoundments identified in the Project area. Jordan Creek is enclosed in double 11-by-9-foot concrete box culverts across most of the Project site (1,470 linear feet) with the most western extent confined to a concrete-lined channel (80 linear feet) just upstream of North Main Avenue.

Because Jordan Creek is considered jurisdictional under the Section 404 of the Clean Water Act, the Project requires a permit from the USACE for impacts caused by Project implementation. On May 4, 2022, the City of Springfield submitted a request to the USACE for authorization for construction activities under Nationwide Permit 27 (Aquatic Habitat Restoration, Establishment, and Enhancement Activities). Prior to issuance of the permit verification, an update to the proposed design was completed to accommodate the ability to daylight Jordan Creek while preserving the structural integrity of the existing concrete box culverts that currently carry the stormwater conveyance associated with Jordan Creek. As a result of this design change, the USACE recommended the city withdraw its original request and resubmit an updated request. The updated request for nationwide permit verification was submitted to USACE on February 21, 2023.

The request stated that once connectivity is established between water carried within the concrete box culvert and the discharge into the newly constructed open channel, construction activities to complete the Project, including removal of the concrete-lined channel, removal of the downstream section of the concrete box culvert, and reconstruction of the existing culvert structure under North Campbell Avenue would result in approximately 18,942 square feet (0.43 acre) of permanent impact to Jordan Creek because of the placement of fill (Appendix A, Figure 6).

Impact Discussion

The Project would result in the permanent impact of 0.43 acre of perennial stream because of the placement of fill. The city requested verification from USACE that the Project qualifies under Nationwide Permit 27. The USACE is expected to issue its verification in January 2024. In practice, nationwide permits are issued for a variety of minor project activities with no more than *minimal* effects. With implementation of nationwide permit general conditions and any special conditions identified in USACE's verification letter, the Project would have minimal effects to jurisdictional waters.

5.2.3.2 Biological Resources

The 9.6-acre Project site is located in the urbanized core of downtown Springfield and is surrounded by commercial, industrial, and institutional properties. The Project site is heavily disturbed and includes ancillary parking lots, pedestrian and vehicular pathways, three buildings, and vacant land. Jordan Creek traverses the Project site from east to west and is

almost entirely contained within buried concrete culverts. Approximately 80 feet east of the North Main Avenue Bridge, the existing concrete box culverts discharge into a concrete-lined channel that averages approximately 20 feet in width and has walls as high as 10 feet. The concrete-lined channel carries Jordan Creek west under North Main Avenue Bridge (western Project boundary). The following subsections describe biological resources within the Project site and vicinity.

Vegetation Communities

Outside of impervious surfaces (approximately 5.63 acres), the Project site is comprised of ruderal/disturbed vegetation (approximately 3.53 acres) and developed/ornamental vegetation (approximately 0.44 acre). Ruderal/disturbed vegetation occurs in areas that are heavily disturbed by past or ongoing human activities but retain a soil substrate. This habitat at the Project site is either unvegetated or heavily dominated by non-native annual grasses, with small patches of native and non-native grasses and forbs.

Developed/ornamental vegetation is present along sidewalks and within parking areas. In addition, along the underground box culvert alignment and the concrete-lined channel, a thin woody buffer exists with tree species comprised primarily of the native box elder (*Acer negundo*), slippery elm (*Ulmus rubra*), red maple (*Acer rubrum*), and the non-native tree of heaven (*Ailanthus altissima*). The understory in these thin buffers is dominated by non-native vegetation comprised of wintercreeper (*Euonymus fortunei*), bush honeysuckle (*Lonicera morrowii; Lonicera maackii*), Japanese honeysuckle (*Lonicera japonica*), and eastern red cedar (*Juniperus virginiana*; Habitat Architects 2022).

Existing trees, shrubs, and other vegetation present within the Project site will be removed to accommodate construction of the Project.

Fish and Wildlife Species

The Project site and surrounding area are heavily urbanized and provide minimal habitat for terrestrial wildlife species. Wildlife typical of urban environments (e.g., small mammals, songbirds, etc.) are expected to be present.

Jordan Creek is listed on the Missouri Department of Natural Resources 303(d) list of impaired waters for PAHs and is considered impaired for aquatic life (MDNR 2022). Fish communities in Jordan Creek have low diversity and are dominated by the following tolerant species: creek chub (*Semotilus atromaculatus*), bluntnose minnow (*Pimphales notatus*), white sucker (*Catostomus commersoni*), yellow bullhead (*Ameiurus natalis*), blackspotted topminnow (*Fundulus olivaceous*), western mosquitofish (*Gambusia affinis*), bluegill (*Lepomis macrochirus*), and green sunfish (*Lepomis cyanellus*; USACE 2013). Between 1980–2021, discharge of pollutants (e.g., diesel fuel, sour milk, turkey blood, and phosphoric acid) into Jordan Creek

resulted in 13 fish kills (Kiner and Vitello 2021). Aquatic macroinvertebrate communities in Jordan Creek are indicative of poor water quality as evidenced by the very low proportions of intolerant taxa (Ephemeroptera, Plecoptera, and Trichoptera [EPT] = 9 percent) and high proportions of tolerant taxa (Chironimidae = 50 percent; MDNR 2007). Because Jordan Creek is buried and culvertized through the Project site, there is no aquatic or riparian habitat present in the Project site that is supportive of aquatic life.

Special-status Plant Species

No special-status plant species were identified during the review of USFWS' Information for Planning and Consultation (IPaC) system (USFWS 2023).

Special-status Wildlife Species

A total of six special-status wildlife species were identified during the IPaC review (Table 2), including gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalist*), northern long-eared bat (*Myotis septentrionalis*), tricolored bat (*Perimyotis subflavus*), Ozark cavefish (*Amblyopsis rosae*), and monarch butterfly (*Danaus plexippus;* MDC 2023; USFWS 2023).

There is no suitable habitat for special-status wildlife species (Table 2) at the Project site and there have been no reported occurrences of special-status wildlife species on or adjacent to the site.

Table 2. List of Special-status Wildlife Species in the Project Area.

Common Name	Scientific Name	Status	Habitat
Gray Bat	*Myotis grisescens*	FE, SE	Hibernates in caves and mines over winter and roosts in trees, in human-made structures, under rocks, and in piles of wood in summer. Forages over streams and bodies of water and in woodlands near water.
Indiana Bat	*Myotis sodalist*	FE, SE	Hibernates in caves or occasionally abandoned mines over winter and roosts under loose tree bark during the summer. Foraging takes place along rivers or lakes and in uplands.
Northern Long-eared Bat	*Myotis septentrionalis*	FE, SE	Migrates from winter caves and mines to summer roost trees. Roosts in live or dead trees with diameters at breast height greater than 3 inches. Prefers mature upland forests near stream corridors for foraging, but the species also uses open spaces such as small forest clearings, water, and along roads.
Tricolored Bat	*Perimyotis subflavus*	FC	Roosts among live and dead leaf clusters in live or recently dead deciduous trees during nonhibernating seasons. Has been observed summer roosting among pine needles, in eastern red cedar, and in a variety of artificial roosts.

			Forages at treetop level or above. Hibernates in caves and mines but may also use culverts, tree cavities, and abandoned wells where caves are sparse.
Ozark Cavefish	*Amblyopsis rosae*	FT, SE	Occurs in cave streams and springs with a gravel bottom.
Monarch Butterfly	*Danaus plexippus*	FC	Lives mainly in prairie, meadow, and grassland habitat and roadside areas across North America. Adults feed on the nectar of a variety of flowers but are reliant on milkweed as a host plant for reproduction.

FE: Federally Endangered

FT: Federally Threatened

FC: Federal Candidate

SE: State Endangered

Migratory Birds and Raptors

The Project site and immediate vicinity provide nesting and foraging habitat for a variety of migratory bird species common to urbanized areas, such as American robin (*Turdus migratorius*), tufted titmouse (*Baeolophus bicolor*), blue jay (*Cyanocitta cristata*), eastern phoebe (*Sayornis phoebe*), Carolina chickadee (*Poecile carolinensis*), and northern cardinal (*Cardinalis cardinalis)* (Audubon 2022; CLO 2023; iNaturalist 2023). Raptors, such as red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*), Cooper's hawk (*Accipiter cooperii*), American kestrel (*Falco sparverius*), and turkey vulture (*Cathartes aura*) may be using the Project site because they have been observed inhabiting areas within the City of Springfield's city limits, including Fassnight Park, approximately 1.2 miles south of the Project site (Davit 2009; Audubon 2022; CLO 2023; iNaturalist 2023).

Impact Discussion

The biological resources of the Project site are indicative of heavily urbanized areas and generally consist of poor habitat conditions. No special-status plants or wildlife would be affected as a result of implementation of the Project.

The Project includes removal of trees throughout the Project site, which has the potential to impact nesting birds. If vegetation-clearing activities commence during the avian breeding season (April 1 through July 15), the City of Springfield will conduct a preconstruction nesting bird survey to determine the presence or absence of nesting birds. If active nests are present, a suitable avoidance buffer will be established by a qualified biologist (refer to Section 6). Therefore, the Project would result in minimal impacts to nesting birds.

The Project includes creation of a natural channel to restore Jordan Creek that involves the excavation of material to create a riparian corridor across the Project site that provides aquatic

habitat and facilitates improved water quality. Additional habitat restoration includes in-channel and stream-edge boulder clusters, herbaceous native vegetative plantings, overstory plantings, and created wetlands throughout the Project site. Therefore, implementation of the Project would result in environmental benefits to aquatic resources.

5.2.4 Construction Impacts

This section summarizes impacts associated with Project construction. These are typically temporary, short-term impacts that are limited to the immediate area surrounding the site. They can include such impacts as temporary traffic congestion, increased noise levels, dust and emissions, and erosion and sedimentation. Each of these impacts are discussed below.

5.2.4.1 Traffic

Construction of the Project may require temporary partial or full lane closures and/or detours that could result in traffic moving to nearby roadways. A Traffic Control Plan is included in the Plan Set that specifies measures for public notification and signage, and coordination with local fire and police departments before road closures to ensure emergency service providers and the public are aware of any temporary road closures and/or detours ahead of time. Because of the temporary nature of the disruption, availability of alternative travel routes in the area, and development of a traffic control plan, traffic impacts would be minor.

5.2.4.2 Noise

Noise levels in the Project area are indicative of an urban setting and arise primarily from sources such as vehicular traffic and industrial and commercial activities. The Project site is surrounded by commercial, industrial, and institutional properties. There are no noise-sensitive receptors (e.g., residences, schools, parks, and/or hospitals) adjacent to the site that would be affected by construction noise.

During construction, noise from equipment would cause localized increases in ambient noise levels. Construction noise typically occurs intermittently and varies depending on the nature or phase of construction. The City of Springfield's Noise Standards (Division 6, Sec. 36-485) exempts noises emanating from construction and maintenance activities between the hours of 7:00 a.m. and 11:00 p.m. Construction activities for the Project would generally occur between the hours of 7:00 a.m. and 7:00 p.m.

There will be rare instances, especially when work involves crossing the railroad or working within its loading influence zone, when construction activities will extend outside the city's construction exemption window (i.e., nighttime work from 11:00 p.m. to 7:00 a.m.). This is due to a project construction requirement imposed by railroad timeline constraints.

Because there are no sensitive receptors in the immediate vicinity of the Project and increases in local noise levels would be short-term and generally be conducted in accordance with the city's noise standard, impacts would be minor.

5.2.4.3 Air Quality

Construction activities include excavation, grading, hauling, and other activities that could result in a short-term degradation of air quality from the release of airborne dust and emissions from construction vehicles and equipment. Best management practices (BMP) to control wind-borne dust will be implemented and all equipment used for construction will be required to be compliant with Environmental Protection Agency (EPA) emissions standards. Because of the short-term, temporary nature of construction activities and with implementation of BMPs and use of construction equipment that meets EPA emissions standards, air quality impacts would be minor.

5.2.4.4 Water Quality

Construction activities have the potential to affect water quality as a result of stormwater runoff from the site. Because the Project would disturb greater than 1 acre, a Land Disturbance Permit from the City of Springfield Water Quality Management and Protection Division must be obtained prior to construction. As part of acquisition of the Land Disturbance Permit, development of a site-specific storm water pollution prevention plan (SWPPP) that details the design, installation, and maintenance of effective BMPs to minimize the discharge of pollutants and reduce erosion and sedimentation will be required. With the acquisition of all required construction permits and implementation of BMPs identified in the SWPPP, water quality impacts would be minor.

5.2.5 Cumulative Impacts

A cumulative impact is the impact on the environment, which results from the incremental impact of the Project when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The Project consists of restoration of a portion of Jordan Creek between North Main Avenue and North Boonville Avenue and creation of a mixed-use urban park adjacent to the creek that would serve as a community gathering space. The Project is part of the Renew Jordan Creek Master Plan (City of Springfield 2021), which includes concepts for the redevelopment of three underutilized downtown sites along Jordan Creek. The Project is also identified in the city's recently adopted Comprehensive Plan (City of Springfield 2022a). The Project represents the first phase of a comprehensive planning effort and other large-scale improvements in the downtown area that are largely focused on flood reduction and water quality improvement.

Construction of the Project would contribute to cumulative environmental impacts. However, the Project would not make a significant contribution to cumulatively adverse impacts associated with past, present, or reasonably foreseeable future actions undertaken by the city or Greene County. Further, the environmental benefits of the Project related to flood hazard reduction and improved water quality and aquatic habitat outweigh any short-term, temporary impacts that would minimally contribute to cumulative environmental impacts in the region.

6. MITIGATION MEASURES

Impacts of the Project can be mitigated without extraordinary measure. This section identifies specific mitigation measures that will be incorporated into the Project to minimize impacts.

6.1 Cultural Resources Measures

Memorandum of Agreement – Implement the Memorandum of Agreement (Appendix C) regarding documentation of the building located at 351 North Boonville Avenue.

Deep Trenching Plan – Implement the Deep Trenching Plan (Appendix D) to document extent and determine eligibility of sites 23GR2023 and 23GR2024.

Monitoring Plan – Implement Monitoring Plan (Appendix E) during construction.

6.2 Biological Resources Measures

Nesting Bird Surveys – If vegetation-clearing activities commence during the avian breeding season (April 1 through July 15), a qualified biologist will conduct a preconstruction survey to identify active migratory bird nests within 200 feet of vegetation-clearing activities. The survey will be conducted within 14 days prior to initiation of these activities. If no active nests are identified, no further mitigation is required. If active nests are identified, a suitable buffer should be established by a qualified biologist around active nests and no construction activities within the buffer should be allowed until a qualified biologist has determined that the nest is no longer active (i.e., the nestlings have fledged and are no longer reliant on the nest or the nest has failed). Encroachment into the buffer may occur at the discretion of a qualified biologist. Any encroachment into the buffer should be monitored by a qualified biologist to determine whether nesting birds are being affected.

