



3. Affected Environment

Jefferson National Expansion Memorial
Environmental Assessment for Implementing CityArchRiver Initiative Elements

Affected Environment

INTRODUCTION

This chapter describes the existing environment at Jefferson National Expansion Memorial and along the Central Riverfront. The discussion is focused on resources that could potentially be affected by the implementation of any of the alternatives and provides a baseline for the subsequent evaluation of impacts documented in Chapter 4.

The topics within this chapter are discussed in the following order:

Cultural Resources

- Historic Buildings, Structures, Sites, Objects, and Districts
- Cultural Landscapes
- Archeological Resources
- Museum Collections

Natural Resources

- Vegetation
- Soundscape
- Water Quality/Water Resources/
Stormwater Management
- Floodplains

Visitor Use and Experience

- Visitor Opportunities and Use
- Pedestrian and Bicycle Circulation
- Parking
- Accessibility

Socioeconomics

Operations and Management

- Park Operations and Management
- Energy Requirements and Conservation/
Sustainability
- Central Riverfront Operations and
Management

Several topics were initially considered for evaluation, but were eliminated from detailed study because impacts would be negligible to minor. These topics are discussed in the Issues Considered but Dismissed from Further Analysis section in Chapter 1.

CULTURAL RESOURCES

This section documents the cultural resources that are present at the park and within the surrounding area, which include historic buildings and structures; cultural landscapes; archeological resources; and museum objects.

CULTURAL RESOURCES IMPACT AREAS

This EA is being prepared in parallel with an ongoing Section 106 compliance process for the CAR2015 projects, as required by the NHPA of 1966. This EA will document impacts to cultural resources as a result of implementing these projects on park properties and along the Central Riverfront. A separate assessment of effect under section 106 of the NHPA will be made as appropriate. Figure 24 depicts the Cultural Resources Impact Area for the EA and the location of these cultural resources.

HISTORIC BUILDINGS, STRUCTURES, SITES, OBJECTS, AND DISTRICTS

There are multiple, overlapping National Register of Historic Places and National Historic Landmark (NHL) listed properties at the Jefferson National Expansion Memorial. The National Register of Historic Places identifies five property types to categorize listed and eligible properties, including buildings, structures, sites, objects, and districts. Properties are described in summary below, organized by relationship to the park

and the Central Riverfront project areas and the cultural resources impact area. Each property's location is identified in Figure 24. Listed historic properties are discussed in greater detail in the GMP within Appendix C: Detailed Descriptions of Historic Resources within the APE. Some historic properties are located within the park; others are adjacent to the park. Other historic properties, while not in or adjacent to the park, are adjacent to the Central Riverfront. Additional historic properties fall within the project cultural resources impact area but are not adjacent to either the park or Central Riverfront.

Within the Park Grounds

There are historic properties that are listed in the National Register of Historic Places and/or the City of St. Louis Landmarks registry within the park boundary, including the Jefferson National Expansion Memorial National Register and NHL districts, the Gateway Arch, and the Old Courthouse and its associated sundial and fountain, described as follows.

Jefferson National Expansion Memorial

Jefferson National Expansion Memorial was nominated to the National Register of Historic Places in 1966 and accepted in 1977. The nomination form identifies the property as a historic district and includes the entire park landscape, paying particular attention to three historic features: the Gateway Arch, the Old Courthouse, and the Old Cathedral. The nomination lists the status of the property as a "work in progress" (NPS 1966).

In 1987, the property was designated a NHL district. The park was thought to be so important and transcendent in its design elements that the designation was made before it reached 50 years old under the exception in the National Register criteria that states, "a property achieving national significance within the past 50 years [may be designated] if it is of extraordinary national importance." The boundaries of the NHL are slightly different from the previously designated National Register historic district, and include only the portion of the park east of Memorial Drive, north of Poplar Street south of the Eads Bridge (see Figure 24). The National Register and NHL districts both encompass the park

The Jefferson National Expansion Memorial is listed on the National Register of Historic Places and is also designated a National Historic Landmark due to its significance. The park commemorates, through a designed memorial, Thomas Jefferson's vision of building a unified continental nation and St. Louis' role as a confluence and gateway of the American westward expansion during the 19th century.

landscape and several historic structures including the Gateway Arch, Old Courthouse, the Visitor Center and Museum of Westward Expansion, the North and South Overlooks, Grand Staircase, and railroad tunnels. The Arch, Old Courthouse, and Old Cathedral have also been identified as individually eligible or listed. The following are not listed separately in the National Register, but are character-defining for the designed landscape within the Jefferson National Expansion Memorial NHL:

The Park Grounds

The Gateway Arch is sited within a distinctly modern landscape. The product of a collaboration between master architect Eero Saarinen and master landscape architect Dan Kiley, the grounds design complements, enhances, and carries out into the surrounding landscape the graceful form and lines of the Arch. The two men applied geometric forms and classical landscape design elements to create a setting that is both spectacularly and subtly appropriate. The scale, impact, and design of the grounds constitute an essential mooring for the world-famous Gateway Arch.

The North and South Overlooks

The scenic overlooks were designed to provide visitors with a vantage point from which to view the Mississippi River. They were originally intended to house museums on the fur trade and the use of Mississippi and Missouri rivers. The overlook stairs have a unique form, in which the riser remains constant while the tread increases in size as

LEGEND

- - - - Park Boundary
- - - - NHL Boundary
- Area of Potential Effect

1. North Riverfront Industrial Historic District
2. Ashley Street Power Plant
3. St. Louis Levee
4. Missouri Athletic Club Association Building
5. J. Kennard and Sons Carpet Company Building
6. Laclede's Landing Historic District
7. Security Building
8. Mississippi Valley Trust Company Building
9. Laclede Building
10. Old Courthouse, fountain, and sundial
11. Eads Bridge
12. North and South Overlooks
13. Railroad tunnel cuts
14. Gateway Arch
15. Museum of Westward Expansion
16. Grand Staircase
17. International Fur Exchange
18. American Zinc, Lead and Smelting Company Building
19. Old Cathedral
20. Pet Plaza
21. St. Mary of Victories Church
22. Crunden-Martin Manufacturing Company Historic District
23. Peabody Coal Company National Headquarters
24. Wainwright Building
25. MacArthur Bridge



Figure 24 Historic Architectural Resources within the Cultural Resources Impact Area

the steps descend to the Mississippi River. This design element was also intended to be used in the Grand Staircase, although it was not realized there. Although the museums on the overlooks were never completed, the overlooks, constructed of concrete in a unique form that employs both vertical and horizontal catenary curve segments in both the walls and the stairs, are major structural elements of the Saarinen/Kiley designed landscape of the park grounds, and thus contribute to the significance of the NHL.

Grand Staircase

The Grand Staircase provides both a physical and a visual connection between the Gateway Arch and the Mississippi River. The staircase is a symbolic representation of the movement of settlers through St. Louis, the gateway to the West. Although the relationship between the treads and risers was modified in its final design, it is representative of the Saarinen/Kiley concept and is in its designed location. It thus contributes to the significance of the NHL.

Railroad Tunnels

The north and south railroad cuts and three tunnels were designed by Saarinen, and were important components of his concept for the site. Constructed between 1959 and 1962, the entrances to the tunnels are curved to recall the geometry of the Gateway Arch. The north tunnel (548 feet long), the center tunnel (960 feet long), and the south tunnel (360 feet long) carry the railroad through the site in conjunction with the open north and south cuts, which have poured concrete walls and are 720 feet and 840 feet long, respectively. The railroad tunnels and concrete floodwalls, reflecting the Saarinen/Kiley design concept, contribute to the significance of the NHL.

The Gateway Arch

The Gateway Arch, the centerpiece of the park's design, is listed separately from the district as a NHL structure, as well as contributing to the NHL district. It was conceived by Eero Saarinen in 1947 as a symbolic gateway to the West. Although the placement of the Gateway Arch and the design of the grounds evolved over the next several decades, the original design of the Gateway Arch endured with little change. An inverted, weighted catenary curve (a type of curve created by supporting both ends of a hanging chain), the Gateway Arch soars 630 feet from

its base on a constructed landform on the bank of the Mississippi River. It is composed of a series of stacked, triangular stainless steel sections covered by a stressed steel skin. The latter feature allows the exterior materials to carry the structural load without major interior framing. Inside the legs of the Gateway Arch, a unique transportation system carries visitors to an observation deck at the top of the monument.

Entrance ramps at the base of the Gateway Arch lead into the subterranean Visitor Center and Museum of Westward Expansion. Conceived by Saarinen and Kiley in 1959, the placement of these triangular features beneath the Gateway Arch, out of sight until one is nearly upon them, reinforced the Saarinen/Kiley concept of a unified landscape, in which the curvilinear character of the Gateway Arch is repeated throughout the design, such as in the walkways and the landform. The museum was designed by Aram Mardirosian and completed in 1976.

The Gateway Arch is significant for its commemoration of Thomas Jefferson's role in the nation's westward expansion. In addition, it is significant as a triumph of architecture and engineering. It is an icon of Modernist design, using the latest materials and sculptural forms available in the late 1950s and early 1960s to develop a design that specifically

Figure 25 The Gateway Arch and Reflecting Pond within the Park Grounds





Figure 26 The Old Courthouse and Luther Ely Smith Square

responds to the site and fully integrates architecture and landscape architecture. As noted in the significance statement of the NHL nomination, “Its structural system had never been attempted before on so massive a scale. Its highly complex and subtle design based on a weighted catenary is unique in architecture. The Arch is a symbolic architectural expression of such simplicity and modernity that even today . . . it still seems avant-garde.”

The Old Courthouse

The Old Courthouse stands within the National Register district for the Jefferson National Expansion Memorial as a contributing building, as well as being individually eligible for National Register listing. It was constructed in several phases between 1839 and 1862. The three-story Greek Revival brick and stone building was constructed in the shape of a cross with large classical porticoes (or porches) on all four facades. A central rotunda is capped by a Renaissance Revival cast iron dome and lantern. The lightweight cast iron structure of the dome was patented by the architect, William Rumbold. It was one of the first uses of this engineering technique in the United States. The same materials were used, in conjunction with a different patent, in the dome of the U.S. Capitol Building in Washington, D.C.,

which was built concurrently with the Old Courthouse dome. The St. Louis project was the first cast iron dome to be completed in the U.S. The inside of the dome is decorated with elaborate murals. The surrounding reproduction sidewalks and fence have also been identified by the National Park Service as contributing to the interpretation of the Old Courthouse.

The building is significant both for its architectural and engineering merits, and also as the site of important historic events. Early in its history, the courthouse was a public gathering space for people planning their travel west. More notably, the structure was the site of the historic Dred Scott case in which Scott, a slave, sued for and was awarded his freedom. Freedom was later taken away from the Scotts by an appeal to the Missouri Supreme Court, and the case was ultimately decided by the U.S. Supreme Court in *Dred Scott v. Sandford* in 1857. In the infamous decision of the court, persons of color were denied citizenship. Slavery in the Western territories was deemed to be a property right that could not be extinguished by legislation. In 1971, the Old Courthouse was designated a City Landmark. Associated features include two objects - the Old Courthouse Sundial and Southeast Courtyard Fountain.

The Old Courthouse Sundial: Constructed of bronze, copper, iron, and granite, the sundial is the only surviving detached exterior feature associated with the courthouse. The circular bronze sundial face has Roman numerals and is protected by a copper cover. The National Park Service has determined that the object is eligible for listing in the National Register as a contributing element to Jefferson National Expansion Memorial National Register district together with the Old Courthouse.

The Southeast Courtyard Fountain: Located in the southeast courtyard of the Old Courthouse grounds, this fountain is on the NPS List of Classified Structures, and is considered an historic structure. The National Park Service has determined that the object is eligible for listing in the National Register as a contributing element to the Jefferson National Expansion Memorial National Register district together with the Old Courthouse.

Adjacent to the Park

There are listed properties adjacent to the park, including the Eads Bridge, Old Cathedral, the Laclede's Landing Historic District, and the St. Louis Levee, summarized as follows:

Eads Bridge

Eads Bridge, a National Historic Landmark, borders the park to the north, connecting St. Louis, Missouri and East St. Louis, Illinois across the Mississippi River. Constructed between 1867 and 1874 to accommodate rail, pedestrian, and vehicular traffic, the bridge employs a three-span deck arch design, with ribbed steel arches and decks supported on granite-faced limestone piers. At the time of its construction, the spans were larger than any previously constructed bridge. Significant for its pioneering design, construction methods, and materials, the bridge was named a National Historic Landmark in 1964, and a National Historic Civil Engineering Landmark by the American Society of Civil Engineers in 1971. It was designated a City of St. Louis Landmark that same year (NPS 1975a).

