

Of the exterior roads and pedestrian overpasses, only the exterior roads were ever built. Washington Avenue, Poplar Street, Wharf Street (renamed Leonor K. Sullivan Boulevard), and Third Street Expressway (or Memorial Drive) contain the Memorial as they were designed to do. Although Washington Avenue was relocated to the north when the Arch Parking Garage was built in 1986, other roads have retained their designed path. The exterior roads are over two miles in length, and there is curbing along their perimeter. They are considered contributing elements of the historic landscape.

Saarinen and Kiley intended the pedestrian overpasses to bridge Memorial Drive and to provide connections between the Gateway Arch landscape and the Old Courthouse. They created multiple alternatives that included both single and double bridge crossings; however, these structures were never constructed. Without the pedestrian connections, Memorial Drive physically and visually separates the Gateway Arch from Luther Ely Smith Square and the Old Courthouse.

Although a parking garage at the north end of the site was studied by Saarinen and Kiley, and was identified within the Cultural Landscape Report as being a contributing element, the National Park Service has determined that the structure does not fully represent the Saarinen-Kiley concept. As such, it is now not considered to be a contributing feature to the significance of the historic landscape. However, its general site location and scale are considered in keeping with the Saarinen-Kiley concept.

CONSTRUCTED WATER FEATURES

The north and south reflecting ponds (or lagoons) were part of the final Saarinen-Kiley concept for the Memorial. Located slightly to the west of the Gateway Arch, the ponds are on axis with each other and stretch northwest and southwest from the Gateway Arch bases. Each pond sits within a slight topographic depression. The original design for the ponds showed deeply incised and irregular borders, 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. The redesign took place in 1969 under the NPS designers. Nevertheless, they are important elements of the Saarinen-Kiley concept. Their placement away from the immediate Gateway Arch landscape provides separate and intimate spaces that contrast with the more monumental spaces near 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.

SMALL-SCALE FEATURES

The Saarinen-Kiley team created designs for benches in the Memorial in 1960. The design detail showed ten-foot-long benches, built with limestone seats set on a limestone block with a concrete foundation, and tied together with steel dowels. These benches were designed as part of the levee development, though it is not known whether they were ever installed on the levee. More than ten years later, a landscape architect at the Denver Service Center of the National Park Service redesigned the benches with almost identical proportions, though to be made of concrete. These redesigned benches were initially placed on the east side of each rest area, and then in a later phase seven more were added to the west side. Eventually, additional benches of this design were added to the landings of the Grand Staircase. 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 Memorial, but it was never implemented. The original plans for the Memorial did not show proposed lighting locations. The Denver Service Center of the National Park Service proposed new plans and details for the lighting at the Memorial that included a twelve-foot-tall light with globe luminaire. These lights were installed in two phases: first along the north-south axis in 1974, and then throughout the rest of the site several years later. The lights were placed along the sidewalk edges, approximately

ninety feet apart. The small-scale features at the Memorial are character-defining features of the landscape.

LUTHER ELY SMITH SQUARE

Luther Ely Smith Square is included within the Memorial boundary. The square, a park with a sunken garden of rectangular beds flanked by allées of trees on its north and south sides, was designed in 1951 by a landscape architect on the City staff. It was intended to be a temporary beautification of the parcel, until the Memorial was implemented.

Saarinen and Kiley conceived of the parcel as an extension of the Memorial east of Memorial Drive, providing a critical connection between the Old Courthouse and the Gateway Arch. According to this concept, the allées of uniform trees that characterize the east side of the Memorial grounds were to continue through the square, framing the critical east-west view to the Gateway Arch and the river. In addition, pedestrian connections were to be provided from the square over Memorial Drive to the Memorial grounds. However, this design was never implemented.

Although the current design of the square includes allées of trees, they are not uniform, nor are they continuous with the ash trees east of Memorial Drive. They effectively narrow the view corridor from the Old Courthouse to the Gateway Arch. In addition, the garden's sunken form was not part of the Saarinen-Kiley design; it disrupts the spatial continuity Saarinen and Kiley envisioned along the east-west axis. Thus, it is not representative of the Saarinen-Kiley concept, nor is the design historically significant in its own right.

Area of Potential Effects

An initial step in the Section 106 process is to determine the area within which historic properties would be affected or are likely to be affected. The Area of Potential Effects (APE) as defined by 36 CFR 800.2 represents "the geographic area within which an undertaking may cause changes in the character or use of historic properties, if any such properties exist."

For the purposes of this section, the APE for historic buildings, structures, sites, objects,

districts, and cultural landscapes includes the area that could be directly or indirectly affected by each of the alternatives. As illustrated in Figure 3.4, the APE includes areas that are bounded by Broadway Street south of Market Street to Interstate 64, east on I-64 to Interstate 55, south on I-55 and Third Street to Chouteau Avenue, north along the west side of the river to the Poplar Street Bridge, east across the bridge following I-55/64 to the rail lines that run to the northeast crossing Trendley Avenue and continuing to the rail line that curves to the west and passes north of the Cargill grain elevator to Front Street, turning north on Front Street to Eads Bridge, west across Eads Bridge to the riverfront, north along the river to Martin Luther King Memorial Bridge, west along the Bridge and its associated access drive to Convention Plaza, west on Convention Plaza to North Broadway Street, south on Broadway Street to Chestnut Street, west on Chestnut Street to Seventh Street, South on Seventh Street to Market Street, and east on Market Street to Broadway Street. The APE may be revised within the Section 106 consultation process.

There are thirteen buildings, structures, and districts located outside of the bounds of the Memorial but within the APE that are listed in the National Register of Historic Places and/or the City of St. Louis Landmarks registry. The locations of these resources are identified in Figure 3.4. These resources include Eads Bridge, located directly north of the Memorial; the Laclede's Landing Historic District further to the north; the J. Kennard and Sons Carpet Company Building, the Missouri Athletic Club Association Building, the Security Building, the Laclede Building, the Mississippi Valley Trust Company Building, the International Fur Exchange, and Pet Plaza, all located west of the Memorial; and St. Mary of Victories Church and the Crunden-Martin Manufacturing Company District, located south of the Memorial. A detailed discussion of those resources most likely to be affected by the proposed alternatives is provided in Appendix C.

Archeological Resources

PHYSICAL HISTORY

MEMORIAL GROUNDS The succession of European Colonial and U.S. development since the late 17th century destroyed any prehistoric

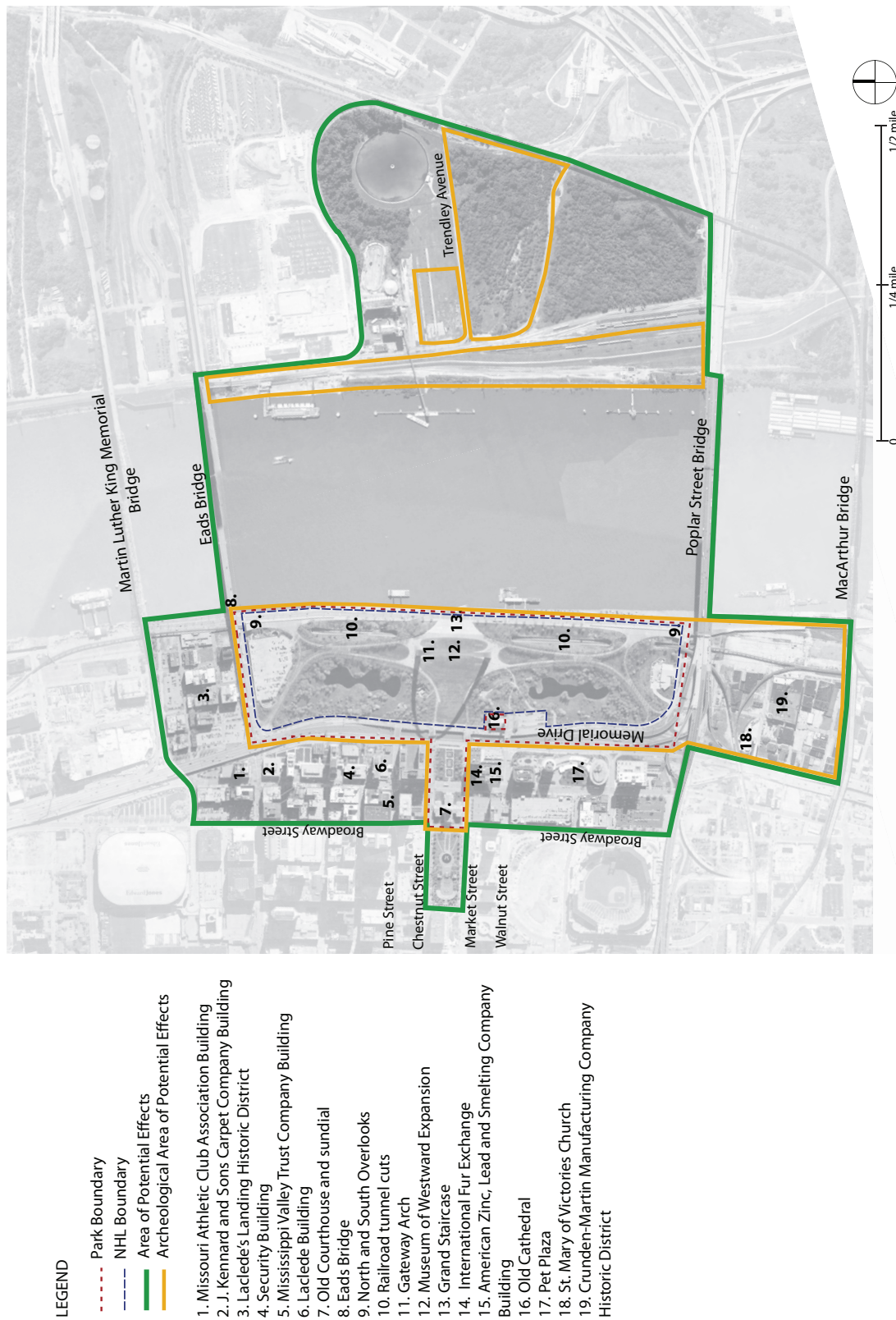


Figure 3.4. Historic Buildings, Structures, Sites, Objects, and Districts Located within the Area of Potential Effects.