6.3 Wetland and Waters Measures

404 Permit Conditions – The City of Springfield is responsible for compliance with the general terms and conditions of Nationwide Permit 27 – Aquatic Habitat Restoration, Establishment, and Enhancement Activities, and any special conditions identified in USACE's permit verification letter expected to be issued in January 2024.

6.4 Hazardous Materials Measures

Handling and Disposal of Contaminated Materials – Contractor is responsible for handling and disposing of any contaminated materials encountered during construction in accordance with local, state, and federal regulations.

Disposal Authorizations and Notifications – Contractor is responsible for obtaining authorization for special waste disposal and/or completing asbestos notifications required by the Missouri Department of Natural Resources.

Health and Safety Plan – Prior to construction, contractor will prepare a site-specific Health and Safety Plan that addresses worker safety and contaminants at the site.

Materials Management Plan – During construction, contractor is responsible for implementing protocols described in the MMP (Olsson 2022).

6.5 Construction Measures

Traffic Control Plan – Prior to construction, A Traffic Control Plan will be prepared that include measures for public notification and signage and coordination with local fire and police departments before road closures to ensure emergency service providers and the public are aware of any temporary road closures and/or detours ahead of time.

Noise – To the maximum extent possible, construction activities will be limited to between the hours of 7:00 a.m. and 11:00 p.m., in accordance with the City of Springfield's noise standards (Division 6, Sec. 36-485).

Dust Control – During construction, the contractor will implement BMPs to control wind-borne dust per the City of Springfield's *Best Management Practices (BMP) Manual for Land Disturbance Activity* (City of Springfield 2014).

Emissions Control – During construction, the contractor will ensure all equipment used for construction is compliant with EPA emissions standards.

Land Disturbance Permit – Prior to construction, the City of Springfield, or its contractor, will obtain a Land Disturbance Permit from the City of Springfield Water Quality Management and Protection Division.

Storm Water Pollution Prevention Plan – Prior to construction and as part of acquisition of the Land Disturbance Permit, the City of Springfield, or its contractor, will prepare a site-specific SWPPP that details the design, installation, and maintenance of effective BMPs to minimize the discharge of pollutants and reduce erosion and sedimentation. BMPs for the Project will be determined based on the City of Springfield's *Stormwater Management Plan, Municipal*

Separate Storm Sewer System Permit 2022–2027 (City of Springfield 2022b) and *Best Management Practices (BMP) Manual for Land Disturbance Activity* (City of Springfield 2014).

6.6 Invasive Species

Spread of Invasive Species – During construction, to prevent the spread of invasive species, the contractor will inspect and clean vehicles and equipment thoroughly before entering/leaving the work area.

7. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

This section describes irreversible and irretrievable commitments of resources that would occur as a result of implementation of the Project. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects the use of those resources have on future generations. Irreversible commitments of resources are those that cannot be reversed except over an extremely long period of time. These irreversible effects primarily result from the destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural site).

Implementation of the Project would result in an irreversible or irretrievable commitment of nonrenewable or depletable resources, including the following:

- Building materials used in construction
- Fossil fuels (gasoline and diesel oil) consumed during construction and maintenance
- Electrical power used during construction and maintenance
- Human effort (time and labor) required to develop, construct, and maintain the Project
- Funds committed to the design, construction, and maintenance of the Project
- Permanent removal or disturbance of archaeological sites and historic buildings

The use of the nonrenewable resources is expected to account for a minimal portion of the region's resources and would not affect the availability of these resources for other needs within the region. The permanent removal or disturbance of cultural resources will be mitigated as described in Section 6.

8. PUBLIC PARTICIPATION

A public meeting for the Project was held on January X, 2024, at the location in the City of Springfield, Missouri. The meeting was advertised on December X, 2023, in the *Springfield News-Leader* (at least 30 days prior to the date of the meeting).

To date, there have been no adverse opinions regarding the Project expressed.

Appendix F includes the public meeting record, including a copy of the proof of publication, list of attendees, written testimony received, and responses to the issues raised.

9. REFERENCES

ARC (Archaeological Research Center of St. Louis Inc.). 2021. Cultural Resource Survey of the Proposed Renew Jordan Creek Improvements, City of Springfield, Greene County, Missouri. Research Report #1019. October.

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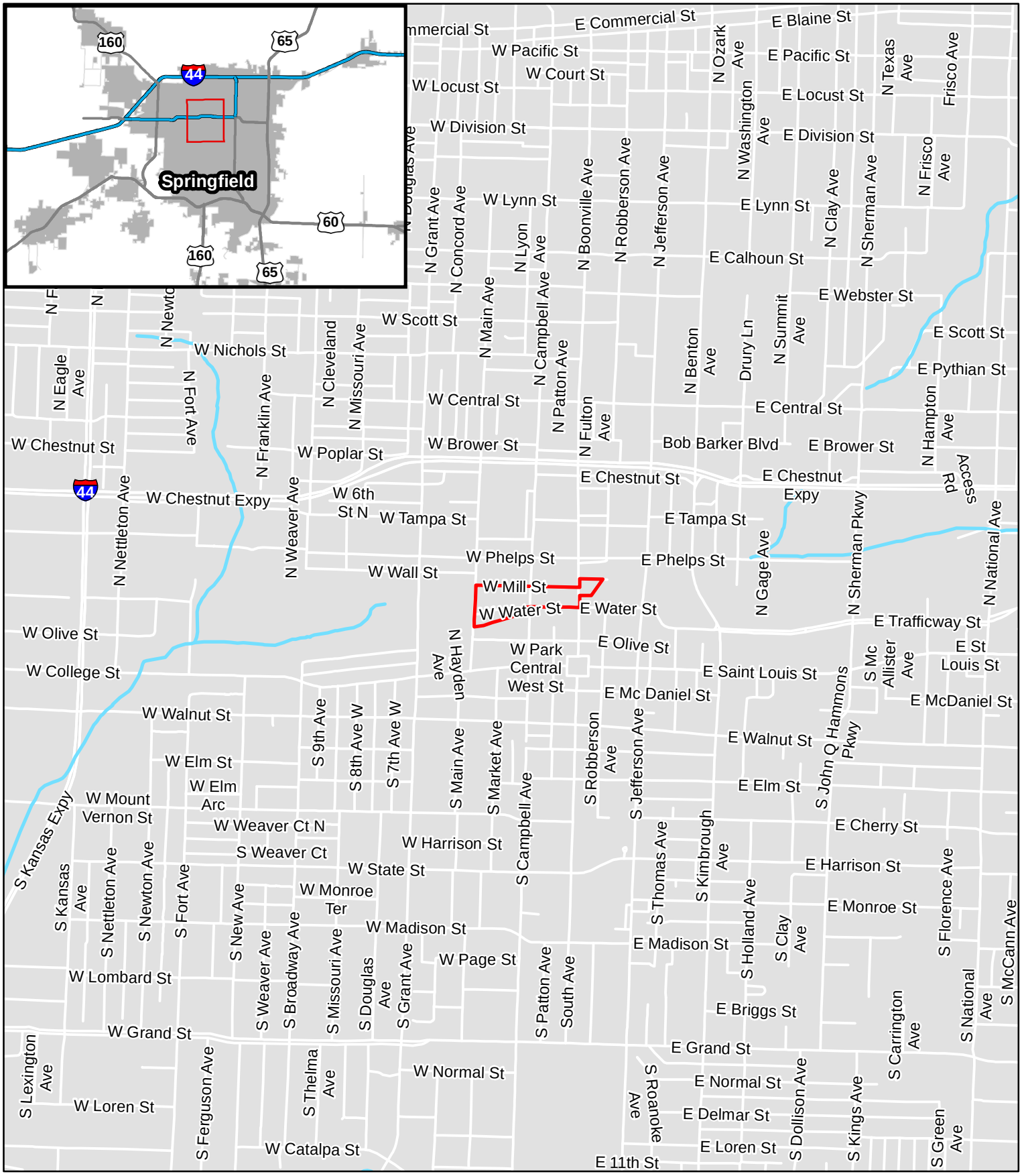
APPENDIX A

Project Figures



NAD 1983 UTM Zone 15N

N

0 0.25 0.5 Miles

1 inch = 1,500 feet

Project Boundary

Renew Jordan Creek Project
Main Avenue to Boonville Avenue
Springfield, Missouri
Olsson Project No. 020-29780
Site Vicinity Map
Figure 1

olsson

N

0 95 190 ft

1 " = 125 '

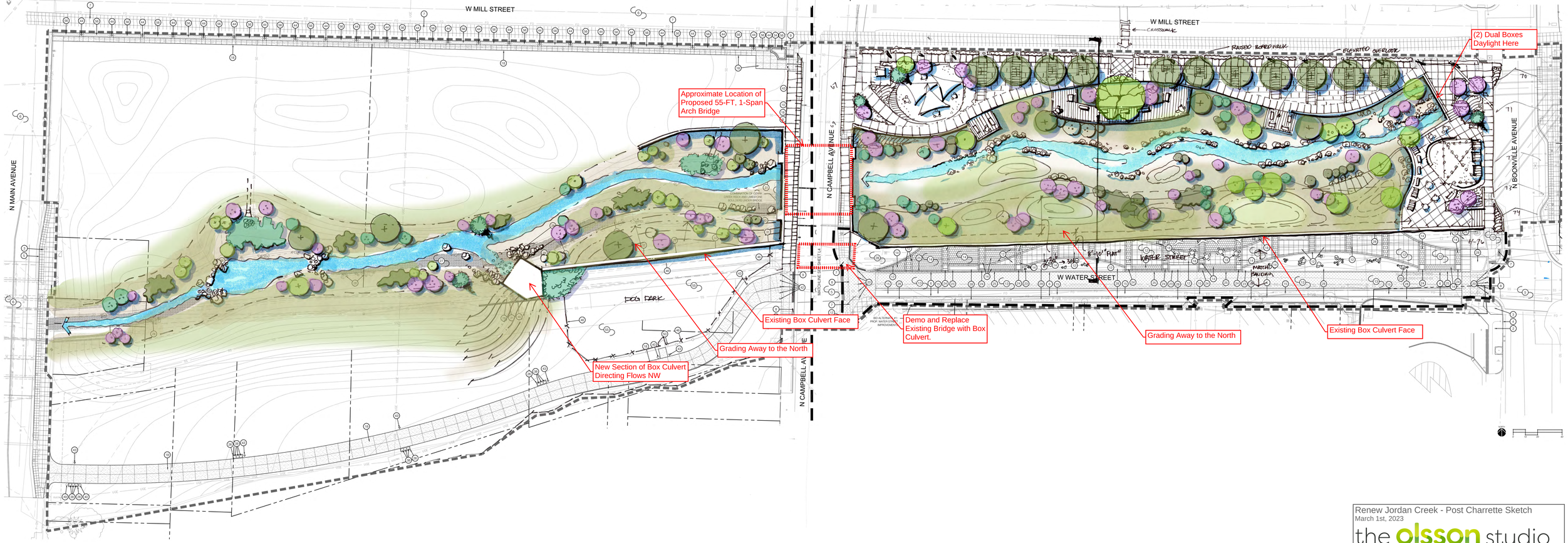
olsson

Project Boundary

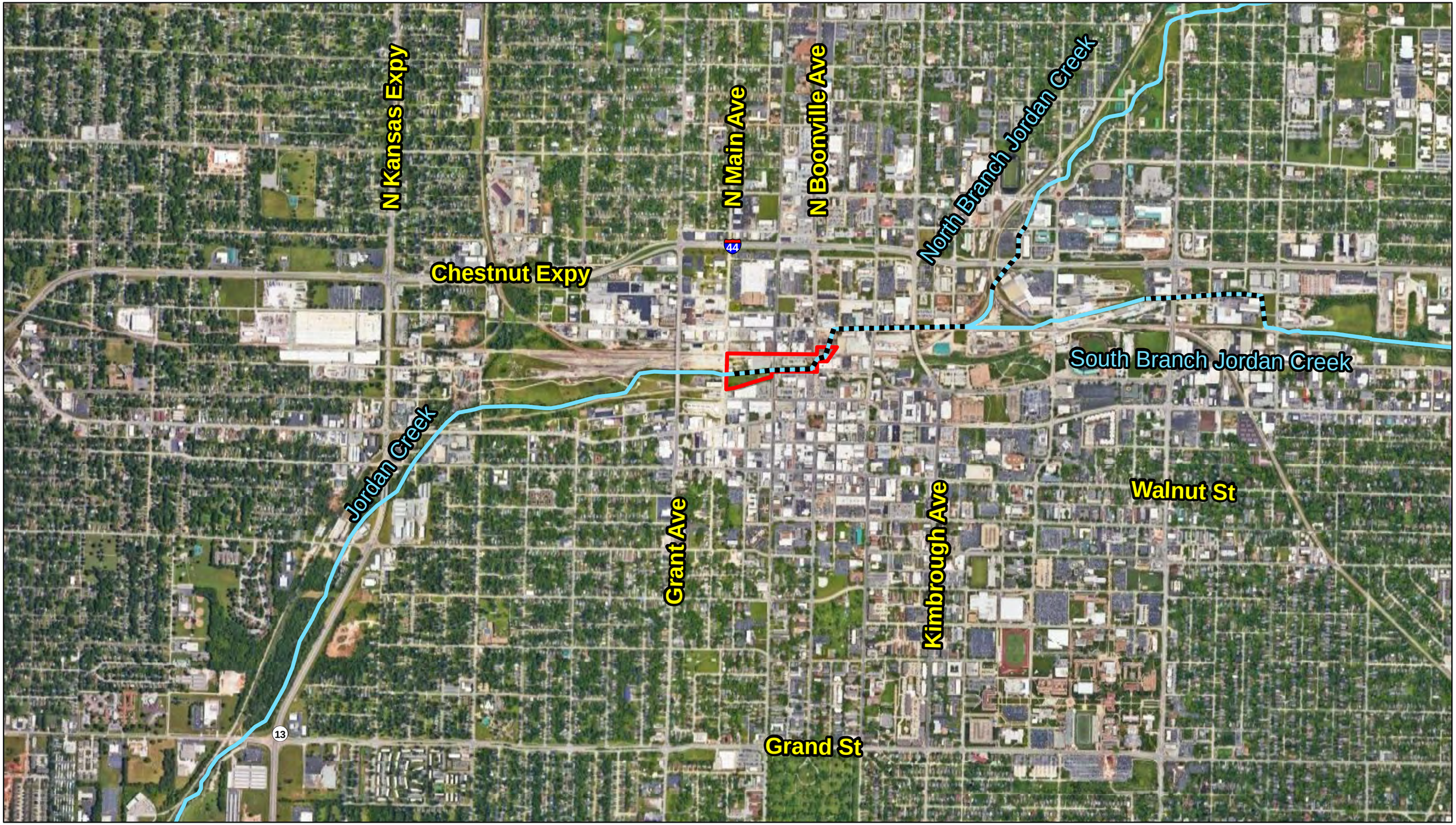
Renew Jordan Creek Project
Main Avenue to Boonville Avenue
Springfield, Missouri
Olsson Project No: 020-29780
Site Aerial Map
Figure 2

