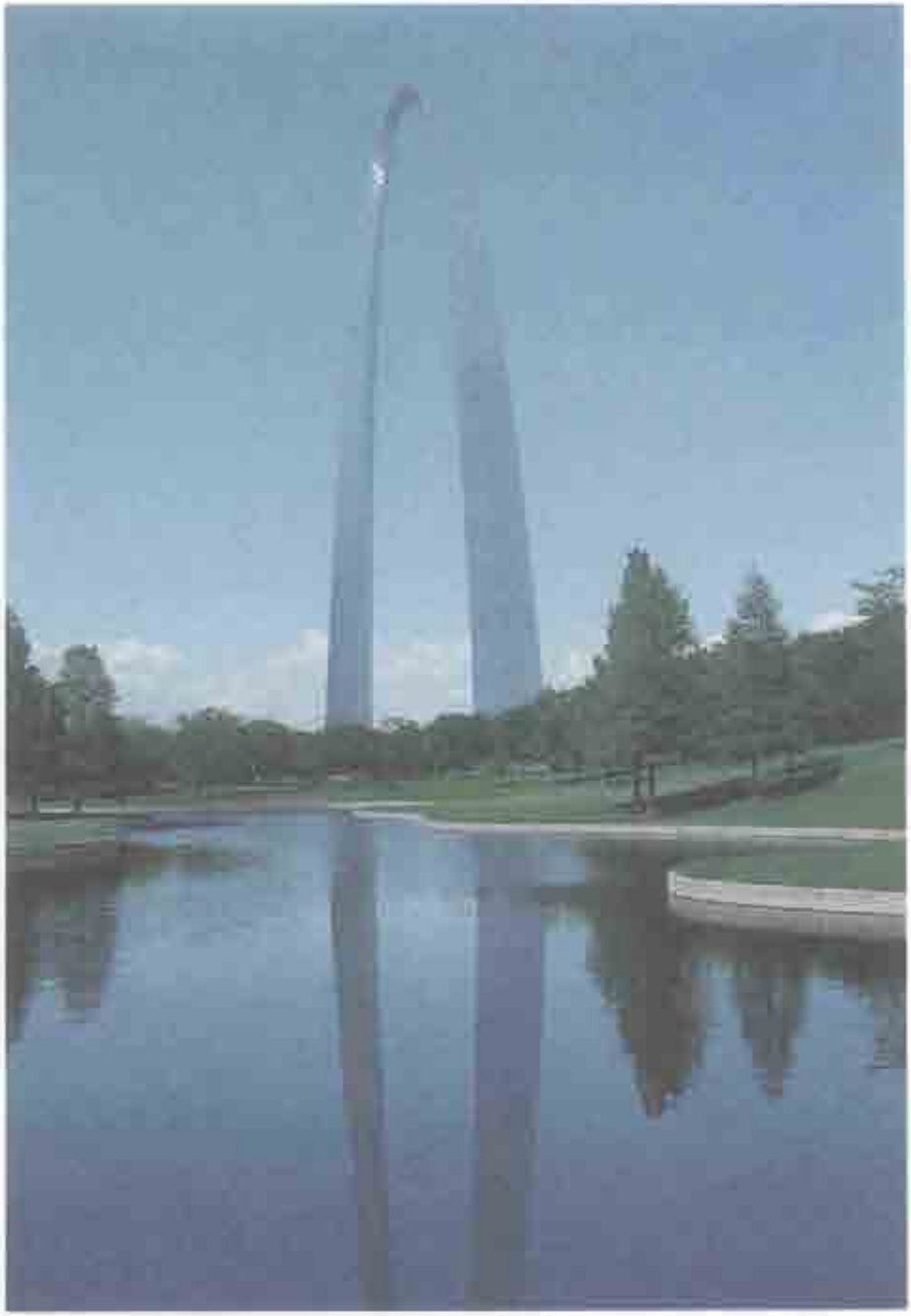
CULTURAL LANDSCAPE REPORT

for

JEFFERSON NATIONAL EXPANSION MEMORIAL

St. Louis, Missouri



National Park Service, 1996

CULTURAL LANDSCAPE REPORT

JEFFERSON NATIONAL EXPANSION MEMORIAL
ST. LOUIS, MISSOURI

by
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Midwest Field Area

with the Saarinen/Kiley Design Collaboration History
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Acknowledgments

This *Cultural Landscape Report* would not have been possible without the continued support and cooperation of Superintendent Gary W. Easton and members of the staff at Jefferson National Expansion Memorial. In particular, Park Historian Bob Moore shared invaluable information about the history of the park and the important players involved in the development of the Memorial. Archivist Laura Mills provided much assistance and access to archival materials. Civil Engineer Gargar Chan displayed ease and expertise generating the period plans in AutoCAD and was responsible for some of the photography. And finally, Gardener Supervisor Jim Jacobs and the grounds maintenance staff were instrumental in providing insights regarding maintenance issues and existing conditions.

Special thanks to landscape architect Gregg Bleam and his staff in Charlottesville, Virginia for their research and detailed analysis of the relationship and design collaboration of Eero Saarinen and Dan Kiley. Their research on the design analysis and history of the park made up a major portion of "Chapter II: History of Design Development" of this *Cultural Landscape Report*.

Thank you also to Historical Landscape Architect Sherda Williams of the Midwest Field Area, and Historical Landscape Architect David Uschold of the Olmsted Center for Landscape Preservation for their technical support and editorial review comments.

And finally, many thanks to former NPS employee Mary Hughes. Without Mary's energy, persistence, and dedication to landscape preservation, this project would never have been initiated. Her assistance, support, and guidance throughout the project was greatly appreciated.

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Chapter I: Management Summary

Study Boundaries

Jefferson National Expansion Memorial (JEFF) is a 90.96-acre park located in St. Louis, Missouri on the west bank of the Mississippi River (see figure 1). The park occupies forty city blocks between Eads Bridge and Poplar Street and is bound by Leonor K. Sullivan Boulevard on the east and Memorial Drive and depressed Highway 70 on the west. Also within the park boundaries are two blocks to the west of Memorial Drive, including Luther Ely Smith Square and the site of the Old Courthouse (see figure 2).[1]

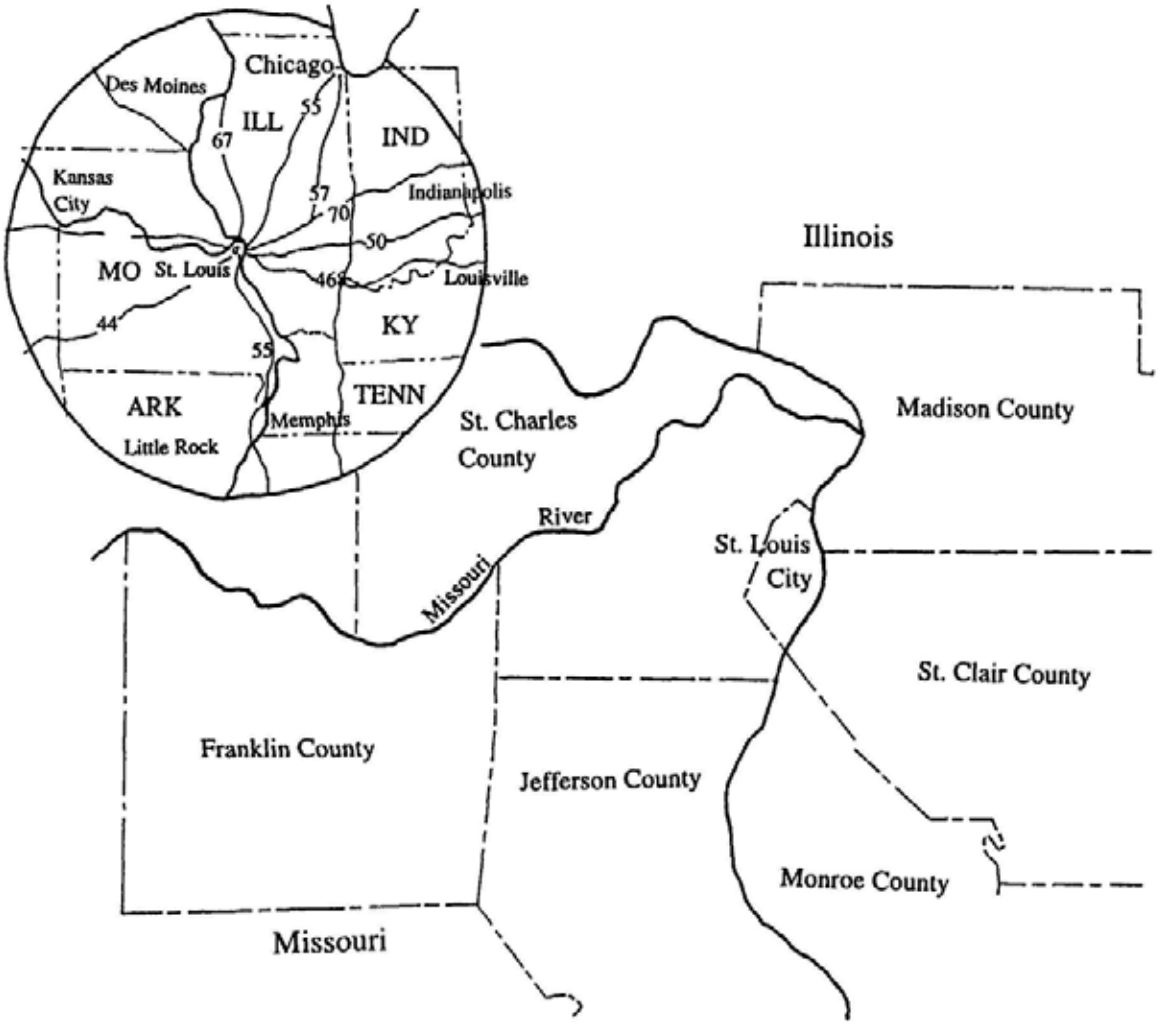

Figure 1: Context Map: Midwest Region and St. Louis vicinity. (Bellavia, 1996).

[1]A 100-acre extension of the park on the east side of the Mississippi River was authorized in 1984 and finalized in 1992. The east bank will not be addressed in detail in this report.

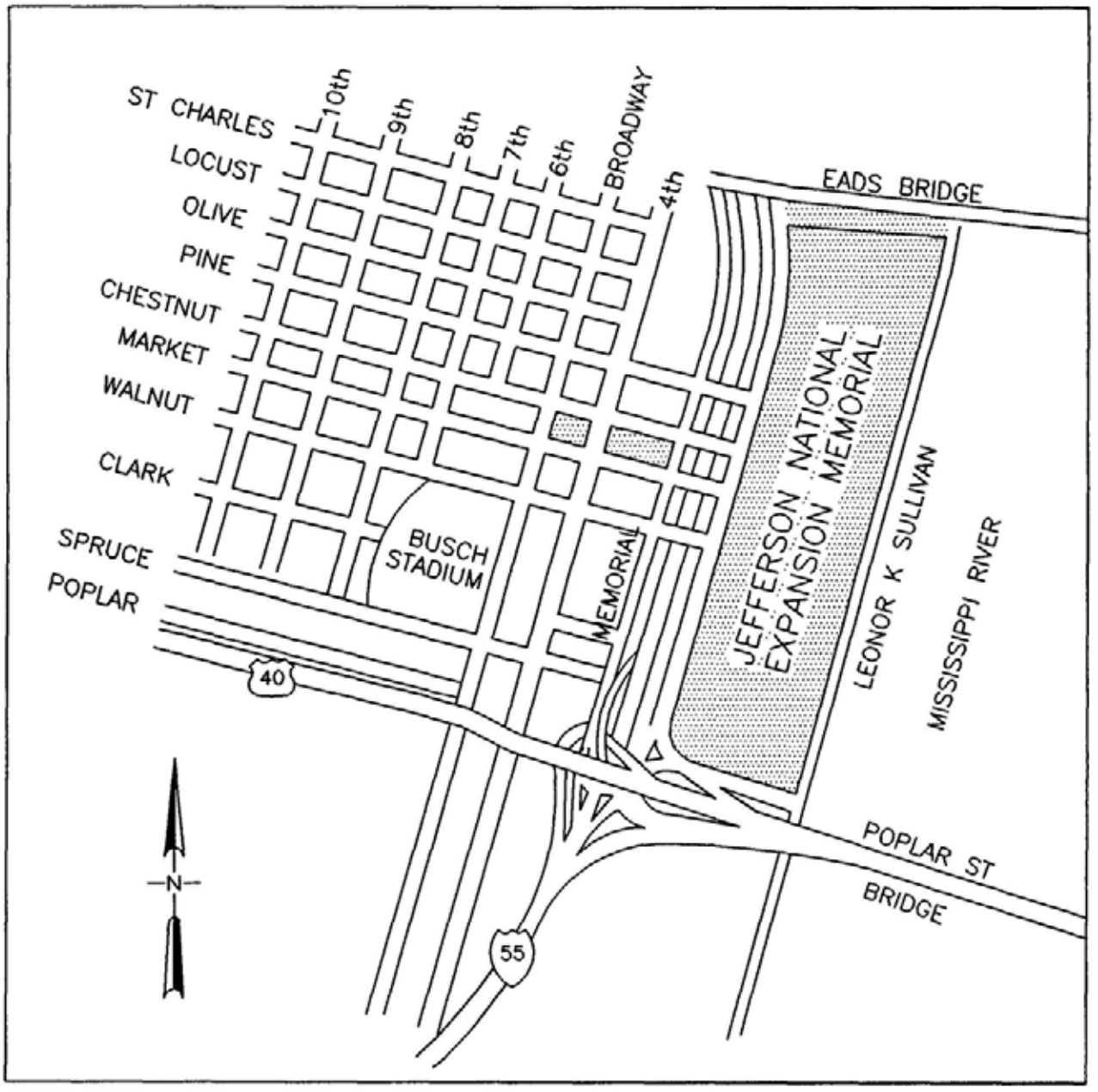

Figure 2: Map of Downtown St. Louis and Jefferson National Expansion Memorial. (JEFF, 1995 Site Plan).

Project Background

This Cultural Landscape Report is intended to provide site managers with a comprehensive, detailed history of the designed landscape and its character-defining features, and recommendations for future planning decisions. It was produced as a collaborative effort between the Cultural Resources Division, Midwest Field Area, and Jefferson National Expansion Memorial. Landscape architect Gregg Bleam was hired to consult on the project and prepare a report documenting the early history and the design evolution under a separate contract.[2]

Historical Overview

The Gateway Arch and surrounding landscape was designed by architect Eero Saarinen in collaboration with landscape architect Dan Kiley. The period of significance for the landscape is 1947-1986. This period includes a design competition, evolution of the award-winning design development plan, and implementation of the approved development plan. Although modifications were made to the approved Saarinen/Kiley design development plan during its' long implementation period, all money and energy expended was geared toward executing the approved design.

A two-stage national design competition was held in 1947 and 1948. The first stage, in 1947, narrowed the competition from 172 entries to five finalists. Of the five, Eero Saarinen's design was chosen unanimously in 1948. Following the competition, a 10 year period of negotiations between the City of St. Louis, the National Park Service (NPS), and the Terminal Railroad Association (TRRA) regarding the relocation of the elevated railroad tracks on the levee took place. In 1957, when an agreement was finally reached, Saarinen and Associates were hired to design the Memorial (the railroad relocation plan required major alterations to the design). Saarinen subsequently subcontracted Dan Kiley as landscape architect for the project. Throughout the evolution of the design development plan between 1947 and 1966 (the year the final plan was approved), the concept remained the same: a symbolic Memorial in the form of an inverted catenary curve located in a landscaped setting on the riverfront.

Construction of major structural elements (the railroad tunnels and overlooks) began in 1959 and concluded with the completion of the Arch in 1965. There were two major phases of landscape development. The first, 1969-1973, focused on the north-south axis and area immediately west of the railroad cuts. The second, 1979-1981, focused on the completion of the plan (the entire west half of the site). The grand staircase, another major structural element, was partially constructed between these two periods (in 1976) and the three-story parking garage was completed in 1986. Thorough documentation of the landscape development is recorded in "Chapter III: Physical History of the Landscape."

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[2]Midwest Field Area of the National Park Service contract with Gregg Bleam Landscape Architect. Contract #:1443PX600094635. Portions of this report are taken directly from Gregg Bleam's "Evolution of a Landscape: Eero Saarinen and Dan Kiley's Collaborative Design for Jefferson National Expansion Memorial."

Statement of Significance

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."[3] The Arch is recognized as historically significant because it has architectural and engineering design value which will endure the "test of time." It was determined that 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."

Jefferson National Expansion Memorial derives national significance under National Register Criterion A (event) for its commemoration of Thomas Jefferson and others responsible for the nation's territorial expansion to the west. The Memorial marks the symbolic economic hub and embarkation point of westward expansion. In addition, the Memorial is significant under National Register Criterion C (design/construction) for its architectural and engineering merit.

Although the 91-acre landscape surrounding the Arch is included in the National Register nomination, the specific features which characterize the landscape are not clearly addressed, nor is Dan Kiley, a master landscape architect, credited for his work.[4] Consequently, the Memorial is also significant under Criterion C as the collaboration of a master architect and landscape architect.

An exploration into Saarinen and Kiley's design philosophy, their design intent for the Memorial, and their working relationship is required. The two men did not merely collaborate on the design of a unique monument to a historic American event, itself a worthy accomplishment, but collaborated on many important building projects as architect and landscape architect. Moreover, they were close friends with common ideas about the possibilities for architecture and design. Perhaps what makes this project even more special is that their winning design for the Memorial's architectural competition of 1947-1948 launched their respective careers.

From this exploration of Saarinen and Kiley, one theme becomes quite dominant; the firm belief in architecture as addressing the total environment. Consequently, the design of the Memorial's impressive Arch was never intended as separate from the site planning and landscape design for the entire grounds. As such, early on they came upon the idea of the memorial in a forested, park-like setting, a simple complement to the majesty of the Arch, yet with a function and purpose of its own. However, as budget constraints inevitably affected the development program, the landscape program acquired secondary status. Were it not for the strength of their vision, Saarinen and Kiley's ideal would not exist even in its current form.

Scope of Work and Methodology

An analysis of the design intent was completed under contract with Gregg Bleam, Landscape Architect. Mr. Bleam is a licensed landscape architect and scholar who worked for Dan Kiley and has studied Kiley's design philosophy and career. He reviewed plans and written documentation at the former office of Eero Saarinen and Associates and at Dan Kiley's office, and also conducted oral interviews with former associates of both

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[3]U.S. Department of the Interior. *National Register Bulletin 22: Guidelines For Evaluating and Nominating Properties That Have Achieved Significance Within the Last 50 Years.* The bulletin was completed by the Interagency Resources Division of the National Park Service, U.S. Department of the Interior, n.d., 3.

[4]A more thorough analysis of the character-defining features and the statement of significance can be found in "Chapter V: Statement of Significance and Analysis of Integrity."

Saarinen and Kiley. His analysis of the design evolution is an invaluable addition to this report.[5]

The primary author, JEFF Historical Landscape Architect Regina Bellavia, reviewed archival documentation at Jefferson National Expansion Memorial. Collections reviewed include drawings and specifications, Superintendent's monthly reports, correspondence of the Jefferson National Expansion Memorial Association (JNEMA), photographs, and other written material. The extensive collection of photographs of Arteaga Photos Ltd. documenting the construction of the Arch were reviewed.[6] In addition, the author reviewed materials at the Denver Service Center, Technical Information Center (DSC/TIC) of the National Park Service (NPS).

Oral interviews were conducted with people associated with the construction of the site. The information gathered, combined with the written and photographic documentation in the Jefferson National Expansion Memorial archives (hereafter referred to as the JNEM Archives), was compiled and summarized to form the basis for the treatment recommendations.

A field inventory of existing conditions and landscape features was conducted by Regina Bellavia and seasonal Landscape Architecture Assistant Julie Barham in the summer of 1995. An extensive tree inventory was completed and will be recorded in a visually oriented data management system.[7] The existing conditions inventory was based on AutoCAD generated maps produced under separate contract for the purposes of this project in 1995.[8] The AutoCAD files were also used to produce period plans. JEFF Civil Engineer Gargar Chan was responsible for manipulating the data under the supervision of the author.

Administrative Context

Other National Park Service planning documents or previous studies that identify and/or recommend treatment of the cultural landscape include the following:

- *Jefferson National Expansion Memorial Master Plan* (General Management Plan) prepared by Chief Park Historian William C. Everhart, 1962.

The "current" Master Plan is over 33 years old and is no longer adequate to provide guidance for management decisions. Very little of the memorial development was completed in 1962. The only hint of landscape development at this time was the import of fill material which raised the ground nearly 30' in some areas. The plan documents the intended use of the park grounds and proposed facilities but is inadequate as a management tool in 1996.

When an updated General Management Plan is undertaken, this *Cultural Landscape Report* will contribute substantially to the long term strategies and planning for the park.

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[5]Gregg Bleam's work on the design evolution will be published as a separate design analysis. However, a large portion of his report is integrated with this report where necessary to complete the design history of this *Cultural Landscape Report*.

[6]Bob Arteaga, a local photographer, was the "official" photographer for the Gateway Arch.

[7]Recommendations for an appropriate system are identified in "Chapter VI: Treatment Recommendations."

[8]Purchase Order No. 1443PX600095231. Contract between National Park Service, Midwest Field Area and Kuhlmann Design Group, Inc.

- Conceptual Plans (various dates from 1935-present)[9]

The idea for a riverfront memorial in St. Louis goes back far beyond the inception of the Memorial by President Franklin D. Roosevelt in 1935. Many conceptual plans and references to plans can be found in the JNEM Archives. In 1928, noted landscape designer Harland Bartholomew planned the redevelopment of the St. Louis riverfront. Other proposals were being made during the same period.

Saarinen and Associates developed many conceptual plans during the 16-year period between the 1948 competition and NPS approval of the plan. These conceptual plans clearly document the transition in the concept from a forested "wilderness" to a more open landscape with continued use of the parabolic line. At least one plan was approved and then superseded by a very similar plan which became the final design development plan for the Memorial.

Many sets of construction documents were prepared by the National Park Service Denver Service Center (NPS DSC) and by the local St. Louis firm Harland Bartholomew and Associates (HBA). The drawings for the landscape development are confusing because they were packaged and re-packaged several times in light of budgetary opportunities and constraints at different times in the implementation process. The drawings that were used by contractors to construct the landscape and its character-defining features are more clearly identified in "Chapter II: History of Design Development."

A "Land Use Plan" was developed by NPS DSC in 1981 upon completion of landscape construction. The basic data for the maps was taken from the construction documents and specifications developed by DSC and Harland Bartholomew and Associates, and from Laclede Gas Company, the Metropolitan St. Louis Sewer District, and Deeds and Court Actions, St. Louis Courts.[10]

The most current maps of the park were completed in 1995 under contract with Kuhlmann Design Group, Inc. The firm used aerial photography and photogrammetric mapping to produce plans of the existing conditions of the site. The plans were generated in AutoCAD, Release 13.

- *Administrative History Jefferson National Expansion Memorial National Historic Site*, prepared by Sharon A. Brown, June 1984.

Sharon Brown's 1984 Administrative History details the history of the park from 1933-1980. It gives an in-depth account of the establishment of the memorial from the inception of the idea, to the design competition, through construction of the Arch and landscape. Ms. Brown's publication is a good source of information regarding legal issues, financial difficulties, and the political history of the park. Much of the background information for this report and other JEFF planning documents and reports comes from this source.

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[9]Most of the plans discussed throughout this report can be found in the JNEM Archives, Record Unit 120.

[10]Basic Data information is noted on page 1 of the Land Use Plan, October 2, 1981. Copy on file in the JNEM Archives, Record Unit 120, drawer 13, folder 10.

- *Lobby Interpretive Plan*, submitted by National Park Service in cooperation with Daniel Quan Design, 1993.

The purpose of the *Lobby Interpretive Plan* was to address the enhancement of the visitor experience at Jefferson National Expansion Memorial. Although the plan focused on the interior of the George B. Hartzog Visitor Center, it identified interpretive and functional issues which affected the cultural landscape as well. The primary issue was circulation and identity of the park as a National Park. The plan proposed additional exterior signs and wayside exhibits which would affect the cultural landscape.[11] It also identified existing signs, the kiosk, and recommended more efficient uses of these landscape elements. Treatment of the issues identified in the *Lobby Interpretive Plan* should coincide with the recommended treatments in this *Report*.

- *Statement for Management*, recommended by Gary W. Easton, Superintendent, 1993-1994.

The *Statement for Management* outlined the legislative and administrative requirements and constraints of Jefferson National Expansion Memorial. Operational aspects of the park such as visitor use, utilities, facilities, interpretive programs, safety, and accessibility were discussed. The report mentioned the close collaboration of Saarinen and Kiley. Of the landscape, the *Statement for Management* stated that the "location and variety [of trees] are not significant but the variety and quantity of trees form a visual and symbolic impact which is necessary to fulfill the Saarinen concept."[12] This statement directly conflicts with the findings of this *Report*. A more thorough examination of the character-defining features, including the plant material, can be found in "Chapter III: Physical History of the Landscape." Chapter III and "Chapter V: Statement of Significance and Analysis of Integrity" provide a clearer picture of the existing plant material in relation to the Saarinen/Kiley concept for the landscape.

Several major issues were identified in the Statement for Management as potentially affecting the natural and cultural resources of the park (including the landscape) in the immediate future. The completion between 1993-1995 of a new convention center/football stadium, hockey arena, light rail system and increased riverboat gambling is expected to increase visitation substantially. The potential impact on the landscape is tremendous; but perhaps more threatening is the effect this increased visitation will have on the ability to protect visitors and the resource given current human and financial resources. Since these facilities have only very recently been completed, analysis of the effects are not available at this time.

- Administrative History, *Urban Innovation and Practical Partnerships: An Administrative History of Jefferson National Expansion Memorial, 1980-1991*, prepared by Historian Bob Moore, 1994.

The 1994 *Administrative History* detailed the inner workings of the park from 1980-1991. It described in depth the day-to-day jobs of maintaining, protecting, administering, and interpreting the resource. The History discussed grounds maintenance practices and the changes that have taken place over the 11-year period. It provided a detailed history of the Veiled Prophet Fair and the effects the celebration has had on the landscape in the past. The *Administrative History* is a valuable source of information regarding the operations of the

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[11]Exterior signs recommended in the 1993 Lobby Interpretive Plan were installed in 1995. The signs and their affect on the landscape are addressed more thoroughly in "Chapter IV: Existing Conditions."

[12]*Statement for Management, 1993-1994*. Recommended by Superintendent Gary W. Easton and approved by Acting Regional Director William Schenk, page 18. Copy on file at JEFF Office of the Superintendent.

park, the history and association with cooperating agencies and how cooperative agreements were established and maintained.

- *List of Classified Structures*, prepared by Architectural Historian Dena Sanford, 1995.

The *List of Classified Structures* (LCS) identifies all historic and prehistoric structures that have archeological, historical, architectural, and/or engineering significance. The original LCS for JEFF was completed in 1975 and was updated in 1994-95. The update emphasizes the identification of structures which had previously been overlooked. Obviously, the major architectural and engineering structures, including the Arch and the Old Courthouse, are listed. But the updated list also includes landscape features which are considered contributing to the overall significance of the property. These include: the grand staircase, the circulation system, railroad tunnels, north and south overlooks, and lagoons. The LCS coincides with this *Report*, which elaborates on these features in chapters two and three.

- *Resources Management Plan* prepared by Cultural Resources Curator Kathryn Thomas, 1995.

The plan addresses the existing conditions of the cultural resources of the site and identifies needs for better protection of the park's resources. In particular the plan identifies several studies and preservation efforts pertaining to some of the landscape features. It clearly identifies the need for this *Cultural Landscape Report.*

- *Statement for Interpretation*, prepared by Park Ranger Dave Uhler, 1995.

The *Statement for Interpretation* identifies the themes and objectives of the interpretive program at Jefferson National Expansion Memorial. The objectives coincide with those of this *Cultural Landscape Report.* It is important, however, to understand that to meet some of these objectives, the landscape will be potentially affected. This *Report* should serve as a guide to avoid detrimental effects on the landscape when planning to meet the objectives of the *Statement for Interpretation.*

Organization of Report

This *Cultural Landscape Report* consists of six chapters. This chapter gives a general overview of the park, its boundaries and its significance. A brief discussion of the scope of work and methodologies is included as well as a discussion of other plans in-place which directly relate to or affect this work.

Chapter 2 documents the development of plans for the memorial from the time of its inception to when the final construction documents and specifications were completed. This chapter takes us through Eero Saarinen and Dan Kiley's involvement, and the NPS offices of design and construction approval and development of construction documents and specifications based on Saarinen and Kiley's plan. This chapter also includes the involvement of the local firm Harland Bartholomew and Associates.

Chapter 3 documents the implementation of the site development and landscape plan and any changes that were made along the way. This chapter is divided into four specific construction periods when major portions of development occurred. Period plans compliment each of the four periods, depicting the features which were added or removed during the time period. Reductions of these plans are located at the end of the chapter. Full scale copies were deposited at the Midwest Field Area of the National Park Service, and at Jefferson National Expansion Memorial.

Chapter 4 is a detailed description of the site as it exists in 1996. A full-scale plan of the existing conditions is located in the back pocket of this report.

Chapter 5 describes the significance and integrity of the park. Threats to the integrity of particular features are identified as a high priority for treatment. The National Register Form was reviewed based on this analysis, and an amendment to the form was recommended to include the significance of the landscape.

Treatment Recommendations are proposed in chapter 6. The chapter begins with a brief discussion of the recognized preservation treatments and clearly identifies why rehabilitation is chosen as the recommended overall treatment for JEFF. General and specific recommendations were made to guide future landscape management and planning decisions. A treatment plan graphically depicting these recommendations is located at the end of the chapter and a full-scale plan is located in the back pocket of this report. These recommendations should directly relate to the annual Resource Management Plan and a future General Management Plan.

Several useful appendices follow chapter 6. For a complete list of the appendices, consult the contents page.

Summary of Findings

The 91-acre landscape surrounding the Gateway Arch is a nationally significant cultural landscape that reflects the design philosophies of a master architect and master landscape architect. This *Cultural Landscape Report* documents the landscape from idea through implementation and analyzes its character-defining features. Based on the site history and analysis, treatment recommendations are oriented toward rehabilitation of the site. As a treatment, rehabilitation will allow protection and preservation of existing character-defining features and the design concept as a whole, while allowing additions to meet current management needs.[13]

[13] U.S. Department of the Interior. *The Secretary of the Interior's Standards for the Treatment of Historic Properties 1992*. The pamphlet was completed by the Preservation Assistance Division of the National Park Service, U.S. Department of the Interior, 1992. The Secretary of the Interior recognizes four approved approaches to the treatment of historic properties: preservation, rehabilitation, reconstruction, and restoration. Preservation focuses on maintaining existing historic material; rehabilitation acknowledges the need to alter the historic property to meet contemporary needs; reconstruction re-creates non-surviving portions of a property, and restoration depicts a property at a certain period of time and removes evidence of other time periods.

Chapter II: History of Design Development

Introduction

Jefferson National Expansion Memorial was built to commemorate the foresight of Thomas Jefferson and those pioneers who realized his vision with determination and perseverance in the westward expansion of the United States during the 19th century. The Memorial, although only 34 years old, has a long and complicated history.[14] And, although not anticipated, its significance goes far beyond its original intention as a memorial. It is clear as a result of this research effort that both the architecture and the landscape together form a work of art, reflecting the work of two masters, that contribute to the significance of this property.

The City — "Gateway to the West"

Established by Pierre Laclede in 1764 as a French fur-trading post along the Mississippi River, St. Louis grew from a village into a thriving town following the negotiation of the Louisiana Purchase by Thomas Jefferson in 1803 (see figure 3). St. Louis also became the central point of departure for those traveling into the western territories. As western lands opened and trade began, St. Louis became a hub of commercial activity. It was in recognition of this movement westward, and St. Louis' central role as the "Gateway to the West," that the Gateway Arch was to rise over St. Louis' waterfront at the point of Laclede's original settlement.

The Riverfront

St. Louis quickly became a hub of the young nation's river transport, being well located near the confluence of the Missouri and Mississippi Rivers, with the Missouri River becoming the main artery for frontier commerce. Regular steamboat runs began soon after the first crude launch arrived in 1817, and the sloping site of the old village quickly came to be crowded with warehouses and steamboats moored along its levee (see figure 4). Following such rapid growth and Missouri statehood, St. Louis incorporated as a city in 1822. (Of note, an 1849 fire required reconstruction of most of the riverfront.)

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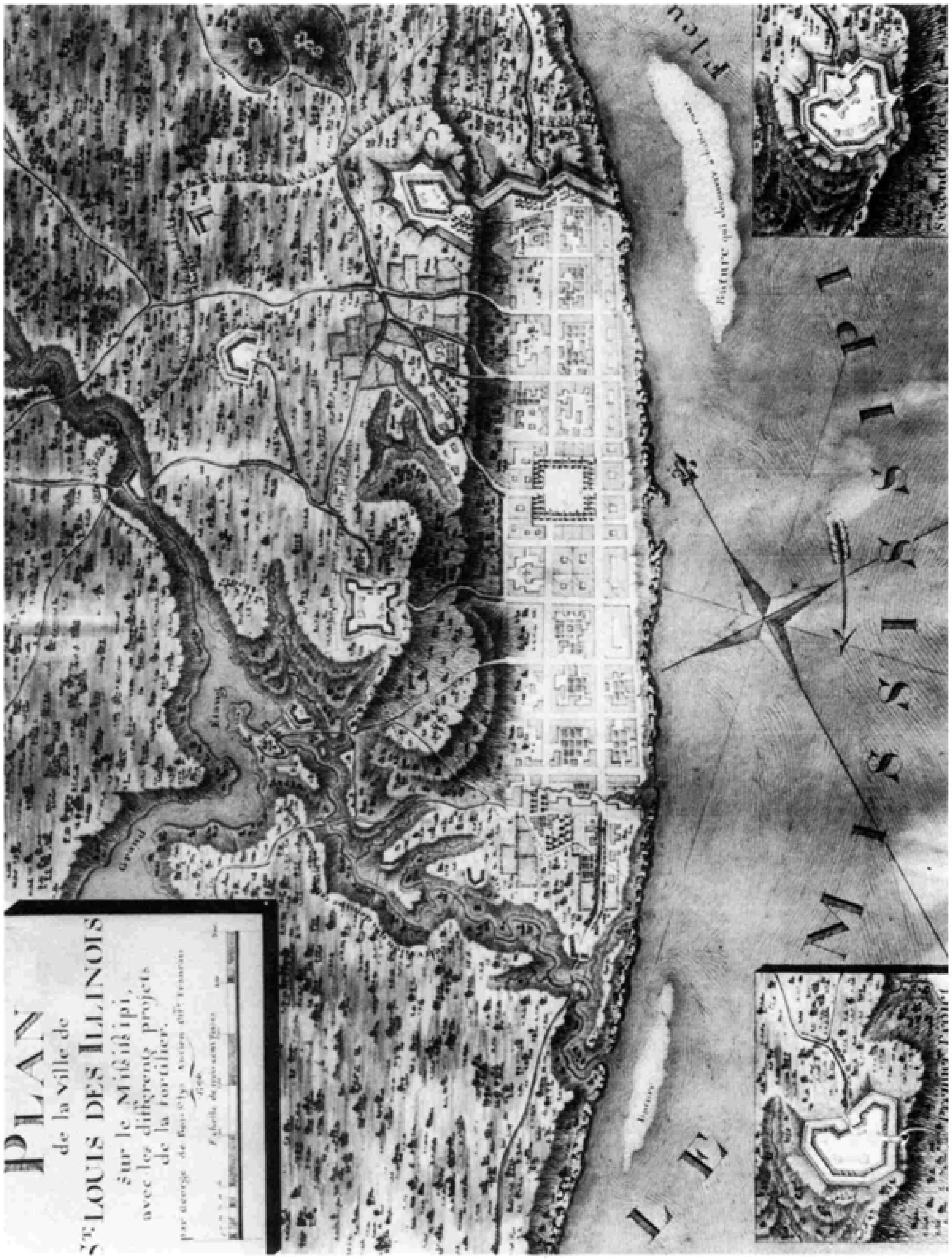
[14] An abbreviated history is given here but for a comprehensive history see *Administrative History Jefferson National Expansion Memorial* by Sharon A. Brown, 1984 and *Urban Innovation and Practical Partnerships: An Administrative History of Jefferson National Expansion Memorial, 1980-1991* by Bob Moore, 1994.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de la ville de
St. LOUIS DES ILLINOIS
sur le Missisipi,
avec les differents projets
de la fortifier.
LE MISSISSIPI

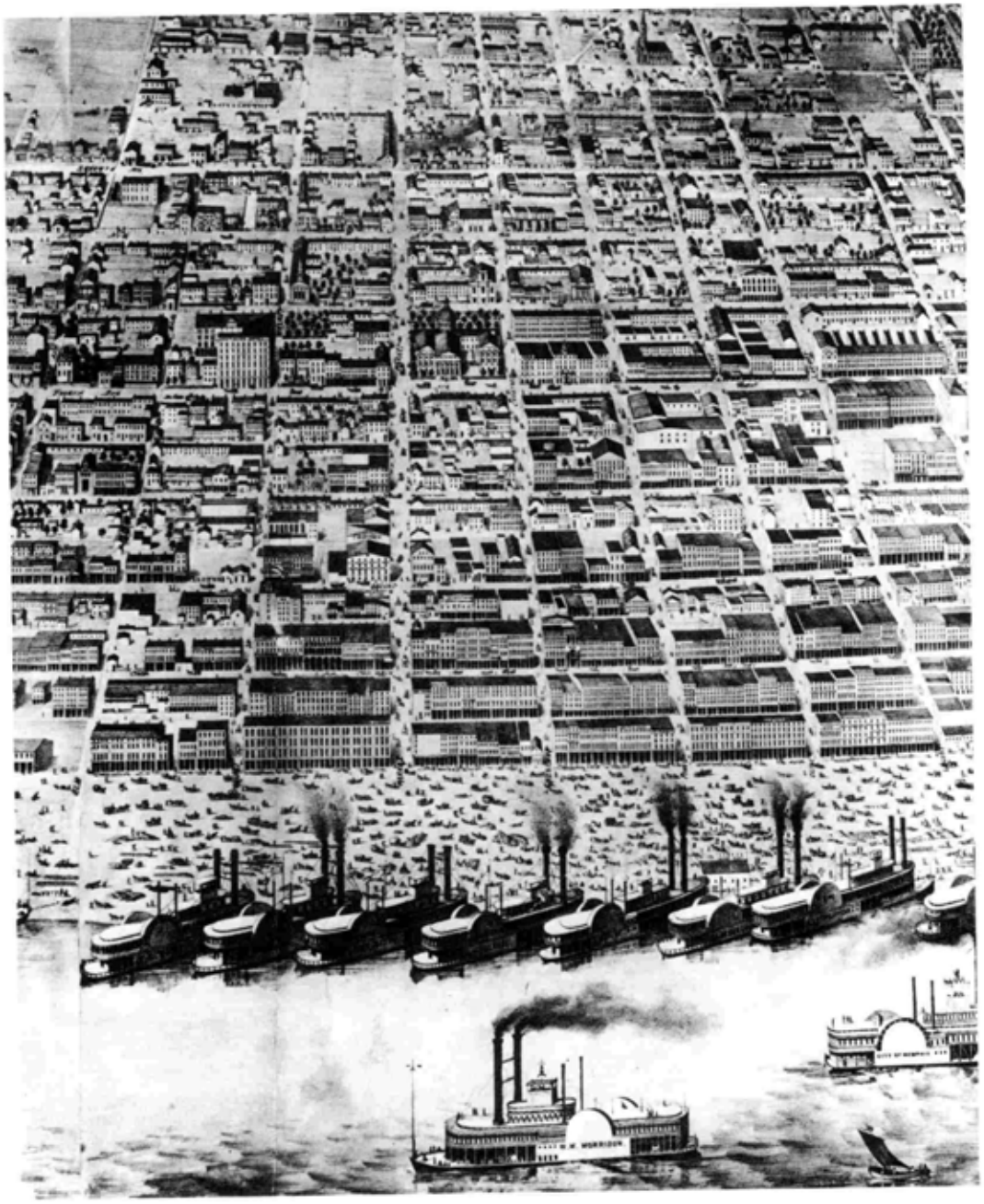

Figure 4: St. Louis Riverfront, 1852. (JNEM Archives, uncatalogued collection).

Although the city had grown to over 300,000 residents by 1870, the steamboat and river commerce upon which St. Louis grew and thrived eventually declined, largely replaced by rail transport following the Civil War. St. Louis ultimately became the nation's second largest rail terminal, but with this shift in transportation came a corresponding deterioration of the city's waterfront area, a cause for concern among civic leaders. The Louisiana Purchase Exposition of 1904, the largest world's fair ever staged, provoked action on this issue. Its classically arranged Beaux Arts buildings amidst broad lagoons and statuary brought the "City Beautiful" movement to St. Louis and sparked interest in civic improvements. Subsequently, comprehensive city planning began in 1907, including recommendations for improvements for the decaying waterfront.

Many different plans were suggested for the development of the decayed riverfront between 1907 and 1937. Two plans produced by the City Plan Commission in 1926 and 1927 focused on large-scale automobile parking. Other later proposals included a sea wall on the river with a large aquarium on the site, while another proposed a major housing project.[15]

Of particular interest was "Plan 8009" developed by the National Park Service (see figure 5).[16] The plan maintained several historic buildings in their original locations, as well as retaining the original street pattern of the old French village. Major north-south and east-west axes were proposed, and at their intersection stood a suggested central motif. It was a central tower surrounded by a colonnade which would shelter a narrative about the "winning of America by and for the Americans."[17] The idea for a memorial plaza was discussed for many years among civic leaders. The memorial plaza studied for so many years forms the city's important urban axis, upon which the Gateway Arch is aligned.

1933-1944: Movement to Establish a Memorial

Plans for the revitalization of the St. Louis waterfront most firmly coalesced in 1933 through the efforts of Luther Ely Smith, a prominent St. Louis attorney. Smith conceived the idea after participating in the project to create the monument to George Rogers Clark in Vincennes, Indiana. In addition to memorializing an event of national significance, he also saw the project as a means to revitalize the riverfront, promote economic development, and provide jobs in the midst of the Great Depression.

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[15]"St. Louis Riverfront Proposals of the Last 45 Years," *St. Louis Globe-Democrat*, November 17, 1946. Copy on file in JNEM Archives, Record Unit 119, box 7.

[16]*A Description and Explanation of "Plan 8009" For The Jefferson National Expansion Memorial*, St. Louis, October, 1937. JNEM Archives, Record Unit 104, box 7, folder 31.

[17]Ibid.

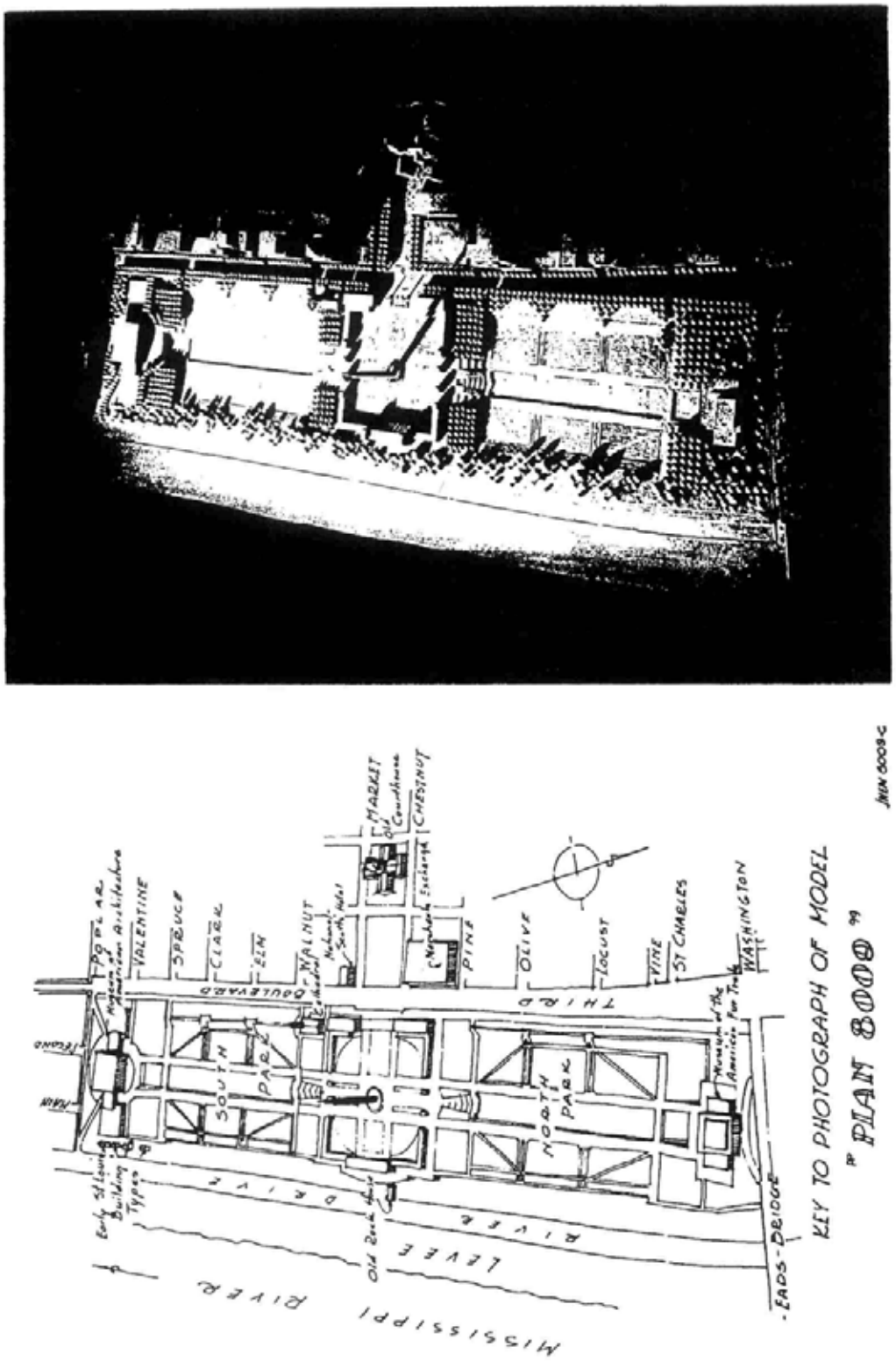

Figure 5: National Park Service "Plan 8009", 1937. (JNEM Archives, Record Unit 104, box 31, folder 7).

St. Louis Mayor Bernard Dickmann reacted favorably to Smith's proposal for a riverfront memorial, in turn presenting the plan to a group of community and business leaders in December 1933. Again, the idea was well received, the group forming a temporary committee to further explore the matter. Shortly thereafter, the committee formed the Jefferson National Expansion Memorial Association (JNEMA), chartered as a nonprofit organization with the intent to develop and adopt plans, generate public interest, build financial support and ultimately improve a site for the Memorial. More specifically, this was to be:

> ...a suitable and permanent public memorial to the men who made possible the western territorial expansion of the United States, particularly President Jefferson, his aides Livingston and Monroe, the great explorers, Lewis and Clark, and the hardy hunters, trappers, frontiersman and pioneers who contributed to the territorial expansion and development of these United States; and thereby to bring before the public of this and future generations the history of our development and induce familiarity with the patriotic accomplishments of these great builders of our country.[18]

From the outset, these words established the guiding ideal for the Memorial, an ideal which proved critical in overcoming ongoing political, legal and financial obstacles to the Memorial's development.

Federal Support — The United States Territorial Expansion Memorial Commission

Because the proposal was to memorialize events of national significance rather than to commemorate local persons or events, within months of its founding, the JNEMA pursued Congressional support and funding. This support was initiated upon authorization in 1934 of the United States Territorial Expansion Memorial Commission to design and construct a permanent memorial upon approximately 85 acres adjoining the St. Louis levee south of the Eads Bridge. In accordance with the resolution providing for the Commission's establishment, the group's fifteen members were composed of federal lawmakers and persons from throughout the country, including Luther Ely Smith.

Despite creation of the national commission, the more local JNEMA continued to develop detailed plans for the riverfront, and considered the idea of holding an architectural competition for the Memorial. A St. Louis architect hired by the JNEMA, Louis La Beaume, provided a written concept for the competition in early 1935, important because it contained the principal components of the future competition. Meanwhile, the commission initiated meetings and by May 1935, based on input from the JNEMA, the commission agreed upon the memorial's historical significance, approved site boundaries and the concept of a national architectural competition, as well as a cost estimate of $30 million for planning, acquisition and development.

Financial Matters and Historic Site Designation

Financial support from state and local lawmakers arrived rapidly, with the St. Louis Board of Alderman approving an ordinance permitting a special bond issue election to contribute $7.5 million toward the Memorial project. Although the election was scheduled for September 1935, the approval came with the

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[18]Brown, *Administrative History*, 1. Ms. Brown prints, in part, the Pro Forma Decree of Incorporation of Jefferson National Expansion Memorial Association, June 11, 1934. A copy of the decree can be found in the JNEM Archives, Record Unit 104, box 24, folder 9.

understanding that Federal authorities would approve the project and make a substantial financial contribution prior to the date of the election. Therefore, commission and JNEMA members continued in pressuring Federal authorities for promises of financial support.

Attempts to secure funding focused on the Federal Public Works Administration (PWA), chaired by Harold Ickes, and the Works Progress Administration (WPA), headed by Harry Hopkins, project backers arguing that the Memorial was a suitable candidate for the New Deal work relief funds. By August 1935, the commission gained verbal promises of support in their application for Federal relief funds from both Ickes and Hopkins, as well as a promise that the National Park Service (NPS) would assume responsibility for maintenance of the Memorial. It was at this time that NPS involvement in the Memorial project first began. The NPS initiated preliminary investigations, relying on NPS engineer John Nagle to inspect the proposed plans and location. Nagle reported favorably on the project and its significance, also recommending federal aid, but for the first time he addressed the difficulties existing railroad tracks presented for development of the site (see figure 6). The NPS' association with the Memorial would soon become a close marriage, and Nagle would play an essential role in the Memorial's development.

Figure 6: Elevated railroad tracks along the levee in St. Louis, c. 1935. (JNEM Archives, Reference Slide Collection).

With the verbal assurances of Ickes and Hopkins, the city proceeded with the bond issue election on September 10, 1935. The bond issue passed and survived immediate legal challenges. Federal funding followed in unusual fashion when on December 21, 1935, President Franklin D. Roosevelt signed Executive Order 7253 permitting the Secretary of the Interior to acquire and develop Jefferson National Expansion Memorial.[19] In order to overcome various political and legal roadblocks, the Executive Order declared the site of Old St. Louis as the location of the Memorial, the country's first national historic site designated under the Historic Sites Act. The Act was a recent (1935) law providing for the preservation of historic sites, buildings, objects, and antiquities of national significance, and providing the Secretary of the Interior broad powers to carry out this policy through the National Park Service. The President's action included the allocation of $3.3 million in WPA funds and $3.45 million in PWA funds for site acquisition.[20]

Between 1936-1939, progress was slow while the JNEMA found themselves dealing with numerous political, financial, and legal delays. John Nagle continued to oversee efforts for the NPS, in June 1936 opening an office in St. Louis as Superintendent of the Memorial, and commencing with various historical and planning studies that were to continue for the next four years. Much activity revolved around complicated matters of land acquisition.

The National Park Service — Planning Studies

NPS studies were initiated with an early proposal for a Museum of American Architecture, and thereafter gained momentum. Most importantly, the NPS brought aboard Thomas E. Tallmadge, FAIA to study the site and comment on the value of certain buildings in the Memorial area. Tallmadge advocated the destruction of all the buildings except the Old Rock House, Old Cathedral, and the Old Courthouse (see figures 7, 8, 9). Tallmadge's report proved vital, as the NPS generally relied on its findings in determining which buildings should be spared demolition. While Tallmadge believed many of the buildings to possess architectural and historical value, he did not find any to be of "outstanding quality." Consequently, he recommended in favor of the preservation of only two buildings in the Memorial area, the Old Cathedral and the Old Rock House.[21] The report also stated that the Old Courthouse (built in 1862) should be included in the Memorial's "great architectural scheme," an idea that received favorable reaction from NPS personnel. Beyond the report's assessment, however, saving and restoring decayed warehouses seemed to lack economic justification during the Depression.

Following the Tallmadge report, the NPS Branch of Historic Sites and Buildings prepared recommendations for the Memorial, consisting of additional requirements for historical research, including detailed analysis of the historic value of buildings in the area, development of an educational program relating the area to the history of western expansion, and development of a temporary historic museum as a step toward the Memorial's permanent development. This report became the basis for NPS work beginning in 1937, which eventually led to further support for demolishing buildings in the Memorial area, as well as the establishment in 1943 of a temporary museum in the Old Courthouse.

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[19]A copy of Executive Order 7253 is on file in the JNEM Archives, Record Unit 104, box 4, folder 21.

[20]This had the effect of reducing moneys contributed from the municipal bond issue which required three dollars of federal funds for each dollar of local funds. See Brown, *Administrative History*, 1-12.

[21]Ultimately the NPS razed all buildings in the Memorial area, except the Old Cathedral, built in 1834, and originally known as the Cathedral of St. Louis of France. The Old Rock House was dismantled for reassembly elsewhere on the Memorial site in order to accommodate construction of the Arch, but it was later determined that the building's integrity rested in the original site and it was not reassembled. The Old Courthouse was saved and incorporated into the Memorial scheme.

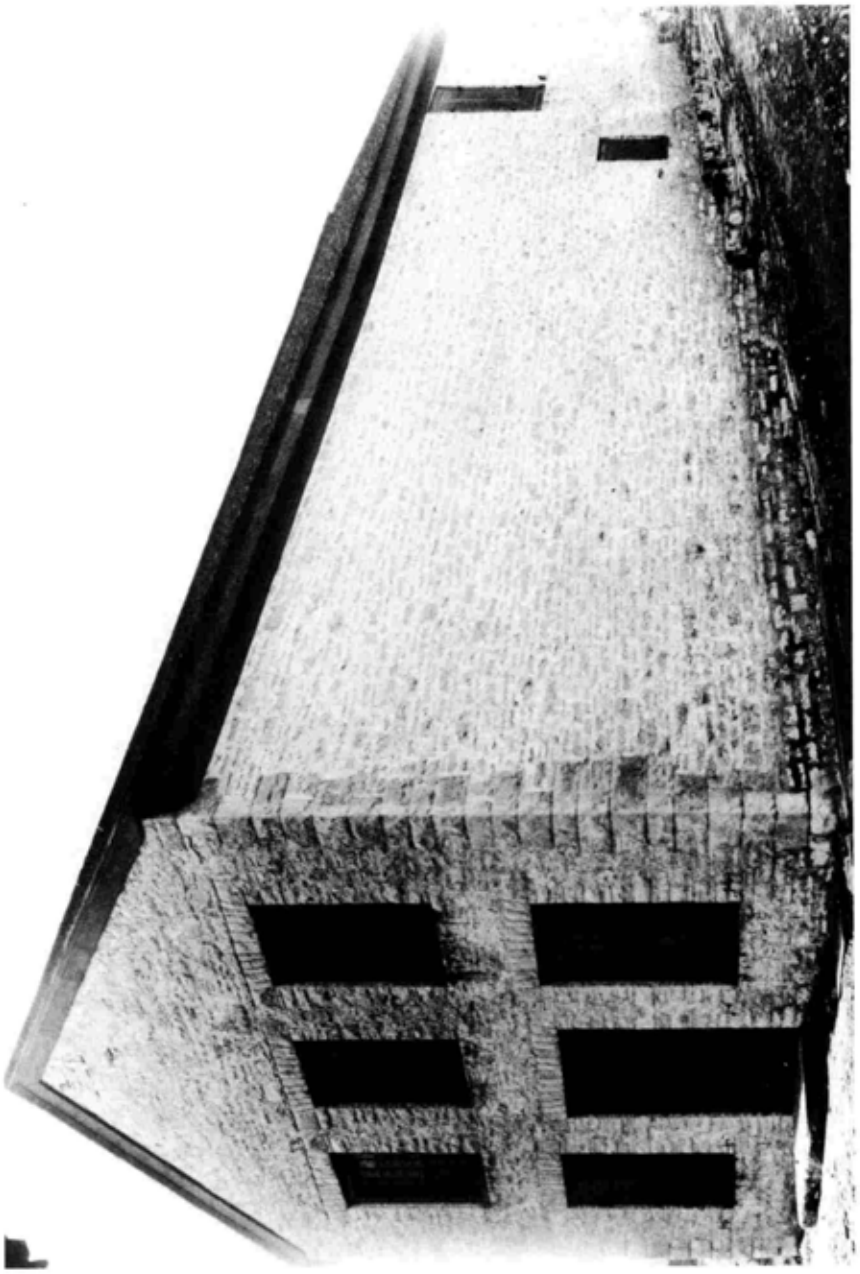

Figure 7: Restored Old Rock House, c. 1943. (JNEM Archives, Visual Image 106-943, Record Unit 106, box 10, folder 7).

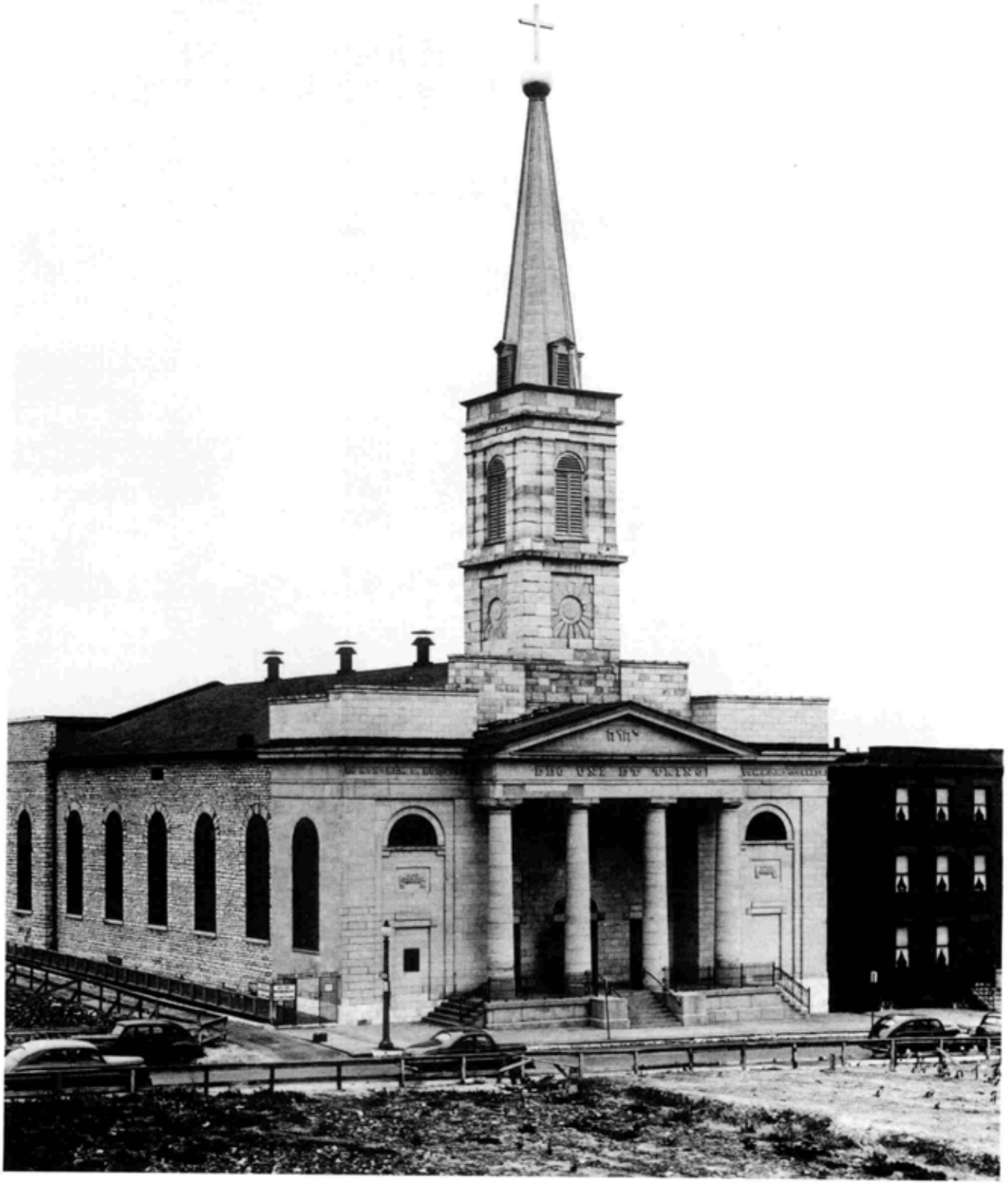

Figure 8: Old Cathedral, c. 1939 (JNEM Archives, Visual Image 106-1436, Record Unit 106, box 9, folder 14).

Figure 9: Old Courthouse, 1939. (JNEM Archives, Visual Image 106-175, Record Unit 106, box 20, folder 42).

Land Acquisition and the Railroad Problem

The process of land acquisition essentially began with filing the first condemnation suits in June 1937, but proceeded slowly. Much of the delay was due to Federal caution and legal challenges to such action. A major hurdle was cleared in January 1939 when the United States Circuit Court of Appeals upheld the validity of the Federal Government's program of land acquisition, allowing the NPS to proceed with condemnation plans. Even so, the start of demolition on site was delayed until October 10, 1939. Moreover, questions remained as to the Memorial's status, project backers uncertain as to whether funding for the project beyond land acquisition and demolition would become available. It seemed that Congress would have to be approached for additional funds.

Of equal concern, the railroad tracks crossing the site posed their first threat to the project when Secretary of the Interior Ickes ruled that no funds would be allocated toward building the Memorial without their removal. Therefore, Superintendent Nagle began immediate negotiations for the removal of the tracks, simultaneously with the process of land acquisition. From the beginning the NPS favored a solution whereby the tracks would be relocated off site. Yet, with three surface and two elevated tracks along the riverfront on the east side of the Memorial site, it would take twenty years to overcome the obstacles posed by their existence.

General Development Principles

With land acquisition progressing slowly through 1938 and questions arising as to the Memorial's justification, planning became more sharply focused on general development principles and defining the underlying idea for the artistic and historical development of the Memorial. Superintendent Nagle's leadership was significant in this regard, defining the major purpose of the Memorial as "to commemorate the westward expansion of the United States with emphasis on the Louisiana Purchase."[22] For Nagle, this meant that the importance of the site and its buildings depended on their relation to national events. Thus, only the Old Courthouse and the Old Cathedral were regarded as worthy of preservation, reflecting the findings of the Tallmadge report and NPS studies.

Nagle's vision also meant that development of the site was to place emphasis on the relationship between the site and the Mississippi River, recognizing the important tie between river and landing in the city's and nation's development. The Memorial's architectural elements were to be symbolic of St Louis' role in westward expansion as the "Gateway to the West," with the architectural elements centering on the east-west axis set by the Old Courthouse, and following the original mall proposal. As for the Memorial grounds, Nagle required a scheme with a maximum of open green space, and any structures built on the site were to exhibit events surrounding the Louisiana Purchase and westward expansion. Finally, these goals were to be realized through a nationwide professional competition seeking the nation's best talent to give architectural expression to the Memorial. The above ideas were reinforced by a series of landscape studies prepared by National Park Service staffers, examining principal site features and compositional ideas.[23] While Nagle's proposals were just that in 1938, they were to become among the strongest influences upon the Memorial project.

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[22]John Nagle in correspondence to Dr. Herman Bumpus, March 3, 1938, as quoted in Brown, *Administrative History*, 36. Dr. Bumpus served as Chairman of the Advisory Board on National Parks, Historic Sites, Buildings and Monuments, established as part of the Historic Sites Act of 1935.

[23]A clay model prepared by the architectural staff of the Memorial reflected early NPS efforts toward directing site planning for the Memorial. Referred to as "Plan 8009", the formally arranged design included extensive open park land, and a centrally placed spire on axis with the Old Courthouse. The plan also retained the Old Cathedral and the Old Rock House, and provided a Museum of American Architecture and a Museum of American Fur Trade.

1940 -1944

Property acquisition and demolition of the riverfront buildings continued until 1942, as did problems and delays (see figure 10). There was a general lack of progress toward completion of the memorial with no specific plans or funding for the Memorial itself. Of course, World War II effectively determined such an outcome, with the entire country focused on the war effort; no domestic Memorial project could feasibly be constructed at such a time. Most crucial, however, the public saw evidence of progress through the process of demolition and grading of the site, and rehabilitation of the few select buildings. By early 1942, all but three buildings were razed from the Memorial area, the Old Rock House, the Denchar Warehouse, and the Old Cathedral (see figure 11).[24] Also of interest, John Nagle resigned as Superintendent of the Memorial to accept a position with the War Department, to be replaced by Julian Spotts, who had served as an advisor on the project.

Figure 10: St. Louis Riverfront after demolition of warehouses, c. 1942. (Photo by Arteaga, JNEM Reference Slide Collection).

[24]The Denchar Warehouse, located at the corner of Second Street and Clark Avenue, was spared demolition for a time and used as a storage space for the architectural remnants saved during demolition for future display in the proposed Museum of American Architecture. When the Museum was eliminated from the development plans the architectural remnants were given to the Smithsonian and other museums and the Denchar Warehouse was razed.

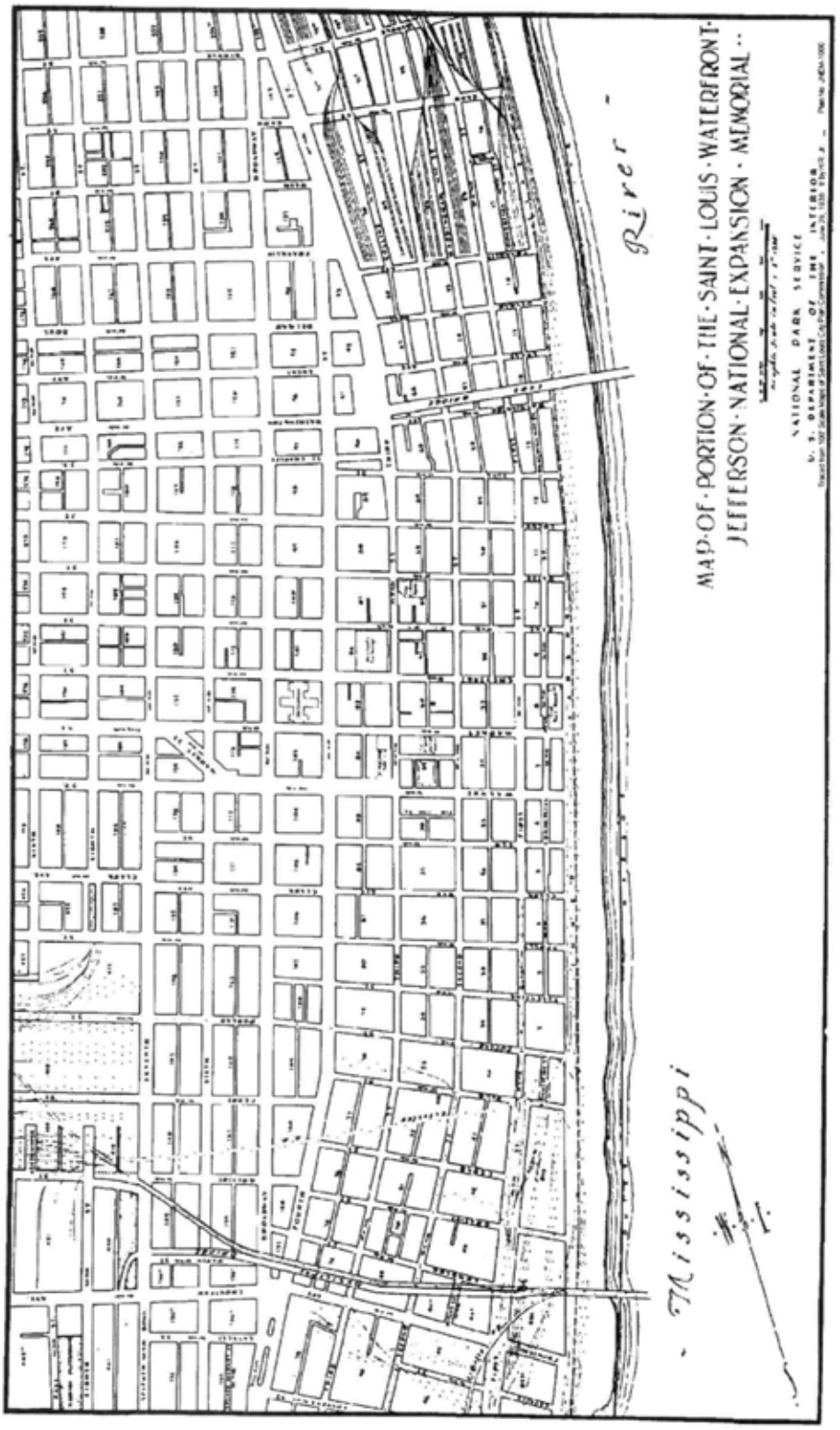

Figure 11: Map of a Portion of the St. Louis Waterfront, 1936. (JNEM Archives, uncatalogued collection).

The Old Courthouse and Other Issues

In addition to demolition, the most important work focused on preservation and inclusion of the Old Courthouse as integral to the Memorial scheme, and continued negotiations to solve the railroad problem. While little progress was made on the railroad problem, the courthouse issue found favor among project backers as evidence revealed that the it played a crucial role in the movement west. Moreover, it was reasserted that President Roosevelt's Executive Order declaring the Memorial a historic site specifically referred to the Old Courthouse. While some Federal officials were reluctant to take possession of the building in its dilapidated state, President Roosevelt approved action to take title. Restoration work allowed the Old Courthouse to open in 1943 as a temporary museum and to house the NPS's St. Louis offices. The museum and the associated exhibit and lecture programs sponsored by the NPS generated additional public interest in the Memorial.

Competition Prelude

After February 1, 1941 the WPA ceased to operate any Federally sponsored projects. This was crucial to Memorial development as its available funds were spent, work relief funds were no longer an option, and further development beyond the completed land acquisition and demolition would clearly rely on future approvals from Congress. Therefore, NPS staff turned their attention toward postwar planning, believing that additional funds would eventually become available. Once again, this meant a reexamination of the Memorial's purpose and theme, with special consideration given to how the Memorial would conform to NPS ideals, particularly its function in interpreting relevant United States history. In fact, questions arose as to the necessity of a new Memorial structure given the historic site designation. Superintendent Spotts, however, saw value in a Memorial, potentially bringing more people into contact with the NPS interpretive work. Likewise, he felt that because the NPS did not have a specific design for the Memorial, the NPS should cooperate with the Jefferson National Expansion Memorial Association's proposed architectural competition.