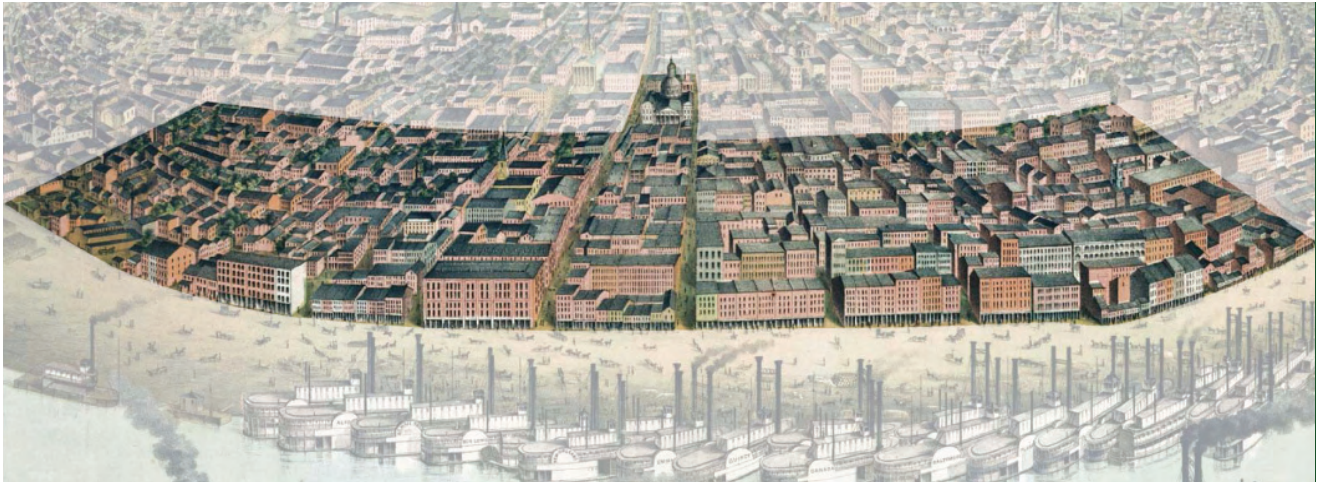


Figure 3.5 “Our city, (St. Louis, Mo.),” lithograph by A. Janicke & Co., published by Hagen & Pfau at the *Anzeiger des Westens*, c. 1859. Jefferson National Expansion Memorial grounds highlighted. Source: Library of Congress, Call No. PGA—Janicke—Our city (St. Louis, MO).

remnants of early cultures that might have been present on the Memorial grounds. The existing archeological resources date to after the Louisiana Purchase with few potential resources surviving from before 1850. Archival and photographic documentation demonstrates a multi-layered building history of the St. Louis riverfront since its inception as a fur trading center. Population expansion accompanied a steamboat trade boom in the 1830s that stimulated riverfront development and creation of a tenement and boarding house area in the old French settlement south of Market Street. The 1849 fire along the wharf fed on this new density, engulfing “numerous business and leaving 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 today’s Memorial (NPS 1954).

Prior to the Civil War, St. Louis experienced an industrial boom as a result of its river and rail connections. Residential occupation along the riverfront did not recover following the 1849 fire, and “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). Residential occupation shifted to the west as diverse industries took advantage of the riverfront access to transportation corridors (Figure 3.5).

The 1907 Sanborn Fire Insurance map shows the multi-story commercial brick structures dominating the landscape (Figure 3.6). By the end of the decade, the 1908 and 1909 Sanborn maps illustrate that the area south of Market Street was almost exclusively industrial warehouses, though a few dwellings, tenements, and lodging houses could be found to the south between Clark and Poplar Streets (Sanborn Fire Insurance Company 1908, 1909). North of Market Street, industrial manufacturing dominated. Despite the development, the turn of the century saw the waning of river-based commerce and the riverfront area felt the impact, with the commercial area slowly abandoned and its structures heading into steady decline.

The Memorial’s overlay of fill in the 20th century is well known. Standing buildings in the area were razed to clear the land in anticipation of construction of the Memorial 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, including wells, refuse disposal features, etc. Construction and landscaping of the Memorial further obscured the original ground surface.

Starting in late December 1954, the Missouri Highway Department dumped 80,000 cubic yards of earth on the site northward from Clark Street toward the Eads Bridge, between Memorial Drive and Wharf Street. Almost 300,000 cubic yards had already been deposited from Clark Street south to the Memorial boundary (Brown 1984a). 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 (Brown 1984b).

CHOUTEAU'S LANDING Chouteau's Landing, the modern name for the area directly south of the Memorial and north of Chouteau Street, developed as a commercial and industrial site from early on in St. Louis's history due to its accessible location on the river. In the late 19th century, several flour mills were located in this area. The Iron Mountain Railroad was built from 1853-1857 to bring iron ore into the city, and when it consolidated with other lines to form the St. Louis, Iron Mountain & Southern Railroad in 1874, Chouteau's Landing accessed practically all railroads connecting in St. Louis (Landmarks Association of St. Louis 1988).



Figure 3.6. 1907 Sanborn Fire Insurance Map, St. Louis, Missouri. Jefferson National Expansion Memorial grounds highlighted. Source: University of Missouri Digital Library, file name sanborn6397.jpg.

The construction of the Merchant's Railroad Bridge in 1889 solidified the presence of larger manufacturing plants along the riverfront with access to the railroads.

Sanborn Fire Insurance maps indicate that Chouteau's Landing was primarily an industrial and manufacturing area by 1908 (Sanborn Fire Insurance Company 1908). The riverfront was dominated by large plants and railroad yards, including the St. Louis, Iron Mountain & Southern Railroad yards, the Southern White Lead Works and National White Lead Company, and the Laclede Gas-Light Company. Other manufacturing businesses located between the riverfront and Fourth Street included metal works, canning and meat packing factories, flour mills, buggy factories and wheelworks, and a soap and washing powder factory. The majority of buildings between Second Street and Fourth Street were two- to three-story brick storefront or apartment buildings, many listed as tenement housing. Few social centers were located in this area, although a church and school were present.

EAST ST. LOUIS In 1797, James Piggott established a ferry across the Mississippi River from the settlement at St. Louis. Eighteen years later, five of Piggott's seven heirs sold their interest in the ferry and the 100-acre parcel Piggott had claimed to St. Louis entrepreneurs, who combined it with another holding to develop the settlement of Illinois Town across the river. Platted in 1818, the town was incorporated in 1859, by which time the Alton & Terre Haute and Ohio & Mississippi railroads had established terminals on the west side of Bloody Island, the sandbar turned island that rose out of the river c. 1800; and ferry docks on the island were providing service out of Illinoistown (NPS 1937). That same year, the area just south of present-day Eads Bridge is known to have housed construction and railway workers in an area known as "Lower Patch." The southernmost of three such residential concentrations built by the Wiggins Ferry Company between the late 1850s and the Civil War, much of the Lower Patch area was probably destroyed by construction of the bridge and its approaches as well as the tornado in 1871 that also destroyed railroad and lumber facilities in

the area. Following incorporation, a second charter was passed in 1861, absorbing the nearby town of East St. Louis and officially adopting that name for the city. A 1906 photo looking south from the Eads Bridge illustrates the industrial land use in this area at the start of the 20th century (Figure 3.7).