NAD 1983 UTM Zone 15N

Basemap: ESRI World Imagery



Renew Jordan Creek - Post Charrette Sketch
March 1st, 2023
the olsson studio



N

0 200400 800 1,200 1,600 2,000 ft

1 " = 1,225 '

olsson

Jordan Creek

Jordan Creek Culvertized

Project Boundary

Renew Jordan Creek Project

Main Avenue to Boonville Avenue

Springfield, Missouri

Olsson Project No: 020-29780

Jordan Creek Hydrology

Figure 4

NAD 1983 UTM Zone 15N

Basemap: ESRI World Imagery

N

0 100 200 400 ft

1 " = 287 '

olsson

Jordan Creek

Jordan Creek Culvertized

Project Boundary

Renew Jordan Creek Project

Main Avenue to Boonville Avenue

Springfield, Missouri

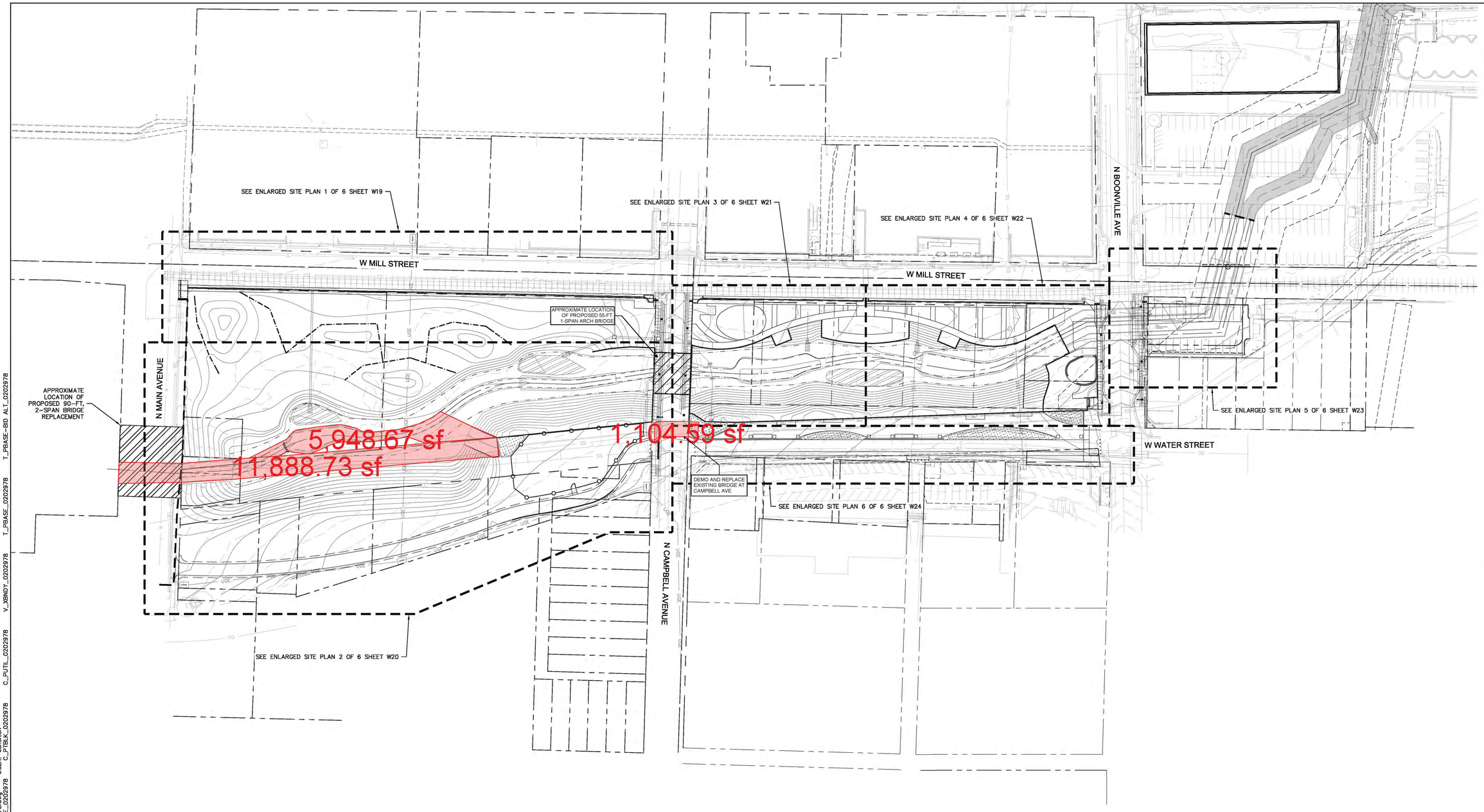
Olsson Project No: 020-29780

Jurisdictional Resources

Figure 5

NAD 1983 UTM Zone 15N

Basemap: ESRI World Imagery



BENCHMARKS:

BM #1 – C.O.S. #18
N.E. QUADRANT OF THE INTERSECTION OF CAMPBELL AVE. & WATER ST.
ELEVATION = 1274.77

BM#2 – SQUARE CUT ON THE SOUTH SIDE OF THE WEST WALL THE MAIN STREET BRIDGE LOCATED 280'± SOUTH OF THE OF THE SOUTHWEST QUADRANT OF THE INTERSECTION OF MAIN AVE. & MILL ST.
ELEVATION = 1267.26

BM #3 – C.O.S. #17
S.E. QUADRANT OF THE INTERSECTION OF CAMPBELL AVE. & MT. VERNON ST.
ELEVATION = 1317.85

N

0' 25' 50' 100'
SCALE IN FEET

olsson
Olsson, Inc. Engineering MO State Cert. of Authority #001592
Olsson, Inc. Landscape Architecture MO State Cert. of Authority #2005000285
550 St. Louis St.
Springfield, MO 65806
Olsson # 020-2978
TEL 417.890.8802
www.olsson.com

REV. NO.	DATE	REVISIONS DESCRIPTION	REV. BY
NO.	DATE	DESCR.	

REVISIONS

OVERALL SITE PLAN

RENEW JORDAN CREEK
MAIN TO BOONVILLE

SPRINGFIELD, MO

2022

drawn by: CRW
checked by: EJS
approved by: JLR
project no.: 020-29780
drawing no.: C_SIT01_0202978
date: 01.31.2023

MISSOURI ONE CALL SYSTEM
1-800-DIG-RITE or 811
www.mo1call.com

CITY OF
SPRINGFIELD, MO
RENEW JORDAN CREEK
FROM
MAIN TO BOONVILLE

SURVEYED BY: OLSSON	DESIGN: OLSSON	SCALES	SHEET W18
FIELD BK.:	DRAWN:	HOR. 1"=20'	OF 104 SHEETS
LEVEL BK.:	CHECKED:	VERT.:	FILE NO. 2019PW0073

Figure 6: Impacts to Jurisdictional Waters

DWG: F:\2020\2501-3000\020-2978\40-Design\AutoCAD\Final Plans\Sheets\GNCV\RJC\C_SIT01_0202978.dwg USER: eshelton
DATE: Feb 17, 2023 10:02am XREFS: C_XBASE_0202978 C_PSURF_ALL_0202978 C_PBASE_0202978 C_PFBLK_0202978 C_PUTIL_0202978 V_XBNDY_0202978 T_PBASE_0202978 T_PBASE_BID ALT_0202978

APPENDIX B

Agency Clearance Letters

From: Weber, John S
To: Preston, Kirkland
Subject: Fw: [EXTERNAL] State Revolving Fund Clearance Letter Request from USFWS
Date: Friday, March 10, 2023 1:37:18 PM
Attachments: image001.gif
23-03-10_RJC_USFWS_DraftClearance_COS_Letterhead.pdf

Dear Mr. Preston,

What an exciting and excellent project. I have replaced Karen Herrington as the field supervisor for MO. I performed a review of your project site and did not find any nearby records of listed species. You should be good to go from our perspective:

The U.S. Fish and Wildlife Service has reviewed this project and does not have any concerns about impacts to species listed under the Endangered Species Act. Please let me know if you have any additional questions or concerns.

Best regards,

John Weber
Field Supervisor
Missouri Field Office
U.S. Fish & Wildlife Service
Cell: 573-825-6048

From: Herrington, Karen <karen_herrington@fws.gov>
Sent: Friday, March 10, 2023 9:56 AM
To: Weber, John S <John_S_Weber@fws.gov>
Subject: Fw: [EXTERNAL] State Revolving Fund Clearance Letter Request from USFWS

I can't remember who this goes to

Karen Herrington
Midwest Region Ecological Services Program Leader
U.S. Fish and Wildlife Service
NEW PHONE: 763-234-4705
she/her/hers: why pronouns matter

From: Preston, Kirkland <kpreston@springfieldmo.gov>
Sent: Friday, March 10, 2023 8:18 AM
To: Herrington, Karen <karen_herrington@fws.gov>
Subject: [EXTERNAL] State Revolving Fund Clearance Letter Request from USFWS

Karen,

The City of Springfield has applied for State Revolving Fund loan toward construction of the Renew Jordan Creek Main to Boonville Project (the Project). As part of the environmental review process for the State Revolving Fund, the City is required to contact your agency to obtain a clearance letter for the project.

Please see attached for State Revolving Fund Clearance Letter Request for additional information and project details. Please feel free to contact me at the contact information below if there are any questions or if additional information is required.

Thank you,

Kirkland Preston
Department of Public Works - Stormwater
City of Springfield
417-864-1990 (office)
612-437-1941 (cell)
kpreston@springfieldmo.gov

Julie Smith

From: Jonathan Polak <jpolak@habitatarchitects.net>
Sent: Thursday, March 30, 2023 5:01 PM
To: Julie Smith
Cc: Jared Rasmussen
Subject: Re: RJC - USACE Consultation

Hi Julie,

I spoke to the Corps about Jordan Creek and they do not have additional ESA coordination for our project. The Corps determined internally that our project would have "No Effect" and therefore through their agreement with USFWS they do not have to complete additional consultation. They made their determination based on the IPAC info and the known habitat within the project area.

He said that with the roadway receiving funding through the state (or FHWA) there may be a need for additional coordination that the Corps is not required to complete based on their determination.

Jonathan Polak, P.E.*
Vice President - Environmental Engineer
Habitat Architects
ENVIRONMENTAL COMPLIANCE & RESTORATION
3904 East 185th St. | Belton, MO 64012
913.526.5085 | jpolak@habitatarchitects.net
*KS,MO

From: Natural Heritage Review
To: Preston, Kirkland
Subject: RE: State Revolving Fund Clearance Letter Request from MDC
Date: Tuesday, March 21, 2023 3:07:15 PM
Attachments: project_report_3_renew_jordan_creek__53084_54306_FINAL.pdf

---

Hello Kirkland,

Please note that a Natural Heritage Review provides information about species and natural communities of conservation concern, public lands and sensitive resources that could be affected by development projects. A Natural Heritage Review Report is **not a site clearance letter or a concurrence letter**. The Department does not issue or require site clearance letters, concurrence letters, or incidental take permits. The absence of data for a given geographic area is not a guarantee that sensitive species or features are not present, only an on-site survey can determine the presence or absence of natural heritage resources.

An updated automated report was generated for this project (attached), which also came back as LEVEL ONE indicating there were no records of occurrence for species or natural communities tracked by the Natural Heritage Program. At this time, we have **no additional recommendations** regarding your project request. Please refer to your automated report for ways to minimize impacts to Missouri's sensitive natural resources. If you have further questions, please reply to this email or call 573-522-4115 ext 3151.

Thank you for using the Natural Heritage Review Program,

Kelly Rezac
Wildlife Diversity Coordinator
Missouri Department of Conservation
(573) 522-4115 ext 3151
Kelly.Rezac@mdc.mo.gov

From: Preston, Kirkland <kpreston@springfieldmo.gov>
Sent: Friday, March 10, 2023 8:18 AM
To: Natural Heritage Review <NaturalHeritageReview@mdc.mo.gov>
Subject: State Revolving Fund Clearance Letter Request from MDC

Hello.

The City of Springfield has applied for State Revolving Fund loan toward construction of the Renew Jordan Creek Main to Boonville Project (the Project). As part of the environmental review process for the State Revolving Fund, the City is required to contact your agency to obtain a clearance letter for the project.

Please see attached for State Revolving Fund Clearance Letter Request for additional information and project details. Please feel free to contact me at the contact information below if there are any questions or if additional information is required.

Thank you,

Kirkland Preston
Department of Public Works - Stormwater
City of Springfield
417-864-1990 (office)
612-437-1941 (cell)
kpreston@springfieldmo.gov

Missouri Department of Conservation

Missouri Department of Conservation's Mission is to
protect and manage the forest, fish, and
wildlife resources of the state and to
facilitate and provide opportunities for all citizens to
use, enjoy and learn about these resources.

Natural Heritage Review Level One Report: No Known Records

Foreword: Thank you for accessing the Missouri Natural Heritage Review Website developed by the Missouri Department of Conservation with assistance from the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, Missouri Department of Transportation and NatureServe. The purpose of this report is to provide information to federal, state and local agencies, organizations, municipalities, corporations, and consultants regarding sensitive fish, wildlife, plants, natural communities, and habitats to assist in planning, designing, and permitting stages of projects.