1945-1948: The Design Competition

The end of the Second World War allowed efforts to focus on the development of a design for the Memorial project; this meant undertaking an architectural competition as originally thought out by the Jefferson National Expansion Memorial Association. The original intent that the Memorial be a $30 million enterprise, meant that following land acquisition and clearance, $20 million were to be expected for improvements to the site. Therefore, JNEMA members desired the best talent available to transform their vision into clear form as demonstrated through drawings and models.[25]

NPS Conditions

This vision was most clear in the mind of civic leader Luther Ely Smith, the man who set the process in motion beginning in 1933. He remained firm in his convictions, expressing his desire for a Memorial "transcending

[25]Brown, *Administrative History*, 79-88.

in spiritual and aesthetic values."[26] His personal view was that these values could best be expressed through one central feature, such as a shaft, building, arch or other construction symbolic of American culture and civilization. Nonetheless, he and the other JNEMA members recognized that their desires would have to be balanced against the needs and ideas set down by the Federal Government.

The JNEMA formally announced a national architectural competition in January 1945, despite the fact that approximately $225,000 had yet to be raised to stage the competition, and that the National Park Service, although favoring the idea, had not officially endorsed the competition. The latter issue was crucial of course, as any design chosen through the competition would have to be approved by the Department of the Interior and the U. S. Territorial Expansion Memorial Commission. Encouraged by Superintendent Julian Spotts, NPS Director Newton Drury indicated that his agency would cooperate in the competition provided that the Memorial carry out the theme of westward expansion with emphasis on the historic significance of the site, and that the proposal include space for a museum. In addition, any design proposal would have to abide by the condition imposed by former Secretary of the Interior Ickes, that the railroad tracks along the Memorial's east boundary had to be removed to reestablish the critical connection between river and site. Finally, the NPS balked at the inclusion of extensive parking as part of the Memorial scheme, an element desired by many downtown St. Louis businessmen who were the primary financial contributors to the architectural competition. Otherwise, Drury felt that the designer should be allowed complete liberty to express the Memorial's theme.

A Competition Advisor

Fund raising spearheaded by Smith progressed slowly, taking two years to raise the money from local sources. However, in August 1946, as fund raising neared completion, Philadelphian George Howe, a fellow of the American Institute of Architects (AIA), was asked by Smith to serve as professional advisor to the competition. Both the NPS and the JNEMA felt that the competition would benefit from a well-known advisor based outside St. Louis; the advisor was intended to give the competition national stature. Howe agreed on the condition that the competition reflect his architectural philosophy.

As a proponent of a modern architectural philosophy, Howe believed that architecture was to reflect contemporary life spiritually and materially rather than mimic historic forms. As regards the Memorial site, Howe emphasized inspirational, educational and recreational facilities that celebrate life in the present above the act of remembrance. As such, he felt that this approach could prove troublesome and warned Smith accordingly.

Regardless of his own concerns, George Howe was confirmed by the Jefferson National Expansion Memorial Association as a professional advisor to the competition, and spent several months writing the terms of the competition. Luther Ely Smith remained influential, guiding the JNEMA throughout the competition proceedings as the organization's president.

The Competition Program

The competition guidelines prepared by Howe closely followed earlier plans for a competition established by the JNEMA, reflecting the contribution of local architect Louis La Beaume. Principally, there were to be two

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[26]Correspondence from Luther Ely Smith to the Jefferson National Expansion Memorial Association, November 4, 1944, as quoted in Brown, *Administrative History,* 81.

stages to the competition, both anonymous; the first stage to eliminate all but a few competitors and the second stage to select a single architect and design. In addition, the competition was open to all architects and practitioners of the allied arts to include sculptors, landscape architects and painters who were citizens of the United States.

Smith and Howe met with NPS representatives in March 1947 to discuss final plans for the competition, at which point differences between local and national intent for the Memorial emerged. In particular, Smith and Howe wished to accommodate an underground parking lot as an element of the competition, while the NPS strongly opposed such a conception as incompatible with the function of a national historic site. Potentially more problematic, the Federal Government expressed concern that local commercial interests were becoming overly influential in the development of a Memorial intended to commemorate significant events in the nation's history. Smith reached a compromise by suggesting that the first stage of the competition remain open to a range of solutions, whereas the second stage could remedy specific problems and disagreements.

The Competition Program drafted by the JNEMA established the rules for submission of a design, and set forth programmatic requirements for a design proposal. These programmatic requirements attempted to satisfy diverse functions while presenting a unified intent for the Memorial:

> (a) an architectural memorial or memorials to Jefferson; dealing (b) with preservation of the site of Old St. Louis — landscaping, provision of an open-air campfire theater, reerection or reproduction of a few typical old buildings, provision of a Museum interpreting the Westward movement; (c) a living memorial to Jefferson's 'vision of greater opportunities for men of all races and creeds;' (d) recreational facilities, both sides of the river; and (e) parking facilities, access, relocation of railroads, placement of an interstate highway.[27]

In this, the program attempted to meet the requirements of the congressionally sanctioned and appointed U.S. Territorial Expansion Memorial Commission, the City of St. Louis, the National Park Service, and the private non-profit Jefferson National Expansion Memorial Association. (For instance, the open-air campfire theater was a standard requirement for every National Park site in 1947.) Thus, its scope was unique in its comprehensiveness and extent, including a consideration of the entire Memorial area and its relation to the adjacent cities of St. Louis and East St. Louis.

The JNEMA also set forth the rules by which a jury composed of seven persons was to select the competition winner and the size of the prize. The identity of competitors was to remain anonymous until the jury completed its work, with decisions reached by secret ballot requiring a majority vote to carry the decision. Just before the competition's scheduled opening on May 30, 1947, it received an important endorsement when the U.S. Territorial Expansion Memorial Commission approved the competition plans.

JNEMA's competition attracted immediate attention among practitioners as the major competition following the war. More than 200 architects who signified their intent to enter received the Competition Program. Three months were allotted within which to submit an entry, the deadline set for September 1, 1947. Ultimately, 172

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[27]This is an accurate summary of the programmatic requirements of the first stage of the competition, from "Jefferson Memorial Competition Winners," *Architectural Record*, v. 103 (April 1948). See Jefferson National Expansion Memorial Association, "Architectural Competition for the National Expansion Memorial, Program" (St. Louis: 1947), 13-24 for the programmatic requirements of the competition. JNEM Archives, Record Unit 104, box 26, folder 2.

entries were received from throughout the country, and on September 23, Howe met in St. Louis with the seven jury members for three and one-half days of deliberations. The jury members were as follows: Chairman William W. Wurster, A.I.A.; S. Herbert Hare, F.A.S.L.A.; Fiske Kimball, F.A.I.A.; Louis La Beaume, F.A.I.A.; Charles Nagel, Jr., A.I.A.; Richard J. Neutra, A.I.A.; and Roland Wank, A.I.A. Although Howe was not permitted to vote, he took part in the deliberations.

The Saarinen Arch (Competition Stage 1)

Among the five finalists chosen from the numbered entries was Design Number 144, an immense arch (see figures 12 & 13). Written comments provided by the jury described a range of reactions.[28] Hare was skeptical as to the practicality of the scheme, while both Wank and Nagel thought the design to be one of considerable merit. In fact, Wank referred to the scheme as "inspired," and Nagel thought the scheme "an abstract form peculiarly happy in its symbolism."[29]

The monumental Arch and grounds were the work of a collaborative design team headed by Eero Saarinen of the firm Saarinen, Saarinen and Associates of Bloomfield Hills, Michigan, a firm well established through the work of Eero's father, Eliel Saarinen. However, the competition provided the younger Saarinen with an opportunity to produce a major work apart from his father. Assisting in this task were J. Henderson Barr, associate architect, Dan Kiley, landscape architect, Alexander H. Girard, painter, and Lily Swann Saarinen, sculptress.[30]

Despite the collaborative nature of the effort, the Arch itself was strictly Saarinen's conception. Underscoring his attachment to the symbolic expression of the Arch form as "Gateway to the West," as the design's essence he pursued a simple expression of form, ultimately settling upon the two-legged Arch following a visit to the memorial site. Saarinen believed the major concern was to create a monument which would have lasting significance and would be a landmark for modern times. He recognized that "an absolutely simple shape — such as the Egyptian pyramids or obelisks — seemed to be the basis of the great memorials that have kept their significance and dignity across time."[31]

In developing this scheme, Saarinen chose the purest expression of the forces acting upon the Arch, a mathematically precise catenary curve in which the thrust forces are directed toward the center of the Arch legs. Built of stainless steel with a concrete core, its materials were to emphasize both a timeless and modern quality. These fundamental components generated the sweeping, upward thrusting character of the Arch, no longer earth-bound and wholly in line with Saarinen's visualization that this should be the tallest of monuments.

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[28]Typed comments of the judges in reference to the five finalists were recorded by the Jefferson National Expansion Memorial Association, JNEM Archives, Record Unit 104, box 29, folder 17.

[29]Ibid. And also, Brown, "Jefferson National Expansion Memorial: The 1947-1948 Competition," in *Gateway Heritage, Quarterly Journal of the Missouri Historical Society - St. Louis, Missouri* (Winter 1980).

[30]Of note, Eliel submitted a competition design as well, and the better known father was mistakenly and rather tragically sent the congratulatory telegram intended for Eero following the first stage competition.

[31]Aline B. Saarinen, ed., *Eero Saarinen on His Work* (New Haven: Yale University Press, 1968), 18.

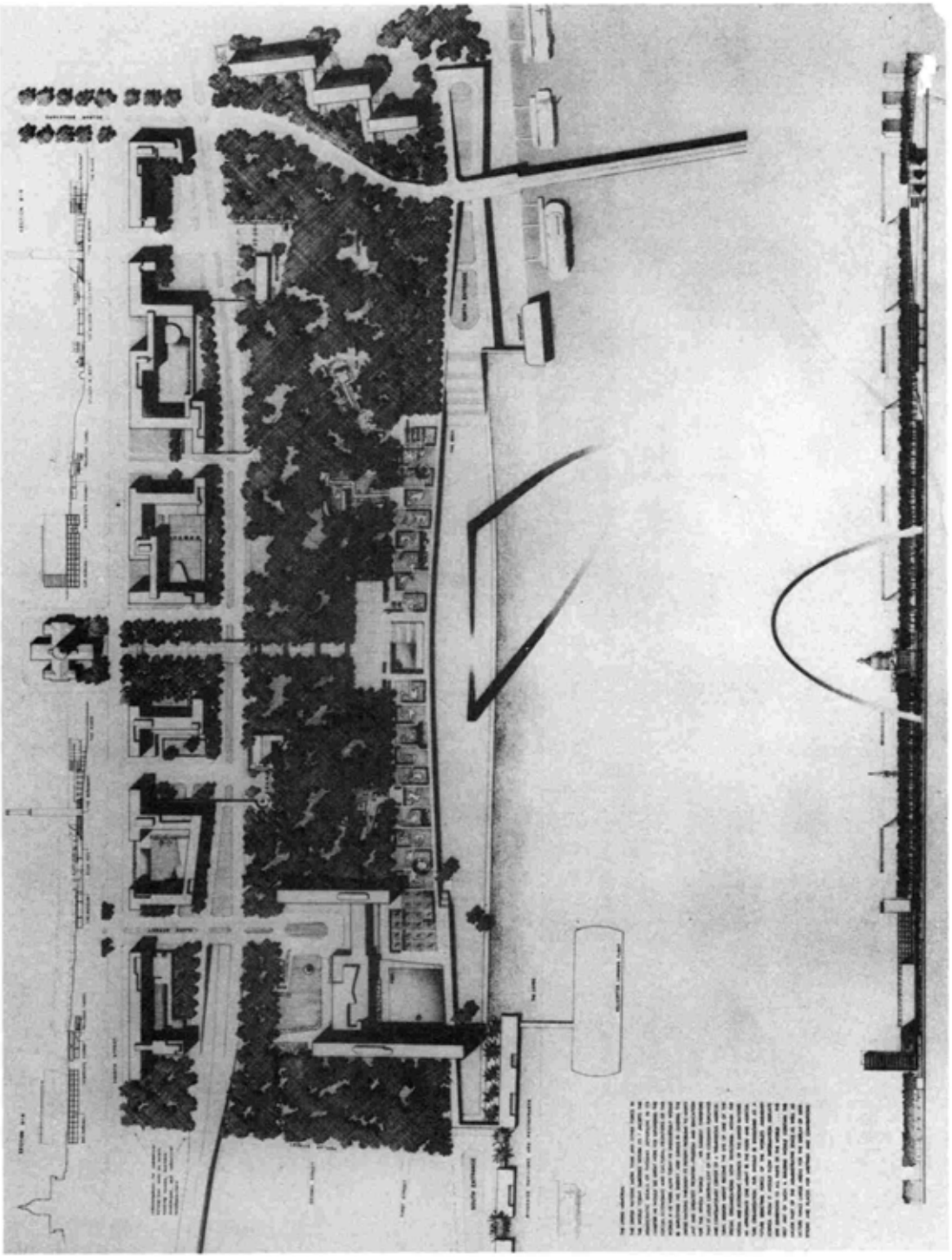

Figure 12: Eero Saarinen's Stage One submission, Plan View, 1947. (JNEM Archives, Visual Image 104-251).

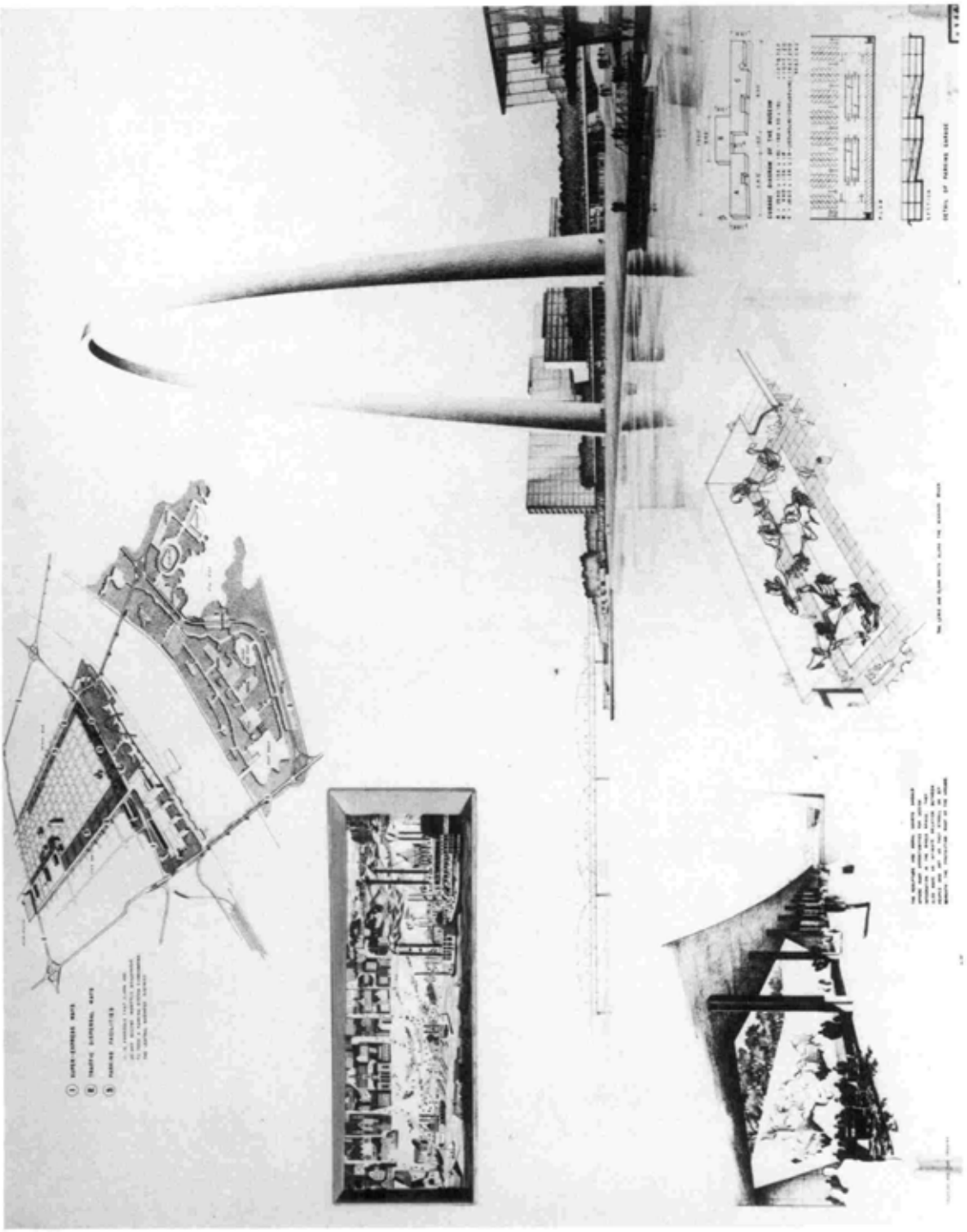

Figure 13: Eero Saarinen's Stage One submission, Perspective View, 1947. (JNEM Archives, Visual Image 104-252).

> Neither an obelisk nor a rectangular box nor a dome seemed right on this site or for this purpose. But here, at the edge of the Mississippi River, a great arch *did* seem right.[32]

Landscape architect Dan Kiley was an especially important member of the design team. Saarinen invited Kiley to work on the first competition entry, the idea for an arch as symbolically important already well established in his mind. Consequently, from the outset of their collaboration, Saarinen and Kiley together wrestled with the Arch's symbolic value and its special relation to the site, seeking a unified conception. Most importantly, the Arch would be the lofty visual center to a park setting and "symbolize the spirit of the whole Memorial."[33] Parallel to the river, with the centerline of the Arch initially placed slightly off-axis to the Courthouse, the Arch nonetheless framed views of the Old Courthouse from the river, creating an immediate connection.

As for the character of the site, Saarinen later commented: "We believed that what downtown needed was a tree-covered park. We wanted to have the most nature possible toward the City."[34] Kiley emphasized that the site should take on the character of a forest zone that one might pass through traveling across the prairie landscape, a forest dominated by one or two tree species, much as he viewed the natural landscape. The simplicity of Kiley's forest was to give majesty to Saarinen's Arch.[35]

Saarinen and Kiley

Saarinen and Kiley first met in 1942 through the great architect Louis I. Kahn, and continued to correspond throughout the war years, beginning their professional relationship in 1945 with a competition for a government center in Quito, Ecuador. Their relationship developed in such a way that Kiley collaborated as the landscape architect on much of Saarinen's most important work, including Jefferson National Expansion Memorial, the Detroit Civic Center, Dulles International Airport, and master planning projects for a number of colleges and major universities. Remembers Kiley, "...Eero asked me to do all his work, for twenty years, and the only time I didn't do it is because the client already had somebody they wanted.... So, Eero and I had a very close relationship."[36]

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[32]Ibid, 18. On this basis, Allan Temko argues that the symbolism of the Arch as "Gateway to the West" was a later realization, and that the immense Arch was derived from the simple notion of a high and permanent form rising from the river's levee. See Allan Temko, *Eero Saarinen* (New York: George Braziller, 1962), 18-19. Temko's argument seems to be the correct one based on a brief commentary written by Saarinen for the *St. Louis Post-Dispatch* (March 7, 1948), JNEM Archives, Record Unit 119, box 10, folder 61: "More and more, it began to dawn on us that the arch was really a gateway, and various friends who stopped to look at what we were doing immediately interpreted it as such. Gradually, we named it the 'Gateway to the West.'"

[33]Aline B. Saarinen, ed., *Eero Saarinen on His Work*, 18.

[34]Ibid. The forest of trees was conceived as the setting for the Arch, but a practical purpose was assigned to the forest as well, the forest as a park. From the Saarinen commentary in the *St. Louis Post-Dispatch* (March 7, 1948; JNEM Archives, Record Unit 119, box 10, folder 61): "We got quite enthusiastic about covering as much of the site with a dense forest, because we had heard many people complain about the heat in St. Louis in the summer. In fact, we were so enthusiastic about this that we wondered whether our chances in the competition would not be greater if we forgot about the arch and just emphasized a great forest."

[35]Mary Hughes, interview with Dan Kiley, June 8, 1991 (transcript on file in the JNEM Archives); Historian Bob Moore, interview with Dan Kiley, July 22, 1993 (transcript on file in the JNEM Archives).

[36]Ibid. Kiley reaffirms this in the interview with Historian Bob Moore, July 22, 1993: "I did all his work, unless the client had a different idea."

The nature of Saarinen and Kiley's relationship is evident in Kiley's remembrance of Saarinen's initial correspondence concerning the Arch, inviting Kiley to join him in preparing a submission for a major competition. The letter was sent to Kiley's New Hampshire residence in what Kiley refers to as "mirror writing"; to be read, the letter had to be held up to a mirror. In fact, Saarinen frequently communicated with Kiley in this manner, revealing a close friendship.[37]

With an affirmative answer, Saarinen and his wife Lily traveled to Kiley's residence in Franconia, New Hampshire to begin conceptualizing and preparing the competition entry. Saarinen arrived with a small sketch of an Arch in hand. For the next week, the two discussed the symbolic value of the Arch and site, and the relation of the Arch to the remainder of the site, all the while preparing more sketches.

> So Eero came up and worked with me for a week in the very, very beginning. My office was a little barn.... And the first thing Eero did when he got there, he took a nap up in the hay. I was amazed how he could just go all of a sudden and nap out of the blue for twenty minutes and then he was fine. So that started the whole thing, and we worked for a week thinking about it and making sketches.[38]

Following the week in New Hampshire, there was another month of intense work at Saarinen's office in Michigan, the other team members becoming more involved. This intensity and rush to generate the competition entry even caused Saarinen and Kiley to work on a single drawing at the same time, an episode which seems to have become a competition unto itself. Beginning at opposite ends and meeting in the middle, Saarinen's proved to be the faster hand.

> I'm left-handed, and Eero started here and I started on this side, and he beat me to the middle, but my claim to fame was I could draw cobblestones like Eero...[39]

Regardless, Kiley's humor provided relief in the Saarinen office, and balanced Saarinen's especially competitive drive.[40]

Preparing for the second stage of the Memorial competition, the atmosphere was equally high-pitched. Kiley again spent considerable time at the Saarinen house in Bloomfield Hills, Michigan, the two working nearly around the clock for a period of four months. "We were delighted to learn that we were one of the five selected for a final competition in 1948. I lived with Eero and Lily Saarinen for four months working all night every night or as Eero put it, 'till we achieved a definite advance."[41] A close collaboration such as that between architect and landscape architect was therefore critical to Saarinen's design approach, but clearly the relationship between Saarinen and Kiley was unusually strong, based on friendship as well as professional circumstance.

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[37]Ibid.

[38]Ibid. Kiley also discussed this episode in the Moore interview, July 22, 1993, and in an interview with Gregg Bleam and Gina Bellavia, July 28, 1995 (transcripts on file in the JNEM Archives). The Moore interview confirms that Saarinen already had the idea for the Arch when he arrived in New Hampshire.

[39]Hughes interview with Kiley, June 18, 1991. A similar comment is made in Gregg Bleam's interview with Kiley, July 28, 1995.

[40]In the Hughes interview, Kiley discussed the atmosphere in the Saarinen office while preparing for the first stage of the competition. "And through it there was lots of joking...and I kept Eero's office, you know, always having fun." Also: "...everybody was so intense, and I kept making funny cracks all the time all through."

[41]Dan Kiley, "Jefferson National Expansion Memorial," in *Landscape Design: Works of Dan Kiley, Process Architecture, No. 33* (October 1982), 109.

That Saarinen found value in the relationship between architect and landscape architect might best be distilled from a lecture given a number of years later at Dickinson College in 1959:

> The conviction that a building cannot be placed on a site, but that a building grows from its site, is another principle in which I believe. I see architecture not as the building alone, but the building in relation to its surroundings, whether nature or man-made surroundings. I believe very strongly that the single building must be carefully related to the whole in the outdoor space it creates. In its mass and scale and material it must become an enhancing element in the total environment. Now this does not mean that the building has to succumb to the total. Any architecture must hold its head high. But a way must be found for uniting the whole, because the total environment is more important than a single building.[42]

Here was direct evidence that Saarinen carried forth his father's philosophy in the Scandinavian tradition of creating an architecture that benefited from a reciprocal relationship with the landscape, and reflected in the memorial design. And, from the same lecture:

> Unlike painting and sculpture, where the individual works entirely alone, architecture involves many people. It is true that it all has to be siphoned through one mind, but there is always teamwork.[43]

The design of Jefferson National Expansion Memorial proves Saarinen's to be the "one mind" through which "it all has to be siphoned," but without a doubt Kiley was a key member of the team.[44] As Kiley's role developed, he focused on the preparation of the planting plan, which both he and Saarinen considered essential to the Memorial's total development, a fitting setting and complement to the Arch. Certainly, the original conception was for the Arch to rise from a forested, park-like setting, and the architect and landscape architect never deviated from this ideal.

Program Changes

With the completion of the first stage of the competition, and the selection and announcement of five designers, Howe drafted a second stage addenda somewhat redefining the nature of the problem. Giving weight to NPS concerns, the railroad tracks along the riverfront were to be thought of as removed or placed underground, and that any underground components of the design such as a parking garage were not to affect the surface design. The addenda also called for a transformation of the site into a shaded park with an open view between the levee and the Old Courthouse, although the designers were no longer required to consider a specific redesign of the levee, and were now fundamentally confined to the area between the levee and the city. Finally, the architectural memorial was to be considered as "essentially non-functional," an appealing and

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[42]Aline B. Saarinen, ed., *Eero Saarinen on His Work*, 6. Kevin Roche, a partner in Saarinen's firm, offered the following insight: "So in Eero's work right from the start—the St. Louis Competition, where Dan [Kiley] was a part of the winning team, and Dan's landscape—Eero himself was very interested in site planning and in site design and in landscaping as an idea for siting a building. It wasn't that he was an avid landscaper in the sense of knowing how or what tree should be used where, but in a compositional sense..." Kevin Roche, interview with Gregg Bleam, June 30, 1992 (transcript on file in the JNEM Archives).

[43]Ibid, 10.

[44]Along this line of thought, Kevin Roche stated in his interview with Gregg Bleam, May 1, 1995 (transcript on file in the JNEM Archives): "He [Eero] had very tight control over the whole thing, but...he would certainly listen to what Dan [Kiley] had to say and so it was a collaboration."

notable structure visible from a distance. Both the Director of the National Park Service and the Assistant Secretary of the Interior gave their approval to the above requirements. As a result, most of the competitors were required to rethink their schemes.[45]

A deadline of February 10, 1948, was established for submittal of the final competition entries, with an awards dinner scheduled for February 18 to announce the competition winner. All five finalists submitted their entries by the deadline, and a week later the jury met for final deliberations. Upon meeting, Chairman William Wurster read important sections of the Competition Program to remind the jury of their charge, and George Howe affirmed that the Memorial should have a striking design and character.

The Competition Winner (Competition Stage 2)

After reviewing the entries the jury took a test ballot, and Design Number 144 won every vote (see figure 14). No further balloting was necessary; the proposal submitted by Saarinen's design team had been chosen the winner of the competition. Significantly, the addenda to the Competition Program did not change Saarinen's conception of a monumental arch in a park-like setting, a conviction which won favor with the jury.

The final report of the jury of award described the competition winner and the jury's assessment. It described some of the main features of the design included with the Arch, such as an "arcade" to feature sculpture and paintings to tell the story of westward expansion, a theater and pioneer village re-creation to augment NPS interpretive goals, as well as two museums, one architectural and the other historical. Also clear in this discussion was the intentional relationship between the grand Arch, the memorial site, its subsidiary elements, and the connections to adjacent community and surroundings (see figure 15).

> This entry placed in the First Stage, for it contains intrinsically the very features aspired to by the Program...a memorial, a park, balanced harmony and fine grouping of buildings. The success of the plan does not depend upon the carrying out of a suggested collaboration of communities on the eastern bank of the Mississippi though it suggests to the full the advantages of such a possibility.
>
> The Second Stage resulted in an enriched and improved plan with no diminution of any of its initial excellencies. It tends to have the inevitable quality of a right solution. The monument suggests the historic past of St. Louis as the Gateway to the West. It is large in scale, yet does not dwarf other structures, and by its very form is sympathetic with the Courthouse dome. The use of the Manuel Lisa Warehouse as an entrance to the Memorial is a peculiarly happy instance of the brilliant effect to be gained by the occasional close juxtaposition of old and new.

[45]Jefferson National Expansion Memorial Association, "Jefferson National Expansion Memorial Competition, Second Stage Addenda to the Program," 2. JNEM Archives, Record Unit 104, box 29, folder 19. The "Second Stage Addenda" certainly seemed to favor the Saarinen team proposal. From the Addenda: "In general, the Site is to be treated as a tree-shaded park, sloping down to the river, with an open vista from the Old Courthouse to the Levee. The architectural Memorial may be placed near its boundaries rather than towards the center."

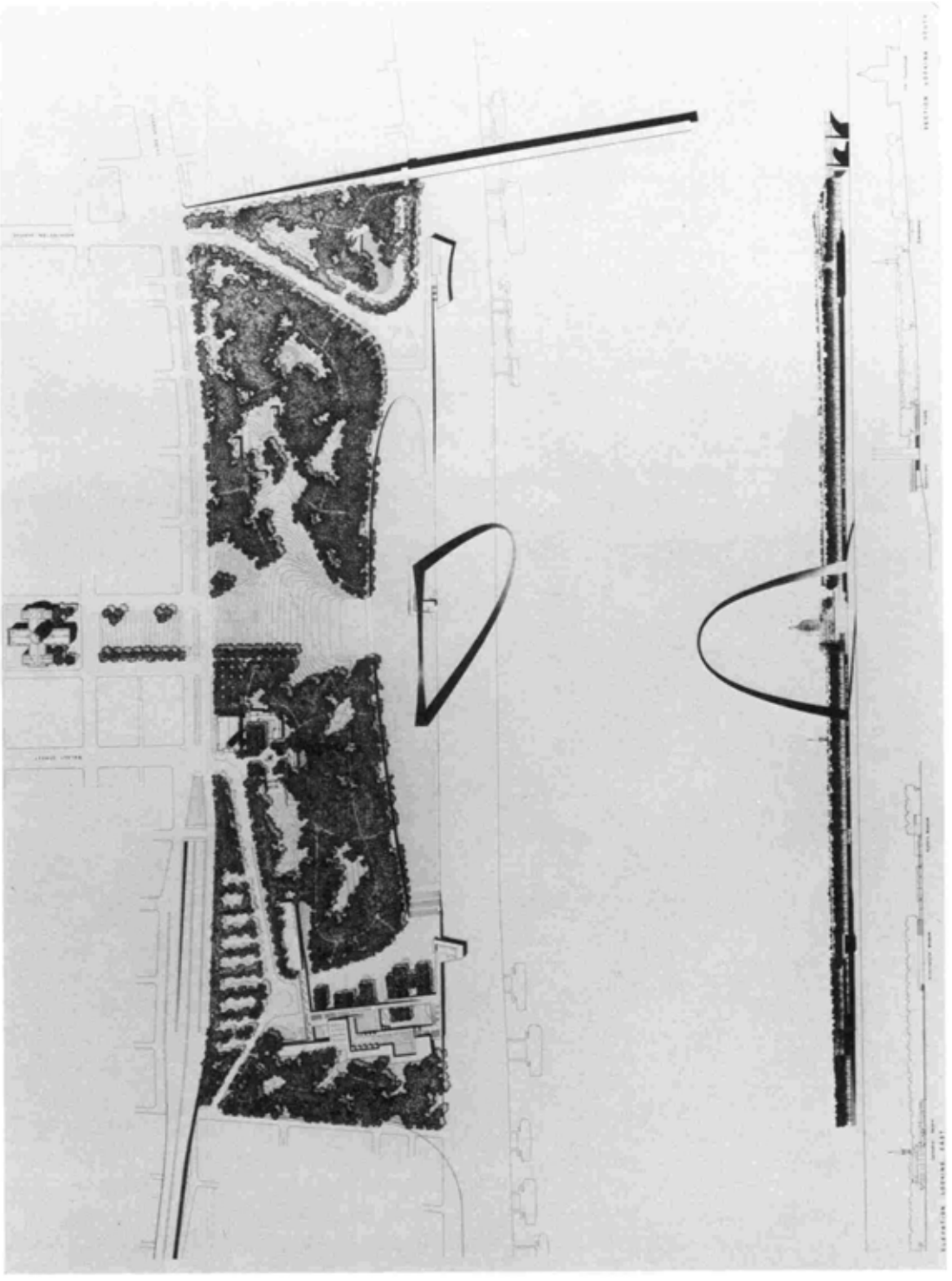

Figure 14: Eero Saarinen's winning competition entry, Plan View, 1948. (JNEM Archives, Record Unit 104, unnumbered).

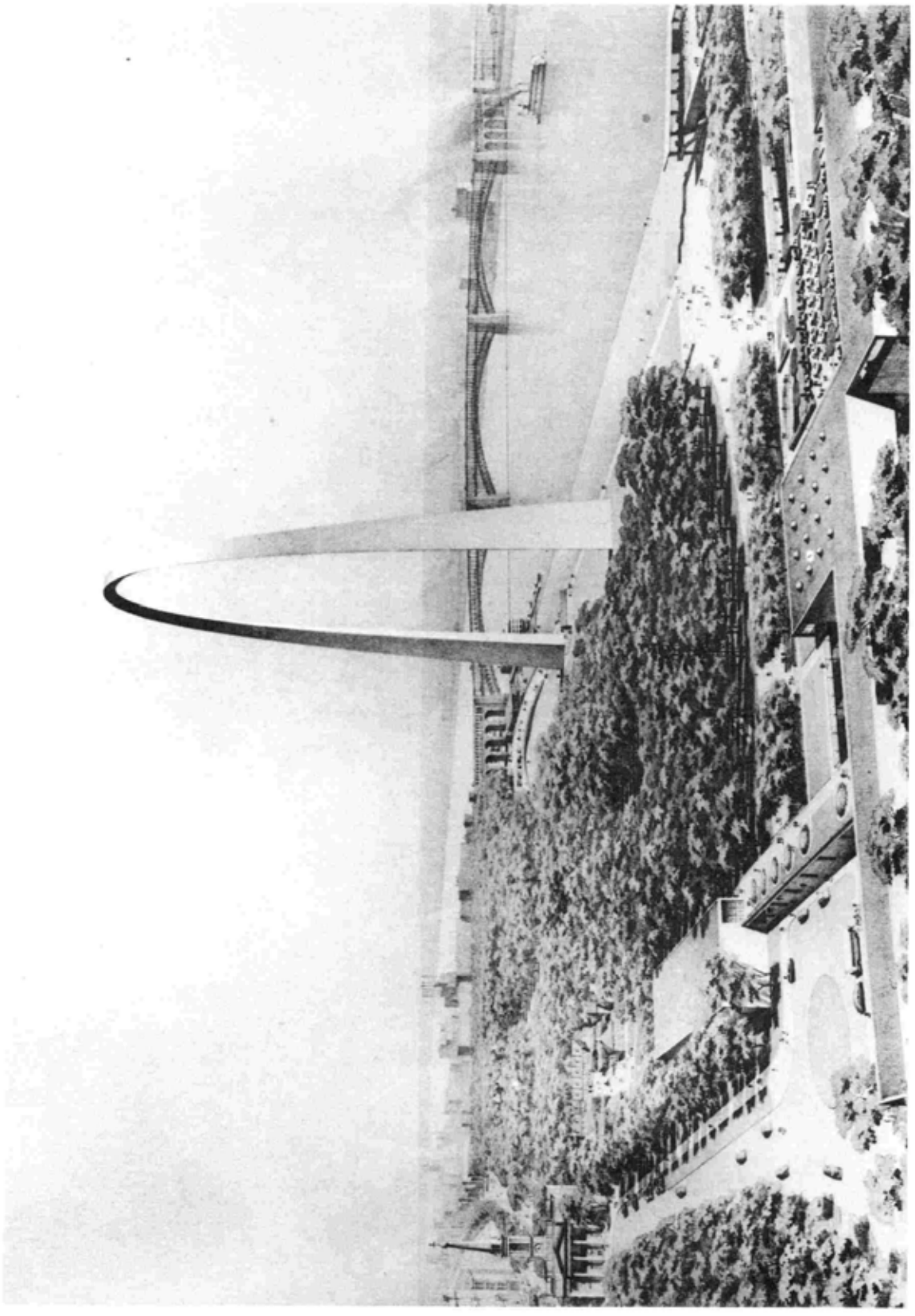

Figure 15: Eero Saarinen's winning competition entry, Perspective View, 1948. (JNEM Archives, Visual Image 104-321).

> The park gives promise of shade in the warm season. The treatment of the roadways is an effective guard against traffic intrusion. The approach to the Old Cathedral and its adjacent dependencies ensures a proper setting for that dignified structure. The treatment of sculpture commemorating historical episodes is particularly engaging as it gradually unfolds along the levee edge. A frontier village in the wooded area recalls the flavor of the time of the Western Expansion. Restaurants on either end afford vistas of the Memorial area and the Mississippi. Feature by feature a masterful plan reaches desired fulfillment.
>
> The entire concept, full of exciting possibilities for actual achievement, is a work of genius, and the memorial structure is of that high order which will rank it among the nation's greatest monuments.[46]

Perhaps such a viewpoint, cognizant of the entire concept, could not be avoided. J. Henderson Barr, the Associate Architect, produced a series of about 100 color sketches for the Final Stage study, illustrating the design impact of the monumental Arch from viewpoints around the compass and over the course of the day. The rendering chosen for the Competition entry dramatized the Arch, but also showed old and new structures, including St. Louis' historic Eads Bridge (see figure 15).[47]

Reaction

When renderings of the Saarinen proposal first appeared in the press, they provoked a range of commentary on the project. The *New York Times* called the Arch "a modern monument, fitting, beautiful and impressive."[48] The architectural press also reacted positively. By contrast, many locals referred to the Arch as a "stupendous hairpin and a stainless steel hitching post."[49] Nonetheless, the most volatile criticism came from Gilmore D. Clarke, a landscape architect and Chairman of the National Commission of Fine Arts. In a letter to jury Chairman Wurster, Clarke charged that Saarinen's design for the Arch too closely resembled one approved by Italian Dictator Benito Mussolini for a Fascist exhibition in Rome in 1942. For this reason, he felt that the Arch could not symbolize Jeffersonian Democracy.[50]

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[46]"Final Report Of The Jury Of Award to the Professional Adviser on the First and Second Stages of the Jefferson National Expansion Memorial Competition," JNEM Archives, Record Unit 104, box 29, folder 16.

[47]"Competition: Jefferson National Expansion Memorial," in *Progressive Architecture* (May 1948). The article also describes how the team studied the proposed contours of the site in a clay model to create a free flow among the various design elements.

[48]Aline B. Louchheim, "For A Modern Monument: An Audacious Design", *New York Times*, February 29, 1948. Copy on file in the JNEM Archives, Record Unit 119, box 10.

[49]"Big 'Hairpin' Memorial Leaves St. Louis Cold," *Akron Ohio Beacon Journal*, February 27, 1948. Copy on file in the JNEM Archives, Record Unit 119, box 10.

[50]Brown, "Jefferson National Expansion Memorial: The 1947-1948 Competition" in *Gateway Heritage*, discusses the reaction to the competition winner, including the Clarke controversy. See the following sources for the response of the architectural press: "Jefferson National Expansion Memorial Competition Winners," in *The Architectural FORUM*, v. 88 (March 1948); "Jefferson Memorial Competition Winners," in *Architectural Record* (April 1948); and "Competition: Jefferson National Expansion Memorial," in *Progressive Architecture* (May 1948). Also, a brief discussion of the Clarke controversy may be found in "St. Louis Selects Modern Design," in *Art News*, v.47 (March 1948). This article points out that the "Fascist" arch was never executed, and was designed with a semi-circular form.

The Gilmore controversy attracted national attention. While Saarinen thought the objections ridiculous, Wurster took the charges quite seriously and with other members of the jury drafted a rebuttal which finally ended the controversy.[51] Their reply stressed the historic and modern usage of the arch as an architectural form, and that it was clearly not a fascist invention. In reference to Saarinen's Arch, they reiterated the suitability of its symbolism as the Gateway to the West. For his part, Saarinen claimed that his Arch was based on mathematical principles. "It's just preposterous to think that a basic form, based on a completely natural figure, should have any ideological connection."[52]

With the passing of the initial praise and criticism, the United States Territorial Expansion Memorial Commission unanimously adopted a resolution in May 1948, approving the selection of the Saarinen team's design, and recommending to the NPS and the Secretary of the Interior that Saarinen be selected as architect for the Memorial's development and construction. Meanwhile, Saarinen forged ahead on the project, working without a contract. Concerned that the proposal become a reality, Saarinen began engineering studies on the Arch itself, and proceeded to deal with the unresolved problems of parking and the relocation of the railroad lines crossing the site. Working with William Wurster he also developed objectives for special zoning in the area adjacent to the Memorial site, wishing to ensure that future development not interfere with his vision of the Memorial as a unified whole.

In October 1948, Secretary of the Interior Julius Krug and National Park Service Director Newton B. Drury gave general approval to the competition's winning design and awarded a contract to Saarinen for preliminary work. With a definite design proposal the Memorial appeared ready for the next step in its development. Yet, appropriations for construction of the Memorial required Congressional approval, and funding remained in danger until the railroad problem could be solved. Optimism over the project still ran high. To Luther Ely Smith, who resigned as president of the Jefferson National Expansion Memorial Association within months of the competition's completion, Saarinen's design was the fulfillment of his dream for a Memorial. At the awards dinner honoring the competition winner, Smith displayed his gratitude: "We are still breathless at the vision you have opened up for us by your marvelously fine design. The more we gaze upon it the more wonderful and gripping it grows."[53] Unfortunately, Smith died on April 2, 1951, well before the Memorial's completion.

1949-1956: Railroad Problem

Despite progress achieved through the competition and the legitimacy bestowed on the project through President Truman's dedication of the Memorial site on June 10, 1950, problems continued to surface that delayed further advancement of the project for several years. A major obstacle was once again armed conflict. With the outbreak of the Korean War in June 1950, international matters held the attention of Congress and

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[51]"Winning Arch Not Fascist Invention, Says Award Jury," *St. Louis Post-Dispatch*, March 14, 1948. Copy on file in JNEM Archives, Record Unit 119, box 10.

[52]"Arch That Triumphed Attacked As Like One Mussolini Approved," *St. Louis Post-Dispatch*, February 26, 1948. Copy on file in the JNEM Archives, Record Unit 119, box 10.

[53]Brown, "Jefferson National Expansion Memorial: The 1947-1948 Competition," in *Gateway Heritage*. A letter written from Smith to Saarinen, dated June 3, 1948, stated: "It was your design, your marvelous conception, your brilliant forecast into the future, that has made the realization of the dream possible—a dream that you and the wonderful genius at your command and the able assistance of your associates are going to achieve far beyond the remotest possibility that we had dared visualize in the beginning. Please accept again our profound gratitude." (Copy on file in the JNEM Archives, uncatalogued collection).

the President until late 1953, and as a result postponed Congressional authorization and appropriations for the Memorial. Therefore, although Saarinen and Kiley made progress in their production of working plans for the Memorial, no improvements were completed on the physical site itself. In fact, much of Saarinen's work revolved around finding a workable solution to the relocation of the railroad tracks crossing the site, a problem which continued to haunt the project.[54]

The "Saarinen Vista"

By the end of 1949, a solution to the railroad and parking problems looked quite hopeful, but the year did not begin with such expectations. A necessary condition was major compromise, requiring movement from positions firmly held by interested parties. On the one hand, the railroads had indicated earlier in the year that they would object to placing the railroad tracks underground because the potential costs seemed unlikely to be borne by the Federal government. On the other hand, the National Park Service was adamantly opposed to any location which visibly placed the rail lines between the Memorial site and the river. Additionally, the NPS remained opposed to any on-site parking other than that essential to the operation of the Memorial. Meanwhile, Saarinen stated that he did not wish to be the architect for the project if the tracks separated the Memorial from the river (see figure 16).[55]

Saarinen initially held to his position for the very reason that the visual line from the river through the Memorial to the courthouse was so critical to his conception. This line both tied the courthouse to the Memorial site and brought the river into the composition. The idea of connecting the river with the Memorial was especially important and caused the Arch to be placed along the levee in close proximity to the river, thereby recognizing the influence of the river in the history of westward expansion:

> The arch was placed near the Mississippi River, where it would have the most significance. Here it could make a strong axial relation with the handsome, historic Old Courthouse which it frames. Here, from its summit, the public could confront the magnificent river. The arch would draw people to the superb view and picturesque activity at the river's edge. The museum, the restaurant, the historic riverboats were all projected on the levee. The river would be drawn into the total composition.[56]

Thus, the visual line was also intended to draw the movement of people from the summit of the courthouse down to the activity planned for the riverfront. In fact, the "Second Stage Addenda" to the Competition Program required a vista from the Old Courthouse to the river, although the Saarinen concept featured this sight line already in the first stage competition proposal, further suggesting its importance to the scheme. Maintaining the "Saarinen vista" would therefore guide the initial agreement for siting the railroad tracks, although not without compromise on the part of Saarinen.

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[54]Brown, *Administrative History*, 94-114.

[55]Ibid, 94.

[56]Aline B. Saarinen, ed., *Eero Saarinen on His Work*, 18. Although this quote is taken from a January 1959 statement by Saarinen on the Memorial project following the extensive redesign in 1957, the quote discusses the intent and design of the original concept for the Memorial's relation to the Old Courthouse and the river.

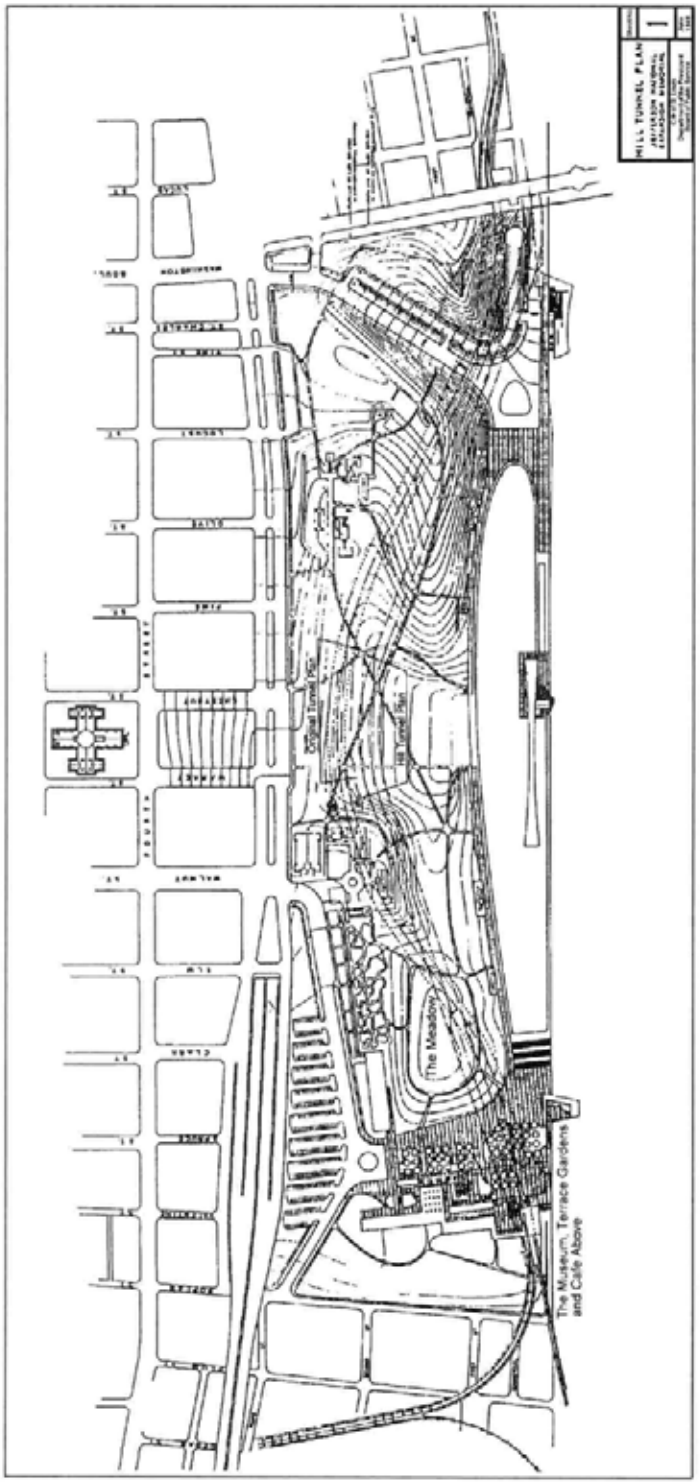

Figure 16: Eero Saarinen & Associates, Early Railroad Study, 1949. (JNEM Archives, uncatalogued collection).

A Railroad Tunnel

A new concept for the rail lines was presented in June 1949, by which the lines were to be lowered and placed in a cut immediately in front of the Arch, the cut to be shielded by retaining walls and landscaping. Labeled the Levee-Tunnel Plan, the proposal was backed by the city and the railroads. Saarinen initially objected in favor of his own idea for placing the tracks in a tunnel farther removed from the riverfront, but recognizing the strength of support for the Levee-Tunnel Plan, he reluctantly worked with the idea, while at the same time suggesting changes to make the plan more aesthetically acceptable. This was the first step toward resolution, and emerged as a strong influence upon the final treatment of the track relocation problem.

Frustrated by the lack of definitive progress, the various groups vitally interested in the Memorial's completion met in early December to resolve the uncertainties associated with the project, especially the railroad and parking controversies. The urgency attached to the meeting was based on knowledge that the necessary Congressional authorization and appropriations would require prior resolution of these matters.

In response, the parties consented to a "Memorandum of Understanding," requiring the relocation of the existing surface and elevated railroad tracks based on a revised plan by Saarinen, and also including provisions for underground parking and above ground parking for the city. The Saarinen plan for the railroad lines reflected the compromise position of the groups involved, placing the tracks in a tunnel near the Arch and close to the alignment of the existing elevated railroad tracks. Initially placed on the west side of the Arch, Saarinen shifted the tunnel to a location between the river and the Arch in order to allow the existing elevated tracks to operate during the Memorial's construction. This approximated the eventual location of the relocated tracks, and was further evidence of Saarinen's willingness to compromise on the railroad issue.

The Secretary of the Interior approved the "Memorandum of Understanding," but the tunnel proposal required special approval from the Missouri Public Service Commission for deviations in design standards. A lower than otherwise acceptable tunnel height proved necessary, for there were physical limitations as to how far the tunnel could be depressed, and to raise the tunnel would unacceptably negate the "Saarinen vista." The Public Service Commission eventually gave their approval for the lower tunnel in August 1952. Even so, by early 1950 Memorial backers presented a united front to key members of Congress, pressing for immediate Congressional authorization, all the while fearing the project's demise. Unfortunately, the advice from Congressional insiders was to abandon such efforts as inappropriate during the Korean War effort.

Preliminary Office Work

Without Congressional approval and Federal funds for construction, efforts focused on project planning and office work. By January 1951, Saarinen had completed much of the preliminary work under his contract, an extensive set of drawings, including profile and structural drawings for the Arch, scale drawings of the museum and restaurants to be located on-site, and various layout and engineering studies for the proposed railroad tunnel. The engineering firm of Severud, Elstad and Kruger provided structural calculations for the Arch, based on wind tunnel tests of an Arch model.[57] It was the railroad issue, however, that occupied much of Saarinen's time, as completion of preliminary work on the railroads was seen as necessary for eventual Congressional authorization.

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[57]See Brown, *Administrative History*, 104-105.

Because work focused intensely on resolution of the railroad problem, as well as the structural integrity of the Arch, Kiley's role was rather limited from the waning days of the competition up to 1957. In the meantime, he began research for the planting plan, already looking to the Missouri Botanical Garden in St. Louis for information on plants appropriate to the region.[58]

Beyond its role in working to resolve the railroad and parking dilemmas, the NPS also continued its involvement in the planning of the Memorial. Specifically, they found it necessary at this stage to coordinate the NPS' prewar planning with the Saarinen proposal. While accepting Saarinen's space allotments for a proposed western museum and museum of architecture, they objected to that part of the winning concept that featured the frontier and cathedral villages of reproductions of early St. Louis buildings. Eventually, cost and other design constraints altered the Saarinen plan for use of the grounds to more closely follow NPS goals.

1953-1956

The Louisiana Purchase sesquicentennial in 1953 brought renewed public attention to the Memorial project, as did other events. Some of this attention grew out of downtown St. Louis' parking problems; approximately 3,500 motorists routinely used the cleared memorial site for a parking lot (see figure 17). More positively, extensive restoration of the Old Courthouse, beginning in 1954, kept the Memorial in the public's mind. Amid all this public recognition of an unfinished project, and the end of the Korean War, new efforts were made to win Federal authorization and appropriations.

Unfortunately, funding for the project was delayed: this time the Department of the Interior and other project backers were informed that appropriations would have to wait until the national budget could be balanced in the aftermath of the war. Nonetheless, a 1954 bill provided authorization for the spending of not more than $5 million in Federal funds on the Memorial project. Although no funds were immediately appropriated through this authorization, and although it restricted the expenditure of Federal funds on the Arch itself, the authorization provided an indicator that Congress would follow through with plans to construct the Memorial. Moreover, project proponents remained optimistic for a balanced national budget.

Because extensive funding could not yet be secured, apparent physical work on the Memorial was limited to rehabilitation of the Old Courthouse. Although the NPS had maintained the Old Courthouse since 1943, much of the structure remained unrestored and even hazardous, including the building's rotunda and west courtroom which were in severe deterioration. To correct these problems, a comprehensive restoration program was begun in 1954 and carried on through 1956. In addition to structural improvements, much of the work was cosmetic, allowing restoration of the mural paintings in the rotunda, and a coat of white paint for the building's exterior.

Defining Kiley's Role

Optimism and expectancies again surged when in January 1956, President Eisenhower announced the prospect of a balanced budget for 1957. The more immediate result was a partial appropriation of $2.64 million dollars toward the relocation of the railroad tracks. Still, many were concerned that there be an additional authorization of funds to include the Arch structure. This would have to wait until 1958.

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[58]Dan Kiley to the Missouri Botanical Garden, January 26, 1949. Copy on file in the JNEM Archives, uncatalogued collection.

Nonetheless, anticipating renewed progress on the memorial project, Saarinen wrote Kiley on August 6, 1956, updating him on the project: "... you and I should get together to reevaluate the design, placing of the Arch, the whole plan." Clearly, he still considered Kiley's work essential and integral to the project. In an accompanying memo also intended for his design associates, Saarinen outlined the anticipated scope of work under a series of contracts with the NPS, citing Kiley's role in the need for "finished site plan work and landscaping." Saarinen closed out the letter to Kiley with the following message: "I may be optimistic but it really looks as if sometime within the not too distant future you will be sitting on the steps of the Manuel Lisa Warehouse with your cigar supervising trees coming down the river in barges."[59]

Figure 17: Memorial grounds used for municipal public parking, 1961 (Photo by Arteaga; JNEM Archives, Visual Image #106-4200).

[59]Eero Saarinen to Dan Kiley, August 6, 1956. Copy on file in the JNEM Archives, uncatalogued collection. The accompanying memo is also dated August 6, 1956.

1957: Saarinen and Kiley's New Vision

On May 16, 1957, delegates to the AIA Centennial Convention in St. Louis unanimously adopted a resolution urging Congress to take necessary action to complete the Memorial in accordance with the plan adopted by the United States Territorial Expansion Memorial Commission on May 25, 1948. The AIA spoke out in response to a renewed threat to the Memorial; the railroad problem aggressively reemerged to ultimately force a major reconsideration of Saarinen's proposal.[60]

The previous year National Park Service and railroad interests had jointly hired a Chicago-based engineering firm, Alfred Benesch and Associates, to study the cost of relocating the tracks. Controversy erupted when the final report was issued on May 3, 1957, and went beyond the requested scope of work, offering an opinion against removing the tracks because of the high cost associated with tunneling or otherwise lowering the tracks. Saarinen and the American Institute of Architects immediately denounced the idea, and it was made known by project supporters that the engineer was heavily biased toward the rail interests. NPS Director Conrad Wirth addressed the need for additional negotiations, and subsequently asked Saarinen to study design changes. The NPS response to the Benesch Report depended on what adjustments Saarinen could make to his design while at the same time minimizing the relocation of the rail lines.

Revised Plans

The summer of 1957 was spent reworking the plans (see figure 18) and by October the revisions were complete (see figure 19). Saarinen concluded that the competition plan was unworkable in the face of the railroad controversy, and he was highly intent on seeing his majestic Arch constructed.[61] Moreover, an impending bridge with interstate highway connections to be located at the Memorial site's southern edge was expected to reduce the site to about 70 acres.

The new scheme provided for the railroad tracks through an open cut and partial tunnel configuration still proximate to the existing elevated lines, but reduced the depth by which the tracks were to be lowered. So as not to separate the Arch from the river, a grand staircase was to rise over and bridge the tracks from the river levee to the monument. Yet, the "Saarinen vista" was lost. While the Arch was positioned in stronger axial relation to the Old Courthouse (the Arch no longer slightly off-axis), the plan abolished the unobstructed sight line from the Old Courthouse to the river, or for that matter, from the Arch to the river (see figure 20). Other components of the design were also altered, for instance, abandoning the Museum of Architecture and the village-like reproductions of early St. Louis buildings. For the first time, however, lagoons appeared on the site plan as features embedded in the forest setting.

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[60]Brown, *Administrative History,* 113-116.

[61]John Peter, *The Oral History of Modern Architecture: Interviews with the Greatest Architects of the Twentieth Century* (New York: Harry N. Abrams, Inc., 1994), 199. From a 1958 interview with Saarinen: "I'm terribly interested in Jefferson [National Expansion Memorial]. That one I would like to build more than anything else. As you know, we have now come to an agreement with the railroad, so that if Congress says yes to the whole thing we may go ahead. I would very much like to build this stainless-steel arch and the whole park." Saarinen's partner Kevin Roche also stated in an interview with Gregg Bleam, May 2, 1995 (transcript on file in the JNEM Archives): "He was anxious to get it going—it was his most identifiable [project] and the highlight of his career."

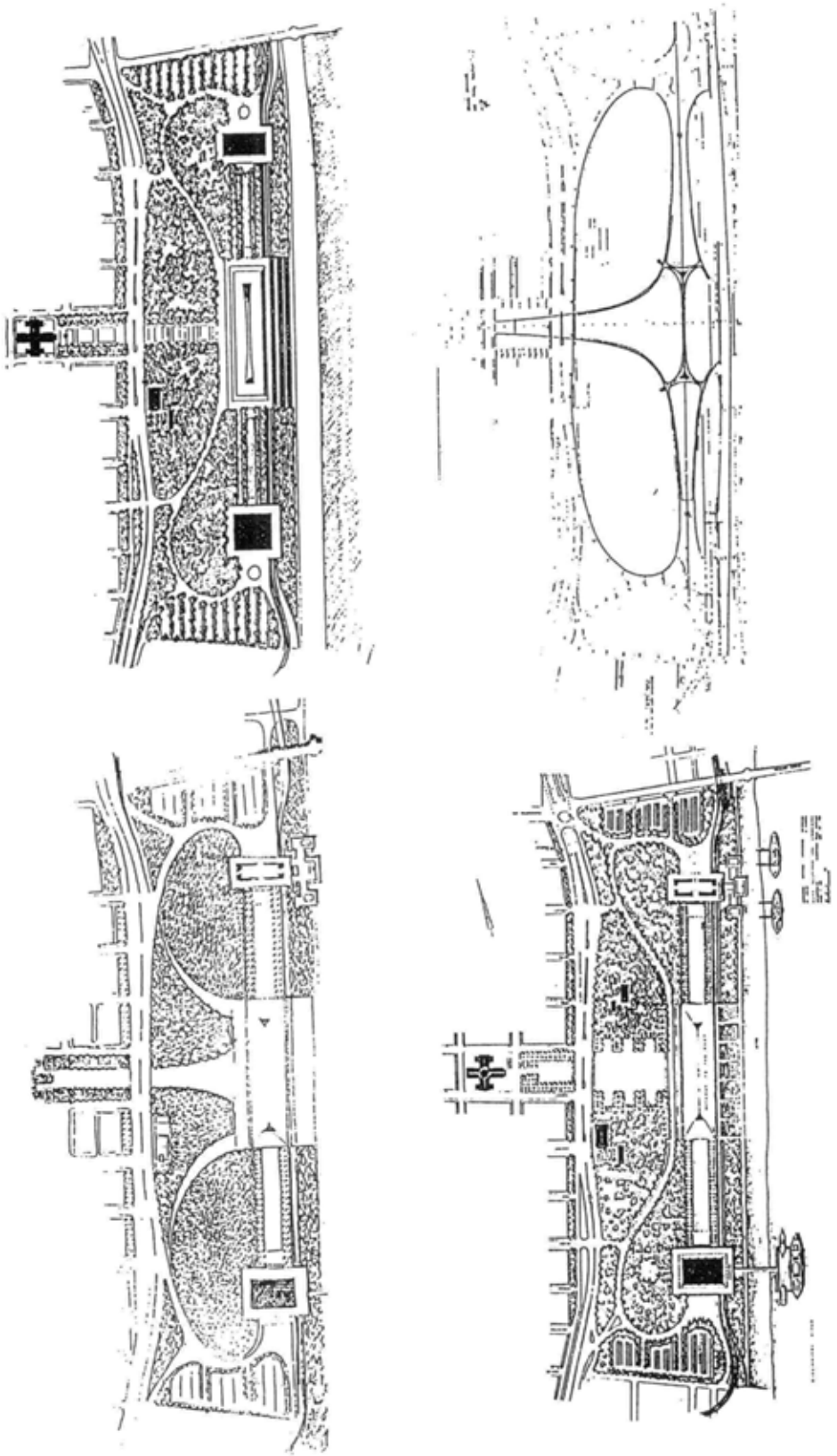

Figure 18: Eero Saarinen & Associates, Site Plan Studies, 1957. (JNEM Archives, uncatalogued collection).

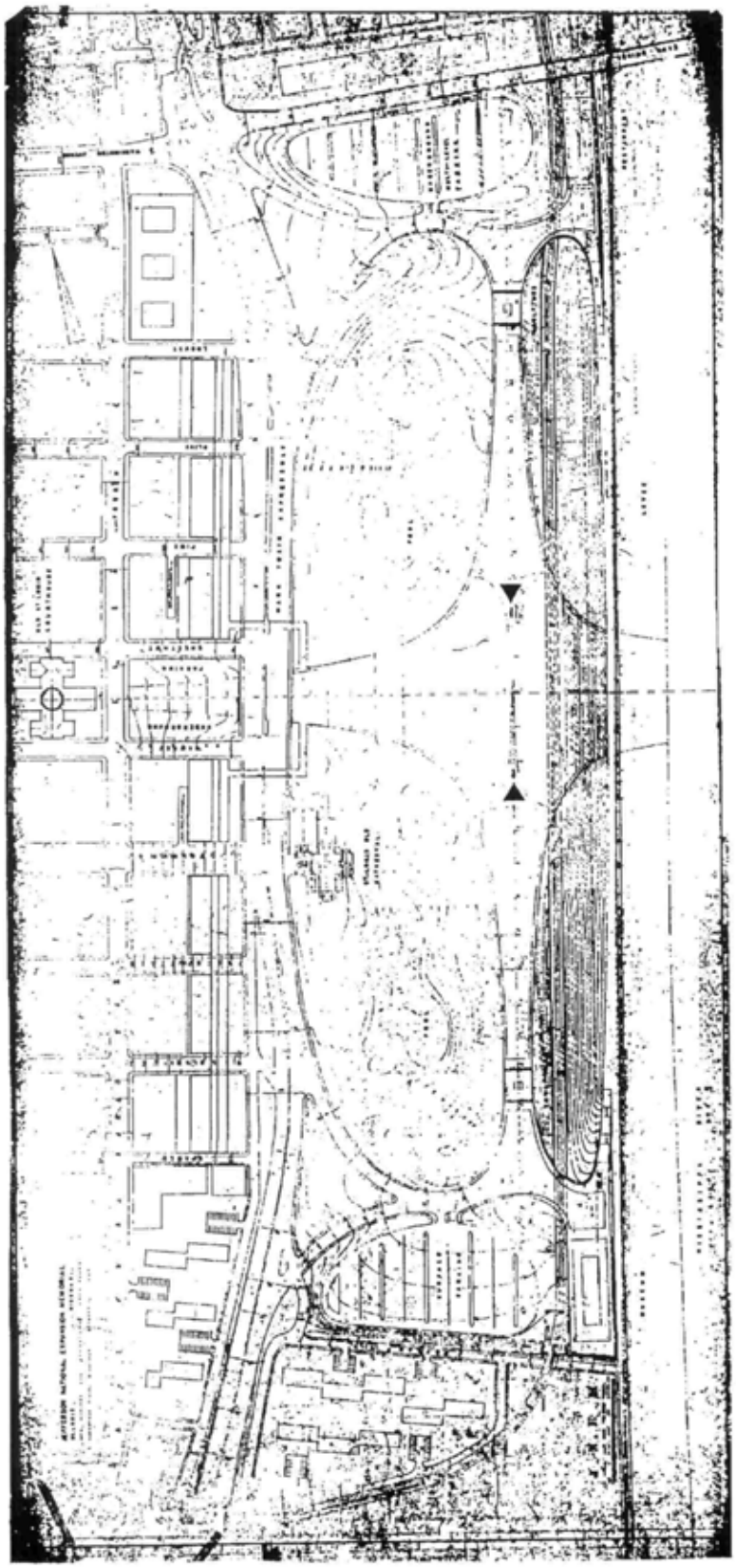

Figure 19: Eero Saarinen & Associates, Site Plan with 2' contour interval, Drawing 1 of 4, October, 1957. (JNEM Archives, uncatalogued collection).

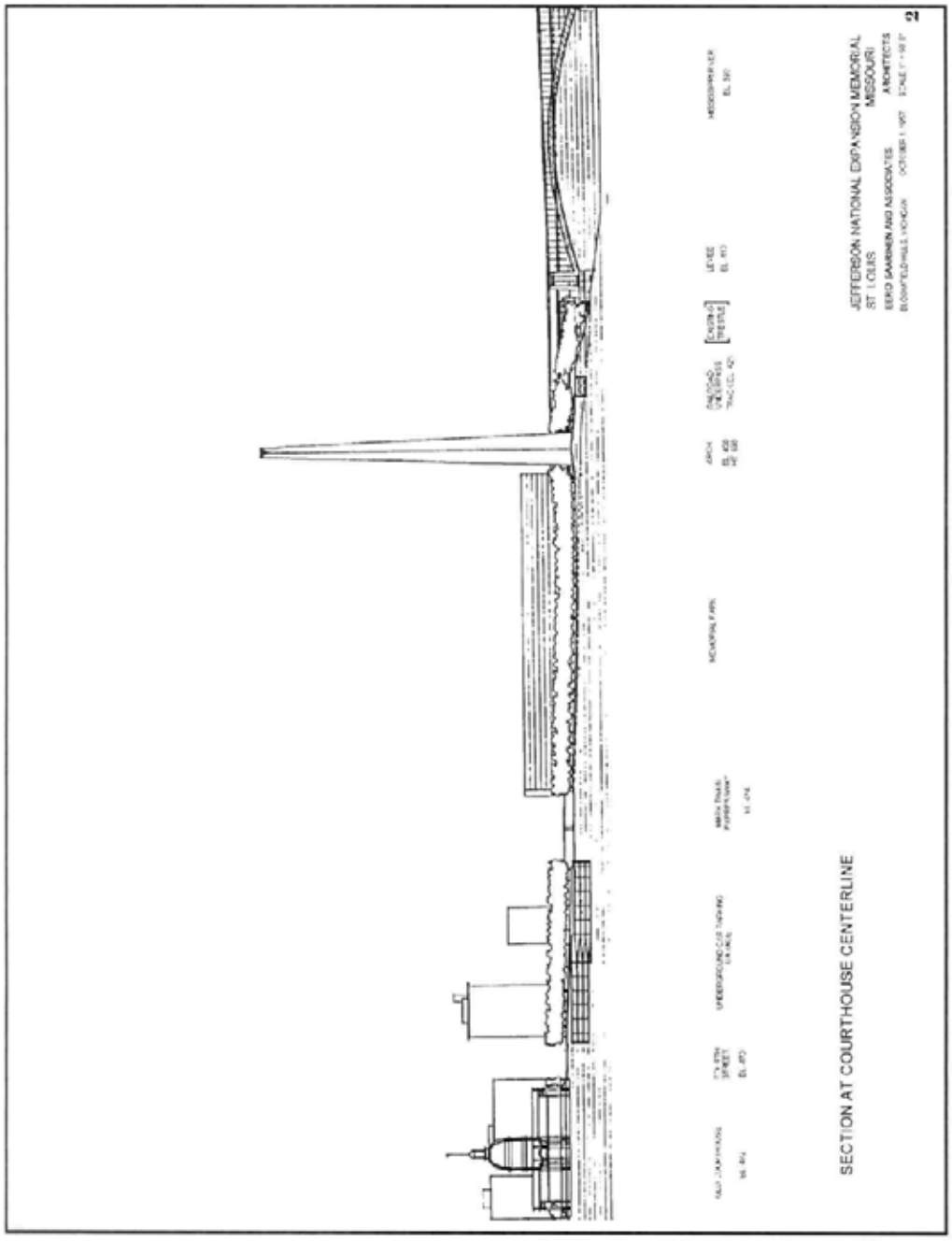

Figure 20: Eero Saarinen & Associates, Section Through Old Courthouse to River, Drawing 2 of 4, October, 1957. (JNEM Archives, uncatalogued collection).

On October 2, 1957 Saarinen presented his revised plan in model form in the west courtroom of the Old Courthouse. Before representatives of the city, the railroads, the NPS, as well as a Congressional delegation, he offered a statement regarding the changes to the original plan. It is an appropriate description of the plan and its intent.