ARCHEOLOGICAL SITES WITHIN THE STUDY AREA

A total of nineteen surveys (Appendix D) have taken place within a one-mile radius of the project area. These have resulted in the identification of seventeen archeological sites, all dating to the historic period (Appendix E). In addition, just outside the one-mile radius (to the north of the project site), but still of note, were a group of prehistoric mounds known as the St. Louis mound group, just 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 Only three archeological sites were recorded within St. Louis (outside the Memorial boundaries) and they all included refuse and construction debris dating back to the 1840s and 1850s. They include Sites 23SL976, 23SL2229, and 23SL2234. Like the blocks within the Memorial, 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

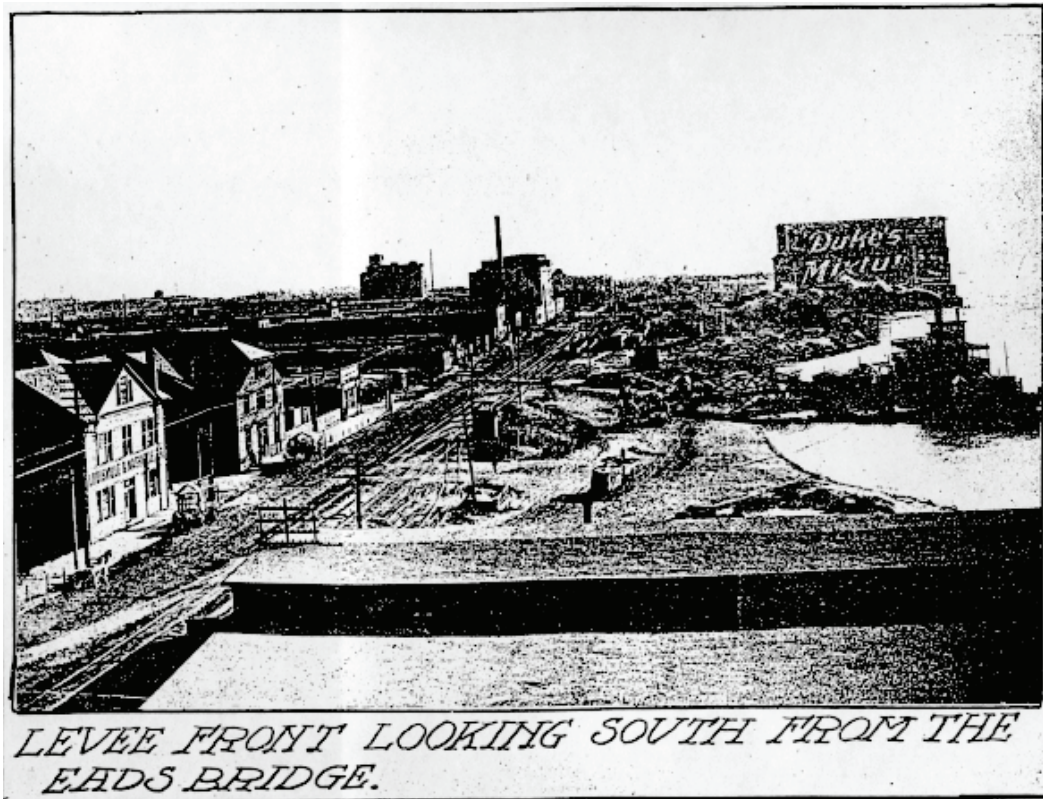


Figure 3.7. Levee Front, Looking South from the Eads Bridge. From Chas A. Franke & Horace J. Eggman, *Pictorial East St. Louis* (1906). Source: RiverWeb, University of Illinois at Urbana-Champaign (<http://riverweb.ncsa.uiuc.edu/cgi-bin/viewrid?RID=812>).

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.

No sites have been documented in Chouteau's Landing to the south of the Memorial, 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).

EAST ST. LOUIS In East St. Louis, Illinois, most of the sites were related to the railroad and included structural remnants and equipment. They also included two historic houses and the Eads Bridge, all recorded in 1979. Archeological investigations in the Streetscape/Riverscape area of the Memorial identified in alternatives 3, 4, and 5 along the Illinois shoreline have been limited in scope. Studies to the east of Front Street have yielded evidence of the rail lines and rail facilities upon which the hamlet of Illinoistown depended, including Site 11S671 (the Gulf, Mobile and Ohio Freighthouse) constructed in 1881 after the railroad's acquisition of the Cairo and St. Louis Railroad. Results of a 1993 survey indicated that the eastern two-thirds of the building's wooden superstructure were demolished but the western third of the structure, built of brick, was still standing. While nothing was observed on the surface during the survey, it is unknown whether subsurface deposits in

the location of the former structure along present-day West Trendley Avenue east of Front Street may be present. No sites have been identified west of Front Street in the shoreline Streetscape/Riverscape area. However, the western bank of Bloody Island, the sandbar that now constitutes East St. Louis' riverfront, is known to have been the site of bustling railway and ferry activities.

ARCHEOLOGICAL INVESTIGATION OF THE MEMORIAL GROUNDS

In addition to the sites and surveys adjacent to the Memorial, several archeological investigations have taken place within the Memorial grounds. Appendix F provides a summary of the type of work completed and the findings of each investigation.

These excavations and subsurface examinations were focused on identifying intact pre-1849 features and deposits within the Memorial grounds. Excavations within the Memorial boundaries were undertaken in 1960 by Memorial Archeologist Zorro Bradley. Subsequently, Bradley suggested that 35 sites of historic importance were under the ten to thirty feet of fill deposited for landscaping east of the Second Street area on the basis of historic documentation (Bradley 1960). 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. Seven additional sites were identified between Second and Memorial, presumably under little to no fill; two were thought to have been previously disturbed or erased by more recent construction. The 1810 office of Dr. Farrar, an important early St. Louis physician, was suggested to have remnants in this area. An additional four sites were thought to exist in proximity to the Old Cathedral (Bradley 1960). Following more 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 two excavations yielded a small number of artifacts; none appear to have been recovered from in situ deposits.

In 1984 and 1985, monitoring of construction activities for the Gateway Arch parking structure spanning the former First and

Second Street areas at the northern edge of the Memorial observed six archeological features, though none definitively represented an intact resource dating to before 1849 (Wells and Williams 1985). Here, remnants of the First 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 First Street, excavation revealed a mix of approximately nine feet of building and structural material sitting directly on bedrock. East of First 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 W.H. Bull Medicine Factory later built on the site and demolished by the National Park Service between 1939 and 1942 (Woods 1984).

Two additional features were observed running west from First 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 and the second consisted of a brick foundation corner directly to the north. A final feature at the west end of the site was associated with late 19th and early 20th century material. No features were found to have diagnostic information or artifacts, 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 First Street" (Wells, Williams 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, Williams and Woods 1985).

Further monitoring in 1999 for the construction of the maintenance facility at the south end

of the Memorial also illustrates 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. Memorial 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 Memorial have typically yielded historic construction debris and partially disturbed architectural and infrastructure features dating to the second half of the 19th century. Because the focus of many if not all of the previous investigations was on identifying pre-1849 resources, the potential for intact later deposits or features was not extensively examined. However, the architectural and infrastructural features observed in earlier studies are indicative of the potential presence of historic period resources that may meet National Register eligibility criteria. Additionally, much of the area has not been subjected to investigations. While the archeological reports all acknowledge that the deep fill in the eastern portion of the Memorial indicates that the likelihood of encountering archeological deposits for most construction projects is limited, the presence of intact deposits and features cannot be discounted.

In a 1960 memorandum between the Memorial archaeologist and the 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 Memorial west of Second 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 Memorial 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 deposits pre-dating the industrial development of the area relatively close to the surface. The area between First and Second Streets, however, may also have a medium to high archeological potential depending on the depths to which future ground disturbing activities may occur. Portions of the southern area are expected to have medium archeological potential as a result of the rubble fill that appears to span from below ground surface to near the limestone bedrock. Sites like Cochran Gardens, Walsh's Row, and Lafayette Avenue in Chouteau's Landing surrounding the Memorial illustrate that, even under significant amounts of building rubble, intact material remains below the surface of St. Louis. Further, the piercing of the possible sewer line in the southern area of the Memorial 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 in place in 1847, and sewer systems in place by 1850.

The Chouteau's Landing area to the south of the Memorial has undergone little to no archeological examination according to available records. Any expansion of the memorial southward or placement of facilities in the Chouteau's Landing area pose a high potential to encounter intact mid-19th century deposits like those found along Lafayette Avenue, as well as later deposits.

Lastly, the East St. Louis area appears to have medium archeological potential. Here, no sites have been identified in the Streetscape/Riverscape area, though remnants of the ferry and railway activities shown in Figure 3.7 may be present below the surface. Similarly, features or deposits associated with 19th century railway activities may remain below ground in any future joint management areas east of Front Street.

Curatorial Objects and Museum Collections

The Memorial'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 biology objects. Currently, there are 411 cataloged objects on display in the Museum of Westward Expansion and 529 items on display in the Old Courthouse.

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 Memorial's Museum of Westward Expansion collection, and focuses on the history of westward expansion, St. Louis history, 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. The Memorial also has a small collection of

fine art, including works by Thomas Moran and Ansel Adams.

The Memorial archives include materials which document the creation of 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 significant events in the Memorial's history. The archives contains most of the original architectural competition entries from noted architects in addition to Eero Saarinen, such as Louis Kahn, Edward D. Stone, Harris Armstrong, Walter Gropius, Gyo Obata, and many others. Another important collection in the archives consists of extremely detailed records, including photographs of the buildings that were razed to create the Memorial 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 significant collection of contracts awarded for original construction of the Old Courthouse in the 1850s-1860s.

3.3 NATURAL RESOURCES

The inventory and characterization of physical and biological resources provide a baseline for analysis of potential impacts discussed in Chapter 4. The study area for the inventory and analysis of physical and biological resources has generally been defined as the Memorial grounds on the Missouri side of the Mississippi River, and the East St. Louis addition including Malcolm Martin Memorial Park on the Illinois side of the river. On the west side of the river, the study area is bounded by Eads Bridge to the north, Leonor K. Sullivan Boulevard to the east, Poplar Street Bridge to the south, and typically Interstate 70 to the west, although a two-block extension to incorporate the Old Courthouse and Luther Ely Smith Square is also included. On the east side of the river, the study area is bounded by the Cargill facility to the north, and the Terminal Railroad Association tracks to the east, south, and west.

In preparing this analysis, the following resources were reviewed: U.S. Geological Survey mapping, aerial photos, local comprehensive and land use plans, Geographic Information System (GIS) databases, conceptual design drawings, scientific literature, government reports, previous studies, agency comments, and other materials as needed. In addition, field surveys were conducted.