PROJECT INFORMATION

Project Name and ID Number: Renew Jordan Creek - Main to Boonville #11590
User Project Number: City of Springfield - 2019PW0073
Project Description: Restoration of segment of Jordan Creek in downtown Springfield Missouri from N. Boonville Avenue to N. Main Avenue. Project includes sitewide excavation to naturalize the channel and replant the riparian buffer next to the stream with Missouri native plants and trees to help improve water quality and provide habitat. The existing box culverts will be partially demolished at this segment and additional/new pedestrian gathering areas and paths will be constructed. The project is located in Greene County Missouri at approximate lat/long (3721129395051765, -93.29435761256) and T29N, R22W, NE 1/4 of S23
Project Type: Conservation Easement
Contact Person: Kirkland Preston
Contact Information: kpreston@springfieldmo.gov or 417-864-1990

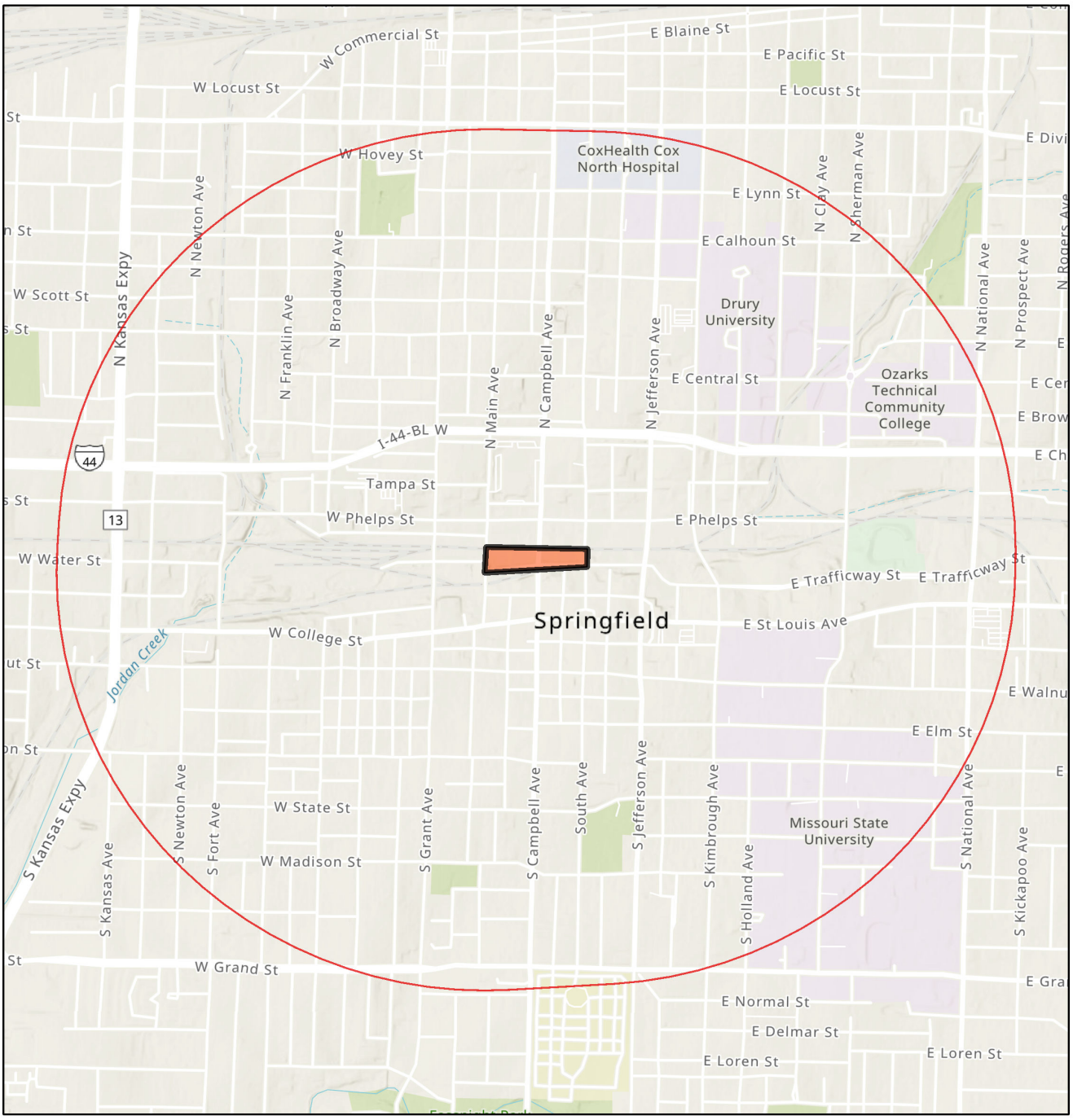
Disclaimer: This NATURAL HERITAGE REVIEW REPORT identifies if a species or natural community tracked by the Natural Heritage Program is known to occur within or near the project area submitted, and shares recommendations to avoid or minimize project impacts to sensitive species or natural habitats. Incorporating information from the Natural Heritage Program into project plans is an important step in reducing impacts to Missouri's sensitive natural resources. If an occurrence record is present, or the proposed project might affect federally listed species, the user must contact the Department of Conservation or U.S. Fish and Wildlife Service for more information.

This Natural Heritage Review Report is not a site clearance letter for the project. Rather, it identifies public lands and records of sensitive resources located close to and/or potentially affected by the proposed project. If project plans or location change, this report may no longer be valid. Because land use conditions change and animals move, the existence of an occurrence record does not mean the species/habitat is still present. Therefore, reports include information about records near but not necessarily on the project site. Lack of an occurrence record does not mean that a sensitive species or natural community is not present on or near the project area. On-site verification is the responsibility of the project. However, the Natural Heritage Program is only one reference that should be used to evaluate potential adverse project impacts and additional information (e.g. wetland or soils maps, on-site inspections or surveys) should be considered. Reviewing current landscape and habitat information, and species' biological characteristics would additionally ensure that Missouri Species of Conservation Concern are appropriately identified and addressed in planning efforts.

U.S. Fish and Wildlife Service – Endangered Species Act (ESA) Coordination: Lack of a Natural Heritage Program occurrence record for federally listed species in your project area does not mean the species is not present, as the area may never have been surveyed. Presence of a Natural Heritage Program occurrence record does not mean the project will result in negative impacts. This report does not fulfill Endangered Species Act consultation with the U.S. Fish and Wildlife Service (USFWS) for listed species. Direct contact with the USFWS may be necessary to complete consultation and it is required for actions with a federal connection, such as federal funding or a federal permit; direct contact is also required if ESA concurrence is necessary. Visit IPaC: Home (fws.gov) to initiate USFWS Information for Planning and Conservation (IPaC) consultation. Contact the Columbia Missouri Ecological Field Services Office (573-234-2132, or by mail at 101 Park Deville Drive, Suite A, Columbia, MO 65203) for more information.

Transportation Projects: If the project involves the use of Federal Highway Administration transportation funds, these recommendations may not fulfill all contract requirements. Please contact the Missouri Department of Transportation at 573-526-4778 or visit Home Page | Missouri Department of Transportation (modot.org) for additional information on recommendations.

Renew Jordan Creek - Main to Boonville



March 21, 2023

1:21,026

0 0.17 0.35 0.7 mi

0 0.28 0.55 1.1 km

Buffered Project Boundary

Project Boundary

Esri, NASA, NGA, USGS, FEMA, Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

Species or Communities of Conservation Concern within the Area:

There are no known records of Species or Natural Communities of Conservation Concern within the defined Project Area.

Other Special Search Results:

No results have been identified for this project location.

Project Type Recommendations:

No recommendations have been identified for this project type.

Project Location and/or Species Recommendations:

Endangered Species Act Coordination - If this project has the potential to alter habitat (e.g. tree removal, projects in karst habitat) or cause direct mortality of bats, please coordinate directly with U.S. Fish and Wildlife Service (Ecological Services, 101 Park Deville Drive, Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132 Ext. 100 for Ecological Services) for further coordination under the Endangered Species Act. Indiana bats *(Myotis sodalis*, federal- and state-listed endangered) and **Northern long-eared bats** (*Myotis septentrionalis,* federal-listed threatened) may occur near the project area. Both of these species of bats hibernate during winter months in caves and mines. During the summer months, they roost and raise young under the bark of trees in wooded areas, often riparian forests and upland forests near perennial streams. During project activities, avoid degrading stream quality and where possible leave snags standing and preserve mature forest canopy. Do not enter caves known to harbor Indiana bats or Northern long-eared bats, especially from September to April.

Karst: This county has known karst geologic features (e.g., caves, springs, and sinkholes, all characterized by subterranean water movement). Few karst features are recorded in Natural Heritage records, and ones not noted here may be encountered at the project site or affected by the project. Cave fauna (many of which are Species of Conservation Concern) are influenced by changes to water quality; please check your project site for any karst features and make every effort to protect groundwater in the project area. Additional information and specific recommendations are available at Management Recommendations for Construction and Development Projects Affecting Missouri Karst Habitat (mo.gov).

Ozark Cavefish: The project is within the recharge area for an Ozark Cavefish (Troglichthys rosae, federal listed threatened, state-listed endangered) site. All activities that might adversely impact groundwater quality should be avoided. Please see Best Management Practices for Construction and Development Projects Ozark Cavefish (mo.gov) and Management Recommendations for Construction and Development Projects Affecting Missouri Karst Habitat (mo.gov). Additional coordination with the U.S. Fish and Wildlife Service may be required for the project under the federal Endangered Species Act (U.S. Fish and Wildlife Service, Ecological Services, 101 Park DeVille Drive, Suite A, Columbia, Missouri 65203-0007; phone 573-234-2132).

Invasive exotic species are a significant issue for fish, wildlife and agriculture in Missouri. Seeds, eggs, and larvae may be moved to new sites on boats or construction equipment. Please inspect and clean equipment thoroughly before moving between project sites. See Managing Invasive Species in Your Community | Missouri Department of Conservation (mo.gov) for more information.

- Remove any mud, soil, trash, plants or animals from equipment before leaving any water body or work area.
- Drain water from boats and machinery that have operated in water, checking motor cavities, live-well, bilge and transom wells, tracks, buckets, and any other water reservoirs.
- When possible, wash and rinse equipment thoroughly with hard spray or HOT water (>140° F, typically available at do-it-yourself car wash sites), and dry in the hot sun before using again.

Streams and Wetlands – Clean Water Act Permits: Streams and wetlands in the project area should be protected from activities that degrade habitat conditions. For example, soil erosion, water pollution, placement of fill, dredging, in-stream activities, and riparian corridor removal, can modify or diminish aquatic habitats. Streams and wetlands may be protected under the Clean Water Act and require a permit for any activities that result in fill or other modifications to the site. Conditions provided within the U.S. Army Corps of Engineers (USACE) Clean Water Act Section 404 permit (Kansas City District Regulatory Branch (army.mil)) and the Missouri Department of Natural Resources (DNR) issued Clean Water Act Section 401 Water Quality Certification (Section 401 Water Quality Certification | Missouri Department of Natural Resources (mo.gov)), if required, should help minimize impacts to the aquatic organisms and aquatic habitat within the area. Depending on your project type, additional permits may be required by the Missouri Department of Natural Resources, such as permits for stormwater, wastewater treatment facilities, and confined animal feeding operations. Visit Wastewater Permits | Missouri Department of Natural Resources (mo.gov) for more information on DNR permits. Visit both the USACE and DNR for more information on Clean Water Act permitting.

For further coordination with the Missouri Department of Conservation and the U.S. Fish and Wildlife Services, please see the contact information below:

Email (preferred): NaturalHeritageReview@mdc.mo.gov
MDC Natural Heritage Review
Science Branch
P.O. Box 180
Jefferson City, MO
65102-0180
Phone: 573-522-4115 ext. 3182

U.S. Fish and Wildlife Service
Ecological Service
101 Park Deville Drive
Suite A
Columbia, MO
65203-0007
Phone: 573-234-2132

Miscellaneous Information

FEDERAL Concerns are species/habitats protected under the Federal Endangered Species Act and that have been known near enough to the project site to warrant consideration. For these, project managers must contact the U.S. Fish and Wildlife Service Ecological Services (101 Park Deville Drive Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132; Fax 573-234-2181) for consultation.

STATE Concerns are species/habitats known to exist near enough to the project site to warrant concern and that are protected under the Wildlife Code of Missouri (RSMo 3 CSR 1 0). "State Endangered Status" is determined by the Missouri Conservation Commission under constitutional authority, with requirements expressed in the Missouri Wildlife Code, rule 3CSR 1 0-4.111. Species tracked by the Natural Heritage Program have a "State Rank" which is a numeric rank of relative rarity. Species tracked by this program and all native Missouri wildlife are protected under rule 3CSR 10-4.110 General Provisions of the Wildlife Code.

See Missouri Species and Communities of Conservation Concern Checklist (mo.gov) for a complete list of species and communities of conservation concern. Detailed information about the animals and some plants mentioned may be accessed at Mofwis Search Results. Please contact the Missouri Department of Conservation to request printed copies of any materials linked in this document.

Michael L. Parson
Governor

State of Missouri
OFFICE OF ADMINISTRATION
Post Office Box 809
Jefferson City, Missouri 65102
Phone: (573) 751-1851
Fax: (573) 751-1212

Kenneth J. Zellers
Commissioner

March 21, 2023

Kirkland Preston
840 N. Boonville Ave
Springfield, MO 65802

Subject: 2309039
Legal Name: City of Springfield
Project Description: Clean Water State Revolving Fund Loan / Construction of the Renew Jordan Creek Main to Boonville Project

The Missouri Federal Assistance Clearinghouse, in cooperation with state and local agencies interested or possibly affected, has completed the review on the above project application.

None of the agencies involved in the review had comments or recommendations to offer at this time. This concludes the Clearinghouse's review.

A copy of this letter is to be attached to the application as evidence of compliance with the State Clearinghouse requirements.

Sincerely,

Sara VanderFeltz

Sara VanderFeltz
Administrative Assistant

cc:

Missouri Department of dnr.mo.gov
NATURAL RESOURCES
Michael L. Parson, Governor
Dru Buntin, Director

June 15, 2023

City of Springfield Public Works
Attn: Kirkland Preston, P.E.
Busch Municipal Building
840 Boonville Ave
Springfield, MO 65802

RE: Renew Jordan Creek Project (Main to Boonville), City of Springfield, Greene County, Missouri

Dear Mr. Preston,

Thank you for the opportunity to comment on the City of Springfield's Jordan Creek improvements project. As these improvements do not include construction of waste containing earthen impoundments, this project does not require a geohydrologic collapse potential evaluation. Because a new NPDES wastewater discharge is not proposed, there is no need for a geologic stream evaluation. Land application of wastewater is not proposed, so the onsite determination of sinkholes and geologic stream classification is not required. A geohydrologic site evaluation is not required from this office, therefore, we have no comment on the proposed project at this time.

If you need further assistance from our office, please do not hesitate to contact me via email at sherri.stoner@dnr.mo.gov or Feyi Ilesanmi at feyi.ilesanmi@dnr.mo.gov

Sincerely,

MISSOURI GEOLOGICAL SURVEY

Sherri Stoner

Sherri Stoner, R.G.
Environmental Geology Section
Geological Survey Program
PO Box 250
Rolla, MO 65402

C: WPP/FAC

MISSOURI
STATE PARKS

March 17, 2023

Kirkland Preston, P.E.
Department of Public Works-Stormwater
Busch Municipal Building
840 Boonville Avenue
Springfield, MO 65802

Re: Renew Jordan Creek Project, Springfield, MO

Dear Kirkland Preston:

The Department of Natural Resources, Missouri State Parks, Planning and Development Program has reviewed the plans you sent regarding the above referenced project. Based on the information provided, we have determined that this project will have **no impact** to the state parks or federally funded parks located in this area.