Old Cathedral

The Old Cathedral building is individually eligible for the National Register. The parcel occupied by the Old Cathedral was designated for religious purposes when the city was founded in the mid-18th century by Pierre Laclede and Auguste Chouteau. A log house and small church were built on the site in the late 18th century. In 1826, St. Louis became a Catholic diocese, and several years later construction began on the current church. Completed in 1834, the Greek Revival Style structure was the first cathedral established west of the Mississippi. In 1961, Pope John XXIII named the building the "Basilica of St. Louis, King of France," the highest honor bestowed upon an American Catholic church.

Laclede's Landing Historic District

The Laclede's Landing National Register historic district is a nine-block area north of the Memorial, bounded by the Mississippi River to the east, Eads Bridge to the south, 3rd Street to the west, and the Dr. Martin Luther King Memorial Bridge to the north. The district is significant as the only surviving portion of the city's 19th-century commercial waterfront. It preserves a large number of cast iron commercial buildings, as well as the city's original 18th-century street grid and sloping topography. Laclede's Landing was listed in the National Register in 1976. Within the district, the Christian Peper Building at 719 North 1st Street is a City Landmark.

St. Louis Levee

The St. Louis levee is located between Carr Street on the north and Lombard Street on the south, and from the western edge of Leonor K. Sullivan Boulevard on the west to the Mississippi River on the east. The Missouri SHPO has determined the levee to be eligible for inclusion on the National Register of Historic Places under Criterion A in the area of commerce. It also has strong associations with transportation, and potentially ethnic heritage.

The St. Louis levee is significant for its role in supporting the commerce that transformed St. Louis into the primary commercial emporium of the American West. The levee has various important social history associations and was the point of departure for expeditions of exploration, fur trade enterprises, and troops headed to war with Mexico and later the Southern Confederacy. The St. Louis waterfront was inextricably bound up in the larger story of the nation's westward expansion during the 19th century. The levee was also a place with significant associations with African-American heritage in terms of both labor and cultural history. It was the place where thousands of enslaved persons were brought in chains to be herded up the street to the auction houses and sold as strong, "northern" slave stock to southern plantation owners. Many free African Americans in St. Louis were employed transporting and storing goods for transfer to other vessels. The historically paved portion of the St. Louis levee retains sufficient integrity to be listed on the National Register of Historic Places (NPS and City of St. Louis 2012).

The International Fur Exchange Building

The International Fur Exchange Building, located at 2-14 South 4th Street, is directly southeast of the Old Courthouse. The period of significance runs from 1920, when the building was constructed, through 1948. The building has national importance due to its association with the primacy of the city in the international fur trade. The commercial structure is seven stories high and is clad in multicolored brick with white terracotta accents. It was listed in the National Register in 1998.

Along the Central Riverfront

There are listed properties that are not adjacent to the park, but are located along the Central Riverfront, such as the North Riverfront Industrial Historic District and the Ashley Street Power House, summarized below.

North Riverfront Industrial Historic District

The North Riverfront Industrial Historic District is located north of downtown St. Louis adjacent to the Mississippi River, along the Central Riverfront. The eight contributing buildings are located on seven city blocks roughly bounded by Dickson, Lewis, O'Fallon, 2nd, Ashley, and Biddle Streets and the Mississippi River. Heights range from one story to six, with four large smokestacks on the roof of the Ashley Street Power House towering over the District. Most of the buildings are of red brick, although two use brown brick as their primary exterior material. The district is listed on the National Register.

In a section of the city nearly wiped clean by the tornado of 1896 but rich with connections to rail lines and the Mississippi River, this small grouping is an important concentration surviving in the midst of what was once a larger linear industrial and commercial district. Two specific industries, power generation and cold storage, account for five of the eight contributing buildings. All buildings and their major additions were constructed between 1894 and 1919, most falling within the first seven years of the 20th century (1900-1906). The period of significance begins in 1894, the construction date of the oldest building, and ends in 1953, an arbitrary 50-year cutoff. Although not every building is completely intact, the district retains sufficient integrity to convey the scale of the industrial and commercial activities that thrived here in the early 20th century (NPS 2002).

Ashley Street Power House

The Ashley Street Power House is located in the North Riverfront Industrial Historic District at the north edge of the Central Riverfront, and is listed as a contributing structure to that National Register listed historic district. The Power House is located at the foot of Ashley Street on the Mississippi River. Constructed in 1902 by engineer/architect Charles Ledlic, it was the first large electrical power plant to be erected by the Union Electric Company. The classic exterior

is organized by a series of terra cotta arches supported on fluted, iconic pilasters which read as two extra-tall stories high. The South elevation may be considered the primary elevation since it faces downtown St. Louis and bears the original name (Union Electric Light & Power Co.) in terra cotta across and below two pediments. Above the arches is a dentil course. The top story of large windows is topped by a dentil cornice with two projecting shallow pediments. Four large smokestacks and a set of multi-story metal additions are located on the building's roof (NPS 2002).

The St. Louis riverfront has a storied history as the focus of industrial and commercial activity. Ashley Street Power House conveys the character of an early 20th century industrial center. This richly detailed building in close proximity to rail and river offers a rare insight into the way industry worked at the dawn of the 20th century. The building became a City Landmark in 1971.

MacArthur Bridge

The MacArthur Bridge is part of a 6.2 mile long elevated track which crosses the Mississippi River, connecting St. Louis with Illinois. Construction of the bridge began in 1907, but was not completed until 1917. The MacArthur Bridge and elevated track is the second-longest elevated steel structure across the Mississippi River. Originally constructed with a road deck over the rail deck, the bridge is currently used only for railroad traffic (TRRA 2012 and St. Louis Post Dispatch 2009).

Within the Study Area

The following historic properties fall within the project cultural resources impact area but are not directly adjacent to the park or the Central Riverfront: the J. Kennard and Sons Carpet Company Building, the Missouri Athletic Club Association Building, the Security Building, the Laclede Building, the Peabody Coal Company National Headquarters, the Mississippi Valley Trust Company Building, the American Zinc, Lead and Smelting Company Building, Pet Plaza, St. Mary of Victories Church, and the Crunden-Martin Manufacturing Company District. These properties are described in the 2009 General Management Plan Appendix C.

The Wainwright Building is also located within the study area, but is not described in Appendix C. The Wainwright Building, listed in the National Register of Historic Places, is a ten-story office building constructed between 1890 and 1891. Dankmar Adler and Louis Sullivan designed the building, which was their first commission involving the use of completely iron and steel framing. The resulting design represents Sullivan's most thorough attempt to create a special form appropriate to the multi-story office block (NPS 1975b).

CULTURAL LANDSCAPES

A cultural landscape is defined as “a geographic area, including both cultural and natural resources . . . therein, associated with a historic event, activity, or person, or that exhibit other cultural or aesthetic values” (NPS 1998).

Background

The Jefferson National Expansion Memorial was acknowledged initially as a National Register property in 1977 for the significance of its outstanding architecture and engineering, and for its memorialization of the nation's westward expansion. The park was designated a National Historic Landmark in 1987. The landscape was recognized in early documentation as a vital part of the designed resource, but a detailed documentation of its significance for landscape design was lacking for many years. To rectify this gap in the history of the Arch and its grounds, the National Park Service undertook a Cultural Landscape Report (CLR), published in 1996 (NPS 1996). The CLR provided a detailed history of the designed landscape and its character-defining features, an inventory and condition assessment of existing landscape features, and an updated significance of the park to include the designed landscape (NPS 1996). The CLR was updated in 2010 (NPS 2010). The revised CLR reflects current conditions at the park, further develops and expands the significance statement relating to the grounds as an important example of Modernism, and provides detailed treatment recommendations in coordination with the 2009 General Management Plan (NPS 2010). The 2010 CLR also provides the basis for this section of the report.

Significance

The period of significance identified in the 2010 CLR for the park landscape is 1947-2003, beginning the year the United States Territorial Expansion Commission sponsored a national design competition, marking the inception of the Memorial idea (NPS 2010), and ending with the completion of the central section of the Grand Staircase.

According to National Register Criteria for Evaluation, properties which are less than 50 years old may be listed on the National Register of Historic Places if they are of “exceptional importance.” The Gateway Arch is recognized as significant because it has architectural and engineering design value which will endure the “test of time.” The merits of the design to the architecture and landscape architecture design professions are eternal and could be recognized before the customary 50-year “test of time.”

The Jefferson National Expansion Memorial is listed on the National Register and is also designated a NHL due to its exceptional significance. The Arch and surrounding designed landscape have national significance under National Register Criterion A for the commemoration of Thomas Jefferson and others responsible for the nation’s expansion to the West. The Arch and grounds mark the symbolic economic hub and embarkation point of westward expansion. In addition, and perhaps most importantly, the park is significant under National Register Criterion C for its architectural and engineering merit, and as the collaboration of a master architect and landscape architect.

An exploration into Saarinen and Kiley’s design philosophies, their design intent for the park, and their working relationship is undertaken in the CLR (NPS 2010). The two men not only created a unique monument to a historic American event, but also collaborated on many other important projects. Their winning design for the Arch and grounds in 1947-1948 launched their respective careers. The Arch and surrounding grounds are an extraordinary example of a Modernist design principle of architecture that addresses the total environment. The impressive Gateway

Cultural Landscape Report – A report that serves as the primary guide to treatment and use of a cultural landscape, and that prescribes the treatment and management of the physical attributes and biotic systems of a landscape, and use, when use contributes to historical significance.

Arch was not intended to be an isolated object separate from the site planning and landscape design. Early on, the designers generated the idea of a forested, park-like setting, a simple complement to the majesty of the Gateway Arch, yet with a function and purpose of its own. Saarinen and Kiley’s compelling vision for the park had the strength to sustain their intentions through the subsequent decades of incremental changes, including alterations due to budget constraints and other designers’ development of their concepts.

Integrity

Typically, when a particular feature existed at the time of the landscape’s period of significance and also retains integrity to that period, then it supports the landscape’s significance. The National Register Bulletin How to Apply the National Register Criteria for Evaluation states that “integrity is the ability of a property to convey its significance. . . Historic properties either retain integrity (convey their significance) or they do not. . . The retention of specific aspects of integrity is paramount for a property to convey significance.” At the park grounds, some features constructed during the period of significance do not contribute to the significance of the park landscape, due to major departures from the 1964 design and the Saarinen/Kiley vision. The seven aspects of integrity are location, design, setting, materials, workmanship, feeling, and association. The park grounds cultural landscape possesses integrity of all seven aspects.

Landscape Characteristics, Contributing Features, and Character-defining Features

According to the NPS, landscape characteristics are “processes and physical forms that characterize the appearance of a landscape and aid in understanding its cultural value” (NPS 1998a). Landscape characteristics include topography, spatial organization, views and vistas, buildings and structures, circulation, vegetation, constructed water features, and small-scale features.

Landscape characteristics that were determined to embody the original design intent of Saarinen and Kiley are considered to be contributing features of the designed landscape of the park grounds. Contributing features are defined as “biotic or abiotic feature[s] associated with a landscape characteristic that contributes to the significance of the cultural landscape” (NPS 1998a). Key contributing features are discussed below.

Character-defining features represent the essential historic (and in this case, design) qualities that lend the landscape its significance. They are the most “prominent or distinctive aspect(s), quality(ies), or characteristic(s) of a historic property that contributes significantly to its physical

character. Structures, objects, vegetation, spatial relationships, views... may be such features” (NPS 1998). According to the NPS CLR Guide, “The term ‘character-defining feature’ was conceived to guide the appropriate treatment and management of historic structures (and later of cultural landscapes), so that features conveying historic character would be retained by treatment activities” (NPS 1998).

The major character-defining landscape features that contribute to the significance of the park include the Gateway Arch; the overall landform and spatial organization; designed views; the system of walks; the single species allées; the two ponds; the overlooks including the stairs; the railroad open cuts and tunnels; the Grand Staircase; the baldcypress circles; the screen plantings and depressed service areas; the entrance ramps into the Gateway Arch; and the concrete benches.

Topography

The landform of the park grounds was created with a substantial amount of fill to raise its elevation further above the Mississippi River. From a level expanse of land directly beneath the Gateway Arch, the ground rises to the north and south of the site. Service areas are located at the low points in the landscape.