Vegetation

The vegetation community of the Memorial grounds is quite different than that of the East St. Louis addition. The Memorial grounds is a formally planned, designed, and planted landscape, while the East St. Louis addition is a combination of recently cleared land for park construction and early successional forest colonizing formerly industrial land.

THE MEMORIAL GROUNDS

See the Cultural Landscape section above for a discussion of the vegetation on the Memorial grounds.

Of major concern for the vegetation community of the Memorial grounds is the vulnerability of the predominant ash plantings to the emerald ash borer. The emerald ash borer is an exotic wood-boring insect that feeds only on ash trees (*Fraxinus* sp.). The first documented North American occurrence of the beetle was in 2002 in southeastern Michigan and Windsor, Ontario, Canada, and it is thought to have been introduced in the 1990s on solid wood packing material originating from Asia. Unlike many other wood-boring beetles, the emerald ash borer aggressively kills trees within two to three years after infestation. The beetle has no known natural predators in North America and no effective control options have yet been developed. If it is not contained or its effects mitigated, it is likely to continue to infest and kill all species of ash trees throughout its ever-expanding range, including those on the Memorial grounds. The results of the emerald ash borer infestation on the rural and urban forests of North America would be similar to the historic loss of native American chestnut and elm trees associated with chestnut blight and Dutch elm disease, respectively. The emerald ash borer was found in Illinois in 2006 (USDA-APHIS 2008) and on July 23, 2008, the

emerald ash borer was found in Missouri at Wappapello Lake (MDC 2008).

EAST ST. LOUIS ADDITION

The portion of the East St. Louis addition to the south of Malcolm Martin Memorial Park is dominated by early successional trees such as the native eastern cottonwood (*Populus deltoids*), and exotic, invasive species such as mulberry (*Morus alba*), and Siberian elm (*Ulmus pumila*). Portions of the site have a dense shrub layer dominated by the invasive Amur honeysuckle (*Lonicera maackii*). Although the vegetation present on the site seems to be healthy, the dominance of invasive species means that the quality of the overall community is poor.

Federally Listed Threatened and Endangered Species

A federally-listed Threatened species is one that is likely to become Endangered in the foreseeable future. An Endangered species is one that is in danger of extinction throughout all or a significant portion of its range. Plant and animal species that are Threatened and Endangered, either locally, regionally, or nationally, are considered sensitive and are protected (along with their habitat) under a number of federal laws. These include the federal Endangered Species Act of 1973, as amended (ESA), the Bald and Golden Eagle Protection Act, and the Migratory Bird Treaty Act. The ESA requires the federal government to designate “critical habitat” for any species listed under the act. “Critical habitat” is defined as: “the specific areas within the geographical area occupied by the species at the time of listing on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations.” All federal agencies must ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species, or destroy or adversely modify its designated critical habitat.

The U.S. Fish and Wildlife Service (USFWS) has responsibility for listing, protecting, and managing federally-listed Threatened and Endangered species under the ESA.

Coordination between the National Park Service and USFWS to identify local populations within the study area are ongoing. There are no known occurrences of Threatened and Endangered species or critical habitat on the Memorial grounds.

The National Park Service has initiated informal consultation with USFWS related to one Threatened species, the decurrent false aster (*Boltonia decurrens*), that may exist on the East St. Louis side of the Mississippi River between the river and the railroad tracks that run along the top of the levee. The decurrent false aster is a perennial plant that grows from one to five feet tall and can occasionally reach heights of over six feet. It blooms from July to October and bears seeds from August to October. Its leaves are linear and narrow with lower leaves broader and larger than upper leaves. Leaves also often have a bluish tint. This plant is called “decurrent” because the leaf tissue extends down the stem from the point of leaf attachment. The flowers of the decurrent false aster are approximately one inch in diameter and occur in branched groups of composite heads with yellow disk flowers and white to purplish ray flowers (Schwegman and Nyboer 1985). It is typically found on moist, sandy, floodplains and prairie wetlands along the Illinois and Mississippi Rivers where it relies on periodic flooding to scour away other plants that compete for the same habitat. Its only known occurrence in Missouri is in St. Charles County, north of the study area (USFWS 1990, MoDNR 2007c). It is more widespread in Illinois with known populations in St. Clair and Jersey Counties and several counties bordering the Illinois River (USFWS 1990).

Soundscape

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. Typical indoor and outdoor noise levels in dBA are presented in Figure 3.8.

NOISE REGULATIONS AND POLICIES

The State of Missouri does not have a state noise statute, but the State does regulate noise

emissions from watercraft. The State of Illinois has a general prohibition on the emission of sound that would cause noise pollution beyond a property boundary. For the purposes of Section 25 of the Illinois Environmental Protection Act and the codified regulations under Title 35, Subtitle H, Chapter 1, Part 900, noise pollution is defined as “the emission of sound that unreasonably interferes with the enjoyment of life or with any lawful business or activity.”

The City of East St. Louis has a general prohibition on noise pollution similar to the Illinois state statute. The City requires that construction activities (including excavation)

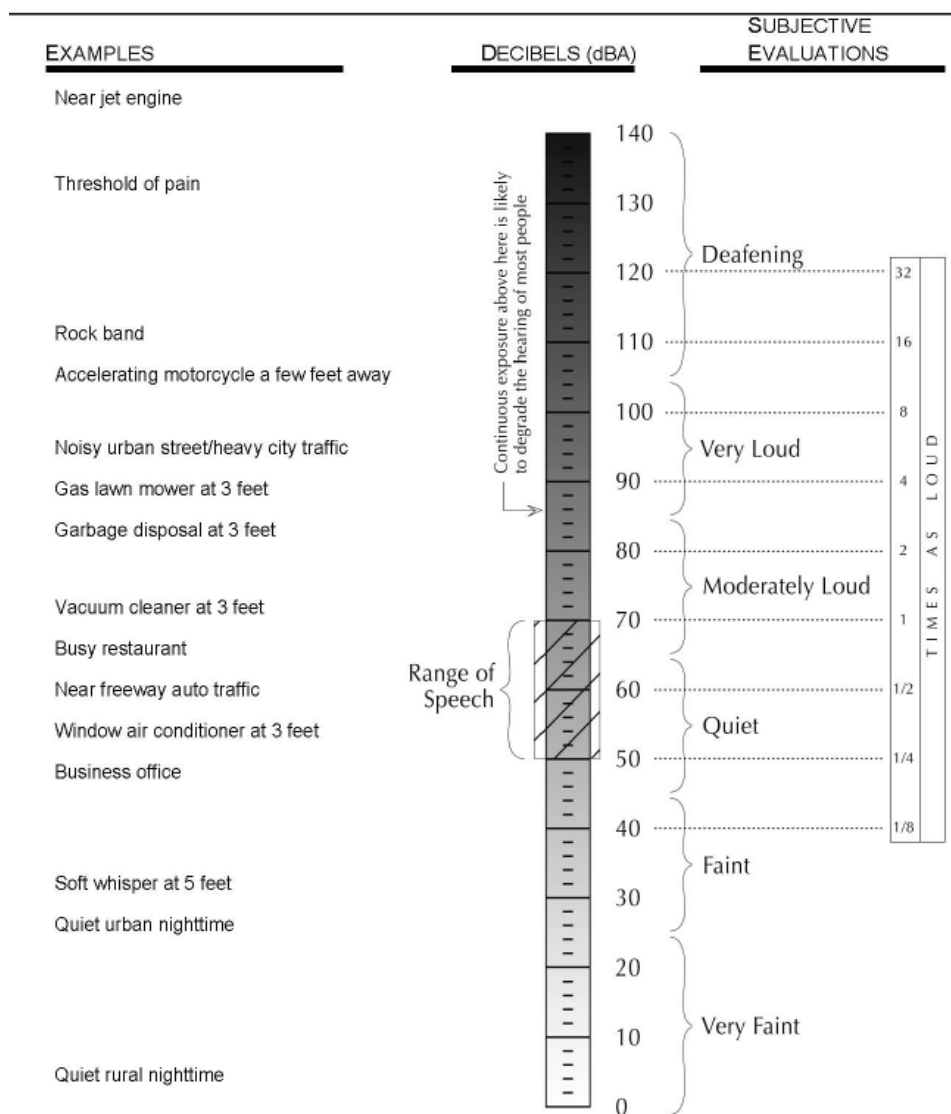


Figure 3.8 Typical Indoor and Outdoor Noise Levels. Source: EGAN 1988 and EDAW 2005.

occur between the hours of 7:00 a.m. and 6:00 p.m. on weekdays, except in the case of urgent necessity in the interest of public health and safety and with a permit from the building inspector (Section 50-32(9)). 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 Memorial 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.”

NATIONAL PARK SERVICE POLICY ON SOUNDSCAPE MANAGEMENT

A portion of the National Park Service mission includes protecting and enhancing soundscapes. A soundscape refers to the total acoustic environment of an area. Depending on the purposes and values of the Memorial, 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 restores degraded soundscapes to the natural condition wherever possible, and protects natural soundscapes from unacceptable impacts (NPS 2006).

CURRENT CONDITIONS ON THE MEMORIAL GROUNDS

The Jefferson National Expansion Memorial 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, Jefferson National Expansion Memorial is bounded by Leonor K. Sullivan Boulevard along the Mississippi River. An active set of railroad tracks is located below-grade in both

open cuts and tunnels on the eastern portion of the Memorial grounds.