This clearance applies only to the rules and regulations governing Missouri State Parks and the National Parks Service's Land and Water Conservation Fund program. Additional clearances from our department may be required.

Please feel free to contact Dawn Scott at (573) 522-0571 or write to Department of Natural Resources, P.O. Box 176, Jefferson City, Missouri 65102 if you have any questions. Thank you for the opportunity to serve the residents of the City of Springfield.

Sincerely,

MISSOURI STATE PARKS

Terry Bruns, Director
Planning and Development Program

APPENDIX C

Memorandum of Agreement Between the U.S. Army Corps of Engineers and the Missouri State Historic Preservation Officer

MEMORANDUM OF AGREEMENT
BETWEEN
THE U.S. ARMY CORPS OF ENGINEERS
AND THE
MISSOURI STATE HISTORIC PRESERVATION OFFICER
REGARDING THE
RENEW JORDAN CREEK IMPROVEMENTS: MAIN TO BOONVILLE, THE CITY OF SPRINGFIELD, GREENE COUNTY, MISSOURI
MISSOURI SHPO PROJECT 055-GR-21
DEPARTMENT OF ARMY PERMIT NO. SWL-2022-00064

WHEREAS, the U.S. Army Corps of Engineers (USACE) has determined that the City of Springfield (Applicant) will require a Nationwide Permit #27 (Aquatic Habitat Restoration, Establishment, and Enhancement) authorized under Section 404 of the Clean Water Act (33 U.S.C. § 1251 *et seq.*) for the Renew Jordan Creek Improvements: Main to Boonville in the City of Springfield, Greene County, Missouri; and

WHEREAS, the undertaking consists of daylighting the section of Jordan Creek between North Main Avenue and North Boonville Avenue to achieve floodplain mitigation and create community recreation improvements and economic redevelopment benefits for this area of downtown and

WHEREAS, the USACE in consultation with the Missouri State Historic Preservation Officer (SHPO) determined the area of potential effects (APE) is approximately 8.5 acres bounded by West Mill Street to the north, West Water Street and railroad tracks to the south, North Boonville Avenue to the east, and North Main Avenue to the west in portions of Sections 23 and 24, Township 29 North, Range 22 West on the Springfield quad; and

WHEREAS, the USACE has determined that the undertaking will have an adverse effect on the Springfield Warehouse and Industrial Historic District, listed in the National Register of Historic Places on May 12, 1999 (NRHP Ref. No. 99000715), through demolition of 351 North Boonville Avenue, a contributing element under Criterion C to the district; and

WHEREAS, the USACE has consulted with the SHPO pursuant to 36 CFR Part 800, the regulations implementing Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108), and on October 18, 2022, the SHPO concurred with the USACE finding of adverse effect to the historic district and recommended an agreement document to govern mitigative measures for the resource (SHPO Log Number 055-GR-21); and

WHEREAS, the USACE has consulted with the Applicant regarding the effects of the undertaking on historic properties and has invited them to sign this MOA as a consulting party; and

WHEREAS, the USACE has consulted with the Cherokee Nation, Delaware Nation, and Osage Nation regarding the effects of the undertaking on historic properties and invited signature as a concurring party; and

WHEREAS, in accordance with 36 CFR § 800.6(a)(1), the USACE has notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination with specified documentation, and the ACHP has chosen *not to* participate in the consultation pursuant to 36 CFR § 800.6(a)(1)(iii); and

NOW, THEREFORE, the USACE and the SHPO agree that the undertaking shall be implemented in accordance with the following stipulations to account for effects on historic properties.

STIPULATIONS

The USACE shall ensure that the following measures are carried out:

I. Documentation

A. The USACE will ensure recordation of Building 351 North Boonville Avenue with a Missouri Department of Natural Resources, State Historic Preservation Office Architectural/Inventory Form, to include background research, a site map/plan, and photographic documentation of each elevation, at a minimum. All work must be to the standards of the Missouri SHPO.

IV. **DURATION**

This MOA will expire if its terms are not carried out within five (5) years from the date of its execution. Prior to such time, the USACE may consult with the other signatories to reconsider the terms of the MOA and amend it in accordance with Stipulation VII below.

V. **REPORTING**

Upon fulfillment of the terms of this MOA, or upon expiration or termination, the USACE shall provide all parties to this MOA a summary letter detailing work undertaken pursuant to its terms. In accordance with 36 CFR § 800.6(b)(1)(iv), the USACE will submit a copy of the executed MOA, along with the documentation specified in Section 800.11(f), to the ACHP prior to approving the undertaking.

VI. **DISPUTE RESOLUTION**

Should any signatory or concurring party to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, the USACE shall consult with such party to resolve the objection. If the USACE determines that such objection cannot be resolved, the USACE will:

A. Forward all documentation relevant to the dispute, including the USACE's proposed resolution, to the ACHP. The ACHP shall provide the USACE with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, the USACE shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, signatories and concurring parties, and provide them with a copy of this written response. The USACE will then proceed according to its final decision.

B. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day period, the USACE may make a final decision on the dispute and proceed accordingly.

Prior to reaching such a final decision, the USACE shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to the MOA and provide them and the ACHP with a copy of such written response.

C. It is the USACE's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged.

VII**. AMENDMENTS**

This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

VIII. **TERMINATION**

If any signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other signatories to attempt to develop an amendment per Stipulation VII, above. If within thirty (30) days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.

Once the MOA is terminated, and prior to work continuing on the undertaking, the USACE must either (a) execute an MOA pursuant to 36 CFR § 800.6 or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR § 800.7. The USACE shall notify the signatories as to the course of action it will pursue.

Execution of this MOA by the USACE and the SHPO and implementation of its terms evidence that the USACE has considered the effects of this undertaking on historic properties and afforded the ACHP an opportunity to comment.

SIGNATORIES:

U.S. Army Corps of Engineers

_____Date:
[insert agency official name and title]

Missouri State Historic Preservation Officer

_____Date:
[insert name and title]

CONCURRING PARTIES:

City of Springfield

_____Date:
[insert name and title]

APPENDIX D

Cultural Resources Deep Trenching Plan

A PROPOSAL FOR

DEEP TRENCH GEOARCHAEOLOGICAL CONSULTATION ASSOCIATED WITH THE RENEW JORDAN CREEK PROJECT, CITY OF SPRINGFIELD, GREENE COUNTY, MISSOURI

Prepared for:

Olsson;
City of Springfield;
Environmental Protection Agency;
U.S. Army Corps of Engineers
(DA Permit Number SWL-2022-00064);
and the Missouri Department of Natural Resources,
State Historic Preservation Office
(Missouri SHPO Project 055-GR-21)

Prepared by:

Howard J. Cyr
Principal Investigator/Geoarchaeologist
GeoArch Solutions
3804 Cline Drive SE
Smyrna, Georgia 30082
(865) 804 - 8192
hcyr@geoarchsolutions.com

and

Joe Harl and Timothy Baumann
Archaeological Research Center of St. Louis, Inc.
6049 Hampton Ave.
St. Louis, Missouri 63109
Phone: 314-349-1531
Email: arc@arcstl.com

Kevin Cupka Head
Warren Center for Archaeological Research
Missouri State University
901 S. National Ave.
Springfield, Missouri 65897
Phone: 417-836-5363
Email: kcupkahead@missouristate.edu

October 2023

INTRODUCTION

The City of Springfield and Olsson have submitted a long-term flood management plan to reopen a portion of Jordan Creek that was enclosed/covered in 1928 because of repeated flooding and property damage (Bullard 2001; Berneking 2016). The current project will open and rechannel the creek, transform the surrounding land into a greenspace for recreation, and initiate economic redevelopment for the neighborhood. These improvements cover approximately 29,000 square meters (7.2 acres) within Sections 23 and 24 of Township 29 North, Range 22 West in the City of Springfield, Missouri (Figure 1). The area of potential effects (APE) is bounded by North Main Avenue on the west, West Mill Street on the north, West Water Street on the south, and North Boonville Avenue on the east. The proposed improvements will require that a new creek channel be excavated to a maximum depth of 5 meters (16 feet) below the ground surface. This undertaking will be conducted under Section 404 of the Clean Water Act (33 U.S.C. § 1251 *et seq.*), which requires a Nationwide Permit (NWP) #27 (Aquatic Habitat Restoration, Establishment, and Enhancement) administered by the United States Army Corps of Engineers (USACE) (DA Permit Number SWL-2022-00064). As part of the USACE permit, cultural resource investigation is required in compliance with the National Historic Preservation Act of 1966, Section 106 (Public Law 89-665, amendments PL91-243, 93-442, 94-458, and 96-665), the National Environmental Policy Act of 1969 (PL91-190), and Executive Order 11593 of 1971.

Previous investigations by Missouri State University's Center for Archaeological Research (CAR) identified two archeological sites within the APE: the Springfield Wagon Shops Site (23GR2023) and the Springfield Manufacturing Company Site (23GR2024) (Figure 1). Site 23GR2023 is located west of North Campbell Avenue. Its present boundaries are limited to 1000 square meters (0.247 acres) on the southern end of this block near Jordan Creek; however, the site has not been delineated archaeologically (Jones et al. 2007, Jones 2006a). CAR placed three trenches just south of the parking lot on this site. These trenches exposed a mixed fill with historical artifacts to depths of 80 to 100 cm (2.7–3.3 feet) beneath the modern ground surface. They also determined that the soil was contaminated by industrial waste. Under the mixed cultural deposits was a reddish clay with chert residuum and historical artifacts that extended to a depth of about 125 cm (4 feet). The eastern two trenches (Trench 2 and 3) contained a yellowish gray gleyed silty clay with several precontact artifacts, between 125 and 145 cm (4–6 feet) below the ground surface. Carbonized deciduous and coniferous wood remains were also found in this undisturbed zone, suggesting that precontact cultural features could still be preserved. At about 175 cm (about 6 feet), presettlement alluvium, linked to Hepler series soil, was identified and found to be void of human activity.

Site 23GR2024 is located east of North Campbell and west of North Boonville (Jones et al. 2007; Jones 2006b). As presently recorded, this site also covers approximately 1000 square meters along Jordan Creek but has not been delineated archaeologically. CAR conducted two trenches on this site, which were described as:

> Trench l was oriented north-south approximately 3 meters north of the Jordan Creek retaining wall in a wooded area just east of the current parking lot. The trench measured approximately 3 m in length and 2 m in width. The north end of the trench was ramped down for access. Trench 2 was placed at the western edge of the

> property, approximately 4 meters north of the Jordan Creek retaining wall in an open area partly covered in crushed limestone gravel. Trench 2 also measured approximately 3 m in length and 2 m in width; it was also ramped on the north end to provide access.

Both trenches within site 23GR2024 had a mixed fill with historical artifacts to depths of 120 and 165 cm (4 and 5.5 feet) below the ground surface. Immediately below this mixed fill, each trench had *in situ* historic limestone foundations. Many historical artifacts continued to be found below these stone foundations, including an ashy lens at about 200 cm (6.7 feet) in Trench 1. Precontact artifacts, consisting of flaking debris, were recovered between 200 to 300 cm (6.7 to 10 feet) below grade. The presettlement soil, which is void of any human activity, was encountered at 300 cm (10 feet) in Trench 1 and 240 cm in Trench 2 (8 feet) below the ground surface (Jones et al. 2007, Jones 2006b).

In CAR's final report, Jones et al. (2007:87) recommended that:

> However, given the high amount of lead and other contaminants in the upper historic layer, in addition to moderate to heavy disturbance, testing should be limited to the historic alluvium (1.5-2.13 m bs) to include the earlier historic deposits and prehistoric layer. . . Further investigations are warranted to ascertain the spatial extent and integrity . . . and to evaluate their eligibility for listing on the NRHP.

Missouri Department of Natural Resources, State Historic Preservation Office (SHPO) (Log # 055-GR-21) agreed with these recommendations that sites 23GR2023 and 23GR2024 needed additional testing to determine eligibility for the National Register of Historic Places (NRHP). If future undertakings could not avoid these sites, Phase II testing would be necessary. The USACE determined that the proposed Renew Jordan Creek Project (undertaking) would impact these two sites and that further testing was warranted to evaluate their NRHP eligibility and to aid in designing an appropriate mitigation plan, should either site be determined eligible.

Proposal for Archaeological and Geoarchaeological Investigation

GeoArch Solutions LLC, the Archaeological Research Center of St. Louis Inc. (ARC), and CAR propose investigations and identification of cultural remains associated with the Renew Jordan Creek Project located in the City of Springfield, Greene County, Missouri. The proposed archaeological work will occur north of Jordan Creek within the APE that will be excavated deeper than 80 cm below the present grade. This was the minimum depth of mixed/disturbed archaeological deposits previously identified by CAR in 2007.

These investigations will determine the extent of sites 23GR2023 and 23GR2024 within the proposed Renew Jordan Creek construction footprint. The APE spans an upper terrace with potential for deeply buried surfaces. These buried surfaces mark periods of floodplain stability often associated with precontact human occupation. Although little is known about the Holocene depositional and environmental history of the creek system, trench excavations carried out by CAR in 2007 clearly demonstrate the presence of precontact artifacts to depths of 300 centimeters below the surface (cmbs). Although critical to understanding precontact occupation of the area, the trench

excavations by CAR covered only a small portion of the APE. The cultural and natural stratigraphy for most of this area is still unknown.

In an urban context, standard archaeological investigations of shovel tests, augering, or hand excavating test units are impractical (Dickens 1982; Staski 1982, 1987). Urban sites often have deep and dense archaeological deposits from landfilling and leveling, construction debris, trash dumping, and constructing, modifying, and demolishing the built environment. This is true of the Renew Jordan Creek project area. The 2007 CAR trench excavations identified disturbed historic fill layers extending as much as 200 cm below the surface. In addition, the CAR investigations identified high amounts of lead (as much as 1,810 ppm) and other industrial contaminants (e.g., arsenic, mercury, zinc) in the upper historic fill layers. This contamination was so great that in CAR's final report, Jones et al. (2007:87) recommended that testing be limited to the sediment and soils underlying the historic fill layer. The safety concerns posed by exposure to disturbed contaminated fill limit the applicability of hand or mechanical augers or deep shovel tests to examine the subsurface stratigraphy.