> ...The spirit of this new design is the same as that of the design which won the national competition 10 years ago. The Arch — the major element of the plan - is in fact unchanged from that of the original design and only in the plan of the park, the setting for and approaches to the Arch and the placement of other buildings on the site have changes been made.
>
> We feel that we have now related all the major elements of the Park to each other in a more unified way. The stainless steel Arch — as the symbolic Gateway to the West -- is the center and focus. It now stands on a raised base as have all the great vertical monuments of the past.... On the levee side, a broad stairway, a broad monumental stairway leads up to the Arch. It is a symbolic stairway, as well as an actual one, for it symbolizes the movement of the peoples through St. Louis, the gateway.
>
> The axial relation between the Arch and the handsome, historic courthouse, which it frames, is now much stronger and clearer. The new curvilinear form of the plaza on which the Arch stands and of the roads which wind through the Park all belong to the same 'parabolic' family as does the Arch itself. Thus the whole design becomes a more mature and classic design.
>
> The formal elements of the Plaza and the axial, tree lined mall leading to the Court House are contrasted with the romantic forest areas on each side of the axis — areas in which we envision pools and rock outcroppings and pleasant, winding paths.
>
> ...We have found a compromise with the problem of the railroads, which we think will be a practical as well as an aesthetically satisfactory solution. The tracks of the Terminal railroad now on the trestle have been relocated 100 feet westward and lowered a maximum of 16 feet. The railroad runs in an open cut among the trees. There is a 960-foot long bridge over the railroad where the broad, monumental stairway rises from the levee to the Arch. The railroad is also bridged, at the north and south ends of the Park. Here the bridges lead to the (Historical) Museum and the restaurant and to the stairways down to the levee at these locations.
>
> One cannot think of the Park alone. The Park, the City, the west side of the Mississippi and the east side — these are all parts of one composition. On the model, we have taken the liberty of showing a diagrammatic redevelopment on all three sides of the Park. Not only do we believe that this frame of the Park — these edges — ought to be redeveloped, but we see here one of the great opportunities in an American city for redevelopment.[62]

[62]Saarinen's statement in its entirety may be found in the following source: "Revised Scheme, Revised Hope, For Saarinen's St. Louis Arch," in *Architectural Record*, v. 122 (November 1957).

It is evident from Saarinen's statement that while the railroad problem forced a reconsideration of the site plan, and the years of negotiations constrained Saarinen to substantial compromise that was at least "satisfactory," the plan was in the end not driven by the railroads (see figure 21). As with the competition scheme, Saarinen and his design team retained a conception of the unified whole.

The Same Form-World

Among the many alterations to the site plan, perhaps the most lasting (through various future permutations) and perceptible was this creation of a unified whole emphasizing the axial relationship of the mall with the Old Courthouse, and extending the curvilinear nature of the Arch to other site features, especially the paths and roads. Commenting on the plan in January 1959, Saarinen allowed further insight to the Memorial's development.

> The formal elements of the plaza and the axial, tree lined mall leading to the Old Courthouse are contrasted with the romantic areas on each side of the axis-areas with pools, rock outcroppings, and winding paths. All the lines of the site plan, including the paths and roads, and even the railroad tunnels, have been brought into the same family of curves to which the great arch itself belongs. More and more I believe that all parts of an architectural composition must be parts of the same form-world.[63]

From the approved competition plan, only the concept of the Arch in a park-like setting remained the same. Regardless of what had been lost, to Saarinen's mind the new site design was better, much simpler and reflected the lines of the Arch itself; As Saarinen stated in 1958, the Arch had been "put together with many different well-related things, but of many different form-worlds. Now it's going to be all one."[64]

The curvilinear form permeated the new design, expressed both in plan and section. Consequently, the broad, monumental stairway leading from the levee to the Arch, was designed to "have treads of decreasing depth toward the top to dramatize the upward sweep of the approach to the arch."[65] Moreover, considerations of this kind were not taken lightly. In response to concerns that the stairway design might not be safe, Saarinen's office constructed a full scale mock-up of the steps, and ran employees in the office up and down the steps to see if they would trip (figure 22).[66] Such consistent attention to detail and form continued throughout the process of design and construction.

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[63]Aline B. Saarinen, ed., *Eero Saarinen on His Work*, 18.

[64]Peter, *The Oral History of Modern Architecture*, 201. From the same source: "The second thing was in the reworking of the lines of the park, the roads, the approaches to the thing to introduce the same lines inherent in the arch itself, the parabolic line. You see, all these things relate."

[65]Aline B. Saarinen, ed., *Eero Saarinen on His Work*, 18.

[66]Ibid, 21. The story about the office employees testing the mock-up is taken from Gregg Bleam's interview with Bob Burley, an associate in the Saarinen office, dated July 27, 1995 (transcript on file in the JNEM Archives): "Well, it goes back to Eero's curvilinear feeling, both in plan and section.... And, of course, there was the misgivings about whether that was going to be safe, which is why we did that full scale mock-up. And ran everyone in the office up and down the steps to see if they would trip."

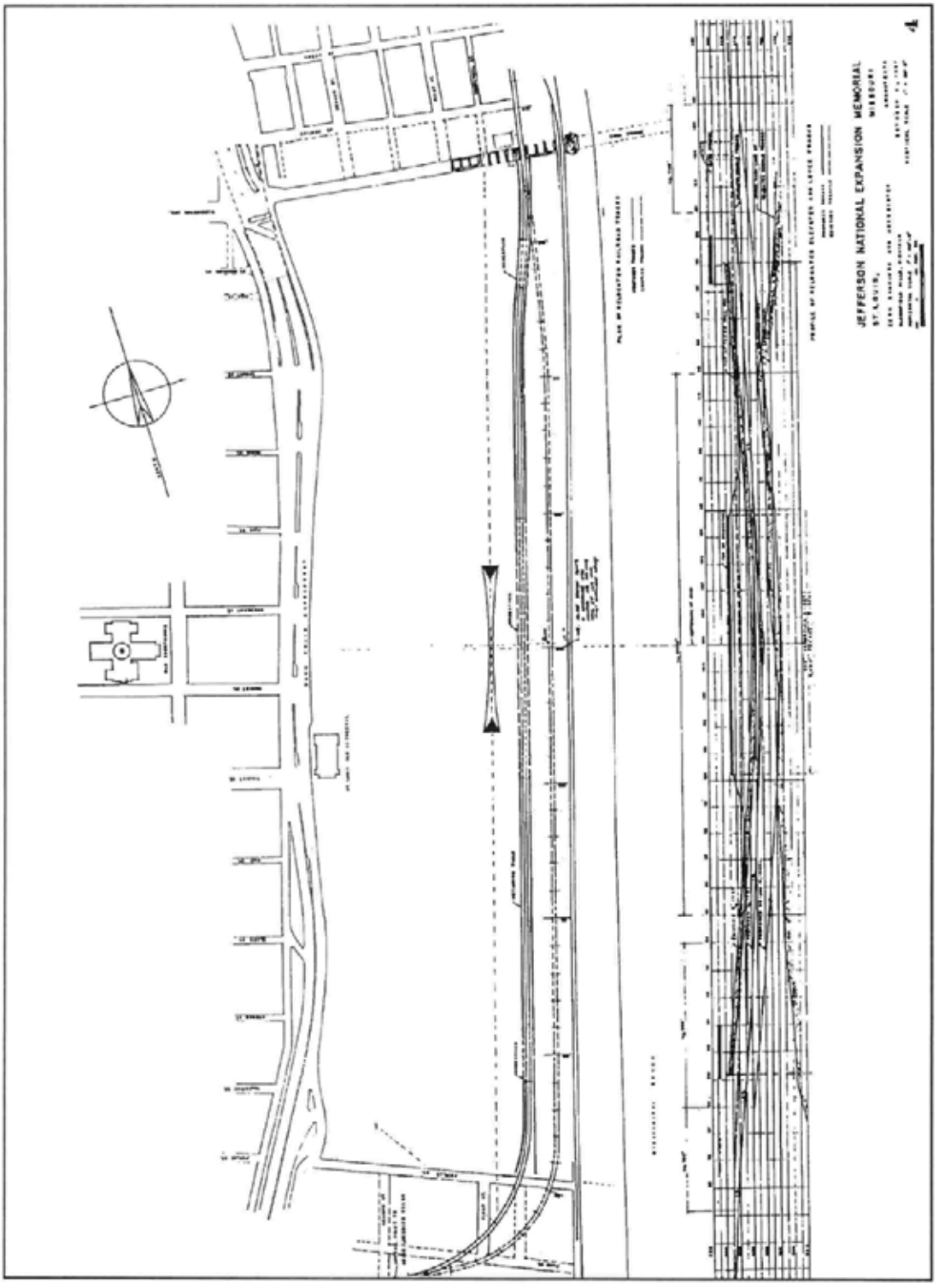

Figure 21: Eero Saarinen & Associates, Plan and Profile of Relocated Railroad Tracks, Drawing 4 of 4, October 1957. (JNEM Archives, uncatalogued collection).

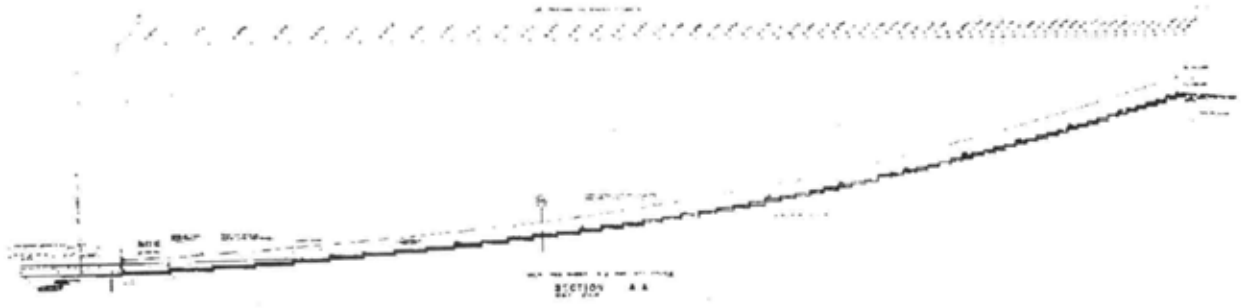

Figure 22: Saarinen and full scale mock-up of grand staircase (Courtesy of Yale University Press); Section Detail Through Grand Staircase, November 1960. (JNEM Archives, Record Unit 120, drawer 22, folder 12).

Even while the form of the Arch had not changed, its location and relation to the site were distinctly different, a forced change required by the relocation of the railroad tracks. Saarinen was satisfied that an improvement had been made, however.

> The arch in the earlier plans was right on the levee. From the city you went down to it. It was almost at the bottom of the bowl. Now, because of practical things, we had to raise it up. It's not only the practical things that made me want to raise it up. I also started thinking what vertical monuments are there that you approach going downhill and the only one I could think of was the sunken ship at the bottom of the Spanish Steps in Rome. You cannot place a vertical monument at the bottom of some steps.[67]

Saarinen had become ever more conscious of the Arch's relation to other buildings in the city and desired to raise the base; the base was to give the Arch "more dominance over the tall buildings of the city" and "it seemed essential as an approach to a vertical monument."[68]

The strong placement of the Arch on axis with the courthouse and the generally symmetrical layout suggests Saarinen's influence as well. Architectural critic Peter Papademetriou wrote in 1981: "If you look at Eero's site plans, you see modern buildings laid out according to Beaux-Arts compositional principles."[69] The new focus drew naturally from Saarinen's early Beaux Arts training at Yale University, the more general movement in the 1950's toward a symmetrical, classical ordering of modernist building design, and Saarinen's commitment to the integration of building and landscape. The landscape also took on a highly ordered geometry, this union of geometries in both landscape and building emerging in the work of Saarinen in the 1950s.

Revisions to the conceptual order of the memorial site therefore did not appear without precedent. Through the summer of 1957, prior to his revealing the revised proposal in October, the plan evolved through a series of site plan sketches prepared by Saarinen in which he experimented with axial layouts and curvilinear forms (see figure 18).[70] Thus, Saarinen's description of the revised memorial plan and the prepatory site plan

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[67]Peter, *The Oral History of Modern Architecture*, 201.

[68]Aline B. Saarinen, ed., *Eero Saarinen on His Work*, 18.

[69]Peter Papademetriou, as quoted in Andrea O. Dean, "Eero Saarinen in Perspective," in the *AIA Journal* (November 1981). Another critic wrote: "...he tried to overtake the fast moving train of technology...and impose upon it a system of checks and balances similar in effect to the discipline of classical and Renaissance architecture." See Rupert Spade, "Introduction" to *Library of Contemporary Architects: Eero Saarinen* (New York: Simon and Schuster, 1971), 9.

[70]Site plan sketches and drawings from Saarinen's office, dating from throughout 1957, are quite telling in a number of respects. First, they reveal Saarinen's new emphasis on axial arrangement, showing rectangular pools aligned on a strong north-south axis with the Arch, as well as an approximately bilateral symmetry along the equally strong east-west axis connecting the Arch with the Old Courthouse. Second, the drawings also indicate that Saarinen's major reconfiguration of the plan in late 1957 cannot be solely attributed to the railroad impasse, (although the railroad problems did in fact require a new scheme). The revised plan must also be seen in light of a changing design philosophy. Finally, these drawings seem to show an intermediate step toward the more strict reliance on curvilinear forms of the later plans. In the earlier schemes from 1957, rectangular forms interact with circular paths, albeit the curving lines appear considerably less graceful than with later schemes. In 1958, Saarinen related that; "Now, *in the middle of the changes* I saw for the first time that really in relation to the Arch, the park, the roads, the approaches to the park should all be done within the same curved-form world, which it wasn't before (emphasis added)." Peters, *The Oral History of Modern Architecture*, 201.

sketches are revealing in another respect. The conceptual basis for the site planning, the idea behind a single form-world were inherent in his thought; his was the "one mind" through which "it all has to be siphoned."

Kiley's Role — The Planting Plan as Integral to the Whole

Dan Kiley remained an important team member, and his later descriptions of the memorial project suggest a prominent role, especially in creating a planting scheme integral and not superfluous to the total conception.

> My basic interest in the landscape was to develop a sense of movement of spatial continuity. This was done by arranging undulating lines of high tulip poplar trees spaced very close together so they started from either entrance wide and narrowed down to a neck, and then as one turned to the side elevation of the Arch, the trees would widen up to the base. This development would happen on both sides of the Arch. This was really the important aspect of the landscape design treatment, the rest of the planting was to provide color and interest with forest groves for sitting and picnicking and on the river side to clothe the banks with masses of flowering shrubs and trees; and finally at the levee included a boulevard of willow trees.[71]

Favorably, Kiley's ever present interest in the spatial qualities of the landscape and this focus on the movement across the landscape in relation to the structure worked hand in hand with Saarinen's unified conception of a site.[72] Moreover, it lent magnitude to Kiley's role in the process of designing the Memorial project, and his activities focused on this ideal, refining and developing the planting plan in support of the whole[73] However,

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[71]This statement can also be read as an effective description of the final planting plan concept prepared by Kiley's office and approved in 1966 by the National Park Service. The intent here is to elicit the underlying source of his design response. Dan Kiley, "Jefferson National Expansion Memorial" in *Landscape Design: Works of Dan Kiley, Process Architecture, No. 33*, (October 1982), 109.

[72]Dan Kiley recalled: "Well, one of the big things I was trying to tell Eero during the designing phases, both in the first and second phases, I was trying to interject a more spatial mystery to the whole site...And that the landscape should relate more spatially, visually/spatially, like a walk in nature. It should be like a walk in the woods, and you don't know what's next. And its leading you, always leading you. And sort of—I call it spatial continuity. And, Eero would say, well, draw it." From Historian Bob Moore's interview with Dan Kiley, July 22, 1993 (transcript on file in the JNEM Archives). Much in line with the shift found in Saarinen's work from the 1950s, Kiley's work beginning with the Miller Garden (Columbus, Indiana) collaboration with Saarinen in 1955 shows a new focus on the geometric ordering of outdoor space. Inherent in Kiley's approach was the idea of spatial integration between building and landscape, and an understanding of the quality of movement through these spaces. Kiley's approach found favor with many architects, and certainly contributed to the success of the on-going and collaborative nature of his relationship with Saarinen. For a more in-depth discussion on this development in both Saarinen and Kiley's work, see Gregg Bleam, "Modern and Classical Themes in the Work of Dan Kiley," in Modern Landscape Architecture: A Critical Review, Marc Treib, ed. (Cambridge, The MIT Press, 1993), 220-239.

[73]Therefore, it may not be surprising that Kiley's later reflections on the design of the Memorial project occasionally give precedence to circulatory dynamics in generating the curving form of the walks, rather than any desire to mimic the form of the Arch. As Kiley stated in his 1993 interview with Historian Bob Moore, "It wasn't trying to make a symbol, a mirror of the Arch at all. It was to do the circulation in a lyrical, three dimensional quality." Interview with Dan Kiley, July 22, 1993. While one can only speculate at this point, the argument here is for a fortuitous coupling of form and function, Saarinen's single-form world conception taking precedence. In an interview with Gregg Bleam, May 1, 1995 (transcript on file in the JNEM Archives), Saarinen's partner Kevin Roche confirmed Saarinen's lead in giving curvilinear form to the path system, and in Bleam's July 28, 1995 interview with Kiley (transcript on file in the JNEM Archives), Kiley succinctly states that: "Eero had done the shape of the walks. I just put the trees along them." Of course, this statement downplays the importance of the trees in creating the "spatial continuity" that Kiley was after.

it would not be until late 1959, when Kiley began working on the planting plan in earnest, that he would again become an obvious contributor to the project.[74] Of the planting plan, he would later recall, "... it took a lot of studies, many, many, many."[75]

Revised Plan Approvals

The new proposal, of course, required the support and approval of numerous groups, not the least being the railroad interests. The U.S. Territorial Expansion Commission rapidly approved the plans, and by the end of November interested parties, including the city, the railroads and the Department of the Interior, agreed to another "Memorandum of Understanding" accepting the revised plans for relocating the tracks. Saarinen even went so far as to accept the continued operation of the three surface tracks along the levee, and therefore, the estimated cost of $5 million was to provide only for the relocation of the elevated lines. It seemed that the railroad problem was again near resolution, but difficulties briefly presented themselves once more due to disagreement over the allocation of costs. Fortunately, the new plan conception accommodated a final solution.

1958-1959: The Site Plan Evolves

The years 1958-1959 were exceptional for the development of the Memorial by comparison to the stops and starts and often misplaced optimism of the ten years following the competition. The revised Saarinen plan presented at the end of 1957 provided the basis for progress and resolution on a number of levels. The railroad problem was resolved in a manner compatible with the plan, and this in turn helped provide the justification for additional funding requests. The revised Saarinen plan also provided the framework for development of the National Park Service's 1959 Master Plan for Jefferson National Expansion Memorial, refining programmatic elements of the Memorial. By the middle of 1959, the site was ready for ground breaking ceremonies.[76]

Positive Signs: Railroad Resolution and Increased Federal Authorization

Following the revised agreement for relocation of the elevated railroad tracks, the railroad interests balked, anticipating that their share of the cost of relocation would be excessive. Instead, they favored an open cut without tunnels for the entire length of the Memorial site. The solution had to balance cost with aesthetic considerations, and emerged simply as an alternative whereby Saarinen's proposed 960 foot tunnel would be developed as a less costly open cut roofed with concrete slabs. Saarinen could foresee no changes in the aesthetics of his plan and approved of the concept, as did city and railroad officials. On June 2, 1958, a final agreement was signed by NPS Director Conrad Wirth and the Secretary of Interior, opening the way for the

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[74]It is difficult to determine what the exact nature of Kiley's influence on the Memorial project was between the period covering the end of the competition in 1948 and his work on the planting plan beginning in 1959, a period in which his role is less clearly documented. The close friendship between Saarinen and Kiley, and the fact that they collaborated on many projects together, leads one to suspect that many ideas were discussed outside the confines of documented correspondence. Kiley and Saarinen worked together on some twenty projects, at least ten of which were initiated in the years 1955-1958, including Dulles Airport. In his interview with Gregg Bleam, May 1, 1995, Kevin Roche confirmed that there was a close friendship: "As to Eero's and Dan's relationship it was always very, very good."

[75]Mary Hughes, interview with Dan Kiley, June 8, 1991, (transcript on file in the JNEM Archives).

[76]Brown, *Administrative History*, 123.

use of authorized federal funds for track relocation. The cost was approximately $3 million, with the railroads and the city together matching the Federal contribution. Following a modified ruling by the Missouri Public Service Commission to allow for the new rail line configuration, and payment of the railroad's financial obligation, NPS Director Wirth finally announced that relocation of the tracks would begin in June or July of 1959.

While the railroad problem was being concluded, Memorial supporters pushed for the authorization and appropriation of additional funds. Buoyed by the St. Louis area Congressional delegation, a bill for the increased authorization of funds made its way through the House and Senate, and on September 7, 1958, President Eisenhower signed the bill authorizing an increase of $12.25 million for the Memorial (for a total authorization of $17.25 million). Additionally, the bill eliminated restrictions on the use of funds for construction of the Arch itself. While the bill did not provide for immediate appropriation of the moneys, Congress provided its most clear evidence that the Memorial would be funded and built. With construction near at hand, the NPS named George B. Hartzog, Jr. as Superintendent of the Memorial following the resignation of Julian Spotts.

The 1959 National Park Service Master Plan Document

With a solution to the track relocation, limited appropriations, and authorization for more extensive funding, the site was ready for physical improvement. This meant following the general plan set by Saarinen's revised proposal and preparing the ground for construction of the Arch. While the dominant feature of the plan remained an Arch located in a park setting, programming for the site continued to shift and cause alterations to the plan.[77]

George Hartzog took office on February 1, 1959, and immediately set about the tasks of planning and scheduling necessary to move the project ahead. A key part of all this was the completion of a document detailing the Memorial's development program and associated policies. Entitled *Guidelines for the Master Plan, Jefferson National Expansion Memorial,* the document was revealed to the press and city officials at a meeting in the Old Courthouse on March 10, 1959; it was well received and later approved by NPS Director Conrad Wirth in October of the same year.

While clarifying the primacy of the Saarinen Arch and scheme, the NPS Master Plan furnished new ideas for a museum and other interpretive features on-site. In conjunction with Saarinen, it was decided that a historical museum was to be included, and that this "Museum of Westward Expansion" was to be housed in a visitor

[77]National Park Service, *Guidelines for the Mater Plan, Jefferson National Expansion Memorial* (St. Louis: March 10, 1959), 2. JNEM Archives, Record Unit 104, box 32, folder 3. Guideline no.2 in this document, which contains a total of 22 numbered guidelines for the physical development of the Memorial, states, "development will follow the general pattern of the revised Saarinen Plan of 1958, with certain modifications in detail reflected in the 1959 Master Plan." Guideline no. 3 reads as follows: "The dominant physical and inspirational feature of the Memorial will be a parabolic stainless steel arch of colossal dimensions, with elevator facilities, which will symbolize: (a) St. Louis as 'The Gateway to the West', (b) The great frontier traditions of the 'westward course of the empire', and (c) The new technological frontiers which challenge us today."

center located beneath the promenade at the foot of the Arch (see figure 23).[78] In addition, two river overlooks at the north and south ends of the Memorial were to contain exhibits concerning the importance of the river and the railroad in relation to westward expansion.

The plan also required the removal of any remaining buildings and parking lots on the grounds, except the Old Courthouse, the Old Cathedral, and the Old Rock House which was to be reconstructed near the south terrace overlook. (A later determination was made not to reassemble the Old Rock House; after being dismantled, many felt that its integrity rested with its original site, which could no longer accommodate the structure.) It was decided instead that the Old Rock House was to be dismantled to make way for the railroad relocation and the grand staircase. The Old Courthouse continued to serve as the NPS's administrative and operational headquarters for the area, and to include interpretive elements on the structure's history and St. Louis' role in westward expansion. Other planned interpretive devices were trail systems within the planted areas, relating to the Oregon and Santa Fe Trails.[79] As for the Memorial's role in the city, the plan restricted the location of city-constructed and operated parking facilities to the north or south end of the grounds, although the plan made it clear that the Memorial was not to be developed and function as another city park.[80]

This matter of the Memorial's relation to the city, however, was extremely important to Saarinen, and therefore he continued to work with city officials on the zoning of property near the Memorial, a consideration which first began shortly after the competition victory. Saarinen believed that much of the Memorial's success depended upon the harmonious development of adjacent areas, including the design of a new bridge to handle a proposed interstate highway. The initial result of these efforts was a "gentleman's agreement" to place a fifteen block area west of the Memorial under redevelopment, coupled with a decision by the city to restrict structures facing the Memorial to a height of 275 feet. (A 1967 city ordinance raised the height limit to 306 feet and defined the peripheral area as a new zoning district known as the Jefferson Memorial District.) In response, Saarinen chose to increase the height of the Arch from 590 feet to 630 feet in order to maintain the structure's architectural presence.

Groundbreaking

By the end of April, the NPS approved plans and specifications for the railroad's relocation as the first phase in the Memorial's development program, and accepted both the railroad's and city's financial contributions to the track relocation. (The city's contribution came from a bond issue which had initially received approval in the 1934 bond issue election.) Following the Missouri Public Service Commission's formal hearing on the plans and specifications, the NPS accepted bids and awarded a contract for the work. The first phase of construction had at last cleared all hurdles, and at 10:30 A.M. on Tuesday, June 23,1959, special ceremonies marked the opening of Memorial construction. On hand were St. Louis Mayor Raymond Tucker, who played a significant role in the rail negotiations, NPS Director Conrad Wirth, and former Mayor Bernard Dickmann.

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[78]Ibid, 2. Guideline no. 4 stated, "The principal facility for enlightenment of the visitor as to the historic theme of the Memorial will be a structure, to be designated a Visitor Center, containing exhibits telling the story of westward territorial expansion. The structure shall be incorporated in the arch below the promenade level."

[79]Ibid, 3. Guideline no. 10 stated, "In the two planted areas, readily accessible to the visitor center, there will be trail systems with interpretive devices relating to the Oregon and Santa Fe Trail."

[80]Ibid, 4. Guideline no. 14 stated, "It is believed that the City of St. Louis has ample facilities in civic parks and auditoriums for such events, and it is not intended that the Memorial be regarded as another City park." As an interesting side note, Saarinen and Kiley had initially imagined the grounds as a shaded park to accommodate the people of the City of St. Louis.

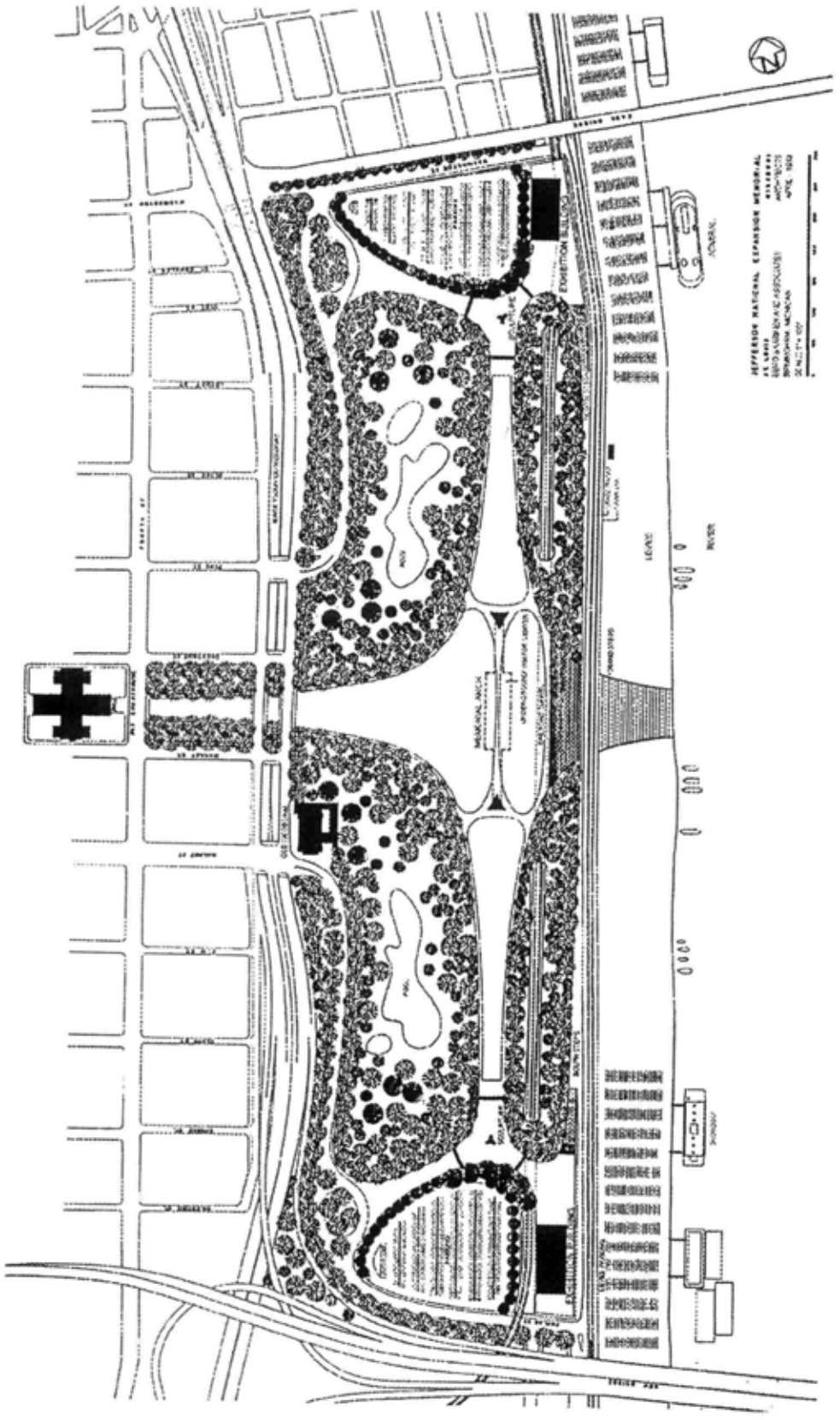

Figure 23: Eero Saarinen & Associates, Site Plan, April 1959. (JNEM Archives, uncatalogued collection).

Serious Planning

Construction on the first phase of development was well under way by the end of 1959, beginning with the excavation of the railroad tunnels, and a completion date of 1964 was anticipated for the Memorial (in time for the 200th anniversary of the founding of St. Louis). Therefore, Saarinen needed to move ahead rapidly on detailed plans for various features of the Memorial, consisting of the Arch, the visitor center, and the overlooks. This also required a reinvestigation of the site plan. To proceed, however, he needed detailed data from the NPS on administrative, interpretive, and maintenance requirements for the memorial. This prompted the NPS to begin a thorough new round of planning studies, beginning in 1960 and continuing through to 1962.

With the project moving ahead at a quickening pace, Saarinen again looked to Kiley. In a letter dated October 17, 1959, he addressed Kiley's expected role:

> We are sending you...the site plan of the St Louis project in its present state. This site plan has finally been approved and it looks as if the project is getting serious now. The railroad tunnel, that is, the relocation of the railroad tracks, is already under contract. Some time after the first of the year we want to get serious about the overall planning and would like to consult with you on landscaping.[81]

1960 Construction Begins — Initial Planting Plan Proposals

Beginning in 1960, the National Park Service began its most intensive research and planning work on the historical aspects of the Memorial. This included ongoing restoration of historical buildings, planning for exhibits and the installation of the museum's proposed interpretive units, as well as an archaeological investigation of the Old St. Louis site. Rapid yet comprehensive planning was essential, as construction on the first phase of the Memorial was well under way and the 1964 completion date had been publicly announced. The museum planning, however, soon came to represent only one aspect of the complexity of the project. Construction, on-going funding battles, intense planning and programming, and a strict time limit required supreme coordination. Budgetary concerns were also being hinted at by the year's end.[82]

With the NPS pursuing their studies, in January 1960 contracts were issued to Saarinen for design, working drawings, supervision and preliminary drawings for the visitor center and Arch. As for Kiley, he was once again heavily involved in the project, officially as the Site and Landscape Consultant, and as such became involved in meetings with National Park Service representatives. He proceeded with development of the landscape plan.[83]

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[81]Eero Saarinen to Dan Kiley, October 17, 1959. Copy on file in the JNEM Archives, uncatalogued collection.

[82]Brown, *Administrative History*, 127.

[83]This is shown in the Office of Eero Saarinen and Associates "Conference Notes" for meetings related to Jefferson National Expansion Memorial. On file in the JNEM Archives is a copy of the "Conference Notes" for meetings held on March 21, 22, and 23, 1960; present were representatives from the National Park Service, Saarinen's Office, consulting engineers, and Kiley. The Oregon and Santa Fe Trails plan was discussed at this meeting. Also on file at JNEM, is a copy of the Agenda for a meeting on September 2, 1960, involving Kiley and a discussion on the landscaping. National Park Service Director Conrad Wirth was also in attendance, and it is suspected that this is the meeting in which Wirth first raised his objections to Kiley's planting plan. Wirth was not in attendance at the March meetings.

Museum Programming

The 1959 Master Plan brought final agreement on building a museum in conjunction with the Memorial, and that this museum should illuminate the history of westward expansion. It was also decided that this museum should be the largest museum in the park system and conform to an exceptional quality that matched the standard set by the Arch. To pursue this goal, Saarinen and the NPS staff conducted a survey of outstanding museums in the United States, looking for those qualities they most wanted to incorporate into the memorial.

Yet, despite the presence of a Master Plan for the memorial and lofty goals, the year began with no definite determination on the museum's content. However, before the year was over the NPS's research team prepared the memorial's interpretive prospectus, a 200 page document that clearly defined the museum's interpretive goals and objectives. Historians began drafting research narratives and plans for exhibit layouts. A series of conferences were held at Saarinen's office to determine space arrangements in the proposed museums, but Saarinen declined to expand his contract to prepare the museum's preliminary exhibit plan.

Construction Schedules, Budget Constraints and Funding Battles

Under the seemingly tight 1964 completion deadline for the Arch, a debate emerged as to whether the museum should be constructed in conjunction with the Arch, or instead be constructed and opened sometime later. The latter option was frowned upon by many involved in the Memorial's development, but especially Superintendent Hartzog. He understood the Arch and the museum to be wholly dependent upon each other, and it appeared that the museum was on the verge of being relegated to secondary status. Yet, others felt that the complex engineering of the Arch (requiring "the best technical minds in structural design and erection, both here and in Europe ... to produce this marvel of modern technology") and the on-going museum research and planning suggested a later construction date.[84] Hartzog battled strongly for simultaneous development and won the support and decision of Director Wirth.

In the midst of this debate, however, rising costs came to the forefront, and Director Wirth decided that the overall program for the Memorial was to be confined to that which was essential to completing the principal elements of Saarinen's plan. As a result, certain features were pared down, including plans for the complete restoration of the Old Courthouse and construction of the grand staircase. Scheduling and budgetary concerns were compounded by the fact that federal moneys had still been appropriated only for the first phase of development, consisting primarily of the track relocation. Although the bill signed by President Eisenhower in 1958 authorized the expenditure of $17.25 million on the Memorial, little of this money had yet been appropriated. In 1960, despite the best efforts of St. Louis Mayor Raymond Tucker, the U.S. Territorial Expansion Memorial Commission and others, only $4.6 million could be raised, just enough to continue Memorial development at a minimum for the fiscal years 1960 and 1961.

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[84]Quotation from Edward Zimmer, Chief of the National Park Service's Eastern Office of Design and Construction in correspondence with JEFF Superintendent George Hartzog, dated August 1, 1960, taken from Brown, *Administrative History,* 126. Zimmer favored delaying museum construction.

The Planting Design — The Oregon and Santa Fe Trails/Detailed Planting Studies

Saarinen and Kiley did not anticipate the impact that growing budget constraints and the priority given to the museum would soon have on the landscape program. Therefore, they continued in their understanding that the landscape treatment of the site, both conceptually and in detail, was integral to the Memorial's development. With the design of the Arch and the main features of the site plan essentially set through the 1957 redesign, and with modifications derived from the 1959 Master Plan document, the time had arrived to consider more comprehensively and with greater specificity the finished quality of the site (see figure 24). This was Kiley's job, and he rightly considered how the overall landscape plan could best be elaborated so as to not only provide the proper setting for the Arch, but to build upon the symbolic, interpretive, and experiential qualities of the site.

A much discussed aspect of the landscape plan at this stage was the concept of site trails, identified in the 1959 Master Plan document as interpretive elements relating to the Oregon and Santa Fe Trails, which seemed to play into Saarinen's original idea for village recreations. With the elimination of the village reproductions in the 1957 redesign, however, the trail idea was retained and greatly emphasized.[85]

In response, Kiley's office prepared a schematic plan and section drawings with elaborate mounding, featuring up to forty foot grade changes and scaled interpretation of the historic trails (see figures 25 & 26).[86] Yet, in this effort to create a literal reproduction of the trails as a miniature cross section of the United States and its dramatic mountain ranges, the NPS expressed unease. At a presentation of these drawings in late March 1960, it was suggested that the Oregon and Santa Fe trails be treated in a less literal sense and instead be thought of as a guide to exhibits located in the trail area. Other suggestions were made as well: the planting of cottonwood trees, buffalo grasses and other western references to highlight the trails and the interpretive experience; and the more strategic use of earth mounds to screen the two main planted areas incorporating the trails from the proposed Third Street Expressway.[87]

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[85]In later interviews, Kiley discussed the trails and considered them to have had a "Disney" like quality which he did not favor. He attributed the idea to Saarinen as part of his proposed village reproductions found in the winning competition plan. Mary Hughes, interview with Dan Kiley, June 8, 1991(transcript on file in the JNEM Archives); Bob Moore, interview with Dan Kiley, July 22, 1993 (transcript on file in the JNEM Archives).

[86]Whether or not Kiley favored a literal trail scheme, his office obviously moved ahead on the idea as evidenced in the early 1960 plan and section drawings for the site. Terry Boyle, an associate in the Kiley office, recalled: "I remember simulating climbing up mountains and they were supposed to represent ranges of mountains all the way up. I mean it was a miniature cross section of the U.S. from...St. Louis to where the Lewis and Clark expedition ended. I thought that's what the profile was supposed to represent. That was my recollection." Gregg Bleam and Gina Bellavia, interview with Terry Boyle, July 27, 1995 (transcript on file in the JNEM Archives). The 40 foot grade change may be determined from an examination of contours depicted on the early 1960 plan, and the sections confirm dramatic grade changes.

[87]From the "Conference Notes" for the March 21, 22, 23, 1960 meetings at the Office of Eero Saarinen. Copy on file in the JNEM Archives.

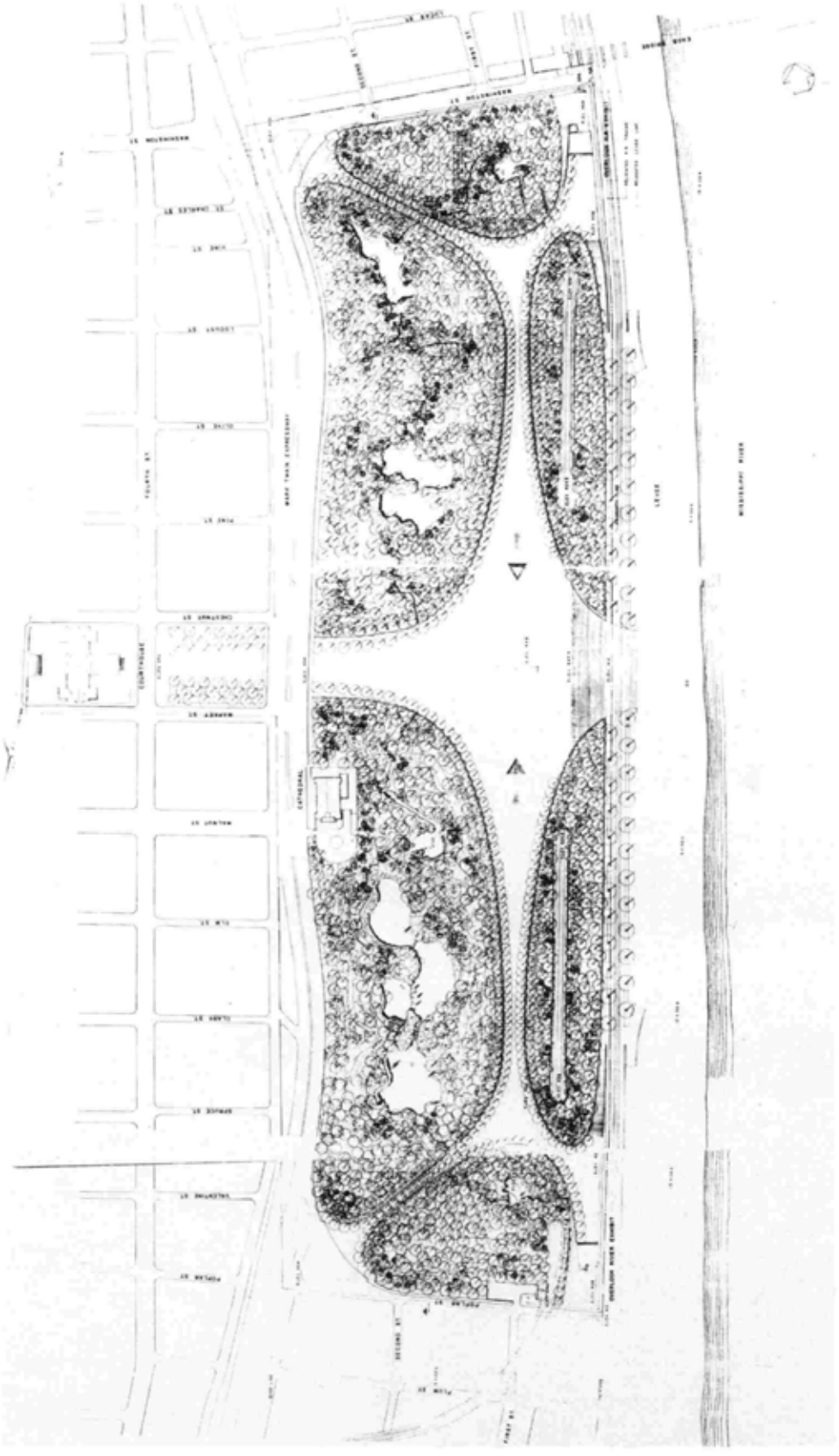

Figure 24: Eero Saarinen & Associates, Site Plan, February 1960. (JNEM Archives, uncatalogued collection).

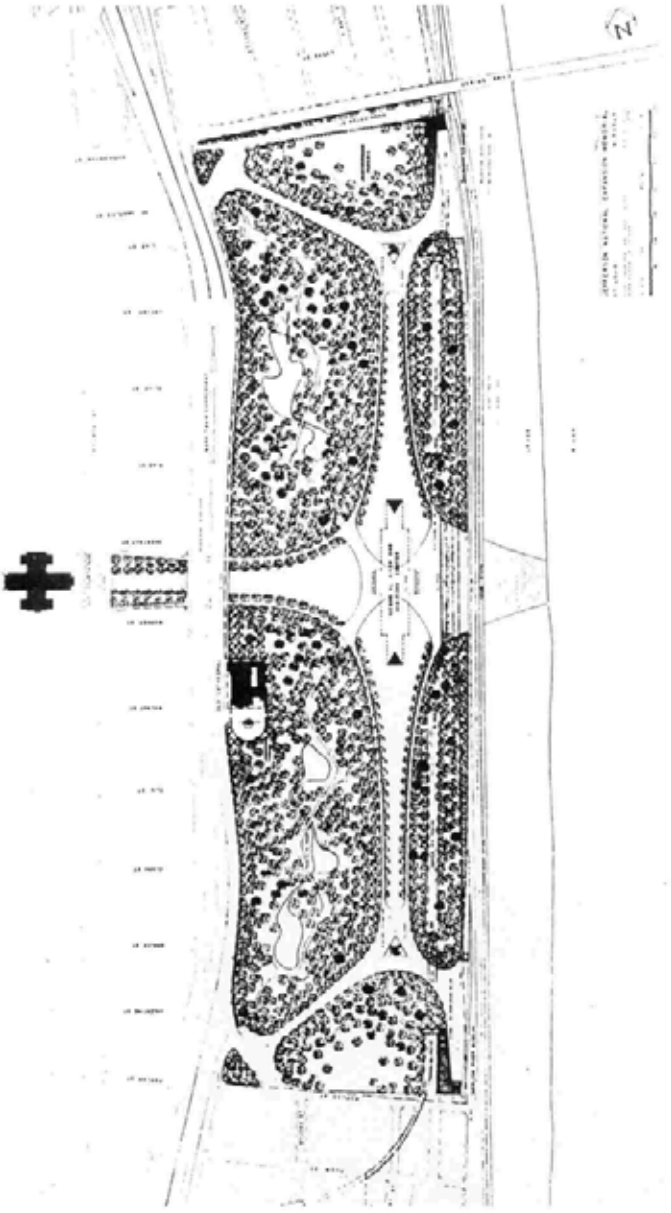

Figure 25: Office of Dan Kiley, Schematic Planting Plan, February 1960. (JNEM Archives, uncatalogued collection).

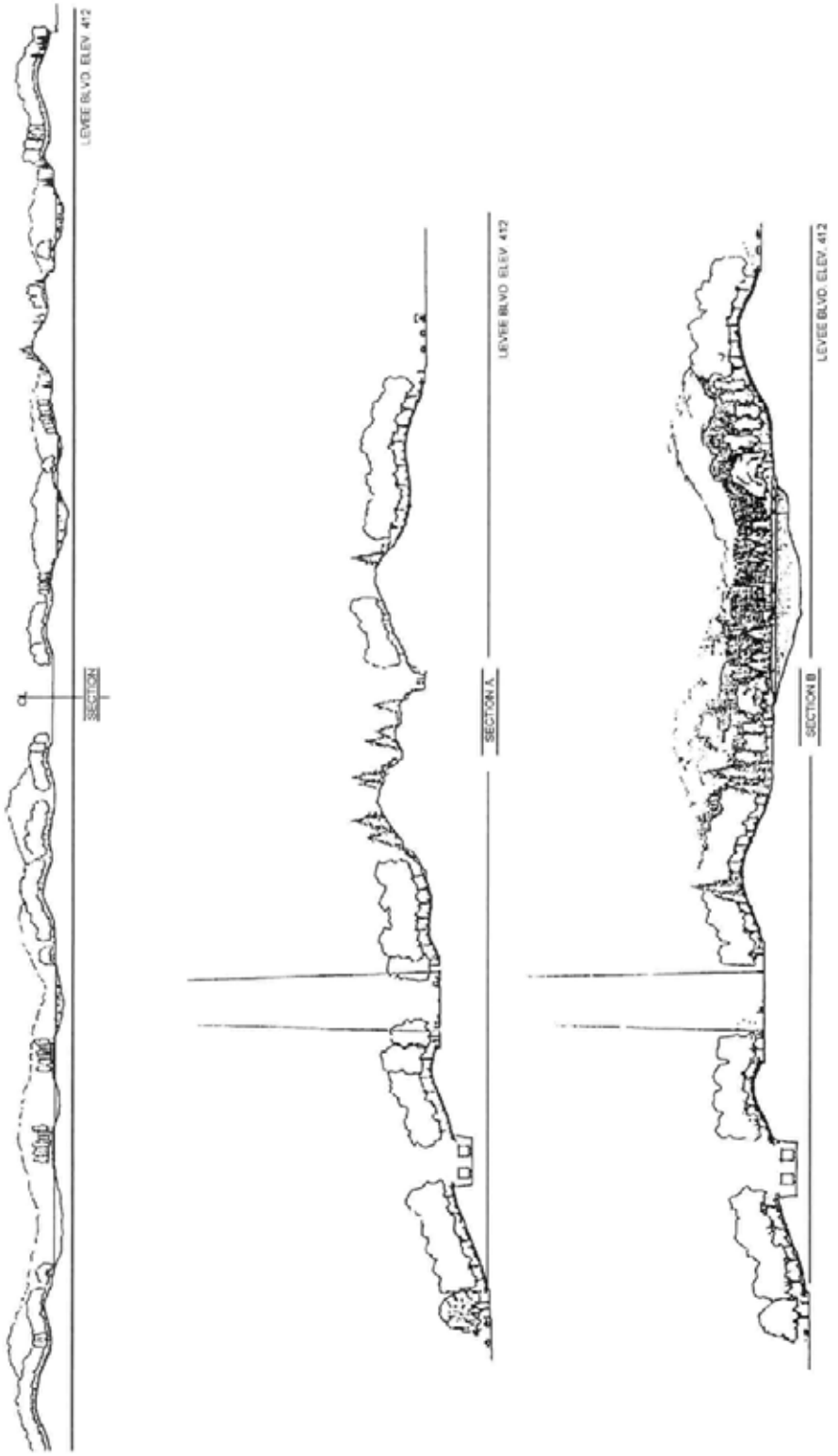

Figure 26: Office of Dan Kiley, Sectional Studies, February 1960. (JNEM Archives, uncatalogued collection).

Regardless of this brief focus on an elaborate interpretive trail system, Kiley continued working with the main idea of providing a forested setting for the Arch. This allowed Kiley the flexibility to quickly abandon the overly literal quality of the Oregon and Santa Fe trail scheme and focus on the essence of the idea. In effect, a visitor was to make their way through the forest, encountering clearings in the forest for special features such as the lagoons, which first found their way into the site plan beginning in 1957. This idea of clearings in the forest as places for special happenings had been present in Kiley's and Saarinen's concept for the Memorial since the earliest days of the competition, and a revised planting plan soon emerged which reconfirmed the commitment to this ideal and eliminated the fanciful quality of the trails (see figure 27).[88]

At the same time, Kiley's office prepared more detailed plans for the areas immediately surrounding the railroad cuts, specifying particular plant species to visually screen these rather intrusive features (see figure 28).[89] By September 1960, the detailed plans addressing the rail cuts, and a revised conceptual landscape plan for the site were prepared and again presented to the NPS at a meeting in which Director Conrad Wirth was in attendance.[90] Apparently, Wirth was not pleased with the result, largely due to looming budget problems, but the full consequences of his displeasure would not be made known to Saarinen and Kiley until the following year. Thus, much as the railroad problem caused a reassessment of the competition site plan, outside constraints would soon cause a reassessment of the landscape plan.

Highway and Railroad Considerations

While Kiley was engaged in development of the landscape plan, Saarinen remained vigilant in planning development peripheral to the memorial site. In particular, the proposed interstate highway bridge to be located south of the Memorial area attracted Saarinen's attention. He felt that this bridge could be a positive addition, working with the Eads Bridge north of the Memorial area, to tie the complex together. Saarinen was concerned with the aesthetics of the bridge and that the design be sympathetic to the Memorial. As a result, tentative discussions were held which suggested depressing the expressway approaches on the Missouri side of the river.

The NPS was also concerned with the remaining surface railroad lines running east of the Memorial, and in 1960 made a decision to pursue the relocation of these tracks. A primary consideration was to provide ample street width along the levee in order to accommodate automobile traffic. It was agreed by the affected parties that this could be accomplished through the consolidation of the three existing tracks into one track, a relatively easy determination by comparison to the railroad controversies of previous years. Saarinen and Kiley imagined this area as becoming a tree-lined boulevard; with the rail line running down the middle. The boulevard would act as a transitional element between riverfront activities and the Memorial.[91]

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[88]For instance, the proposed village reproductions found in the competition drawings were imagined as unique places that would open up in the midst of the tall tree forest. Mary Hughes, interview with Dan Kiley, June 8, 1991. Transcript on file in the JNEM Archives.

[89]The chosen species included a number of shrubs as extensive underplanting adjacent to the railroad cuts. It seems that Wirth objected to the underplanting as causing a policing problem. Curiously, the plans show the London planetree as the monoculture species lining the walks (see figure 28; copy of this plan is on file in the JNEM Archives).

[90]This is shown in the Agenda for the September 2, 1960 meeting with the NPS. Copy on file in the JNEM Archives, uncatalogued collection.

[91]"Saarinen Calls For Boulevard On Riverfront," *St. Louis Post-Dispatch*, April 19, 1960. JNEM Archives, Record Unit 119, box 24.

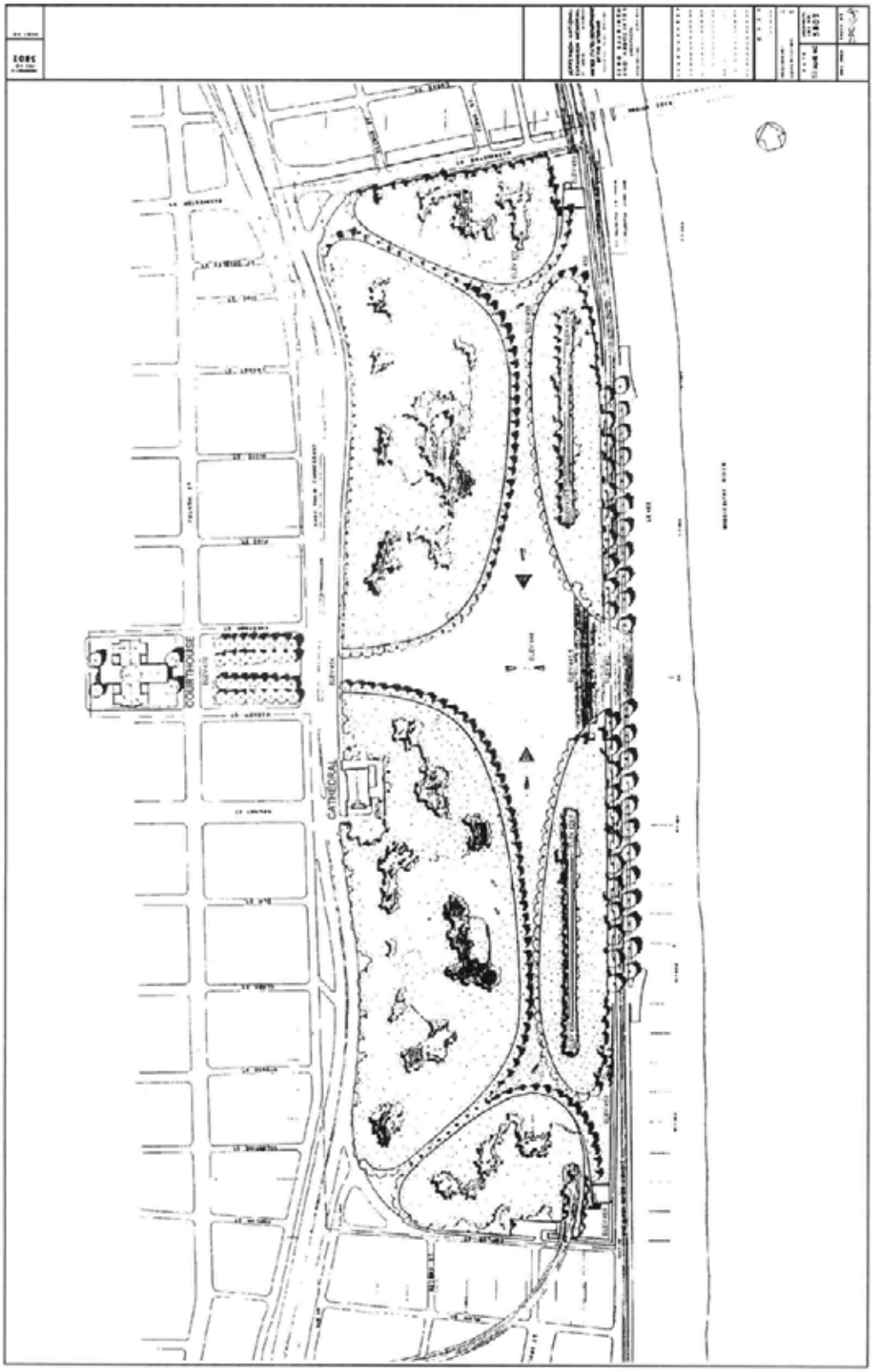

Figure 27: Eero Saarinen & Associates, Site Plan, August 1960. (JNEM Archives, uncatalogued collection).

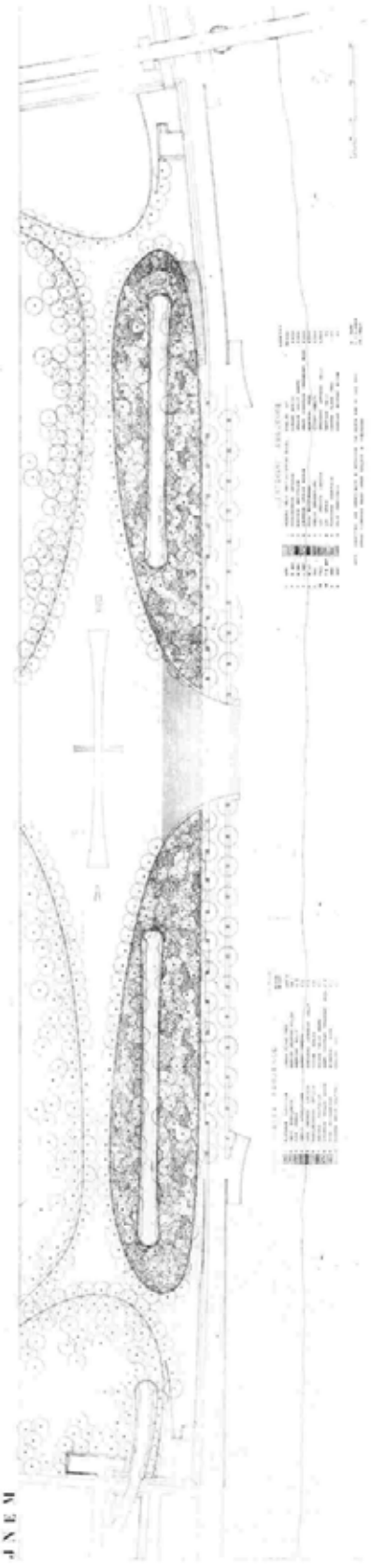

Figure 28: Office of Dan Kiley, Planting Plan Adjacent Railroad Cuts, August 1960. (JNEM Archives, uncatalogued collection).

The year 1960 ended with success on many fronts. Museum planning was on track, budget concerns were resolved, a landscape plan to complement prior site planning had been developed, and potentially divisive issues of peripheral development were settled in favor of the Memorial. Moreover, construction was proceeding well; the railroad relocation contract was approximately 50 percent complete by the end of the year, and the NPS was ready to award a contract for the levee construction. Appropriating funds from Congress appeared to be the only obstacle to timely completion of the Memorial project.

1961-1964: Refining the Planting Plan

Although 1960 ended on a positive note for the Memorial's development, the year also foreshadowed the problems which would arise beginning in 1961. Specifically, budget constraints continually delayed the project and forced on-going cutbacks in the development program. By 1964, it was more than apparent that the landscape program would be the big loser. Ironically, after the struggles of the previous year; significant funds were finally appropriated in 1961.[92]

Substantial Federal Funds

On August 3, 1961, President Kennedy signed the 1962 fiscal year Interior Department Appropriation Bill which included approximately $9.5 million for construction of the Memorial, an amount which covered almost the entirety of the remaining authorized Federal funds. Congressional approval was eased by project backers such as St. Louis Mayor Raymond Tucker, who guaranteed that the Memorial would be finished within the amount of the $17.5 million Federal authorization. As of December 1961, the total authorization of funds from a combination of Federal and local sources stood at $23 million, with about $3.3 million remaining to be appropriated. This was in addition to the approximately $9 million spent between 1935 and 1959.

Preserving the Basic Design

In order to keep within the promised budget limit, Saarinen pursued further alterations to the plan while attempting to preserve its basic concept and retain a workable program in regard to the Memorial's function and operation. As a result, Saarinen deleted certain details and finishes, and cut back the square footage of finished exhibit space. This was not enough; National Park Service Director Conrad Wirth's cutbacks were more decisive.

Wirth agreed that certain desirable but nonessential elements would have to be eliminated to keep under budget and directed additional cost reductions while expanding the role of the NPS in the Memorial's design and development. Among the changes, it was decided to separate the contract for the interior construction of the museum from the contract to cover construction of the Arch and the shell of the visitor center/museum, in order to accommodate complete design of the exhibit spaces and exhibits by the NPS. A reduction in the scale of the north and south overlooks was also ordered.

Especially difficult for Saarinen, Director Wirth required that the landscape and utility programs be greatly reduced, anticipating that the Jefferson National Expansion Memorial Association could solicit donations for the landscaping program. Yet, Wirth's directive went even further; the landscape program was to be undertaken by the NPS, and Wirth stated that no dunes, mounds or lagoons should be included in the landscaping despite

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[92]Brown, *Administrative History*, 128.

their presence in Saarinen's design.[93] In effect, it seems that Kiley was to be removed from the project despite the need for a major reconsideration of the planting program.[94]

By the end of 1961, planning, bidding and work schedules were effectively complete, consistent with Wirth's cost reductions. Construction work was divided into four phases: Phase I primarily involved relocation of the tracks and was nearly complete, with operation of the trains on the relocated tracks beginning at year's end; Phase II began early in 1961 and consisted of museum planning, levee redevelopment with construction of the north and south overlooks, construction of the Arch foundations and the visitor center/museum excavations; Phase III was to cover construction of the Arch and the visitor center/museum, and a portion of the final landscaping; Phase IV would involve the final landscaping. A completion date of 1964 was still envisioned.

While project proponents, especially Saarinen, battled to retain the essence of the Memorial design, a greater tragedy struck. Eero Saarinen died rather suddenly and unexpectedly of a brain tumor on September 1, 1961, at Ann Arbor, Michigan. Those who knew Saarinen mourned the loss of a great architect, many of whom believed Saarinen was just entering his most productive years. His partners, Joseph Lacy, John Dinkeloo and Kevin Roche were to supervise the completion of Saarinen's projects, including the Arch. Because the site planning and Arch design were by this time essentially set, his death did not allow the project to give way to radically new conceptions. Nonetheless, prior to his death, Saarinen found the need to argue for the necessity of Kiley preparing the landscape plan, a collaboration and a plan he always viewed as imperative to the Memorial's success.[95] In many respects, Saarinen would prove successful in this regard, but as the final phase of development, the landscape design of the site was the most compromised and most delayed.

The Planting Program

Director Wirth's decisions to scale back the Memorial's development program, of course, directly affected Kiley, especially the decision to have NPS staff oversee the landscaping program. This revealed an important area of disagreement between the NPS and Saarinen in dealing with the budget constraints. To Saarinen, the Arch was the most important aspect of the Memorial design, followed by the landscaping of the grounds; a reflection of the original conception of the Arch within a park-like setting. The NPS, on the other hand, felt that the Arch and the museum were the most crucial aspects of the Memorial, evident in Hartzog's desire to

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[93]This overview of the cut backs on the Memorial project is taken from Brown, *Administrative History*, 129-130.

[94]Although it is not entirely clear what Kiley's intended role was to be following Wirth's decision-making on cutbacks to the Memorial project, there is an assumption that he was to be removed as collaborator on the project and its design, even when faced with a major reevaluation of the planting plan. This becomes more evident in a letter from Eero Saarinen to Dan Kiley, dated January 30, 1961 (copy on file in the JNEM Archives, uncatalogued collection). Not only did Saarinen outline the NPS's objections to the planting plan presented to the NPS in which had been presented by Kiley in late 1960, but he also wrote the following: "After the meeting, he [Wirth] ruled that the landscaping is to be done by the NPS staff...I understand that part of the reason for him so ruling is that he felt that the large staffs the NPS has for planning and architecture should be put to better use. This makes me very unhappy and I am planning at an appropriate time to try to get this situation modified. I think that it would be impossible to have him reverse his position completely so that all design, working drawings, specifications and supervision would be done outside of the Service. I think the only thing I can ask for is the design—in other words, consultation with an outside consultant (that is, you) and then the further detailed work be actually carried out by the Department."

[95]Eero Saarinen to Dan Kiley, January 30, 1961. Copy on file in the JNEM Archives, uncatalogued collection.

see museum development keep pace with the Arch construction.[96]

While Wirth wished to make better use of the NPS's staff for planning and architecture, Saarinen remained loyal to Kiley and his contribution to the project, and sought to modify Wirth's decision as it would clearly minimize Kiley's role. He instead desired that Kiley at least be retained for the design work, and from this work the NPS staff could prepare working drawings and specifications, and supervise landscape installation. Saarinen wrote to Kiley: "I will also appeal to him on the basis that you were part of the competition, on the basis that it is such an essential part of the architecture, that it is impossible to work with a new person, etc."[97] Meanwhile, the Kiley office had continued its research into appropriate plant species for the area, apparently anticipating a continued role in the design process.[98]

Saarinen, however, was well aware of the budgetary constraints, and addressed the matter by asking Kiley to alter his preliminary landscaping plan according to Wirth's requested changes. As Saarinen viewed it, Wirth presented three criticisms of the plan: 1) he disapproved of the extensively sculptured ground because the expressway was to be depressed and therefore not create a noise problem; 2) he did not favor the extensive use of underbrush because of policing problems, nor did he care for the use of tall trees for reasons of cost; and 3) "He did not at all like the budget." Saarinen continued in his letter to Kiley: "I will take full responsibility for the amounts and promise to eliminate them and I think it would be well for you to think of eliminating the underbrush and agreeing to work within a practical budget."[99]

In response, Kiley agreed to abide by these constraints, but clearly unhappy, indicated that the Memorial's design intent was compromised.

> Is there not some way based on the rules of the competition that we can insist on doing the work based on our own design philosophy...I do feel the tall tree forest covering the whole site is the most important landscape design element and regardless of what happens, I hope that you can retain that.[100]

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[96]Bruce Detmers, interview with Gregg Bleam, May 1, 1995 (transcript on file in the JNEM Archives). "I remember in a meeting with Conrad Wirth discussing the sequence of the project, Eero said the Arch is the most important part of the project, then the landscaping and then the museum. Wirth responded, 'No, the priorities are the Arch first, the museum second, and the landscape third.' For him the planting was not a high priority."

[97]Correspondence from Eero Saarinen to Dan Kiley, dated January 30, 1961. Copy on file in the JNEM Archives, uncatalogued collection.

[98]Correspondence from Terrance J. Boyle to Dr. Philip C. Stowe, Entomology Department, University of Missouri, dated February 7, 1961 (copy on file in the JNEM Archives). Boyle, an associate in Kiley's office, was interested in information about plant pests.

[99]Correspondence from Eero Saarinen to Dan Kiley, dated January 30, 1961. Copy on file in the JNEM Archives, uncatalogued collection. Wirth's criticisms of the sculpted landform is interesting in that it seems his opposition was to the inclusion of large berms to protect the site from noise from the nearby expressway, elements that were probably added at the suggestion of NPS representatives at the March 1960 presentation of the Oregon and Santa Fe Trail plan. However, it was also at about this time that Saarinen successfully pushed for a depressed expressway, his success and growing budget constraints probably affecting the NPS's attitude toward the berm. The criticism of the underbrush was most likely Wirth's response to the detailed planting plans for the areas adjacent to the railroad cuts.

[100]Correspondence from Dan Kiley to Eero Saarinen, dated February 3, 1961. Copy on file in the JNEM Archives, uncatalogued collection. Kiley was referring to the original competition program which stated: "Every associate whose name appears as joint Author of a submission will be given full credit by name, in all publicity, for his contribution and, if associated with the Architect winning the First Prize, will be recommended, along with him, for ultimate employment by the Department of the Interior in executing the design." However, the Department of the Interior

Although Saarinen was successful in retaining Kiley for conceptual landscape design services on the Memorial, it was clear that the planting plan would have to be reconsidered in light of the increasing budget constraints.[101]

Late 1961 and the beginning of 1962 was a time of regrouping for the design team, following Saarinen's death, with Kevin Roche of the Saarinen office meeting with Kiley's office to reassess the landscape design.[102] From this point until the final planting plan was completed in late 1964, there was consistent activity from Kiley's office in preparing planting plan variations (see figure 29). Yet, by the end of 1962, the conceptual plan for the planting of the Memorial shifted considerably, and the variations revolved around a common conception, a planting of forest and meadow.

Budget constraints forced Kiley to reassesses the relationship of forest to clearing, as the opportunities to create special site features and so extensively plant the tall tree forest were lost. As a result, the curvilinear scheme for the walks remained the same, set by the Memorial's earlier site planning, but much else changed. The remainder of the site, which had always been presented as heavily forested, was changed to depict areas both as heavily forested and as two extensive open meadows. Kiley intended to present a contrast between the open meadow and forested area, a simple presentation of nature.

But the most important aspect of the planting plan remained the idea of forest as setting for the Memorial, and rather than relying on the entire site to emphasize this relationship, it was to be most strongly emphasized through the trees lining the curvilinear walkways. To create this effect, Kiley proposed lines of closely spaced tulip poplar trees three rows deep for most of the length of the walks. Thus, the character of the walkways themselves changed in the sense that the walks became more heavily lined with trees than prior plans had shown.

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was never obligated to hire the design team recommended through the competition. Jefferson National Expansion Memorial Association, "Architectural Competition for the National Expansion Memorial, Program" (St. Louis: 1947). This document is on file in JNEM Archives, Record Unit 104, box 26, folder 2.

[101]The particulars of Saarinen's maneuverings to retain Kiley for design development of the landscape plan are unknown. It does appear that Saarinen successfully pleaded Kiley's case without Kiley's participation in the lobbying effort. Later interviews with Kiley suggest that the relationship between he and Wirth was strained, and he attributes this to various causes: 1) Kiley's failure to join the American Society of Landscape Architects, an organization of which Wirth had been president; 2) a belief on Wirth's part that the landscape architects employed by the National Park Service were the best in the country, and therefore, an outside consultant such as Kiley was seen as unnecessary; and 3) a disagreement over design philosophy, Kiley referring to Wirth as being from the Olmstedian tradition. This is drawn from the Mary Hughes interview with Dan Kiley, June 8, 1991 (transcript on file in the JNEM Archives) and the Bob Moore interview with Dan Kiley, July 22, 1993 (transcript on file in the JNEM Archives).

[102]Bruce Detmers to Dan Kiley, January 9, 1962 (copy on file in the JNEM Archives, uncatalogued collection). Bruce Detmers, an associate in the Saarinen office, was writing to confirm an upcoming meeting "to resolve the landscaping and site problems."