The soundscape on much of the Memorial grounds is dominated by fairly loud background noise from traffic on the surrounding roadways. The traffic noise is loudest on the portions of the Memorial grounds closest to these roadways and diminishes towards the central area near the Gateway Arch and the north and south reflecting ponds; however, the background traffic noise is perceptible on most of the site. Traffic noise near the Gateway Arch and the north and south reflecting ponds is somewhat lower than other areas of the Memorial grounds due to natural attenuation and the intervening topography between the roadways and these portions of the site. Trains moving across Eads Bridge and trains in the below-grade cuts on the eastern portion of the Memorial grounds can be periodically perceived above background noise levels. Commercial aircraft fly over or near the Memorial grounds on approach or departure from 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. In general, the soundscape on the Memorial grounds is comparable to the soundscape of other busy urban areas.

Existing sources of noise on the Memorial grounds include:

- The emergency generators which are tested monthly
- Grounds maintenance equipment such as lawn mowers
- Trains passing through the site on the mainline railroad tracks
- Helicopters taking visitors on aerial tours from a barge moored on the river beneath the Gateway Arch
- Broadcast music from riverboats

Visitors near the emergency generator building when the generators are started or are operating would likely be able to hear the generators above the background noise. Similarly, visitors

near park maintenance activities such as lawn mowing would be temporarily affected by the noise from the maintenance equipment. As discussed above, visitors near the below-grade train trenches when trains are passing are able to hear the trains above background noise levels.

During special events on the Memorial grounds, the soundscape of the Memorial is degraded slightly due to crowd noise, vehicular noise, and amplified sound systems.

CURRENT CONDITIONS IN THE EAST ST. LOUIS ADDITION

The Cargill grain elevator is located immediately adjacent to Malcolm Martin Memorial Park; noise associated with the operations of this facility and the associated truck loading, railcar loading, conveyor belt, and barge loading operations are noticeable throughout the Malcolm Martin Memorial Park.

Another source of noise near the East St. Louis addition is the main railroad line that runs along the east side of the Mississippi River.

3.4 VISITOR OPPORTUNITIES AND USE

Visitor Opportunities

INFORMATION, INTERPRETATION, AND EDUCATION

The Rotunda and first floor exhibits chronicle the history of the Old Courthouse building and its construction between 1839 and 1862. An exhibit about the Dred Scott case and the location of the original courtroom are located in the west wing. A special exhibit gallery located on the first floor of the west wing is used for temporary exhibits and special events.

The Diorama Room, located across the hallway from the Museum Store, exhibits six dioramas representing historic events and periods relating to the westward growth of the United States. Three of the dioramas are historic museum pieces produced by National Park Service craftsmen in the early 1940s. The Competition Room, located next to the Diorama Room, addresses the 1947-48 architectural competition that led to the

selection of the design of the Gateway Arch. Four exhibit galleries with themes covering the growth of St. Louis and the Mississippi River Valley are located on the first floor, and constitute the main exhibit inside the Old Courthouse: *St. Louis: The Early Years, 1764-1850*, south wing; *St. Louis: Becoming a City, 1850-1900*, south wing; *St. Louis: Entering the 20th Century, 1900-1930*, north wing; and *St. Louis Revisited, 1930-present*, north wing.

PERSONAL SERVICES

Jefferson National Expansion Memorial receives most of its visitation within its structures: the underground complex beneath the Gateway Arch, the Museum of Westward Expansion, and the ride to the top of the Gateway Arch. Visitor contact stations currently include the visitor information desk in the lobby of the George B. Hartzog Visitor Center; 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.

MUSEUM EDUCATIONAL PROGRAMS

The Memorial offers many educational programs to groups, ranging from pre-school to high school, college, and seniors. Topics include the Lewis and Clark Expedition, the Dred Scott Trial, American Indians, Trappers and Traders, African-Americans of the West, St. Louis History, Immigrants of the Frontier, and other subjects related to westward expansion. Teacher workshops are offered twice a year and provide teachers with an overview of the programs and focus on special topics presented by the Education Department. The Old Courthouse presents school programs concerning St. Louis history and other westward expansion topics. Mock trials, particularly one on the Dred Scott case, are the most popular park programs. The emphasis of other Old Courthouse programs is on the role St. Louis played in the judicial, economic, transportation, and social history of westward expansion.

THEATERS

The Tucker Theater is located on the north side of the lobby and accommodates 325 visitors. A brick mural on the façade of the

theater commemorates the workers, designers, politicians and civic leaders who made the Gateway Arch a reality, as well as demonstrates the height of the Gateway Arch in scale with other well-known landmarks. The captioned film “Monument to the Dream,” a 28-minute documentary on the construction of the Gateway Arch, is shown hourly.

The Odyssey Theatre seats 265 people and is located on the south side of the lobby opposite the Tucker Theater. This theater daily presents special films in the Odyssey Ultra 70mm Wide Screen Projection System and THX Sound System. Films such as “Lewis and Clark: Great Journey West” are shown.

PARK EXHIBIT PROGRAM

One of the goals of the exhibit program at the Memorial is to increase visitor knowledge of the resource and its themes through non-personal interpretive media. The department is responsible for routine and preventive maintenance for exhibits throughout the Memorial. They also seek out and evaluate submitted traveling exhibit proposals, and install chosen exhibits in the special exhibit galleries in the Museum of Westward Expansion and the Old Courthouse.

MEMORIAL GROUNDS

Visitor activities on the grounds include walking, jogging, watching the river, sitting and reading. The area is used by visitors who pass through on their way to the Gateway Arch, as well as local downtown workers who spend their lunch hours there.

The Museum of Westward Expansion is located on the west side of the lobby beneath the Gateway Arch. Through artifacts, quotations, photographs, and animatronic figures, this one-of-a-kind museum commemorates the people and events of the 19th century American westward movement. The exhibits in the Museum of Westward Expansion, in combination with those at the Old Courthouse, are accredited by the American Association of Museums, one of the few NPS museums to have such an accreditation. The Museum of Westward Expansion opened on August 10,

1976, and was dedicated on August 23, 1976. Since that time, an average of over a million visitors a year have experienced its unique layout and displays.

THE JOURNEY TO THE TOP

The Gateway Arch Transportation System takes visitors to the top of the Gateway Arch in two specially designed trams, one in each leg of the Gateway Arch. Each tram consists of eight five-passenger, barrel-shaped capsules and has its own independently-operated electric motor and back-up emergency generator, which pulls the tram by cable. To safely negotiate the curves at the bottom and the top of the Gateway Arch, the trams travel along tracks. The ride up takes approximately four minutes, while the ride down takes approximately three minutes. However, to enjoy the picturesque view of the riverfront and the city from the observation deck at the top, the average visitor takes 30 to 40 minutes to complete the round trip. A cooperative agreement between the National Park Service and Metro Business Enterprises (Metro) permits Metro to operate the tram ride, but the tram system is maintained and controlled by the National Park Service. The top of the Gateway Arch contains an observation deck approximately 15 feet wide and 69 feet long, which can accommodate approximately 160 visitors at a time. An interpretive ranger is stationed at the top to greet and assist visitors and to respond to safety and security concerns.

SPECIAL EVENTS

The Memorial annually hosts a series of special events including African American Heritage Month, Fourth of July celebrations, Constitution Day, Victorian Holidays and St. Louis Traditions, and other special events.

PARK MUSEUM STORES

AND SALES AREAS

Jefferson National Parks Association operates the Memorial’s museum stores which include the Gateway Arch Museum Store, Levee Mercantile, and the Old Courthouse Museum Store.

PARTNERS

Jefferson National Expansion Memorial and the Gateway Arch were created as a result

of public-private partnerships, and the cooperation of the City of St. Louis and the federal government. Today, the assistance rendered to the Memorial by the Jefferson National Parks Association, which runs the Memorial's museum stores, and Metro, which runs the trams that take people to the top of the Gateway Arch as well as the interpretive riverboat cruises of the St. Louis riverfront, is so important that the Memorial truly could not function without these vital partners. Many other informal partnerships also exist with local educational and religious groups, professional associations, museums and historic sites.

RECREATIONAL ACTIVITIES

Some recreational activities are allowed on the Memorial grounds, as long as they do not conflict with the stated purpose of the Memorial or its setting. Visitor activities on the landscape currently include walking, jogging, watching the river, sitting, reading and informal recreation such as Frisbee tossing. Organized sporting events are not permitted.

Visitor Use

Memorial partner Metro completed a visitor assessment of the Memorial's interpretive program in 2007. A total of 18,000 surveys were distributed; 10,000 to 11,000 completed surveys were returned. Metro conducted two major surveys for the Memorial, a 16-month survey between August 2003 and December 2004, and another in conjunction with the Memorial's Long-Range Interpretive Plan in 2006-2007. Following are the survey results:

- Two-thirds of visitors reside within 500 miles of the Memorial. More than half of the Memorial's visitors reside within 400 miles. This information was determined by zip code analysis, which is a common practice for business plans.
- Most visitors return within 11 years for another visit.
- The average visit lasts a little more than two hours. As reported by visitors surveyed in 2006, visitors on average planned to spend about one and a half hours at the site, but spent more than two hours at the

Memorial; 13 percent of visitors stated that they wished they had set aside even more time to experience the Memorial.

- For at least 19 percent of visitors the Gateway Arch experience – consisting of the tram ride and view from the top of the Gateway Arch – was the primary reason for visiting.
- The vast majority – 90 percent – of visitors knew about the top of the Gateway Arch/tram ride experience before coming to the Memorial.