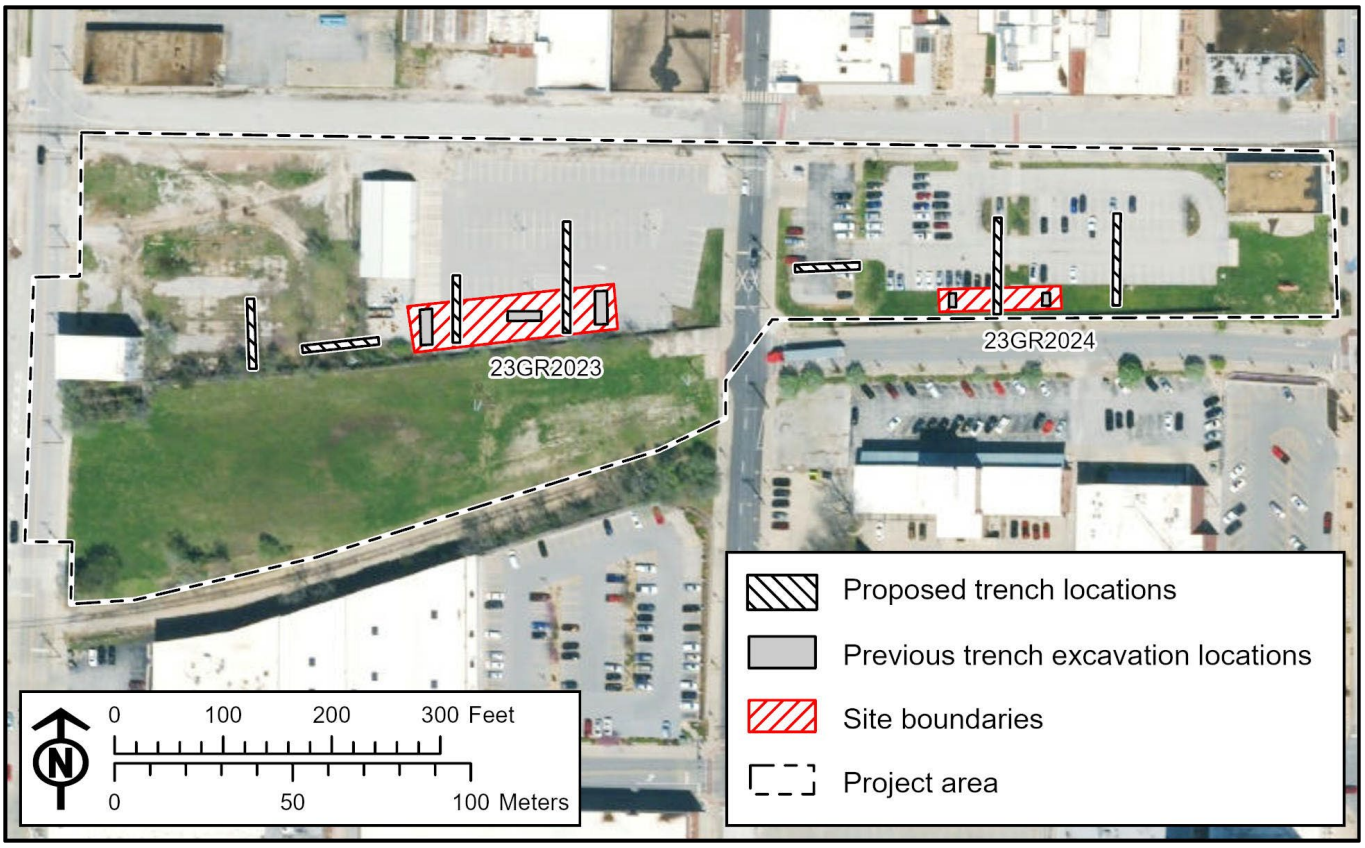
Flooding from Jordan Creek also added alluvium and razed buildings. For example, the 1909 flood destroyed and razed many buildings within the APE (The Springfield Leader 1909; Springfield Republican 1909; Berneking 2016). These natural and cultural deposits can help to protect intact precontact and historical cultural features. For example, urban archaeological projects in Hannibal and St. Louis have uncovered deep and stratified deposits with intact precontact and historical features (Lopinot et al. 1985; Harl 2006; Harl et al. 1996; Harl and Naglich 1995; Machiran and Harl 2014; Meyer 2004, 2008, 2010, 2013; Meyer and Austin 2008).

The greatest potential for finding precontact cultural features will be in buried deposits in areas without historic building construction. Discovering precontact features and artifacts will provide new and potentially significant information on Native heritage in Missouri.

Postcontact features and artifacts recovered from urban contexts can provide valuable information on the lives and labor of everyday people (Young 2000; Mrozowski 2006; Mullins & Warner 2008). This is particularly true of the working class, immigrants, minorities, and women, whose histories have been traditionally ignored or suppressed. The greatest potential to recover intact features in an urban environment is in the rear yard or next to alleyways.

The purpose of the geoarchaeological analysis is to examine the APE for buried soil horizons and surfaces and assess their potential for cultural resources. Through a stratigraphic examination of mechanically excavated trench profiles, the geoarchaeological component of the study proposes to examine the nature, depth, and spatial extent of historic fill layers, floodplain deposits, buried soils, and cultural horizons across the APE. It will also determine the potential for intact features and other cultural remains. This study will provide a better understanding of Holocene landscape changes across the APE and help to identify the depth and spatial extent to which cultural materials are likely to be found. Included below are detailed explanations of the proposed deep testing and microartifact methods, project deliverables, and schedules.

Figure 1. Proposed trench locations within the APE (project area).



Methodology

The archaeological investigation will employ mechanical trench excavations across the upper floodplain to evaluate the site stratigraphy and determine the potential for intact cultural deposits. Figure 1 illustrates the proposed seven trench locations. These trenches are limited to the area where the proposed construction will conduct deep excavation (i.e., 80 cm or greater below grade). Sites 23GR2023 and 23GR2024 cannot be evaluated beyond the proposed construction footprint. The number of trenches and their final locations will be determined during the field investigations after agreement with the various consulting parties.

The trenches will be excavated at least 2 meters (7–8 feet) wide across the two sites. A trackhoe with a 4-foot-wide smooth blade will be used to excavate the trenches. This width will allow for deeper excavations and better observance of the trench floor for features. However, the upper walls may need to be sloped or benched to ensure compliance with applicable OSHA standards. An OSHA-trained competent person will be on site to monitor excavation safety, and all personnel will be required to wear appropriate PPE. At a minimum field personnel will wear hard hats, safety vests, work gloves, and work boots. Additional PPE, including hearing protection, safety glasses, and respirators may also be warranted. Furthermore, CAR field personnel will have completed OSHA 40 Hour HAZWOPER training. Fieldwork will be conducted under the supervision of a SOI-qualified professional archaeologist, and all archaeological technicians will meet ONHPO

minimum professional qualifications. The trackhoe will remove the upper, contaminated fill quickly, but once the lower portion of the fill is reached, thinner slices of about 5 cm (2 inches) will be removed. In addition to one or two people watching the excavations for cultural remains, 2–4 people will watch the back dirt for any cultural materials. Often, precontact artifacts are observed during excavations or in the back dirt just before a feature is exposed. All trenches will be excavated below any cultural deposits and into the pre-settlement soils. Considering that CAR encountered some groundwater seepage in their previous trenches, a dewatering plan will be prepared prior to excavation.

Trench stratigraphy will be examined by a geoarchaeologist from GeoArch Solutions using standard USDA-NRCS soil terminology. Trench profiles will be photographed and drawn. Trench surface elevations and UTM coordinates will be collected using a sub-centimeter survey grade Trimble R8s GNSS RTK system. The geoarchaeologist will analyze the cultural and natural stratigraphy exposed within each trench excavation profile. The geoarchaeological analysis of the site formation processes, both natural and cultural, is vital to understanding the depositional strata, identifying deeply buried precontact deposits, and interpreting the relative age relationships of each lens.

If the top of a feature is exposed during excavations, the trackhoe excavations will stop. The trackhoe, the geoarchaeologist, and a portion of the CAR crew will be moved to another trench. This will prevent any costly downtime for the trackhoe and operator. The other part of the CAR crew will fully expose the feature using shovels and trowels. The plan view will be photographed and drawn. The center of each feature will be recorded with a SparkFun RTK Facet L-Band GNSS unit. As necessary, the four corners, boundaries, and/or bisection points of features will also be recorded via RTK GNSS. Each feature will be assigned a unique field serial number (FSN) and recorded in a feature log. This log will include, at a minimum, the FSN, provenience information, shape of feature top, width and length, feature shape in profile, and maximum depth. A feature form will also be used to document specific characteristics and sizes for each feature, including artifact types, possible cultural age, and function. If the feature is fully exposed in the trench, it will be excavated. However, if it is only partially exposed, it will not be excavated but saved for monitoring operations when the entire feature can be safely exposed. In such cases, any artifacts uncovered at the top of the feature will be collected.

Fully exposed precontact features will be bisected with shovels and trowels, and the fill will be removed in 10 cm levels. However, if a natural lens is encountered, the excavations will stop, and this new zone removed in 10 cm levels. The fill will be screened in the field through ¼-inch wire mesh, and all recovered cultural and/or associated datable materials will be placed into appropriately labeled bags. Fragile or otherwise sensitive materials will be handled, processed, and stored appropriately in order to mitigate the chance of contamination or degradation. The bags will be labeled with, at a minimum, site number, unique FSN, zone/level, depth, artifacts in the bag, excavators' names, and date. Only the fill within the feature will be removed to preserve its original shape. After removing half of the fill, the feature's profile will be drawn and photographed with a north arrow scale and photo board. Information concerning the feature will be recorded on a feature form. The second half will be excavated similarly. A flotation sample of at least ten liters will be taken from the second half of the features and returned to the CAR lab. Flotation samples are used to recover small particles of plant and animal remains. They will be taken from the lower levels of the feature, where the most carbonized materials are typically found. In addition to the flotation sample, samples of plant or animal remains will be removed from feature deposits for possible

radiocarbon dating. The location of the radiocarbon samples taken will be mapped and noted on the feature form. Once the fill has been removed, a final plan view drawing and photograph will be taken of the feature. Any final observations or interpretations will then be used to complete the feature form. Once all features have been excavated from the stripped surface, trench excavation will resume, following the above procedures until culturally sterile sediments are reached.

Historical features such as cisterns, privy pits, and wells will be impractical and potentially dangerous to hand excavate. The trackhoe will be used to remove these features. It will remove half of the feature fill in thin layers, and the wall profile will be drawn and photographed. As the fill is removed, the backhoe operator will spread it out so the field crew may recover artifacts. The second half will be removed with the trackhoe and the fill spread out to recover artifacts. At least one ten-liter flotation sample will be taken from the lower portion of these features.

Inadvertent Discovery Plan

In the event of an unanticipated discovery of human remains or burial, CAR will comply with the Missouri Unmarked Human Burial Law (RSMO §194.400-410) and follow these procedures:

1. Upon encountering human remains or an unmarked human burial during ground disturbing activities, the archaeological crew supervisor will immediately stop work within 50 feet radius from the point of discovery. The archaeological crew supervisor will implement interim measures to protect the discovery from vandalism and looting but must not remove or otherwise disturb any human remains or other items in the immediate vicinity of the discovery.
2. Only natural materials will be used in the process of implementing protection measures for any uncovered human remains.
3. CAR will immediately notify local law enforcement, the City of Springfield, the USACE, and Olsson. USACE will follow up within twenty-four (24) hours of the discovery of unmarked human remains with a phone call to Missouri SHPO and the consulting Tribes.
4. Within seventy-two (72) hours after notification, the county coroner will determine jurisdiction.
5. Other than for crime scene investigation, no excavation, examination, photographs, or analysis of human remains will be conducted without first consultation between CAR, Olsson, City of Springfield, USACE, Missouri SHPO, and consulting Tribes.
6. CAR will have seven (7) working days to determine the degree to which the human remains were disturbed and, if possible, assess their potential age, cultural affiliation, and identity, if possible, without any further disturbance. Upon making their determination, the USACE will notify Missouri SHPO and the consulting Tribes of its findings. This notification must include pertinent information as to the kinds of human remains and/or funerary objects discovered inadvertently, their condition, and the circumstances of their inadvertent discovery.
7. If it is determined that intact or fragmented human remains are present and not considered modern or criminal evidence, Missouri SHPO will take control of the remains. A conference call will be arranged by USACE with CAR, Olsson, the City

of Springfield, Missouri SHPO, and consulting Tribes regarding additional measures to avoid and protect or mitigate the adverse effect of the project on the human remains and burial site. These measures may include:

   a. exploration of potential alternatives to avoid the human remains or burial;
   b. formal archaeological evaluation of the site;
   c. if a mitigation plan is needed, including procedures for disinterment and re-interment, and implementation of the mitigation plan will be discussed by these consulting parties.

8. Throughout any discovery, assessment, and/or excavation (if found necessary), the archaeology team will conduct themselves professionally and sensitively in the vicinity of, and with respect to, the human remains.
9. Missouri SHPO approval will be required to resume fieldwork following completion of the fieldwork component of the mitigation plan.
10. A qualified physical anthropologist, forensic scientist, or other experts will be used to examine and assess the inadvertent discovery. Unless the remains were inadvertently removed, the evaluation will be conducted at the site of discovery. The consulting expert will be allowed to draw and measure the exposed remains and associated burial furniture. **No photographs or digital images will be permitted.** Drawings and other records will be curated at a 36 CFR Part 79-compliant curation facility within Missouri. Drawings cannot be published in any form or shown as part of scholarly presentations without the written permission of Missouri SHPO, consulting tribes, or nearest living descendants.
11. If through consultation, parties determine disinterment is necessary, USACE is responsible for ensuring the transfer of control and possession of any collected human remains and/or funerary objects to the SHPO with all accompanying documentation.
12. USACE will notify Olsson, the City of Springfield, and consulting tribes within twenty-four (24) hours of physical transfer that SHPO has accepted control and possession.
13. USACE will provide the consulting tribes with future documentation concerning human remains.
14. SHPO will, upon receipt, proceed, according to Missouri Unmarked Human Burial Law (RSMO §194.400-410), to continue consultation regarding repatriation independently.

Deliverables

GeoArch Solutions and CAR will submit an electronic copy of the management summary to the Archaeological Research Center of St. Louis (ARC) within one week from the completion of the trench examination. This summary will provide initial stratigraphic interpretations, including the locations and below-surface-depths of all buried surfaces and cultural horizons. The full draft report submitted electronically to ARC will incorporate the initial goals of the project, methods, detailed stratigraphic descriptions, and a discussion of the results with conclusions and recommendations. After ARC, Olsson, and the City of Springfield has reviewed the draft, any

revisions will be addressed. The revised draft report (electronic version) will be submitted to the USACE for review and distribution to consulting parties for comment prior to any archaeological monitoring.