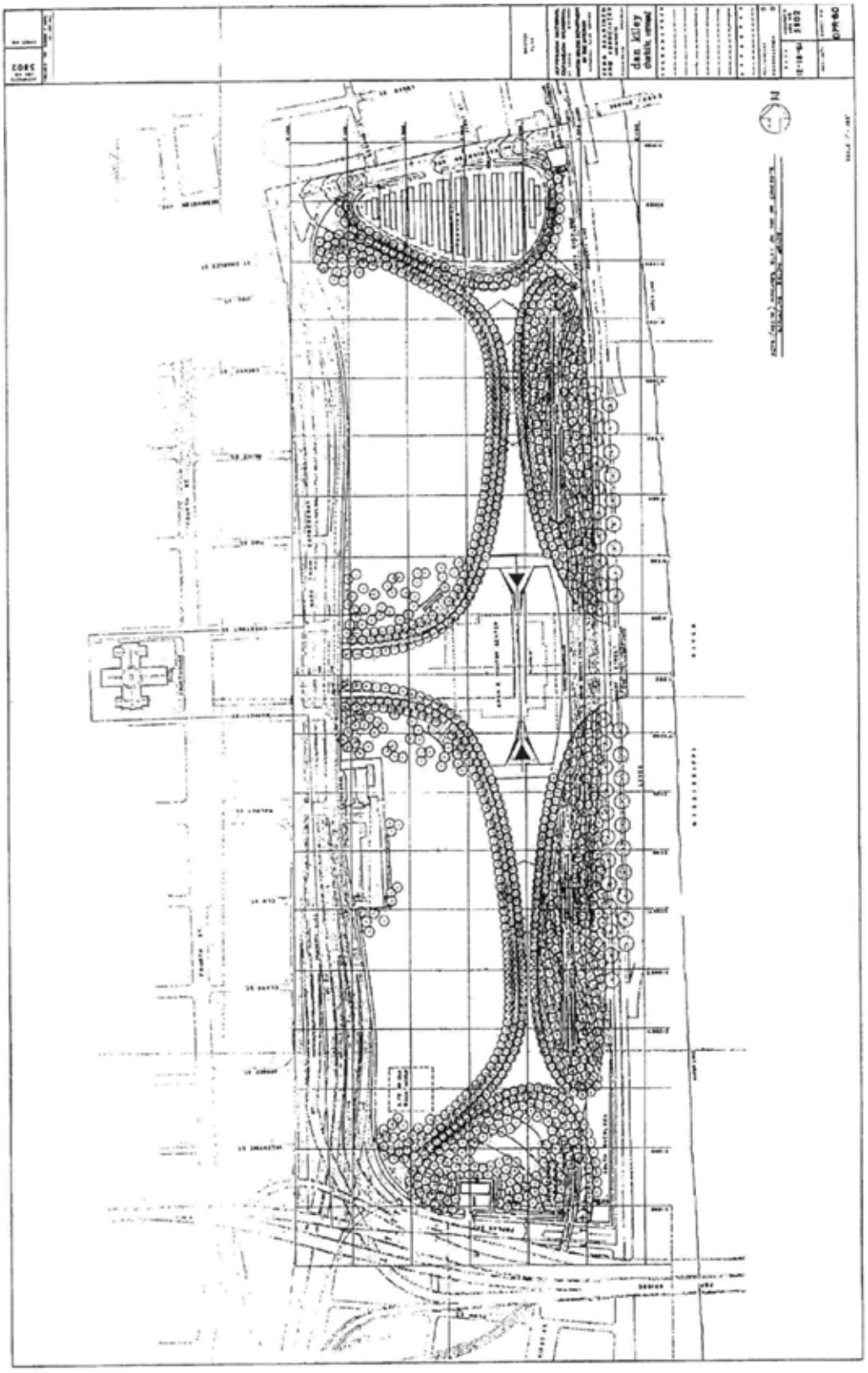

Figure 29: Office of Dan Kiley, Schematic Planting Plan, December 1961. (JNEM Archives, uncatalogued collection).

The new conception first emerged in a series of drawings prepared by Peter Ker Walker of the Kiley office in late 1962, watercolor renderings completed as part of a promotional package requested by the NPS. Included were a plan and perspective drawings featuring views of the Arch in different seasons of the year (figures 30, 31, & 32).[103] The NPS, however, was dissatisfied with the plans, their quality, and that the main walks were too heavily planted with trees, and wished to see their numbers reduced so as to better afford views of the Arch along the walks.[104] They failed to understand Kiley's thinking about movement and "spatial continuity."[105] Future variations of the plan continued to feature curvilinear walks heavily lined with multiple rows of tulip poplars.

A new set of drawings was prepared by Kiley's office for a March 18, 1963, meeting with the NPS (see figure 33). At this time it was agreed that the tree massing should reinforce the plan of the walks, and that the plan should hold to the concept of contrasting closed spaces and open areas; Kiley's conception had been accepted. Therefore, while the NPS was concerned that the Kiley office review their proposed plant species with a materials list provided by the City of St. Louis, Department of Parks, Forestry and Recreation, by and large, Kiley and the NPS were approaching a planting plan suitable to both parties.[106] Over the course of the next few months, the plan changed through the incorporation of new alignments to the expressway and the paths leading to the courthouse. Earlier in the year, Saarinen's office had already explored a variety of schemes for bringing pedestrians across the expressway from the Memorial to the Old Courthouse.

Although certain species such as the tulip poplar had been favored in earlier schemes, plant species were finally decided upon only after much investigation, accounting for earlier research efforts and responding to NPS requests for additional investigation. In 1963, while the planting plan was evolving in accordance with the new conception, Kiley's office again contacted numerous sources for input on proposed species, including the Missouri Botanical Garden, and the City of St. Louis, Department of Parks, Recreation and Forestry.[107] The responses were favorable to the species chosen, with one exception. Harland Bartholomew and Associates, a planning and landscape architecture office located in St. Louis, recommended against the use of the tulip poplar on aesthetic grounds, the only source contacted which answered negatively.[108]

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[103]Phillip Shipman to Bruce Detmers, October 2, 1963 (copy on file in the JNEM Archives, uncatalogued collection). Shipman, an associate in the Kiley office, discussed the promotional package and listed the drawings initially prepared for that package.

[104]Robert Hall, Chief EODC, to the Office of Eero Saarinen and Associates, February 7, 1963 (copy on file in the JNEM Archives, uncatalogued collection). The letter points out the NPS's concerns with the landscaping plans and drawings prepared to date.

[105]The Tulip Poplar was important, if not essential, to Kiley's plan: "...I wanted tulip poplar, and I checked with horticulturists all over the country and everybody said it was a great tree...with so many rows of trees together, it's just like a forest. In Virginia the tulip poplar is beautiful, growing all over the forests there in Virginia, and it's just a fantastic tree." And, "I wanted something that soared up, cathedral-like with big, high trunks..." Kiley also favored the Tulip Poplar because it grew fast. Mary Hughes interview with Dan Kiley, June 8, 1991 (copy on file in the JNEM Archives).

[106]Bruce Detmers to Robert Hall, Chief EODC, March 25, 1963 (copy on file in the JNEM Archives). The letter summarizes points addressed at the March 18, 1963 meeting with the NPS to discuss the landscape plan.

[107]In a letter from an associate in the Kiley office, "We intend using a considerable quantity of some of these plants and, therefore, must be very certain of their validity and how they react to city conditions, local diseases, and pests, etc." Records show that the letter, dated May 17, 1963 from Joseph P. Karr, was sent to at least the following sources: the Missouri Botanical Garden; the City of St. Louis, Department of Parks, Recreation and Forestry; Mr. Eldridge Lovelace, Harland Bartholomew and Associates; and the Morton Arboretum, Lisle, Illinois (copies on file in the JNEM Archives).

[108]Eldridge H. Lovelace, Harland Bartholomew & Associates to Joseph P. Karr, Office of Dan Kiley, May 23, 1963 (copy on file in the JNEM Archives, uncatalogued collection).

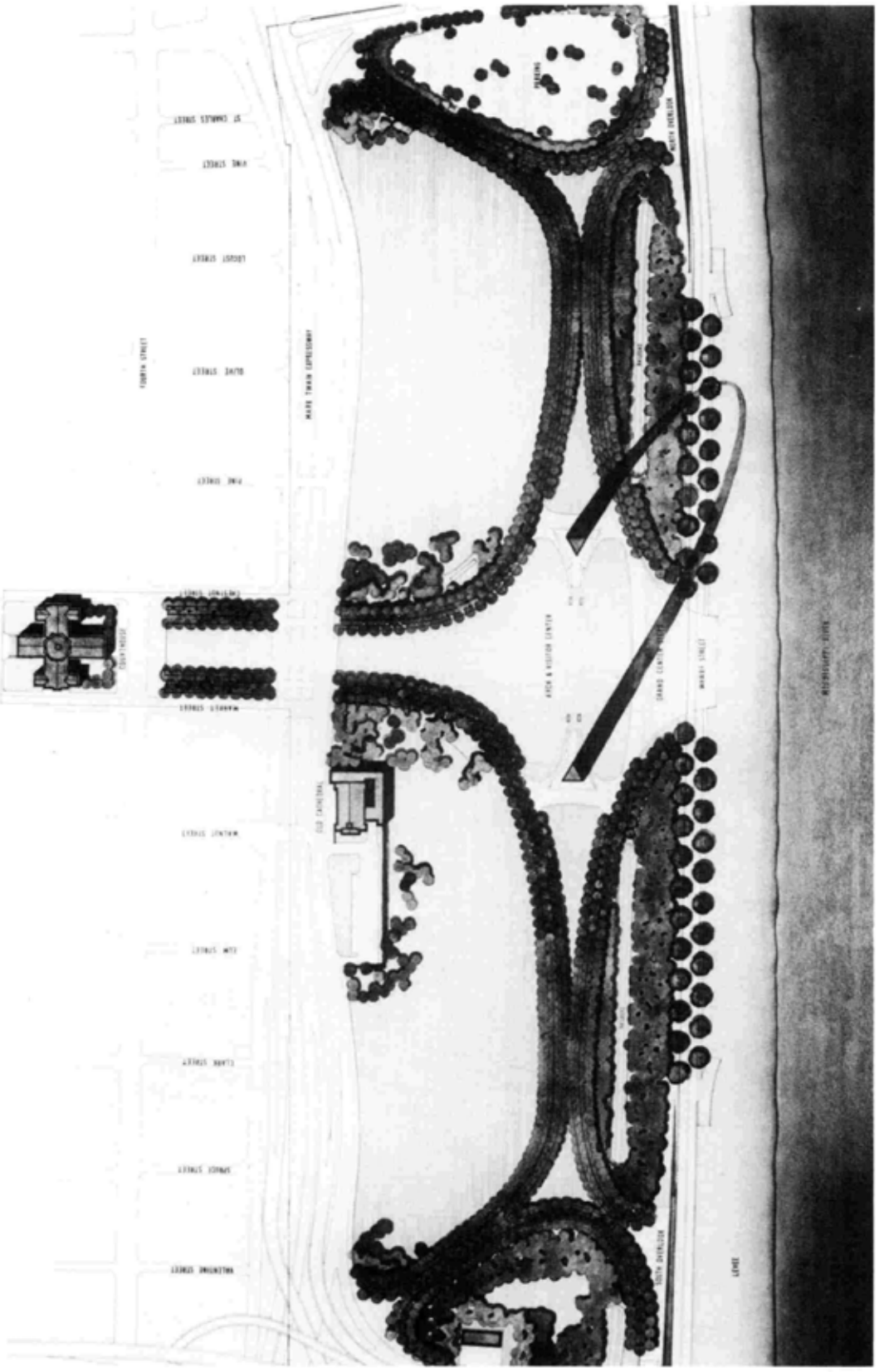

Figure 30: Office of Dan Kiley, Site Plan, Watercolor, December 1962. (JNEM Archives, Reference Photograph Collection).

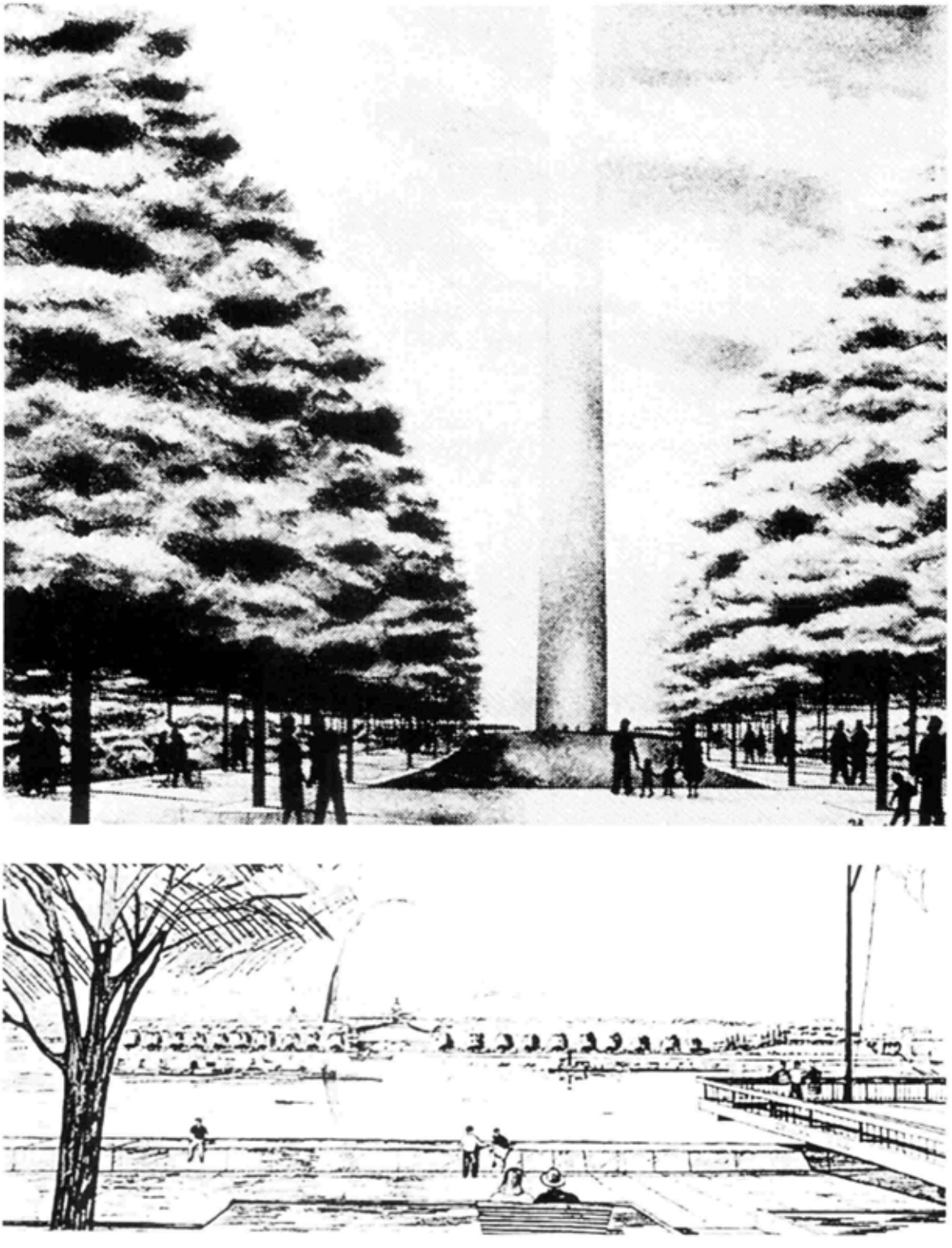

Figure 31: Office of Dan Kiley, Perspective Images, Watercolor, December 1962. (JNEM Archives, uncatalogued collection).

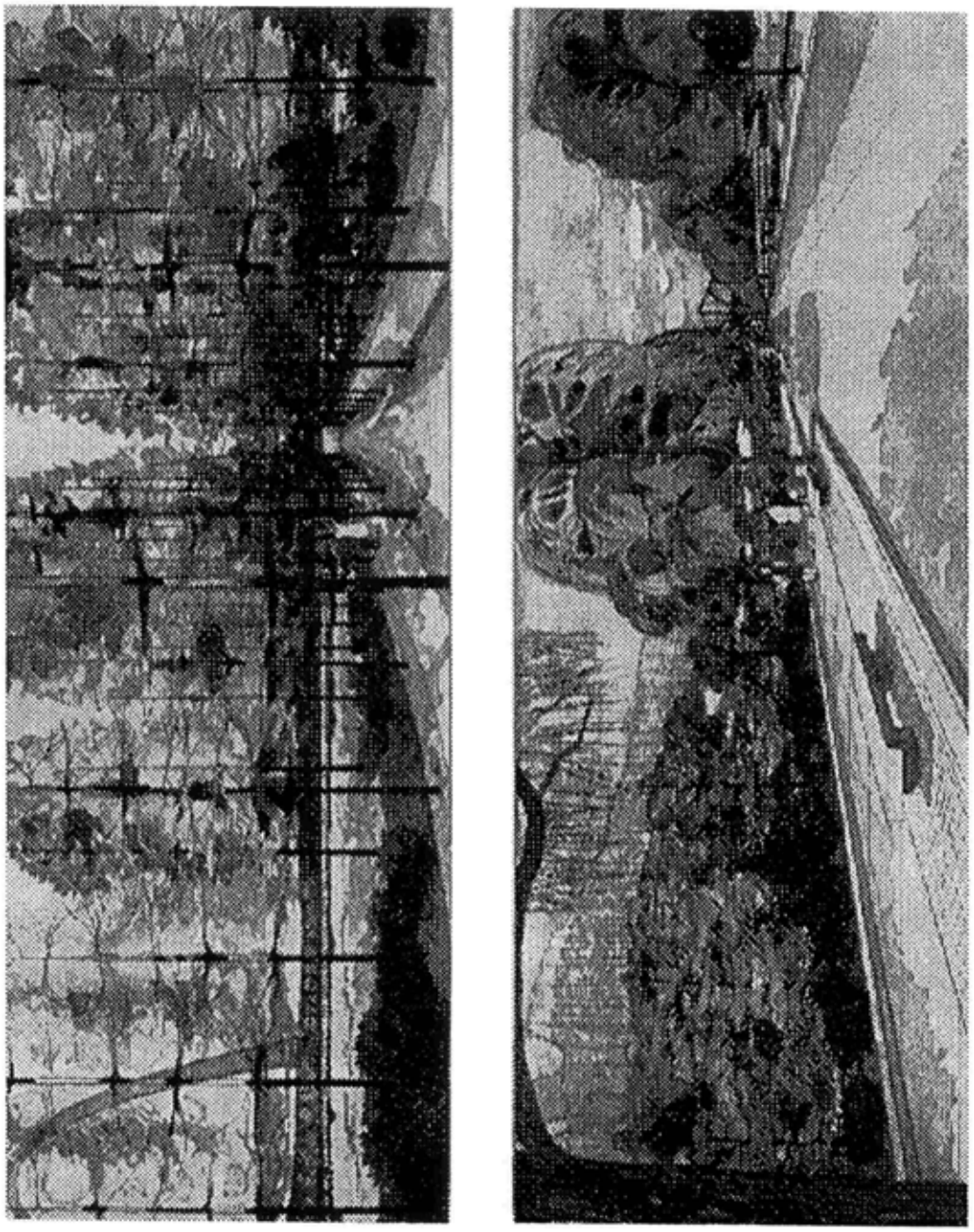

Figure 32: Office of Dan Kiley, Perspective Images, Watercolor, December 1962. (JNEM Archives, uncatalogued collection).

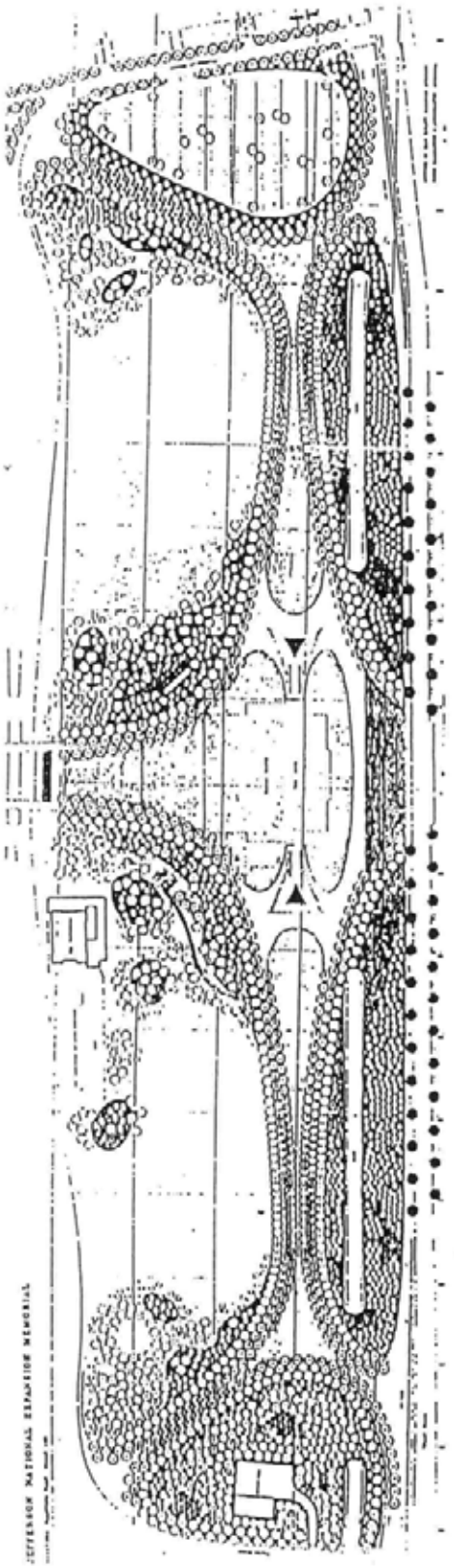

Figure 33: Office of Dan Kiley, Conceptual Planting Plan, March 1963. (JNEM Archives, uncatalogued collection).

> The Tulip Tree loses its leaves very early here. Because so many other trees put on a very fine leaf show for us, it seems a shame to devote any space to this one. I would omit it completely.[109]

In the final planting plan from Kiley's office, approved by the NPS, the tulip poplar remained. The tulip poplar had too many other qualities, such as its scale, stature, and fast growth, which Kiley found essential to the design (see figure 34).

By September 1963, a new set of presentation drawings was complete, including a sequence of study sketches depicting views throughout the Memorial (figure 35). Included with these sketch views were studies examining lakes proposed within the Memorial site; the lagoons which had disappeared following Wirth's landscape cut backs in 1961, had returned on some of the drawings as an element to reconsider (figure 36).[110] Robert G. Hall, chief of the NPS's Eastern Office of Design and Construction (EODC) , responded favorably to the plans, although he expressed some reservations relative to the lagoons: "Mr. Kiley did a very fine job presenting the revised plans, and we are most happy with the results." Some minor modifications were still requested as the design of the pedestrian bridges over the expressway were still in flux.[111] Nevertheless, a major hurdle had been crossed. On November 4, 1964, the Office of Dan Kiley shipped the final conceptual landscape drawings to the NPS for approval.[112]

Arch Construction Begins

Construction on the Memorial proceeded apart from a finished planting plan, as it had already been decided that the landscape program would be a subordinate phase of development. On March 14, 1962, Director Wirth signed the contract for construction of the Arch, and the first concrete for the foundations was poured on June 27 of the same year. Yet, by the end of 1962, financial troubles emerged more seriously than before.

Although extensive cutbacks in the project were decided upon the previous year, it was becoming evident that the cost of the Memorial project would exceed original estimates. As a result, the NPS decided that it would have to change its stand and request Congressional funds above the limit which had been promised. Wirth recognized that this would be an inevitable outcome if the project was to be completed in accordance with the

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[109]Eldridge Lovelace, Harland Bartholomew and Associates, to Joseph P. Karr, May 23, 1963. Copy on file in the JNEM Archives, uncatalogued collection.

[110]Shipman to Detmers, October 2, 1963. Copy on file in the JNEM Archives, uncatalogued collection. This letter lists the sequence of drawings prepared. In this same letter Shipman describes the preparation of drawings for September 7, 1963, illustrating the lagoons: "The original 1/30 scale plan by this time was in poor physical condition due to erasing, and in anticipation of a final meeting with Conrad Wirth a new plan seemed both a practical necessity and a desirable presentation item. During the following weeks a discussion on the "pros and cons" of lakes emerged, which resulted in the then obsolete 1/30-scale plan being revised to show a "lake scheme." A sequence of study sketches was also submitted for your consideration and were subsequently drawn in more presentation detail for the most recent meeting."

[111]Robert Hall, Chief EODC, to the Office of Eero Saarinen and Associates, September 17, 1963 (copy on file in the JNEM Archives, Record Unit 106, box 36, folder 20). The letter also includes the following comment: "We were interested to review the suggested additional features for the Memorial, as illustrated in some of the sketches and in the extra plan which was included in the presentation. However, similar proposals have been suggested before but were not acceptable." This comment presumably refers to the reemergence of the lagoons as a plan element.

[112]Transmittal for final landscape drawings, dated November 4, 1964.

basic plan. Even so, funding from other sources was pursued. For instance, through a bond issue, the Bi-State Development Agency (established by the states of Missouri and Illinois to promote licensed transportation in and around St. Louis) provided for the construction of the transportation system to take visitors to the top of the Arch. This was critical, as the elevator was regarded as a key public attraction and there were no Federal or local funds to build it.

The new construction stirred up interest from the press and surrounding community, and the first stainless steel section of the Gateway Arch was set in place on February 12, 1963. By the end of that year the north leg of the Arch stood at 168 feet, and the south leg measured 120 feet. In addition, Phase I and Phase II of the Memorial's construction were essentially complete by the end of 1963, and the NPS staffers had made considerable progress toward completion of the research, planning, design and specifications for exhibition units. Work on the Third Street Expressway also began in 1963, following plans to depress the expressway in front of the Memorial.

Despite work stoppages along the way, including a delay to question the Arch's stability, the north leg of the Arch reached 326 feet high and the south leg just over 347 feet by the end of 1964.[113] Nonetheless, with the passing of the city's 200th anniversary, and public interest at its height because of the ongoing construction, pressures to complete the Memorial and to do so rapidly were extreme. By this time, however, the NPS would give no assurances regarding the completion date, and was preparing to seek additional funds from Congress.

[113]For more information regarding the questions of the Arch's stability see Brown, *Administrative History,* 138, JNEM Archives Record Unit 106, box 35 and 36; and "Gateway Arch Design Tested in Wind Tunnel," *The Globe-Democrat* (Washington Bureau), January 7, 1965, JNEM Archives, Record Unit 119, box 27.

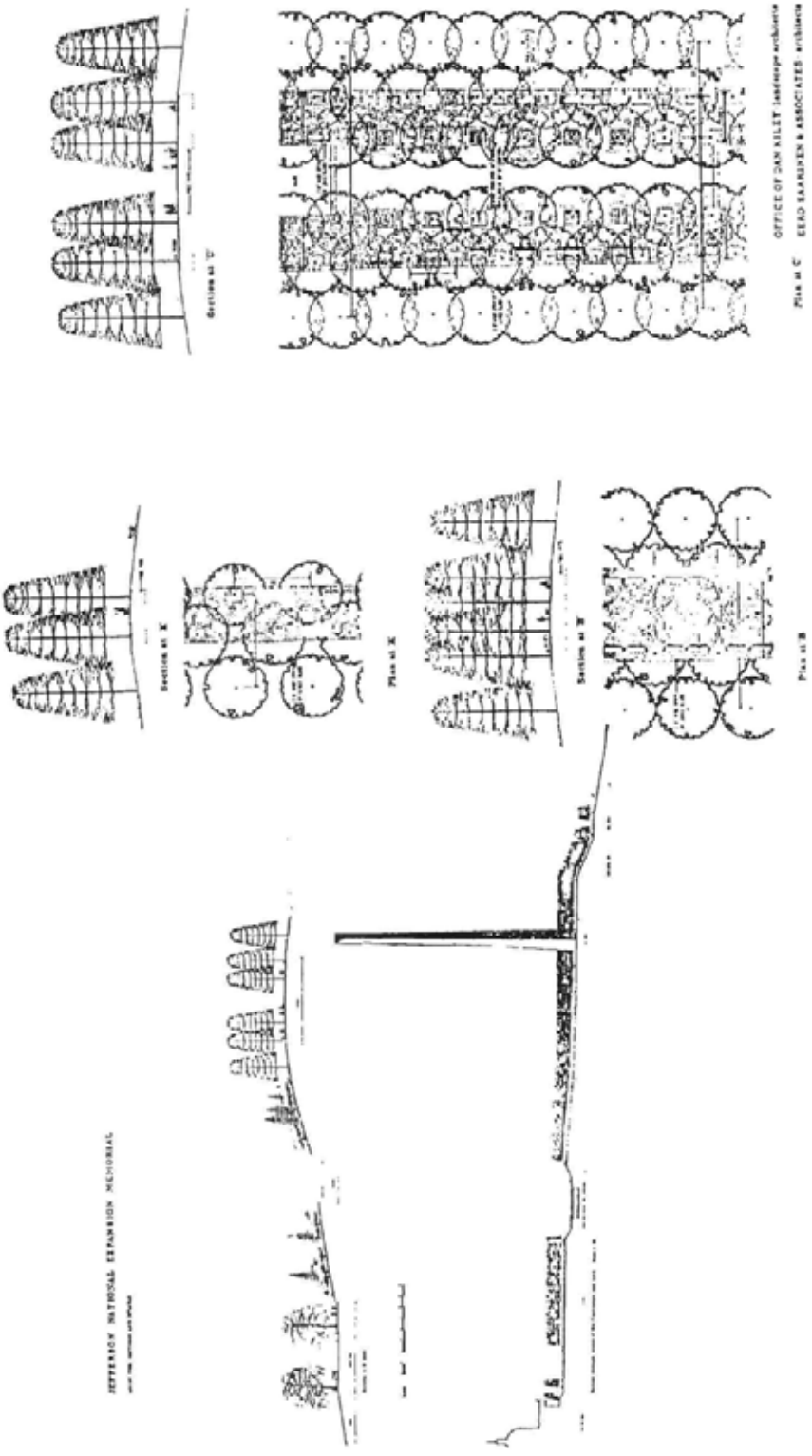

Figure 34: Office of Dan Kiley, Section and Plan Details of Tulip Poplar Plantings, March 1963. (JNEM Archives, uncatalogued collection).

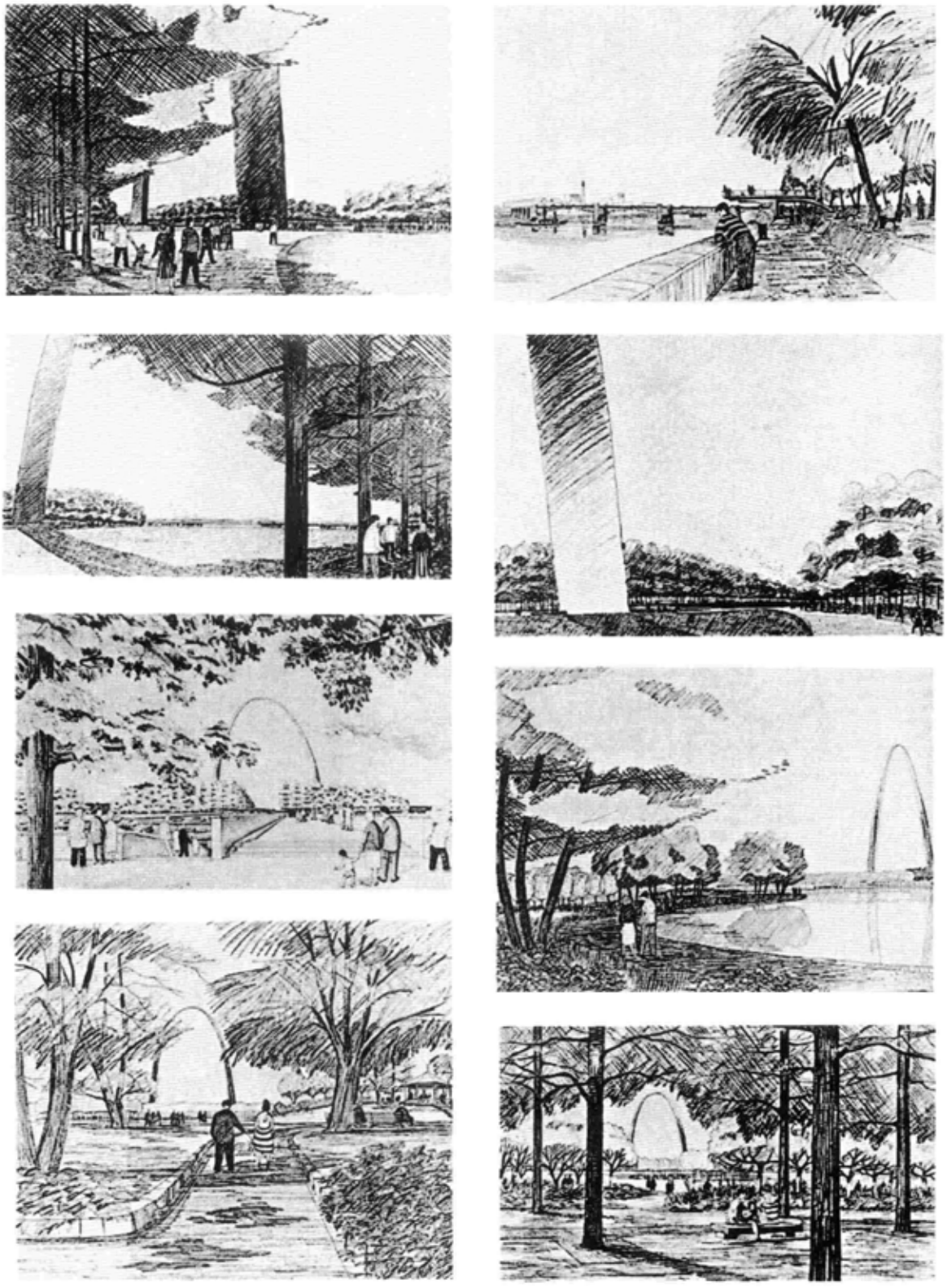

Figure 35: Office of Dan Kiley, Perspective Drawings, September 1963. (JNEM Archives, uncatalogued collection).

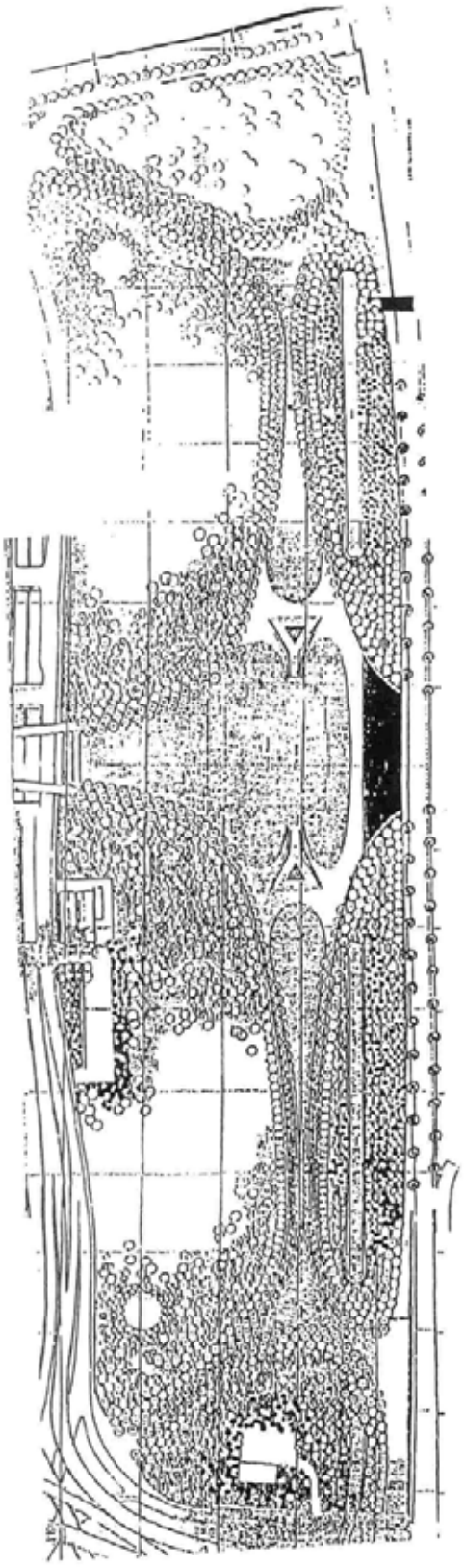

Figure 36: Office of Dan Kiley, Final Conceptual Planting Plan, 1964. Note: Without Lagoons. (JNEM Archives, uncatalogued collection).

1965-1966: Kiley's Final Plan Approved

During 1965, the pursuit for Federal funds was renewed, this time in excess of the Federal ceiling established with the $17.25 million authorization. With George Hartzog, Jr. as the new Director of the National Park Service, an increase to $23.25 million in authorized funds was sought. Hartzog felt that the additional $6 million would place the NPS in excellent financial shape to finish the project in accordance with the basic elements desired; he especially wished to see the Museum of Westward Expansion completed in a timely fashion. Meanwhile, Mayor Raymond Tucker hoped that the additional funds would permit the construction of the giant steps leading from the river to the Arch, which had previously been cut from the development program. With the backing of senators from a number of states, President Lyndon Johnson signed a bill on October 19, 1965, authorizing the additional funds.[114]

The Arch's Last Section

The last section of the Arch was finally put in place at a public ceremony marking the occasion on October 28, 1965; with this section added, the Arch structure stood complete at 630 feet above the city. Much work remained to be done until the Memorial's dedication, including interior work on the Arch itself, such as completion of the all-important transportation system. In fact, due to the various struggles in acquiring funds and completing the work, the Memorial was not dedicated until May 25, 1968, twenty years to the day after the U.S. Territorial Expansion Memorial Commission accepted Eero Saarinen's design for the Arch. Even with the dedication, two crucial elements remained incomplete which were vital to Saarinen's complete conception: 1) the landscaping of the grounds and 2) the Museum of Westward Expansion.

Kiley's Final Planting Plan

The conceptual planting plan, which Saarinen fought to have Kiley prepare, was eventually completed and approved in accordance with the ideas explored and settled upon during the previous few years on February 2, 1966 (see figure 37).[115] This plan was to guide the landscaping of the grounds in the future; but would be deviated from over the years.

The plan as approved revealed and reinforced the site planning strategy largely devised by Saarinen. The roughly bilateral form was clear, as were the sweeping curves of the walkways which reflected the form of the Arch. Emphasizing this structure were Kiley's desired tulip poplars which lined the major walks and brought the Old Courthouse into the whole composition, typically planted in rows three deep. The remainder of the site took the quality of the tall tree forest and meadow, areas densely planted with tall trees and flowering trees at the edges, distinct from two large and open meadow areas. The ascending quality of the tulip poplar tightly planted in a regular fashion dominated the remaining forested areas, mixing white oak, red oak, hackberry, and maidenhair tree (gingko). Only the tulip poplar had the stature to bring the pedestrian into direct relation with the immense Arch.

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[114]Brown, *Administrative History*, 139.

[115]This date is taken directly off the final approved plan, #3071C. Copy on file in the JNEM Archives, Record Unit 120, drawer 12, folder 10.

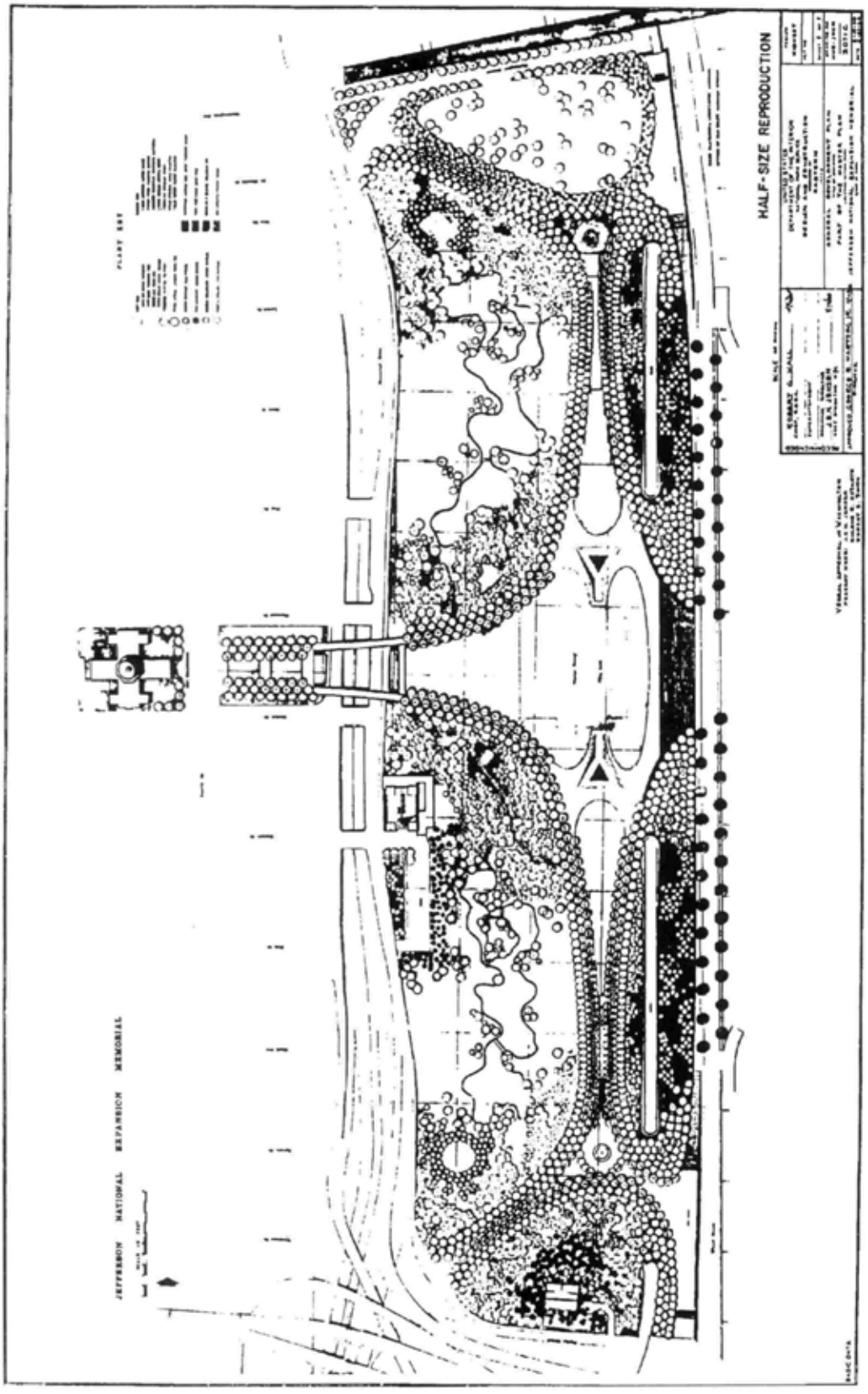

Figure 37: Office of Dan Kiley, Final Conceptual Planting Plan, 1964. National Park Service Approved February 1966. (JNEM Archives, Record Unit 120, drawer 12, folder 10).

Along the forest edge and leading into the meadows were the flowering trees, primarily eastern redbud and flowering dogwood for color and texture. The lagoons which Conrad Wirth ordered removed, reemerge in the midst of either meadow, large site elements with a complex form and extensive outline. The form of the lagoons might even be described as idiosyncratic; the water's edge interacts with the edges of Kiley's forest to create intimate spaces within the larger whole. The composition became the unified and serene park setting initially envisioned for Saarinen's majestic Arch.

1966-1978: Construction Document Preparation

Upon Director Hartzog's approval of Dan Kiley's design development plan, the plan was forwarded to the NPS' Eastern Office of Design and Construction (EODC) in Philadelphia. Careful analysis of both the 1966 approved Kiley plan and the NPS first phase development plan revealed that revisions to the plant composition and open space, as well as other seemingly minor alterations during the preparation of construction documents, ultimately clouded the original design intent. The story of the preparation of construction documents and specifications, the players involved, and the modifications which were made to the plan is told below. Although construction of some of the major site elements took place simultaneously, including construction of the Arch, the physical history of the landscape is not discussed until the following chapter.

National Park Service Modifications

Construction documents and specifications based on the 1966 approved plans were completed over a twelve-year period by the National Park Service design and construction offices and by a local St. Louis firm, Harland Bartholomew & Associates (HBA). Financial opportunities and constraints at different times during the long project implementation process required reformatting the drawings into different bidding packages. Because the implementation of the landscape development spans twelve years and the hands of many different professionals, the history can be quite confusing. The remainder of this chapter documents the NPS and HBA's role in the design development of the Arch landscape.

Financial and programmatic delays held up progress until April 1969. In the NPS San Francisco Center, Landscape Architect John Ronscavage led the development of construction drawings and specifications for the landscape surrounding the Gateway Arch.[116] According to Mr. Ronscavage, the NPS had every intention of following Kiley's approved design development plan as closely as possible.[117]

It was no secret that St. Louisans were unhappy about the dismal landscape surrounding their newly

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[116]Glenn O. Hendrix, Chief, Design and Construction, SSC [San Francisco Service Center] to Acting Assistant Director, Design and Construction, May 26, 1969. JNEM Archives, Record Unit 106, box 36, folder 12. A reorganization of the design and construction offices of the National Park Service occurred early in 1969. All of the areas in the Midwest Regional Office (which included JEFF) were transferred from the Eastern Office of Planning and Design to the San Francisco Planning and Design Office (later called the Western Service Center). A second reorganization of the design and construction offices of the National Park Service occurred in 1972, when the Western Service Center and Eastern Office of Design and Construction merged to form the Denver Service Center in Denver, Colorado.

[117]John Ronscavage, interview with Gina Bellavia, Denver, Colorado, November 15, 1994. John Ronscavage, Team Captain, JEFF Design Team, to Chief, Design and Construction, SSC Glenn O. Hendrix, July 23, 1969. JNEM Archives, Record Unit 106, box 36, folder 12.

constructed $14 ½ million Arch.[118] In response to their concerns, John Ronscavage and the design team focused on preparing construction documents for as much of the landscaping as the budget would allow. The initial package prepared for bidding purposes included both grading and planting of the north-south axis of the Arch, as well as repairs to the visitor center roof (waterproofing), and drainage (see figure 38). The design team hoped that completion of this work would change the appearance of the Arch grounds considerably, and temporarily satisfy the local community.

The construction documents were completed in August 1969.[119] Several differences between these and the approved design development plan were noticeable. First, the design team removed the lagoons from the plan because at that time money was not available for their construction. They also removed fountains on either end of the park for the same reason.[120] The plant list remained the same except for the substitution of white pine (Pinus strobus) and Austrian pine (Pinus nigra) for Canada hemlock (Tsuga canadensis).[121] The substitution resulted from discussions between the NPS and the City Forestry Department in which the foresters noted Canada hemlock was not suited to the conditions at the Memorial site (acid soils are necessary for this tree and they are intolerant of wind and pollution).[122]

A second notable revision came in January 1970 with another change to the plant list. The design team removed the maidenhair tree (Gingko biloba) from the list. The reason for this remains unknown and seems unusual, because correspondence dated after January 1970 suggests that the Ginkgo was a suitable tree for the on-site conditions and was previously approved by the NPS.[123] Nonetheless, the bidding package was put together using these drawings and "Site Development Phase I" was scheduled to open for bids on March 19, 1970.

Plant Substitutions

Before the official opening of bids for the first phase of landscaping took place, the NPS's plans and specifications met with criticism. In a March 12, 1970 article in the Globe-Democrat, members of the Greater St. Louis Nurserymen's Association publicly criticized the heavy use of tuliptrees.[124] Several other nurserymen agreed that St. Louis is the "northernmost boundary" for the tuliptree and it will "leaf scorch and drop leaves all summer long..."[125] Other concerns included the risk of planting a monoculture, combining earthwork, walk construction and planting in the same contract, the large size of trees specified, and restricting the source of plant material to those available at nurseries within a 50-mile radius around St. Louis.

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[118]"Beauty, Not Bickering," *St. Louis Post-Dispatch*. February 26, 1968.

[119]National Park Service, San Francisco Planning & Service Center, drawing number 366/41001, *Site Development, Arch, Jefferson National Expansion Memorial*, August 1969. Copy on file in the JNEM Archives, unprocessed Rennison Collection.

[120]Ibid.

[121]Comparison of approved design development plan (#3071C) and DSC construction drawing #366/41001. Copies on file in the JNEM Archives, unprocessed Rennison collection.

[122]Rich Huber to Ray Freeman, March 20, 1970. JNEM Archives, Record Unit 106, box 36, folder 23. Mr. Huber indicated that landscape architect John Ronscavage had discussions with the City Forestry Department which revealed that the hemlock was not suited to the existing conditions of the site.

[123]Glenn O. Hendrix, Chief, Environmental Planning & Design, WSC to Director, National Park Service, 25 June, 1970. JNEM Archives, Record Unit 106, box 36, folder 27. This change is reflected on JEFF drawing No. 366/41001B. Copy on file in the JNEM Archives, unprocessed Rennison Collection.

[124]"Nurserymen Fear Arch Landscape May Stay Bleak." *The Globe-Democrat*, February 5, 1970.

[125]Ibid.

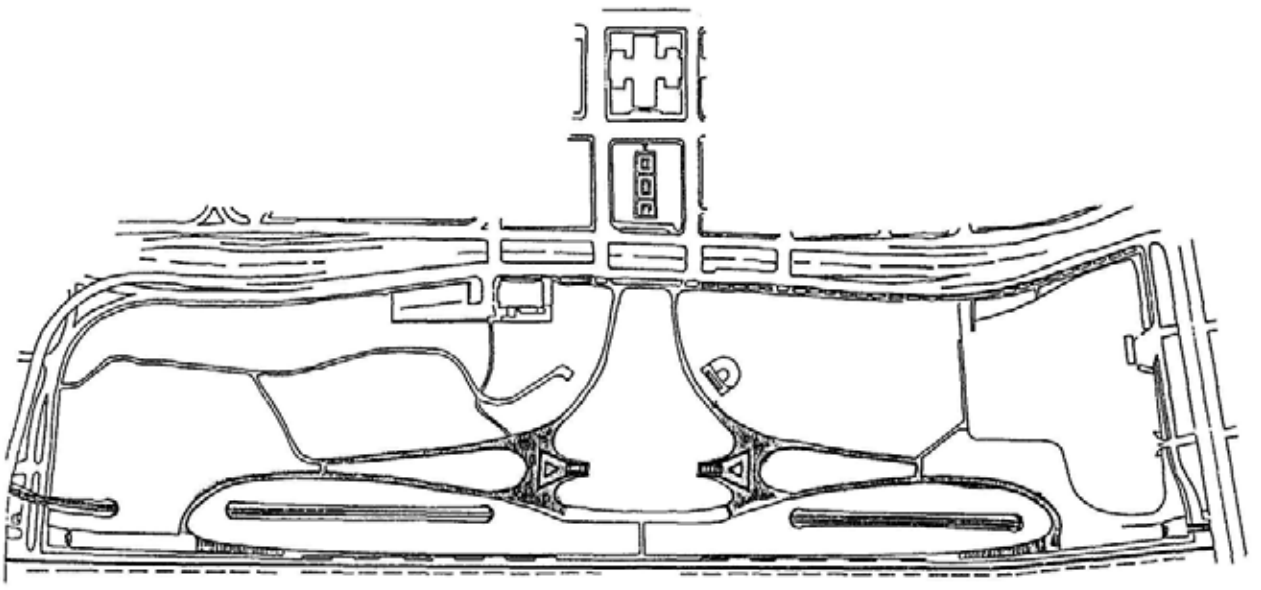

Figure 38: Limits of Construction Phase I. (Bellavia, 1996).

The article prompted public debate and local citizens even wrote letters to their Missouri Congressmen.[126] Senator Thomas F. Eagleton and Congresswoman Leonor K. Sullivan responded by contacting Director George B. Hartzog and others to inquire about the situation.[127] This, of course, was sent through the appropriate channels for consideration. Oddly enough, all bids received for the work exceeded the Government estimate and therefore were discarded. The design team repackaged the proposal and eliminated the planting portion, thereby buying time to deal with the controversy over the plant list.

The re-packaging resulted in three new sets of construction documents, two new phases of site development and one phase of planting. The new "Site Development Phase I" consisted of grading the north-south axis of the Arch, installing temporary crushed stone walks, waterproofing the visitor center roof, drainage, and seeding.[128] The final revision on this drawing was dated April 1970 and the work was contracted in June of the same year.

The second set of drawings, entitled "Site Development Phase II," consisted of water mains, storm drainage, electrical distribution, paving roads and walkways, topsoiling, lawn seeding, and planting wells for the trees (all along the north-south axis of the Arch).[129] This work was contracted shortly after Phase I. Kiley's

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[126]Mrs. Kay Houlihan Behan to Senator Thomas Eagleton, March 11, 1970; Mrs. Paul Shatz to Representative Leonor Sullivan, March 13, 1970; Clarence Owens to Senator Thomas Eagleton, March 12,1970, JNEM Archives, Record Unit 106, box 36, folder 23.

[127]Thomas F. Eagleton to Charles Hamilton, March 16, 1970; Leonor K. Sullivan to George B. Hartzog, March 18, 1970. JNEM Archives, Record Unit 106, box 36, folders 23 and 25 respectively.

[128]JEFF Drawing No. 366/41001C. Copy on file in the JNEM Archives, unprocessed Rennison Collection.

[129]JEFF Drawing No. 366/41009. Copy on file in the JNEM Archives, unprocessed Rennison Collection.

approved plan did not specify paving materials for the walks. Therefore, the NPS specified exposed aggregate in these drawings. The same material was being used at nearby Kiener Plaza and the team thought it would be appropriate to use it on the Arch grounds.[130]

"Planting Phase I,"dated August 1971, consisted of planting trees on the east slope of the railroad tunnels and along the walks (see figure 39).[131] By the time these drawings were completed, two of the three plants specified for phase I had been substituted. The dominant plant species was changed from the tuliptree to the 'Rosehill' white ash (Fraxinus americana 'Rosehill'), and the Canada hemlock replaced with Japanese black pine (Pinus thunbergiana). These were the final construction drawings developed by the NPS design offices for the initial stages of development.

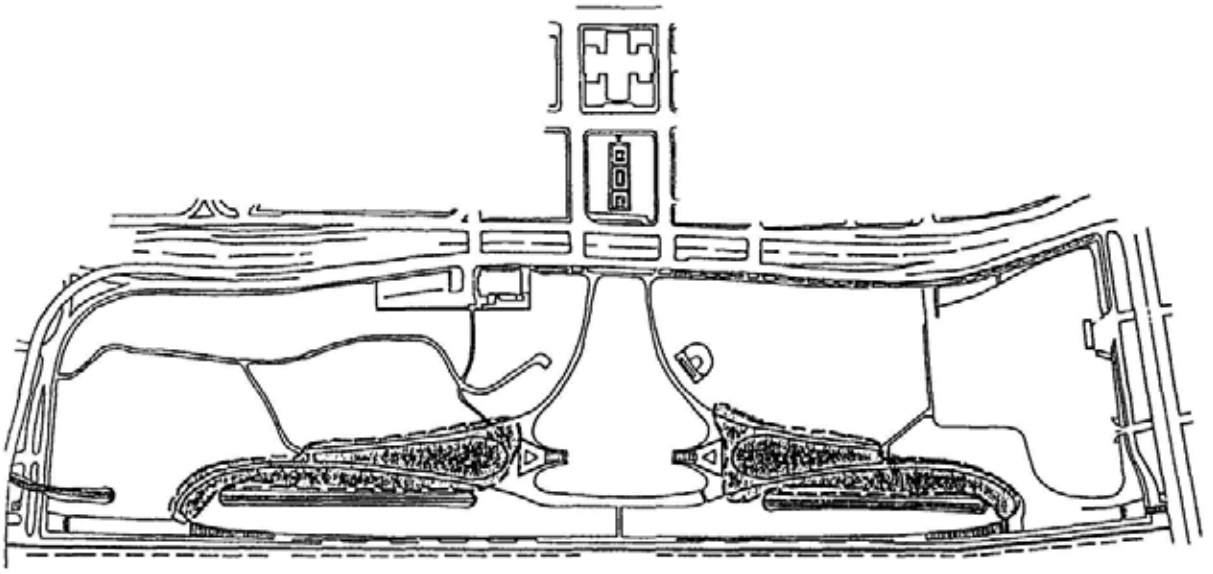

Figure 39: Limits of Phase I Planting Plan. (Bellavia, 1996).

The opposition to the selection of plant materials came as a surprise to the design team in 1970. Records indicate that Dan Kiley contacted local experts regarding his proposed plant list and only one response raised any concern over the use of the tuliptree, all others approved of its use.[132] In fact, in 1961, the St. Louis City Department of Parks, Recreation, and Forestry shared their plant materials list with Superintendent George Hartzog which listed the tuliptree. Moreover, the NPS design team also contacted local experts and again met with general approval. For unknown reasons, objections to the tuliptree were not raised on these earlier occasions, yet were clearly voiced when the contract went out to bid.

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[130]John Ronscavage, personal interview with Gina Bellavia, November 15, 1994, page 21, copy on file in the JNEM Archives.

[131]JEFF Drawing No. 366/41006. Copy on file in the JNEM Archives, unprocessed Rennison Collection.

[132]Joseph P. Karr, Office of Dan Kiley, to Missouri Botanical Gardens, May 17, 1963. Copy on file in the JNEM Archives, uncatalogued collection.

The second protested issue regarding the planting was the restriction placed on the source of plant material to a radius of 50 miles from St. Louis. These limits were later extended to a distance of 250 miles to the north, east, and west. The 50-mile restriction to the south remained. This specification was developed based on a recommendation by the City Forestry Department, for in their experience, plant materials from the south had a higher risk of disease and were generally less hardy.[133]

Raymond Freeman, Deputy Associate Director of Professional Services, defended the NPS design team on these criticisms.[134] He contended the restriction of sources was not discriminatory but followed a recommendation of the St. Louis Department of Parks, Recreation, and Forestry. Freeman defended the selection of plant species and combining the site development and planting plan. He claimed that the NPS landscape architect informally discussed the proposed list with Mr. Bielman of the Missouri Botanical Garden and considered the selections satisfactory.[135] The City Forestry Department also concurred. As for the scope of the contract, the NPS felt that small separate contracts would be too costly. By combining development phases into one contract, administration and supervision costs could be kept to a minimum.

In a letter to the Midwest Regional Director, Superintendent Harry Pfanz, who supported the NPS design team, showed concern over the plant controversy:

> It is my opinion that the Service should review the present plan and give due consideration to the criticism it has received. In the course of this review it should secure further advice from Mr. Bielmann [of the Missouri Botanical Garden] and other persons recognized as local experts. If at all possible whatever plan is utilized should have the open support of these men. If this is not done before the project goes out for bids we shall encounter as much if not more opposition than we received before and in doing so will jeopardize the public's confidence in us. Because we are using local funds it is essential that this confidence be maintained.[136]

On Pfanz's recommendation the NPS design team contacted several local groups in St. Louis, including the Missouri Botanical Garden, Missouri Department of Conservation, University of Missouri Extension Service, City of St. Louis Department of Parks, Recreation & Forestry, and several prominent nurserymen.[137] The planting plan was again analyzed and revisions were recommended to substitute the pin oak (Quercus palustris) for the tuliptree. Local nurserymen also suggested that other species be interplanted with the pin oak to avoid the use of a monoculture and minimize the risks involved. The design team and Glenn O. Hendrix, the Chief of Planning and Design in San Francisco, were clearly opposed to this:

> It was suggested by many of the experts to include another species with the dominant tree, rather than risk 1200 trees of a single species to future insect or disease damage. However, in view of the effect that is to be achieved by the proposed plan, it would be difficult to substitute another species, even in the outer rows of trees surrounding the walkway....We request that particular attention be

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[133]Raymond L. Freeman, Deputy Associate Director, Professional Services, to Charles Hamilton, Assistant to the Secretary for Congressional Liason, March 20, 1970. JNEM Archives, Record Unit 106, box 36, folder 23.

[134]Ibid.

[135]Ibid.

[136]JEFF Superintendent Harry W. Pfanz, to Midwest Regional Director, April 27, 1970. JNEM Archives, Record Unit 106, box 36, folder 26.

[137]Glenn O. Hendrix, Chief, Environmental Planning and Design, WSC to J.E.N. Jensen, Associate Director, Professional Services, NPS, June 25, 1970. JNEM Archives, Record Unit 106, box 36, folder 27.

> given to the dominant tree (Tuliptree) controversy and our proposal to go all the way with one species, the Pin Oak. We believe that the plan would be weakened if the three rows of trees at each walkway were mixed with two or three species.[138]

Associate Director Joe Jensen, in response to this information, concurred with the recommendations but added his concerns regarding the approved concept for the planting:

> While the proposed plant substitutions are agreeable with this Office, we do wish to retain the site development concept which the Director approved in 1966 [referring to the Kiley plan, figure 35].[139]

At the time the design team recommended substituting the pin oak for the tuliptree, other plant substitutions were recommended as well: the littleleaf linden (Tilia cordata) and the basswood (Tilia americana) were recommended to replace the oaks which have transplanting difficulties, and the golden raintree (Koelreuteria paniculata) or the Bradford pear (Pyrus calleryana) were recommended to replace the oriental cherry (Prunus serrulata) which has borer problems. Approval was granted by Associate Director Jensen in July and he suggested that the Midwest Regional Director issue a press release "to relieve the present controversy."[140]

Apparently the use of the pin oak as the dominant tree on the levee also met with criticism.[141] Ivan Parker, the newly appointed JEFF Superintendent, met with Leonard Hall, a Globe-Democrat reporter and conservationist who had written about the plant controversy, to try to resolve the issue. Hall disapproved the new choice because the alkalinity of the riverfront soil was high and the pin oak thrived in acidic soil.[142] These comments prompted further study of the new proposal and the existing riverfront soil.

Original soil tests conducted by EODC revealed that the riverfront soil was neutral, a pH of 7.0. In researching the revised plant list, more soil studies were conducted. Royce Lambert, Soil Conservationist for the Western Service Center, and the Soil & Plant Laboratory at Palo Alto, California conducted soil tests in the summer of 1971. The results indicated that the soil was more alkaline than previously reported, with a pH of 7.5.[143] This initiated yet another review of the proposed plant list and more revisions.

The most significant change was once again that of the dominant tree species. The pin oak, proposed to flank the pedestrian walks, tolerated a maximum pH of 6.5.[144] Clearly the trees would not survive well on the Memorial grounds. A meeting was arranged with local plant authorities to recommend a tree that would perform well under the adverse urban conditions on the riverfront. Ultimately, the 'Rosehill' white ash was suggested as a replacement for the pin oak. Its dense green foliage and fall coloring, upright, sturdy habit,

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[138]Ibid.

[139]Associate Director J.E.N Jensen to Midwest Regional Director. July 23, 1970. JNEM Archives, Record Unit 106, box 36, folder 27.

[140]Ibid.

[141]"The Greening of The Riverfront," *The Globe-Democrat*, May 29, 1971, by Sue Ann Wood. JNEM Archives Record Unit 119.

[142]Ibid.

[143]John Ronscavage, Captain JEFF design team, to Director, Western Service Center, September 9, 1971. JNEM Archives, unprocessed Rennison Collection.

[144]Ibid.

fibrous root system, and tolerance of alkaline soils were noted qualities.[145] Borers were recognized to be a common problem of the ash but not considered a threat because of the Rosehill's fast growth and natural resistance.

Other recommendations were also made based on this study and the meeting of local authorities. The Austrian pine was eliminated because of a recent infestation of tip moth. The flowering dogwood (Cornus florida) was still recommended for moderate use, even though it preferred an acid soil, because it was the state tree of Missouri. Bradford pear was recommended as a replacement for the Cornelian cherry dogwood (Cornus mas) and radiant crabapple (Malus x purpurea 'Radiant') was included to possibly replace the large quantity of flowering dogwood. Juniper, yew or barberry were recommended to replace the mugo pine (Pinus mugo) if it was not available. All other plants from the previous list met with approval. Ultimately, as a result of these changes, the plant list in September 1971 consisted of the following plant materials:

> Canopy Trees:
> Rosehill Ash, Hackberry, Littleleaf Linden, Basswood, Japanese Pagoda Tree, Bald Cypress, Japanese Black Pine, River Birch, Saucer Magnolia, and Star Magnolia
>
> Flowering Trees:
> Redbud, Flowering Dogwood, Washington Hawthorn, Golden Rain Tree, Bradford Pear, Arnold Crabapple, Sargent Crabapple, and Radient Crabapple
>
> Shrubs and Groundcover:
> Dwarf Flowering Quince, Mugo Pine, Bulgarian Ivy, and Fragrant Sumac[146]

Finally, in August 1971, construction drawings for "Planting Phase I" were completed.[147] The limits of construction for this phase (see figures 38 & 39) were the slopes on the west side of the railroad tunnel cuts and a portion of the north-south axis. The only plants listed on this drawing, therefore, were the Japanese black pine and redbud proposed for the railroad cut slopes, and the Rosehill ash to line the sidewalks.

By the time construction drawings for subsequent planting phases were completed (by HBA, drawing # 366/41027), several new tree species were introduced to the list. Red maple (Acer rubrum), sugar maple (Acer saccharum), thornless honeylocust (Gleditsia triacanthos variety inermis 'Shademaster'), and Kentucky coffeetree (Gymnocladus dioicus) were added to the plant list as major trees. River birch (Betula nigra) and hackberry (Celtis occidentalis) were removed.[148]

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[145]It is important to understand that although good qualities of the Rosehill ash were noted, any attempt to maintain the visual and structural appearance of the originally proposed tuliptree was not evident. The form, height, leaf color, and habit of the Rosehill ash was markedly different from that of the tuliptree proposed by Dan Kiley.

[146]Memorandum to Director, Western Service Center from JEFF Team Captain John Ronscavage, September 9, 1971. Copy on file in JNEM Archives, unprocessed Rennison collection. The subject of the memorandum was the soils report and revised plant list for Jefferson National Expansion Memorial. The plant list became the final one used by the NPS.

[147]JEFF Drawing No. 366/41006, copy on file in the JNEM Archives, unprocessed Rennison Collection.

[148]The changes are reflected on JEFF Drawing No. 366/41027, produced by Harland Bartholomew and Associates. Although evidence of the final list is clear, documentation regarding the reason for additions and deletions of plant material from the previously revised NPS list (1971) during this period was not found Copy on file in the JNEM Archives, Record Unit 120, drawer 15, folder 3.

In December 1978, the Denver Service Center produced "as constructed drawings" for the planting at JEFF which depicted yet more changes to the plant list. Prepared in compliance with the previous two approved planting plans (#366/41019 and #366/41027), the drawings depicted four new species and eliminated four more. Added to the list of canopy trees were red oak (Quercus borealis) and bur oak (Quercus macrocarpa) which were previously determined to be difficult to transplant. Laland firethorn (Pyracantha coccinea 'Lalandi'), and wintercreeper (Euonymus fortunei 'Coloratus') were added to the list of shrubs and groundcover.[149]

A comparison of the original approved plant list (Kiley's list) and the plant list "as constructed" indicates that approximately ½ of the original 21 plant species were retained and ten new species were introduced (see figure 40). The composition of the plant material in relation to the hardscape features such as the walks, lakes, Arch and overlooks was reasonably retained.

Harland Bartholomew & Associates

The firm of Harland Bartholomew & Associates (HBA) was hired on January 12, 1973 to prepare construction documents and specifications necessary to complete the landscape development at JEFF according to the 1966 approved plan.[150] The construction drawings developed by the NPS, as well as the approved design development plan and grading plan, were forwarded to the firm. The NPS design and construction offices remained involved to review and supervise until 1978, when the NPS design team again took over and developed a planting plan for the remainder of the site.

HBA was involved in the project for three contracts over a period of six years. The first of the three required a number of different types of services divided into three categories:

> Title I services are performed as part of the initial planning and data gathering and will include such management information aids as the Government may direct. Title II services involve preparation of working specifications, drawings, construction contract documents, and estimates of the cost of construction. Title III services relate to supervision and inspection of the actual construction work (which will be performed by others) and to such other post construction activities as the Government may direct.[151]

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[149]JEFF Drawing No. 366/41047. Copy on file in the JNEM Archives, Record Unit 120, drawer 14, folder 1. Documentation of the rationale behind the changes was not found.

[150]Basic Agreement between the National Park Service and Harland Bartholomew and Associates, Contract No. CX-2000-3-0033, January 12, 1973. Denver Service Center Storage, Accession No: 079-86-0008, Box 2 of 7, RCL #902831. Copy on file in the JNEM Archives, uncatalogued collection. Based on personal conversations with John Ronscavage, the NPS hired Harland Bartholomew and Associates to complete construction document preparation because the JEFF project was taking too much time from DSC designers. It is unclear why the NPS did not seek Kiley's services for this purpose.

[151]Special Provisions (Architect-Engineer Basic Agreement) Contract No. CX-2000-3-0033 Professional Services, Various Projects, Jefferson National Expansion Memorial, St. Louis, Missouri, 1973 Fiscal Year Program. Denver Service Center Storage Accession No. 079-86-0008, Box 2 of 7, RCL#90283. Copy on file in the JNEM Archives, uncatalogued collection.

Final Kiley Plant List for JNEM (dwg.no-3071C) - February 1966

Canopy Trees:

Celtis occidentalis	(Hackberry)
Ginkgo biloba	(Maidenhair Tree)
Quercus alba	(White Oak)
Quercus borealis maxima	(Red Oak)
Liriodendron tulipifera	(Tuliptree)
Sophora japonica	(Japanese Pagoda Tree)
Taxodium distichum	(Bald Cypress)
Tsuga canadensis	(Canada Hemlock)
Magnolia soulangiana	(Saucer Magnolia)
Magnolia stellata	(Star Magnolia)

Flowering Trees:

Cercis canadensis	(Eastern Redbud)
Cornus florida	(Flowering Dogwood)
Crataegus phaenoppyrum	(Washington Hawthorn)
Prunus serrulata	(Oriental Cherry)
Cornus mas	(Cornelian Cherry)
Malus arnoldiana	(Arnold Crabapple)
Malus sargenti	(Sargent Crabapple)

Shrubs and Groundcover:

Chaenomeles sp.	(Dwf. Flowering Quince)
Pinus mugo mughus	(Mugo Pine)
Hedera helix 'Bulgaria'	(Bulgarian Ivy)
Rhus aromatica	(Fragrant Sumac)

Final NPS Plant List (dwg.no.41047) - December 1978

Canopy Trees:

Acer rubrum	(Red Maple)
Acer saccharum	(Sugar Maple)
Gleditsia triacan. 'Shademaster'	(Common Thornless Honeylocust)
Gymnocladus dioicus	(Kentucky Coffeetree)
Fraxinus americana 'Rosehill'	(Rosehill White Ash)
Pinus thunbergii	(Japanese Black Pine)
Quercus borealis	
Quercus macrocarpa	(Bur Oak)
Sophora japonica	(Japanese Pagoda Tree)
Taxodium distichum	(Bald Cypress)
Tilia cordata 'Greenspire'	(Greenspire Littleleaf Linden)

Understory Trees:

Cercis canadensis	(Eastern Redbud)
Cornus florida	(Flowering Dogwood)
Crataegus phaenoppyrum	(Washington Hawthorn)
Magnolia soulangiana	(Saucer Magnolia)
Malus x purpurea 'Radiant'	(Radiant Crabapple)
Pyrus calleryana	(Bradford Pear)

Shrubs and Groundcover:

Pinus mugo mughus	(Mugo Pine)
Pyracantha coccinea 'Lalandi'	(Laland Firethorn)
Rhus aromatica	(Fragrant Sumac)
Euonymus fortunei 'Coloratus'	(Wintercreeper)
Hedera helix 'Bulgaria'	(Bulgarian Ivy)

Figure 40: Comparison of Plant Lists from 1964-1978. (Lists compiled from drawings located in JNEM Archives, Record Unit 120).