3.5 TRANSPORTATION AND ACCESS

The Jefferson National Expansion Memorial, located in the center of the St. Louis metropolitan region, is positioned at the crossroads of numerous modes of transportation. Access to the Memorial is a vital part of the visitor experience. The downtown location of the Memorial presents both challenges and opportunities for getting to and leaving the site.

The following section provides an overview of existing transportation access, parking, and circulation patterns at Jefferson National Expansion Memorial, including roadway characteristics, transit patterns, bicycle and pedestrian circulation, and parking options, as well as existing freight rail and water-based transportation conditions. This summary is based on a variety of information sources including data obtained from the National Park Service, the East West Gateway Council of Governments, the Missouri Department of Transportation, the City of St. Louis, and MetroLink.

Vehicular Traffic

Jefferson National Expansion Memorial, set within downtown St. Louis, is strongly shaped by the urban street pattern that surrounds it. These roadways not only provide access to all sides of the Memorial, they shape the experience of the visitor as well.

Roadways are typically classified according to their function, which relates to whether the roadway is designed for high accessibility

or high mobility. If a roadway is designed for higher accessibility, it means that more streets intersect with it, which lowers travel speeds. On the other hand, a roadway such as a limited access freeway can be designed for a high level of mobility, at a high speed. Such classifications are used to create a functioning network for traffic flow.

The Memorial grounds are surrounded by streets and highways. The type, or functional classification, of each roadway is described below, as well as relevant roadway characteristics and traffic volumes.

The Interstate 70 (I-70) corridor runs through downtown St. Louis, forming the Memorial's western boundary. A part of the larger freeway system in the St. Louis region, it serves as a link between downtown St. Louis and north St. Louis, including Lambert International Airport. The Average Annual Daily Traffic (AADT) in 2006 was 72,777 vehicles (MoDOT 2006). The segment adjacent to the Memorial passes below grade, between Poplar Street and just to the north of Pine Street, at which point it bridges over Memorial Drive.

Memorial Drive forms the western boundary of the Memorial. The street is actually two parallel one-way streets divided by the below-grade I-70. The road functions in part as an on and off ramp to Interstate 70, with three to four lanes of traffic in each direction. It forms a high-speed barrier between the Gateway Arch on the east, and Luther Ely Smith Square and the Old Courthouse to the west.

The former Wharf Street, renamed Leonor K. Sullivan Boulevard for a member of the House of Representatives from Missouri's 3rd Congressional District, forms the eastern boundary of the Memorial. The street serves as St. Louis' riverfront drive. Since it is on the levee and below the floodgates, the street is inaccessible at times due to flooding. The street is considered a local street, with one lane in each direction.

The segment of Washington Avenue between Memorial Drive and Leonor K. Sullivan Drive forms the northern boundary of the Memorial, adjacent to the Eads Bridge. Reconstructed after the building of the Arch Parking Garage,

this one-quarter mile stretch of roadway is located within the boundaries of the Memorial. It consists of two lanes in each direction, with a flood gate at the east end to prevent rising waters from reaching the Arch Parking Garage.

Poplar Street forms the southern boundary of the Memorial, and lies almost directly beneath the I-64/Poplar Street Bridge. It has one lane in each direction, with a planted median along a portion of it. The street has been severed from its historic alignment to the west by the I-55/I-64 interchange, and now directs traffic onto Memorial Drive instead.

Fourth Street and Broadway Street form a one-way pair running north-south through downtown St. Louis. They form the eastern and western boundaries of the Old Courthouse respectively. They are classified as arterial streets, with Fourth Street holding five lanes of traffic northbound, and Broadway Street holding the same number of lanes southbound. The streets do not have on-street parking, with exception of loading zones, and have high posted speeds intended to move traffic quickly through the downtown.

Market Street and Chestnut Street run east-west, forming the northern and southern boundaries of the Memorial adjacent to the Old Courthouse and Luther Ely Smith Square. Chestnut Street, on the north is an eastbound one-way street, with three through lanes and one parking/turn lane. Market Street, to the south, has two lanes running in each direction with a parking lane west of Fourth Street.

While not within the current Memorial boundary, the National Park Service has authorization to purchase land on the East St. Louis side of the Mississippi River, directly across from the Memorial. This expansion was authorized by law, but the exact configuration has yet to be determined, and land has yet to be purchased. Front Street is a minor local road that runs north-south on the east side of the levee and connects the Casino Queen to West Trendley Avenue and the City of East St. Louis. West Trendley Avenue runs east-west and bisects the East St. Louis site.

In addition to the public roads that surround the Memorial, two restricted access roads and a publicly accessible driveway are located within the grounds of the Memorial. The access roads are restricted to the National Park Service and designated contractor use. These interior roadways include the service road to the shipping and receiving area, the generator service road, and the maintenance yard driveway.

The service road to the shipping and receiving area begins at Memorial Drive, just south of the Old Cathedral parking lot, and winds its way approximately 1,000 feet to the shipping and receiving area for the underground Museum of Westward Expansion. It intersects with the heavily used pedestrian path between the Old Cathedral and the Gateway Arch.

The generator service road runs from the central pedestrian pathway that connects Chestnut Street to the Gateway Arch, winding down to the heating, ventilating, and air conditioning systems (HVAC) for the underground Museum of Westward Expansion.

The maintenance yard driveway connects the maintenance facility on the south end of the Memorial to Poplar Street, the southern boundary of the Memorial.

Public Transportation

Located in the center of the St. Louis metropolitan region, the Memorial is accessible by several modes of public transportation. Like many American cities,



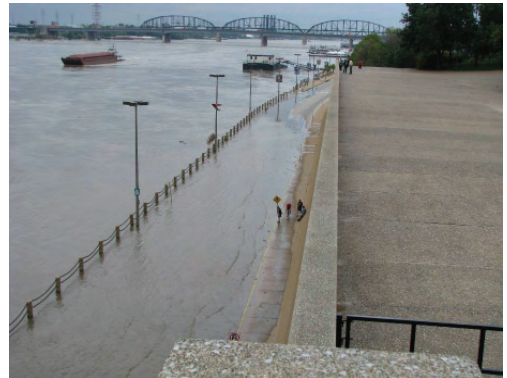
Service road to heating, ventilating, and air conditioning systems.



Memorial Drive, looking south toward the Old Cathedral.



Poplar Street, beneath the Poplar Street Bridge.



Leonor K. Sullivan Boulevard, as viewed from the North Overlook, partially underwater.



Washington Avenue, looking toward the Mississippi River, with the flood gates closed.



Figure 3.9 Jefferson National Expansion Memorial Transportation Context.

St. Louis once had numerous transit lines, in particular streetcars, originating in the downtown. In the post World War II era, most of the streetcar lines disappeared, with the last line ceasing to operate in 1966 (City of St. Louis 1996). The shift to the private automobile as the dominant means of transportation during the postwar era corresponded with the construction of the interstate system, including Interstate 70 through downtown St. Louis, which opened in 1971. The Interstate facilitated the demise of public transportation and created a strong disconnect between the downtown and the Memorial. At the same time, the interstate system contributed to the number of visitors to the Memorial, after its opening in 1965, as Americans used it to travel to visit parks and other attractions outside their home states.

METROLINK LIGHT RAIL

The St. Louis region became one of the first in the nation to bring fixed rail transit back into operation, with the opening of MetroLink, the light rail line, from Lambert International Airport to East St. Louis in 1993. The line includes six stations within downtown St. Louis, including the Gateway Arch/Laclede's Landing Station located in the historic Eads Bridge across Washington Avenue from the Arch Parking Garage. The Arch/Laclede's Landing station had an average of 1,209 daily boardings in 2007. This station has one of the lowest numbers of daily boardings in the downtown area. The Arch/Laclede's Landing station does not have a large employment or residential base within walking distance, making it largely dependent upon users seeking tourism or entertainment.

METRO BUS

The Memorial is also within one to two blocks of numerous Metro bus lines. Broadway and Fourth Streets accommodate five different bus routes. The bus routes operate seven days a week, from approximately 5:00 a.m. to 1:00 a.m. The closest stop to the Memorial is located at Fourth and Pine Streets, which had an estimated 208 daily boardings in 2007 (Metro St. Louis 2007).

METROLINK EXPRESS BUS

Similar to the regular bus routes, Metro operates express bus routes with stops along Fourth Street

and Broadway Street in downtown, within one to two blocks of the Memorial. These buses operate Monday through Friday only, arriving in downtown St. Louis between 6:00 a.m. and 9:00 a.m., and departing between 3:00 p.m. and 7:00 p.m. These routes connect outlying residential areas of the region to workplaces in the business district in downtown St. Louis.

Pedestrian/Bicycle Circulation

Sidewalks of varying widths and conditions are located along downtown roadways. As is typical in a downtown urban setting, many trips can be made on foot within the vicinity of the Memorial. A general rule of thumb for a comfortable walking distance is one-quarter to one-half mile, which corresponds to a five- to ten-minute walk.

While the Gateway Arch is within one-quarter mile of both the Arch Parking Garage and Old Courthouse, the southern portion of the Memorial is further than one-half mile from either of these facilities. This contributes to its relative isolation. The Memorial is also cut off by Interstate 70 from pedestrians accessing the Memorial on other downtown streets south of Walnut.

The largest impediment to pedestrian access to the Memorial is the crossing of Memorial Drive on Walnut, Market, Pine, or Chestnut Streets. While recent pedestrian accommodations include temporary crosswalk striping across Memorial Drive along Chestnut Street, high curbs, fast traffic, and the freeway crossings contribute to poor pedestrian conditions between the Old Courthouse and the Gateway Arch.