The geomorphological information may be included as a separate report, appendix, or section of an overall report prepared by ARC on these investigations. This report will summarize previous work, methodology, detail any cultural remains identified, descriptions of all cultural materials recovered, and discuss how these materials compare to similar sites or what they indicate about the uses of these two sites. The draft and final report will conform to the expectations of the USACE, the Missouri SHPO, and other consulting parties. The report will include relevant maps, figures, and tables. Mapped data will be depicted with USGS 7.5' quadrangles. These data will include the APE limits, trench locations, areas with potential for buried surfaces/cultural material, and associated archaeological site locations. Digital copies of project shapefiles and figures (including representative photographs, stratigraphic profile drawings, recovered artifact lists, etc.) will be provided as rendered images and in their native ESRI GIS format.

Information from these investigations will provide insights into the extent of precontact and historical remains across the areas threatened by the Renew Jordan Creek project. It also will provide some insights into the number and extent of features across this area and could provide insights into when the precontact features were utilized. This information will be used to develop a better plan and budget for archaeological monitoring during the initial construction phase of the project.

After the project has been completed, all artifacts, field notes, digital or printed images, and electronic data will be deposited in a repository that meets Federal standards as outlined in 36 CFR 79 for archaeological collections.

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APPENDIX E

Cultural Resources Monitoring Plan

PROPOSED MONITORING PLAN
ASSOCIATED WITH THE RENEWAL OF JORDAN CREEK, CITY OF SPRINGFIELD, GREENE COUNTY, MISSOURI

Prepared for:

Olsson;
City of Springfield;
Environmental Protection Agency;
U.S. Army Corps of Engineers
(DA Permit Number SWL-2022-00064);
and the Missouri Department of Natural Resources,
State Historic Preservation Office
(Missouri SHPO Project 055-GR-21)

Prepared By:

Joe Harl and Timothy Baumann
Archaeological Research Center of St. Louis, Inc.
6049 Hampton Ave.
St. Louis, Missouri 63109
Phone: 314-349-1531
Email: arc@arcstl.com

Kevin Cupka Head
Warren Center for Archaeological Research
Missouri State University
901 S. National Ave.
Springfield, Missouri 65897
Phone: 417-836-5363
Email: kcupkahead@missouristate.edu

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Introduction

The proposed improvements for the Renew Jordan Creek project will impact the Springfield Wagon Shops Site (23GR2023) and the Springfield Manufacturing Company Site (23GR2024) within the City of Springfield, Greene County, Missouri. The USGS quadrangle map provided with the site form indicated that site 23GR2023 covered the entire parking lot between Jordan Creek on the south, a building on the west, West Mill Street on the north, and North Boonville Avenue (Figure 1). However, the detailed map of this site and its description in the site form suggests that the site actually is west of North Campbell Avenue and was limited to the southern end of this block near the creek, covering 1000 square meters (0.247 acres). Campbell Avenue did not pass through this block on the quadrangle map utilized for the form, which may have caused confusion about the site's location. Site 23GR2023 would have been located within the broad floodplain of Jordan Creek. Jones et al. (2007, Jones 2006a), from the Center for Archaeological Research at Missouri State University (CAR), placed three trenches just south of the parking lot (Figure 2). In general, these trenches had a mixed fill with historical artifacts to depths of 80–100 cm (2.7–3.3 feet) beneath the modern grade. They also determined that this soil was contaminated by industrial waste. Under the mixed soil was a reddish clay with chert residuum and historical artifacts that extended to a depth of about 125 cm (4 feet). The eastern two trenches (Trenches 2 and 3) contained a yellowish gray gleyed silty clay with several precontact artifacts. This soil started at depths of 125–175 cm (4–6 feet). Carbonized materials mixed with the artifacts consisted of deciduous and coniferous wood. These materials could indicate that precontact features may exist. Around 175 cm (about 6 feet), pre-settlement alluvium (PSA) was identified, corresponding to the Hepler soils. The concrete channeled bed of Jordan Creek continued to a depth of 1.22 meters (4 feet) below the top of the PSA and would have destroyed any Precontact remains in that area.

Likewise, the location of site 23GR2024 appeared to have been wrongly shown east of North Boonville Avenue when it was located east of North Campbell. No detailed map showing the trench locations was provided, but their locations were described by Jones et al. (2007:76) as:

> Trench 1 was oriented north-south approximately 3 meters north of the Jordan Creek retaining wall in a wooded area just east of the current parking lot. The trench measured approximately 3 m in length and 2 m in width. The north end of the trench was ramped down for access. Trench 2 was placed at the western edge of the property, approximately 4 meters north of the Jordan Creek retaining wall in an open area partly covered in crushed limestone gravel. Trench 2 also measured approximately 3 m in length and 2 m in width; it was also ramped on the north end to provide access.

Figure 1: Sites 23GR2023 and 23GR202 and Proposed Monitoring Area within the APE.

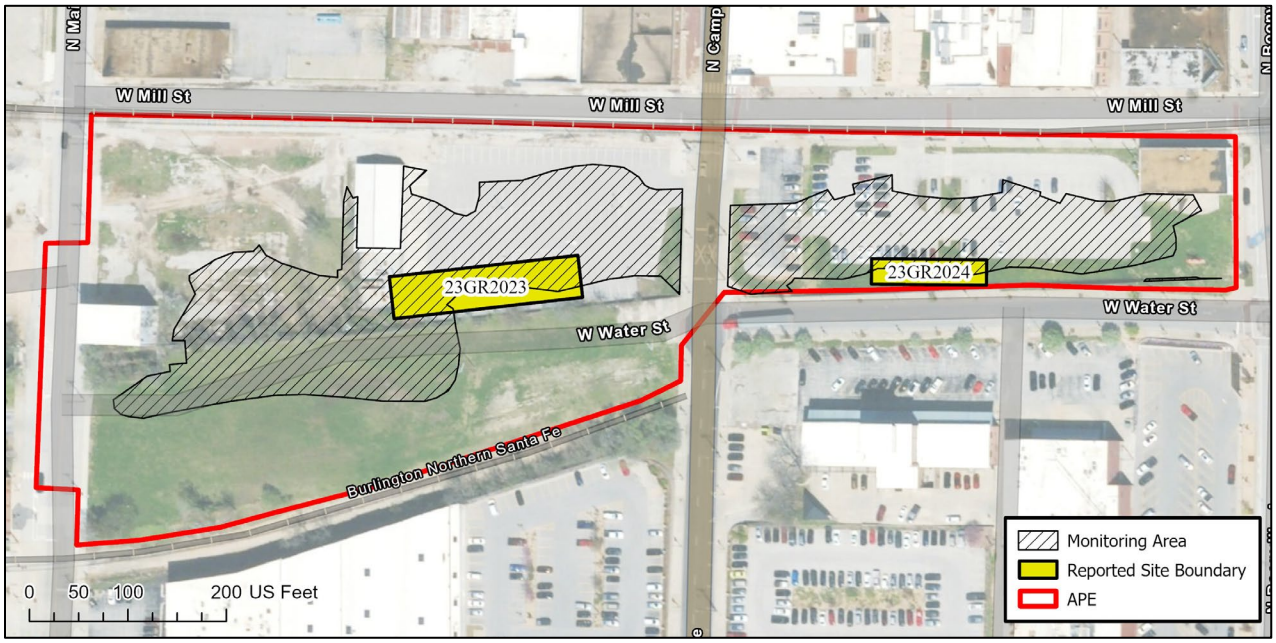
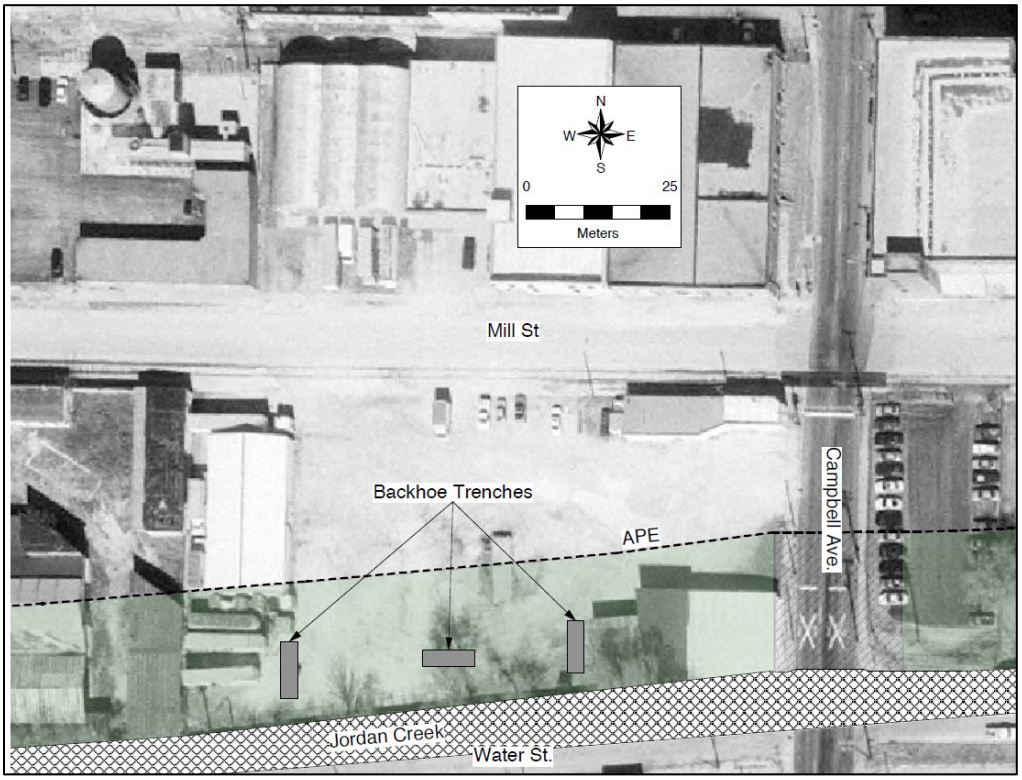


Figure 2: Locations of Trenches at Site 23GR2023 (Jones 2006a)



The two trenches within site 23GR2024 produced mixed soil to depths of 120–165 cm (4–5.5 feet). Historical artifacts were found in the mixed soil. Immediately below the mixed fill, both trenches encountered limestone slabs representing the base of historic foundations. Many historic artifacts were found below the limestone slabs, including an ashy lens at about 200 cm (6.7 feet) in Trench 1. A fire broke out at the Springfield Wagon Company, destroying some buildings on October 28, 1883. The ashy lens could be the result of that fire. Precontact artifacts, consisting of flaking debris, were found between 200–300 cm (6.7– 10 feet). The PSA was encountered at 300 cm (10 feet) in Trench 1 and 240 cm in Trench 2 (8 feet) (Jones et al. 2007, Jones 2006b)

Jones et al. (2007:87) recommended:

> However, given the high amount of lead and other contaminants in the upper historic layer, in addition to moderate to heavy disturbance, testing should be limited to the historic alluvium (1.5–2.13 m bs) to include the earlier historic deposits and prehistoric layer. . . .Further investigations are warranted to ascertain the spatial extent and integrity . . . and to evaluate their eligibility for listing on the NRHP. . .

Research Design:

Precontact Occupation

The 2007 CAR trench excavations documented Precontact occupation zones at sites 23GR2023 and 23GR2024, with artifacts recovered between 125–300 cm (4–10 feet) below the surface. The full extent of these precontact occupations is still unknown. Also, no diagnostic artifacts were recovered indicating when and how these sites were utilized, nor were there any intact cultural features found.

The proposed excavations at sites 23GR2023 and 23GR2024 could address some basic research questions; however, these could change as the time and type of occupation are determined. Overall, research questions may be divided into three levels, shifting from everyday life to abstract ideologies. Tier one questions cover food, shelter, and technology. Secondary questions address social organization, trade networks, and craft specialization. Last, these questions attempt to uncover religious beliefs and folk traditions. The first tier is limited to descriptive, functional interpretations (e.g., find deer bone = they ate deer). The second tier tries to use artifacts and features to reconstruct social networks and relationships (e.g., exotic trade objects = higher status). The third tier tries to understand how people thought about their world (origin, afterlife). This last level is often interpreted through art and symbolic images on objects or from the spatial arrangement and frequency of objects within a feature (e.g., burial or house floor). Typical research themes that might apply to precontact deposits within the APE include: chronology, site function, subsistence, technology and adaptive strategies, and geomorphology.

Postcontact Occupation

Archaeological sites 23GR2023 and 23GR2024 sit within the historic core of Springfield's business and industrial district that developed near the St. Louis – San Fransico Railway. This rail

line, nicknamed the "Frisco," operated between 1876 and 1970 with Springfield as its headquarters and ran lines to the southeast and west/southwest. Archival research indicated that wagon manufacturing companies and lumber yards existed at these sites. In addition, businesses and a hotel were placed along N. Boonville Ave., immediately west of site 23GR2024. These buildings were still standing until at least the mid-1900s.

Urban sites like these often have deep and dense archaeological deposits from landfilling and leveling, trash dumping, and constructing, modifying, and demolishing the built environment. When buildings were razed, it was easier to dump the construction debris into the basement and spread it onto the surrounding ground than to haul it away. During the 19th and early 20th centuries, coal was burned to heat homes, cook food, operate factories, and fuel trains. The burned cinder and coal were dumped on the surrounding ground, which also built up the landscape. Natural flooding from Jordan Creek also provided a mechanism to add alluvial fill and raze buildings. The 1909 flood destroyed and razed many buildings within the project area (The Springfield Leader 1909; Springfield Republican 1909; Berneking 2016). These natural and cultural deposits can help to protect intact cultural features. For example, urban archaeological projects in Hannibal and St. Louis have uncovered deep and stratified deposits with intact features (Lopinot et al. 1985; Harl 2006; Harl et al. 1996; Harl and Naglich 1995; Machiran and Harl 2014; Meyer 2004, 2008, 2010, 2013; Meyer and Austin 2008).

Historic artifacts recovered from urban contexts can provide valuable information on the daily lives of everyday people (Young 2000; Mrozowski 2006; Mullins & Warner 2008). This is particularly true of the working class, immigrants, minorities, and women, whose histories have been traditionally ignored or suppressed. Archaeological data may provide a key to telling their stories, but the analysis and interpretation are often clouded by urban development and dense fill of architectural remains from razed buildings. The greatest potential to recover intact cultural features in an urban environment is often the rear yard or adjacent to alleyways. These areas contain associated outbuildings (e.g., privy, water closet, wells, and cisterns) and were used for specialized activities (e.g., butchering and washing clothes). These historic features were filled relatively rapidly and can be seen as time capsules for a specific event/activity or linked to an individual family.