Figure 27 Lawn Directly Beneath the Gateway Arch, Looking Back Towards the Old Courthouse



Constructed overlooks stand at high points at the north and south ends, providing views of the Mississippi River. The landforms are both functional (concealing railroad tracks and service areas) and extend the curvilinear form of the Arch's geometry into the grounds, as intended by Saarinen/Kiley. The ponds, overlooks, and berms define spaces within the park, orchestrate views and visitor circulation, and provide drainage. The designed topography complements the monumental character of the Gateway Arch, and creates a distinction between it and the service areas on the periphery, the railroad tracks, and the more intimate pond areas to the north and south.

Topography is a character-defining feature of the park grounds. The landform was implemented as originally intended, and remains intact today. The few changes made over time have resulted in minimal divergence from the design concept. Some of the berms along Memorial Drive were built taller than designed, but function to conceal views of the roadway and reduce noise and pollution in the park, and are therefore functionally important to the visual quality of the landscape.

- Contributing Feature: Topography.

Spatial Organization

The arrangement of spaces in the landscape is designed to emphasize a contrast among the monumentality of the Gateway Arch and surrounding open lawn, the overlooks with their long vistas, and the more enclosed human-scale spaces under the trees. A major spatial organizing feature is the primary east-west axis connection from the Old Courthouse through the Gateway Arch to the Mississippi River. A secondary axis, the north-south system of walks, orchestrates movement within the park. The closely spaced trees along the walks form an enclosing, uniform canopy.

Symmetry is another important organizing feature of the landscape. The curving pathways, allées of trees, irregular ponds, and structures in the northern portion of the grounds mirror the features of the southern end. This symmetry enhances the formality established by the major north-south and east-west axes.

The major concepts of the park—the historical importance of the movement from east to west, and the city's crucial relationship to the river—are expressed through the spatial organization of the design. In addition, the designed contrast between the monumental spaces of the Gateway Arch environs and the intimate spaces along the canopy-shaded walks supports the narrative essential to the story of westward expansion—that is, the movement from the populated, small-scale spaces of the east to the less-populated, vast spaces of the west.

The overall spatial organization of the property remains the same as the Saarinen/Kiley plan. A few minor departures from their plan occur in the planted forms and density used along the east-west axis, Memorial Drive, around the operations areas, in Luther Ely Smith Square, and around the ponds. However, the strength of the designed spatial organization of the park grounds continues to be character-defining.

Contributing Features:

- System of walks and allées
- Primary axis between the Old Courthouse and the river
- Pond areas
- Overlooks (including staircases)
- Old Courthouse block
- Service areas

Views and Vistas

Views are a key feature of the Saarinen/Kiley design. The most well-known of these, the view east from the Old Courthouse through the Gateway Arch to the Mississippi River, is along the primary designed axis that organizes the park grounds, described above in Spatial Organization. This view establishes a crucial connection between the park, the city, and the river.

The secondary north-south axis and associated views along the walks leading to the Arch are key elements of the Saarinen/Kiley design. Views towards the Gateway Arch from the north and south emphasize the immense verticality of the monument. Views of the park from the base of the Gateway Arch are dominated by the views along the central east-west axis and by the enclosing

rows of ash trees. The designed topography and vegetation control visitors' perception of the Gateway Arch by framing its immense scale and sculptural form. In addition, they screen undesirable views, hiding the service areas to the west of the Arch and the structures at the north and south ends of the park from view. The views from the system of walks and from the north and south reflecting ponds to the Arch are also created by the designed topography and plantings. The alternation of enclosing tree canopy and open areas were intended by Saarinen and Kiley to provide dramatic views of the Gateway Arch from certain points along the visitor's journey through the park towards the Arch.

The North and South Overlooks were designed by Saarinen and Kiley to provide expansive views of the Mississippi River and the Arch. These views encompass the variety and complexity of the park's urban landscape - the soaring Gateway Arch, the expanse of the Mississippi River, the industrial uses on the river's east bank, and the dense plantings of trees within the park. As such, they are important elements within the cultural landscape.

Contributing Features:

- View from the Old Courthouse to the Gateway Arch
- View along the north-south axis
- Views around the ponds
- Views between the park grounds and East St. Louis
- Views from the overlooks
- Screened views of service areas

Buildings and Structures

The Gateway Arch, the Old Courthouse, the Visitor Center and Museum of Westward Expansion, the North and South Overlooks, the Grand Staircase, and the North and South Railroad Tunnels are contributing features to the historic landscape. They are discussed in detail above under Historic Buildings, Structures, Sites, Objects, and Districts.

Contributing Features:

- Gateway Arch
- Old Courthouse

- Visitor Center and Museum of Westward Expansion
- Grand Staircase
- North and South Overlooks
- Railroad open cut walls and tunnels

Vegetation

Dan Kiley proposed a plant palette of 16 tree species in dense plantings to structure and define spaces. His intent was to rely on an intentionally limited number of species, creating a consistent and dense planting to give park landscape spaces a strong sense of character and definition, including circles of baldcypress trees and dense single-species allées of trees along the walks, creating an idealized "forest" contrasting with open areas representing an idealized "meadow."

By the time of major planting installation after the Arch was completed, changes had been made to the Kiley plan as planting was implemented: NPS plans showed an increase in the number of species, and a reduction in the overall number of trees to be planted. The forms of the tree species as planted were also less distinctive and varied in their character than Kiley's proposed species. The greater variety of species, spread more evenly over the landscape, obscured the original intent of the planting.

The overall plant composition in some respects reflects Kiley's design intent, particularly the distinctive planted form of the dense allées of uniform trees along the walks, the open lawn on the vista from the Old Courthouse to the Gateway Arch, and the baldcypress circles. However, in the pond areas, the concept of forest and meadow has been somewhat obscured by the development of a manicured, park-like character composed of small groups and single tree plantings set in a closely clipped lawn. The original intent in tree structure, form, and texture have not always been taken into consideration when tree replacements were made. Areas along the railroad open cuts were not planted as densely as intended in the Kiley planting plan (Office of Dan Kiley 1964). The other existing plantings, including vegetative screening at service areas, open

lawn, plantings in Luther Ely Smith Square, and the use of ash trees in the allées, while not implemented as directed in the Kiley planting plan, are generally compatible with the character of the park landscape.

Contributing Features:

- General plant composition
- Single-species allées
- Baldcypress circles

Circulation

The curving concrete walks that traverse the site are important elements of the Saarinen/Kiley design, guiding visitor movement through the landscape. There are almost five miles of walkways within the park, and more than two miles around the perimeter of the park. The location and alignment of walks reinforces the east-west and north-south axis of the landscape, orchestrates views towards the Gateway Arch, and reflects the curving geometry of the Arch, thus creating unity in the overall design. The walks were laid out as the designers intended, but NPS landscape architects selected the materials of exposed aggregate concrete.

Leading to the Visitor Center/Museum at the Arch are ramps, steps, and architectural features designed by Saarinen and Kiley and constructed in the 1960s. These provide the current entry experience for the Visitor Center/Museum. Constructed originally of terrazzo, the ramps were later rebuilt in 1983 of granite.

As designed by Saarinen/Kiley and implemented by NPS, vehicular circulation is restricted to the perimeter of the park. Washington Avenue, Poplar Street, Wharf Street (renamed Leonor K. Sullivan Boulevard), and Third Street Expressway (or Memorial Drive) provide the boundaries of, and vehicular access to, the park. The exterior roads total over two miles in length. They are considered contributing elements of the historic landscape as they form the park boundaries; the streetscape appearance and function of these circulation features have changed over time, but they continue to define the edges of the park. While changes to the roads would not necessarily affect the integrity

of the historic landscape, as their contribution to character is generally limited to their spatial function as boundary features, the CLR provides recommendations for streetscape rehabilitation that is intended to improve pedestrian connections (NPS 2010).

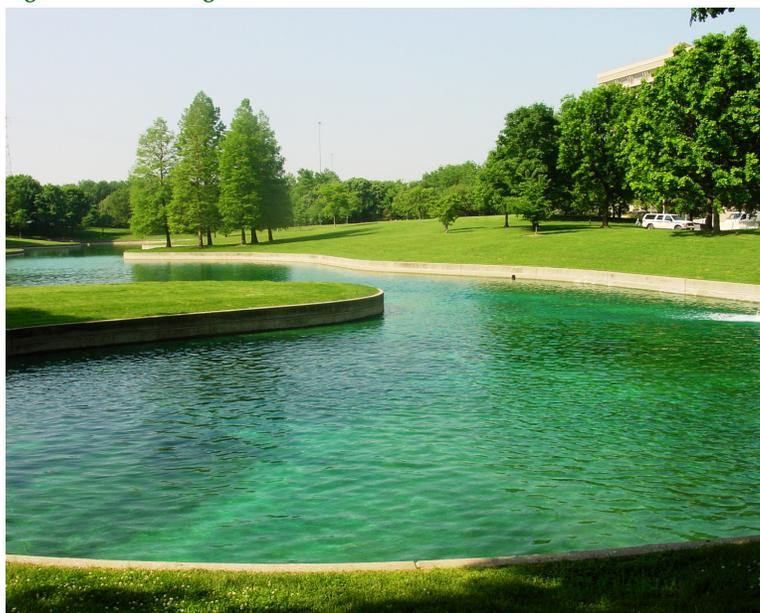
Saarinen and Kiley conceptually planned the Arch Parking Garage and the Old Cathedral Parking lot as part of the original park. As constructed, these features do not express the Saarinen/Kiley design concept and are not considered contributing features of the historic landscape.

Saarinen and Kiley intended there to be pedestrian overpasses across Memorial Drive to provide connections between the park grounds and the Old Courthouse. They designed multiple alternative concepts that included both single and double bridge crossings; these structures were never constructed. Without the pedestrian connections, Memorial Drive and I-70 physically and visually separate the Gateway Arch from Luther Ely Smith Square and the Old Courthouse.

Contributing Features:

- Pedestrian Walks
- Gateway Arch entrance ramps and steps
- Perimeter roads

Figure 28 Reflecting Pond



Constructed Water Features

The north and south reflecting ponds are part of the Saarinen/Kiley concept for the park. Each pond is sited within a topographic depression. The original design for the ponds included deeply incised and irregular edges, creating intimate spaces on their banks. The ponds were also to include small islands on their northern ends, which were to be connected to the landscape by means of narrow footbridges. Neither pond, as constructed, was as large as originally designed by Saarinen and Kiley, nor did they include the islands and footbridges. Their edges were much simplified, and the surrounding planting was also reduced during NPS design development. Despite changes to the details, the ponds remain important elements of the historic designed landscape. Their placement provides separate and intimate spaces that contrast with the more monumental spaces along the east-west axis and beneath the Gateway Arch. In addition, their, stylized curving edges are in keeping with the modern design of the landscape and enhance the overall character of the design.

Contributing Features:

- North and South Ponds

Small-Scale Features

The Saarinen/Kiley team created designs for benches in the park in 1960. The design detail showed ten-foot-long benches, built with limestone seats set on a limestone block with a concrete foundation. The NPS implementation of the benches was almost identical, but fabricated of concrete. These benches were initially placed on the east side of each rest area north and south of the Arch. Eventually, additional benches of this design were added to the landings of the Grand Staircase as well. Benches of an entirely different design—metal frame with iron slats—were installed in Luther Ely Smith Square at an unknown date.

The Saarinen/Kiley team also designed a light standard for the park, but it was never implemented. The early plans for the park did not show proposed lighting locations.

The NPS developed plans and details for the lighting at the park that included a twelve-foot-tall single pole with globe luminaire, which was ultimately installed along the walks, approximately ninety feet apart. They are considered compatible but not contributing to the historic landscape.

Contributing Features: Benches

ARCHEOLOGICAL RESOURCES

Physical History: Park Grounds and Central Riverfront

Development of the city of St. Louis has been ongoing from its earliest times as a Euro-American settlement in the 18th century. Archeological information regarding earlier occupation is sparse and known existing archeological resources date to after the Louisiana Purchase. Therefore the potential for early archeological sites from before 1850, including prehistoric archeological sites, is largely unknown on the park grounds and the Central Riverfront.

Archival and photographic documentation demonstrates a multi-layered history of building construction and deposition of materials along the St. Louis riverfront since the city's inception as a fur trading center. Population expansion accompanied a steamboat trade boom in the 1830s that stimulated riverfront development including establishment of a tenement and boarding house district in the old French settlement south of Market Street. An 1849 fire along the wharf engulfed “numerous business and [left] thousands homeless” (Roselle et al 1999). On July 7, 1849, “the City Council instructed the City Engineer to have the rubbish then being hauled from the burned district deposited in the low places on the wharf near Plum Street,” at the southern edge of what is now the park grounds (NPS 1954).