Within the Memorial, there are approximately five miles of exposed aggregate sidewalks, as well as more than two miles of concrete sidewalks around the perimeter (NPS 1996a). The exposed aggregate sidewalks within the Memorial show signs of upheaval and cracking in places.

While the Grand Staircase leading from the Gateway Arch 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 north and south staircases that reach from the North and South Overlooks down to Leonor K. Sullivan Boulevard are showing their age with cracks and crumbling concrete in places.

With few designated on-street bicycle lanes in downtown St. Louis, most cyclists must share the roadway with automobiles. The Memorial, however, 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 Memorial is at the center of this trail system and an expansion is planned in the coming years.

The Riverfront Trail, a popular segment of the regional Great Rivers Greenway District, runs past the Memorial along Leonor K. Sullivan Boulevard. This segment of the trail shares the street lanes with vehicular traffic. Poplar Street, Memorial Drive, and Washington Avenue are 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 contains dedicated bicycle lanes in downtown St. Louis.

The grounds of the Memorial allow bicyclists, though specific 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 Memorial grounds, the location and perceived ease of access to it shapes the visitor experience. For the purposes of this analysis, the parking facilities have been divided into those parking locations within the grounds of the Memorial, and those parking facilities outside of the Memorial.

ON-SITE PARKING FACILITIES

ARCH PARKING GARAGE Work began in 1983 on the construction of the Arch Parking Garage adjacent to Washington Avenue. This parking structure holds 1,208 vehicles on three levels, with two levels below-grade and the top level entrance on grade with surrounding walkways. A perceived deficiency with the current garage is its maximum height of seven feet, which precludes bus, RV, and oversize vehicle parking. The garage remains the primary access point for visitors to the Memorial, with the approximately one-quarter mile walk to the Gateway Arch as one of the most actively used paths within the Memorial grounds.

OLD CATHEDRAL PARKING LOT The surface parking lot at the Old Cathedral, with approximately 87 spaces, dates from 1961 (NPS 1996a). While the Old Cathedral is not within the Memorial boundary, the associated parking lot is. An effort on behalf of the Archdiocese of St. Louis to expand the lot to accommodate additional worshipers was turned down by the National Park Service in 1969, due to its potential impact on the Memorial. The existing lot was resurfaced and redesigned in 1994. There is a bus drop-off area located alongside the Old Cathedral parking lot, with access from Memorial Drive.

The pedestrian path from the Old Cathedral parking lot provides the shortest barrier free accessible route to the Gateway Arch and the Museum of Westward Expansion, making it a desirable drop-off and pick-up location for visitors.

MAINTENANCE FACILITY PARKING LOT

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

ON-STREET PARKING SPACES (WITHIN THE MEMORIAL 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 Memorial 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 traffic squad. The other boundary streets around the Memorial grounds (Memorial Drive, Washington Avenue, Poplar Street, and Leonor K. Sullivan Drive) do not have on-street parking spaces, though in times of flooding, on-street parking informally occurs along Leonor K. Sullivan Drive, when the levee parking is underwater.

OFF-SITE PARKING FACILITIES

Visitors to the Memorial have numerous options for parking off site. Given the Memorial's location in downtown St. Louis, additional parking facilities include public on-street spaces as well as 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 Memorial are considered. It is assumed that most visitors arriving via private automobile would park within one-quarter mile (a five-minute walk) of the Memorial if they are not utilizing the on-site parking facilities. Some portions of the Memorial, such as the Old Courthouse and the southern portion of the Memorial grounds are actually closer to off-site parking facilities than to either the Arch Parking Garage or the Old Cathedral parking lot. The study area for the affected parking environment and locations of off-site parking facilities is outlined in Figure 3.10.

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 Memorial boundary. The majority of these facilities are utilized by long-term users, but most have space available for public use as well. A summary of the public parking facilities within one-quarter mile of the Memorial is provided in Appendix I.

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 Memorial, 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.

Parking in East St. Louis Addition Parking facilities on the East St. Louis side of the river currently consist of a large surface parking lot associated with the Casino Queen, located near the East River MetroLink station. Front Street does not have formal on-street parking restrictions. Parking is also available near Malcolm Martin Memorial Park.

Water Transportation

Current water transportation consists of two riverboats operated by Metro in partnership with the National Park Service. Operating from floating docks along Leonor K. Boulevard, the replica steamboats primarily serve visitors to the Memorial and other tourists. From June through August, the boats operate on a set schedule of five daily trips on weekdays and six on weekends, cruising up and down the river, with no other stops. In the shoulder seasons, March through May and September through November, there are two to four daily scheduled trips. There are no scheduled trips during the winter months from December through February.

There is currently no passenger ferry or water taxi service operating between downtown St. Louis and the East St. Louis side of the river.

3.6 SOCIOECONOMICS

Jefferson National Expansion Memorial is located within the urban area of St. Louis, Missouri. The Memorial attracts millions of visitors each year and is a major tourism attraction for the region. As individuals and families travel to the area they provide an economic stimulus through their local spending. Given the importance of the Memorial as a regional attraction, the influence area for the social and economic

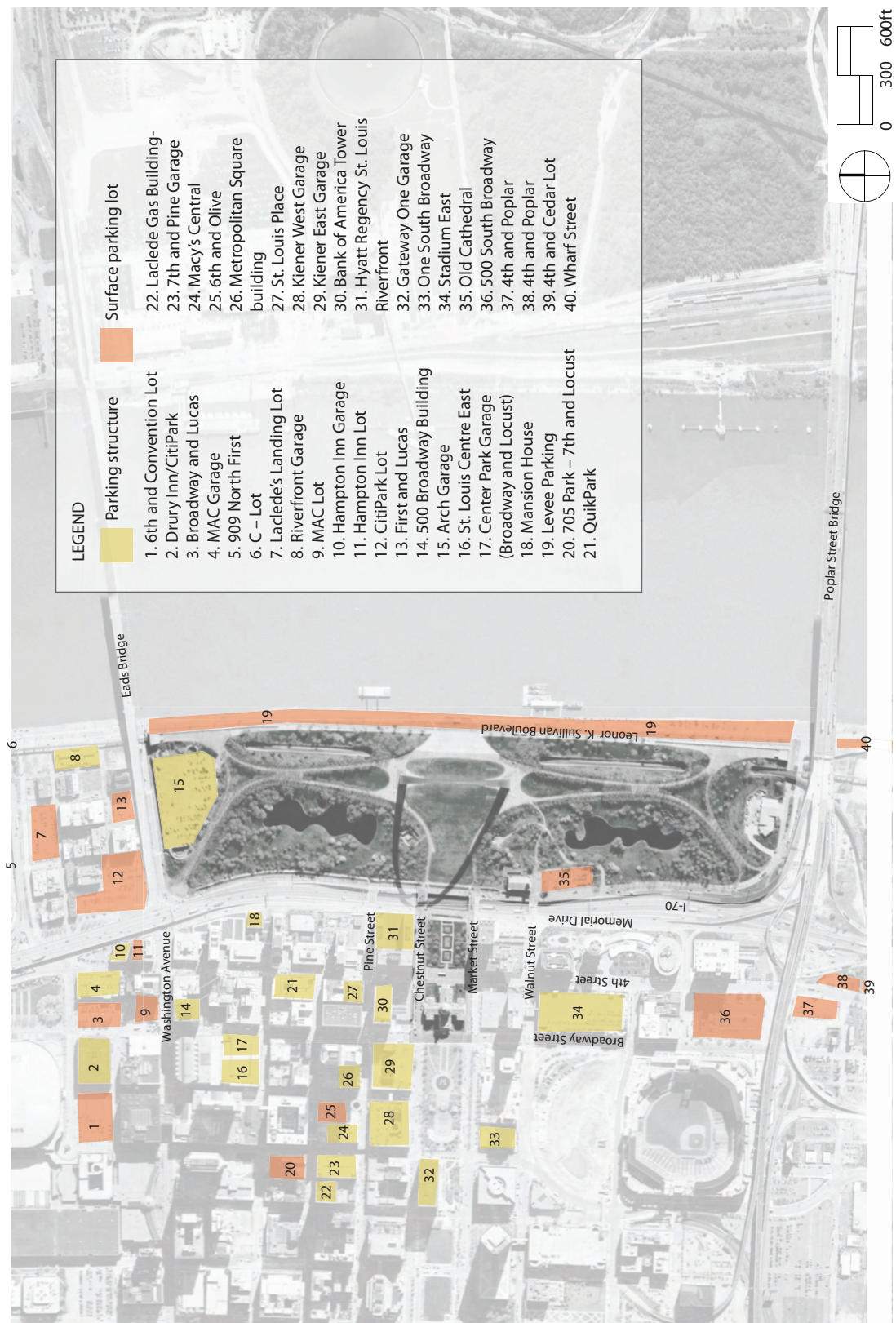


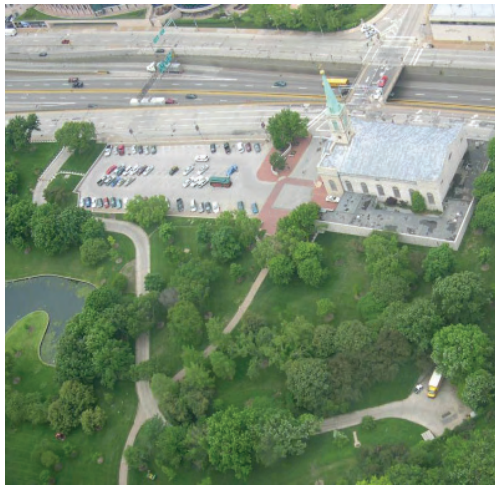
Figure 3.10 Parking Facilities within One-Quarter (1/4) Mile of Jefferson National Expansion Memorial.