The services were to be in accordance with the NPS designs, including the 1966 approved design development plan, and the construction drawings and specifications developed by the design and construction office in San Francisco.[152] Immediate projects included design concepts, construction drawings, specifications, and cost estimates for two pedestrian overpasses. Also outlined was the comprehensive design, construction drawings, specifications, cost estimates and construction supervision for completing the following: site grading and sealing of ponds, irrigation system, utility extensions, walk and area lighting, pedestrian walkways, monumental entrance (grand staircase), planting plan, rehabilitation of electrical components in the Old Courthouse, and modification of the existing storm drainage system.[153]

Although by the time HBA's contracts were completed many drawings had been produced, not all were approved and used for implementation. Three important sets of drawings were developed under this contract.[154] The first, consisted of all site work including grading, utility extensions, irrigation system, and construction of ponds and retaining walls. The second was the specification of lighting standards, their location and electrical requirements. The third was the planting plan that complimented the site work. (Note that Phase I was already constructed at this point and these drawings focused on the completion of the 1966 approved plan — all but the north-south axis). These drawings were approved by the Manager of the DSC in April 1973 and by the Acting Regional Director in November of the same year. Although implementation was not based on these drawings, all other construction drawings developed by both HBA and the NPS Design and Construction Office were in compliance with these approved sets of drawings.

Although never approved or constructed, the pedestrian overpasses and Luther Ely Smith Square construction drawings are important because they were a major portion of the first contract with HBA.[155] At the time they were developed, the engineering of segmented post-tension, pre-cast concrete structures were uncommon in this country (see figure 41). However, the NPS could potentially modify and use the drawings for implementation in the future.

The second contract between the NPS and HBA required the reformatting of the existing drawings (# 366/41019-site development, # 366/ 41027-planting plan) into six bidding packages.[156] In other words, the NPS wanted to break the remaining work into phases and complete only sections of the property at a time. As with the previous development at JEFF, phases of implementation were required due to financial opportunities and constraints of time. The following drawings, construction specifications, and six engineer's estimates were completed and mailed to the NPS in October 1977:

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[152]Work Directive No. 0033-73-1, Basic Agreement No. CX-2000-3-0033, JNEM, page 7. The drawings provided by the Government included 3071-C, 3030, 41001A, 41001C, 41009, 41006, 3077, and electrical system study of the Old Courthouse by J. Kozel. Copy on file in the JNEM Archives, unprocessed Rennison collection.

[153]Ibid.

[154]JEFF Drawings 366/41019, 41024A, 41027. Copies on file in the JNEM Archives, Record Unit 120.

[155]JEFF Drawing 366/41025. Copy on file in the JNEM Archives, Record Unit 120.

[156]Architect-engineer Contract No. CX-2000-7-0013. The drawings produced as a result of this contract are 366/41037, 41038, 41039, 41040, 41041, 41042. Copy on file in the JNEM Archives, unprocessed Rennison collection.

Site Development Plan - Phase II (North Section), DWG. No. 366/41037, 36 sheets
Planting Plan - Phase II (North Section), DWG. No. 366/41038, 10 sheets
Site Development Plan - Phase III (South Section), DWG. 366/41039, 38 sheets
Planting Plan - Phase III (South Section), DWG. No. 366/41040, 10 sheets
Site Development - Phase IV (Levee Section), DWG. No. 366/41041, 11 sheets
Planting Plan - Phase IV (Levee Section), DWG. No. 366/41042, 10 sheets
Construction Specifications - Site Development - Phases II, III, IV
Construction Specifications - Planting - Phases II, III, IV[157]

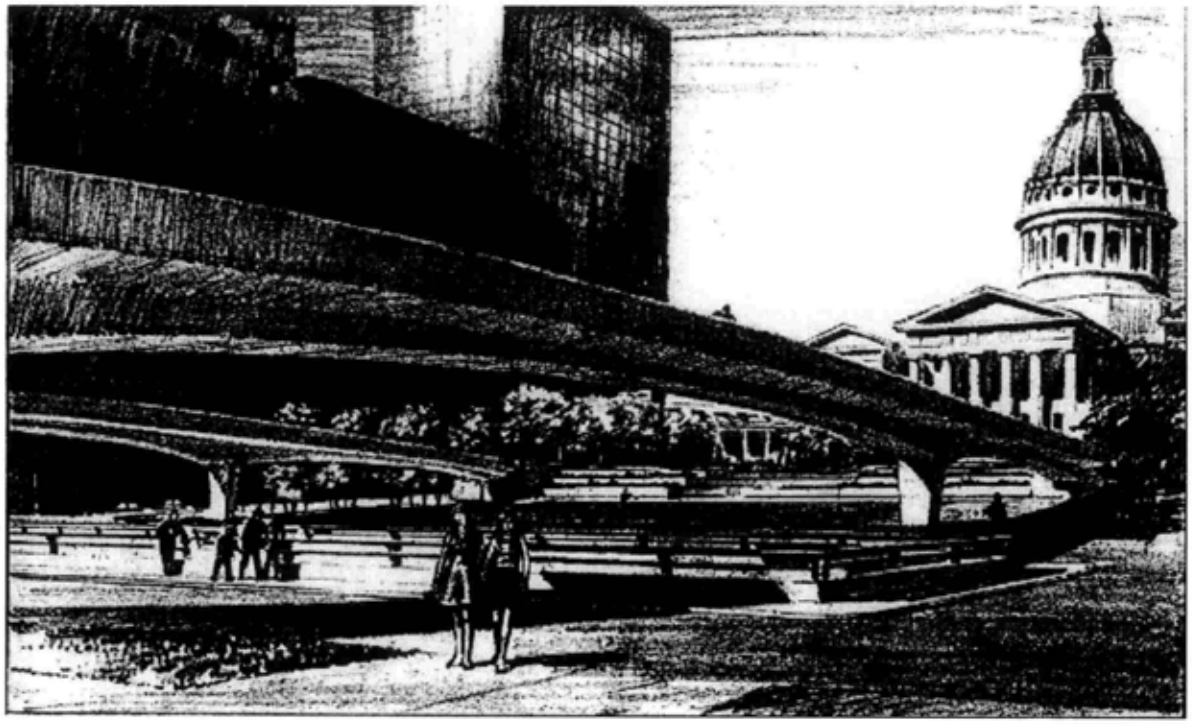

Figure 41: Harland Bartholomew & Associates, sketch of proposed pedestrian overpasses, 1975. (JNEM Archives, Record Unit 120, Drawing 366/41025).

[157]Stanley Dolecki, P. E., Harland Bartholomew & Associates, to Bob Shelly, National Park Service. October 4, 1977. Copy on file in the JNEM Archives, uncatalogued collection.

The landscape was completed according to these drawings, but not in the phase order suggested by HBA.[158] One major change and several minor changes to the original plan were suggested by HBA and approved by the NPS. The most important was the change of the Monumental Entrance (grand staircase).

Originally designed by Eero Saarinen, the Monumental Entrance was envisioned as a bold connection of the Gateway Arch and the Old Courthouse to the historic riverfront. The steps were originally planned with an unusual tread/riser relationship (see figure 22). Each tread was to increase in size from the top of the staircase to the bottom (closest to the river) with a constant 6" riser (similar specifications were used at each of the overlooks). Planners at HBA were opposed to this design. They used the overlook steps as examples when arguing that this unusual tread/riser relationship, although unique and creative from a design standpoint, was uncomfortable and potentially dangerous for the large numbers of visitors who would use the steps daily.[159]

Although the overall form of the Monumental Entrance (500' wide at the top and 291' wide at the bottom, with curved sides) and its location was retained as Saarinen designed it, the recommendations made by HBA were considered and the details were changed, resulting in the specification of a typical tread/riser relationship. The construction documents were developed so that the Monumental Entrance would be constructed in two phases. The first phase consisted of construction of the north and south sections, leaving the middle section out for later development. The second phase of construction would connect the two previously constructed sections, thus completing the Monumental Entrance (see figure 42).

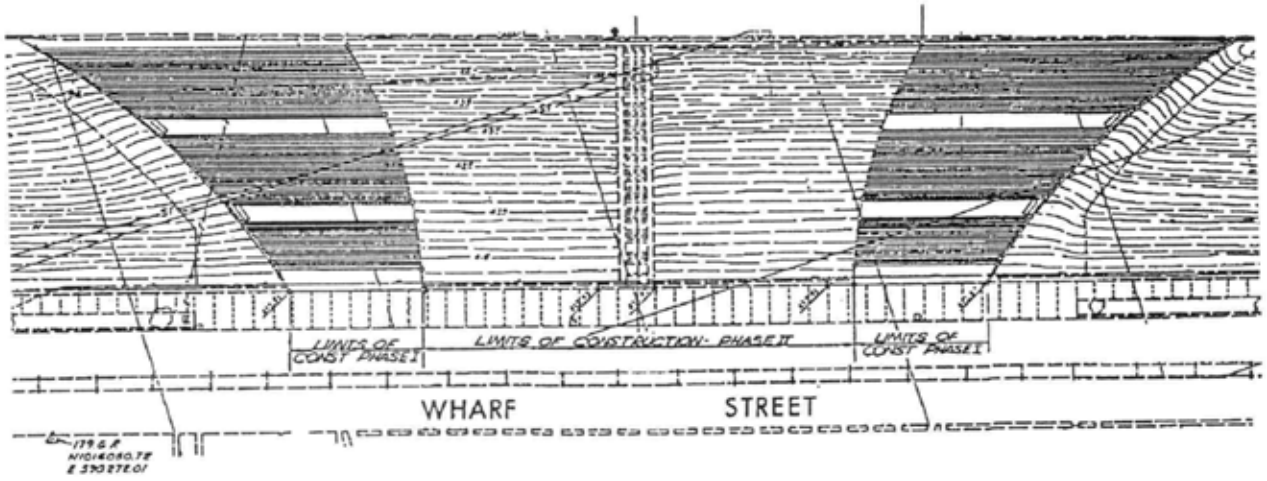

Figure 42: Phased development of grand staircase as proposed by HBA (taken in-part from JEFF drawing no. 366/41025, JNEM Archives, Record Unit 120).

[158]The construction history is detailed in "Chapter III: Physical Construction of the Landscape," below.

[159]Eldridge Lovelace, former Partner, Harland Bartholomew & Associates, interview with Gina Bellavia, December 6, 1994. Transcript on file in the JNEM Archives.

Summary of Design Development

The development of Jefferson National Expansion Memorial was a long and difficult task. The original winning design concept evolved from a forested site from which the Gateway Arch would soar to magnificent heights to an urban park with tree-lined pedestrian walkways and an overall curvilinear vocabulary reflecting the simplistic curves of the Arch. After the concept was finalized and accepted, the National Park Service and other design professionals developed construction documents and specifications geared toward implementing the concept. Although some compromises and changes were made in the planning stages, the goal remained unchanged. All design efforts were directed toward realizing the Saarinen/Kiley concept development plan.

Chapter III: Physical History of the Landscape

Introduction

The history of the construction of the Arch landscape is long and complicated. Many contracts and contractors were employed to complete different phases of the work. A summary chart of the contractors and their responsibilities can be found in Appendix A. The physical construction of the JEFF landscape began in 1951, with the temporary beautification of the block immediately east of the Old Courthouse (later to be called Luther Ely Smith Square) and ended with the last major construction effort in 1986, the Arch parking garage.[160] The following narrative documents the physical construction of the site from 1951 through 1986. Plans corresponding with each major development period graphically document the physical changes over time, and can be found at the end of this chapter.

1951: Luther Ely Smith Square

The block bounded by Fourth, Chestnut, Third, and Market Streets, just east of the Old Courthouse, was developed in 1951 as a result of an agreement between the United States of America and the City of St. Louis.[161] The "Riverfront Garden" as it was called, was designed by landscape architects who worked for the city parks department.[162] The plans called for a sunken garden with flower beds in the middle and two rows of trees on each side, one row of shade trees along Chestnut and Market Streets, and one row of flowering trees on either side of the sunken garden (see figure 43). Concrete steps led down to the garden from Fourth Street and it met the grade at Third Street.

Portions of the Memorial grounds south of the Old Cathedral were also planned to be temporarily developed as ball fields (softball, baseball, and football) and a small playground. This work was never completed due to lack of funds.[163]

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[160]It is important to realize that although this chapter of the CLR documents the construction projects to date, the Saarinen/Kiley vision is not yet fully realized. Several major projects, including a permanent maintenance facility, finishing the grand staircase, and pedestrian bridges over Memorial Drive would complete the original concept and are not out of the realm of possibility should funding become available.

[161]See agreement between United States of America and City of St. Louis, March 1, 1951. Copy on file in JNEM Archives, Record Unit 103, box 7, folder 3. The agreement allows the city to finance the temporary beautification of the Memorial grounds with money collected from the parking lot on the riverfront (at the north end of the Memorial area). It is made clear in the agreement that the work will be temporary pending implementation of the Saarinen plan.

[162]See "Riverfront Garden Started," *St. Louis Post-Dispatch*, March 30, 1951. Copy on file in the JNEM Archives, Record Unit 119, box 15. Landscape Architect G.J. Griesenauer is mentioned. See also "Sunken Garden To Be Laid Out Soon On River Front Memorial," *St. Louis Star Times*, February 20, 1951; "Riverfront Garden Will Be Built To Improve Memorial," *St. Louis Post-Dispatch*, February 20, 1951. Copies on file in the JNEM Archives, Record Unit 119.

[163]See " Tidy Up River Front," *St. Louis Globe-Democrat*, January 18, 1951; and "$20,000 River Front Landscape Fund Okayed," *Star Times*, February 9, 1951. Copies on file in the JNEM Archives, Record Unit 119, box 15.

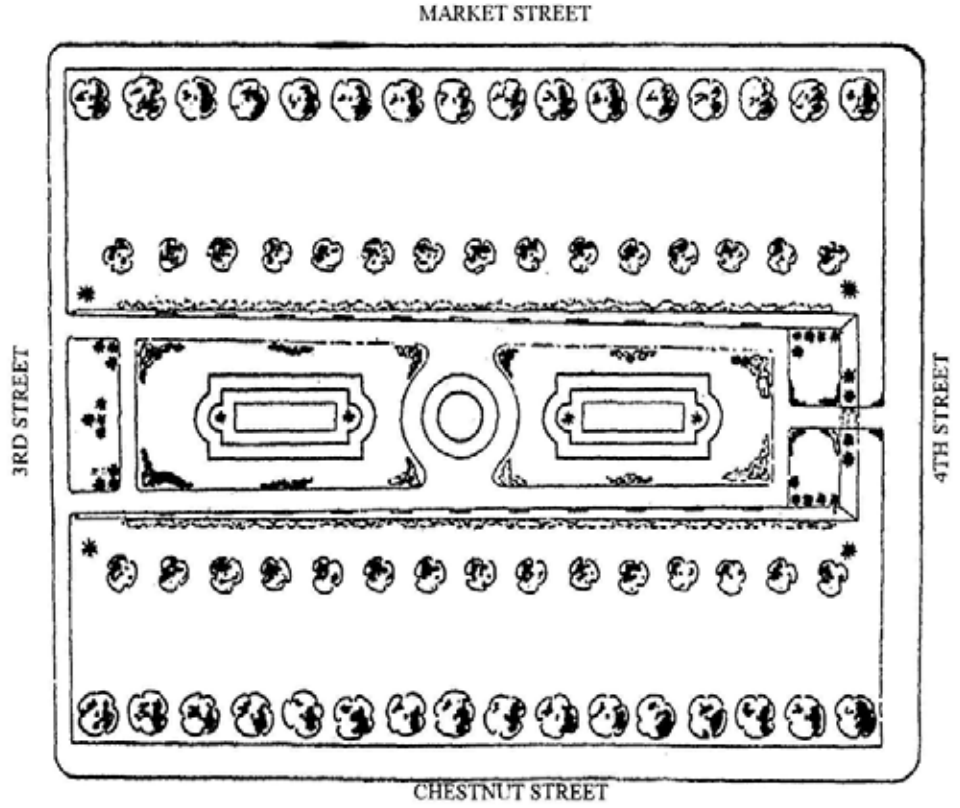

Figure 43: Architect's drawing of Riverfront Garden (*St. Louis Post Dispatch*, March 30, 1951. Copy on file in the JNEM Archives, Record Unit 119, box 15).

1959-1968: Railroad Relocation, Scenic Overlooks, & Gateway Arch

Construction of the Memorial began in 1959 with the dismantling of the Old Rock House, which now stood in the way of the proposed railroad relocation and grand staircase. Local citizens were dismayed to hear of its destruction since it had been restored just eighteen years earlier. In response to the protests, the Park Service carefully numbered and stored some of the stones from the building with the intent of reconstructing it on an undetermined location on the site.[164] A location for the building was considered for a short time, but eventually the idea to reconstruct it was eliminated from the development concept.[165]

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[164]A plan produced by Eero Saarinen and Associates dated December 18, 1961 shows a possible location for the reconstructed building in the southwest corner of the site. Copy on file in the JNEM Archives, Record Unit 120, drawing number D120-0053. The building does not appear on later Saarinen drawings and, according to George Hartzog, it didn't show up because Saarinen didn't want it. See George B. Hartzog, interview with Bob Moore, October 25, 1994. Copy on file in JNEM Archives.

[165]Since the Old Rock House was built into the limestone bluff, the west wall could not be reconstructed with original material. Therefore, an accurate reconstruction according to National Park Service standards was not possible. This played a large part in the decision not to attempt a reconstruction of the building.

At this time the Denchar Warehouse was also razed. This building had been used to store the ironwork and architectural fragments that had been salvaged from the demolition of other riverfront buildings. These were planned to be a principal resource for the proposed Museum of American Architecture, but in 1957, due to financial realities, this museum was dropped from Saarinen's development plan.[166]

The National Park Service, in an effort to coordinate construction, divided the work into four proposed phases. Phase I included the track relocation, retaining walls, and "bridges" over the railroad tracks. Phase II included research and planning for the museum, redevelopment of the levee, and excavations for the Arch foundations and visitor center/museum. The third phase included the Arch construction, structural portions of the visitor center and museum, construction and installation of museum exhibits, and a portion of the final landscaping. And finally, phase IV was to consist of the final landscaping. Although the proposed completion date of 1964 was not met, this schedule for development was basically followed as planned, with a few changes along the way.

Railroad Relocation

Once the Old Rock House was removed, efforts to relocate the two elevated railroad tracks approximately 105' to the west in a series of open cuts and tunnels began. The project was completed under three separate contracts, each awarded to MacDonald Construction Company. The first was the construction of the 960' tunnel on the east side of the site. The contract was awarded in June 1959 and by August the tunnel excavation had started and concrete walls were being poured.

By January 1960, contracting for the retaining walls (open cuts) was begun (figure 44). Three open cuts were constructed: a 731' cut on the north, and two cuts measuring 840' and 210' on the south. The retaining walls gradually increased in height from the middle toward the ends and were gently curved to reflect the curvature of the Arch. The cuts ranged in width from approximately 35' to 48' wide.

North and South Overlooks

The third contract was awarded on February 9, 1961. MacDonald Construction Company again submitted the low bid of $3,796,015 for the excavation of the Arch foundations, visitor center/museum excavations, and the levee redevelopment. This construction also included construction of the north and south scenic overlooks (see figure 45).

The overlooks served two important functions; they bridged the railroad tracks from the open cuts to the perimeter of the site, and they provided a viewing platform for watching the river traffic, an important aspect of the Saarinen concept. The overlooks were located 4,000 feet apart on the north and south ends of the park. A 56' x 60' building was part of each, originally intended as museums interpreting railroad and river transportation. The building roofs were viewing platforms, with concrete parapet walls and metal railings. The east walls of the overlooks ranged from just a few feet to 54' high and were an extension of the floodwall system. The walls were curved vertically as well as horizontally to reflect the curve of the Arch. The steps leading from the overlooks down to Wharf Street were not a typical design. Rather than have a standard, unchanging tread/riser relationship, Saarinen designed steps with an unchanging riser of 8" and treads which

[166]The architectural fragments and ironwork were donated to the Smithsonian and other museums and the Denchar warehouse was subsequently demolished.

increased in length from the top of the staircase to the bottom. This design created a sweeping effect and echoed the parabolic line of the Arch. Construction of the overlooks completed the railroad relocation project and marked the beginning of the construction of the Gateway Arch.

Figure 44: Construction of railroad cut walls and tunnel, 1960. (Photo by Arteaga; JNEM Archives, Visual Image #106-3732)

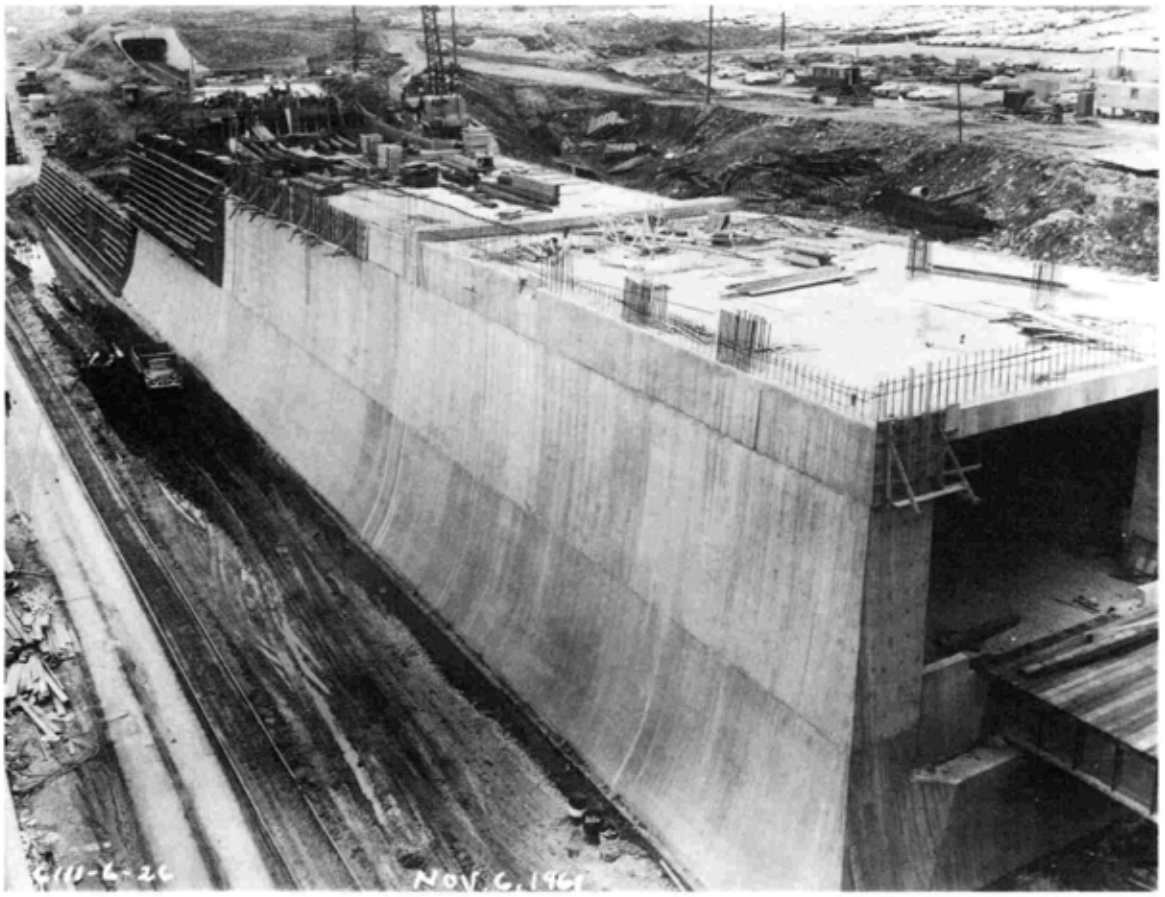

Figure 45: Construction of north overlook, 1961. (Photo by Arteaga; JNEM Archives, Visual Image #106-3792)

The Gateway Arch

On January 22, 1962, bid opening took place in the Old Courthouse for construction of the Arch and visitor center. Of the four bids received, MacDonald Construction Company was the low bidder and was subsequently awarded the contract on March 14, 1962.[167] Pouring the first concrete for the Arch foundations took place on June 27, 1962. MacDonald's subcontractor, Pittsburgh-DesMoines Steel Company (PDM), made the stainless steel sections in Pittsburgh, and shipped them via railroad to the site where they were assembled and set in place. The first section was placed on the south foundation on February 12, 1963 and filled with concrete on April 9.

When the Arch reached the 300-foot level, consultants to PDM questioned the integrity of the Arch design. Construction ceased while the NPS brought in the Bureau of Public Roads and the Bureau of Reclamation to

[167]Brown, *Administrative History*, 131-132. The low bid was $11,923,163 which was $3,856,163 above the government estimate. MacDonald Construction Company agreed to lower their bid by $500,000 and NPS Director Conrad Wirth accepted the bid for $11,442, 418. Ms. Brown gives a detailed narrative of the bidding process and some of the problems encountered.

perform seismographic measurements of the Arch and study its sway, complete a structure design study, and conduct wind tunnel tests. Ultimately the studies indicated that the Arch would be structurally sound and construction continued.[168] As a result of the wind tunnel tests, specific heights were proposed along the north-south axis of the Arch to deflect high winds and protect the structure.[169]

The final section was put in place on October 28, 1965 (see figure 46). At this point the NPS and the community were focused on constructing a transportation system to take visitors to the top of the Arch. The construction of the Arch was $2 million over budget and the NPS said there was not money to build the transportation system. Bi-State Development Agency offered to make an agreement with the NPS whereby they would bear the cost of construction and be responsible for running the trips to the top.

Transportation System

The transportation system was a unique system designed by an independent contractor named Richard Bowser (see figure 47).[170] The system consisted of eight capsules in each leg of the Arch which would bring visitors up to the 7' 2" x 65' observation deck at the top of the Arch. The system was constructed by Bi-State Development Agency in cooperation with the National Park Service. The system was built between 1965 and 1967 by several contractors including Planet Corporation and General Steel Industries.[171]

Old Cathedral Parking Lot

Several other minor additions to the site took place during this initial 9-year construction period. In 1960, NPS Director Connie Wirth approved the construction of a small parking lot south of the Old Cathedral. The lot, paved with asphalt, was 310' x 105' and held approximately 87 vehicles. A small plaza was also constructed between the Old Cathedral and the parking lot. A free-standing stone wall, 57' in length, three trees, and two concrete benches were included in the plaza.

In 1969, the Pastor of the Old Cathedral requested permission, at the expense of the Archdiocese of St. Louis, to enlarge the parking lot because the lot could not accommodate the number of parishioners during special masses.[172] The request proposed that the lot be almost doubled in size from 87 cars to 167 cars. The request was denied by the National Park Service for several reasons. First, the NPS felt that ample parking could be found in nearby garages or at the surface lot on the north end of the grounds. Second, the NPS felt that the extension would "adversely affect the architectural integrity of the whole memorial."[173]

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[168]See Brown, *Administrative History* for a more detailed narrative of the construction of the Arch.

[169]Ibid. See also Ronscavage interview with Bellavia (copy on file in the JNEM Archives); and wind tunnel study, JNEM Archives, Record Unit 106, box 35, folder 27.

[170]Richard "Dick" Bowser, interview with Bob Moore, June 9 and 11, 1992. Copy on file in the JNEM Archives.

[171]See Brown, *Administrative History*, 149-153; and Moore, *Urban Innovations and Practical Partnerships*, 137-150 for more detailed accounts of the tram system construction. The system, including the transporters, two elevators, and stairs cost $2,500,000 and was paid by Bi-State Development Agency.

[172]See JNEM Archives, Record Unit 106, box 38, folder 1 for correspondence between the pastor of the Old Cathedral, JEFF Superintendent, and Midwest Regional Director regarding the request.

[173]Correspondence from Superintendent Ivan D. Parker to Colonel James E. Sanders, President, Board of Police Commissioners, March 22, 1971. Copy on file in the JNEM Archives, Record Unit 106, box 38, folder 1.

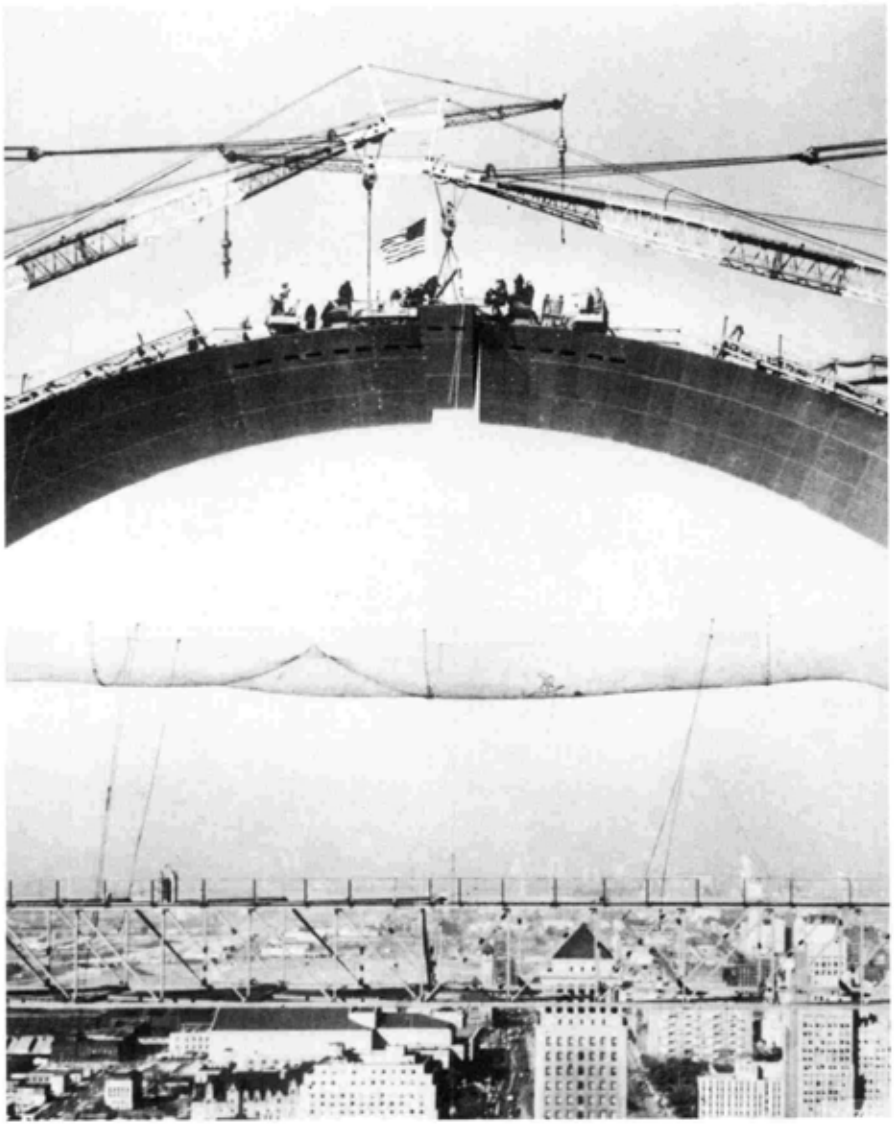

Figure 46: Final section of Gateway Arch is put in place, October 28, 1965. (Photo by Arteaga; JNEM Archives, Reference Photograph Collection.)

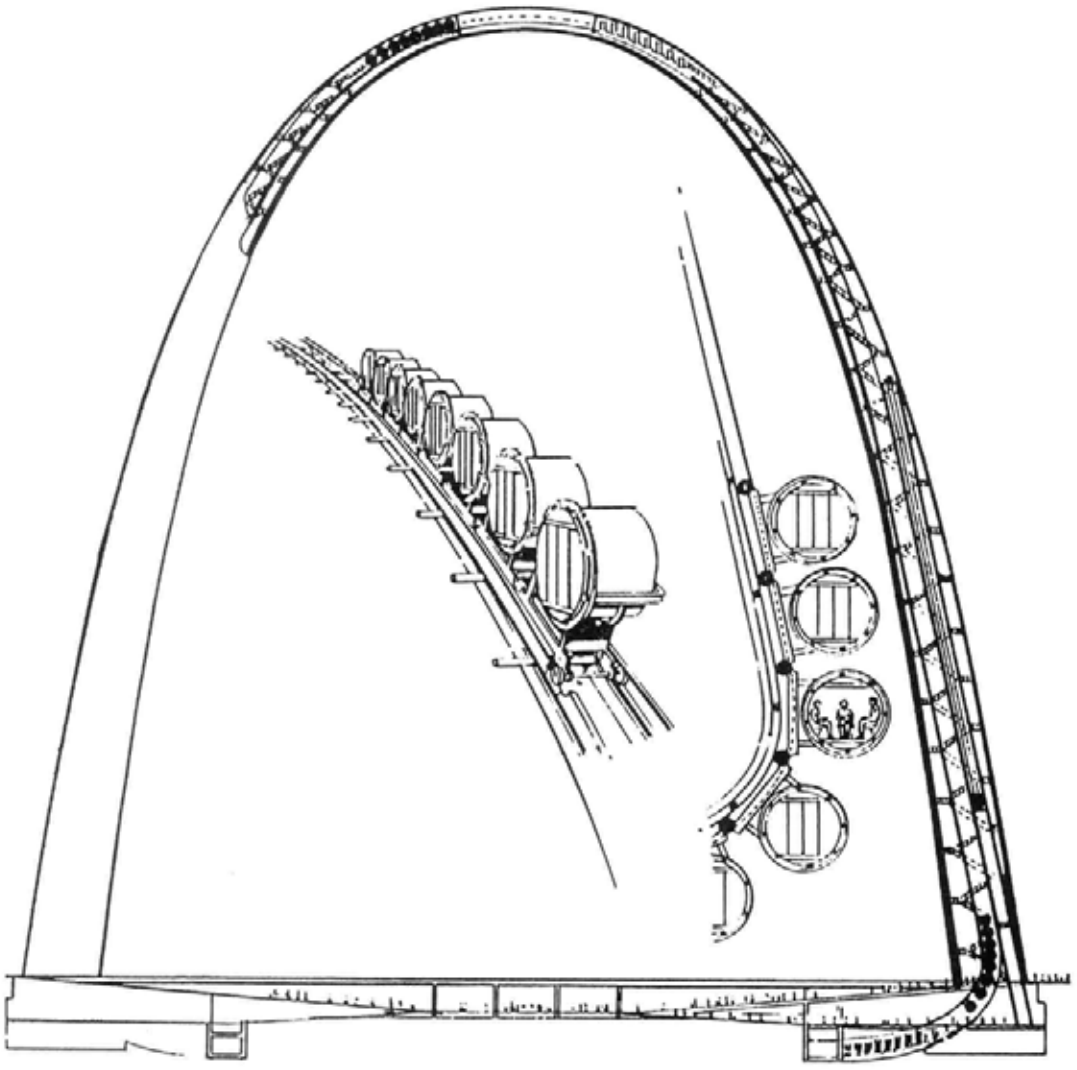

Figure 47: The Gateway Arch transportation system. (JNEM Archives).

Summary

By 1968 the Memorial landscape had taken a different look. Some of the major structural features of the site were constructed and the plan began to take shape. The entire north end of the site was used for parking. The south end of the park was basically a construction lot. Construction roads scarred the landscape from Poplar Street to the Arch. Temporary pedestrian walks were constructed from Memorial Drive to the Arch legs. The local community was anxious to see the landscape completed.

1969-1973 Site Development Phase I and Planting Phase I

Construction projects completed before 1969 (railroad relocation and the Arch) consumed more than the anticipated funds, and so future projects were prioritized. It was the viewpoint of the NPS that the Museum of Westward Expansion was the next priority. After all, the story of westward expansion, which the Gateway Arch symbolized, was yet to be told. St. Louisans, however, felt differently. This wonderful contemporary icon that gave the city a new identity, and cost millions of dollars, stood amidst a wasteland of weeds and construction roads. The people of St. Louis felt that landscaping should be given priority before the visitor center and therefore the construction of one of the theaters in the visitor center was deferred to allow for the planting of trees.[174]

Landscape development based on the construction documents prepared by the NPS design team began in 1970. As previously stated, work originally planned to be completed as one contract was divided into three separate contracts and spread over a three year period. Phase I of the Site Development was completed by two separate contracts (and contractors) in 1970-1972 and Planting Phase I was completed in 1972-1973.[175]

The first phase of landscaping work was site development which included grading, drainage, temporary walks, and planting along the north-south axis of the Arch (see figures 38 & 39). Bids were opened March 19, 1970 and all estimates were developed based on NPS construction drawings.[176] All bids received exceeded the government estimate and were therefore discarded.

The plans and specifications were revised, limiting the scope of work and eliminating the planting of trees.[177] Bids were opened a second time three months later on June 11, 1970. Four bids were received for the grading, drainage, waterproofing, and seeding of the visitor center. Kozeny-Wagner, Inc. submitted the low bid and was awarded the construction contract for Site Development Phase I on June 19, 1970.[178] Gene Mott and Jim Holland, staff from the NPS San Francisco Service Center, were assigned as project inspectors.[179]

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[174]"Beauty, Not Bickering," *St. Louis Post-Dispatch*. February 26, 1968.

[175]Drawing No. 366/41001-C entitled Site Development Phase I (portion) corresponding to the work completed by Kozeny-Wagner, Inc. and Drawing No. 366/41009A entitled Site Development Phase II corresponding to the work completed by Millstone Associates, Inc. were originally both considered Phase I. For the purposes of this report, their combined work during the early 1970s will be referred to as Phase I despite the fact that drawing no. 366/41009A is clearly labeled Phase II. This helps to clarify the following phases of development.

[176]See drawing no. 41001-B. Copy on file in the JNEM Archives, unprocessed Rennison Collection.

[177]See drawing no. 41001-C(por). Copy on file in the JNEM Archives, unprocessed Rennison Collection.

[178]"Arch Landscaping Contract Let," *St. Louis Post-Dispatch*. June 20, 1970. Kozeny Wagner was awarded contract no. 14-10-7-971-267 for their low bid of $419,955.00.

[179]Acting Director, Midwest Region to JEFF Superintendent Pfanz, June 23, 1970. Copy on file in the JNEM Archives, Record Unit 106, box 36, folder 27.

The project supervisor for Kozeny-Wagner brought his workmen to the Old Courthouse to look at the model of the Arch "...so they'd know what Eero Saarinen had in mind for the landscaping."[180] Their work began on the south end of the site on July 27 and progressed to the north end by late August. The firm was responsible for installing a portion of the underground drainage system, scraping the soil off the visitor center roof to waterproof it, grading the visitor center roof and reseeding it, and basic grading to establish the sub-grade of the approved plan.

The initial earthwork produced a dramatic change in the appearance of the landscape. Before Kozeny-Wagner began, the site was predominantly flat. By September 1970, according to one observer, there appeared to be a ski jump at either end of the site.[181] The onlooker was referring to high points on the north and south axis of the Arch where the sidewalks would ultimately converge. These high points were designed as a result of wind tunnel studies that were conducted using a model of the Arch.[182] In combination with the trees lining the walks, the high points helped deflect potentially detrimental north-south winds, thereby protecting the Arch.

Many other tasks were being completed at the same time. Under the terms of the contract, Kozeny-Wagner was responsible for digging 147,000 cubic yards of unclassified excavation. In short, they were scraping the rubble off the top, contaminated with brick bats, concrete and other unwanted material from the earlier demolition of buildings and the construction of the third street expressway. They stockpiled it, and excavated cleaner soil. They then graded out the rubble and put the clean soil on top. The ponds and surrounding ground were also being sculpted at this time.[183]

By September 1971, the first portion of Phase I of the Site Development was completed. In the meantime, in March of the same year, Kozeny-Wagner was awarded another contract on the Arch grounds. The project consisted of an addition to the visitor center lobby, construction of a theater, and the installation of air-conditioning and other mechanical work.[184]

The second portion of Phase I of the site development began in August 1971. It was divided into two contracts and four schedules. Schedules I and II were construction of portions of the sidewalk system, paving of service roads, construction of 280 tree wells, topsoiling, and 14 concrete benches, and schedules III and IV included the installation of a portion of the sprinkler system. Millstone Associates, Inc. was awarded both contracts.[185]

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[180]"Landscaping At Last For The Arch," *St. Louis Post-Dispatch*. September 20, 1970.

[181]Ibid.

[182]"Aerodynamic Stability of Jefferson National Expansion Memorial Gateway Arch," written by Lloyd R. Cayes and Charles F. Scheffey, U.S. Department of Commerce, Bureau of Public Roads, July 1965. Copy on file in the JNEM Archives, Record Unit 106, box 35, folder 27. See also, "Gateway Arch Design Tested in Wind Tunnel," *The Globe Democrat* [Washington Bureau]. January 7, 1965. Copy on file in the JNEM Archives, Record Unit 119, box 27.

[183]The ponds were not constructed at this time. The landscape was graded so that there were low points where the ponds would eventually be constructed.

[184]"Bids opened on new Arch project." *St. Louis Post-Dispatch*, March 26, 1971. The contract number for this work was 4970B10045.

[185]Contract no. 4970B101077 included the sidewalks and tree wells, and contract no. 4970B20053 included portions of the sprinkler system. Copies on file in the JNEM Archives, unprocessed Rennison collection.

Installation of the sidewalks began on the south side of the Arch. The exposed aggregate walkways were poured from the overlooks on the east side to the Arch legs and from the rest areas on the west side to the Arch legs (on both the north and south ends of the site). The rest areas were not constructed at this time. These newly constructed walks met the older temporary bituminous walks which led to the Old Courthouse. A concrete base for the visitor information kiosk and a pedestrian walk along the south side of the visitor parking area were also constructed. The contractor was responsible for importing topsoil and grading it out accordingly.

Implementation of schedules III and IV, the installation of part of the irrigation system, as well as installation of the storm drainage system, repair of the sump pumps, and electrical distribution were completed by June 1972.

Planting Phase I

Bids for Phase I of the Planting Plan were opened October 27, 1971. There were two options listed on the bid form; the second option called for trees of smaller size than the first one, another indication of the projects' financial constraints. On November 9, 1971, Suburban Tree Service, Inc. was awarded the contract for option two of Phase I: the ground preparation, seeding, and planting of 573 trees.[186]

The plans and specifications, preliminary surveys, and construction layout of the Phase I Planting were all completed by John Ronscavage of the Design Office of the San Francisco Service Center.[187] The first work consisted of grading the north and south railroad cut slopes, and began on December 1, 1971. The first trees planted along the slopes were redbuds (Cercis canadensis) on December 17.[188] By May 22,1972, the grading, soil preparation, and planting of 120 redbuds and 80 black pine (Pinus thunbergi) along the railroad cuts was completed.

Beginning in January, topsoil was hauled in from a borrow pit in Lambert Field.[189] The spreading of topsoil and planting of Rosehill ash trees (Fraxinus americana var. 'Rosehill') began on the north end of the site and was completed at the south in July 1972. Two-hundred and eighty Rosehill ash, 2"-2½" caliper, were planted along the newly constructed walks. Ninety-three of the same species and size were planted outside of the walks. Suburban Tree Service completed Phase I with the paving of the tree wells. The borrow pit at Lambert Field was reshaped and seeded to the airport engineer's satisfaction, resulting in completion of the contract on September 21, 1972 (see figure 48).

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[186]See Completion Report, Planting Phase I , Contract No. 4970B20053. Copy on file in the JNEM Archives, unprocessed Rennison Collection. The work corresponded to drawing no. 366/41006 and was completed for $135,562.50.

[187]Completion Report, Planting Phase I, Work Order No. 6525-8025-404, Contract No. 4970B20053, Suburban Tree Service, April 1974. Copy on file in the JNEM Archives, unprocessed Rennison Collection.

[188]Ibid; "Arch Landscaping," *The St. Louis Post-Dispatch*, December 19, 1971. Copy on file in the JNEM Archives, Record Unit 119.

[189]Lambert Field is northwest of St. Louis. The property is partially occupied by Lambert Airport.

Figure 48: Aerial view of Arch grounds after Phase I of landscape construction, 1975. (Photo by Arteaga; JNEM Archives, Reference Photograph Collection).

There were several problems encountered during the completion of the Phase I Planting. First, there was some difficulty finding enough Rosehill ash and black pine. Mr. Ronscavage and Mr. Holland made several trips to various nurseries to tag adequate trees.[190] Princeton Nurseries in New Jersey and Rosehill Nursery in Kansas City were the suppliers. Of the 280 Rosehill ash trees planted, 82 died and were replaced by the contractor. A study of the dead material indicated that there was insufficient drainage (most of the dead trees were on the north end of the site). This prompted the use of underdrains in the tree pits in the next phase of landscaping. Some of the plant material also had to be held during very hot, dry days until the sidewalk construction was completed, adding undue stress to the young trees.[191]

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[190]Charles E. Rennison replaced Jim Holland as Project Inspector in late July 1972. Mr. Rennison, a former Saarinen and Associates inspector on the Arch project, would continue to work at JEFF for many more years.

[191]President Robert B. Schall of Suburban Tree Service, Inc. to Mr. Leon R. Thygesen, Contracting Officer, National Park Service, April 16, 1973. Copy on file in the JNEM Archives, unprocessed Rennison Collection.

The first planting of grass had only a 40% success rate. This was determined to be a result of poor timing due to the delay in other construction contracts. Time extensions to the contract were granted to allow for reseeding. There was one change order that resulted in a time extension also. The added work included restoring the north and west slopes adjacent to the parking area. All replacement materials and construction of this contract were completed and a final inspection was made January 22, 1974.

1974-1977: Museum of Westward Expansion, Grand Staircase and other Miscellaneous Features

This period in the construction history was predominantly devoted to the construction and development of the Museum of Westward Expansion. Eero Saarinen originally made provisions for two museums, one on the history of the west, the other on the architecture of old St. Louis. Budget constraints changed this concept from above-ground museums to an underground museum, built in conjunction with the planned visitor center.

George Hartzog, former Superintendent of JEFF but now serving as Director of the National Park Service, selected Aram Mardirosian and the Potomac Group to design a museum to fit within the space beneath the Arch. Mardirosian was an architect, not a museum planner, so he was not ruled by traditions or preconceptions.

Funding for museum construction was provided in 1974, coming from several sources, including Federal appropriations from Congress; revenue generated by the Bi-State Development Agency's operation of the Arch transportation system; the City of St. Louis, which shares one-fourth of the development costs of the National Historic Site; The Jefferson National Expansion Historical Association, a non-profit corporation which supports educational programs for the National Park Service; and the Memorial Parking Lot, operated for the National Park Service by the City of St. Louis.

Construction of the museum began in 1974 and it was opened on August 10, 1976.

Walk and Area Lighting

The contract for the installation of utilities for the walk and area lighting commenced on February 18, 1974 and concluded on August 3, 1974. The plans and specifications, preliminary surveys, and construction layout were all completed by R. Johanningsmeier of the Design Office of the Denver Service Center.[192] Harding Electric Company was the contractor and Ted Rennison was the Project Supervisor. The work included the installation of transformers, control panels, and circuits in the Museum area and supplying underground conduit for telephone and electrical circuits for the area lighting and power receptacles on the grounds. The lights were 12' high brown aluminum posts with a 21" globe at the top (see figure 49). The lighting was typical for pedestrian spaces.

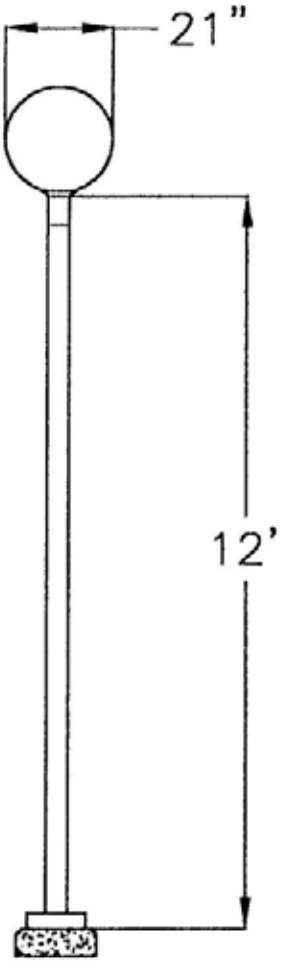

Figure 49: Construction detail of walk lighting, Redrawn by Gargar Chan, 1996. (JNEM Archives, Record Unit 120, drawer 15, folder 4).

[192]Completion Report, Work Order No. 6525-7600-503, Contract No. CX6000-4-9009, Harding Electric Company, Walk and Area Lighting, March 22, 1976. Copy on file in the JNEM Archives, unprocessed Rennison Collection. The contract was completed at a cost of $148,580.98.

Temporary Maintenance Building

In June 1974, a contract was let to construct a temporary grounds maintenance facility on the south end of the site. Until this time, maintenance vehicles and equipment were stored in the visitor center shell. Hankins Construction Company was awarded the contract which included site grading, installation of utilities, construction of foundations, and erection of a 32' x 72' prefabricated steel panel building.[193] A fenced yard, 50' x 72', was also completed at this time and was expected to meet the needs of the maintenance division for the next five years.

Plans and specifications for the building and yard were developed by the Assistant Chief of Park Maintenance, Roy Scown. Scown was also responsible for the preliminary surveys and construction layout. Soon after construction, compacted construction roads leading from the building to the north end of the park emerged (see period plan).

Overlook Paving

Around the time of completion of the walk and area lighting, Sahrmann Construction Company was commissioned to complete the paving of the north and south overlooks. Up until this time, the 18' wide pedestrian walks on the east side extended to the overlook steps, but the overlooks themselves were grass.

The contract was started on August 12, 1974 and completed on November 26, 1974. The work included demolition, excavation and construction of underdrains, installation of base course and exposed aggregate paving, concrete light bases and manholes, and miscellaneous seeding.[194]

Monumental Entrance (Grand Staircase)

Construction of the Monumental Entrance began on August 5, 1975 by contractor Kozeny-Wagner and was substantially completed by June 10, 1976 (see figure 48).[195] Two phases of plans and specifications and preliminary surveys were completed by Harland Bartholomew and Associates. The construction layout was made by Kozeny-Wagner. The work included the construction of two unconnected sections of staircases and 1500 square yards of new walks, installation of electrical service for light fixtures and a snow-melting mat for the north stairs, installation of a drainage system, and grading and seeding.

Several change orders were requested and approved for various reasons. The most noteworthy were the extension of the snow-melting mat to the sidewalk at the base of the north stairs, replacement of a section of exposed aggregate concrete at the south overlook, and sodding the section between the stairs rather than seeding. Although these were changes to the original contract, the plans and specifications for the first phase

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[193]Completion Report, Work Order No. 6525-7103-404, Contract No. CX6000-4-9017, Hankins Construction Company, Temporary Maintenance Building, May 22, 1975. Copy on file in the JNEM Archives, unprocessed Rennison Collection. The contract was completed at a cost of $57,723.00.

[194]Completion Report, Work Order No. 6525-7601-503, Contract No. CX6000-4-9018, Sahrmann Construction Company, Overlook Paving, February 9, 1976. Copy on file in the JNEM Archives, unprocessed Rennison Collection. The contract was completed at a cost of $115,296.44.

[195]Completion Report, Work Order No. 6520-7602-503, Contract No. CX6000-5-9005, Kozeny-Wagner, Inc., Monumental Entrance, January 5, 1977. Copy on file in the JNEM Archives, unprocessed Rennison Collection.

of the monumental entrance were closely followed. Phase II of the development of the monumental entrance (the center section) was never constructed due to financial constraints.

As noted before, the plans and specifications developed by Harland Bartholomew incorporated a significant change from the original Saarinen/Kiley plan. The stairs were originally to be constructed with a tread/riser relationship similar to those of the overlook stairs. HBA argued the point with the NPS based on the issues of safety of visitors. The NPS agreed and the change was made. HBA also studied the design in terms of the number of landings. Saarinen had designed the stairs with no landings. The final design included two landings (see figure 42).

Only two years after construction, the grand staircase began crumbling, despite the fact that Kozeny-Wagner followed strict specifications. After a year of debate as to why the concrete failed, Schuster Engineering, Inc. was contracted to make repairs. The repairs were completed during the summer of 1980.[196]

1978-1986: Site Development Phases II-IV; Arch Parking Garage

The completion of a major portion of the landscape development occurred between 1978 and 1981. Harland Bartholomew & Associates produced construction documents and specifications for the development of the west half of the site.[197] Schuster Engineering was awarded the contract to complete the site development, including the construction of two ponds, extension of the walks, extension of the irrigation system, extension of the electrical systems, extension of the walk lighting, and installation of cast-iron tree grates (see figure 38 & 39). The temporary maintenance building was also relocated at this time. Due to lack of funds, construction of the permanent facility was delayed until a later date and the temporary facility was relocated to the area where the permanent facility would eventually be built.

Construction began in 1978, with grading of the west side of the Memorial site. A large portion of the temporary parking lot was demolished to make way for the extension of the northwest sidewalk leading to Washington Avenue and Memorial Drive. More grading took place to establish appropriate heights so that construction of the ponds and walkways could begin. The work progressed, beginning with the center section, then the north and finally the south. The work on the south end of the site included relocating the temporary maintenance facility to the location of the proposed permanent facility. Along with the grading work, construction of retaining walls at both the north and south service entrances was required.

Several changes occurred during this portion of site development. Grade changes were made along Memorial Drive as a result of an error in the cut/fill calculations. Excess fill material was deposited along Memorial Drive south of the Old Cathedral.[198] This mounded area became 5' higher than originally planned.

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[196]Brown, *Administrative History*, 179; and Statement for Management, Jefferson National Expansion Memorial 1993-1994, 26. In 1980, the poured in place concrete was overlaid with pre-cast exposed aggregate concrete.

[197]It is important to understand that HBA did not do very much design. The construction documents and specifications produced by the firm were based on the approved Saarinen/Kiley design development plan.

[198]Memorandum from Landscape Architect John Ronscavage, to Chief, Branch of Construction, Midwest/Rocky Mountain Team, Denver Service Center, December 19, 1978. Copy on file in the JNEM Archives, unprocessed Rennison Collection.

Site furnishings such as benches and drinking fountains were detailed by Harland Bartholomew and Associates based on details prepared earlier by the NPS.[199] The cobblestone paving around the Rosehill ash trees was removed and replaced with cast iron tree grates at this time. The cobblestones were settling and caused an uneven, hazardous surface. JEFF Superintendent Robert Chandler observed the situation and realized that the full width of the sidewalks was not being utilized and decided to replace the cobblestones with cast-iron tree grates.[200]

While Schuster Engineering began the site development on the west side of the site, Shelton and Sons Landscaping was awarded a planting contract to begin working on the east side of the railroad tunnels. The plant material installed on the east side of the tunnels included beds of low growing shrubs such as fragrant sumac, mugo pine, and pyracantha. Eastern redbud, flowering dogwood and black pine were planted in groups along the tunnels. Bald cypress was planted in groups closer to the sidewalk along Wharf Street where existing Bald cypress lined the west side of the street, spaced 75-80' apart. Large beds of Wintercreeper were planted along the west sides of the north and south overlook steps.

Upon completion of site development work by Schuster, Shelton and Sons began planting on the west half of the park. They planted the remaining Rosehill ash in and along the newly paved pedestrian walks. Shelton and Sons were required to remove the tree grates installed by Schuster only months before in order to plant the trees. Seeding of the lawns took place before the planting of the trees around the ponds. Although this is not typical practice, it was done in order to stay on or close to the planting schedule. Schuster Engineering was delayed in completing their contract and this in turn held up the planting. Once the grass was planted, Shelton avoided driving across it by bringing the trees to their planting holes by helicopter.[201]

To complete the planting plan, groundcover was planted around the service areas, maintenance building, and west of the railroad tunnels. Large beds of Bulgarian ivy were planted on the steep slopes west of the railroad tunnels. Wintercreeper was planted along the slopes surrounding the service entrances and around the maintenance facility. All of these areas had excessive slopes that would be difficult to maintain if they were seeded.

Arch Parking Garage

As early as 1958, architect Eero Saarinen conducted feasibility studies for a parking garage on the north end of the Memorial site. Similar studies and several agreements between the NPS and the city of St. Louis were conducted between this time and 1978. The obstacle was a lack of construction funds. In 1983, as a result of a three-way partnership between the National Park Service, the City of St. Louis, and the Bi-State

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[199]DSC Storage, Accession No: 079-86-0008, Box 2 of 7, Records Center Location #902831, Basic Agreement No. CX-2000-3-0033; Special Provisions, Work Directive No. 0033-73-1. Copy on file in the JNEM Archives, uncatalogued collection.

[200]Robert Chandler, personal telephone conversation with Gina Bellavia, March 1996.

[201]Moore, *Urban Innovations and Practical Partnerships*, 110-114, 126. Although Jerry Schober takes credit for proposing the idea to bring the trees in by helicopter, it should be noted that Mike Mayberry (foreman for Shelton and Sons) disagrees. In a personal conversation with the author, Mayberry says it was his decision, and idea, as the contractor to import the trees by helicopter. According to Mayberry, 800 trees were lifted and planted in 10 hours. It is also important to note here that the seed mix used at this time was developed specifically for the Arch grounds. The mix consisted of 49% arboretum bluegrass, 15% regal ryegrass, 15% creeping red fescue, 10% glade bluegrass, and 10% Kentucky bluegrass. This mix became known as the "Arch Grounds Seed Mix" and was available on the consumer market.

Development Agency, an agreement was forged that would expedite the construction of the Gateway Arch parking garage.[202]

Fred Weber, Inc. of St. Louis was awarded the contract for his low bid of $6,262,000 to build the garage based on a design and specifications developed by WVP Corporation.[203] The agreement between the city and Bi-State Development Agency authorized the relocation of Washington Avenue approximately 20 feet to the north.

Excavation began in 1984 while archeological monitoring was conducted by Southern Illinois University at Edwardsville (SIUE). By 1986 construction of the three-story, 1,208-car parking garage was complete (see figure 50). Two levels were constructed below grade and the top deck was at grade (or close to it) with the north and northwest walkway.

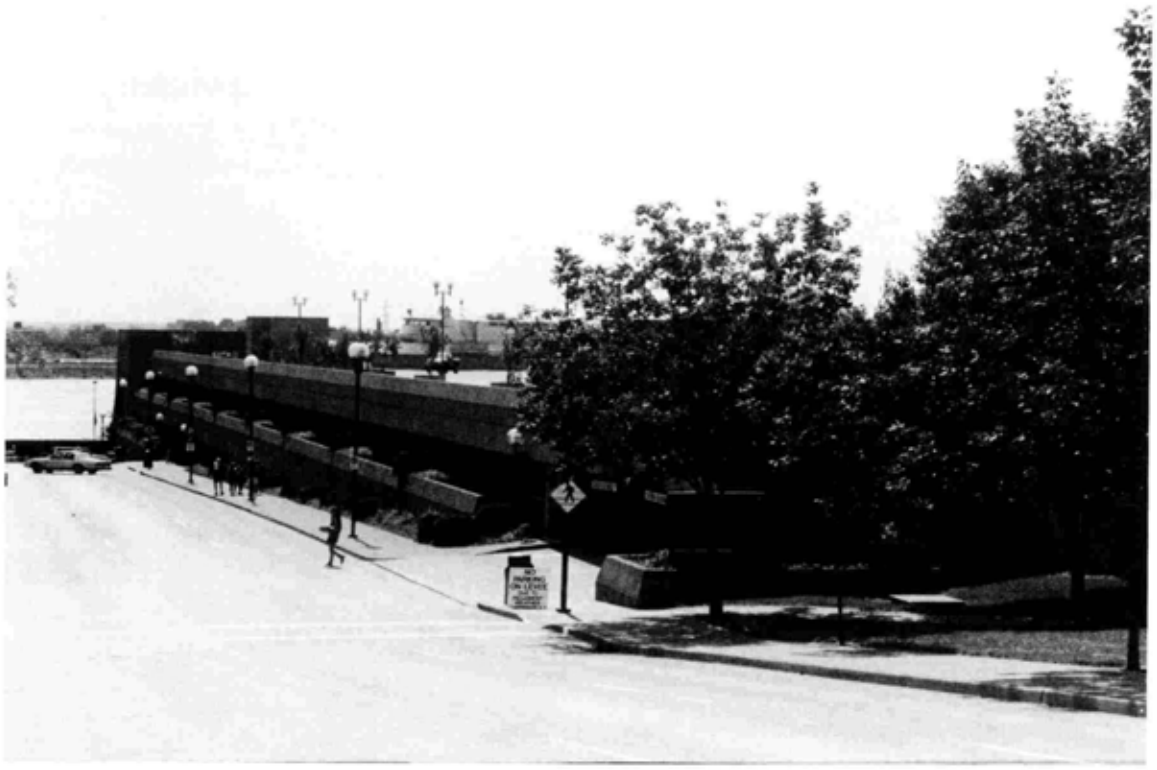


Figure 50: Photo of Arch parking garage (Chan, 1996).

[202]Moore, *Urban Innovations and Practical Partnerships*, 13-22. Historian Bob Moore details the cooperative agreement between the NPS, City of St. Louis, and Bi-State Development Agency.

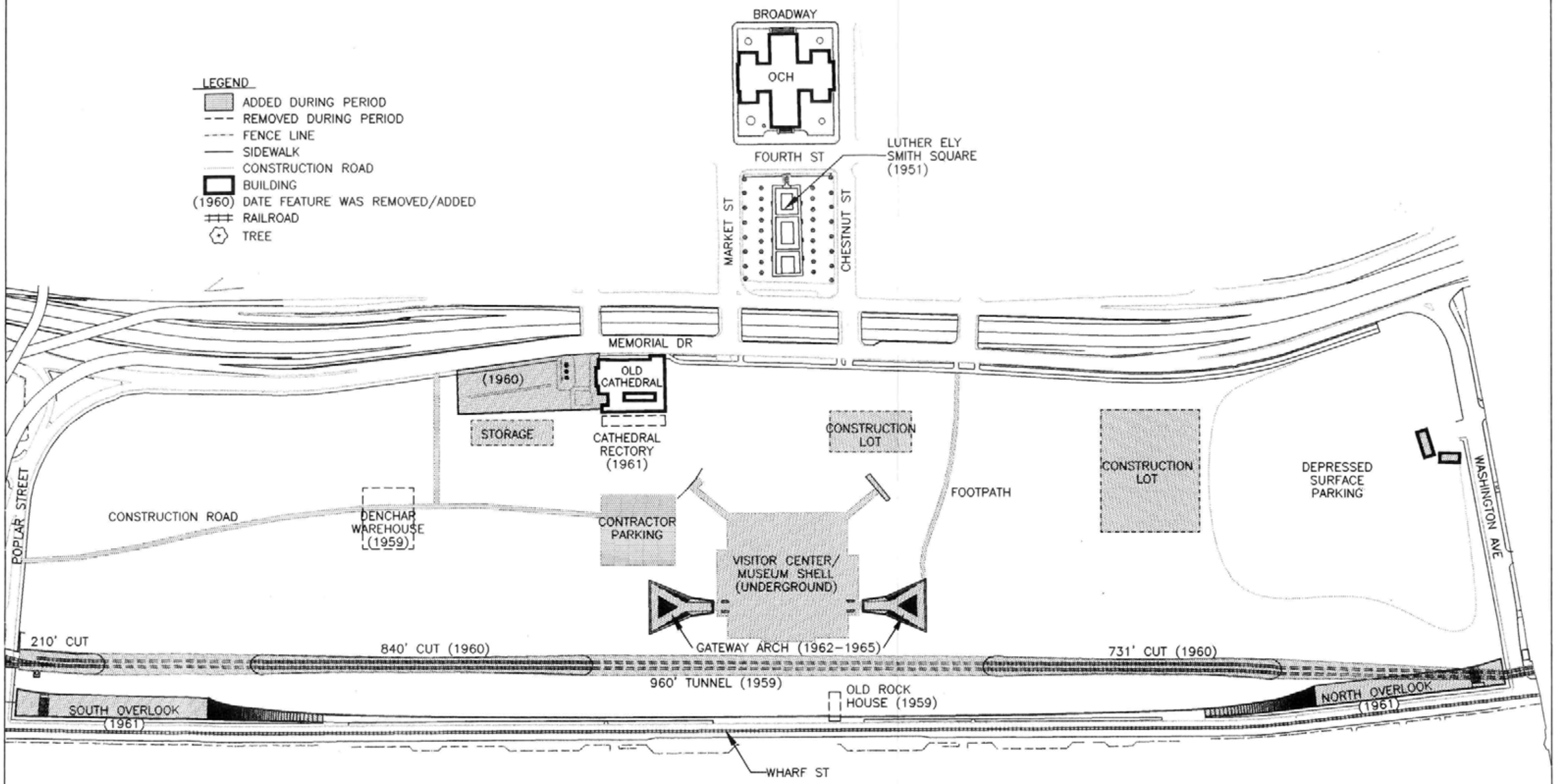
[203]Ibid. Copies of the designs and specifications produced by WVP Corporation are on file in the JEFF Facility Managers Office.

A planting plan was also developed by WVP Corp. and implemented by Fred Weber, Inc. The plant list included low growing shrubs for raised planters along Washington Avenue and the foundation walls on the south side, flowering trees, a few canopy trees, groundcover, and lawn areas. After recommendations made by the NPS were considered, the planting plan included the following trees, shrubs, and groundcovers: Rosehill ash, saucer magnolia, Sargent crabapple, radiant crabapple, amur maple, hetz blue juniper, mentor barberry, anglojap yew, and wintercreeper. The plant palette basically included species already existing in the park with the exception of the shrubs.

The flowering trees were generally planted in groups of two or more on the west, south, and east sides of the garage in lawn areas. Low-growing shrubs were located in raised planters along Washington Avenue and along either side of the garage entrance located off the northwest pedestrian walk. Wintercreeper was planted in the raised planters and other planting beds along the foundation walls as well. Amur maple were planted in concrete planters and located on the top deck of the garage.

Summary

By 1986, most of the major structures and plantings reminiscent of the Saarinen/Kiley proposed plan were complete. Exceptions included the permanent maintenance facility, the pedestrian overpasses and Luther Ely Smith Square, and the center section of the grand staircase. At this point in time, most efforts were focused on maintaining the plan as implemented thus far and not on completing any major construction, particularly related to the landscape.