Just prior to the Civil War, St. Louis experienced an economic and industrial boom as a result of its river and rail connections, which were strengthened as the waterfront area devastated by the 1849 fire was rebuilt

as a fledgling industrial area. Residential occupation along the riverfront shifted away to the west, “as residents fled the pollution and noise caused by the development, the number of industrial and commercial buildings quickly grew” along the river’s edge (Roselle et al 1999).

A 1907 Sanborn Fire Insurance Company map shows multi-story commercial brick structures dominating the landscape in the area that would later become the park. The 1908 and 1909 Sanborn maps illustrate that the area south of Market Street was almost exclusively industrial warehouses with just a few dwellings, tenements, and lodging houses between Clark and Poplar Streets (Sanborn Fire Insurance Company 1908, 1909). North of Market Street, industrial manufacturing was the dominant land use. Despite this growth, the turn of the century subsequently saw the waning of river-based commerce, with the commercial area slowly abandoned and its structures declining.

The park’s substantial overlay of fill in the 20th century is well known. The remaining buildings in the area designated to become the park grounds were cleared in anticipation of construction of the park between 1939 and 1942. Many of these structures “had at least one, and sometimes two full basements, entailing a minimum of 15-30 feet of ground disturbance” resulting from both their construction and demolition (York 1983). If archeological evidence remains, basement foundations and a variety of subsurface features could be present beneath the park grounds, such as wells and refuse disposal features. In addition, the fill is believed to be composed at least in part of demolition materials, although the origin of the materials is undocumented, possibly originating from buildings razed on the site and/or brought in from elsewhere (NPS 2010).

Regrading of the park was a major operation involving extensive fill and a complete reshaping of the landscape. Starting in late December 1954, the Missouri Highway Department dumped 80,000 cubic yards of earth and rubble fill on the site northward from Clark Street toward the Eads Bridge, between Memorial Drive and Leonor K. Sullivan Boulevard. Almost 300,000 cubic

yards had already been deposited from Clark Street south to the park boundary (NPS 1984). Again in 1958, hundreds of cubic yards of fill were deposited on the site as stipulated by the grading plans and a remaining warehouse south of the Cathedral was removed (NPS 1984).

Archeological Sites

The study area for archeological resources is the park boundary, depicted on the Cultural Resources Impact Area map (Figure 24); as well as the linear path of the Central Riverfront along the levee. This study area was established based on areas of potential ground disturbance and excavation in the alternatives.

Within the Study Area

Archeological surveys previously completed within a one-mile radius of the project area have identified seventeen archeological sites that date to the historic period. In addition, a group of prehistoric mounds known as the St. Louis mound group were documented just outside the one-mile radius to the north of Laclede’s Landing. Early 19th-century accounts describe the mounds site as consisting of 26 pyramids with a two hectare plaza, with the largest “Big Mound” at the northern end of the site (Pauketat 2004). Because of these mounds, St. Louis was nicknamed “Mound City.” The St. Louis mound group was demolished as St. Louis development spread north in the 19th century. The majority of mounds were leveled by the 1870s, and little is known about the site as a result (Milner 1998).

St. Louis

Archeological sites 23SL976, 23SL2229, and 23SL2234, previously recorded within St. Louis but outside the park boundaries, include refuse and construction debris dating to the 1840s and 1850s. Like the blocks within the park, the areas where these three sites were found appear to have undergone the pattern of razing buildings and constructing new ones atop the construction debris. Cochran Gardens (Site 23SL2229) provides a good example of this. Located at the southeast corner of O’Fallon Avenue and North Seventh

Street, the Cochran Gardens site was a densely populated residential and commercial area from the mid-19th to the mid-20th century. Here, 19th-century buildings were razed in 1950 and the debris spread on the parcel as the base for an apartment complex. After the apartments were themselves razed in 2002, the rubble was used to fill basements and level the site, and subsequently capped by fill (Altizer, McLaughlin and Harl 2005). This pattern appears to have been the case even in the absence of modern construction. Phase II testing at the Walsh's Row site (Site 23SL2234), remains of row houses built c. 1845 and demolished c. 1935, indicates that modern fill from the demolition overlies brick streets or sidewalks as well as 19th-century brick and mortar building debris (Meyer 2004). These sites were found during excavations for new construction, mostly on blocks that were presumed to have no intact archeological features due to development in the 20th century. In each of the sites, intact deposits including refuse deposits, privies and cistern, were encountered below the rubble.

To the north of the park, there are ongoing archeological investigations due to excavation related to the construction of the New Mississippi River Bridge. Ten historic sites have been identified. The historic sites date from the mid-19th and early-20th centuries and include civic, residential, and commercial property types. Two locations where prehistoric sites were once present in the area were also investigated. The prehistoric sites were associated with Big Mound and the St. Louis Mound group. Testing of the prehistoric sites yielded only a handful of prehistoric artifacts in disturbed contexts and no intact prehistoric deposits or features were identified (MoDOT 2011).

No sites have been documented in Chouteau's Landing to the south of the park, though construction to the south along Lafayette Avenue (site 23SL338) revealed four cisterns intact with artifacts dating from the mid- to late 19th century (Fairchild 1979, in Roselle et al. 1999).

Within the Park Grounds

In addition to the sites and surveys in the vicinity, several archeological investigations have taken place within the park grounds. These excavations and subsurface examinations were focused on identifying intact pre-1849 features and deposits within the park. Excavations within the park boundaries were undertaken in 1960 by NPS Archeologist Zorro Bradley. Subsequently, Bradley suggested that 35 sites of historic importance were beneath the ten to thirty feet of fill deposited east of the 2nd Street area on the basis of historic documentation (Bradley 1960). The deepest portion of this fill extends east from a north-south line in the vicinity of 2nd Street to the area of the railroad cut along Commercial Street. Seven additional sites were identified between 2nd and Memorial, presumably under little to no fill; two were thought to have been previously disturbed or obliterated by more recent construction. Remnants of the 1810 office of Dr. Farrar, an important early St. Louis physician, were tentatively identified in this area. An additional four sites were thought to exist in proximity to the Old Cathedral (Bradley 1960). Following additional limited excavation in 1961, it was determined that "the historic structures . . . sought no longer existed or were too deeply buried to warrant excavation" (Bradley 1976). The subsequent two excavations yielded a few artifacts, none of which appear to have been recovered from in situ deposits.

In 1984-1985, monitoring of construction activities for the Arch Parking Garage spanning the former 1st and 2nd Street areas at the northern edge of the park identified six archeological features, none of which was confirmed as containing intact resources dating to before 1849 (Wells and Williams 1985). In the location of the garage, remnants of the 1st Street limestone block retaining wall were observed at an elevation of 443 feet above mean sea level sitting directly on bedrock and capped by the street's 1882 cobblestones. While some apparently sterile soil was observed below the cobblestones, efforts to remove the capping and examine

the deposits below the street were deemed inadvisable (Wells and Williams 1985). West of 1st Street, excavation revealed a deposit of building and structural debris about nine feet deep sitting directly on bedrock. East of 1st Street, two exposed features were observed within trenches five meters deep, consisting of limestone foundation walls and remnants of an aqueduct or sewer. The foundation walls, while corresponding to the location of the “Cadet” Chouteau House built c. 1825, were more probably a portion of the later W.H. Bull Medicine Factory, which was demolished by the National Park Service between 1939 and 1942 (Woods 1984).

Two additional features were observed running west from 1st Street for nine meters and sitting directly on bedrock. The first, a limestone foundation with a top elevation of 435 feet above mean sea level, was associated with a small amount of late 19th- and early 20th-century material; the second was a brick foundation corner directly to the north. A third feature at the west end of the site was associated with late 19th- and early 20th-century material. No associated diagnostic information or artifacts were found, and the matrix of building rubble encountered led to the conclusion that “. . .in situ features if they exist, will be located below the 436.0-foot elevation that excavation is now, or up slope west of 1st Street” (Wells and Williams 1984 and Woods 1985). The findings suggested that “post-1849 urban renewal had destroyed any earlier structures present above grade elevation [436.0 feet above mean sea level] prior to commencement of excavation for construction of the parking facility” (Wells and Williams 1984 and Woods 1985).

Archeological monitoring in 1999 for the construction of the maintenance facility at the south end of the park also indicated the potential for archeological resources. Here, auger bore samples hit the limestone bedrock at 9.25 to 13.5 feet below surface, trending to a maximum of 38.5 feet below surface in the northernmost boring observed. Dense brick rubble was seen in many of the borings ranging from below the present asphalt surface

to depths of three to ten feet; an undated abandoned sewer line also appeared to have been hit in a separate boring. NPS Archeologist Vergil Noble concluded that “it is well known that the grounds here were landscaped on urban fill after the buildings were razed” (Noble 1999).

The archeological investigations within the park have typically yielded historical construction debris and partially disturbed architectural and infrastructure features dating to the second half of the 19th century. The focus of many investigations has been on identifying pre-1849 resources; as a result, little is known regarding later historic features. However, the post-1850 architectural and infrastructural features that have been identified indicate the potential presence of additional historic resources that may meet National Register eligibility criteria. Much of the park has not been subjected to archeological investigations. While all archeological reports acknowledge that the deep fill in the eastern portion of the park severely limits the potential for archeological deposits to be disturbed in future construction, the presence of intact deposits and features cannot be discounted.

In a 1960 memorandum between the park’s Archeologist and Superintendent, the archaeologist pointed out the following:

Over the past four years an artificial fill running from 10 to over 30 feet deep has been dumped over the Memorial area in preparation for final landscaping. The deepest portion of this fill extends eastward from a north-south line in the vicinity of Second Street to the area of the railroad cut along Commercial Street.

Due to the slope of the original ground surface, the section of the park west of 2nd Street has the highest potential to yield archeological deposits that are not covered by deep fill and that may be affected by future development. Unexamined areas in the central western area of the park in particular may yield additional information, including areas around the Old Courthouse and Luther Ely Smith Square

that are in relatively undisturbed contexts and could contain intact, relatively shallow deposits pre-dating the industrial development of the area. The area between 1st and 2nd Streets, however, may also have a medium to high archeological potential depending on the depths of future ground disturbing activities. Portions of the southern area are expected to have medium archeological potential as a result of the rubble fill. Sites like Cochran Gardens, Walsh's Row, and Lafayette Avenue in Chouteau's Landing illustrate that, even under deep fill and building rubble, intact material may remain. Further, the piercing of a possible 19th-century sewer line in the southern area of the park suggests the potential presence of intact infrastructural remains that may pre-date or be contemporaneous with the Fire of 1849, including waterworks developed in 1830, gas light infrastructure from c. 1847, and sewer systems in place by 1850.

MUSEUM COLLECTIONS

The park's collection consists of 1,347,086 cataloged items: 10,257 objects and 45 archival collections. There are 8,941 history objects, 860 archeological objects, 342 ethnology objects, 54 geology objects, and 60 natural history objects. There are 411 cataloged objects on display in the Museum of Westward Expansion and 529 items on display in the Old Courthouse (NPS 2009). The purpose of the collection is to preserve historic artifacts and to support understanding of the park's themes through exhibits, research, and interpretive programs.

The cultural collection is sub-divided into four disciplines: archeology, ethnology, history, and archives. Collections are used for permanent and temporary exhibits in the Museum of Westward Expansion and Old Courthouse, and for staff and public research. Archeological holdings from excavations done in association with site work are administered by the NPS Midwest Archeological Center in Lincoln, Nebraska. Ethnological materials in the collection consist of American Indian clothing, weapons, tools, and domestic items such as basketry and pottery. A collection of architectural materials is on long-term loan to Southern Illinois University, Edwardsville for cataloging and study.

The history collection forms the bulk of the Museum of Westward Expansion collection, and focuses on the history of westward expansion, St. Louis history, the Old Cathedral, and Gateway Arch construction. Objects associated with the history of westward expansion include clothing, tools, equipment, weapons, household goods, personal items, and transportation devices that are representative of those used in exploring and settling the Trans-Mississippian West between 1804 and 1890. To interpret the city's growth and development of the "Gateway to the West," objects in the collection include many of these items manufactured in St. Louis. Included in this category are documented furnishings of the Old Courthouse and selected samples of historic fabric removed from park structures during approved restoration projects. Also included in this category is a large collection of pharmaceutical artifacts and documents from a St. Louis pharmacy in the 1890s. There is also a small collection of fine art, including works by Thomas Moran and Ansel Adams.