Site of future Memorial with surface parking and Luther Ely Smith Square in foreground (circa 1950s).



Arch Parking Garage, looking west along Washington Avenue; Eads Bridge/MetroLink on right.



View of Old Cathedral parking lot adjacent to Memorial Drive.



Leonor K. Sullivan Drive with informal on-street parking.



Bus drop-off location adjacent to Old Cathedral parking lot along Memorial Drive.



NPS Ranger on a riverboat.

considerations has been defined as the City of St. Louis, where most of the economic stimulus caused by visitor spending while visiting the Memorial is likely to occur. In addition, as some of the alternatives presented in this report consider land areas on the east side of the Mississippi River, East St. Louis is also included in the study area. Where possible, the project team collected data and information describing socioeconomic baseline conditions for the Cities of St. Louis and East St. Louis. However some data is only available at a county level. For most parameters, the project team also collected data for St. Louis and St. Clair Counties, where available, to compare trends.

Economic Contributions of the Memorial

As mentioned earlier, the Memorial attracts millions of visitors each year. An estimate of

annual visitation is provided in Table 3.1. From 2003 to 2007, the Memorial averaged three million annual 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 Memorial averaged 1.8 million visitors per year over this period.

As individuals and families travel to the area, they provide an economic stimulus through their local spending. The economic contribution of the Memorial during 2003 has been estimated using the NPS Money Generation Model (NPS 2008a). According to this analysis, the Memorial hosted 2.69 million recreational visitors who spent \$90.29 million in the area. This spending generates additional economic activity in the form of sales, income, and jobs to businesses that provide goods and

Year	Recreation Visits	Non-Recreation Visits	Total Annual Visits to Jefferson National Expansion Memorial	Annual Percentage Change in Total Visits	Adjusted Recreational Visits to the Memorial ¹	Annual Percentage Change in Adjusted Recreational Visits
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Annual Average						
(1998 - 2007)	3,059,333	371,929	3,431,262	-3.50%	2,091,304	-3.00%
Annual Average						
(2003 - 2007)	2,673,401	294,513	2,967,914	-5.03%	1,786,687	-7.02%
1 Adjusted Recreational Visits exclude visitors coming to the Jefferson National Expansion Memorial for special events and Non-recreational visits (column 3).						
Source: Monthly Public Use Reports and Personal Communication with Mardi Arce, NPS.						

Table 3.1 Annual Estimated Visitation at the Memorial

services to visitors. The additional economic activity resulted in \$111.3 million in sales, \$41.7 million in personal income and 2,150 in employment (NPS 2008a).

Population

The City of St. Louis and East St. Louis have experienced a decline in population for most of the last two decades. The trend resulted in over 45,000 individuals leaving the City of St. Louis and nearly 12,000 leaving East St. Louis between 1990 and 2007. However, this trend appears to be reversing in St. Louis, where there has recently been a slight population increase. St. Louis County has experienced a slight increase (less than one percent) in population between 1990 and 2007. In all areas, population grew much more slowly than the rest of Missouri which increased population by nearly 15 percent between 1990 and 2007. The U.S. Census estimates that total population in 2007 for City of St. Louis was 350,700, 28,996 for East St. Louis, just fewer than one million for St. Louis County and over 260,000 in St. Clair County.

Employment

Decreases in population in the City of St. Louis and East St. Louis are likely due to a general decline in economic conditions. For instance, total full-time and part-time employment fell by 16 percent in the City of St. Louis between 1990 and 2006, a loss of nearly 54,000 jobs. Employment throughout St. Louis County fared better with the addition of 110,000 jobs during this same time period, a 16 percent increase. Information on total employment was not available for East St. Louis. However, employment increased in St. Clair County by 22 percent between 1990 and 2006, increasing by nearly 24,000.

The difference in economic structure of the City of St. Louis, St. Louis County, and St. Clair County is evident in data reflecting employment by industry. The City of St. Louis shows a stronger concentration in Education and Health than either of the two counties. St. Louis County shows a strong relation to Professional Services, Finance and Real Estate, and Trade and Manufacturing. The economy in St. Clair

County is stronger in Transportation and Utilities and Public Administration.

Unemployment over the last ten years in the St. Louis metro area has tended to follow the trend of the national economy. However, for East St. Louis and St. Clair County, unemployment rates have been much higher than any other area evaluated including the United States. For East St. Louis, unemployment has exceeded 10 percent for the past two years. In addition, since 2005, the St. Louis Metropolitan Statistical Area has experienced a higher unemployment rate than the national rate.

Income and Poverty

While total personal income exceeded \$10 billion in the City of St. Louis in 2006, the City lagged behind in growth of personal income in St. Louis and St. Clair Counties. The City has experienced a decline in total personal income, in real terms, of 1.6 percent between 2000 and 2006. This is in contrast to St. Louis and St. Clair Counties, which have experienced growth in total personal income of seven percent.

Total personal income includes earnings from work and other types of income including dividends, interest, and rent and transfer payments (such as social security and public assistance). The City of St. Louis and St. Louis County experienced a loss in net personal income due to individuals commuting into the area for work, while St. Clair County experienced a net increase in personal income from commuting. For the City of St. Louis, nearly half the earnings are paid to commuters coming to the City.

Other forms of income make up a significant percentage of total personal income in the City of St. Louis. This includes retirement income (dividends, interest, and rent) at 14 percent and transfer payments at 23 percent. Retirement income in the City of St. Louis is similar in percentage to retirement income in St. Clair County (13 percent), but far below the percentage of total personal income in St. Louis County (21 percent). Transfer payments in the City of St. Louis comprise nearly a quarter of personal income (24 percent),

which far exceeds percentages for St. Louis County (nine percent) or St. Clair County (16 percent).

Trends in per capita income also show that the City of St. Louis is economically disadvantaged compared to St. Louis County or the nation as a whole. Real per capita income has declined by 2.6 percent, while it has increased in both the counties and at the national level. In addition, per capita income in City of St. Louis is 77 percent of income levels throughout the U.S. and only 57 percent of per capita income in St. Louis County.

Another perspective on economic welfare is provided by looking at median household income and poverty rates. The City of St. Louis lagged significantly behind the rest of the study area in terms of median household income in 2006. This is especially pronounced when compared with St. Louis County median household income. During 2006, income levels within the City were just 58 percent of income levels in the County. The City of St. Louis also reported poverty levels that are much higher than the other reference communities including the U.S. as a whole.

Land Use

The Jefferson National Expansion Memorial is located entirely within the urban area of downtown St. Louis. The 91-acre Memorial sits on the west bank of the Mississippi River and occupies forty square blocks between Eads Bridge and Poplar Street, as described earlier in this report (NPS 1996a). The site is used as a public park for passive recreational, museum and interpretive uses.

The East St. Louis addition consists of a strip of land between the levee and the riverfront running north-south between the Eads Bridge and the Poplar Street Bridge, as well as one parcel of land located south of Trendley Avenue, crossing over Front Street to the east. Current land uses along the east and west banks of the river include rail and barge transportation uses. The parcel of land south of Trendley Avenue was previously used as a rail car manufacturing facility and is presently vacant.

3.7 NPS OPERATIONS

The Memorial is administered by a 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 Memorial. Memorial staffing is 166.5 Full Time Equivalent (FTE) employees. Memorial operations are augmented by 110 FTE from partners Metro and Jefferson National Parks Association.

The Ranger Activities Division is responsible for 24-hour, 365-day law enforcement throughout the Memorial and physical security of the Gateway Arch complex. The Memorial 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 Memorial. 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.

The Museum Services and Interpretation Division at the Memorial includes an Education Department, Exhibits Department, Theater and Audio-Visual Department, Curatorial Department, and Interpretation Department.

The Division of Administration is responsible for the Memorial'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 Memorial's telephone system.

The Maintenance Division consists of the Grounds Section, Custodial Services, Building Services, and Gateway Arch Transportation System.

The Memorial relies on volunteers through the Volunteers in Parks (VIP) program to complete a variety of tasks. These include custodial services, information reception, presenting interpretive programs, and clerical assistance. The Memorial has benefited greatly from volunteer service hours. In fiscal year 2008, 33,546 hours were contributed to the Memorial as part of the VIP program. In fiscal year 2007, 885 volunteers donated 33,667 hours to the Memorial. In fiscal year 2006, a total of 35,084 hours were donated by 631 volunteers.

Various partnerships including the Jefferson National Parks Association (JPNA) represent a vital part of the Memorial's interpretive effort with contributions to the museum education

program, exhibits, and library and archival staffing. JNPA operates three stores in the Memorial, and a wide variety of projects are funded through their donations including special exhibits and programs.

Metro Business Enterprises (Metro) is another major partner. Metro funded and built the Gateway Arch Transportation System in the 1960s, and continues to administer its operation. In addition, they collect park fees, built and operate the Arch Parking Garage, and fund exhibits and other improvements.

Currently the Memorial has working relationships with more than 30 groups and organizations, and will continue to build on these partnerships. The memorial 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.