North

SCALE: 1" = 240'

240 0 240 480

MAP SOURCE: TOPOGRAPHIC SURVEY JNEM–NPS SEPT. 1948 BY ARMY CORPS OF ENGINEERS; PHOTOGRAPHS

CULTURAL LANDSCAPE REPORT: JEFFERSON NATIONAL EXPANSION MEMORIAL

1959–1968 PERIOD PLAN

SAINT LOUIS, MISSOURI

DRAWN: CHAN	DRAWING NO. 366 80,020
TECH. REVIEW: BELLAVIA	
DATE: 7/96	SHEET 1 OF 6

LEGEND

- ADDED DURING PERIOD
- FENCE LINE
- SIDEWALK
- CONSTRUCTION ROAD
- BUILDING
- (1960) DATE FEATURE WAS ADDED
- RAILROAD
- TREE
- TREE IN TREE WELL

BROADWAY
OCH
FOURTH ST
LUTHER ELY SMITH SQUARE
MARKET ST
CHESTNUT ST
MEMORIAL DR
OLD CATHEDRAL
STORAGE
CONSTRUCTION ROADS
SOUTH SERVICE AREA
TEMP PEDESTRIAN WALKS
NORTH SERVICE AREA
PLANTING OF ROSEHILL ASH TREES (1972)
DEPRESSED SURFACE PARKING
WASHINGTON AVE
POPLAR STREET
STORAGE
PLANTING OF ROSEHILL ASH TREES (1972)
EXPOSED AGGREGATE WALK (1971)
VISITOR CENTER/ MUSEUM SHELL (UNDERGROUND)
EXPOSED AGGREGATE WALK (1971)
KIOSK (1971)
GATEWAY ARCH
TEMP RR TIE STAIRS
NORTH OVERLOOK
SOUTH OVERLOOK
TREE PLANTING AROUND RAILROAD CUTS (1971–1972)
WHARF ST
TREE PLANTING AROUND RAILROAD CUTS (1971–1972)

North

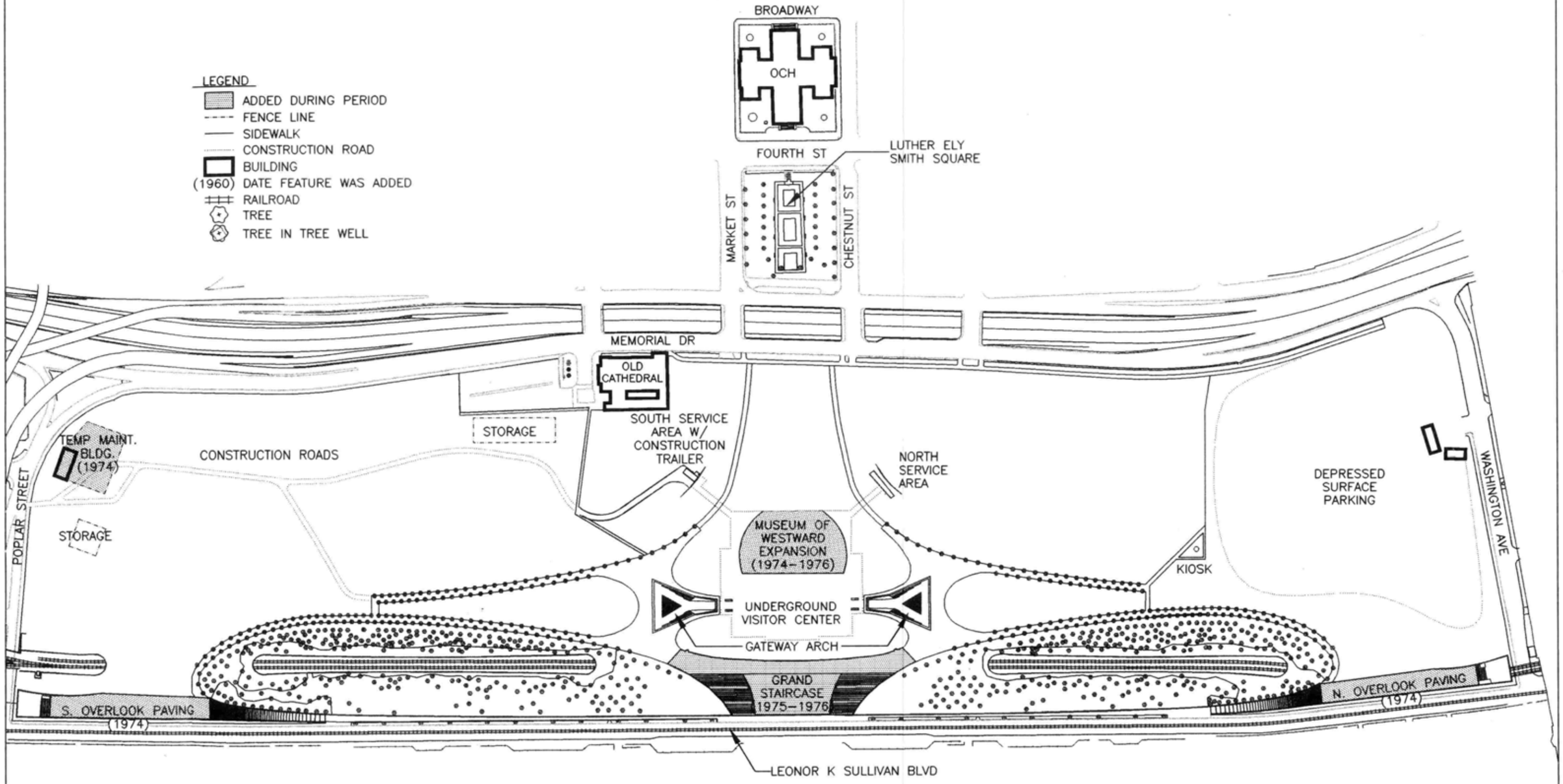
SCALE: 1" = 240'
240 0 240 480

MAP SOURCE: JEFF DWGS 366/41009A; 41035A; 41037A; 41039A

CULTURAL LANDSCAPE REPORT: JEFFERSON NATIONAL EXPANSION MEMORIAL 1969–1973 PERIOD PLAN

SAINT LOUIS, MISSOURI

DRAWN: CHAN	DRAWING NO. 366 80,020
TECH. REVIEW: BELLAVIA	SHEET 2 OF 6
DATE: 7/96	



North

SCALE: 1" = 240'

240 0 240 480

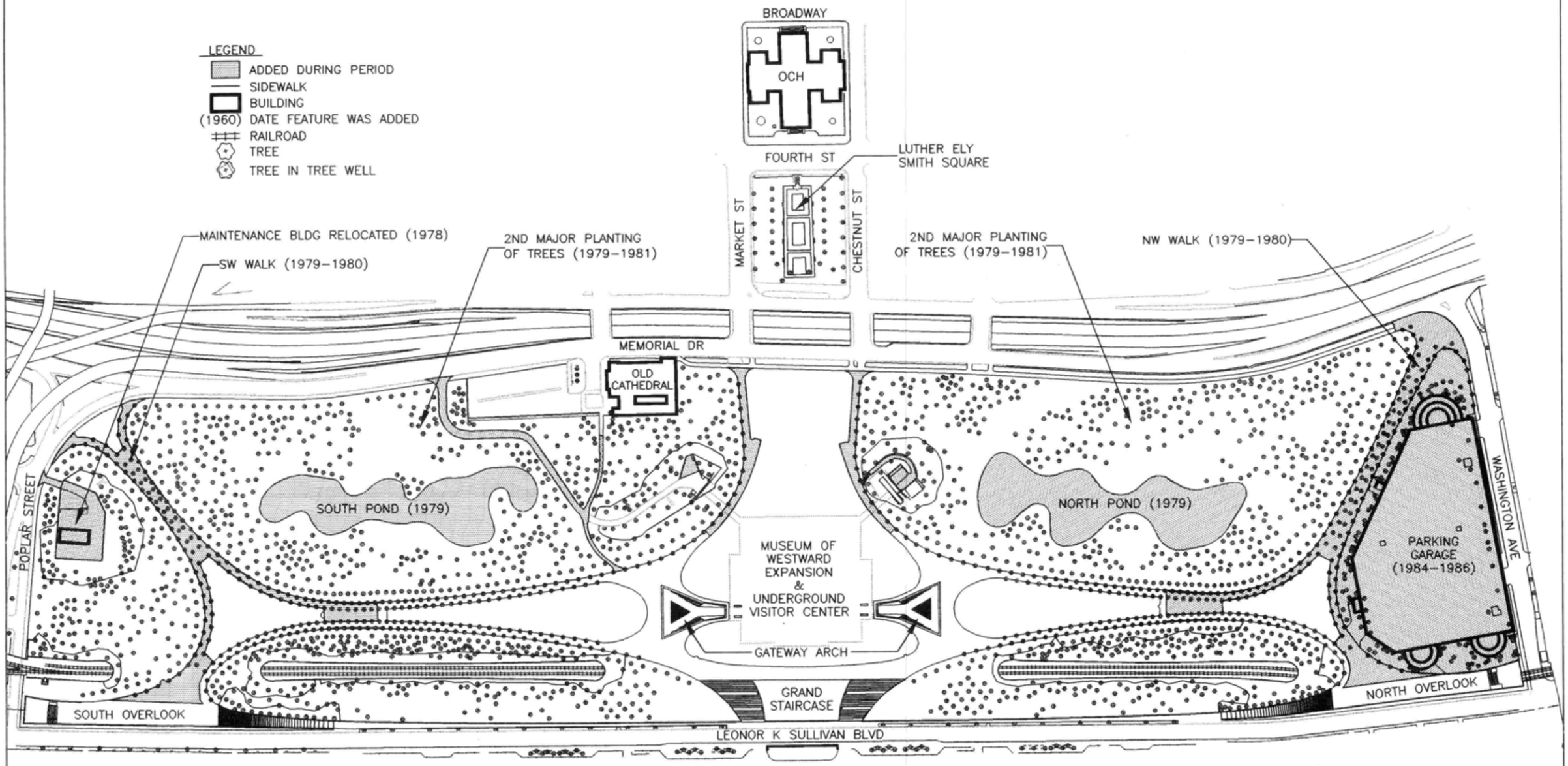
MAP SOURCE: JEFF DWGS 366/41024; 41031; 60010

CULTURAL LANDSCAPE REPORT: JEFFERSON NATIONAL EXPANSION MEMORIAL

1974–1977 PERIOD PLAN

SAINT LOUIS, MISSOURI

DRAWN: CHAN	DRAWING NO. 366 80,020
TECH. REVIEW: BELLAVIA	
DATE: 7/96	SHEET 3 OF 6



North

SCALE: 1" = 240'

240 0 240 480

MAP SOURCE: JEFF DWGS 366/41035; 41037; 41039; 41047

CULTURAL LANDSCAPE REPORT: JEFFERSON NATIONAL EXPANSION MEMORIAL

1978–1986 PERIOD PLAN

SAINT LOUIS, MISSOURI

DRAWN: CHAN	DRAWING NO. 366 80,020
TECH. REVIEW: BELLAVIA	
DATE: 7/96	SHEET 4 OF 6

Chapter IV: Inventory of Existing Conditions

Introduction

An inventory and condition assessment of all existing landscape features of the site was completed in the summer of 1995. An overview of the environmental context, landscape setting, and natural systems forms the framework for the existing conditions of the character-defining features of site. The individual landscape features were then separated into seven categories; topography, buildings and structures (including mechanical and site engineering systems), vegetation, spatial organization (including views and vistas), circulation, water features and furnishings and objects. Inspection sheets were taken into the field and each character-defining feature was visually assessed for its physical condition.[204] Black and white photographs were taken to document the character-defining features. Each was evaluated based on the criteria developed for the Cultural Landscape Inventory (CLI) initiative.[205]

Good	The features of the landscape need no intervention; only minor or routine maintenance is needed.
Fair	Some deterioration, decline, or damage is noticeable; the feature may require immediate intervention; if intervention is deferred, the feature will require extensive attention in 3-5 years.
Poor	Deterioration, decline, or damage is serious; the feature is seriously deteriorated or damaged, or presents a hazardous condition; due to the level of deterioration, damage, or danger the feature requires extensive and immediate attention.
Unknown	Not enough information available to make an evaluation.

The following narrative summarizes the existing conditions of the site. A 1996 Existing Conditions Plan is located at the end of the chapter and a full-scale copy is located in the back pocket of this report.

Environmental Context

The Mississippi River is the most significant natural feature which directly affects JEFF and adjacent lands. Just north of St. Louis, the Missouri River converges with the Mississippi River. In recent years, the park has been greatly impacted as a result of flooding of these major waterways. The average depth of the river in St. Louis is 11.20 feet, with a flood stage of 30 feet. In 1993, flood waters reached their highest recorded mark of 49.58 feet, 19.58 feet above flood stage.

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[204]See Appendix B for samples of inspection sheets used for this assessment.

[205]The Cultural Landscape Inventory (CLI) is a computerized inventory designed to identify and document cultural landscapes in the National Park Service. The CLI will directly relate and cross reference elements documented in the List of Classified Structures (LCS), an ongoing program that documents all historic structures in the NPS. The CLI will also identify parks in need of a Cultural Landscape Report (CLR).

The St. Louis Metropolitan Area comprises approximately 5,300 square miles. It is made up of portions of both Missouri and Illinois, divided by the Mississippi River, and nine counties. The population of the city in 1990 was 2,444,099, ranked 17th in the country.[206] The population has remained stable in the past two decades, however, a change in the population density has occurred. A declining core, stable suburban ring, and a growth on the outer edges is the result of the population change.

Landscape Setting

A cooperative agreement between the United States and the Archdiocese of St. Louis dated February 23, 1961 provided for the preservation and interpretation of the Old Cathedral. This agreement is still in effect. The Old Cathedral is a fully functioning Catholic Church located within the boundaries of the park. The Cathedral and the land it occupies are owned by the Catholic Church. Adjacent land north of the Cathedral is used by the Church to accommodate air-conditioning units, while a surface parking lot to the south serves the congregation. Both are used under special use permits.[207]

The Terminal Railroad Association (TRRA) has a perpetual easement on two railroad tracks that run through the east side of the park.[208] The tracks are in open cuts and partially in a tunnel. In 1981 the agreement was modified to accommodate railroad yard traffic so that the tracks on Sullivan Boulevard could be removed. The TRRA has plans to remove and replace the entire track bed and install one set of tracks in the center of the cuts/tunnel in 1997.

Washington Avenue, a city street located on the north end of the park, is located within park boundaries but is maintained by the city. North of Washington Avenue is Eads Bridge, the northern boundary line of the park. Eads Bridge was listed on the National Register of Historic Places in 1966 and is a National Historic Landmark.

Adjacent to the northern boundary of the park is Laclede's Landing. A rehabilitated historic district, Laclede's Landing is primarily a commercial district with restaurants, bars, and small shops. This district resembles the historic warehouse district that once occupied the riverfront. Industrial land uses occupy the land south of the Arch grounds.

Topography

Jefferson National Expansion Memorial is constructed on imported fill material approximately 60' above the Mississippi River. The landform is artistically shaped to disguise the railroad tracks and service functions and was raised as much as 30' in some areas.

Although the topography varies greatly around the site, certain predominant topographical features are evident. The site is generally flat underneath the Arch at elevation 446'. The ground elevation gently increases toward

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[206]James E. O'Donnell, ed., *St. Louis Currents: The community and its resources.* Published by The Leadership Center of Greater St. Louis, 1992.

[207]An agreement with the Pastor of the Church provides for the use of 15 parking spaces in the lot by JEFF employees. These spaces are not available for park use during ceremonies and services at the church.

[208]Track Relocation Agreement, June 2, 1958. Copy on file in the JNEM Archives, Record Unit 104, box 19, folder 1.

the north and south and culminates at two high points at elevation +/-471', a 25' vertical change. Toward the west, the ground gently slopes up to a mound along Memorial Drive at elevation 465', a 19' grade increase.

The most evident and drastic grade changes occur at the service entrances, north and south overlooks, around the ponds, and around the maintenance building. The service areas are deep depressions where access to the underground tunnels and visitor center is located. Retaining walls contain slopes which range from 38-66%. The grade changes approximately 16' at the south entrance and 25' at the north entrance.

The overlooks are constructed at elevation 466' over the river. Beyond the curved walls is a 55' drop to Sullivan Boulevard. Varied slopes from 14-47% occur around the ponds. In some areas between the pedestrian sidewalk and the pond water elevation the vertical change is as much as 29'.

The maintenance building sits in a hollow at elevation 423', about 23' lower than the surrounding area. The grass slopes around the building average between 25-35% and are difficult to maintain.

There are many 50-70% slopes on the site, particularly around the railroad cuts and tunnels, the parking garage, and east of the maintenance building. These slopes are predominantly covered with grass and create several problems. They are very difficult to maintain, soil erosion continues to be a problem, and these areas are sometimes subject to damage from vehicles and equipment.

Luther Ely Smith Square is a one-block area surrounded by Market Street, Fourth Street, Chestnut Street, and Memorial Drive (see figure 51). The topography, plant materials, and streets define the space. The entire area slopes gently toward the east (3%). A central sunken area, approximately 65' x 220', is defined by paved asphalt walks and is 3-5' lower than the adjacent streets. This central area has somewhat of an open feeling because low growing flowers are planted in the center planting beds.

The adjacent sides of the central area slope toward Memorial Drive as well. These two grassy strips, approximately 65' wide, contain two rows of trees which form an overhead canopy and create an intimate, enclosed feeling.

Spatial Organization

The axial relationship between the Arch and the Old Courthouse is the primary organizing feature of the landscape. The contrast between the wide open space beneath the Arch and the intimate, enclosed space created by the tree-lined sidewalks on the north-south axis has a strong visual effect. The expanse of the lawn underneath the Arch emphasizes its verticality. In contrast, the tree-lined walkways with their dense overhead canopy create a more intimate, human-scale space. The walks terminate at the overlooks, where again there is wide open space emphasizing the horizontal plane and the expanse of the Mississippi River. There are a few intimate spaces enclosed by vegetation and varied topography around the ponds, but for the most part this area has an open, spacious feeling.

Views and Vistas

The most significant view is the axial view from the Old Courthouse to the Arch and vice versa (see figure 52). This view has been kept unobstructed. It forms a relationship between the Arch and riverfront and the Old Courthouse and city.

Figure 51: Luther Ely Smith Square, (Chan, 1996).

Figure 52: View from Gateway Arch to Old Courthouse, (Bellavia, 1995).

Another important view is from the Arch to the river and from East St. Louis to the Arch. The view from the Arch toward the east is unpleasant. Various land uses which lack any kind of cohesiveness as far as aesthetics create an unsightly situation. The Casino Queen is located northeast of the Arch, and although the riverboat itself is not unsightly, the visitor contact building and parking lot are enormous (see figure 53). Directly across from the Arch is the Continental Grain Company Elevator, many railroad tracks, and a large fountain built in the early 1990s (see figure 54), commissioned by a private land developer. The fountain is supposed to shoot water 630' in the air to compliment the height of the Arch. The attraction is supposed to take place every day at 12:00 noon.

The view of the Arch and the City of St. Louis from the east side of the river is very important and was a significant part of the Saarinen/Kiley plan. This view clearly illustrates the Arch in relation to the city which it symbolizes as the gateway. The land uses on the east side of the river at this time limit the possibilities for enjoyment of this view. Planning efforts are currently underway to purchase the land in East St. Louis.

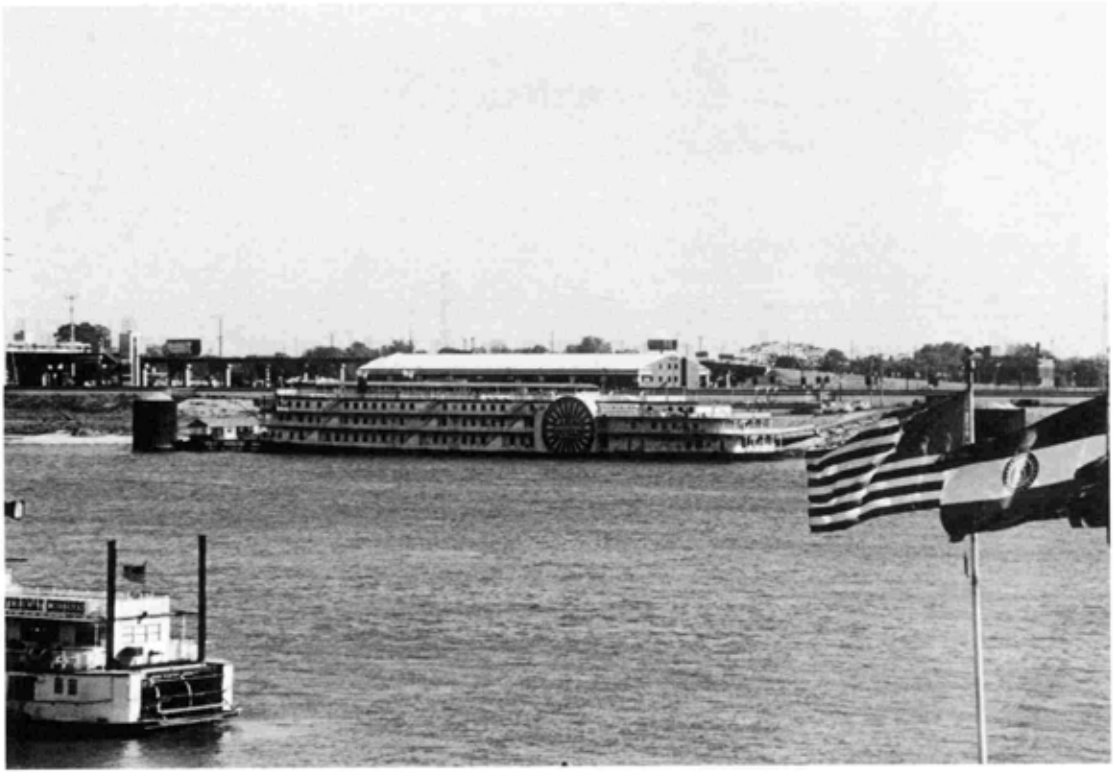

Figure 53: View of the Casino Queen gambling boat across from Gateway Arch, (Bellavia, 1995).

Figure 54: View of Continental Grain Elevator across from the Arch, (Bellavia, 1995).

Buildings and Structures

Most of the buildings and structures on the site were constructed between 1959 and 1976 (excluding the Old Courthouse, constructed 1839-1862, the Old Cathedral, completed in 1834, which is not NPS property, and the parking garage constructed in 1984-1986). A visual inspection of the buildings and structures on the Memorial grounds indicates that there is some deterioration but because a structural analysis has never been completed on any of the more recent construction, the extent of the deterioration cannot be measured. The following summarizes the existing condition based on a visual assessment and review of the outstanding Outlines of Park Requirements (OPRs) for JEFF.[209]

Old Cathedral - The Old Cathedral was begun in 1831 from plans prepared by Joseph Laveille and George Morton and completed in 1834. It is made of limestone and is in the Greek Revival style (see figure 55). Although within park boundaries, the building is still owned and cared for by the Roman Catholic Archdiocese of St. Louis.

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[209]Outlines of Park Requirements, or Standard Forms 10-238, identify park needs. The form requires a description of the project, justification for it, and the planning and management requirements necessary to complete the project. Review of these forms helped to identify some of the problems on site and sometimes indicates when and why the problem originated.

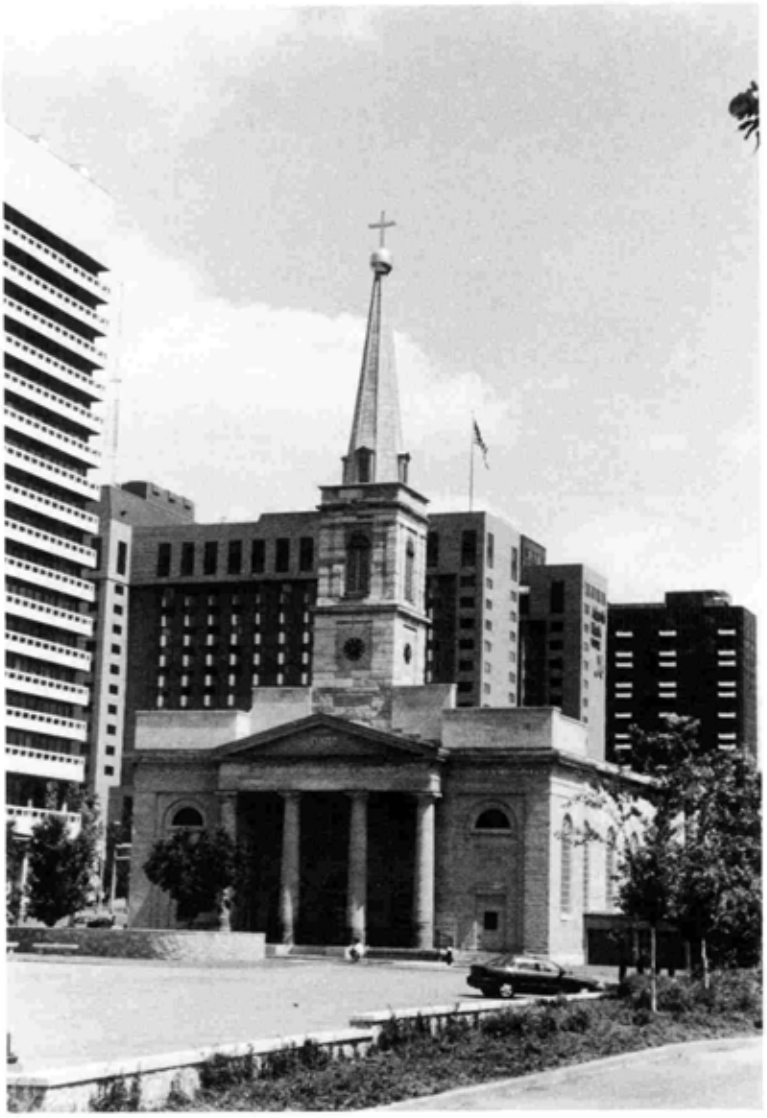

Figure 55: View of the Old Cathedral from the south, (Chan, 1996).

Old Courthouse - The Old Courthouse was built between 1839 and 1862. It is a three-story Greek Revival brick and stone building designed by several architects (see figure 56). The building is basically a Greek cross in plan, and the junction of the four wings forms a central domed rotunda.

The Old Courthouse is in fair condition. Several serious problems have been identified, including the deterioration of the masonry chimneys, decline of portions of the cornices, and failure of the flagpole at the top of the dome. Thirteen of the thirty-three chimneys are in serious disrepair. The need for a structural analysis followed by preservation maintenance planning has been identified by the park as critical.

Figure 56: The Old Courthouse, (Bellavia, 1995).

Some pieces of the cornices have repeatedly fallen off in the recent past and present a hazardous condition to park staff and visitors. An assessment of the building's condition is currently underway by staff of the Midwest Field Area. The flag pole at the top of the dome is unstable. The condition and necessary repairs are unknown at this time, however, the park is awaiting the estimates for an investigative analysis. Gaining access to the base of the flagpole will be costly.

These problems are not only an indication of the condition of the building but present serious threats to the safety of employees and visitors. Other less critical needs include repairing and repainting the exterior, and interior repairs.

Gateway Arch - The condition of the Arch was not assessed (see figure 57). It has not been structurally analyzed since its completion in 1965. A cursory inspection of the Arch legs and foundation construction joints in 1984 revealed defects and the possibility of a water intrusion problem between the outer and inner skins.[210] Marks on the exterior stainless steel skin are visible at about the 350' height. Problems continue to occur with visitors scratching graffiti on the exterior of the north and south legs. An analysis of how well the structure has held up over the past 30 years and what measures should be taken to guarantee that it will be around for the next 100 years or more (Saarinen said it was designed to last 1000 years) is needed.

Visitor Center and Museum - The visitor center and museum are in good condition. A structural analysis of the underground visitor center was completed in 1989-1990. The analysis began as a simple investigation to identify the source of water intrusion but ultimately led to the discovery of cracks in the ceiling support beams.

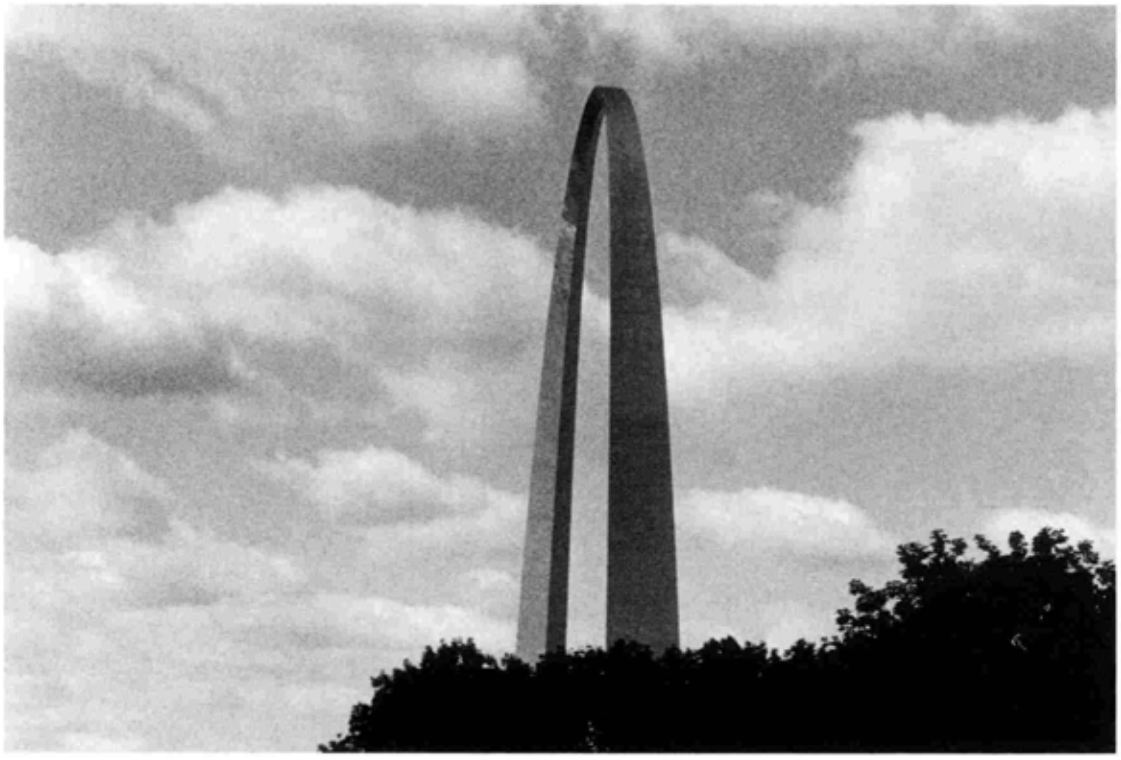

Figure 57: The Gateway Arch, (Chan, 1996).

[210]Outlines of Park Requirements, package 802, October 25, 1984. A copy of the OPR can be found in the JEFF Facility Manager's Office.

Structural reinforcements were erected and the roof was waterproofed.[211] As a result of this contract, portions of the interior of the visitor center were damaged. The women's restroom and the ticket sales area have recently been remodeled.

Grounds Maintenance Building - The maintenance building is in poor condition (figure 58). It was constructed in 1974 as a temporary five-year facility. The building is inadequate in terms of work space, storage space, and employee comfort facilities. There is only a unisex locker room and bathroom for a crew which ranges in size from six to ten employees. The building has insufficient ventilation and a rodent problem.

Generator Building - The generator building is in fair condition. The hot tar and meramac gravel roof needs to be replaced.

Figure 58: The Grounds Maintenance Building, (Chan, 1996).

[211]Moore, *Urban Innovations*, 89-97. Historian Bob Moore gives a detailed description of the water intrusion problem and the structural problems identified with the visitor center.

Site Engineering Systems & Mechanical Systems

North and South Overlooks - The north and south overlooks are in fair to poor condition (figure 59). They were constructed in the early 1960s and have not been structurally analyzed since their completion. Problems with cracking and pieces of concrete falling from the overlook walls have occurred in the recent past. The surface of the observation decks are in very poor condition. Temporary measures were taken to stabilize the structures and eliminate any hazards to visitors but the underlying problem was never identified nor treated. The park has requested funding for the replacement of the overlook steps and observation decks. The north observation deck is in such serious disrepair that it is considered hazardous and access may have to be denied in the near future.

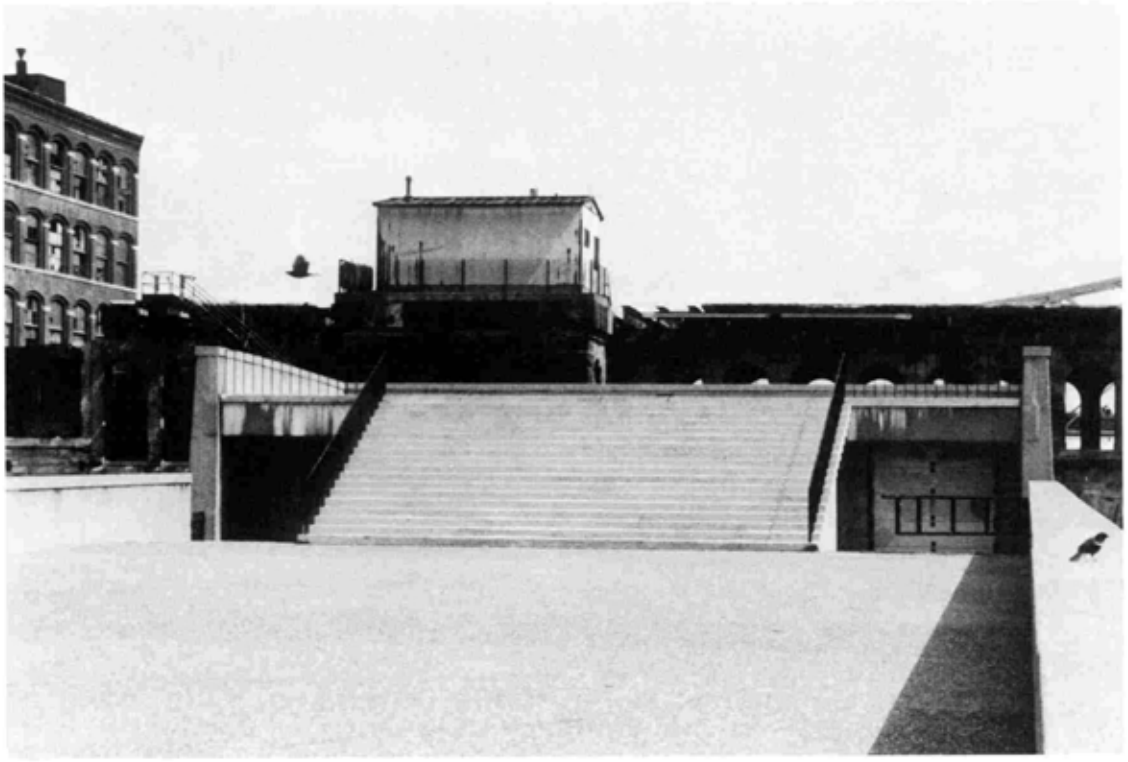

Figure 59: Top observation deck of North overlook, (Chan, 1996).

Railroad Cut Wall and Tunnels - The condition of the railroad cut walls and tunnels is unknown (see figure 60). They were constructed in 1959-1960. A cursory visual inspection indicates that there has been some spalling and cracking of both the walls and the tunnels but no critical deterioration was documented.

Figure 60: Railroad cut walls, (Chan, 1996).

Tree Grates - The cast iron tree grates surrounding the Rosehill Ash trees are in poor condition (see figure 61). The grates are difficult to keep level due to heaving from frost/thaw cycles, uplifting from tree roots, and damage from heavy trucks and traffic during the annual Fair St. Louis. The grates are routinely cut to accommodate tree growth, however, when 10" diameter trees are replaced with 3" caliper trees the cut tree grate is no longer efficient. The grates not only require intensive maintenance, but more importantly, present a serious hazard to pedestrians.

Irrigation System - The irrigation system is in fair to poor condition. The maintenance crew has been upgrading the system in a piecemeal fashion. Several problems currently exist. The design is inconsistent and many of the sprinkler heads distribute water on the sidewalks, manual control valves intended for limited use are deteriorating from excessive use, and the system is only partially automated.

Retaining Walls - The retaining walls at the service entrances are in good condition. There are a number of poured-in-place concrete retaining walls at both locations varying in heights and length. All appear to be in fair to good condition.

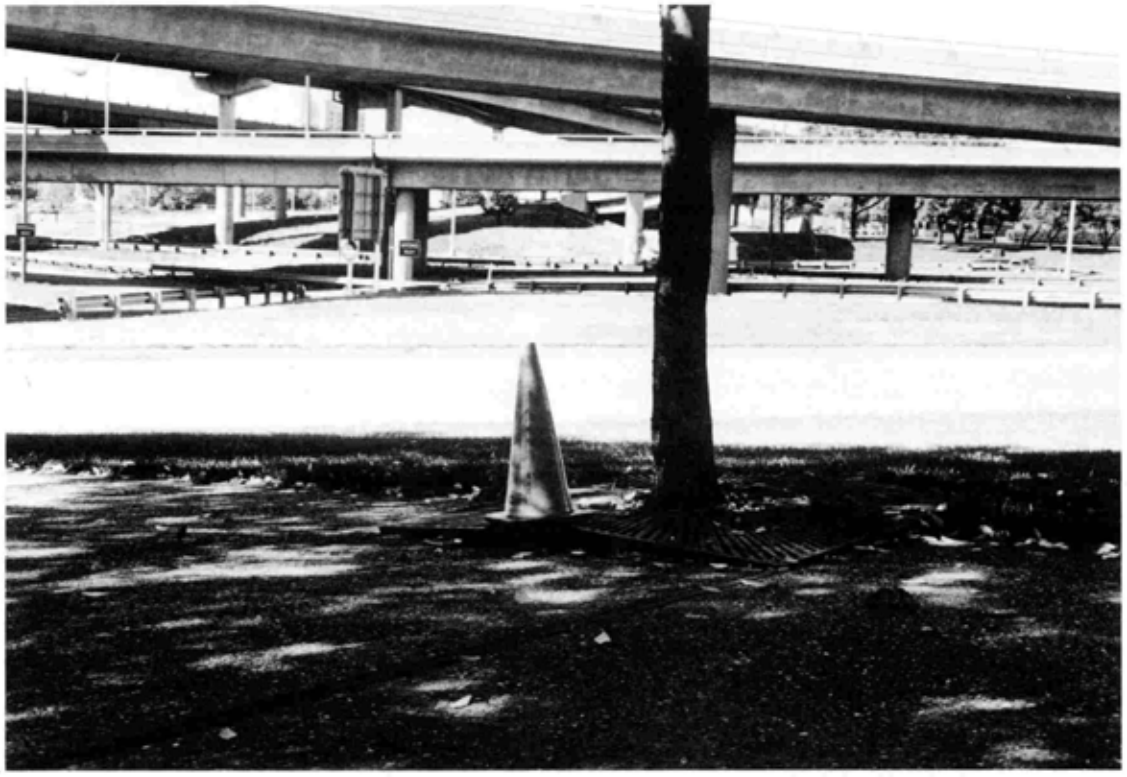

Figure 61: Detail of uplifted tree grate, (Bellavia, 1996).

Vegetation

Rosehill Ash Monoculture - The Rosehill ash trees (Fraxinus americana 'Rosehill') are in fair condition (see figure 62). At the time of the inspection, 71 trees out of 985 were in very poor condition and required replacement and 11 were missing. For the most part, those trees that are in poor condition are some of the oldest Rosehill ash trees on the site (planted in phase I, 1969-73). These trees have reached their maturity and even outlasted the average lifespan of an urban tree. Some missing trees have not been replaced to decrease shade and encourage turf growth.

Bald Cypress - The bald cypress trees (Taxodium distichum) are in good condition. Those located on the west portion of the site (the circles) were planted in 1980 and are doing well considering the urban environment. The bald cypress located along Leonor K. Sullivan Boulevard are in fair condition. These trees suffer from spring flooding that has occurred frequently in the recent past. Although they survive the floods, they continue to show signs of decline that can be attributed in part to the flooding.

Plant Composition around Ponds - The trees around the ponds are in fair condition. There are many different genera including: oak (Quercus sp.), maple (Acer sp.), linden (Tilia sp.), crabapple (Malus sp.), hawthorn (Crataegus sp.), coffeetree (Gymnocladus sp.), and honeylocust (Gleditsia sp.). These genera generally do well in an urban environment.

Figure 62: Rosehill Ash monoculture flanking sidewalks, (Bellavia, 1995).

Railroad Cut Plantings - The plantings around the railroad cuts and tunnels range from good to poor condition. Many of the trees on the west side of the tunnels were removed in 1994 due to decline (see figure 63). The species removed include black pine (Pinus thunbergiana), flowering dogwood (Cornus florida), and eastern redbud (Cercis canadensis). These plants have not been replaced to date. The remaining plants on the west side are in fair to poor condition. These were the first trees planted on the site and have simply reached their expected maturity given the existing growing conditions.

The plantings on the east side of the tunnels are in good condition (see figure 64). They are recent replacements of trees and shrubs that were affected by the flood of 1993. Although they appear to be in good condition, the trees planted in this area are subjected to flood waters year after year and cannot be expected to reach maturity. It is important to note that the effects of the floodwaters on the bald cypress trees along Sullivan Boulevard and other mature trees in this location may not be visible for several years.

Service Area Plantings - The service area plantings are in fair condition. A wide variety of trees and shrubs are planted in these areas including: hawthorn, maple, zelkova, honeylocust, mugo pine, and wintercreeper (Euonymus fortunei). However, the mugo pines are in poor condition due to the effects of pollution, sawfly, pine scale, Nantucket tip moth, pine shoot moth, and Diplodia. Other species appear to be in fair condition.

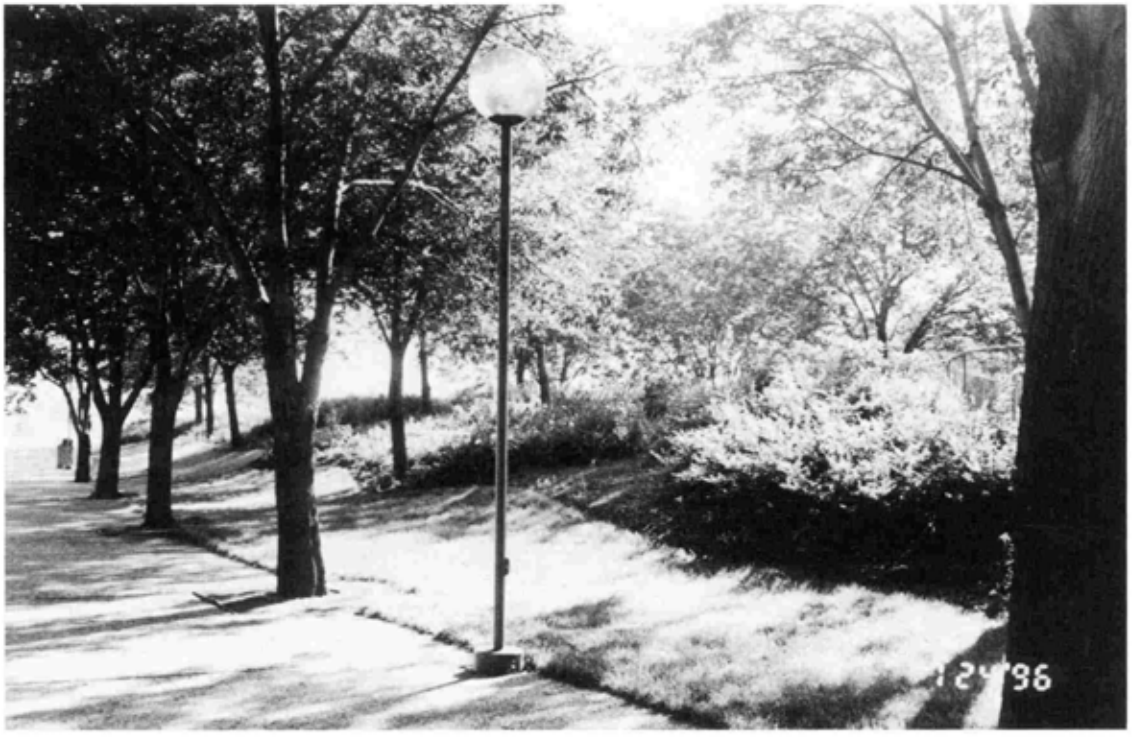

Figure 63: Plantings west of south railroad cut, (Bellavia, 1996).

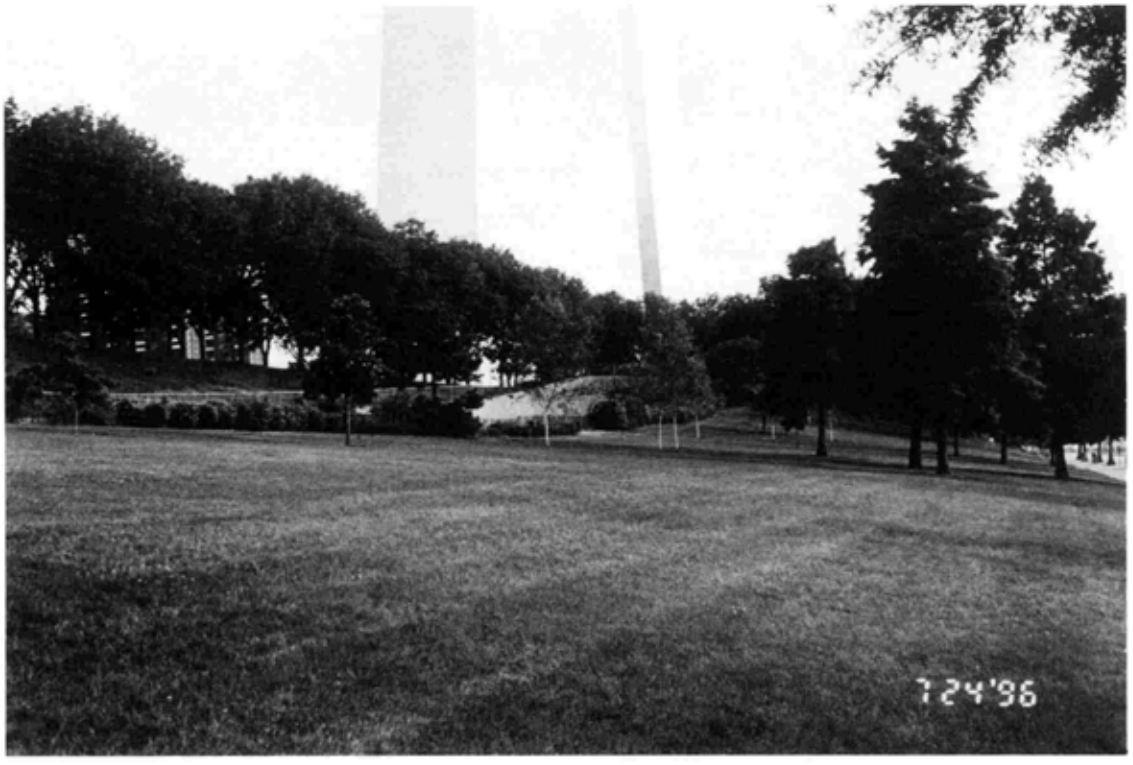

Figure 64: New plantings on east side of south railroad cut, (Bellavia, 1996).

Circulation

Parking Garage - The parking garage is in good condition (see figure 65). The garage is maintained by the Bi-State Development Agency.

Figure 65: View of the Arch Parking Garage from Eads Bridge, (Chan, 1996).

Exposed Aggregate Sidewalks - The existing circulation system is in poor condition (see figure 66). There are approximately five miles of exposed aggregate sidewalks on the interior of the park and 2.1 miles of concrete sidewalks on the perimeter. Cracks are visible in portions of the exposed aggregate sidewalks and the redwood expansion joints have deteriorated. Portions of the sidewalk have shifted and sunk requiring mud jacking in the past to level the sections. Cracks and spalling are also visible in the concrete perimeter walks. The overlook steps, which have been rehabilitated in the past, are deteriorating. The size and color of the aggregate used for past repairs does not match the original existing aggregate.

Arch Entrance Ramps and Steps - The ramps at the Arch entrances are in good condition (see figure 67). However, a very serious problem exists at the ramps which lead into the Arch visitor center. Although the existing granite paving surface is in good condition (it replaced terrazzo in 1983) the ramps are very slippery when wet and present a dangerous situation for pedestrians.

Figure 66: Exposed aggregate sidewalks. (Bellavia, 1996).

Figure 67: Entrance ramps to the George Hartzog Visitor Center. (Bellavia, 1996).

The concrete steps adjacent to the entrance ramps are in poor condition. These steps were constructed in the early 1960s as architectural features or sculpture that could be used as sitting walls.[212] They are in a high-use area and therefore their deterioration creates a hazardous condition for employees and visitors.

Grand Staircase - The grand staircase steps are in fair condition (see figure 68). The snow-melting mats installed in the 1980s function intermittently, and the recessed lighting in the walls along the steps has been vandalized and are flooded regularly when the Mississippi River rises. The steps also need to be caulked to prevent water from seeping into the joints and causing heaving and cracking. The park has submitted a funding request to replace the electrical system and heat mats and to complete the center portion of the steps (phase II of the 1975 plans for the monumental entrance).

Figure 68: View of Grand Staircase from Leonor K. Sullivan Boulevard, (Bellavia, 1995).

[212]Bob Burley, Architect, interview with Gina Bellavia and Gregg Bleam, July 27, 1995. Copy on file in the JNEM Archives. Mr. Burley worked for Eero Saarinen and Associates from 1956-1963. He was personally responsible for the design of the entrances to the Arch and has told the author that these were meant to be architectural features. The tread riser relationship is not typical, indicating that the "steps" were meant for sitting or viewing, and not walking or entering the facility.

Old Cathedral Parking Lot - The Old Cathedral parking lot is in good condition. It was resurfaced and redesigned in 1994.

Old Cathedral Sidewalk - The Old Cathedral sidewalk is in fair condition. It is 8' wide exposed aggregate walks and, like other walks on the site, the Cathedral walk is affected by Fair St. Louis activities and suffers from some cracking and sinking in areas.

Interior Roads - The park interior roads are in good to fair condition. The 0.2 mile service road leading from Memorial Drive to the shipping and receiving area (SHIPREC) is in good condition. It is paved asphalt approximately 15' wide with 6" concrete curbing. The service road leading to the heating, ventilating, and air conditioning systems (HVAC) is generally in good condition. The road is partially constructed of precast porous pavers, for the first 35', and the remainder of the road is concrete with concrete curbing. The road is in good condition.

Exterior Roads - There are approximately 2.1 miles of paved road on the perimeter of the park and they are in fair condition. Washington Avenue, on the north end of the park, is a 1/4 mile interior park road that was reconstructed with non-Federal funds in 1984-1986 (when the parking garage was constructed). The roads are somewhat deteriorated from chemicals, heavy equipment and heavy use.

Much of the curbing along the perimeter of the park boundary (Memorial Drive, Washington Avenue, Sullivan Boulevard, and Poplar Street) is in a deteriorated condition.

Water Features

North and South Ponds - The north and south ponds are in fair condition (see figures 69 & 70). They are routinely cleaned every two years. After the north pond was emptied, cleaned and refilled in 1995, the maintenance division noticed the water level dropping, indicating a leak. The pond has since been recaulked and the water level has been maintained.

The ponds do not have any type of aeration or circulation system to recirculate the water and prevent the growth of algae. Significant algae blooms have appeared in recent years that affect their aesthetic quality and sometimes emit and odor.

Furnishings and Objects

Concrete Benches - The existing concrete benches are in good condition (see figure 71). Half of the concrete benches were constructed in 1971 and the remainder in 1979. The need for more benches at other locations along the sidewalks in addition to the rest areas has been identified.[213]

[213]One of the biggest complaints the park receives is the distance from the parking garage and Old Cathedral parking lot to the Arch legs. Obviously the distance will not change, soit is recommended that the park install more benches. It should be noted here that the addition of benches will potentially affect the landscape and therefore specific recommendations are suggested in the following chapter pertaining to this proposal.

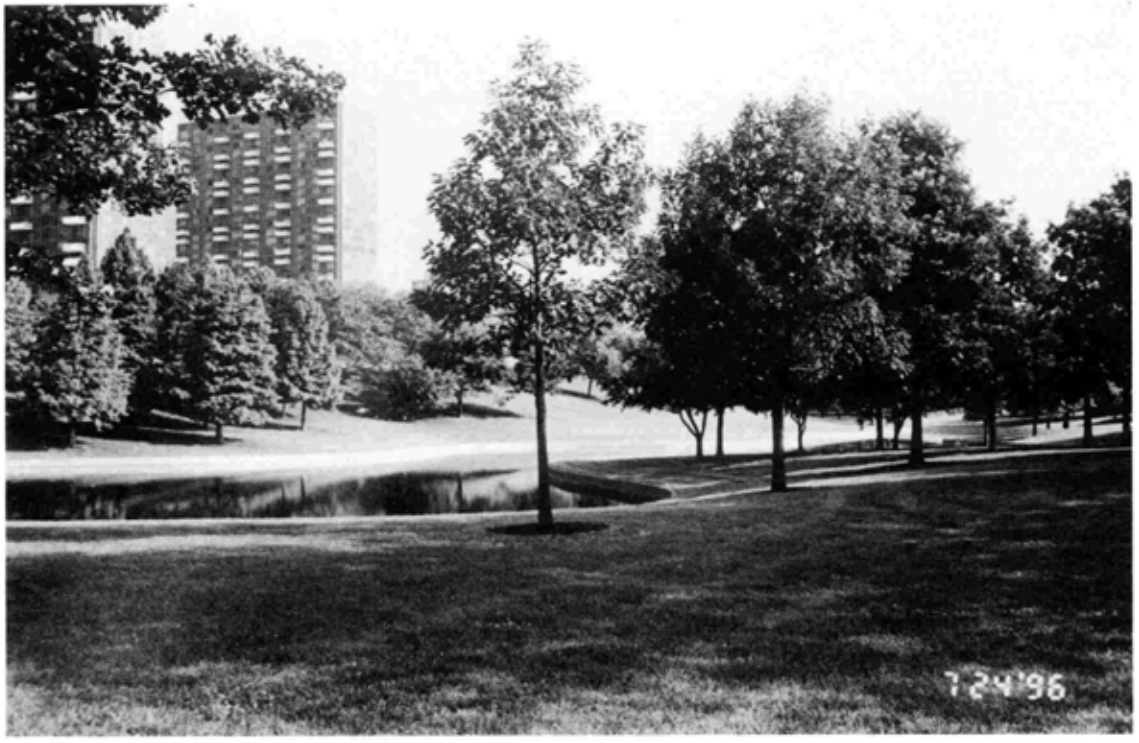

Figure 69: View of the north pond, (Bellavia, 1996).

Figure 70: View of the south pond, (Bellavia, 1996).

Figure 71: View of concrete benches at the north rest area (Bellavia, 1996).

Light Standards - The walk lights are in fair condition. They are 12' tall brown metal posts with 21' diameter glass globe lanterns on the top (see figure 72). The globes are vandalized on occasion and require replacement. The posts and bases are weathered and require replacement or repair.

Trash Receptacles - The trash receptacles are in fair condition. There are currently about 155 exposed aggregate concrete containers with brown heavy plastic lids (see figure 72). The lids are replaced every 3-4 years. The containers along the exterior roads are more susceptible to damage from chemicals used on the city streets, and these are showing the most deterioration.

Drinking Fountains - The drinking fountains are in fair condition. They were constructed in the late 1970s of exposed aggregate concrete and are located east of the north and south legs of the Arch. Drinking fountains are also located at each of the rest areas, but these are not in working condition. The steel water supply line has had many breaks in recent years.

Kiosk - The information kiosk is in good condition. It was constructed in 1986 at the southeast end of the parking garage (see figure 73). The kiosk is precast concrete and is generally triangular in shape. It has a 4' x 4' information board for posting events, operating times and procedures.

Entrance Signs -The entrance signs are in good condition. There are twelve 7' x 3' rectangular signs at each park entry point (see figure 74). The signs are wood, painted grey with the NPS arrowhead in brown and white painted lettering and identify JEFF as a National Park Service area. There are no other permanent signs on the site.

Figure 72: Walk lighting and trash receptacles on Arch grounds, (Bellavia, 1996).

Figure 73: The information kiosk, (Bellavia, 1995).

Figure 74: Park entrance sign, (Bellavia, 1995).

Chain-Link Fences - The chain-link fence surrounding the railroad cuts is in poor condition. There are approximately 2,000 feet of 5' high chain-link fence anchored in the concrete retaining walls (see figure 75). Installed in 1972, the posts have deteriorated and the top rail has been damaged, compromising the strength of the fence. The deteriorated fence creates a potentially dangerous situation for employees and visitors.

Joseph Pulitzer Plaque - The Joseph Pulitzer Plaque is in good condition. It is a bronze plaque located in the sidewalk at the east entrance of the Old Courthouse. The plaque is 28" x 21" and commemorates the location where Joseph Pulitzer bought the St. Louis Dispatch newspaper on December 9, 1878 (see figure 76).

Saarinen Memorial Plaque - The Saarinen Memorial Plaque is in good condition. It is a bronze 22" x 28" plaque mounted on a 24" x 29 3/4" stone base (see figure 77). The base is pitched 45 degrees. The plaque is mounted on the west sidewalk curb along Leonor K. Sullivan Boulevard on the centerline of the Arch/Old Courthouse axis. This area is often affected by flood waters therefore the condition of the plaque is potentially threatened.

Luther Ely Smith Memorial Marker - The Luther Ely Smith Memorial Marker is in good condition. It is a granite polished marker with an angled face and pitch-face base (see figure 78). It is 2' x 16" x 3' and is located on the west side of Luther Ely Smith Square. The memorial commemorates the St. Louis lawyer who first proposed a monument on the riverfront in 1933. It was dedicated in 1985.

Figure 75: Chain-link fence surrounding railroad cuts, (Chan, 1996).

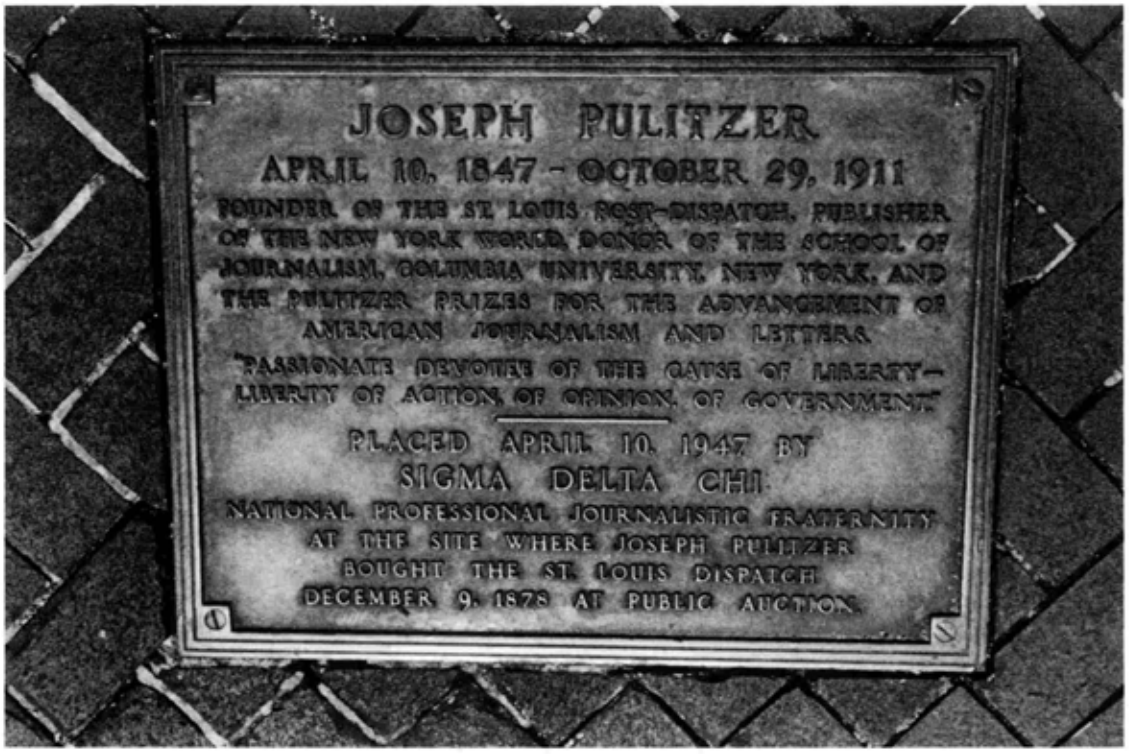

Figure 76: Joseph Pulitzer memorial plaque, (Chan, 1996).

Figure 77: Saarinen Memorial plaque, (Bellavia, 1996).

Figure 78: Luther Ely Smith Memorial Marker, (Bellavia, 1996).

Lewis & Clark Plaques - The Lewis and Clark plaques are in good condition. They are bronze plaques measuring 18 ¼ " x 16 ¾" (see figures 79 & 80). The Meriwether Lewis plaque is mounted on the west side of the south overlook wall and the Clark plaque is mounted on the west side of the north overlook wall. The plaques commemorate the efforts of Lewis and Clark and their expedition. The overlook concept as well as commemorating the two explorers at the overlooks was a Saarinen concept.

Flood of 1993 Plaques - The plaques marking the height of the 1993 floodwaters are in good condition (see figure 81). The plaques were mounted on the north and south walls of the Grand Staircase at the elevation where the floodwaters of the 1993 flood began to recede. The Mississippi River reached 49.58 feet, the highest level ever recorded in the City of St. Louis. The markers are bronze and measure 16" x 10¼".

Figure 79: Meriwether Lewis Memorial plaque, (Chan, 1996).

Figure 80: William Clark Memorial plaque, (Chan, 1996).

Figure 81: Plaque marking the high water mark of the Great Flood of 1993, (Chan, 1996).

American Society of Civil Engineers Plaque - Located on the wall above the south entrance to the underground visitor center, this plaque was awarded to JEFF by the American Society of Civil Engineers for "outstanding civil engineering achievement" in 1967. The plaque is bronze and measures approximately 2' x 11".

The Gateway Arch Plaque - Located on the wall above the north entrance to the underground visitor center, the plaque was mounted for the dedication of the Gateway Arch to the people of the United States. The Arch was dedicated on May 25, 1968 by President Lyndon B. Johnson. The plaque measures approximately 2' x 1'-8" and is bronze.

Other Management Concerns

Plant Failures, Substitutions

Since the completion of the landscaping in 1981, there have been several contracts for replacements of trees and shrubs. The first such contract occurred around 1983 when Regency Landscaping was hired to replace the suffering Bulgarian ivy (Hedera helix 'Bulgaria') on the west side of the railroad tunnels with sod. According to Mike Mayberry of Regency Landscaping, the ivy was not properly maintained and weeds overtook it, eventually requiring its removal.[214]

In September 1985, Treeland Nurseries was awarded a contract to replace shrubs around the railroad tunnels and at the service entrances. Species replaced included fragrant sumac (Rhus aromatica), pyracantha 'Lalandii' (Pyracantha coccinea 'Lalandei'), and mugo pine (Pinus mugo). These were replacements in-kind of the shrubs that had been planted in the early 1980s.

Another contract was awarded to Treeland Nurseries in May 1986. This time the contractor was to replace 178 dead trees. At this time it seemed evident that certain species did not perform well on this site under the existing conditions. For example, the flowering dogwoods in the park continued to suffer from the time they were planted. Under the above contract, flowering dogwoods which needed removal were replaced with snowdrift crabapples (a strategy begun earlier on a small scale). This marked the first major departure from the original planting plan as implemented by the NPS.

Between 1986 and 1995, the NPS grounds maintenance division continued to have difficulties with certain tree species. In particular, the following tree species were not performing well in the park and the need to identify new replacement species seemed inevitable: flowering dogwood, sugar maple, Bradford pear, Japanese black pine, and littleleaf linden. As these species began to decline, they were replaced by snowdrift crabapple, amur maple, redspire pear, and red pine respectively. River birch and 'Greenspire' linden replaced the littleleaf linden.

In addition, the Flood of 1993 decimated the areas around the railroad tunnels and required the replacement of many trees and shrubs. An attempt was made to replant these areas with species native to wetland areas so they would have a better chance of survival in the event of future floods. Species introduced on the riverfront included: river birch, swamp white oak, black gum, heritage birch, and sweetbay magnolia. Some of these

[214]Gina Bellavia, interview with Mike Mayberry of Regency Landscaping (formerly with Shelton and Sons Landscaping), February 21, 1995. Copy of notes on file in the JNEM Archives. It is important to note that the park was not authorized to use pre-emergent herbicides at this time.

species were introduced on an experimental basis and were monitored for adaptability to the site conditions. Shrubs were replaced with pyracantha 'Gnome', a smaller variety than the 'Lalandei', daylilies, and fothergilla. At this time, fragrant sumac, which was included in the implemented NPS plan, was not replaced.

Although an effort was made by the staff to maintain the tree numbers in the park, the introduction of a greater variety of species further disguised the intended planting concept. By 1995, there were eleven more canopy tree species on the site than were originally planted in 1981; five new flowering tree species; and two new shrubs and groundcover.

Pests and Diseases

Many experts have been consulted since 1977 regarding plant health on the Arch grounds. Much attention was given to the Rosehill Ash monoculture, but the health of other species was a concern as well. Experts contacted include plant pathologists, tree pathologists, and most recently a research agronomist specializing in soil science.[215] Their findings over the past eighteen years is summarized below.

From the late 1970s to the mid 1980s there was a concern over the decline and general poor health of the Rosehill ash monoculture. This was attributed to several things, including the ash borer, cytospora canker, and the poor growing conditions of an urban site. Influences such as the fact that the trees are planted in fill material and urban pollution factors have added stress to the trees and therefore made them weaker and more susceptible to pests and disease. The planting of a monoculture was horticulturally criticized, and the general consensus was to replace dead or diseased trees with alternate species to increase plant diversity, thereby eliminating some inherent problems. In light of the importance the monoculture plays in the design concept of the Memorial grounds, replacing the Rosehill ash trees with a variety of species was not considered a viable option.

Once the causes for decline were identified and recommendations for pest control were implemented, the conditions began to improve. By 1992, entomologist Dr. David Nielsen visited the park and was impressed with condition of the Rosehill ash monoculture.[216] He suggested general plant management techniques such as aeration for soil compaction, mulching beneath trees, and continued ash borer monitoring with a Dursban spray program. Today, it is recognized that most Rosehill ash decline is attributed to the age of the plant.[217]

In 1995, soil scientist James Patterson visited the park and assessed some of the plant health problems from a soils standpoint.[218] In his opinion, the soil conditions adjacent to the sidewalks and in the tree pits are less than adequate for optimum plant growth. In general, the Rosehill ash suffer because they do not have ample room for root growth and a drainage problem exists in the planting pits. Other areas of the site that were investigated also displayed drainage problems.

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[215]The following experts have consulted on the health of the plants on the Arch grounds: James B. Hanson, U.S. Department of Agriculture, National Forest Service; Dr. David G. Nielsen, Ohio Agricultural Research and Development Center, Department of Entomology; James L. Sherald, U.S. Department of the Interior, National Park Service.

[216]Dr. David G. Nielsen to Jim Jacobs, November 3, 1992. Copy on file in the JEFF Grounds Maintenance files.

[217]For a more comprehensive discussion of some of the problems the grounds maintenance division was faced with between 1981 and 1991, see Moore, *Urban Innovations and Practical Partnerships*, 119-125.

[218]James Patterson to Gary Easton, September 25, 1995. Copy on file in the JNEM Archives, uncatalogued collection.

Mr. Patterson outlined several very important facts that should be considered and eliminated at this park. First, there is a drainage problem. The park was built on poor fill material and therefore the soil condition for plant growth is far from adequate. The need for a good soil amendment and aeration program cannot be overstated. He also recommended creating mounds of acceptable soil where there are particularly wet conditions. Finally, Patterson recommended replacing certain species with other species more tolerant of the wet conditions.[219]

Vandalism and Visitor Impact

Due to current uses, the JEFF landscape suffers from a recurring amount of vandalism. The park's proximity to downtown sporting events and riverboat gambling, as well as its use for the annual Fair Saint Louis, contributes to this problem. The most frequent damage occurs to the trees and trash receptacles. Tree and shrub branches are occasionally broken, and sometimes initials are carved in the tree bark. The trash receptacles, concrete walls, and concrete benches are commonly spray- painted with graffiti. While the park Law Enforcement & Safety Division combats the vandalism, damage still occurs.

Visitor impact is highest on the park grounds during Fair Saint Louis, which takes place every year around July 4.[220] The festivities last for three days but set-up and tear down of the stages and booths add about two weeks on each end of the event. The impact on the landscape is very substantial and will have detrimental long-term effects if not carefully monitored and countered.

It is important to realize that while some damage is visually evident immediately after it occurs, other more serious damage is cumulative and will not show its effects for years. For example, soil compaction is one of the most serious contributors to the decline of the park's trees and turf. Although the effects of trucks on the sidewalks and millions of people on the turf under the Arch don't seem significant, after several years of compaction and weakening of the sidewalks, damage becomes apparent.

Since the first VP Fair was held at the site in 1981, the damage to the natural and cultural resources of the park has been minimized. This is due for the most part to the stricter controls set by the NPS on what is and what is not allowable on park property. Future regulations and requirements may limit the damage to the resource even further, or at least assist in the replacement of important landscape features.

Accessibility

Jefferson National Expansion Memorial has implemented many measures in an attempt to make the park and its programs more accessible to all visitors. Although many of the improvements were related to making areas more accessible through self-activated video programs, providing large print brochures, acquiring TDD equipment for the deaf, and providing wheelchairs on request, some physical changes were made as well.

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[219]Ibid.

[220]Moore, *Urban Innovations*, 37-78. Mr. Moore describes the history of the Veiled Prophet Fair and details the celebrations from the first held on the grounds in 1981 until 1991. It should be noted that celebrations on the riverfront occurred before 1981 but were known as the July Fourth "Freedom Festival" and were not nearly as elaborate as the VP Fair. The name of the celebration changed in 1994 from the "VP Fair" to the "Fair Saint Louis."

During the 1980s several adjustments were made to the Old Courthouse, including the addition of a wheelchair lift on the west entrance and portable ramps to provide access to the first floor galleries. The building was completed in 1862, before the advent of elevator systems, so the second floor is not accessible. Video programs on the first floor provide scenes of the second floor courtrooms to ensure that all visitors receive a quality interpretive experience. Similar video programs are offered in the Arch visitor center, providing views of the unique transportation system, the observation deck at the top of the Arch, and the views to the east and west.

The most extensive construction project related to accessibility was completed in 1994. The Old Cathedral Parking lot was redesigned and reconstructed to provide a bus pull-off along Memorial Drive. This addition enables drivers to drop off or pick up their parties close to the Arch's south leg near the Old Cathedral. Parking at the Old Cathedral parking lot is reserved for visitors and parishioners of the Old Cathedral only. Accessible parking for visitors to the Arch is provided on all levels of the Arch parking garage, located at the north end of the site, 1,100 feet from the Arch entrance at the north leg.

The Arch visitor center is accessible via ramps with an 8% grade at both the south and north legs. Although the ramps meet the Americans with Disabilities Act (ADA) requirements for grade, they do not meet the requirement for their length and the number of landings or rest areas.[221] At this time there is a proposal in place to provide accessible ramps east of the currently used ramps. These ramps would be approximately 170' long at the north and south ends and would converge underground. The proposed ramps would include an 8.3% slope and there would be landings approximately every 27 feet.[222] A new entrance to the visitor center would be located on the east wall.

Implementation of this plan would not necessarily eliminate the existing exterior accessibility problems at the park. The most common complaint in this regard is the distance between the parking garage and the Arch, and the lack of automated entrance doors. Most physically challenged visitors do not have a problem conquering the ramps, but have difficulty opening the heavy glass doors at the visitor center entrances.

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[221]The ADA requires a maximum of 8% slope with at least 5' landings at 30' intervals. The problem with the existing ramps at the Gateway Arch is that there are no landings and the distance from the top of the ramp to the entrance doors is greater than 30'. Also of note, the NPS adheres to the *Uniform Federal Accessibility Standards* (41 CFR 101-19.6), a stricter guideline for accessibility than the ADA. The *Uniform Federal Accessibility Standards* suggest that 8% ramps are only acceptable if they are enclosed and protected. The Arch ramps are only enclosed and protected for less than half their distance. The park generally does not receive complaints about the slope of the ramps but rather, the distance from the parking to the Arch and the entrance doors themselves, which are not automated.

[222]The proposal would have an adverse impact on the cultural landscape. A discussion of the potential impact and alternative recommendations is described in "Chapter VI: Treatment Recommendations."