The park archives include materials which document the creation of the park, the clearing of the site, the architectural competition of 1947-1948, the selection of the Saarinen/Kiley design concept, the planning and construction of the Gateway Arch and landscape, the restoration of the Old Courthouse, and other important events in the park's history. Another notable collection in the archives consists of extremely detailed records, including photographs of the buildings that were razed to create the park site. The archives also contains other collections relevant to park resources and themes, including interviews and papers related to widows of frontier soldiers, a collection of papers and images of western forts, a research collection of Lewis and Clark materials, insolvent debtor records from 1815-1870 and a small but important collection of contracts awarded for original construction of the Old Courthouse in the 1850s-1860s.

NATURAL RESOURCES

The inventory and characterization of physical and biological resources provide a baseline for analysis of potential impacts discussed in Chapter 4. The natural resources at the Jefferson National Expansion Memorial and along the Central Riverfront discussed in this section include vegetation, soundscapes, water quality/stormwater management, and floodplains. Other natural resources that have been dismissed from further analysis are discussed in Chapter 1. The study area for the inventory and analysis of physical and biological resources is the park grounds and the Central Riverfront. The park is bounded by Eads Bridge to the north, Leonor K. Sullivan Boulevard to the east, Poplar Street Bridge to the south, and Interstate 70 to the west, plus a two-block extension to incorporate the Old Courthouse and Luther Ely Smith Square. The Central Riverfront is located along Leonor K. Sullivan Boulevard between the Mississippi River and the park, to the east and west, and Biddle Street and Chouteau Avenue to the north and south.

VEGETATION

The park grounds are a formally planned, designed, and planted landscape. It is highly maintained with no extant naturally occurring native plant communities. The park's plants include a mixture of ornamental native and non-native deciduous and evergreen trees, as

well as a few shrubs, expanses of maintained turf lawn, and ground cover. Mature Rosehill ash trees (*Fraxinus americana* "Rosehill"), the park's major planting, are planted in tree pits and along the park's paved walks. The majority of the trees in this urban planting are approximately 40 years of age, far older than the typical lifespan expected for urban plantings in similar conditions. The ash trees have begun to decline and will continue to do so as they age and naturally reach senescence; a number of them have already been removed (NPS 2011a). Vegetation along the Central Riverfront consists of street trees along portions of Leonor K. Sullivan Boulevard and several small grass-covered areas. Vegetation is limited due to the urban and paved nature of the area.

Of major concern is the vulnerability of the park's predominant ash plantings to the emerald ash borer (*Agrilus planipennis* Fairmaire). This exotic wood-boring insect feeds primarily on ash trees. The emerald ash borer larvae feed under the bark of a tree and cut off the flow of water and nutrients in the tree's vascular system. Affected ash trees die within several years of infestation (NPS 2011a). As of July 2010, the emerald ash borer has been detected in 15 states including Missouri (Missouri Department of Conservation 2011). At this time, the emerald ash borer has not been detected within 150 miles of St. Louis or at the park. The emerald ash borer's life cycle does not include traveling long distances; it typically is spread through the transportation of infested wood and wood products.

Figure 29 Processional Walks and Allées of Uniform Trees along the Walk



SOUNDSCAPE

National Park Service Policy on Soundscape Management

A portion of the National Park Service mission includes protecting and enhancing soundscapes within units of the national park system. Director's Order 47 provides guidance on soundscapes. A soundscape refers to the total acoustic environment of an area. Depending on the purposes and values of the park, both natural and human-caused sounds may be desirable and appropriate in a soundscape. Soundscapes often vary in their character from day to day and from season to season and can be affected by changes in the numbers of visitors who introduce human-caused sounds into the environment. The NPS policies require that the National Park Service restore degraded park soundscapes to the natural condition wherever possible, and protect natural soundscapes from unacceptable impacts (NPS 2006).

Noise is generally defined as unwanted or objectionable sound that alters or disturbs quality of life or communication. It also may affect physical health. Most environmental noise, particularly in urban areas, consists of a variety of frequencies of common, distant noises that create relatively constant background noise levels. Periodic loud noises such as horns honking, trucks driving by, or low-level aircraft overflights are easily perceived above background noise levels. Noise levels are usually measured and expressed in decibels (dB) that are weighted to frequencies perceivable by the human ear, known as A-weighted sound levels or dBA. Noise levels are typically measured over a set period of time (one hour, eight hours, or 24 hours) and are commonly expressed as dBA Leq, which represents the equivalent or average noise level in dBA for a given time period.

Noise Regulations and Policies

The City of St. Louis Revised Code Chapter 15.51 regulates stationary sources of industrial noise and sets permissible noise levels for various zoning districts. Stationary noise sources are defined as any equipment, motor

vehicle, aircraft, or facility, fixed or movable, capable of emitting audible sound. Noise from stationary sources within the central business district is generally limited to 70 dBA or less if the duration of the noise generating activity exceeds 60 minutes. This limitation would apply to construction and other activities on the park grounds. In addition, Chapter 15.50.081 prohibits construction activity within 1000 feet of a residential property before 6:00 a.m. and after dusk, except in case of an "urgent necessity."

Current Conditions on the Park Grounds

The park is surrounded on three sides by major roadways which include the elevated Eads Bridge to the north, Interstate 70 and Memorial Drive to the west, and the elevated Poplar Street Bridge to the south. To the east, it is bounded by Leonor K. Sullivan Boulevard along the Mississippi riverfront. A below-grade railroad corridor runs parallel to the river below-grade along the eastern part of the park grounds.

In general, the soundscape at the park is typical of a busy urban area. The soundscape at the park is dominated by fairly loud urban background noise from traffic on surrounding roadways. The traffic noise is loudest closest to the roadways. While the background traffic noise is perceptible everywhere, it diminishes towards the center of the park near the Gateway Arch and reflecting ponds due to natural attenuation and intervening topography and plantings. Trains moving across Eads Bridge and in the below-grade cuts in the eastern portion of the park can be periodically perceived above background noise levels. Commercial aircraft fly over or near the park on approach to and departure from the international airport at Lambert Field, but these noise events are typically of short duration. Horns from ships on the Mississippi River and other noises from the surrounding urban environment contribute to the existing soundscape.

Other sources of noise at the park include:

- The emergency generators which are tested monthly;
- Grounds maintenance equipment such as lawn mowers;

- Helicopters taking visitors on aerial tours from a barge moored on the riverbank below the park;
- Music broadcast from nearby riverboats; and
- Music from riverfront and park special events.

Visitors near the emergency generator building when the generators are operating would likely be able to hear the generators above the background noise. Similarly, visitors near maintenance activities such as

lawn mowing would hear noise from the maintenance equipment. As discussed above, visitors near the below-grade railroad tracks when trains are passing are able to hear the trains above background noise levels. During special events at the park, there is increased noise due to crowds, vehicles, and amplified sound systems.

While not covered by the NPS policy on protecting and restoring soundscapes within national parks, noise along the Central Riverfront is considered in this EA. Like the park, noises perceived along the Central Riverfront come from the surrounding urban environment, in particular roadway noise from Leonor K. Sullivan Boulevard, noise from helicopters taking off and landing at the barge moored along the riverbank in front of the park, and noise from riverboats. The Central Riverfront passes underneath three bridges that carry interstate highway traffic, the Poplar Street Bridge, Eads Bridge and the Martin Luther King Bridge, which each generate roadway noise.

WATER QUALITY/ STORMWATER MANAGEMENT

Water Quality

The park grounds and Central Riverfront are located in the Cahokia-Joachim watershed. The surface waters in the watershed flow to the Mississippi River along the eastern boundary of the park and along the Central Riverfront. The water quality of the Mississippi River is affected by human activities throughout the watershed. Water pollution is generated by non-point source pollution, such as

stormwater runoff; and point source pollution, such as wastewater treatment or industrial discharges.

The section of the Mississippi River in proximity to the park has been placed on the 303(d) list by the State of Illinois for having high levels of fecal coliform, manganese, and PCBs (EPA 2004). The Section 303(d) list is one of two basic approaches the Clean Water Act uses to protect and restore water bodies. The 303(d) list includes those water bodies and watersheds that exhibit levels of degradation requiring investigation and restoration. Once a water body has been identified on the Section 303(d) list, a Total Maximum Daily Load (TMDL) must be developed for each pollutant that is impairing the water body. A TMDL is the maximum amount of a pollutant that can be introduced into a water body in order for that water body to achieve or remain in compliance with applicable water quality standards (EPA 2010). Missouri developed a TMDL for the Mississippi River as it passes along the state to reduce levels of chlordane and PCBs in fish tissues (MDNR 2006).

Section 305(b) of the Clean Water Act requires that local agencies issue a report to the EPA and Congress every two years describing the water quality of 303(d) listed streams. In 305(b) reports, water bodies are categorized based on the degree to which water quality affects the use of the water bodies. According to Illinois Section 303(d) list for the section of the Mississippi River that passes through the study area, water quality only partially supports the uses of the river as a public water supply, for primary contact recreation, and for fish consumption due to fecal coliform, Polychlorinated biphenyls, mercury, and manganese contamination (Illinois EPA 2011).

Stormwater Management

The storm sewer system within the park is quite complex, as there are numerous local storm drains and storm sewer lines located across its 91 acres. Some of these storm drains direct runoff into the reflecting ponds on the park grounds. The ponds are therefore an integral component of the site's stormwater system. Both ponds have algal blooms, likely related to the use of fertilizer on the park's

lawns which runs off into the ponds both directly and via the stormwater system.

Stormwater collection sumps are located on both the north and south sides of the central portion of the park. One of these stormwater collection sumps is located near the emergency generator building. A submerged pump moves stormwater from this collection area into the North Reflecting Pond. A similar stormwater collection sump is located near the shipping and receiving area at the south service tunnel. A submerged pump moves stormwater from this collection area into the South Reflecting Pond.

Storm flow is held in the North and South Reflecting Ponds where it is then re-circulated or allowed to drain offsite once the water level reaches the top of the overflow structures. The North Pond overflow is directed through a 36-inch storm outfall directly to the Mississippi River (described below), and the overflow from the south pond is directed to the Metropolitan St. Louis Sewer District (MSD) system.

According to the utility map of the park, there are six stormwater outfalls into the Mississippi River between Washington Avenue and Poplar Street:

- The northernmost of these outfalls is a 36-inch reinforced concrete pipe (RCP) storm sewer just north of Washington Avenue that outfalls into the Mississippi River northeast of the North Overlook.
- A 36-inch RCP storm sewer collects runoff from the North Overlook and Arch Parking Garage, running beneath the North Overlook and outfalling into the Mississippi River.
- A 15 inch RCP storm sewer collects runoff from the north railroad cut and a tile subsurface drainage system and flows beneath Leonor K. Sullivan Boulevard, outfalling into the Mississippi River.
- A 15-inch RCP storm sewer collects runoff from the Grand Staircase and east slopes.

This storm sewer also flows beneath Leonor K. Sullivan Boulevard and outfalls into the Mississippi River.

- South of the Gateway Arch, a large 54-inch storm sewer runs across the park beneath the south reflecting pond, the south railroad cut, and Leonor K. Sullivan Boulevard, outfalling into the Mississippi River.
- On the south side of the park, a 36-inch storm sewer outlet from the south reflecting pond runs southeast to a junction with a main storm sewer line beneath the eastbound lanes of Poplar Street outside the park boundary. This large storm sewer also collects runoff from the area around the railroad tunnel and the South Overlook.

In addition to the active storm sewer lines described above, there are a number of abandoned storm sewer lines shown on the utility map. These inactive lines may be encountered during construction activities at the park. They are assumed to present minimal hazards or interference with construction activities, and are therefore not described in detail in this EA.

Stormwater systems along the Central Riverfront are relatively simple. A large portion of the storm flow south of Poplar Street is allowed to sheet flow from Leonor K. Sullivan Boulevard directly to the levee without being collected or channeled. North of Poplar Street, the storm flow is collected by a system of curb inlets, trench drains, and area drains which connect to storm trunk sewers that discharge directly to the Mississippi River.

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year.



Figure 30 Flooding along the Central Riverfront within the Floodplain

FLOODPLAINS

Portions of the East Slopes and the entire Central Riverfront lies within the regulatory Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP) 100-year (1%) Mississippi River floodplain (see Figure 31). The floodway portion of the river is confined by a floodwall/levee system on both the east side of the River (Illinois bank) and the west side of the river (Missouri bank). The floodwall/levee system essentially “squeezes” the floodplain into a relatively narrow floodway.

Floodplains contain flood waters and also provide numerous functions besides storing flood waters. Floodplains can also provide habitat for various flora and fauna especially the islands that are temporarily formed by shifting river sediments. The Mississippi River, below its confluence with the Missouri River, transports a considerable volume of sediment (sand, gravel, silt, etc.). This portion

of the Mississippi River floodplain adjacent to Leonor K. Sullivan Boulevard has been highly industrialized with several river ports / transfer loading facilities located within what is referred to as the St. Louis Harbor. The channel is routinely dredged by commercial sand and gravel suppliers.