Urban archaeology in the United States has also been successful in understanding more complex topics on urbanization, industrialization, modernity, segregation/social inequality, and trade/social networks (Dickens 1982; Staski 1982, 1987; Mullins & Warner 2008). For example, cities have been studied as "city-sites," which view an urban community as one large archaeological site consisting of dwellings, business, industry, transportation, and public institutions (Cressy & Stephens 1982). Archaeologists have also examined urban sites through a "core-periphery" model that tries to reconstruct the economic web of interaction between urban and rural trade networks at the local, regional, national, and international levels (Cressey et al. 1982). These networks can be best seen by tracing/mapping the origin of manufacture for material objects (e.g., ceramics, bottles). Many urban archaeology projects have focused on public engagement and working with descendant communities to address complex or even uncomfortable history, like racism (Baumann et al. 2011).

Proposed Monitoring Operations:

The City of Springfield and Olsson have proposed a long-term flood management plan to reopen a portion of Jordan Creek that was enclosed in 1928 because of repeated flooding and property damage (Bullard 2001; Berneking 2016). The current project will open and rechannel the creek, transform the surrounding land into a greenspace for recreation, and initiate economic redevelopment for the neighborhood. This portion of the improvements covers approximately 29,000 square meters (7.2 acres) within Sections 23 and 24 of Township 29 North, Range 22 West in the City of Springfield, Missouri. The project area is bounded by North Main Avenue on the west, West Mill Street on the north, West Water Street on the south, and North Boonville Avenue on the east. The proposed improvements will require that a new creek channel be excavated to a maximum depth of 5 meters (16 feet) below the ground surface. This undertaking will be conducted under Section 404 of the Clean Water Act (33 U.S.C. § 1251 *et seq.*), which requires a Nationwide Permit (NWP) #27 (Aquatic Habitat Restoration, Establishment, and Enhancement) administered by the United States Army Corps of Engineers (USACE) (DA Permit Number SWL-2022-00064). As part of the USACE permit, cultural resource investigation is required in compliance with the National Historic Preservation Act of 1966, Section 106 (Public Law 89-665, amendments PL91-243, 93-442, 94-458, and 96-665), the National Environmental Policy Act of 1969 (PL91-190), and Executive Order 11593 of 1971.

As Jones et al. (2007) indicated, the spatial extent and depositional integrity of sites 23GR2023 and 23GR2024 is unknown. Although historic fire insurance shows the location of buildings during the late 1800s and 1900s, it is not clear how far the precontact materials extend. Since the extent of cultural remains is unknown, it is recommended that the excavations for the proposed rechanneling of Jordan Creek be monitored by a team of qualified professional archaeologists. Specifically, approximately 10,000 sq m (2.5 acres) within the APE, where excavation is anticipated to exceed 80 cm, will be subject to archaeological monitoring (see Figure 1).

Archaeological monitoring will be conducted by CAR personnel under the direction of Kevin Cupka Head. An OSHA-trained competent person will be on site to monitor excavation safety, and all personnel will be required to wear appropriate PPE. At a minimum field personnel will wear hard hats, safety vests, work gloves, and work boots. Additional PPE, including hearing protection, safety glasses, and respirators may also be warranted. Furthermore, CAR field personnel will have completed OSHA 40 Hour HAZWOPER training. Fieldwork will be conducted under the supervision of a SOI-qualified professional archaeologist, and all archaeological technicians will meet ONHPO minimum professional qualifications. Archaeological monitoring procedures are specified below:

1. The upper 80–100 cm (2.7–3.3 feet) is expected to be mixed, unconsolidated fill (i.e., overburden) as a result of past razing of buildings and flooding of the creek. These upper soils are also contaminated with lead and other industrial waste that would be dangerous to hand excavate. Intact historical remains were discovered below the fill, such as the lower portion of building foundations, ash probably associated with the fire on October 28, 1883, and historical artifacts associated with the past use of this property. While the upper 80 cm (2.7 feet) of overburden may be removed as a single unit, at least one archaeological monitor should be on site to ensure overburden excavations cease at the appropriate depth.

2. After the overburden is removed, it is recommended that a minimum of two monitors be present per operating excavator to watch for intact cultural remains. Additional crew on-call at the CAR office will be available to mobilize as needed for feature recordation and excavation.
3. During archaeological monitoring, a trackhoe with at least a 4-foot wide, smooth-edge bucket should be used for excavations. The smooth bucket provides a clean scrape of the floor so that pit features can be detected. These will typically appear as distinct, dark stains on the stripped surface.
4. Mechanical excavation should proceed in relatively thin (about 5 cm [2 inch]) scrapes at the discretion of the monitors. Backfill should be briefly piled for inspection by the monitors before removal off site. Precontact artifacts are often uncovered just before a precontact feature is discovered.
5. Vertical and horizontal control will be provided by a SparkFun RTK Facet L-Band GNSS unit, which will be used to record excavation limits, piece plots, features, and all other relevant spatial data.
6. Below the overburden, any diagnostic artifacts observed will be collected. Each diagnostic artifact or cluster of artifacts will be assigned a unique field serial number (FSN) and recorded on a FSN log. They will be placed in a labeled bag indicating the site number, location within the site, depth discovered, the FSN, artifacts in the bag, date, and field crew initials.
7. If a feature is identified, excavations will be temporarily halted, and the CAR office will be notified. To prevent costly downtime for the construction crew, the trackhoe will be moved to another location along with the monitoring crew, while two or more on call archaeologists are mobilized from the CAR office. The CAR office is located at 622 S. Kimbrough Ave., about 0.5 mile from the APE, and additional crew can typically be on site within 15 minutes of notification.
8. The feature excavation crew will clean each feature top with shovel, hoe, and/or trowel. Location of the feature within the trench will be mapped, and it will be recorded via RTK GNSS. Each feature will be photographed and mapped in plan view.
9. Each feature will be assigned a unique FSN and recorded in the aforementioned FSN log, as well as a feature log. This log will include, at a minimum, the FSN, provenience information, feature shape in plan view, width and length, feature shape in profile, and maximum depth. A feature form will also be used to document specific characteristics and sizes for each feature, including artifact types, possible cultural age, and function.
10. Large postcontact features such as cisterns, privy pits, and wells will be impractical and potentially dangerous to hand excavate. The trackhoe will be used to remove these features. It will remove half of the feature fill in thin layers, and the wall profile will be drawn and photographed. As the fill is removed, the operator will spread it out so the field crew may recover artifacts. The second half will be removed with the trackhoe and the fill spread out to recover artifacts. At least one ten-liter flotation sample will be taken from the lower portion of these features.
11. Any exposed pit features will be bisected with shovels and trowels, and the fill will be removed in 10 cm levels. However, if a natural lens is encountered, the excavations will stop, and this new zone removed in 10 cm levels. The fill will be screened in the field through ¼-inch wire mesh, and all recovered cultural and/or

associated datable materials will be placed into appropriately labeled bags. Fragile or otherwise sensitive materials will be handled, processed, and stored appropriately in order to mitigate the chance of contamination or degradation. The bags will be labeled with, at a minimum, site number, unique FSN, zone/level, depth, artifacts in the bag, excavators' names, and date. Only the fill within the feature will be removed to preserve its original shape. After removing half of the fill, the feature's profile will be drawn and photographed with a north arrow scale and photo board. Information concerning the feature will be recorded on a feature form. The second half will be excavated similarly. A flotation sample of at least ten liters will be taken from the second half of the features and returned to the CAR lab. Flotation samples are used to recover small particles of plant and animal remains. They will be taken from the lower levels of the feature, where the most carbonized materials are typically found. In addition to the flotation sample, samples of plant or animal remains will be removed from feature deposits for possible radiocarbon dating. The location of the radiocarbon samples taken will be mapped and noted on the feature form. Once the fill has been removed, a final plan view drawing and photograph will be taken of the feature. Any final observations or interpretations will then be used to complete the feature form.

12. After the feature(s) are removed, the trackhoe will be returned to this location to continue excavations. The 2007 CAR trenches suggested that the precontact remains were deeper than the postcontact ones, between 150–240 cm (5–8 feet) below the surface. Any additional features identified will be excavated as described above.
13. For the duration of monitoring, weekly progress reports will be supplied to USACE, Olsson, and the City of Springfield.
14. Monitoring will continue until presettlement soils are encountered, possibly at depths between 213–248 cm (about 8 feet).

Inadvertent Discovery Plan:

In the event of an unanticipated discovery of human remains or burial, CAR will comply with the Missouri Unmarked Human Burial Law (RSMO §194.400-410) and follow these procedures:

1. Upon encountering human remains or an unmarked human burial during ground disturbing activities, the archaeological crew supervisor will immediately stop work within 50 feet radius from the point of discovery. The archaeological crew supervisor will implement interim measures to protect the discovery from vandalism and looting but must not remove or otherwise disturb any human remains or other items in the immediate vicinity of the discovery.
2. Only natural materials will be used in the process of implementing protection measures for any uncovered human remains.
3. CAR will immediately notify local law enforcement, the City of Springfield, the USACE, and Olsson. USACE will follow up within twenty-four (24) hours of the discovery of unmarked human remains with a phone call to Missouri SHPO and the consulting Tribes.

4. Within seventy-two (72) hours after notification, the county coroner will determine jurisdiction.
5. Other than for crime scene investigation, no excavation, examination, photographs, or analysis of human remains will be conducted without first consultation between CAR, Olsson, City of Springfield, USACE, Missouri SHPO, and consulting Tribes.
6. CAR will have seven (7) working days to determine the degree to which the human remains were disturbed and, if possible, assess their potential age, cultural affiliation, and identity, if possible, without any further disturbance. Upon making their determination, the USACE will notify Missouri SHPO and the consulting Tribes of its findings. This notification must include pertinent information as to the kinds of human remains and/or funerary objects discovered inadvertently, their condition, and the circumstances of their inadvertent discovery.
7. If it is determined that intact or fragmented human remains are present and not considered modern or criminal evidence, Missouri SHPO will take control of the remains. A conference call will be arranged by USACE with CAR, Olsson, the City of Springfield, Missouri SHPO, and consulting Tribes regarding additional measures to avoid and protect or mitigate the adverse effect of the project on the human remains and burial site. These measures may include:
    a. exploration of potential alternatives to avoid the human remains or burial;
    b. formal archaeological evaluation of the site;
    c. if a mitigation plan is needed, including procedures for disinterment and re-interment, and implementation of the mitigation plan will be discussed by these consulting parties.
8. Throughout any discovery, assessment, and/or excavation (if found necessary), the archaeology team will conduct themselves professionally and sensitively in the vicinity of, and with respect to, the human remains.
9. Missouri SHPO approval will be required to resume fieldwork following completion of the fieldwork component of the mitigation plan.
10. A qualified physical anthropologist, forensic scientist, or other experts will be used to examine and assess the inadvertent discovery. Unless the remains were inadvertently removed, the evaluation will be conducted at the site of discovery. The consulting expert will be allowed to draw and measure the exposed remains and associated burial furniture. **No photographs or digital images will be permitted.** Drawings and other records will be curated at a 36 CFR Part 79-compliant curation facility within Missouri. Drawings cannot be published in any form or shown as part of scholarly presentations without the written permission of Missouri SHPO, consulting tribes, or nearest living descendants.
11. If through consultation, parties determine disinterment is necessary, USACE is responsible for ensuring the transfer of control and possession of any collected human remains and/or funerary objects to the SHPO with all accompanying documentation.

12. USACE will notify Olsson, the City of Springfield, and consulting tribes within twenty-four (24) hours of physical transfer that SHPO has accepted control and possession.
13. USACE will provide the consulting tribes with future documentation concerning human remains.
14. SHPO will, upon receipt, proceed, according to Missouri Unmarked Human Burial Law (RSMO §194.400-410), to continue consultation regarding repatriation independently.

Laboratory Procedures:

1. Artifact collections will be packaged and returned to CAR for analysis.
2. The artifacts will be cleaned.
3. Once dry, the materials will be cataloged according to provenience and artifact type. The catalog will include accession number, provenience information, artifact's material, function, modifications, segment, count, weight, and general comments. Additional information also will be recorded as needed on diagnostic pieces.
4. Diagnostic artifacts will be scanned or photographed with a scale for presentation in the report.
5. Artifacts will be packaged for curation according to current federal guidelines outlined in 36 Part CFR 79. They will be placed in 4-mil zip lock polyethylene bags labeled with provenience information, the artifacts within the bag, and quantity. The same information will be marked on poly tags placed inside these bags. The bags will be placed in temporary boxes, with each box containing less than 25 pounds of artifacts. Each box will have an exterior label indicating the range of cataloged artifacts inside and provenience information. Also, each box will contain a catalog of all artifacts present.
6. All flotation samples will be processed through a Flote-Tech device to remove the sediments. The remaining sample will be packaged according to light and heavy fractions. The heavy fraction will be sorted through various geological screens, yielding three fractions greater than 2.0 mm, between 2.0 and 0.5 mm, and less than 0.5 mm.
7. The floral remains will be sent to Katherine Parker, and the faunal remains to Terrance Martin for analysis. It will be discussed with these specialists the feature's location, shapes, potential dates, utilization, and quantity of floral and faunal remains. An agreement will be reached as to which samples should be analyzed. These remains will be used to address various research questions. The remaining processed samples will be saved for future research.
8. For precontact features, after analysis, a sample of any carbonized floral remains will be sent to obtain radiocarbon dates. At least eight samples will be sent for radiocarbon dating. This date will more accurately determine when these sites were utilized.
9. Upon completing the project, the collections will be permanently curated at CAR on behalf of the City of Springfield. In addition to the artifact boxes, all field notes,

forms, drawings, photographs, a list of all the artifacts, and a bound and unbound version of the final report will be included in a separate box for permanent curation.

Report Preparation

Within five days after the end of monitoring operations, a letter summary report prepared by CAR will be sent to Olsson and the City of Springfield describing the results of the operations. This summary report will be forwarded to the USACE for review. The USACE will forward the summary report, including a finding of effect and any other applicable determinations (e.g., NRHP eligibility status) to Missouri SHPO and other consulting parties. Once USACE is satisfied that adequate monitoring operations have been completed, they will provide a letter allowing construction to continue without any further archaeological investigations.

Within one year of fieldwork completion, a formal report will be completed by ARC. This report will describe the methodology and results of the monitoring operations. Insights provided from the cultural remains will be discussed, and the various research questions will be answered. This report will be sent to Olsson and the City of Springfield for review. The city will then send a review copy to the USACE, who will then send copies to Missouri SHPO and other interested parties. Any review comments will be incorporated into a final report. Site forms will be prepared for any new sites and updates of sites 23GR2023 and 23GR2024.

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APPENDIX F

Public Meeting Record

RENEW JORDAN CREEK PROJECT – MAIN TO BOONVILLE

City of Springfield, Missouri

December 2023

Olsson Project No. 020-2978