SPECIES LIST

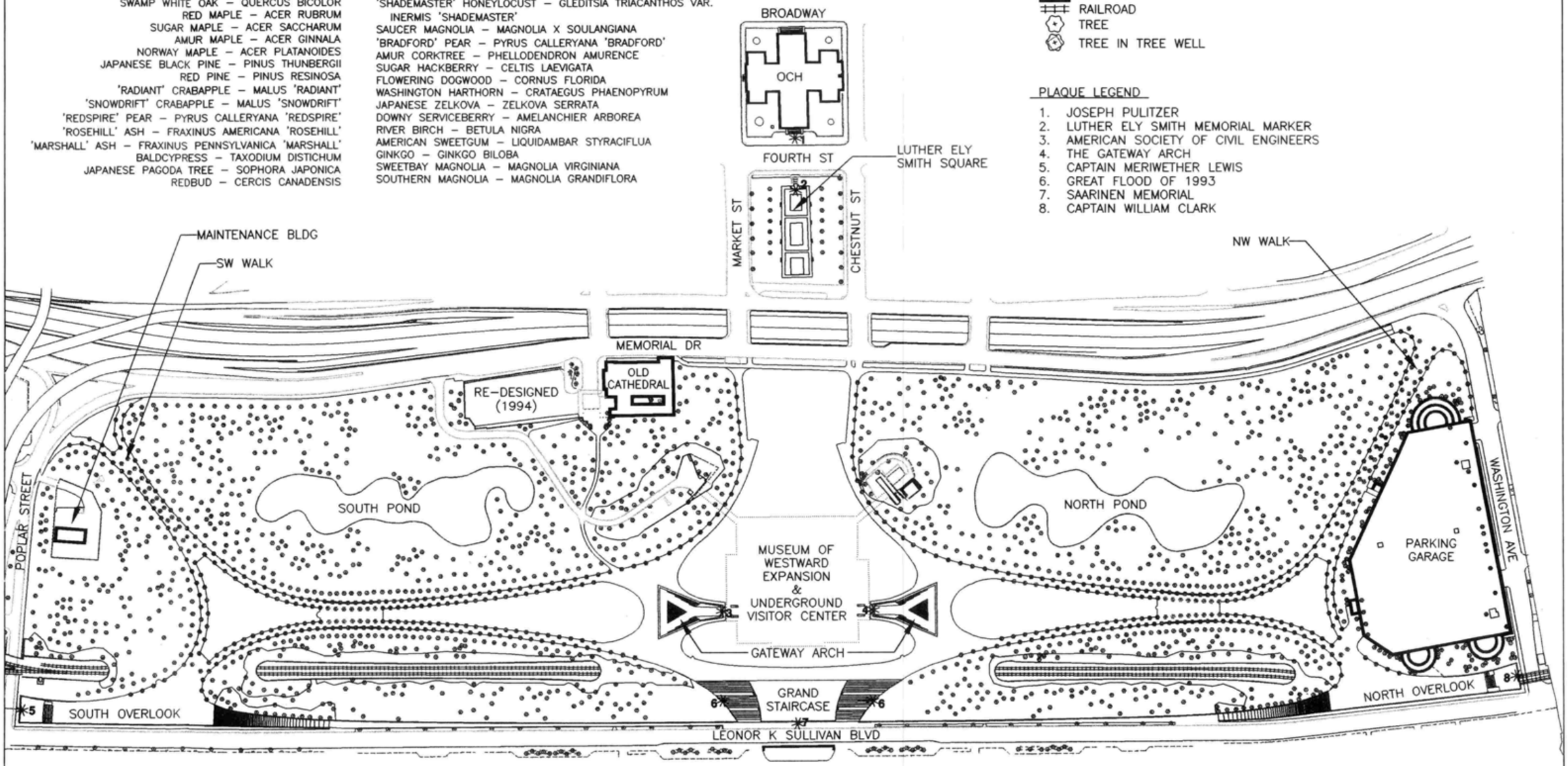
BUR OAK – QUERCUS MACROCARPA
RED OAK – QUERCUS RUBRA
SWAMP WHITE OAK – QUERCUS BICOLOR
RED MAPLE – ACER RUBRUM
SUGAR MAPLE – ACER SACCHARUM
AMUR MAPLE – ACER GINNALA
NORWAY MAPLE – ACER PLATANOIDES
JAPANESE BLACK PINE – PINUS THUNBERGII
RED PINE – PINUS RESINOSA
'RADIANT' CRABAPPLE – MALUS 'RADIANT'
'SNOWDRIFT' CRABAPPLE – MALUS 'SNOWDRIFT'
'REDSPIRE' PEAR – PYRUS CALLERYANA 'REDSPIRE'
'ROSEHILL' ASH – FRAXINUS AMERICANA 'ROSEHILL'
'MARSHALL' ASH – FRAXINUS PENNSYLVANICA 'MARSHALL'
BALDCYPRESS – TAXODIUM DISTICHUM
JAPANESE PAGODA TREE – SOPHORA JAPONICA
REDBUD – CERCIS CANADENSIS
KENTUCKY COFFEE TREE – GYMNOCLADUS DIOICUS
GREENSPIRE LITTLELEAF LINDEN – TILIA CORDATA 'GREENSPIRE'
'SHADEMASTER' HONEYLOCUST – GLEDITSIA TRIACANTHOS VAR. INERMIS 'SHADEMASTER'
SAUCER MAGNOLIA – MAGNOLIA X SOULANGIANA
'BRADFORD' PEAR – PYRUS CALLERYANA 'BRADFORD'
AMUR CORKTREE – PHELLODENDRON AMURENCE
SUGAR HACKBERRY – CELTIS LAEVIGATA
FLOWERING DOGWOOD – CORNUS FLORIDA
WASHINGTON HARTHORN – CRATAEGUS PHAENOPYRUM
JAPANESE ZELKOVA – ZELKOVA SERRATA
DOWNY SERVICEBERRY – AMELANCHIER ARBOREA
RIVER BIRCH – BETULA NIGRA
AMERICAN SWEETGUM – LIQUIDAMBAR STYRACIFLUA
GINKGO – GINKGO BILOBA
SWEETBAY MAGNOLIA – MAGNOLIA VIRGINIANA
SOUTHERN MAGNOLIA – MAGNOLIA GRANDIFLORA

LEGEND

- SIDEWALK
- BUILDING
- RAILROAD
- TREE
- TREE IN TREE WELL

PLAQUE LEGEND

1. JOSEPH PULITZER
2. LUTHER ELY SMITH MEMORIAL MARKER
3. AMERICAN SOCIETY OF CIVIL ENGINEERS
4. THE GATEWAY ARCH
5. CAPTAIN MERIWETHER LEWIS
6. GREAT FLOOD OF 1993
7. SAARINEN MEMORIAL
8. CAPTAIN WILLIAM CLARK



North

SCALE: 1" = 240'
240 0 240 480

MAP SOURCE: 1995 KUHLMANN DESIGN GROUP; 1995 TREE INVENTORY & CONDITION ASSESSMENT

CULTURAL LANDSCAPE REPORT:
JEFFERSON NATIONAL EXPANSION MEMORIAL
EXISTING CONDITIONS PLAN
SAINT LOUIS, MISSOURI

DRAWN: CHAN	DRAWING NO. 366 80,020
TECH. REVIEW: BELLAVIA	
DATE: 7/96	SHEET 5 OF 6

Chapter V: Statement of Significance and Analysis of Integrity

This chapter of the Cultural Landscape Report contains three parts: (1) the statement of significance and explanation of the period of significance for Jefferson National Expansion Memorial; (2) an analysis of character-defining features including their contribution to the significance of the landscape, and (3) an evaluation of the integrity of the property.

Statement of Significance

According to the Secretary of Interior, a property is significant if it represents part of "the history, architecture, archeology, engineering, or culture of a community, State, or nation."[223] A property can achieve significance if it meets one or more of the following four criteria:

> A - Association with historic events, activities, or patterns;
> B - Association with important persons;
> C -Distinctive physical characteristics of design, construction, or form, or:
> D - Potential to yield important information.[224]

Jefferson National Expansion Memorial derives national significance under National Register Criterion A because of its memorialization of the role of Thomas Jefferson and others responsible for the nation's territorial expansion to the west.[225] The park was appropriately established in St. Louis, Missouri, the embarkation point and economic hub of the westward movement in the 19th century. The original primary significance of the site was its identification with the people, commerce and buildings associated with the expansion of the United States. In addition, Eero Saarinen's Gateway Arch is significant for its transcendent architectural and engineering merit under Criterion C. Because the Arch is such a unique and extraordinary structure, its significance under Criterion C has perhaps overshadowed the significance of the memorialization.

JEFF is unique in that it was designated a National Historic Site prior to its complete construction. According to the National Register Criteria for Evaluation, a property may have achieved significance within the last 50 years if it is of "exceptional importance."[226] The Criteria recognizes properties whose unusual contributions to the development of American history, architecture, archeology, engineering, and culture can be demonstrated before the customary "passage of time" necessary to apply the adjective "historic." The Gateway Arch is considered to have "exceptional importance" based on the transcendent nature of its architecture and engineering.

Although not clearly addressed in the National Register nomination, Jefferson National Expansion Memorial is significant under Criterion C as the work of a master architect and landscape architect, and as an example of modern landscape architecture. The landscape surrounding the Gateway Arch is the result of a close

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[223]U.S. Department of the Interior. *National Register Bulletin 16A: How to Complete the National Register Registration Form.* The bulletin was compiled by the Interagency Resources Division of the National Park Service, U.S. Department of the Interior, 1991, 3.

[224]Ibid.

[225]Laura Soullière Harrison, *National Register of Historic Places Inventory—Nomination Form for Jefferson National Expansion Memorial,* 1985.

[226]U.S. Department of the Interior. *National Register Bulletin 22: Guidelines for Nominating Properties That Have Achieved Significance in the Last Fifty Years.* The bulletin was completed by the Interagency Resources Division of the National Park Service, U.S. Department of the Interior, 3.

collaboration between Eero Saarinen and Dan Kiley. The contributions of architects of the past and present have been extensively studied, and patterns and styles of the profession documented with examples preserved. The profession of landscape architecture has not been so widely acknowledged. Even the old masters of the profession like Frederick Law Olmsted and Jens Jensen are not as highly recognized as they should be. Recently, in May 1995, this trend changed when Dan Kiley was awarded the American Academy of Arts and Letters Arnold W. Brunner architecture prize.[227] Kiley is the first landscape architect ever so honored. This is a clear indication of the growing recognition of the profession of Landscape Architecture as well as the importance of Dan Kiley in the broad patterns of the profession, specifically the modern movement.

Jefferson National Expansion Memorial is a particularly important project in Dan Kiley's career for a couple of reasons. First, his participation and success in the Memorial project, the first major architectural competition since World War II, launched his national career. Second, it was the catalyst for a long-time personal and professional relationship with Eero Saarinen. The two continued to work together on various projects for fourteen years until Saarinen's untimely death.

Together, the architecture and the landscape architecture of the Memorial project embody the ideals of both Eero Saarinen and Dan Kiley. Saarinen considered the entire site and carefully shaped the surrounding land to afford specific views of the Arch and Old Courthouse and to subtly disguise views of the service entrance, maintenance facility, and railroad tracks. Kiley took the concept one step further and added plant material that would force views of the Arch and accentuate its simple magnificence. His use of a single tree species spaced closely together is a Kiley signature. The simplicity of his design compliments the simplicity of the Arch.

In light of the importance of the landscape to the significance of the site, the 1976 National Register Nomination Form's statement of significance has been reviewed. Based on the research and documentation completed for this report, it is recommended that the statement of significance be modified to include the importance of the landscape.

Period of Significance

The period of significance for the Jefferson National Expansion Memorial landscape is 1947-1986. It was during this long time period that Eero Saarinen and Dan Kiley collaborated on a design concept for Jefferson National Expansion Memorial. Subsequently, the following 26 years were devoted to executing that plan.

The significant period begins in 1947, the year the United States Territorial Expansion Commission sponsored a national design competition, marking the inception of an idea. Eero Saarinen started with a four person design team including an architect, landscape architect, painter, and sculptor. The team and their design was chosen for its monumental, inspired, symbolic Arch. Unlike the remainder of the submissions, which predominantly consisted of traditional museums, the Arch truly symbolized a gateway to westward expansion.

Between 1948 and 1957, the National Park Service, City of St. Louis, and the United States Territorial Expansion Commission negotiated with the Terminal Railroad Association on the relocation of the railroad tracks. During this nine year period, Saarinen and Kiley moved on to other projects and, because some of the

[227]M.W. Newman, "Landscape designer wins Brunner prize," *The Chicago Tribune*, May 18, 1995. This honor has been awarded (to the architect, designer whose work portrays excellence, etc.) since 1898.

program elements were dropped, the painter and sculptor were removed from the team.[228]

In 1957 the negotiating parties reached an agreement on the relocation of the tracks. The agreed upon solution, to locate the tracks in a series of open-cut tunnels along the eastern border of the property, forced Saarinen to make changes to his winning plan. However, as some of the program elements changed, the underlying concept remained the same: a symbolic Memorial, in the form of an inverted catenary curve, placed in a landscaped setting on the riverfront.

From 1957-1964, Saarinen and Kiley took the overall concept for the Memorial and expanded on it until the patterns of spatial organization and circulation met their ideals as well as the needs of the National Park Service. Once the concept and organizing features were solidified by the team of masters and approved by the NPS, others were charged with preparing construction documents aimed at executing the plan.[229] Between 1960 and 1986, the major conceptual features of the Saarinen/Kiley collaboration were constructed.

It is the intent of the National Park Service, and was when implementation of the landscape began, to communicate the architectural and landscape architectural values of the collaborative Saarinen/Kiley concept plan. The landscape surrounding the Gateway Arch derives significance from that design concept. The ideas of the Saarinen/Kiley plan are important, however, not all of the "as built" features reflect their intent. This is due, in part, to financial constraints over a long implementation period. In this respect, the closer the character-defining features were implemented with the designer's intent, the more significant they are as integral parts of the cultural landscape, and therefore they should receive more scrutiny when addressed in the future management plan.

Site Analysis

After the period of significance was established, a comparison of the character-defining landscape features from the period of significance (1947-1986), and the character-defining features of 1995 was completed. There are three parts to this comparison; (1) an assessment of the feature during the period of significance, (the "historic condition"), (2) an assessment of the feature in 1995, (the "existing condition") and (3) an analysis of the feature.

In part three a determination was made regarding existing features and their contribution to the significance of the property. Since the significance of this landscape is directly related to the Saarinen/Kiley design concept rather than its physical implementation, those features reflecting the designers' intent are more significant than

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[228]The winners of the competition were not given assurance that they would be employed by the Federal Government or even that the Memorial would be built. During the nine years of negotiations with the Terminal Railroad Association, Saarinen and Kiley were not under contract with the government and therefore moved on to other projects. It was not until 1957, when an agreement was reached, that the Government hired Saarinen as architect for the Memorial, and he subsequently hired Dan Kiley to work with him on the landscape plan.

[229]The other designers included the National Park Service Denver Service Center and the firm of Harland Bartholomew and Associates. Although some may consider these two "teams" significant in their own right, it is the opinion of the author that this particular project is not representative of the type of work for which they may be considered significant.

those constructed differently than intended.[230] Therefore, each landscape feature was assessed as either being contributing or non-contributing. A contributing feature is one "...present during the period of significance, and possesses historic integrity reflecting its character at that time or is capable of yielding important information about the period."[231] A non-contributing feature is one "...not present during the significant period, or due to alterations, disturbances, additions, or other changes, it no longer possesses historic integrity reflecting its character at that time or is incapable of yielding important information about the period."[232] Finally, an analysis of the existing features' relationship to the design intent was made. This chapter concludes with an overall evaluation of the integrity of the property.

Environment (Natural/Social/Cultural)

Historic Condition: When Saarinen and Kiley designed the riverfront memorial, the site was surrounded by commercial and industrial uses. The downtown business district was adjacent and to the west of the site. The site was designed as an urban park. Historic Eads Bridge was located adjacent and to the north of the park and was visually and physically an important part of the environment.

Existing Condition: The St. Louis central business district is located adjacent and to the west of the park. Although less people reside downtown than in the past, the city has grown with the addition of business and sports facilities. Riverboat gambling is located on the east and west sides of the river at St. Louis. Eads Bridge retains its visual and physical presence. The resulting environment, although more developed, remains an urban environment. Aside from the changes in the social/cultural overlay, the environment has not changed significantly.

Analysis: Contributing.
While the social and cultural aspects of the environment have changed, the overall environment has retained its urban character and therefore it is contributing.

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[230]Since Saarinen and Kiley were associated with the site through the design development phase, the importance of the landscape is in the conceptual ideas of Saarinen and Kiley, not in the physical details of each and every landscape feature. At the design development stage of a project, materials, colors, and construction specifications are usually not considered. As is the case at JEFF, the construction details were not considered for many features but rather the overall form of the landscape was developed. The overall framework for the landscape was created by the placement of the monument symbolizing the Memorial, the patterns of spatial organization, and the patterns of circulation. This framework was conceptualized by Saarinen and Kiley, then others were charged with choosing materials and instructing contractors how to execute the conceptual design.

[231]U.S. Department of the Interior. *National Register Bulletin 24: Guidelines for Local Surveys: A Basis For Preservation Planning*. The bulletin was completed by the Interagency Resources Division of the National Park Service, U.S. Department of the Interior, 1977, page 45. Revised by Patricia L. Parker, 1985. In the JEFF landscape there are two types of contributing features; 1) those that contribute to the concept and in fact were constructed according to the specification of the designers, and 2) those that contribute to the concept only. The treatment plan should address those features which directly relate to the concept with more scrutiny than those which have been modified in some way. It is also important to note that in the case of JEFF, not all features that existed during the period of significance contribute to the significance of the landscape. However, these features may have other historic value not related to the landscape design and intent.

[232]Ibid. In this case, a non-contributing feature is one that was either added by a subsequent design firm or the design was altered during implementation so that it does not reflect the Saarinen/Kiley design intent.

Topography & Drainage

Historic Condition: The topography of the site was carefully sculpted to achieve specific effects.[233] Perhaps the most significant decision affecting the topography was Saarinen's insistence that the railroad be moved so as not to remain a visual and physical obstruction between the city and the riverfront. This concept resulted in a combination of open cuts and tunnels for the railroad across the eastern boundary of the park. The topography was masterfully sculpted to hide the tracks and in turn they cause minimal distraction in the park setting.

There were high points on axis with the Arch at both the north and the south ends of the park (approximately 470' elevation).[234] The ground plane gradually rose to these points from the Arch legs (approximately 2.8% slope) and from here sloped downward again to street level at a very minimal slope on the northwest and at a 6.3% slope on the southwest corners of the park. Depressed areas around the service entrances and the maintenance building disguised the operational activities of the park. The landform not only hid these activities but it inhibited visitors from entering them as well.

Other significant topographical features included the ponds, overlooks, and berms along Memorial Drive. The ponds not only served as an aesthetic feature but as an important part of the drainage system as well. The overlooks were constructed high above the river to provide a good vantage point to view the river traffic. They were constructed with two levels, approximately 465' and 457' elevations. Berms located along Memorial Drive were part of the original plan but were constructed higher than originally intended. In the second major phase of construction (1978-1981) these berms were created to dispose of excess fill material on-site. The berm on the south end of the site was built up an extra 6' and the berm on the north considerably more, 14' above the original design.

Existing Condition: All of the above topographical features exist as implemented. Small berms were created along the north and south walks on the east side to eliminate a drainage problem and to deter pedestrians from walking on the lawn between the Rosehill Ash trees. Other very minimal changes to the topography occur almost on a yearly basis during turf renovation resulting from Fair Saint Louis.

Park management has identified several existing drainage problems. The most serious problem is occurring on the west side of the railroad cut walls. The existing drainage system is not working and continued erosion of the slopes along these structures is causing problems for the Terminal Railroad Association. Water and soil flows over the walls and onto the tracks during a hard rain.

Other drainage problems exist along the pedestrian sidewalks, particularly along the southwest walks where the slope is greater. Water runs off the walk and into the lawn area causing soil erosion.

Analysis: Contributing.
The topography was a major element in the Saarinen/Kiley concept plan. The landform was implemented as originally intended and is therefore contributing. The few minor changes that have been made have a minimal effect on the overall design concept. The only major change which occurred during the significant period was

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[233]See drawing number JNEM 3019, produced by Saarinen & Associates in 1962. Copy on file in the JNEM Archives, Record Unit 120, drawer 12, folder 10.

[234] U.S. Department of Commerce. *Interim Report on Investigation of Aerodynamic Stability of Jefferson National Expansion Memorial Arch.* The report was completed by the Bureau of Public Roads, Washington D.C., April 1965. Copy on file in the JNEM Archives, Record Unit 106, box 35, folder 26.

the addition of berms along Memorial Drive. These berms eliminate views of the highway and reduce noise and pollution within the park boundaries and are therefore functionally important. Maintaining the overall landform as designed and implemented is important.

Spatial Organization

Historic Condition: The landscape surrounding the Gateway Arch has a combination of formally and informally arranged spaces. A sense of formality was derived from the east-west axial arrangement of the two major built features, the Arch and the Old Courthouse, and the north-south layout of the pedestrian walks. The consistency of tree species and spacing strengthened the formal areas. The axial relationship between the Arch and the Old Courthouse was intended to create a visual connection between the city and the riverfront.

The circulation system was the key element in organizing the horizontal ground plane. The system, as planned by Saarinen, helped organize space in two ways. First, the system connected points of interest. The pedestrian walks and service roads conveniently brought people to where they wanted to go. Second, Saarinen specifically designed the pathways on axis with the Arch to control the on-site views.

Kiley recognized that in the outdoor environment, horizontal dimensions are typically much greater than vertical dimensions. Plant materials are often used as the vertical dimensions to organize and delineate space. The use of a monoculture closely spaced along the walks was deliberately meant to create an edge and sense of enclosure. The trees, spaced 30' on center, formed an overhead canopy providing a comfortable, human scale for the visitor while affording glimpses of the soaring Arch.[235] The use of the same tree throughout strengthened the edge and provided visual continuity and fluidity.

Formality was contrasted with informality around the ponds. The designer's intent regarding spatial composition around the ponds was to create contrasting feelings by massing trees in some areas and providing open "meadows" in others. The plant material, combined with the complex, sinuous shape of the ponds, was intended to create intimate, private spaces. Plant material was also proposed to screen certain areas, such as the parking lot at the Old Cathedral, from view. The plant material, typically evergreen, was intended to separate these spaces both visually and physically from the visitor use areas.

The planting plan was altered during the second major phase of the implementation process which affected the patterns of spatial organization. The numbers of plants were diminished, resulting in a weaker sense of enclosure than originally intended. Particularly around the ponds, the elimination of numbers of plants, according to the designer, resulted in a haphazard plant spacing and composition.[236] Reduction in the numbers of plants used for screening functions weakened the separation of park operations and visitor use areas.

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[235]Dan Kiley interview with Mary Hughes (transcript on file in the JNEM Archives). Mr. Kiley consistently refers to the Tuileries in France where the trees are spaced 12' 6" on center. Some of his original plans for JEFF reflected this spacing (before the period of significance) but the NPS would not approve it. The spacing implemented, 30' on center and closer in the rest areas, follows the approved plan. Mr. Kiley was pleased that the NPS followed his final design in terms of the spacing but has always been disappointed with the substitution of ash trees for the tulip poplar he recommended.

[236]Dan Kiley interview with Gregg Bleam and Gina Bellavia (transcript on file in the JNEM Archives).

The block bounded by Market Street, Chestnut Street, Fourth Street, and Third Street (now called Luther Ely Smith Square) was spatially defined by two rows of tulip poplar trees on the north and south sides of the block, and by a pedestrian overpass on each side as well. The block was a raised plaza on which the pedestrian overpasses terminated at the west end. The pedestrian overpasses and rows of trees were meant to physically and visually connect the two disconnected parts of the park.

Existing Condition: The patterns of spatial organization have been retained as implemented. The site managers over the past fourteen years have replaced trees faithfully in their previous locations.

The strength of the landscape design occurs along the pedestrian sidewalks. The monoculture planting and the alignment of the walks is directly related to the original intent and the intended spatial quality. Perhaps the greatest departure from the original design occurs around the ponds and the areas where plant material was to function as screening (Old Cathedral parking lot, maintenance area, service areas, railroad tunnels, and along Memorial Drive). The reduction of plant material in these areas minimized the spatial quality that the original designers intended.

Luther Ely Smith Square is spatially defined by two rows of trees on the north and south sides as originally proposed, but the plaza itself is sunken. A sunken garden, defined by sloped lawn areas and narrow sidewalks, is very spatially different from the proposed raised plaza.

Analysis: Contributing.
The overall spatial organization of the property directly relates to the Saarinen/Kiley conceptual plan and therefore is contributing. The furthest departure from their plan occurs around the ponds, along Memorial Drive, around the park operations areas, and in Luther Ely Smith Square. The addition of plant material where eliminated during the implementation of the plan would strengthen the spatial qualities around the ponds. Construction of the pedestrian overpasses and re-design of Luther Ely Smith Square would further enhance the spatial quality of the park as originally proposed by Saarinen and Kiley.

Views & Vistas

Old Courthouse to Arch

Historic Condition: The strong axial relationship between the Old Courthouse and the Arch was intended to create a vista. From the east, the Arch was to frame the historic building. From the west, the Arch framed a view of the Mississippi River. Saarinen wanted to create a strong visual relationship between the river and the city it influenced. The pedestrian overpasses and tree-lined walks in Luther Ely Smith Square were designed to strengthen the frame of the vista. The vista was created when the Arch was constructed, 1962-1965.

The axial arrangement of the Arch and surrounding landscape had a direct influence on the views and vistas created. According to Saarinen, "...the arch is in a sense a vertical monument on one axis and a wide monument in another."[237]

[237]John Peter, *The Oral History of Modern Architecture*, page 201.

Existing Condition: The vistas between the Old Courthouse and the Arch exist as implemented. Luther Ely Smith Square and the pedestrian overpasses were never constructed. Although their absence lessens the desired intent and strength of the connection, the axial relationship is still very strong and the designer's intent is evident.

Analysis: Contributing.
The vista created between the Old Courthouse and the Arch directly relates to the Saarinen/Kiley design concept and therefore is contributing.

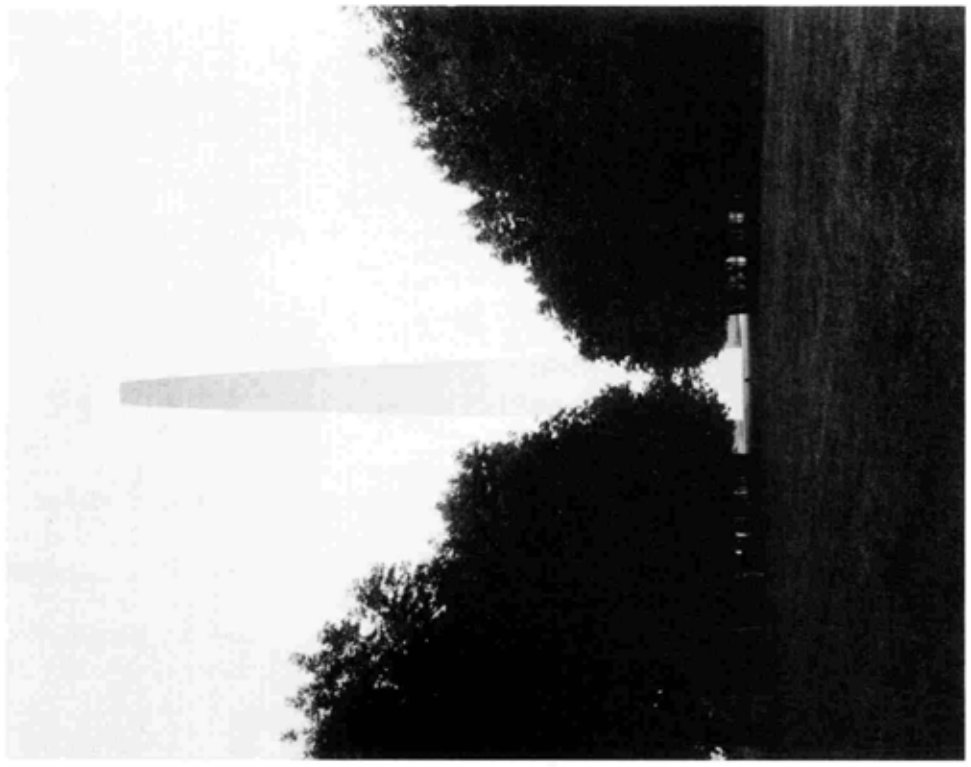
View from North-South Axis

Historic Condition: The axial arrangement of the Arch and surrounding landscape had a direct influence on the views and vistas created. Views of the Arch were intended from specific vantage points in the park. Glimpses of the Arch from the walks were intended. At the rest areas, the view was controlled and pronounced by the layout of the walks and trees. These views were created as a result of the designers' manipulation of other features such as circulation and vegetation. The direct view from the north and south teardrops, on axis with the Arch, created a view of the Arch as a "vertical monument" as opposed to the view discussed above which portrays the Arch as a "wide monument" (see figure 82).

The alignment of the walks and the spacing of the trees influenced views of the Arch. Throughout the period of significance the growth of the trees strengthened the intent by prohibiting views of the Arch from some areas of the park. The more limited views took on importance and became more dramatic as a result.

Existing Condition: The views of the Arch from the north-south axis exist as intended (see figure 82). The maturity of plant materials is key to the designer's intent with regards to these views.

Analysis: Contributing.
The axial arrangement of the property created important views to the Arch which reflect the design concept and therefore are contributing. Dramatic glimpses of the Arch from certain vantage points along the walks exist as intended.



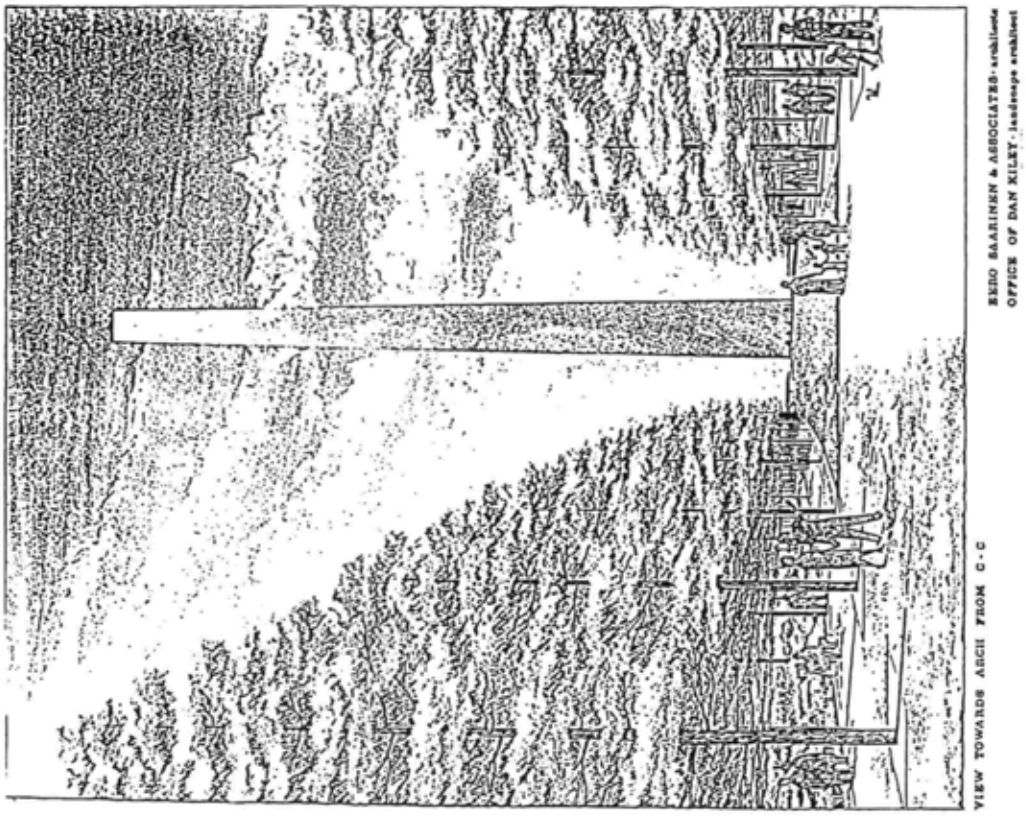


Figure 82: Office of Dan Kiley, View Towards Arch from rest area (left); Photo of same view (right, Bellavia, 1996).

Views from Ponds

Historic Condition: Views from the pond areas were directly influenced by the topography and plantings. Groupings of trees, contrasted with open meadow areas, were intended to obscure views in some areas and afford dramatic views in others. The reflection of the Arch in the ponds was intended to enhance the views created.

Existing Condition: Views of the Arch from the ponds exist generally as intended.

Analysis: Contributing.
Views to the Arch from the ponds reflect the design concept and therefore are contributing.

Views from East St. Louis

Historic Condition: Saarinen's vision was to extend the park to the east side of the Mississippi River because the views from that side back to downtown St. Louis would be magnificent. The Arch would frame the city and show its direct relationship to it. Again, as with views from the Old Courthouse to the Arch, this view is influenced by the axial arrangement of the design and therefore the Arch appears as a wide monument.

Existing Condition: The park has yet to be expanded but the views from the east side and the Poplar Street, Eads and Martin Luther King bridges are magnificent (see figure 83). The NPS has been authorized by Congress to begin purchasing land on the east side for future park development.

Analysis: Contributing.
Views from East St. Louis reflect the design intent and therefore are contributing.

Buildings & Structures

The Gateway Arch

Historic Condition: The Arch, a 630' high, weighted, inverted catenary curve, was constructed between 1962-1965. It was made up of 172 triangular, stainless steel, double-walled sections.[238] The transportation system bringing visitors to the top of the Arch was completed in 1968.

Existing Condition: The Arch currently exists as implemented during the period of significance. No major structural changes have been made. The interior of the Arch is routinely painted. Unidentified marks were recently noticed on the exterior stainless steel.

Analysis: Contributing.
The Arch was constructed as the original architect and engineers intended and has been maintained in its original condition and therefore is contributing. The structural integrity of the Arch has not been analyzed since its construction and an evaluation of the interior and exterior of the structure is a high priority for treatment.

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[238]For more detailed information regarding the Arch construction and engineering, see JNEM Archives Record Units 103, 104, 106, and 120, and Brown's *Administrative History*.

Figure 83: View from East St. Louis toward Gateway Arch. (Bellavia, 1995).

Old Courthouse

Historic Condition: The Old Courthouse was a three-story Greek Revival building constructed between 1839 and 1862.[239] The Courthouse underwent a major rehabilitation in 1941-42. The first floor of the building served as a temporary museum, interpreting the famous Dred Scott case which took place in one of its court rooms, throughout the period of significance.[240] Since 1943, the building has been a combination of historic restoration, museum gallery, and functioning office and storage space for JEFF.

Existing Condition: The building retains its use as a museum and administrative offices for JEFF. The interior is in satisfactory condition. Several serious problems exist, including deterioration of the flag pole, chimneys, and cornices.

The landscape surrounding the Old Courthouse is the result of a restoration completed by the National Park Service in 1954 based on a circa 1870 photograph.[241] Documentation of plant materials in each of the courtyards at this and subsequent periods of time has not been completed. The current condition of the lawn areas and planting beds are fair but do not reflect any historic time period.

Analysis: Contributing.
The Old Courthouse is a major element of the axial arrangement of the Memorial's landscape design. An analysis of the exterior of the building as well as a cultural landscape report for the surrounding landscape is needed and is a high priority for treatment.

Visitor Center & Museum of Westward Expansion

Historic Condition: The underground museum and visitor center located under the legs of the Arch was conceptualized as early as 1959.[242] The visitor center was completed in 1966. The lobby, including the center fountain, and loading zones for the transportation system were designed by Saarinen & Associates after Eero Saarinen's death. Two theaters were conceptualized as part of the interpretation of the Gateway Arch. The 325-seat North Theater, later renamed the Tucker Theater, was completed in 1972 and the hollowed out space

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[239]U.S. Department of Interior. *National Register of Historic Places Inventory - Jefferson National Expansion Memorial.* The nomination was prepared by Architectural Historian Richard I. Ortega for the Midwest Regional Office of the National Park Service, Department of Interior. Omaha, Nebraska, March 3, 1976, 1.

[240]The Old Courthouse was intended to serve as a museum temporarily until the Museum of Westward Expansion was completed.

[241]John H. Lindenbusch, *Historic Structure Report, and Historic Grounds Study*, January 1982. U.S. Department of Interior, Denver Service Center, Denver, Colorado.

[242]Sharon A. Brown. *Administrative History*, page 122. Bob Burley, interview with Gregg Bleam and Gina Bellavia, July 27, 1995 (transcript on file in the JNEM Archives). Mr. Burley was an employee of Saarinen & Associates from 1956-1963. In the 1948 Competition Drawing and other interim plans for the Memorial project there were at times as many as three museums planned for the site, all above ground. Since all above ground museums were abandoned because of cost, plans were made to place the museum under the Arch. The solution was also appropriate in terms of getting visitors into the Arch for transport to the top observation deck.

for the South Theater remained vacant until funds became available for construction. Aram Mardirosian developed the plan for the Museum of Westward Expansion, which was completed in 1976. [243]

Existing Condition: The visitor center and museum have undergone some improvements in the past fourteen years. The Odyssey Theater, the second of the two theaters planned, was constructed in 1990-93. The image-wall, a complicated slide/film program, was removed in 1989 to create space on the north wall for the American Indian Peace Medal Exhibit, which was substantially complete in 1994.[244] Overall, the Museum of Westward Expansion retains the design of Mr. Mardirosian. In 1995, the Museum Store and Bi-State ticket booths were remodeled to accommodate increasing numbers of visitors. Shortly thereafter, a dual video wall system was installed on the east lobby wall. The system, complete with audio capabilities, consists of two video wall units, each housing twenty 27" color monitors in a four high by five wide configuration. Pre-recorded programs previewing the movies shown in the two theaters are played throughout the day.

Analysis: Contributing.
The visitor center and museum reflect the original design intent and therefore are contributing. The underground portions of the park are conceptually important and are a priority for treatment.

North Overlook & South Overlook

Historic Condition: The overlooks were designed to provide a place to view the Mississippi River and the activities that took place on the river. They were constructed as designed by Saarinen & Associates in 1960-1962, at an elevation of approximately 457' above sea level. The interior spaces of the overlooks were envisioned as museum spaces, but this use was never realized.

Existing Condition: Few changes have been made to the overlooks since their construction. They are generally used by visitors to view the river. The interiors are currently used for storage (they were never used as museum spaces). Ramps were installed in 1990-91 to facilitate moving materials in and out. Gates were installed at the top of the ramps to secure the areas during the same period.

The overlook walls have been treated for spalling concrete and there continues to be some problems. The overlook steps (down to Leonor K. Sullivan Boulevard) have been repaired in the past with exposed aggregate that does not match the original in color and aggregate size. The steps, as well as the observation decks, are severely deteriorating.

Analysis: Contributing.
The overlook structures directly reflect the Saarinen/Kiley design concept and therefore are contributing. Their structural integrity has not been assessed since construction. A structural analysis and plan for restoration of both the north and the south overlooks is a priority for treatment.

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[243]The design of the Museum of Westward Expansion was completed by Aram Mardirosian. The Museum may be significant in and of itself as the work of a master. The research and documentation needed to make this determination was not included as part of the scope of work for this project. For more detailed information regarding the museum, visitor center, and theaters see Moore, *Urban Innovations.*

[244]Ibid.

Maintenance Building

Historic Condition: According to the approved concept development plan, a maintenance building was to be located at the south end of the site. No details, other than location, of the maintenance facility were specified on the Saarinen/Kiley concept plan. However, it is evident from the proposed landform surrounding the building that it was intended to be an earth-sheltered structure, hidden from view.

Until 1974 maintenance equipment was stored in the hollowed out shell of the future Museum of Westward Expansion and visitor center. When funds were appropriated for the construction of the museum, the need for a maintenance facility became apparent. In 1974 a temporary prefabricated steel building measuring 32' x 72' was erected on the southwest portion of the site (approximately 240' northwest of the designed location).[245] Although the building was expected to be temporary, lack of funds for the permanent facility prevented construction, so the temporary building was relocated to its permanent location during the second phase of landscape construction (1978-1981).

Existing Condition: The existing temporary maintenance building is in poor condition and is insufficient for the needs of the landscape maintenance division.

Analysis: Non-contributing.
The temporary maintenance building does not reflect the Saarinen/Kiley concept and therefore it is non-contributing. Although the temporary building is located on-site at the southern end of the park where Saarinen and Kiley envisioned it, the building was meant to be removed and replaced with a permanent building which more closely reflected the Saarinen/Kiley concept. A new facility is a high priority for treatment.

North & South Railroad Open Cut Tunnels

Historic Condition: The north and south open cut railroad tunnels, constructed between 1959-1962, were conceptualized and designed by Saarinen and Associates. They were poured concrete walls measuring approximately 720' long and 840' long respectively, and approximately 5' high. There was a clearance of 18' between the top of the railroad track and the under-side of the tunnel. A tunnel, underneath the proposed grand staircase, measuring 960' was constructed at the same time, connecting the two open cuts. The entrances to the tunnels are curved, intentionally reflecting the curvature of the Arch.

Existing Condition: The open cuts and tunnels exist in their original location. A structural analysis has never been completed, therefore their condition is unknown. The tracks are currently used by the Terminal Railroad Association.

Analysis: Contributing.
The tunnels reflect the Saarinen/Kiley design concept and therefore they are contributing. A structural analysis of the tunnel walls is a high priority for treatment.

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[245] *Temporary Maintenance Building Completion Report.* Copy on file in the JNEM Archives, unprocessed Rennison Collection.

Mechanical Systems

Underground Sprinkler System

Historic Condition: Saarinen and Kiley did not provide details of an underground sprinkler system at the design development stage. The underground sprinkler system was designed by landscape architects at Denver Service Center and modified by Harland Bartholomew & Associates. Installation of the system was done in phases which resulted in problems regarding excess coverage and lack of coverage. Improvements to the irrigation system aimed at correcting the deficiencies were made in 1986.[246]

Existing Condition: The existing system is in fair operating condition. The system is currently manually operated but is being gradually automated by the grounds crew. Some of the sprinklers need to be adjusted to eliminate watering the sidewalks and/or to provide coverage where it is lacking.

Analysis: Non-contributing.
The underground sprinkler system does not relate to the Saarinen/Kiley design concept. The system is functionally important and therefore a priority for treatment.

Site Engineering Systems

Tree Grates

Historic Condition: The Saarinen/Kiley concept plan specified cobblestone pavers around the trees in the sidewalks and a 2' strip of cobblestone pavers along the edge of the sidewalks (see figure 84). This was one of the few detailed items and was intended to reflect the levee.

The paving around the trees was implemented in 1972 as part of the first phase of construction. Because the cobblestone paving settled and became an uneven surface, they became a safety factor and were subsequently replaced with cast-iron tree grates in 1979. The 2' border strip was never constructed.

Existing Condition: In the 1980s, a small portion of the 2' cobblestone border was implemented on an experimental basis. The stones were removed sometime later. The tree grates exist as implemented in the late 1970s. The grates are 6' x 6' cast-iron (see figure 84). The grates are very heavy and therefore difficult to maintain. Although the grates themselves are in fair condition, the uneven surface created by their shifting creates a hazardous condition.

Analysis: Non-contributing.
The tree grates do not reflect the Saarinen/Kiley concept plan. They cause hazardous conditions and therefore they are a priority for treatment.

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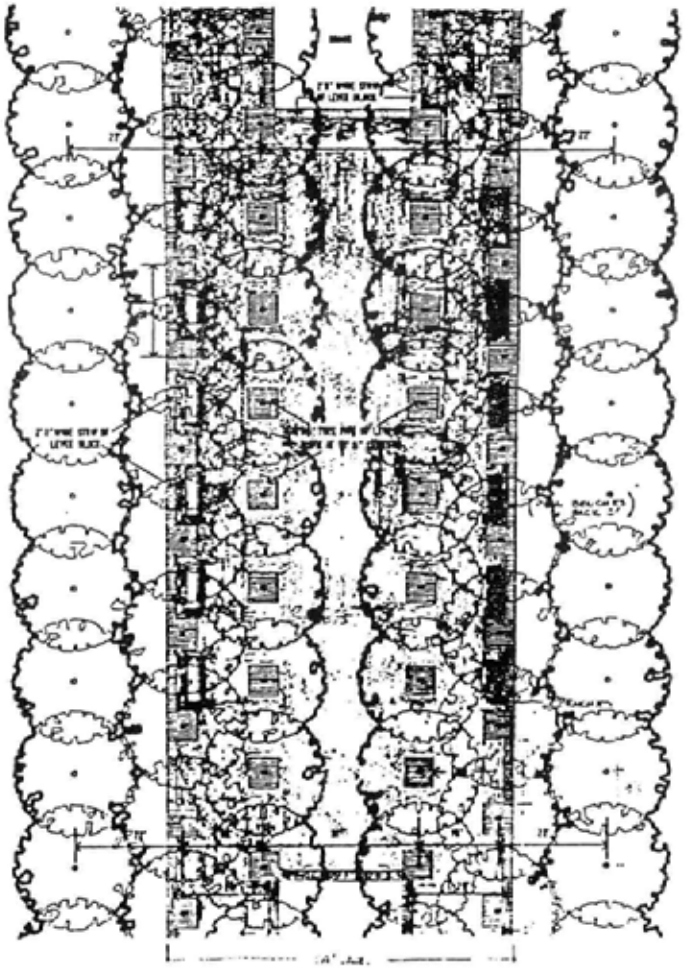
[246]Moore, *Urban Innovations*, 128.



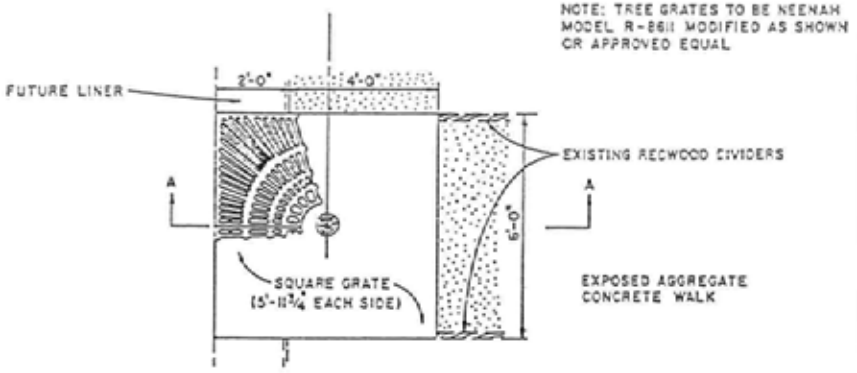


Figure 84: Comparison of Kiley treatment around monoculture trees (left) and NPS treatment (right). (JEFF drawing number 3027, JEFF drawing number 366/41037).

Retaining Walls (HVAC/SHIPREC)

Historic Condition: Retaining walls at the service areas were not clearly detailed by Saarinen and Kiley. [247] Details and construction specifications were completed by Harland Bartholomew and Associates and constructed in the second phase.

Existing Condition: The structural integrity of the retaining walls has not been assessed and therefore their condition is unknown.

Analysis: Non-contributing.
The walls do not directly relate to the Saarinen/Kiley concept plan and therefore they are non-contributing. However, they are functionally important to maintain the existing landform and therefore a structural analysis of the walls is a priority for treatment.

Vegetation

Rosehill Ash Monoculture

Historic Condition: According to the Saarinen/Kiley concept plan, three rows of tulip poplar trees (Liriodendron tulipifera) were to be planted along the pedestrian walks. The monoculture was the strongest single feature of the Kiley planting plan. The tall trees would function to define the pedestrian space and conceptually strengthen the simplicity of the Arch and surrounding site design.

At the outset of the first major phase of construction the monoculture of tulip poplar was changed to the Rosehill ash (Fraxinus americana 'Rosehill') by the National Park Service Western Service Center of Design and Construction.[248] The alignment and spacing of the trees was maintained as specified on the approved plan. The aesthetics of the tree was not carefully considered as the Rosehill ash has a rounded form compared with the columnar form of the proposed tulip poplar (see figure 85).

Existing Condition: The condition of the Rosehill ash monoculture is fair. The oldest trees on site (those planted during phase I of construction, 1969-71) are approximately twenty-four years old now and have lived well beyond the life expectancy of an urban tree.[249] Some trees have reached maturity and require replacement. Other trees have been replaced in-kind since 1981. The original alignment and spacing has been retained.

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[247]Although details of the retaining walls were not identified by Saarinen and Associates, the proposed landform around these areas clearly required retaining walls.

[248]See Site History section of this report (above) for an explanation and history of this change.

[249]Jim Patterson, Research Agronomist, Center for Urban Ecology correspondence with JEFF Superintendent, September 25, 1995. Mr. Patterson visited JEFF to evaluate the soil condition and plant health/growth. He was impressed with the condition of the Rosehill Ash. Other experts have evaluated the monoculture in the past and have been equally impressed with their condition and survival rate. See David G. Nielson, Professor Emeritus & Consultant, Ohio Agricultural Research and Development Center, Department of Entomology correspondence with JEFF Gardener Supervisor Jim Jacobs, November 3, 1992 and James B. Hanson, Field Representative, Forest Health Protection correspondence with Steven Cinnamon, IPM Coordinator, Midwest Regional Office of the National Park Service, July 7, 1992.

Analysis: Contributing.
The monoculture reflects the overall Saarinen/Kiley design concept and therefore is contributing. Although the tree species originally specified by Kiley was not planted, the concept of a monoculture with specified tree alignment and spacing is the primary character-defining feature and was faithfully carried out.[250] The Rosehill ash monoculture is a priority for treatment.

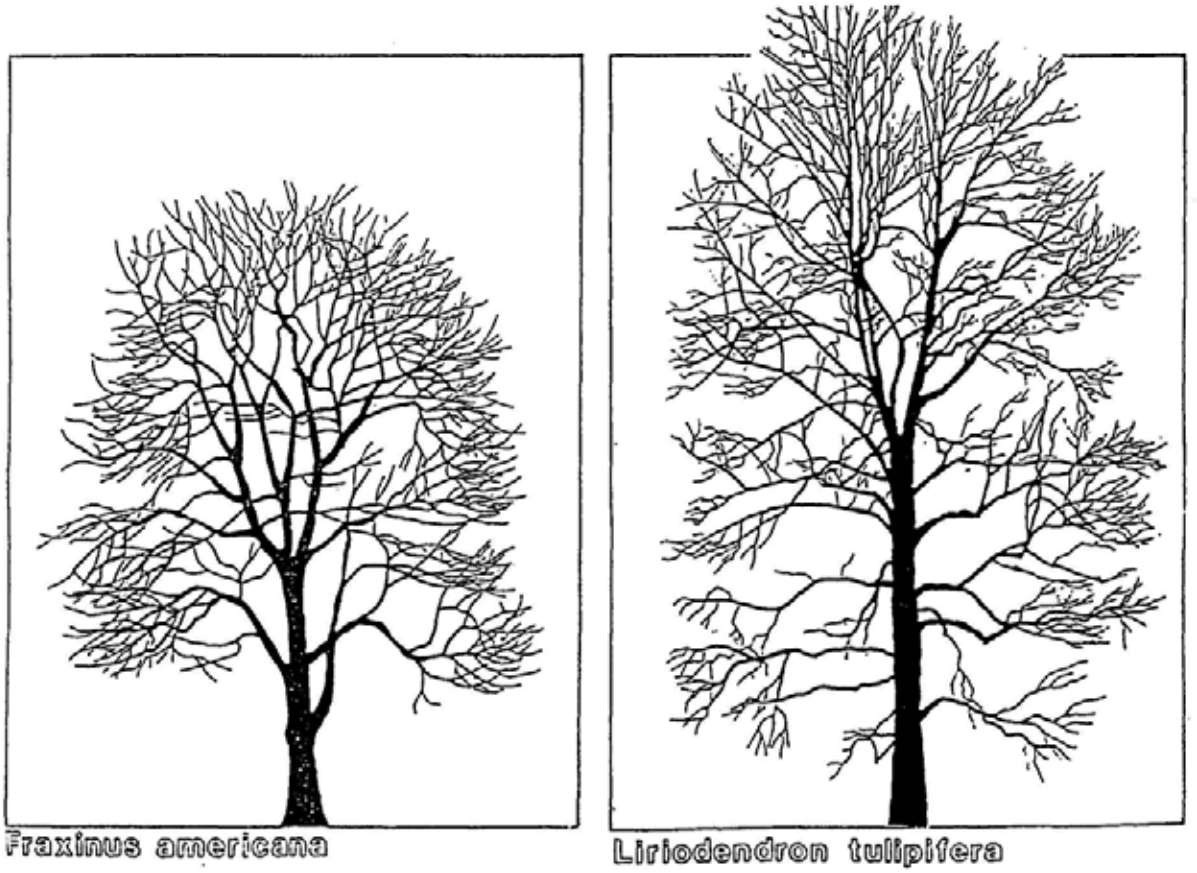

Figure 85: Comparison of Rosehill Ash (left) and Tulip Poplar (right). (Courtesy of Gregg Bleam, 1996).

[250]This project is unique in that historic preservation practices that have been applied toward historic landscape are now being applied to a contemporary landscape. The research, documentation, and analysis of this landscape clearly illustrates how the essence of a landscape is not necessarily the materials used but rather the spatial qualities and delineation of outdoor space. Although the material changed (from tulip poplar to white ash) the numbers, spacing, and planting locations were retained resulting in a spatial quality reflecting the designer's intent.

Bald Cypress Circles

Historic Condition: Two circles of bald cypress trees (Taxodium distichum), one in the northwest portion (51 trees proposed) and one in the southwest portion (70 trees proposed) of the site, were depicted on the Saarinen/Kiley concept plan. These areas were carried over from earlier plans and were originally meant to be "campfire" interpretive areas. During the second major planting phase in the late 1970s and early 1980s, 34 bald cypress trees were planted in the northwest portion of the site, and 30 were planted in the southwest.

Existing Condition: Two circles of bald cypress exist on the site. The circle in the northwest consists of 35 trees and the circle in the southwest consists of 32 trees. Several of the trees are replacements of the original planting.

Analysis: Contributing.
The bald cypress trees reflect the Saarinen/Kiley design concept and therefore are contributing. Although the number of trees were reduced during implementation, the general form and materials were maintained. Additional plantings of bald cypress trees would strengthen the concept.

Plant Composition & Open Space

Historic Condition: Dan Kiley proposed a plant palette of 16 tree species to structure and define spaces. His intent was to rely on few species, creating a consistent and dense planting to give the spaces character and definition. He depended upon the height and stature of the tulip poplar to define the main allees, a small number of tall canopy trees (oak, ginkgo, and hackberry) to interact with the lagoons, and a limited number of flowering trees (Eastern redbud, flowering dogwood, magnolia) to edge the tall tree canopy and give color (see figure 86). Evergreen trees, including Canada hemlock, were intended to screen views of incompatible uses.

By 1974, NPS plans showed an increase in the number of species in the plant palette, and a reduction in the overall number of trees to be planted. The Kiley scheme, which limited the palette and proposed dense plantings to define the character of spaces, was modified. The general form of the proposed NPS species were similar, creating a very uniform, non-descript feeling (see figure 86). By the second major phase of construction, a greater number of species spread more consistently over the site clouded the original intent of the planting.

Existing Condition: There are currently 32 tree species planted on the Arch grounds, twice the number proposed by Kiley. There are approximately 2,179 trees planted on the site, only 56% of the total number of trees originally proposed by Kiley. The trees do not seem to be organized or structured in any way but are widely spread across the site. The distinction between forest and meadow is almost nonexistent.

Analysis: Non-contributing
The overall plant composition and open space around the ponds does not reflect Kiley's design intent and therefore is non-contributing. The concept of forest and meadow is so obscured by random tree plantings that the character of the spaces as Kiley intended is nonexistent. Aesthetics of tree structure, form, and texture were not taken into consideration when tree replacements were made. This has resulted in a very uniform, non-distinct planting across the site.

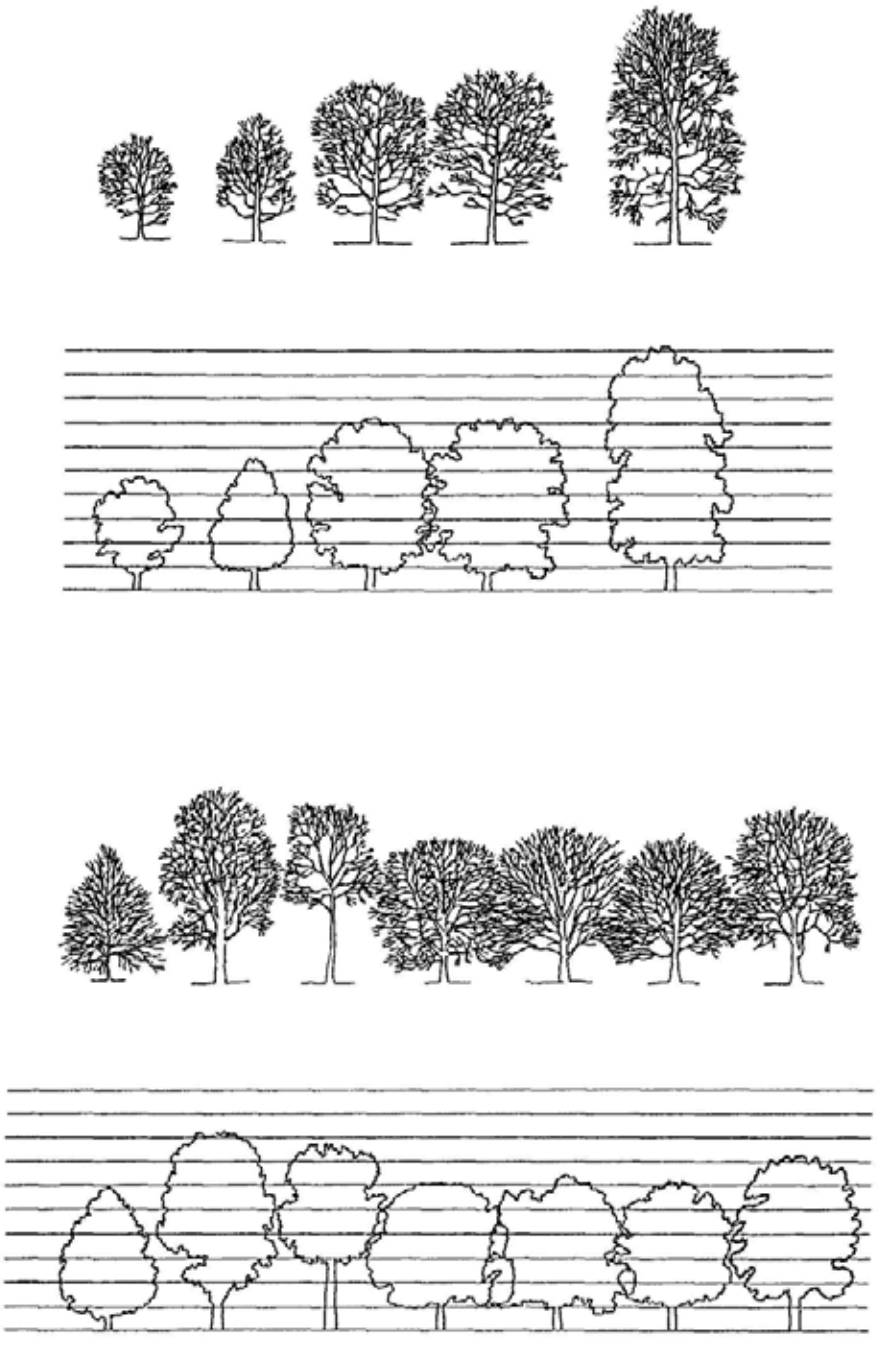

Figure 86: Comparison of canopy tree profiles, Kiley plan (top); NPS plan (bottom). (Courtesy of Gregg Bleam, 1996).

Railroad Tunnel Plantings

Historic Condition: Dan Kiley proposed heavy plantings along the railroad cuts and tunnels to screen the visually incompatible use associated with the lines. Kiley chose to use predominantly Canada hemlock (Tsuga canadensis) to screen the lines, and eastern redbud and flowering dogwood to add interest of texture and color. Shrubs (fragrant sumac, flowering quince, and mugo pine) were also intended to screen visually incompatible uses as well as add interest with color, form, and texture. A groundcover of Bulgarian ivy was proposed along the steep slopes on the west side of the railroad cuts.

The first plantings on the site occurred in 1971 along the west side of the railroad tunnels. The planting consisted of black pines (Pinus thunbergii, replacing the Canada hemlock) and redbuds (Cercis canadensis). The east side of the railroad cuts were planted in 1978-79. These plantings included flowering dogwood (Cornus florida), star magnolia (Magnolia stellata), Arnold crabapple (Malus arnoldiana), black pine, and Bulgarian ivy. The planting followed the Kiley proposal closely. The Bulgarian ivy was removed several years later because it was being choked-out by weeds.

Existing Condition: The plantings on the east sides of the tunnels have had to be replaced frequently due to flooding problems, and finally after the 1993 flood the planting was significantly altered. Trees such as redbud and black pine were replaced with river birch (Betula nigra), a species more tolerant of wet soil conditions and periodic flooding.

The plantings on the west side of the railroad cuts have been significantly altered as well. Many of the black pines were removed because they were seriously deteriorated. Many redbuds, planted in the first phase along the railroad tunnels, were also removed recently because they had reached their maturity. The plantings in this area were not replaced pending the outcome of this report.

Analysis: Non-contributing.
Some of the original plant materials have been retained but for the most part these areas have been significantly altered and do not reflect the Saarinen/Kiley concept plan.

SHIPREC/HVAC and Maintenance Area Plantings

Historic Condition: The plant materials proposed around the service areas were intended to screen these uses and inhibit visitors from approaching these areas. Low growing shrubs including mugo pine, fragrant sumac, and flowering quince were proposed as understory vegetation. Canopy and flowering trees including red oak, white oak, hackberry, magnolia (saucer and star), crabapple, redbud, and dogwood were proposed along the slopes. Heavy planting of Canada hemlock was proposed around the maintenance building.

These areas were generally planted as the original plan proposed. The major changes in vegetation types include the substitution of black pine for Canada hemlock, the elimination of the use of flowering quince, and the introduction of wintercreeper as the groundcover planted on the slopes surrounding SHIPREC and HVAC service entrances. Bulgarian ivy was planted on the slopes surrounding the maintenance building but it was later removed and replaced with sod.

Existing Condition: The plantings around the service entrances are in fair condition. As mentioned previously, black pine does not grow well in St. Louis so many losses have been suffered around the maintenance building.

The mugo pines at the SHIPREC and HVAC service entrances are declining. The wintercreeper groundcover is doing well in these locations. The grassed slopes around the maintenance building are very difficult to maintain.

Analysis: Contributing.
The plantings around the service areas generally reflect the Saarinen/Kiley design concept and therefore they are contributing. Although some of the plant materials have changed, their use and intent have been retained. Planting groundcover on the slopes surrounding the maintenance building would further reflect the original proposed plan and eliminate a maintenance problem.

Planting around and on the Parking Garage

Historic Condition: The Saarinen/Kiley plan proposed Japanese pagoda trees for the main parking area on the north end of the site. The intent of these trees was presumably to shade the parking lot and to integrate the lot with its surroundings. The plant species proposed around the garage are unclear, however, the proposed planting was dense and presumably was meant to screen the lot from the park.

Existing Condition: A parking garage is located on the north end of the site. Circular concrete planters containing amur maple trees are located on the top deck of the garage. The plants in these planters have been replaced since 1986 (completion of the garage) because they do not survive well due to limited growing space and lack of a watering system.

The planting around the garage was installed in 1986 when the garage was completed. The planting plan was developed by WVP Corporation. The planting is high maintenance because many crabapple trees were planted, requiring continued pruning.[251] Steep slopes around the garage create erosion problems and make mowing difficult.

Analysis: Non-contributing.
The existing planting does not reflect the originally proposed Saarinen/Kiley plan and therefore it is non-contributing. The planting should be modified to decrease the amount of required maintenance and should function as screening to soften and disguise the parking use from the park.

Lawn Areas

Historic Condition: Little emphasis was placed on the lawn areas in the originally proposed plan. It seems that the large lawn areas underneath the Arch and on the north-south axis of the Arch were the most important turf areas. The lawn around the ponds was meant to represent a meadow and therefore it presumably was not expected to be highly maintained turf.

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[251]JEFF Gardener Supervisor Jim Jacobs, personal conversations with Gina Bellavia, 1994-1996. Mr. Jacobs feels that the planting around the garage is inappropriate and is a high maintenance planting. He feels that the planting should reflect the other plantings on the site which could be more easily managed.

The Arch grounds turf areas were planted with a seed mix developed in the late 1970s known as the "Arch Grounds Seed Mix."[252] The mix consisted of 49% arboretum bluegrass, 15% regal ryegrass, 15% creeping red fescue, 10% glade bluegrass, and 10% Kentucky bluegrass.

Existing Condition: The existing turf areas are maintained according to three different categories: class A, class B, and class C turf areas.[253] Class A areas are those that are highly visible and these areas are maintained to achieve an excellent quality of appearance. Currently, the areas under the Arch, along the north-south axis (north and south teardrops and triangles), and along Memorial Drive are all maintained as class A turf.

The "Arch Grounds Seed Mix" is still in use but is not an effective mix to achieve quality turf in all areas of the site. Over a 91-acre site, the soil, sun/shade conditions, watering practices, natural factors, drainage, and level of use or foot traffic varies greatly. The use of one specific seed mix to meet these varied conditions with the expectation of producing quality results is unrealistic.

Analysis: Non-contributing.
The open lawn areas under the Arch and on the north-south axis of the Arch are important aspects of the Saarinen/Kiley plan, but the importance should be attributed to the spatial quality rather than the quality of the turf, therefore the lawn areas are non-contributing. Although the lawn areas are important and should have a certain quality of appearance, the "Arch Grounds Seed Mix" is not significant and should be modified to meet the changing site conditions.

Circulation

Exposed Aggregate Sidewalks

Historic Condition: The circulation system as designed by Saarinen and Kiley was extremely important because it formed the basis of the landscape design. The circulation patterns formed the framework for the movement of people through the landscape. The curvature of the walks was meant to reflect the gentle curve of the Arch. The alignment of the walks strengthened the axial arrangement of the site design. Construction material for the walks was not specified by the designers. The layout of the walks and the spacing of the trees in and alongside them was intended to be the dominant landscape feature, reflecting the simplicity of the Arch.

NPS landscape architects specified exposed aggregate concrete to be the material for the sidewalks. The walks were constructed at two different times during the period of significance. The walks are generally 16' wide. The alignment of the walks was implemented as the original designers intended.

Existing Condition: The walk alignment exists as implemented. Some sections of the walks have been replaced or repaired. Heavy vehicular traffic during Fair Saint Louis has caused accelerated deterioration of some portions of the sidewalks.[254]

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[252]Moore, *Urban Innovations*, 126.

[253]The NPS classification of turf is based on the percent of acceptable weed cover, class A allowing the least amount of allowable weed cover. More detailed recommendations regarding classification of turf on the Arch grounds should be included in a future Integrated Pest Management Plan.

[254]Traffic from Fair Saint Louis is blamed for the problems because it is clear that the problem areas coincide with the areas open to heavy vehicular traffic for the fair. It is important to realize that damage from the fair is cumulative and occurs over many years of heavy vehicular traffic on walks that were meant for pedestrian traffic only.

Analysis: Contributing.
The existing walk layout reflects the Saarinen/Kiley design concept and therefore is contributing. Walk alignment is an important organizing principle and character-defining feature. The walks are a high priority for treatment.

Monumental Entrance (Grand Staircase)

Historic Condition: Eero Saarinen designed the Grand Staircase to symbolize "the movement of peoples through St. Louis, the gateway."[255] The stairs were a grand physical connection between the city and the riverfront. They were to be 500' wide at the top and 291' wide at the bottom, with curved sides to reflect the curvature of the Arch. The treads would decrease in depth toward the top from approximately 4' to 1' 6" to "dramatize the upward sweep of the approach to the arch".[256] The risers were designed to be 9 inches, not the typical 6 inches, for aesthetic reasons.[257] The support beams and pilings were constructed early in the 1960s when the railroad tunnels were completed in preparation for the construction of the steps.

In 1974, Harland Bartholomew & Associates (HBA) re-designed the tread-riser relationship of the steps to a more comfortable, consistent relationship of 6" risers and 1' 3" treads (see figure 87). Two landings were also incorporated as well as snow-melting mats on the north end. The steps were scheduled to be implemented in two phases. Phase I of the "monumental entrance", consisting of the north and south sections, was constructed in 1975-76 to the specifications developed by HBA. Some of the original support beams and pilings (from 1960s) were utilized for construction. Phase II, the center section, was to be completed later.

Existing Condition: The north and south sections of the monumental entrance exist as implemented. The snow-melting mats work intermittently. Lack of funding has inhibited the construction of the center section to date. The center is composed of terraced lawn areas which are difficult to maintain due to the slope and location.

Analysis: Contributing.
The monumental entrance relates to the Saarinen/Kiley concept plan. Although details of the tread/riser relationship were altered by a subsequent design firm, the location and form of the stairs was retained from the original plan. Completion of the monumental entrance would complete Saarinen's concept and therefore is a high priority.

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[255] *Eero Saarinen on His Work*, 18.

[256] Ibid.

[257] Bob Moore, telephone conversation with Bruce Detmers, October 31, 1995 (transcript on file in the JNEM Archives). Mr. Detmers recalled that he worked on the mathematics of the grand staircase design. According to him, Eero Saarinen's design of the staircase was to reflect a catenary curve on its side. A section detail of the original design illustrates this (see section detail).

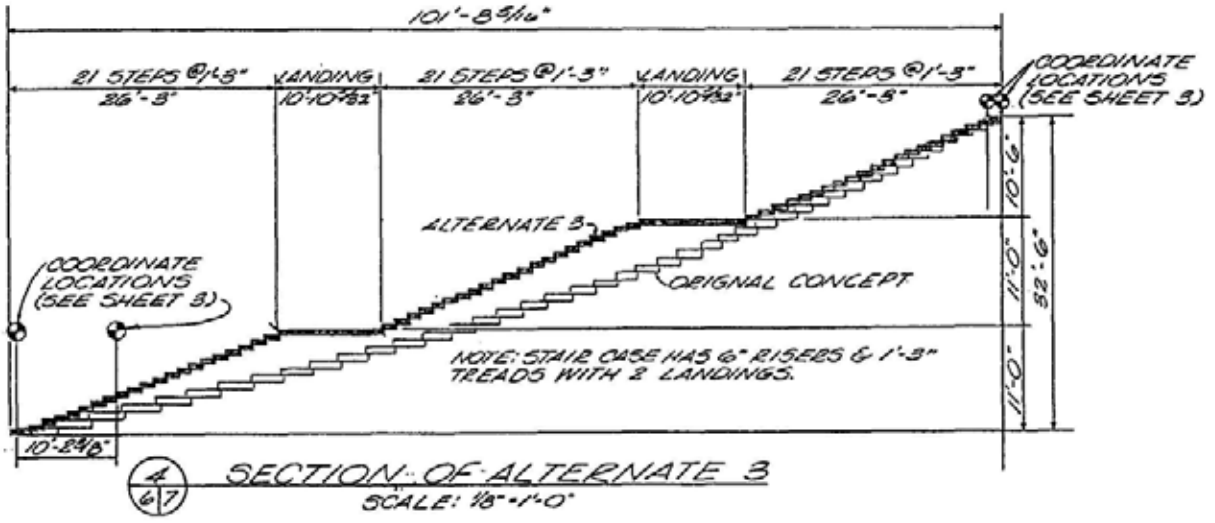

Figure 87: Comparison of original concept of grand staircase and alternative detail developed by Harland Bartholomew & Associates. (JEFF drawing number 366/41026, 1973).

Arch Entrance Ramps and Steps

Historic Condition: The entrance ramps leading to the Arch visitor center were designed by Eero Saarinen and Associates and constructed in the 1960s. The concept of entering the Arch at the base of the legs was an important one because it dramatically affected the visitor experience. Concrete "steps" were constructed along portions of the ramps to be used as sitting walls.[258] The ramps were made of terrazzo tiles which were later replaced by granite pavers in 1983. The steps, or architectural sitting walls, were made of poured concrete.

Existing Condition: Although the ramps to the visitor center are in good condition, they become extremely slippery in wet weather and present a hazardous situation for employees and visitors. The ramps also do not meet the *Uniform Federal Accessibility Standards* (41 CFR 101-19.6). The concrete steps are in fair condition.

Analysis: Contributing.
The Arch entrance ramps and steps directly relate to the Saarinen design concept and therefore they are contributing. Since the ramps are dangerous when they become wet and they do not meet current accessibility legislation, they are a priority for treatment.

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[258]Architect Bob Burley, interview with Gina Bellavia and Gregg Bleam, July 27, 1995. Transcript on file in the JNEM Archives.

Old Cathedral Parking Lot

Historic Condition: The Cathedral parking lot was conceptually located south of the Old Cathedral. Details of the lot were not identified by Saarinen and Kiley, however the approved plan clearly shows a planting bed on the west side of the lot between the lot and Memorial Drive.

A parking lot was constructed in 1961 as a result of an agreement between the NPS and the Archdiocese.[259] The lot was paved asphalt and accommodated approximately 85 cars.

Existing Condition: The existing parking lot is in good condition. It was redesigned by Cox/Croslin and Associates in 1993 and constructed in 1994. The existing parking differs from the original in that it was moved approximately 12 feet to the east to accommodate a bus drop-off point along Memorial Drive. The lot accommodates 81 cars, with accessible spaces. It is paved asphalt, approximately 225' x 105'.