The City of St. Louis is a member of the NFIP and must abide by the rules and regulations of this program. It will be necessary to apply for and obtain a Floodplain Development Permit. Because the Central Riverfront improvements propose raising Leonor K. Sullivan Boulevard to reduce the frequency of flooding, it will be necessary to perform a Riverine Hydraulic Analysis of the proposed improvements to assure the city that a “no-rise” to the 100-year base flood elevation will exist after the proposed improvements are constructed. This is typically referred to as a “no-rise” analysis. This analysis will be performed after approximately 40% of the final design is completed.

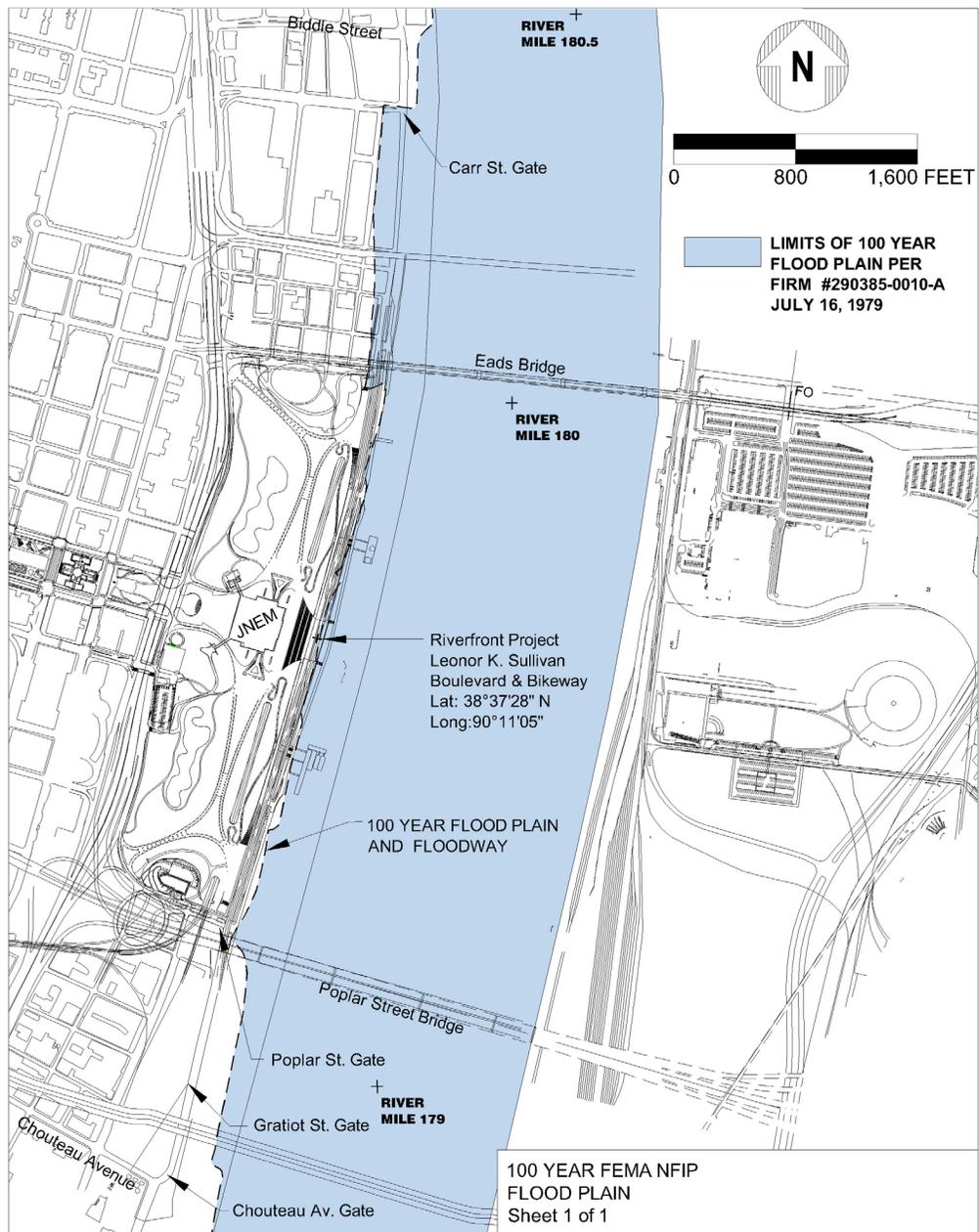


Figure 31 Project Area and 100-year Floodplain (Source: Great Rivers Greenway District)

VISITOR USE AND EXPERIENCE

VISITOR OPPORTUNITIES AND USE

The Jefferson National Expansion Memorial receives most of its visitation within its structures: the Visitor Center/Museum complex beneath the Gateway Arch, the ride to the top of the Gateway Arch, and the observation deck at the top of the Gateway Arch. The underground complex includes a lobby, the Museum of Westward Expansion gallery, visitor loading areas for the Gateway Arch’s transportation system, and two theaters that screen films related to the park’s themes. Additions to the visitor center and museum have included the American Indian Peace Medal Exhibit, two museum stores, and a ticket purchasing area. The Old Courthouse includes the Diorama Room and the Competition Room, as well as exhibits on the history of the City of St. Louis and a museum store.

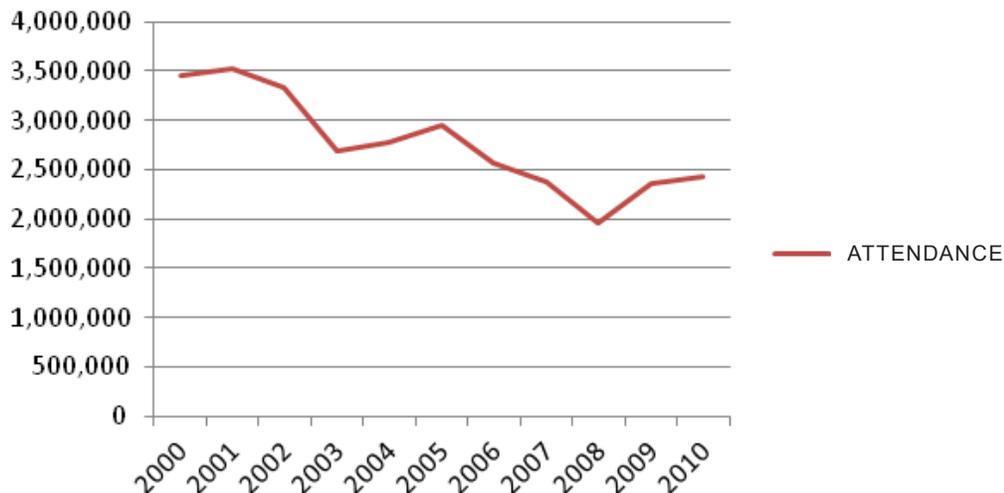
Between the years of 2000 and 2010, an estimated 2.7 million people visited the park annually, including individuals using the site only for the parking garage (non-recreational visits) and special event attendance. Excluding those uses, the park averaged 1.9 million

YEAR	ATTENDANCE
2000	3,458,956
2001	3,532,524
2002	3,333,454
2003	2,685,219
2004	2,779,350
2005	2,944,976
2006	2,572,072
2007	2,385,387
2008	1,954,810
2009	2,360,109
2010	2,436,110

Table 3 Annual Attendance, Jefferson National Expansion Memorial
 Source: National Park Service Public Use Statistics Office (NPS 2011d)

visitors per year. During the same time period, an average of 1.7 million people visited the Visitor Center underneath the Arch, an average of 1.1 million people visited the Museum of Westward Expansion, and an average of 99,000 people visited the Old Courthouse (NPS 2011b). Table 3 below provides estimated annual visitation to the park from 2000 to 2010.

Table 4 Graph of Annual Attendance, Jefferson National Expansion Memorial (Source: NPS)



Results of two surveys conducted by Metro, one in 2003-2004 and one in 2006-2007, indicate that: two-thirds of visitors reside within 500 miles of the park; most visitors return within 11 years for another visit; the average park visit lasts just over two hours; and, at least 19 percent of visitors cited the Gateway Arch experience, consisting of the tram ride and the view from the top of the Gateway Arch, as the primary reason for visiting. Further information about these surveys is discussed in the Chapter 3 of the GMP on page 3-34 (NPS 2009).

Visitor contact stations currently include the visitor information desk in the lobby of the George B. Hartzog Visitor Center underneath the Arch; ticket takers in front of the two theaters; interpreters stationed at the entrance of the Museum of Westward Expansion and roving within the museum; and interpreters stationed at the top of the Gateway Arch and in the Old Courthouse (NPS 2009). Other facilities at the park include exhibit galleries in the Old Courthouse, and museum shops. The park also offers many educational programs to groups, ranging from pre-school to high school, college, and senior citizens.

The Museum of Westward Expansion commemorates the people and events of the 19th century American westward movement through artifacts, quotations, photographs, and animatronic figures. The Museum's collection focuses on the history of westward expansion, St. Louis history, and Gateway Arch construction. The collection includes clothing, tools, equipment, weapons, household goods, personal items, and transportation devices that are representative of those used in exploring and settling the Trans-Mississippian West between 1804 and 1890 (NPS 2009).

The park grounds are used by visitors on their way to the Gateway Arch, as well as by local downtown workers and residents who utilize the park as an urban green space. The park is used by visitors as well as downtown residents and workers for picnics, lunch hours, and passive and active recreation. Some recreational activities are permitted in the park, as long as they do not conflict with the stated memorial purpose of the park or its

setting. Recreational activities include walking, jogging, biking, photography, watching the river, sitting, reading, and informal recreation such as Frisbee tossing. Organized sporting events are not permitted. St. Louis residents and visitors also take advantage of interpretive programming at the park such as the Night at the Museum program, the Family Junior Ranger programs, ranger led bike tours, Arch grounds walking tours, and seasonal programming. The park annually hosts a series of special events including Fair St. Louis, African American Heritage Month, Fourth of July celebrations, Constitution Day, Victorian Holidays and St. Louis Traditions, and others.

The Central Riverfront provides a place for visitors and downtown workers to experience an intimate encounter with the Mississippi River while experiencing a variety of passive and active recreational opportunities. An existing promenade on the east side of Leonor K. Sullivan Boulevard features concrete paved sidewalks, street trees, benches, and outlooks for river viewing. Opportunities for food concessions, horse-drawn carriage rides, and bicycle rentals are available. The Central Riverfront also provides a glimpse into the character of a commercial riverfront through its available riverboats cruises and excursion boat tours. Replica 19th-century paddle-wheel boats, Tom Sawyer and Becky Thatcher, located on the Central Riverfront include cruise narration which offers a historical overview of the area and the role this working river still plays today.

PEDESTRIAN AND BICYCLE CIRCULATION

Sidewalks of varying widths and conditions are located along the streets of downtown St. Louis. As is typical in a downtown urban setting, many trips can be made on foot within the vicinity of the park. One-quarter to one-half mile (a five- to ten-minute walk) is typically considered to be a comfortable walking distance.

While the Gateway Arch is within one-quarter mile of both the Arch Parking Garage and the Old Courthouse, the south end of the park is further than one-half mile from either of



Figure 32 Transportation and Circulation Existing Conditions

these facilities. This contributes to its relative isolation. The park is largely cut off from the rest of downtown St. Louis by Interstate 70, impeding pedestrian access from the downtown streets south of Walnut Street.

The largest impediment to pedestrian access is the need to cross Memorial Drive at the Walnut, Market, Pine, and Chestnut Street bridges. Recent pedestrian-oriented improvements include accessible, paved crosswalks across Memorial Drive. Memorial Drive is four lanes with a pedestrian island in the middle. While waiting at the pedestrian islands, high-speed freeway traffic is visible and audible in the I-70 trench below (Figure 33). These conditions and vehicles converging from multiple directions, however, continue to create disorienting pedestrian conditions between the Old Courthouse and the Gateway Arch.

Within the park, there are approximately five miles of exposed-aggregate concrete sidewalks, as well as more than two miles of concrete sidewalks around the perimeter (NPS 1996a).

While the Grand Staircase leading from the park to the riverfront is in good condition, there is currently no means of reaching the riverfront directly from the Gateway Arch for persons with mobility impairments. In addition, the concrete north and south staircases that reach from the North and South Overlooks down to Leonor K. Sullivan Boulevard have some surface deterioration and cracking.

With few designated on-street bicycle lanes in downtown St. Louis, most cyclists must share the roadway with automobiles. The park is a destination for bicyclists, primarily via the Riverfront Trail, an off-road facility that is part of the River Ring Greenways system. This trail links the Mississippi riverfront with the Greater St. Louis region. The park is a hub of this trail system and its planned expansion.

The Riverfront Trail runs along the edge of park grounds along The Central Riverfront. This segment of the trail shares the street lanes with vehicular traffic. Poplar Street, Memorial Drive, and Washington Avenue are



Figure 33 Pedestrian Bridge over I-70 across Memorial Drive

also designated as part of the regional bikeway network, albeit via shared lanes as well. Other streets in downtown St. Louis, including Chestnut, are designated as bike routes, though without dedicated bike lanes. Only Olive Street, west of 20th Street, has dedicated bicycle lanes in downtown St. Louis.

The park grounds permit bicycle use, though facilities such as bike racks are limited. The NPS partner Metro rents bicycles, including “quadcycles,” from a location at the base of the Grand Staircase along Leonor K. Sullivan Boulevard.

PARKING

While parking is ancillary to the experience of the Gateway Arch and park grounds, the location and perceived ease of access to it helps shape the visitor experience. For the purposes of this analysis, the parking facilities have been divided into those parking locations within the park grounds, and those parking facilities outside of the park.

Arch Parking Garage

The Arch Parking Garage on Washington Avenue was constructed in 1983, and has

a capacity of 1,208 vehicles on three levels, with two levels below-grade and the top level entrance at the same grade as the walks in the adjacent park. A result in part of its design (intended to retain a low profile and avoid visibility from within the park), a perceived deficiency with the current garage is its maximum height of seven feet, which precludes bus, RV, and oversized vehicle parking. The garage is a primary access point for visitors to the Gateway Arch, with the approximately one-quarter mile walk to the Arch remaining one of the most actively used paths within the park. The garage is also used by non-park visitors, including people who are accessing the riverfront and Laclede’s Landing, as well as NPS and Metro employees.

Old Cathedral Parking Garage

The surface parking lot at the Old Cathedral, with approximately 87 spaces, was constructed in 1961 (NPS 1996a). While the Old Cathedral is not within the park boundary, the associated parking lot is. An effort on behalf of the Archdiocese of St. Louis to expand the lot was turned down by the NPS in 1969, due to its potential impact on the park. The existing lot was resurfaced and redesigned in 1994. A bus drop-off is located along Memorial Drive

adjacent to the Old Cathedral Parking lot. The pedestrian path from the Old Cathedral Parking lot provides the shortest barrier free accessible route to the Gateway Arch and the Visitor Center/Museum, making it a desirable drop-off and pick-up location for visitors.

Maintenance Parking Facility

The maintenance facility is located at the south end of the park. The current facility was built in 2002, and includes a small parking lot for use by NPS employees and visitors to the facility. The lot was expanded from five to ten spaces in 2007.

On-Street Parking Spaces (Within the Park Boundary)

Since the official boundary of Jefferson National Expansion Memorial extends to the middle of Market and Chestnut Streets, the area used for on-street parallel parking spaces on the north side of Market Street, adjacent to Luther Ely Smith Square, falls within the park boundary. These 10 spaces are illegal parking areas, as the street is clearly marked as a no parking zone, yet they continue to be used despite frequent issuances of tickets by the City of St. Louis Parking Violations Bureau. The other streets around the park (Memorial Drive, Washington Avenue, Poplar Street, and Leonor K. Sullivan Boulevard) do not have on-street parking spaces, though at times illegal on-street parking occurs along Leonor K. Sullivan Boulevard, particularly in times of flooding, when the adjacent levee parking is underwater.

Off-Site Parking Facilities

Visitors have numerous options for parking off-site within one-quarter mile of the park and Central Riverfront. Given the park's location in downtown St. Louis, there are many options including on-street parking, parking along the levee, nearby private and public parking garages, and surface lots.

For the purposes of this plan, only those parking facilities located within one-quarter mile of the park are considered. It is assumed that most visitors arriving via private automobile would typically park within

one-quarter mile (a five-minute walk) of the park. Some portions of the park, such as the Old Courthouse and the southern end of the park grounds, are closer to off-site parking facilities than they are to the Arch Parking Garage or the Old Cathedral Parking lot.

Parking Garages and Lots

There are approximately 46,000 parking spaces located within downtown St. Louis, with 2,700 of them on-street spaces (Downtown St. Louis Partnership 2008). Of these, many off-street spaces are within one-quarter mile of the park boundary. The majority of these facilities is utilized by long-term users, but most have space available for public use as well. According to the Arch Parking Alternatives Study Final Report, prepared for Metro in 2012, there are 28,440 public parking spaces, with an estimated 13,000 available to park visitors on a daily basis, within the downtown area identified in the parking study (Carl Walker 2012).

Bus and RV Parking

In addition to the bus drop-off location alongside the Old Cathedral Parking lot, Leonor K. Sullivan Boulevard, along the east border of the park, is also used for bus loading and unloading. Bus and oversize vehicle parking is currently accommodated along South Leonor K. Sullivan Boulevard/South Wharf Street south of the Poplar Street Bridge.

ACCESSIBILITY

NPS Director's Order 42 defines architectural accessibility as "the design, construction and/or alteration of a building or facility that is in compliance with officially sanctioned design standards, and that can be entered, and used by individuals with a disability." Architectural accessibility is used in conjunction with the idea of program accessibility, a concept used to ensure that "the programs, activities and opportunities provided to visitors and/or employees will be provided . . . in such a way that individuals with disabilities are not excluded from, nor denied the benefits of, that program or activity."

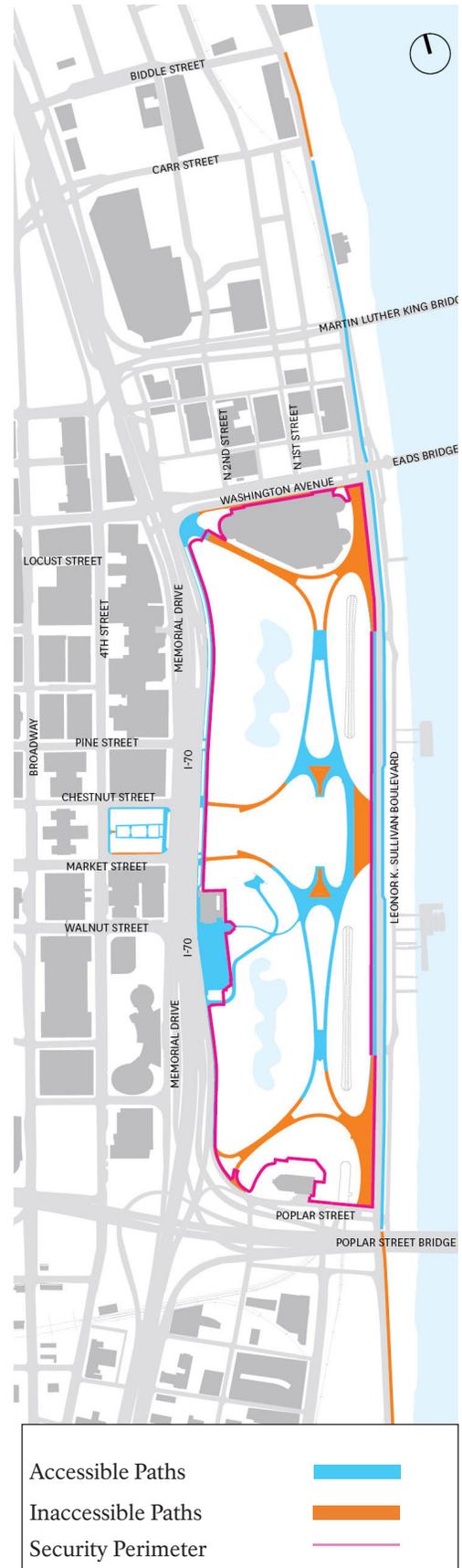
Circulation within and around the park includes both accessible and inaccessible routes and pathways. The area of the park that is the least accessible is the East Slopes between the Gateway Arch and the riverfront. However, the park has implemented many measures to ensure that facilities and programs meet architectural and program accessibility standards. Accessible architectural and program experiences are provided through physical modifications to the park, as well as through self-activated video programs, large-print brochures, and telecommunications device for the deaf (TDD) equipment, and wheelchairs on request.

The most extensive physical modification to accommodate barrier-free access was completed in 1994, when the Old Cathedral Parking lot was redesigned and reconstructed to provide a bus pull-off along Memorial Drive. This enables drivers to drop off or pick up passengers close to the Gateway Arch's south leg, near the Old Cathedral. Accessible parking for visitors is also provided at the Arch Parking Garage. The most common visitor complaint about accessibility at the park is the distance between the Arch Parking Garage and the Gateway Arch (approximately 1,100 feet).

To provide more accessibility at the Old Courthouse, a wheelchair lift was installed in the southwest courtyard in 2007 and replaced in 2012. This is the only courtyard that may be accessed by the public. The wheelchair lift allows access to the first floor and galleries of the Old Courthouse, which contains exhibits and visitor information. The second floor of the courthouse is not accessible as it can only be reached via a staircase.

The visitor center beneath the Gateway Arch is accessed via ramps with an eight percent slope at both the south and north legs. Although the ramps fall within the Architectural Barriers Act Accessibility Standard (ABAAS) requirements for steepness of grade, they exceed the

Figure 34 Accessible Walkways Existing Conditions (Source: MVVA)



acceptable length at this grade. In addition, physically challenged visitors who do not have a problem conquering the ramps may have difficulty opening the heavy glass doors once they reach the visitor center entrances.

Circulation along the Central Riverfront includes both accessible and inaccessible routes and walkways. The sidewalks along the west side of Leonor K. Sullivan Boulevard are generally compliant with current ADA standards. However, there are no ADA compliant connections between this sidewalk and the paths and walkways at the top of the East Slopes of the Arch grounds. Sidewalks along the east side of Leonor K. Sullivan Boulevard between Poplar Street and Washington Avenue do not provide continuous barrier-free access.

Additionally, there are no accessible routes along the Central Riverfront south of Poplar Street, or north of Carr Street. Access from Leonor K. Sullivan Boulevard to the levee is provided via concrete switch-back ramps at two locations near the south and north legs of the Arch, respectively. These ramps are not compliant with current ADA standards, and ADA compliant access along the levee is not provided. Figure 34 indicates the walkways that are accessible and areas of the park and the Central Riverfront that are inaccessible.

SOCIOECONOMICS

Jefferson National Expansion Memorial is located within the urban area of St. Louis, Missouri. The park, a major, iconic tourist attraction, draws millions of visitors each year. As individuals and families travel to the area they provide economic stimulus through their local spending. Given the importance of the park as a regional attraction, the influence area for social and economic consideration has been defined as the City of St. Louis, where most of the park visitor spending is likely to occur. The project team collected data for socioeconomic baseline conditions for the City of St. Louis. Data was also collected for St. Louis County, where available, to provide a broader regional perspective.

ECONOMIC CONTRIBUTIONS OF THE PARK

From 2000 to 2010, the park averaged 2.7 million visitors per year. This includes individuals coming to the site solely to use the parking facilities (non-recreation visits) and those that come to the site during special events (e.g. Fair of St. Louis). When these two types of uses are excluded, the park averaged 1.9 million visitors per year over this period (NPS 2011b). Table 3.1 on page 3-43 of the GMP provides a breakdown of the annual estimated visitation to the park from 1998 to 2007.

Figure 35 Visitors Gathering on the Grand Staircase and Central Riverfront during a Special Event



The economic contribution of the park during 2010 was estimated by the NPS Money Generation Model Version 2, developed by Michigan State University (Stynes 2011a and 2011b). According to this analysis, the park hosted 2.44 million recreational visitors who spent \$98.44 million in the area (Stynes 2011c). This spending generates additional economic activity in the form of sales, income, and jobs through businesses that provide goods and services to visitors. The jobs cited include full-time and part-time jobs with seasonal positions adjusted to an annual basis (Stynes 2011a).

Local and non-local visitor spending is included to capture all economic activity associated with park visits in the local area. Estimates of the economic impact of visitor spending in the local area generally exclude spending by local residents, as it is assumed that if park opportunities were unavailable, local residents would still spend the money on other local activities, while visitors from outside the region would not make the trip. The economic impacts generated by visitor spending should be interpreted as the expected loss in economic activity within the region if the park were closed (Stynes 2011a). In 2010, the economic impacts of non-local visitor spending equaled \$86.62 million in sales, \$37.4 million in labor income, \$60.98 million in value added and 1,309 jobs (Stynes 2011c). The economic sectors most directly affected by the economic contribution of the park are lodging, and restaurants and bars (Stynes 2011b). In 2009, the park directly employed 130 Full Time Equivalent (FTE) employees and park partners, Metro and Jefferson National Parks Association, employed 110 FTE employees (NPS 2009). These jobs generated additional labor income in the local area.

SOCIAL CONTRIBUTIONS OF THE PARK

As discussed in the Visitor Use and Experience section of this EA, the park serves as an open green space in the urbanized area of downtown St. Louis. The park is a resource for downtown residents and workers, as well as out of town visitors, as access to parks and open spaces increases the livability of an area by providing space for outdoor active and passive recreation. The pedestrian connections

to the park that are available from downtown to access the open space can be difficult or unpleasant to navigate, as discussed above in the Pedestrian and Bicycle Circulation section of Visitor Use and Experience.

EMPLOYMENT AND ECONOMIC WELFARE

The 2006-2010 American Community Survey 5-Year Estimates list the top five industries in the City of St. Louis as: (1) educational services, and health care and social assistance; (2) arts, entertainment, and recreation, and accommodation and food services; (3) professional, scientific, and management, and administrative and waste management services; (4) retail trade; and (5) manufacturing. These occupation sectors make up approximately 69 percent of the civilian employed population age 16 years and over residing in the city (U.S. Census Bureau 2010).

Within St. Louis County, the top five industries for the same time period were identified as: (1) educational services, and health care and social assistance; (2) professional, scientific, and management, and administrative and waste management services; (3) retail trade; (4) manufacturing; and (5) finance and insurance, and real estate and rental and leasing. These occupation sectors make up approximately 67 percent of the civilian employed population age 16 years and over residing in the county (U.S. Census Bureau 2010).

The difference in economic structure of the City of St. Louis and St. Louis County is shown in the data reflecting employment by industry. Both the city and the county have a strong concentration in the education and health industry sector, with a higher percentage of jobs related to health care and social assistance than to education. The City of St. Louis shows a stronger concentration in arts, entertainment, and recreation, and accommodation and food services than the county. Within the arts and entertainment industry sector in the city, the largest concentration of jobs is in accommodation and food services. St. Louis County shows a stronger concentration in professional services, finance and real estate, and trade and manufacturing.

Unemployment over the last ten years in the St. Louis metro area has tended to follow the trend of the national economy; however, the city averages a higher unemployment rate than the county. In the 2006-2010 American Community Survey 3-Year Estimates, the unemployment rate in the City of St. Louis was approximately 12.7 percent. In St. Louis County it was estimated at 7 percent (U.S. Census Bureau 2010a). The Bureau of Labor Statistics estimated that the seasonally adjusted unemployment rate in the St. Louis, MO-IL Metropolitan Statistical Area (MSA), which includes the City of St. Louis and St. Louis County, was 10 percent in 2010 (BLS 2011a). The principal cities in the St. Louis, MO-IL MSA are St. Louis and St. Charles, Missouri. The surrounding counties on both sides of the Mississippi River are also included in the MSA. In comparison, in 2010 the annual average unemployment rate for Missouri was estimated at 9.5 percent, as compared to the national rate of 9.6 percent (BLS 2011b).

The labor force employed within the city limits is drawn from both residents and non-residents. In 2009, approximately 26 percent of the labor force employed within the City of St. Louis also resided in the city, while 56 percent of the labor force living in the City of St. Louis was employed outside of the city. Approximately 74 percent of the labor force employed within the City of St. Louis resided outside of the city and commuted in for employment purposes (U.S. Census Bureau 2009).

Another perspective on economic welfare is provided by looking at median household income and poverty rates. The City of St. Louis has a lower median household income than St. Louis County, according to the 2006-2010 American Community Survey 5-year Estimates. Median household income levels within the city were 58 percent of those in the county. The City of St. Louis also reported poverty levels that are much higher than the county and the U.S. as a whole (U.S. Census Bureau 2010a).

ECONOMIC CONTRIBUTIONS OF THE CENTRAL RIVERFRONT

An economic impact study of the effect of ongoing operations along Leonor K. Sullivan Boulevard and their contributions to the local economy was undertaken by the Great Rivers Greenway District in 2012 (GRG 2012). The study included the portions of Leonor K. Sullivan Boulevard along Laclede's Landing, the park, and Chouteau's Landing.

The study estimated that there are approximately 397,900 local and non-local visitors to Leonor K. Sullivan Boulevard per year. Of those visitors, approximately 258,600 are estimated to be non-local visitors. The overall annual economic impact of visitor spending along Leonor K. Sullivan Boulevard on the city's economy is estimated to be \$12.2 million. This includes direct spending, the estimated multiplier effect of the spending, earnings for jobs along Leonor K. Sullivan Boulevard, and multiplier jobs for other city residents. The total number of jobs related to the economic activity along Leonor K. Sullivan Boulevard is estimated at 46, with 11 jobs directly related to Leonor K. Sullivan Boulevard. In addition, the total economic activity generated by the City of St. Louis' operations and maintenance of Leonor K. Sullivan Boulevard is approximately \$193,000 annually and supports 2.15 jobs (GRG 2012).

OPERATIONS AND MANAGEMENT

PARK OPERATIONS AND MANAGEMENT

The park is administered by the Superintendent headquartered in the Old Courthouse. The Superintendent's office includes a Deputy Superintendent, Management Assistant, and Secretary. The Management Assistant is responsible for all Special Use Permits, Filming Permits, and other commercial uses of the park.

There are 130 FTE at the park including administrative staff, interpretive staff, facilities and grounds management and maintenance, and law enforcement. Partner groups provide staff which account for an additional 110 FTE (NPS 2009).

Ranger Activities Division

This division is responsible for 24-hour, 365-day law enforcement and physical security throughout the park grounds and the Gateway Arch. The park has concurrent jurisdiction and commissioned rangers enforce state and federal laws and regulations intended to safeguard visitors and park resources. In addition to law enforcement, this division is responsible for dispatch and emergency medical services throughout the park. Rangers make routine park visitor contacts to ensure that park regulations are understood and being met, to check for safety and resource protection violations, and to respond to or direct visitor inquiries to appropriate park staff. As a designated icon park, the Gateway Arch's physical security is of paramount importance. All visitors to the Gateway Arch are screened via x-ray and magnetometer at one of the two entrances prior to entering the facility.

Museum Services and Interpretation Division

This division includes an Education Department, Exhibits Department, Theater and Audio-Visual Department, Curatorial Department, and Interpretation Department.

The Education Department plans, promotes and presents education programs, events and materials about National Park themes, and resources at the Gateway Arch and Old Courthouse for families, school and scout groups, and educators. The Exhibits Department is responsible for planning and building temporary exhibits on park themes, and routine maintenance and cleaning of museum exhibits. The Theater and Audio-Visual Department handles the operation and maintenance of the park's two theaters and provides the park with AV needs such as photographs and videos of events, programs, training, and personnel. The Curatorial Department manages the park's library, provides assistance to researchers, and catalogs and preserves the park's archival holdings. The Interpretation staff is responsible for staffing public contact points in the park, assisting visitors with directions, answering questions, and providing background and historical information about the park. The staff also plan and implement public programs and events.

Administration Division

The Division of Administration is responsible for the park's budget and financial accounting, property management, payroll, human resource management, contracting and procurement, mail services, filing, and management of the computer system. This division is also responsible for concession management and the park's telephone system.

Maintenance Division

The Maintenance Division consists of the Grounds Section, Custodial Services, Building Services, and Gateway Arch Transportation System. The Grounds Section is responsible for caring for the unique, man-made environment on the park grounds. Staff has an extensive knowledge not only of horticulture, but several other disciplines as well, and manages vegetation based on NPS policies pertaining to Integrated Pest Management (IPM). For more information on tree maintenance practices on the park grounds, refer to the Jefferson National Expansion Memorial Landscape Preservation Maintenance Plan (NPS 2010b). The Landscape Preservation Maintenance Plan, completed as a sequel to the 2010 CLR,

provides detailed guidance on best practices for maintaining the historic character of the park, and for preventing damage to vegetation resources due to construction or other activities.

Duties of the maintenance division include snow removal, mowing, turf maintenance, pest management, tree maintenance, irrigation, landscaping and equipment maintenance, snow removal, and emptying litter containers. Custodial Services is responsible for the cleanliness of the park buildings including the museum and exhibit areas in the Old Courthouse. Building Services is responsible for maintaining the complex heating and air conditioning units at the park. The Gateway Arch Transportation System Department is a group of skilled technicians responsible for maintaining and repairing the Gateway Arch tram system. In addition to work on the trams, these employees perform extensive work on electrical and wiring systems in the park.

PARK PARTNERS

The park has working relationships with a variety of groups and organizations in order to meet operational, interpretive, and programmatic goals, and will continue to build on these partnerships. The park is committed to strengthening relationships with universities, schools, institutes, and organizations as well as local, state, and federal agencies to accomplish a variety of operational needs. In particular, the park partners described below contribute to the daily operation of the park.

Metro Business Enterprises

Metro (also known as the Bi-State Development Agency) was established in 1949 as an interstate compact between Missouri and Illinois and provides public transit for the St. Louis metropolitan region. Metro funded and built the Gateway Arch Transportation System in the 1960s, and continues to administer its operation. Metro also constructed the Arch Parking Garage and continues to operate and maintain the garage. In addition, they collect park fees and fund exhibits and other improvements. A large portion of the fees collected by Metro go towards park operations.

Jefferson National Parks Association

JNPA operates three stores in the park, and a wide variety of projects are funded through their donations including special exhibits and programs. They play a vital role in the park's interpretive effort, with contributions to the museum education program, exhibits, and library and archival staffing.

ENERGY REQUIREMENTS AND CONSERVATION/SUSTAINABILITY

Sustainability can be described as the result achieved by doing things in ways that do not compromise the environment or its capacity to provide for present and future generations. Sustainable practices minimize the short- and long-term environmental impacts activities through resource conservation, recycling, waste minimization, and the use of energy efficient and ecologically responsible materials and techniques. NPS pursues sustainable practices whenever possible in all decisions regarding NPS operations and facilities management.

The buildings and facilities at the park require energy and resources for operations and maintenance. The park's current energy requirements include the electrical and HVAC systems that provide power, heating, and cooling to the Gateway Arch complex of 104,560 square feet, including the underground Visitor Center/Museum; the observation deck at the top of the 630-foot-tall Gateway Arch; and throughout the facility's support rooms and tunnels. The energy needs at the Old Courthouse include electricity and steam heating. Cooling is provided in the Old Courthouse exhibit galleries and second floor offices via electric window air conditioning units.

The park grounds and Arch Parking Garage also require energy and resources for general maintenance and operations. Energy is required for mowing, landscaping, snow removal, and other maintenance activities. Water resources are needed for irrigation of the grounds. The Arch Parking Garage is not fully enclosed and therefore is not climate-controlled. The turf grass at the park is maintained to a very high level, using standard

chemical fertilizers and pesticides. These inputs contribute to the pollution of the ponds, the Metropolitan St. Louis Sewer District (MSD) system, and the Mississippi River. The complex irrigation system overwaters the turf which then leads to faster grass growth which requires increased mowing. Mowing burns fossil fuels and contributes to urban air and noise pollution (NPS 2010b).

CENTRAL RIVERFRONT OPERATIONS AND MANAGEMENT

The Central Riverfront lies within the operational and management authority of the City of St. Louis. The city's Street Department is responsible for maintaining over 1,000 miles of city streets and 600 miles of city alleys. This includes all of the streets along the Central Riverfront. The City of St. Louis Streets Department is also in charge of the city's refuse and recycling programs, traffic signals, street lighting, and street signs, salting and plowing city streets, towing abandoned or damaged cars from the roadways, and for permitting street or mobile vendors.

The floodwall and levee system along the Central Riverfront is a Federal Levee built by the U.S. Army Corps of Engineers, and turned over to the City of St. Louis for operation and maintenance. As such, the Street Department is responsible for all manpower, tools, and equipment necessary to install, remove, and maintain the closure structures on the floodwall along the Central Riverfront. The Street Department also performs and manages all post-flood cleanup operations on Leonor K. Sullivan Boulevard and the levee.

Other entities (e.g., the U.S. Army Corps of Engineers, U.S. Coast Guard) have jurisdictional responsibilities for management of the Mississippi River along the Central Riverfront. However, the operations and management of these organizations would not be affected by the proposed Central Riverfront improvements, and therefore, they are not discussed further in this EA.

Figure 36 Central Riverfront along the Park