Analysis: Contributing.
Conceptually the parking lot contributes to the Saarinen/Kiley design because it is located directly south of the Old Cathedral. However, the materials and construction details do not reflect the Saarinen/Kiley concept and therefore are not a priority for preservation treatment.

Old Cathedral Sidewalk

Historic Condition: The sidewalk leading from the Old Cathedral to the Arch was not a part of the Saarinen/Kiley conceptual plan. It was designed by Harland Bartholomew and Associates and constructed during the second major phase of implementation. The walk, 8' wide, was constructed of exposed aggregate to match other existing sidewalks.

Existing Condition: The Old Cathedral walk is in fair condition.

Analysis: Non-contributing.
The Old Cathedral sidewalk does not reflect the Saarinen/Kiley conceptual plan and therefore it is non-contributing. However, the walk is functionally important and should be maintained.

Interior Roads (to SHIPREC and HVAC)

Historic Condition: Interior roads to the service entrances were not clearly detailed on the Saarinen/Kiley site plan. A road to the south service area was illustrated on the plan to be about 12' wide, material unknown. The road was to lead from the exposed aggregate sidewalk southwest of the south leg to the south service entrance (SHIPREC). No clear service road was indicated on the original plan leading to the north service area.

Harland Bartholomew altered the plans to include a service road from Memorial Drive to the south service entrance, and a road from the exposed aggregate sidewalk north of the north leg of the Arch to the north service area. A truck turnaround was also designed and constructed at the south area to facilitate deliveries.

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[259]Cooperative Agreement between United States of America and the Archbishop of St. Louis, February 23, 1961. Copy on file in JEFF Office of the Superintendent.

The south road is asphalt, approximately 13' wide. The north road is constructed of two strips of precast porous pavers.

Existing Condition: The service road to the south service area is in good condition. The precast porous pavers on the north service road are also in good condition.

Analysis: Non-contributing.
The interior service roads do not reflect the Saarinen/Kiley conceptual plan and therefore are non-contributing. However, the roads are functionally important for the operations of the park, so they should be maintained.

Exterior Roads and Pedestrian Overpasses

Historic Condition: The exterior roads surrounding the park created definite edges to the site design. The park was bounded by Washington Avenue on the north, Poplar Street on the south, Wharf Street on the east, and the Third Street Expressway on the west. A pair of pedestrian overpasses were conceptualized early in the planning stages to bridge the Gateway Arch to the Old Courthouse over the Third Street Expressway, and were studied more extensively by Saarinen & Associates after Saarinen's death (see figure 88).

Very few changes were made to the exterior roads. Washington Avenue was relocated approximately 20' north when the Arch parking garage was constructed in 1986. Wharf Street was renamed "Leonor K. Sullivan Boulevard," and the Third Street Expressway became more commonly known as Memorial Drive.

Existing Condition: Two specific problems with the roadways bordering the park are evident. The lack of curb cuts at the sections of street crossing over Interstate 70 makes it impossible for disabled visitors to cross Memorial Drive safely. Curb cuts are located on park boundaries at Chestnut and Memorial, Market and Memorial, on all four corners of Luther Ely Smith Square and all four corners of the Old Courthouse. Memorial Drive is a very busy highway and there have been many accidents at the various intersections in the past. The pedestrian overpasses intended to bridge from the Gateway Arch to the Old Courthouse over Memorial Drive were never constructed and therefore crossing the highway is very dangerous. The highway divides the park so strongly that some visitors do not even realize that the Old Courthouse is within the park.

Analysis: Contributing.
The exterior roads on the perimeter of the park are generally the same as during the period of significance and therefore they are contributing. Although the design intent in this regard is incomplete without the pedestrian overpasses, the potential to make this visual and physical connection exists and is a high priority for treatment.

Parking Garage

Historic Condition: Parking was always a part of the Saarinen/Kiley concept plan and was envisioned on the north end of the park.[260] Eero Saarinen was awarded a contract in 1959 to study the feasibility of a parking garage on the site.[261] He concluded that it was in fact feasible but the lack of funds prevented its construction.

Surface parking existed on the north end of the site, and at one time covered almost the entire site, from the time the old warehouses were being razed (circa 1939). The lot shrunk in size as landscape development progressed. In the early part of the period of significance, the north end of the site was used as a temporary surface lot. By 1981, the asphalt surface lot held approximately 320 cars.[262]

The garage was constructed between 1984 and 1986. It was a three story (two underground) structure accommodating 1,208 cars and occupying 4.7 acres.[263] The garage construction was made possible by an agreement between the City of St. Louis, the Bi-State Development Agency, and the National Park Service.[264]

Existing Condition: The Arch parking garage is in good condition. The garage is maintained and run by the Bi-State Development Agency.

Analysis: Contributing.
The parking garage directly relates to the Saarinen/Kiley design concept and therefore it is contributing. Although the original designers did not specifically design the garage, they conceptually envisioned parking in that particular location occupying a similar surface area.

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[260]See early plans, Eero Saarinen & Associates. Copies on file in the JNEM Archives, uncatalogued collection. In fact, parking facilities were planned for both the north and south portions of the site at one time.

[261]Brown, *Administrative History*, 121.

[262]Moore, *Urban Innovation*, 13.

[263]Ibid, 16.

[264]Ibid, 13-22. Historian Bob Moore details the history of the construction of the parking garage as well as the operating agreement between the three agencies.

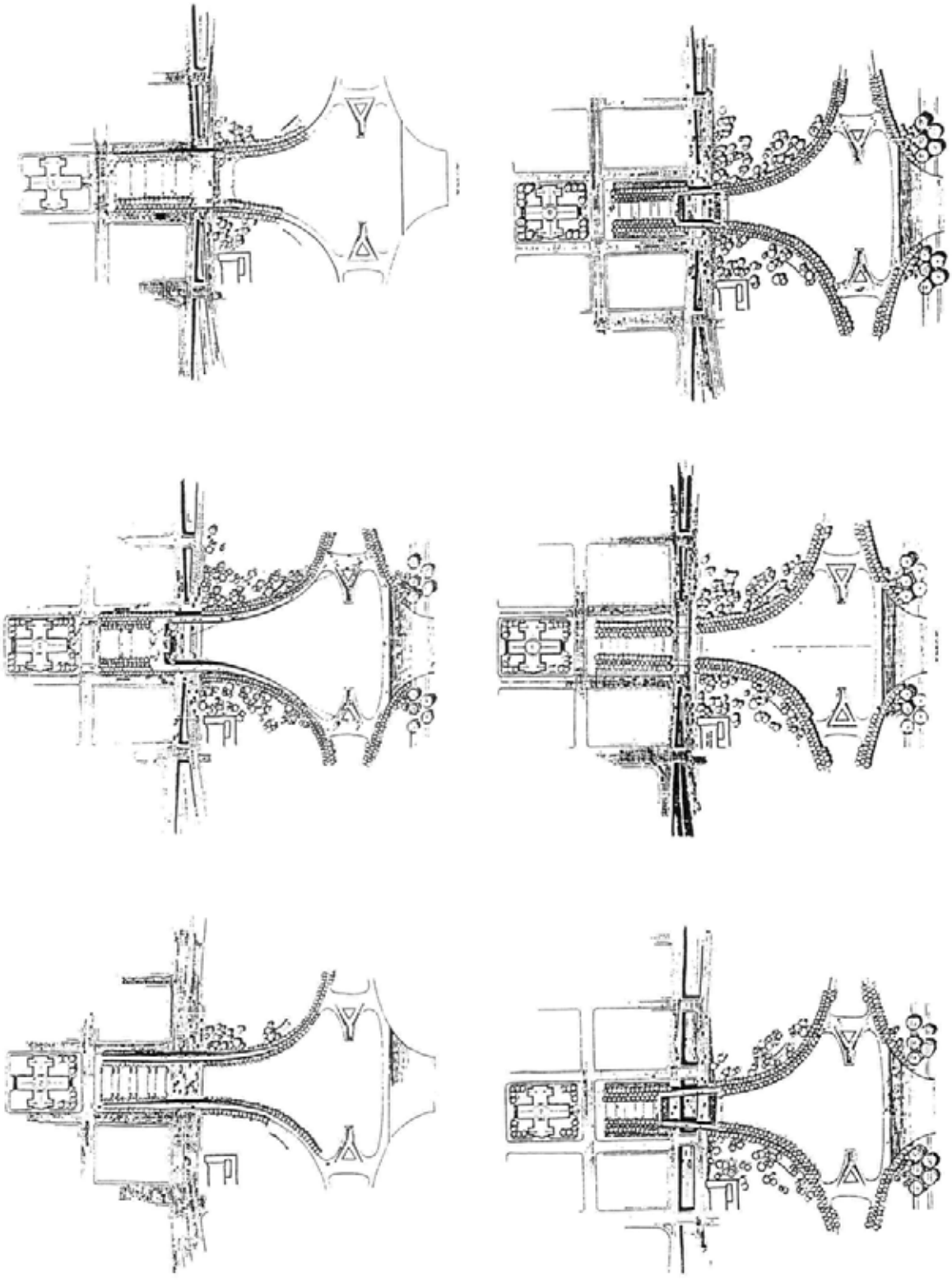

Figure 88: Studies of the proposed pedestrian overpasses. (Eero Saarinen & Associates, circa 1960. JNEM Archives, uncatalogued collection).

Water Features

North Pond & South Pond

Historic Condition: The Saarinen/Kiley concept plan depicted lagoons on the northwest and southwest portions of the site. The south lagoon was proposed to occupy approximately 1.88 acres; the north to occupy 2.50 acres.[265] An island was proposed on the north end of each with narrow footbridges connecting them to the edge of the surrounding landscape. The lagoons were very complex and sinuous. Their complex shapes, combined with Kiley's planting plan, were meant to create numerous intimate spaces along the ponds' edges.

By 1969 the plans for the ponds took on a more simplified form with less intricate curves, and the islands and footbridges were no longer considered (see figure 89). It seems that NPS design teams were responsible for simplifying the shapes. The ponds were constructed in the second phase of development (1978-1981). The south pond occupies approximately 1.59 acres, while the north pond occupies approximately 1.82 acres.[266] Although the size and shapes are comparable to those proposed by Saarinen and Kiley, the simplification and change in planting minimized the design intent.[267]

Existing Condition: The ponds are generally in fair condition. Both ponds need an aeration system installed to minimize the presence of algae, and both need to be re-caulked. The ponds also show evidence of spalling concrete. The ponds should be cleaned once every two years, although budgetary constraints sometimes prevent this.[268]

Analysis: Contributing
The north and south ponds reflect the Saarinen/Kiley design concept and therefore are contributing. Although the shapes have been simplified and the islands and footbridges disregarded, the idea of ponds and their location has been retained as the designers intended.

Fountains

Historic Condition: Two circular fountains aligned with either end of the Arch were proposed in the original design. Their intention was to integrate the primary walks and site with the Arch. The fountains were surrounded on one side by a half-circle of tulip poplar trees.

Existing Condition: The fountains were never constructed.

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[265]JEFF Civil Engineer, Gargar Chan, personal communication with Gina Bellavia. Ms. Chan determined the areas of the ponds by using mathematical calculations and the 1966 approved Kiley development plan.

[266]JEFF Park Engineer Dave Caselli, personal communication with Gina Bellavia, December 14, 1995. Mr. Caselli determined the area of the ponds using mathematical calculations and the 1995 Existing Conditions plan.

[267]An examination of the existing topography and the proposed landform suggests that the Kiley lagoons would have been unworkable in requiring excessively steep grades.

[268]JEFF Gardener Supervisor Jim Jacobs, personal communication with Gina Bellavia, December 14, 1995.

Analysis: Not extant.
The fountains on axis with the Arch were never built. The construction of these fountains would further tie the landscape with the Arch.

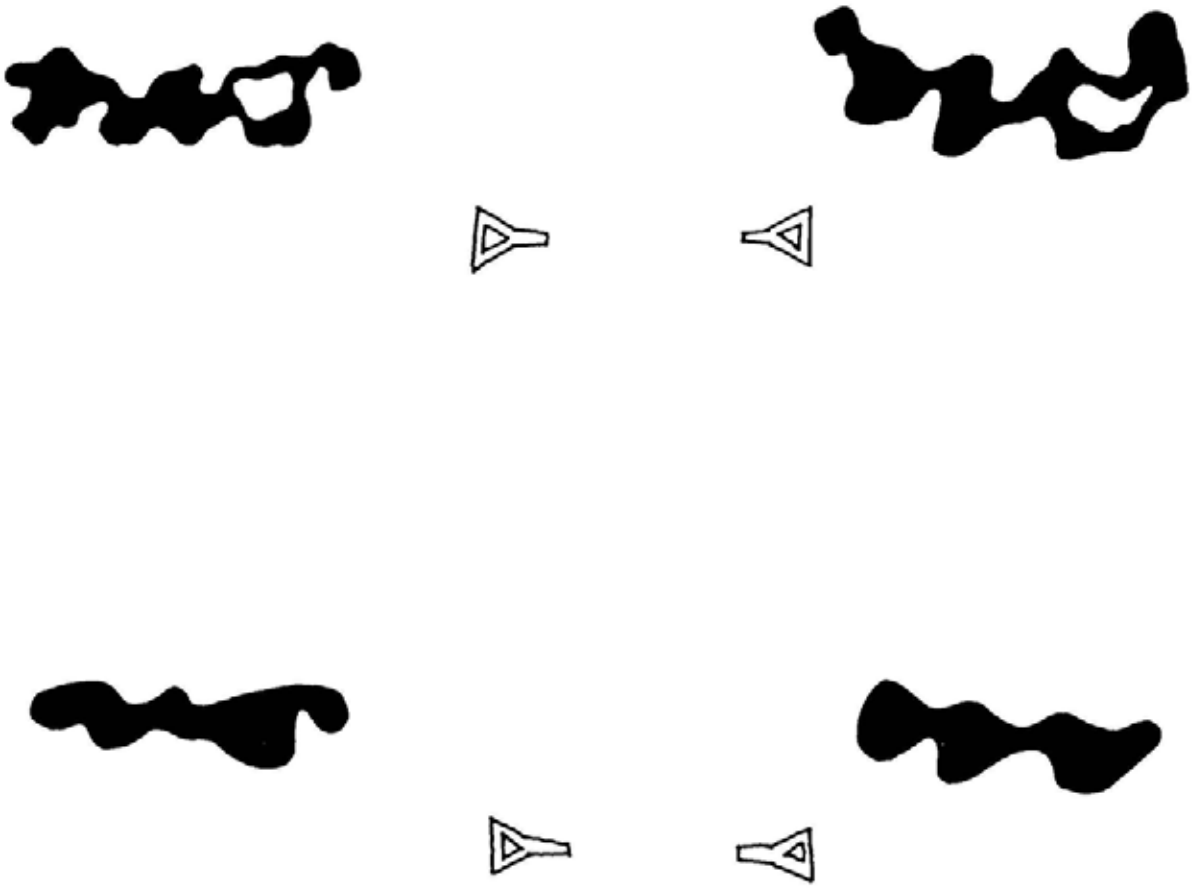

Figure 89: Comparison of pond configuration, Kiley plan (top); NPS plan (bottom). (Courtesy of Gregg Bleam).

Furnishings & Objects

Benches

Historic Condition: Benches were designed by Saarinen and Associates for the levee development.[269] The proposed benches were 10' long, 2' 3" wide, and 1'4" high. They were to be limestone bench tops set on a limestone block and a concrete base (see figure 90). A steel dowel was to be thread through the base, block, and portion of the bench top to anchor it together. It is unknown at this time whether these benches were ever constructed on the levee.

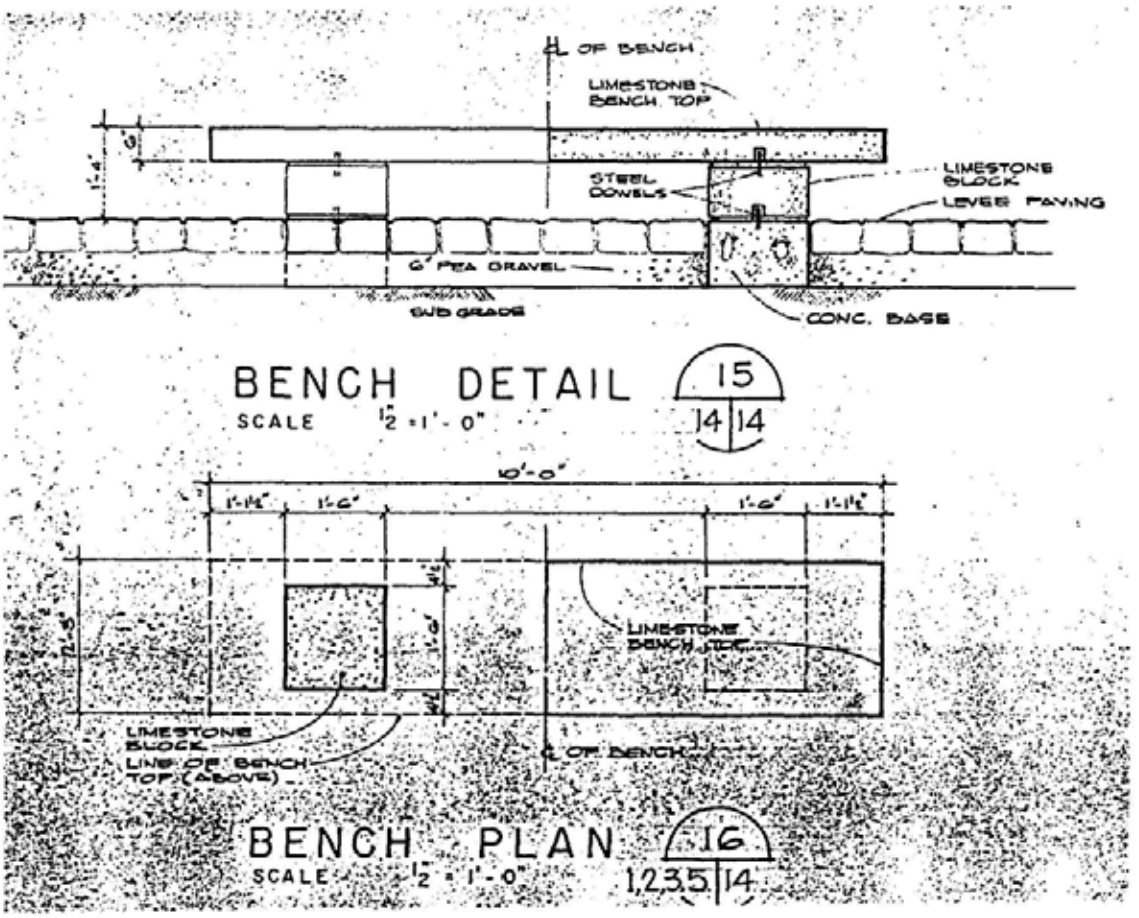

Figure 90: Eero Saarinen & Associates, SD 13 - Bench Detail, 1960. (JNEM Archives, D-120-906).

[269]NHS-JNEM drawing number 3077, dated 11-23-60. Copy on file in the JNEM Archives, Record Unit 120, drawer 23, folder 7. The drawing includes construction details for planting, pavement, and benches on the levee.

Concrete benches were later designed for the Arch grounds by Western Service Center landscape architect John Ronscavage (see figure 91).[270] These were constructed during the two major phases of landscape development. Seven benches were constructed on the east side of each rest area during the first phase of development and seven more at each rest area on the west side during phase two. The size and construction specifications for the benches matched the design specifications proposed by Saarinen and Associates, the material, however, was changed from limestone to concrete.

Four more benches, similar in design to the ones described above, were installed on the landings of the grand staircase. Another type of bench, black metal pipe frame with cast iron slats, was installed in Luther Ely Smith Square. The date of installation is unknown.

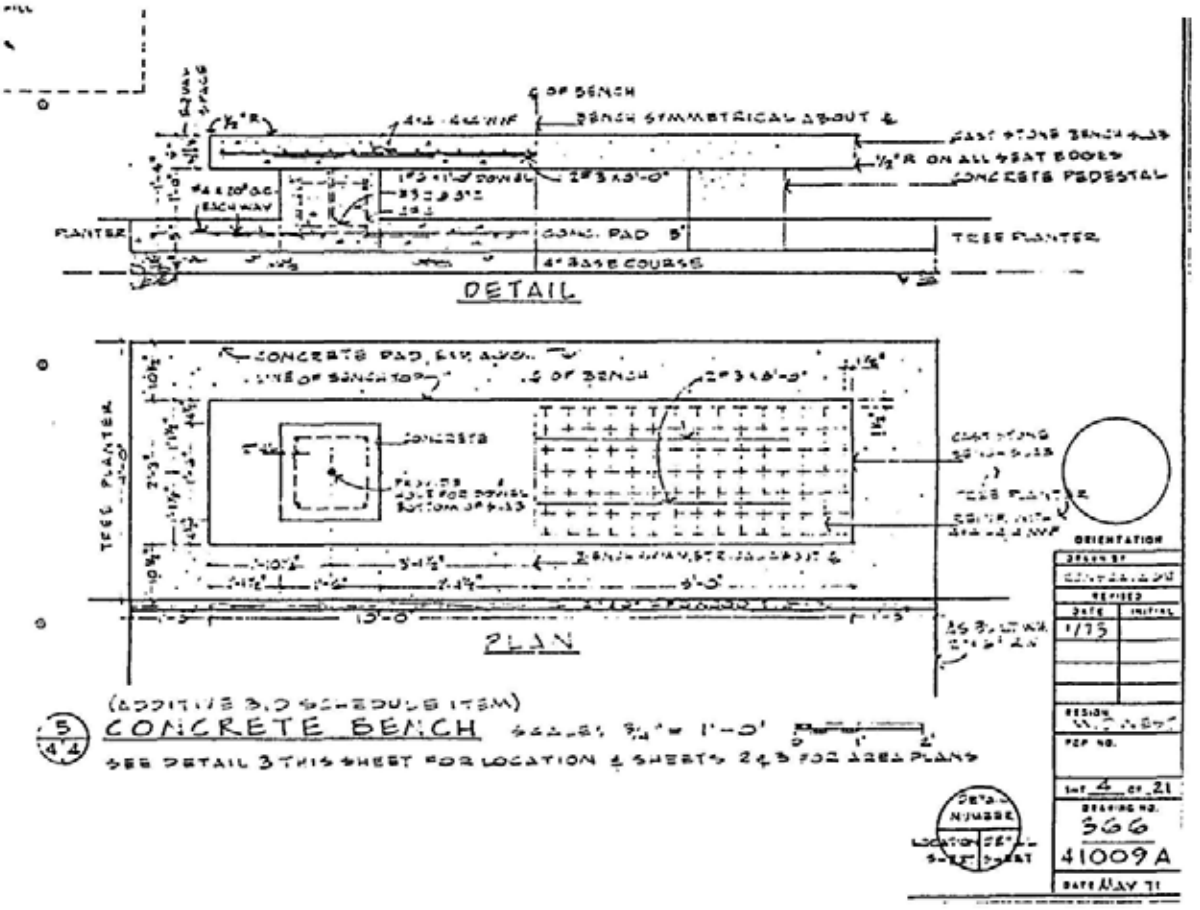

Figure 91: NPS 366/41009A - Bench Detail, May 1971. (JNEM Archives, D-120-1207).

[270]Drawing number 366/41009A, May 1971. JNEM Archives, Record Unit 120, drawer 17, folder 2.

Existing Condition: The fourteen benches exist in good condition. The need for more seating has been identified by park staff.

Analysis: Contributing.
The existing benches reflect the benches proposed by Saarinen for the levee and therefore they are contributing. Although the material was changed, the size and construction specifications were retained and therefore the benches reflect Saarinen's design intent.

Light Standards

Historic Condition: A lamp standard and luminare detail was recommended by Saarinen & Associates, however their proposed locations were not identified.[271] New plans and specifications for standards and electrical boxes were prepared by designers at Denver Service Center (see figure 92).[272] Installation was completed along the north-south axis in 1974. Utility extensions were completed when the remainder of the landscape was completed (1978-81). The standards were brown aluminum poles measuring 12' high from finished grade to the bottom of the luminare. The luminare was a 21" diameter globe. The standards were placed 12" from the edge of the sidewalks, midway between tree wells, and approximately 90' apart. The lighting was installed in two phases; the first phase in 1974 along the north-south axis, and in 1980-81 along the northwest and southwest walks.

Existing Condition: The light standards and luminares exist as implemented. They are in fair to poor condition as a result of vandalism and normal deterioration over time. Park staff has identified the need for replacement parts, bases, and replacement globes.[273]

Analysis: Contributing.
Although the design for the light standards was altered, they conceptually relate to the Saarinen/Kiley plan. The lighting is functionally important for the safety of visitors and staff.

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[271]Eero Saarinen & Associates drawing number NHS-JNEM 3077 E-4, December 9, 1960. JNEM Archives, Record Unit 120, drawer 22, folder 2. See also, a line drawing depicting the proposed luminares on Wharf Street, which was found at Arteaga Studios Ltd., dated September 11, 1963, no. 639-11-3. It is unclear from this artist's rendering whether the luminares were also proposed for the walkways.

[272]JNEM Archives, Record Unit 120, drawer 15, folder 4. The reason the Saarinen & Associates standard and luminare detail was not used is unknown.

[273]See JEFF OPR 10-238s, no. CO16/515. Copy on file in JEFF Facility Manager's Office.

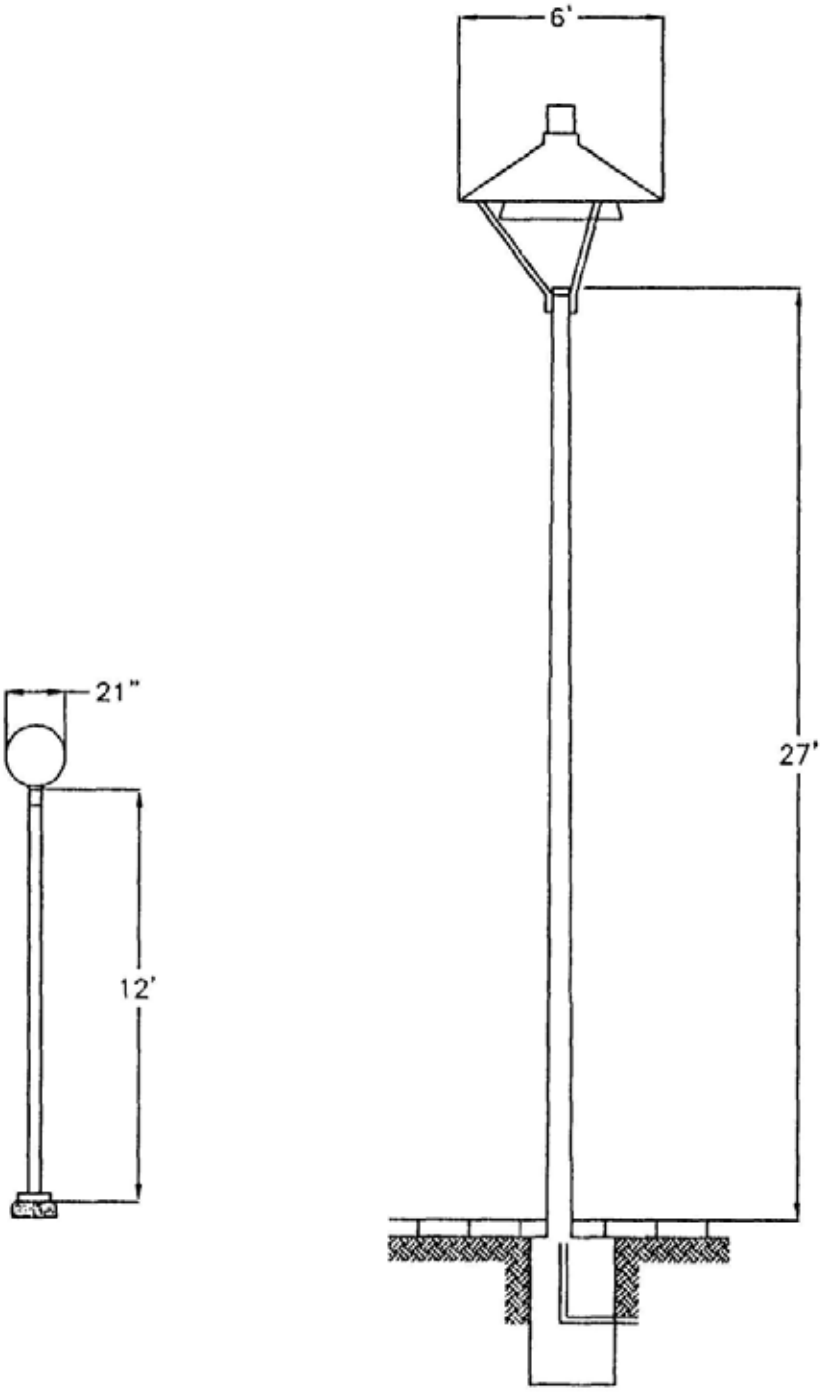

Figure 92: Comparison of Saarinen lighting detail (right) and NPS lighting detail (left). (Redrawn by Gargar Chan from JEFF drawing numbers D-120-909 and D-120-807).

Trash Receptacles

Historic Condition: Trash receptacles were not addressed on the Saarinen/Kiley concept plan. Moveable, exposed aggregate receptacles were installed during the construction phases. The receptacles have brown, hard plastic tops that sit on top of the exposed aggregate container. It is unclear whether the receptacles were specified by Denver Service Center or Harland Bartholomew & Associates.

Existing Condition: There are approximately 155 trash receptacles in the park. The tops need to be replaced every 3-4 years. The exposed aggregate concrete receptacles are in fair condition; about 25% of the total number of receptacles are in poor condition and need to be replaced.

Analysis: Non-contributing.
Although the existing trash receptacles are functional, they are intrusive elements because of their size and number. Less intrusive receptacles would be more appropriate.

Drinking Fountains

Historic Condition: Drinking fountains were not addressed by Saarinen and Kiley. The drinking fountains were designed by HBA and installed during the construction phases. They are located on the east side of the Arch at the north and south, and at each of the rest areas. The fountains are exposed aggregate and match the material of the sidewalks.

Existing Condition: The drinking fountains are in fair condition.

Analysis: Non-contributing.
The drinking fountains do not relate to the Saarinen/Kiley plan and therefore they are non-contributing. However, the fountains are important for the comfort and convenience of the visitors and they should be maintained in working condition.

Kiosk

Historic Condition: The kiosk was constructed in 1986 upon completion of the parking garage. It was constructed of sandblasted, pre-cast concrete. The kiosk is a three-sided structure, 8'8" on each side with a 4' x 4' bulletin board and changeable letterboard.[274]

Existing Condition: The kiosk is in good condition. However, the letterboard is not optimally used.

Analysis: Non-contributing.
The kiosk does not relate to the Saarinen/Kiley concept and therefore it is non-contributing.

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[274]WVP Corporation, Construction Plan for Arch Parking Garage and Washington Avenue Relocation, February 18, 1986, construction details, p. A-16. Copy in JEFF Facility Manager's Office.

Signs

Historic Condition: Signs were not addressed on the Saarinen/Kiley concept plan. Temporary signs were located along Memorial Drive on the west boundary of the park during construction of the Arch.

A permanent NPS entrance sign was located on the western boundary of the park at Chestnut Street and Memorial Drive sometime after completion of the Arch. The sign measured 4' wide, 10' long and was painted grey with brown lettering. Similar signs were attached to the wrought iron fence surrounding the Old Courthouse at the northwest and southeast corners. The dates the signs were installed is unknown.

Existing Condition: Twelve new entrance signs were installed in September 1995. The signs measure 4' wide by 10' long; 4" x 4" posts are set in concrete footings. The signs are grey with brown lettering. They are located at every entrance to the park.

Analysis: Non-contributing.
The signs do not relate to the Saarinen/Kiley concept plan and therefore they are non-contributing. Although signs are functionally important, the existing ones detract from the character of the site and are somewhat intrusive. Development of a comprehensive signage plan is a priority for treatment.

Fences

Historic Condition: Fences were not addressed on the Saarinen /Kiley concept plan. Chain link fences were installed around the railroad tunnels and around the north and south service areas during the construction phases. The fences were 48" chain link. A 7' high chain link fence was installed around the maintenance facility when it was relocated during the second phase of construction.

Existing Condition: The chain link fences exist as implemented. The 7' fence around the maintenance facility is in good condition, it was replaced in 1993. Some of the other fences, particularly around the railroad tunnels, are in need of repair.[275] Some of the chain link is no longer tied to the posts and some of the posts are breaking out of the concrete wall. This creates a potentially dangerous situation, since the walls in some areas are 25' high.

Analysis: Non-contributing.
The fences do not relate to the Saarinen/Kiley concept, therefore they are non-contributing. However, they are functionally important for the safety and welfare of the public and are a high priority for treatment.

Joseph Pulitzer Plaque

Historic Condition: A memorial plaque commemorating the location where Joseph Pulitzer bought the *St. Louis Dispatch* on December 9, 1878 was placed on April 10, 1947 in the sidewalk on the east side of the Old Courthouse. The plaque was placed by Sigma Delta Chi, the National Professional Journalistic Fraternity.[276]

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[275]JEFF Gardener Supervisor Jim Jacobs, personal communication with author, December 14, 1995.

[276]U.S. Department of Interior. *List of Classified Structures*, prepared by Architectural Historian Dena Sanford, 1994.

Existing Condition: The plaque is in good condition. The plaque is bronze and measures 2' 4" x 1' 9". It is potentially affected by bad weather.

Analysis: Non-contributing.
Although the plaque was put in place during the period of significance, it does not contribute to the landscape significance of the memorial. The plaque does have other historic values and therefore it is listed on the List of Classified Structures.[277]

American Society of Civil Engineers Plaque

Historic Condition: The plaque, measuring approximately 2' x 11", is located on the south entrance to the underground visitor center. The plaque was awarded by the American Society of Civil Engineers in 1967 for "The Outstanding Civil Engineering Achievement."

Existing Condition: The plaque appears to be in good condition. It is potentially affected by bad weather.

Analysis: Non-contributing.
Although the plaque may have other historic value, it is not related to the Saarinen/Kiley landscape design and therefore it is non-contributing to the significance of the landscape.

Gateway Arch Plaque

Historic Condition: The Gateway Arch plaque was dedicated to the people of the United States by President Lyndon B. Johnson on May 25, 1968. This plaque commemorates the dedication and is located at the north entrance to the underground visitor center.

Existing Condition: The plaque appears to be in good condition. It is potentially affected by bad weather.

Analysis: Non-contributing.
Although the plaque may have other historic value, it is not related to the Saarinen/Kiley landscape design and therefore it is non-contributing to the significance of the landscape.

Lewis & Clark Plaques

Historic Condition: The overlook plaques were dedicated in memory of Lewis and Clark on August 24, 1973 by the Jefferson National Expansion Memorial Association. The plaques are 1' 6¼" x 1' 4¾" and are made of bronze. The plaque in memory of Meriwether Lewis was set into the south overlook bulkhead and the plaque in memory of William Clark was set into the north overlook bulkhead.

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[277]The List of Classified Structures (LCS) is an evaluated inventory of all historic and prehistoric structures that have archeological, historical, architectural, and/or engineering significance. The Joseph Pulitzer plaque, as well as some others at JNEM, are listed on the LCS as a contributing feature. It is important to note that some features have historic values not related to the landscape and therefore are considered "contributing" on the LCS and "non-contributing" in this Cultural Landscape Report because they do not contribute to the significance of the landscape at JEFF.

Existing Condition: The plaques are in good condition.

Analysis: Non-contributing.
Although the plaques may have other historic value, they are not related to the Saarinen/Kiley landscape design and therefore they are non-contributing to the significance of the landscape.

Luther Ely Smith Memorial Marker

Historic Condition: The Luther Ely Smith Memorial Marker was dedicated on April 12, 1985 to commemorate Luther Ely Smith, a local constituent who was instrumental in the development of Jefferson National Expansion Memorial.

Existing Condition: The Memorial Marker is in good condition.

Analysis: Non-contributing.
Although the plaque may have commemorative value, it is not related to the Saarinen/Kiley landscape design and therefore it is non-contributing to the significance of the landscape.

Saarinen Memorial Plaque

Historic Condition: The Saarinen Memorial Plaque did not exist during the period of significance.

Existing Condition: The Saarinen Memorial Plaque was placed in the sidewalk along Leonor K. Sullivan Boulevard in 1989 by the American Institute of Architects (AIA). The plaque is in good condition but is susceptible to damage from flood waters.

Analysis: Non-contributing.
Although the plaque may have other historic or commemorative value, it is not related to the Saarinen/Kiley landscape design and therefore it is non-contributing to the significance of the landscape.

1993 Flood Plaques

Historic Condition: The flood plaques did not exist during the period of significance.

Existing Condition: The 1993 Flood Plaques are set into the walls on the north and south sides of the grand staircase. The bottom of the plaques marks the height of the Mississippi River during the great flood of 1993. The plaques are in good condition.

Analysis: Non-contributing.
Although the plaques may have interpretive value, they are not related to the Saarinen/Kiley landscape design and therefore are non-contributing to the significance of the landscape.

Statement of Integrity

Integrity is the ability of a property to convey its significance. A property must not only be significant, but it must also have integrity. It is the combined effect of all of the landscape features that determines the overall integrity of the site. The National Register recognizes seven aspects or qualities of integrity: location, design, setting, materials, workmanship, feeling, and association.[278] To have integrity, a feature need not possess all of these qualities. The evaluation of integrity is somewhat subjective, but it must always be based on the physical form of the property in relation to its significance. At JEFF, this means that the existing physical form must relate to the conceptual design intent of the approved Saarinen/Kiley plan in one or more of these seven aspects.

As documented in the statement of significance, Jefferson National Expansion Memorial is significant for its commemoration of westward expansion as well as its architectural, engineering, and landscape architectural design and construction. Although all aspects of integrity are important, location, design, setting, and feeling are the most important aspects to consider in order to evaluate the integrity of JEFF.

The definition of all seven aspects of integrity and whether and/or why they relate to the integrity of JEFF follows. The Gateway Arch, a resource in itself and significant under National Register Criteria C: Design/Construction, retains high integrity in all seven aspects.

Location

"Location is the place where the historic property was constructed or the place where the historic event occurred."[279] JEFF retains high integrity of location. The aspect of location is very important to the integrity of JEFF. The park was established in St. Louis at the embarkation point of westward expansion, the very reason for the park's existence.

Design

"Design is the combination of elements that create the form, plan, space, structure, and style of a property."[280] Design, with the exception of location, is the most important aspect to consider when evaluating the integrity of JEFF. The park retains high integrity of design. It is the result of a design competition and the work of two masters in their professions. Although some change has occurred over time, their design concept is evident.

The site design developed by Eero Saarinen is evident in the park today. The layout and siting of the major walkways, structures, and buildings were relatively unaltered from his design. The curvilinear forms reflected in the railroad tunnels, walkways, and grand staircase were designed by Saarinen and are a primary example of his design philosophy—keeping within the same "curved form world."

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[278]U.S. Department of the Interior. *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation*. The bulletin was completed by the Interagency Resources Division of the National Park Service, U.S. Department of the Interior, 1990; revised 1991, 44.

[279]Ibid.

[280]Ibid.

The planting plan designed by Dan Kiley, which compliments Saarinen's site design, was intended to define and structure spaces with the use of a consistent number of plant species. Few tree species used in great numbers were meant to strengthen the site layout, create a sense of enclosure along the pedestrian walks, and create intimate spaces contrasted with vast spaces around the ponds. The forest versus meadow concept was integral to the landscape architect.

Although the planting design was altered and perhaps Kiley's intent is not as obvious as the site design, the planting plan is a relatively simple feature to recapture. The underlying form of his intent can be identified on the site today.

Setting

"Setting is the physical environment of a historic property."[281] JEFF retains high integrity of setting. The urban character of the surrounding environment has been retained and reflects the environment as it existed when the park was designed and built. Although materials and building styles have changed, the concept of open green space in the urban center reflects the intent of the original designers.

Materials

"Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property."[282] The JEFF landscape retains low integrity of materials. At the design development stage of the project details such as pavement materials are not usually identified as was the case with the design of JEFF. The existing materials were generally chosen by NPS staff and therefore do not reflect the intent of the original designer. However, the walk layout and spatial quality achieved with the use of these materials reflects the designer's concept and therefore the change in materials does not diminish the integrity of the park.

Workmanship

"Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory."[283] Workmanship is not as important for the evaluation of integrity for the JEFF landscape. Appropriate examples of workmanship did not characterize the site during the period of significance. Therefore, integrity of workmanship is not applicable to this site.

Feeling

"Feeling is a property's expression of the aesthetic or historic sense of a particular period of time."[284] Feeling is achieved when physical features are present and together they convey the original designers' intent. JEFF retains high integrity of feeling. The concept of a forested park in an urban setting is evident. The spatial quality resulting from the interaction of the walk layout and densely planted monoculture of Rosehill ash trees evokes a feeling of enclosure and creates a human scale contrasted with the immense scale of the Arch.

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[281]Ibid.
[282]Ibid.
[283]Ibid.
[284]Ibid.

Association

"Association is the direct link between an important historic event or person and a historic property."[285] Integrity of association is high and is a major part of the significance of this park. JEFF marks and commemorates the place where our country's expansion to the west began. The park is also directly associated with two master designers who played a major role in the modern movement of architecture and design. The park is a result of their vision and therefore it retains high integrity of association.

Summary

The overall integrity of the property is high. Because the site has integrity in five of the seven aspects discussed it retains its ability to convey its significance as a designed landscape. The documentation of the design intent, construction history, and the results of the site analysis will provide a basis for the preparation of treatment objectives and guidelines to be incorporated into the Resources Management Plan and General Management Plan for JEFF. The treatment of the property should aim to retain and enhance the character-defining features which reflect the design intent of Eero Saarinen and Dan Kiley, thereby increasing the integrity of design and feeling.

[285]Ibid.

Chapter VI: Treatment Recommendations

Introduction

The preceding chapters of this cultural landscape report discussed the history, significance, and integrity of the landscape of Jefferson National Expansion Memorial. The recommendations presented in this chapter are viable approaches for future management of the property and are intended to 1) preserve the character-defining features of the property which convey it's significance as a designed landscape, and 2) incorporate necessary safety and operational needs without compromising the integrity of the design. It is important to note that these recommendations are intended to be part of the future long term treatment plan and their implementation will directly depend on budgetary opportunities and other constraints of time.

There are four preservation treatments recognized by the Secretary of the Interior: preservation, rehabilitation, reconstruction, and restoration. These four approaches are defined in *The Secretary of the Interior's Standards for the Treatment of Historic Properties* (1992) and guidelines for their application are presented in *Guidelines for the Treatment of Historic Landscapes* (Draft 1992). Based on the definitions of the four treatment alternatives and the documentation and analysis of the character-defining features of the site, the recommended overall treatment for JEFF is rehabilitation.

The goal of rehabilitation is to preserve the portions or features of the property which are culturally significant and still allow for alterations and additions necessary to efficiently and safely operate the park. Within the framework of the primary treatment, recommendations for individual features of the landscape can be made.

This chapter begins with a brief look at the alternatives for the primary treatment and a discussion of why rehabilitation was chosen as the primary treatment of Jefferson National Expansion Memorial. A review of the significant character-defining features of the landscape is followed by general and specific treatment recommendations for all landscape elements. A full-scale plan depicting the recommendations made here is located in the back pocket of this report.

Alternatives for Treatment of the Cultural Landscape

Alternative 1: Rehabilitation, The Recommended Alternative

The general treatment strategy recommended for the Arch landscape is a "rehabilitation" treatment.

> Rehabilitation encourages improvements to a historic property that make possible an efficient contemporary use while preserving those portions or features of the property which are significant to its historical or cultural values. Archeological investigations may be required prior to replacement of missing historic features or projects involving new construction. In rehabilitation, the entire history of the landscape is retained for interpretation.[286]

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[286]U.S. Department of the Interior. *Guidelines for the Treatment of Historic Landscapes*, Draft. The draft was prepared by the Preservation Assistance Division of the National Park Service, U.S. Department of the Interior, 45.

After consultation with park managers and staff, and NPS landscape preservation professionals, rehabilitation was chosen as the most appropriate treatment for JEFF. This treatment allows future changes necessary to meet management needs and contemporary legal requirements while preserving the existing character-defining features. For example, accessibility issues can be addressed in a manner which is sensitive to the original design concept yet conforms with the Americans With Disabilities Act.

Rehabilitation will help meet the goal of preserving the original design concept envisioned by Eero Saarinen and Dan Kiley. It allows for the retention of some non-contributing features, such as some of the Memorial plaques and the trash receptacles, and allows limited replacement of some of the missing features that contributed to the design concept, such as the pedestrian overpasses. Detailed recommendations for the rehabilitation of the landscape begin on page 195.

Alternative 2: Preservation, Not Recommended

Preservation is not recommended as the treatment strategy for several reasons. The definition of "preservation" is as follows:

> The objective of this treatment is the retention and protection of the historic property's existing form, features, materials, and spaces. In addition to ongoing maintenance projects, preservation may include the repair and limited replacement of existing historic materials and features but does not allow for substantial replacement of missing features or new additions and alterations. Preservation as a treatment, allows for the interpretation of the evolution of the landscape, not just one historic period.[287]

Although at first glance preservation seems to be an appropriate treatment alternative for the JEFF landscape, particularly because the design and construction processes evolved over such a long period of time, this strategy is not a viable approach. It does not accommodate changes to meet contemporary needs or new legal codes, nor does it recognize the presence of intrusive features that detract from the historic character of the landscape. Preservation is basically a "no action" approach. This clearly does not conform to the concerns and needs of park management.

Alternative 3: Restoration, Not Recommended

Restoration is not recommended as the treatment strategy for many reasons. The definition of "restoration" is as follows:

> The goal of restoration is to depict the landscape as it appeared at an earlier time during its period of greatest significance. This is usually accomplished through the removal of later historic features constructed after the restoration period, or the addition of missing historic features in order to recreate the appearance of the landscape at a particular period of time. In this treatment, only the restoration period is interpreted.[288]

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[287]Ibid, 27.
[288]Ibid, 67.

Restoration of the landscape is not an appropriate treatment alternative because the landscape retains much of its integrity. Since the goal of restoration is to depict the landscape as it appeared at an earlier time, and this landscape already depicts the Saarinen/Kiley vision, this alternative is clearly not appropriate.

Alternative 4: Reconstruction, Not Recommended

The treatment of reconstruction is appropriate only when all or most of the integrity of the landscape is lost. Since the JEFF landscape retains much of its integrity, and still reflects the Saarinen/Kiley vision, reconstruction cannot be considered a viable approach.

Significant Features

The most significant character-defining features of the approved Saarinen/Kiley concept plan must be preserved while adapting the site to meet contemporary operational and safety needs. A complete list of the individual character-defining features and their significance can be found in Appendix C. An overview of the these characteristics follows:

- The overall site design and landscape setting as developed by Eero Saarinen. The arrangement of the circulation system, placement of buildings and structures, and the subtle use of the curved form reflecting the curve of the Arch are very important overall design features attributed to the hand of Saarinen.

- Topography. The subtle disguise of the park operations areas (Shipping and Receiving, Heating, Venting, and Air Conditioning, and Ground Maintenance) and the railroad tracks was purposefully and artistically conceived by Saarinen.

- Views to and from the Arch. These include the view from the Old Courthouse to the Arch, from the Arch to the Old Courthouse, and from the north-south axis to the Arch. The view from East St. Louis is also important and will be more highly recognized and appreciated when the east side development is completed.

- Monoculture planting and spacing. The use of a single tree species to line the walks reflects the simplicity of the Arch and strengthens the curvature of the pedestrian circulation system. The close spacing of the trees creates a closed overhead canopy lending a sense of enclosure and human scale to the pedestrian spaces in contrast to the verticality and monumentality of the Arch. The simplicity and magnificence of this feature is perhaps the most significant landscape feature and can be attributed to the hand of Dan Kiley.

- Plant composition and open space. The use of a limited number of tree species to define spaces and reflect the "forest versus meadow" concept envisioned by Saarinen and Kiley from the beginning of the design competition is important to enhance.

The recommendations presented below are organized in much the same manner as the preceding chapter (topography, spatial organization, views and vistas, etc.). General recommendations regarding the overall management of the property are followed by specific recommendations related to each of the significant character-defining features.

General Recommendations

- Maintain all existing character-defining features by practicing active preservation maintenance.[289]
- Amend the 1977 National Register of Historic Places — Nomination Form, Jefferson National Expansion Memorial to reflect the significance of the cultural landscape and its features as identified in this Cultural Landscape Report.
- Continue to work closely with Fair Saint Louis. Prepare and distribute written guidelines which outline specific procedures and requirements to be followed by the Corporation, vendors, and construction subcontractors associated with the annual event to protect the landscape.
- Discuss and negotiate the possibility of setting up a revolving fund account for the long term maintenance of the features affected by the annual Fair Saint Louis over time (replacing sidewalks, aeration and soil amendments for the turf areas).
- Continue to study the possibilities of improving accessibility into the Arch visitor center via the existing ramps and entrance doors. Consider hiring architects from the former firm of Eero Saarinen & Associates to study the problem (Kevin Roche, Bruce Detmers, and Bob Burley) and offer design alternatives.[290] Conduct further study of the need and feasibility of providing transportation to visitors from parking areas to the Arch.
- Consider hiring Dan Kiley to complete some of the specific recommendations outlined below to meet the goal of rehabilitating the landscape.[291]
- Consider hiring a consultant to prepare a Cultural Landscape Report for the landscape surrounding the Old Courthouse.

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[289]Preservation maintenance refers to the techniques used to preserve character-defining features. Under the treatment of rehabilitation, it is appropriate to recommend preservation maintenance for those portions or features of the property which are significant to its historical or cultural values. An active preservation maintenance program uses techniques which cause the least disturbance of the feature or surrounding landscape.

[290]Contact Roche-Dinkeloo & Associates, 20 Davis Street, Hamden, Connecticut, 06517.

[291]Dan Kiley still practices and resides in Charlotte, Vermont. He can be reached by telephone at (802) 425-3288, or by mail at East Farm, Charlotte, Vermont 05445.

- Continue researching the types of visually-linked database systems that could be used to record an inventory and condition assessment program for all character-defining features.[292] Consider hiring a consultant to set up the desired program and train the appropriate staff so they could efficiently update the data and record work completed.

- Pursue the acquisition of original drawings from the former offices of Eero Saarinen & Associates relating to the Gateway Arch for preservation in the JNEM Archives.[293]

- Continue to pursue the development of an Integrated Pest Management Plan to accompany the recommendations for tree and turf maintenance identified in this Report.

- Consider updating park planning documents by incorporating information presented in this Report.

Specific Recommendations

Topography & Drainage

- The artistic grading of the landform is clearly a contributing feature. During the process of eliminating drainage problems along the west sides of the railroad cut walls and along the pedestrian sidewalks, the impacts of any solutions on the overall grading of the site should be fully investigated before implementation.

Recommended Action: The overall topography should be maintained. Any changes should be compatible with the original design concept of disguising incompatible uses from visitor use areas. The essential form and integrity of the landform should not be compromised.

Suggestions for Future Design: Eliminating the drainage problem along the west side of the railroad cuts is very important for the preservation of the retaining walls, which are significant. It is also important to maintain amicable relations with the Terminal Railroad Association (TRRA) since they have a perpetual easement through NPS property. It is recommended that a cap be installed on the walls using the materials originally proposed or a compatible material, and low shrubs and groundcover be planted on the slopes to mitigate erosion and eliminate the need for mowing. A concrete drainage swale could be constructed along the wall if necessary. The important aspect of any project in this area is to maintain the general topography and landform. The railroad cut walls should not be altered to mitigate the flow of runoff over the walls (with the exception of installing a cap as originally proposed). Original designs, located in the JNEM Archives, should be consulted and future designs should be compatible with the original.

Eliminating drainage problems along the sidewalks is important for several reasons, including preserving the edge and footing of the sidewalks and deterring soil erosion. It is recommended that this be accomplished in one of two ways. 1) Install cobblestones or a compatible material around the trees and as a 2' border along the

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[292]Several visually oriented data management systems were researched for the purposes of this report. These include: Aperture, NPS Inventory and Condition Assessment Program (ICAP), and AutoFM. The author experimented with a pen-based computer using ICAP and this seemed very useful. The search was not exhaustive nor was a particular program deemed definitely suitable for this park. The matter should be researched further and several management systems should be tested. Finally, a program should be chosen and implemented to meet the needs of the park.

[293]Contact Kevin Roche and John Dinkeloo & Associates, 20 Davis Street, Hamden, Connecticut, 06517.

walks as originally proposed by Kiley. This detail can be modified to create a curb along the walk, or 2) Create a shallow, or low impact drainage swale along the walks. Original designs, located in the JNEM Archives, should be consulted and future designs should be compatible with the original.

Spatial Organization

- The spatial organization of the park is based on the axial arrangement of the Old Courthouse and the Arch. Features such as vegetation, road and pedestrian sidewalks, and topography all help to define outdoor landscape spaces which evoke a feeling and contribute to the visual relationships on the site. The spatial organization must be retained and, in some areas, enhanced.

Recommended Action: The spatial organization should be maintained. This will be addressed more specifically in the recommendations for plantings and circulation. The visual connection between the Old Courthouse and the Arch, and the open expanse of lawn should be maintained without obstructions to preserve the spacious, grand feeling intended by the designers. In contrast, the north-south axis, defined by the pedestrian sidewalks, should be maintained as an enclosed, human-scale space. The Rosehill ash monoculture planting contributes greatly to the feeling of the space and management of the planting will be discussed in more detail later in this chapter.

Suggestions for Future Design: The area where the spatial organization departs from the original intent most severely is around the ponds. Since the topography in this area has been maintained, and there is no hard circulation system, this departure can be attributed to the relationship between the plant composition and open space. More appropriate groupings of plants, as well as a less diverse plant palette, will help to restore the spatial organization originally intended for these areas. Again, specific recommendations regarding the plant material will be addressed later in this chapter.

- Luther Ely Smith Square is part of the overall spatial organization and forms an important connection between the Arch and the Old Courthouse. The design of Luther Ely Smith Square should be enhanced to visually and physically connect the two incontiguous portions of the park.

Recommended Action: Retain the spatial definition as created by the rows of sweetgum trees and crabapple trees and retain the openness of the center of the square by maintaining low planting beds.

Suggestions for Future Design: As funding becomes available to construct pedestrian overpasses as originally proposed by Saarinen (which will be discussed in more detail later in this chapter), the design of Luther Ely Smith Square will change dramatically. It should be a raised plaza where the pedestrian overpasses terminate. Sidewalks, plant material, and site furnishings in Luther Ely Smith Square should be compatible with existing materials on the Arch grounds. The square should ultimately be defined by two pedestrian overpasses (one on the north side and one on the south side) and by two rows of trees matching the species used for the monoculture planting on the Arch grounds.

Views & Vistas

- The design of the Arch grounds is centered on the axial arrangement of the Arch and Old Courthouse. This strong physical connection created a very important vista between the old and new structures.

The great expanse of lawn beneath the Arch accentuates this connection. Specific views and vistas were designed to enhance the visitor experience.

Recommended Action: The view from the Old Courthouse to the Arch should be protected to the extent possible.

- The north-south axis of the Arch and the use of closely spaced trees on this axis creates significant contributing views of the Arch from the north and south teardrops that should be maintained.

Recommended Action: The views from the north and south ends of the site toward the Arch should be maintained. The lawn areas should remain free of vegetation and furnishings to provide an open view, framed by the monoculture planting, of the Arch.

- Views toward the Arch from around the north and south ponds, although less controlled than those from the axes, are significant and contributing and therefore should be maintained.

Recommended Action: Preserve the random glimpses of the Arch from around the ponds by maintaining the existing topography and by following the specific recommendations regarding vegetation outlined later in this chapter.

- Views toward the Arch and city from East St. Louis are significant contributing features and should be enhanced to the extent possible.

Recommended Action: As lands on the east side are purchased and planning begins, views from the east riverfront toward the Arch should remain unobstructed. Early concepts for the east side extension should be referenced during the planning process and should be considered to the extent possible.[294]

Buildings & Structures

- The Arch, Old Courthouse, visitor center and Museum of Westward Expansion, North and South Overlooks, and railroad cut walls are all significant contributing features.

Recommended Action: Maintain these structures pursuant to National Park Service policies on historic preservation.

Suggestions for Future Design: Any future design/construction on the park grounds should not adversely affect these significant buildings and structures.

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[294]The east side expansion plans (past and present) were not researched in detail for this report. Material regarding the east side expansion can be found in various collections located in the JNEM Archives.

- The maintenance building was constructed as a five-year, temporary structure which is now 22 years old. The building is deteriorating and does not meet the needs of the park grounds maintenance division.

Recommended Action: Replace the maintenance building with a larger, permanent facility.

Suggestions for Future Design: The new maintenance building should be located in the vicinity of the existing building. The building should be a one-story, earth-tone structure which will be disguised from visitors by the surrounding topography and vegetation, its height, and its color.

- The north and south open cut railroad tunnels are significant contributing features and should be maintained.

Recommended Action: Conduct a thorough condition assessment of these features.

Suggestions for Future Design: Study design alternatives to eliminate the drainage and erosion problem to the west side of the walls which will ultimately adversely affect these important features (if the adverse affect has not already occurred). Consider hiring Dan Kiley and/or architects from the former office of Saarinen & Associates, as discussed earlier, to study and implement the most appropriate design solution to eliminate the problem while preserving the contributing features.

Mechanical Systems

- The underground sprinkler system is not a contributing feature but it is important for keeping the turf and plant material healthy.

Recommended Action: Conduct an irrigation audit to investigate current water usage and record deficiencies. Based on the results of the audit, modernize the system to optimize water usage and efficiency.

Suggestions for Future Design: Re-design the system separating zones according to usage (i.e.: lawn, shrubs, trees in walks). Establish a cyclic replacement schedule for valves, heads, water lines, and automation clocks to maintain optimum quality and efficiency of the system.

Site Engineering Systems

- The tree grates are a non-contributing feature and they create hazardous conditions.

Recommended Action: Remove the tree grates.

Suggestions for Future Design: Replace the tree grates with pavers or other appropriate material.[295] The

[295]Dan Kiley interview with Gina Bellavia, Mary Hughes, and Gregg Bleam, June 13, 1996 (transcript on file in JNEM Archives). Mr. Kiley suggested removing the tree grates and planting groundcover in their place. This is not considered a feasible solution because of the maintenance involved in keeping the groundcover from spreading into the lawn area. Also, the grouncover would not only need to tolerate the difficult growing conditions but would also have

replacement material should contrast with the walk pavement in color and texture but also allow air exchange in the soil.

Pavers are the preferable replacement material. They should be natural looking such as cobblestones, not refined like brick or interlocking pavers, and should be installed in a manner similar to the original design detail.[296] A good material may be solid pavers that have the same color and texture as cobblestones but they are 3 ⅝" x 3 ⅝" x 7 ⅝" high. These should be set vertically, in the sailor position, and wide joints should be left between them to optimize air exchange. If desired, a two foot strip of the same pavers could be installed on the outside border of the sidewalks to reflect the original design. Implementation of this strip could help solve the drainage problem along the walks as discussed above. The strip could be raised to form a curb which would direct the runoff to a drain, or a drainage system could be incorporated along the walks in and underneath the pavers.

- The retaining walls located near the service entrances (SHIPREC and HVAC) are non-contributing but are functionally important to maintain the existing landform.

Recommended Action: Maintain the retaining walls according the NPS policies and standards.

Vegetation

- The monoculture planting is a significant contributing feature and should be maintained according to NPS policies and standards.

Recommended Action: The Rosehill ash monoculture should be maintained in a healthy state by accepted fertilizing, watering, and pruning practices. Because a monoculture planting is horticulturally a risky approach, the planting should be closely monitored for ash yellows, ash borer, and all other insects and diseases. The spacing of the trees should be faithfully maintained.

It is important to note here that the original planting concept is important and not the individual plants. It is not recommended to take extraordinary measures to preserve individual plants, particularly because they are growing in poor urban conditions. But, it is important to maintain the monoculture concept and therefore replacement in-kind when plants deteriorate is recommended.[297]

Suggestions for Future Design: When the trees deteriorate to the point of being hazardous or losing their natural form, they should be replaced in-kind. If, in the future, there is a serious problem with the monoculture planting (ie: an infestation of ash borer endangering a large percentage of trees) the trees should be replaced with an appropriate substitute tree species. The species should be tolerant of urban conditions, relatively pest and disease free, and should be aesthetically comparable (form, texture, height) to the originally proposed tulip

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to withstand heavy foot traffic.

[296]See drawing number JNEM 3027. Copy on file in the JNEM Archives, Record Unit 120. The installation of pavers will have to be coordinated with the tree replacement program since existing trees and roots will not allow their proper installation now. A landscape architect should design construction details for tree planting and paver installation.

[297]Whether a tree is "deteriorated beyond repair" or not is somewhat subjective. The Gardener Supervisor should make a professional judgement regarding the extent of deterioration of a tree and ultimately decide if and when removal and replacement is necessary.

poplar tree.[298]

An appropriate replacement program should be developed by a qualified landscape architect, horticulturist, or arborist. Experimentation with species alternatives and replacement patterns is encouraged until a program is agreed upon. The following three alternatives should be considered:

> (1) Replace trees in the sidewalks (any tree surrounded by a tree grate, cobblestones, or exposed aggregate sidewalk) in-kind as they deteriorate beyond repair. Do not replace trees in the outside rows as they deteriorate but rather, wait until at least five adjacent trees need to be replaced and replace then in groups of five or more.
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> (2) Replace any monoculture tree in-kind as it deteriorates beyond repair (whether inside or outside the sidewalk).
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> (3) If the monoculture species is to be changed, develop a replacement pattern that has a specific rhythm. For example, starting at the Arch legs, replace the first twenty trees with the new species, leave twenty of the original species, replace the next twenty with the new, leave the next twenty, and so on. Two to five years later replace the remaining original species with the new species, always maintaining a rhythmic pattern.[299]

If the need and funding becomes available to replace the entire monoculture planting, with Rosehill ash or a substitute species, their replacement should be coordinated with replacement of deteriorated sidewalks. At such time, the planting pits should be made larger (using the entire space beneath the sidewalk) and the appropriate soil amendments and drainage material incorporated.

- The bald cypress circles are significant contributing features and should be maintained according to NPS policies and standards.

Recommended Action: Maintain the bald cypress trees in a healthy state by accepted fertilizing, watering, and pruning practices.

Suggestions for Future Design: When the bald cypress trees deteriorate to the point where they lose their natural form or become hazardous, they should be replaced in-kind in the same location or very near to their original planting pit.

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[298]Dan Kiley interview with Gina Bellavia, Mary Hughes, and Gregg Bleam, June 13, 1996 (transcript on file in the JNEM Archives). Mr. Kiley suggested the tulip poplar, London planetree, gingko, honeylocust, or Eastern cottonwood as possible replacements for the Rosehill ash. The monoculture species should be fast-growing, tall, and deciduous. These characteristics should be balanced with maintenance concerns such as availability, resistance to insects and disease, and soil adaptability.

[299]A rhythmic replacement program was suggested by Dan Kiley in an interview with Gina Bellavia, Mary Hughes, and Gregg Bleam, on June 13, 1996 (transcript on file in the JNEM Archives).

- The plant composition and open space is non-contributing and should be enhanced to reflect the original design concept.

Recommended Action: Discontinue replacing *all* trees with the same or substitute species as they become deteriorated beyond repair.

Suggestions for Future Design: Limit the plant palette to approximately 16 tree species. Group the plant material in a manner similar to the original design, contrasting dense plantings to mimic the "forest" with open areas to mimic the "meadow."[300] Maintain the basic concept of planting canopy trees closely together with flowering trees on the edges. A large, deciduous canopy tree should dominate the "forest" with flowering trees and other smaller canopy trees interplanted.[301]

Maintaining a limited number of large tree species to dominate the forest canopy with a limited number of flowering species to add interest of color and texture is critical. Native species of trees, shrubs, and groundcover are preferred.

- The railroad tunnel plantings are non-contributing and should be enhanced to reflect the original design concept.

Recommended Action: Maintain existing plant material in a healthy state by accepted fertilizing, watering, and pruning practices. When funds become available, re-plant this area to reflect the original design.

Suggestions for Future Design: The basic concept of the plantings around the railroad tunnels was to hide the railroad tracks. This area should be replanted to perform this function. An evergreen tree suitable for screening should dominate this area.[302] Flowering trees (species taken from the limited plant palette suggested above) should be interplanted to provide interest. Plant beds should be formed along the steep slopes and planted with groundcover. Original designs, located in the JNEM Archives, should be consulted and future designs should be compatible with the original material and concept.

- The plantings around the service areas are contributing but should be further enhanced to reflect the original design concept.

Recommended Action: Maintain the original concept of screening the service areas from visitors.

Suggestions for Future Design: Replace the black pine around the maintenance area with a similar species capable of performing a screening function (the same species should be used for the screening function

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[300]Refer to the original landscape design approved by the NPS in 1966. Copy on file in the JNEM Archives, Record Unit 120, drawer 12, folder 10, Drawing number 3071C.

[301]Dan Kiley interview with Gina Bellavia, Mary Hughes, and Gregg Bleam, June 13, 1996. Transcript on file in the JNEM Archives. Mr. Kiley suggested that the Red Oak (Quercus rubra) as the dominant canopy tree because it is found in the native Missouri forest. This decision should also be balanced with aspects such as availability, culture, sun and soil preference, and resistance to insects and disease.

[302]Ibid. Mr. Kiley suggested using the loblolly pine (Pinus taeda) or pitch pine (Pinus rigida) to replace the black pine which generally does not perform well on the site. Aspects such as local availability, culture, sun and soil preference, and resistance to insects and disease should be considered.

throughout the site). Groundcover, preferably Bulgarian ivy as originally proposed, should be replanted on the slopes around the maintenance building. Other plant materials, specifically the shrubs around SHIPREC and HVAC service entrances, should be replaced in-kind.

- Lawn areas are more spatially important than vegetatively important. Lawn areas were meant to represent the "meadow" in the original design concept. Although these areas are important, all lawn areas do not need to be maintained as class A turf. The "Arch grounds seed mix" is not significant and can be altered or its use discontinued.

Recommended Action: Maintain the lawn underneath the Arch and in the north and south teardrops and triangles as class A turf according to the current NPS turf classification system. Consider placing less emphasis on the quality of the turf under the trees and around the ponds. These areas could have a coarser appearance to reflect the "meadow" concept.

Suggestions for Future Design: Alter the grass species to meet the current needs and standards of the park. Use different grass species in areas with different conditions. For example, use creeping red fescue in shady locations and use bluegrass varieties in sunnier locations. The bluegrass variety 'Rugby' tolerates foot traffic well and may be considered for those areas susceptible to heavier traffic (along side the walks). Consider consulting a turf specialist to develop a turf development and maintenance plan to meet the needs of the park. The maintenance plan should be more rigorous and include routine aerating and soil amendments, particularly in the Class A areas, to counter the damage done by compaction, particularly as a result of the Fair Saint Louis.

- A double row of trees lining Luther Ely Smith Square was meant to form a strong visual and physical connection between the Old Courthouse and the Arch grounds. The plantings in Luther Ely Smith Square should be enhanced to reflect the original design concept.

Recommended Action: As the sweetgum trees deteriorate they should be replaced with Rosehill ash trees or the monoculture tree species at the time. The inner row of crabapple trees should not be replaced but rather a second row of Rosehill ash trees (or alternate monoculture species matching that of the Arch grounds) should be planted to physically and visually connect and reflect the monoculture planting on the Arch grounds. The original plan approved by the NPS should be referenced for the plant spacing and concept.[303]

- The planting around the Arch parking garage is non-contributing and should be re-designed using the same tree and shrub species found elsewhere on the site.

Recommended Action: Replace trees and shrubs around the garage with species that are locally available and perform well in the existing urban site conditions. The planting concept should be to screen the garage from the remainder of the park. The steep slopes around the garage which are difficult to maintain should be planted with shrubs and groundcover.[304]

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[303]Ibid.

[304]The plantings chosen for this purpose should reflect those used for the same purpose throughout the site.

Circulation

- The exposed aggregate pedestrian sidewalks are significant contributing features and should be maintained according to NPS policies and standards. The circulation system forms the framework for the landscape design and should not be altered.

Recommended Action: Replace deteriorated sidewalks with exposed aggregate concrete (in-kind) as needed. The size and color of the aggregate and concrete should be consistent and should match the existing sidewalk material. Dividers at construction joints (2" x 6" treated redwood) should be replaced simultaneously.

Suggestions for Future Design: When funding becomes available, large portions of the sidewalks should be replaced on an appropriate replacement program. This program should be coordinated with replacement of the trees in the sidewalks. The tree planting pits should be extended underneath the sidewalks from edge to edge. Appropriate soil amendments and drainage materials should be installed prior to sidewalk replacement.

Construction of new sidewalks and paths is not recommended because they would alter the framework of the original landscape design and have an affect on the spatial quality, views, and visitor experience.

- The grand staircase is a significant contributing feature and should be maintained according to NPS policies and standards.

Recommended Action: Maintain the existing portions of the grand staircase. If the steps deteriorate, replace with compatible materials matching the color, aggregate, and specifications.

Suggestions for Future Design: Complete the grand staircase as originally proposed by Eero Saarinen by connecting the two non-connected north and south sections. Materials and design specifications should be compatible with the existing feature.

- The Old Cathedral parking lot is a contributing feature and should be maintained according to NPS policies and standards.

Recommended Action: Maintain the existing parking lot.

Suggestions for Future Design: The size and location of the parking lot is conceptually important. If there should be a need to redesign the lot, it should be in the same location and the same size. Materials should be comparable and colors should be natural tones so they don't become intrusive, particularly visually intrusive from the top of the Arch.

- The Old Cathedral sidewalk is non-contributing but is functionally important for visitor access from the Old Cathedral parking lot and therefore should be maintained.

Recommended Action: Maintain the sidewalk. If the sidewalk deteriorates beyond repair, it or sections of it should be replaced. If only sections of it are replaced, they should be replaced in-kind. If the entire walk requires replacement at one time, the material can be changed but it should be a natural tone concrete or exposed aggregate. The sidewalk can be widened if necessary but the width should be comparable with the

width of other on-site pedestrian walks.

- The interior roads to the service areas (SHIPREC and HVAC) are non-contributing features but they are functionally important for park operations and should be maintained.

Recommended Action: Maintain the existing service roads according to NPS policies and standards.

Suggestions for Future Design: The roads should not be altered to the extent of becoming intrusive features.

- The exterior roads are contributing features because they define the original and existing boundaries of the park. The pedestrian overpasses proposed to bridge the Arch and the Old Courthouse over Memorial Drive should be constructed.

Recommended Action: Initiate and maintain a good working relationship with the city highway department to ensure that the roads and curbs are maintained. Deteriorated roads and curbs are replaced promptly to ensure the safety of visitors and motorists. The city should be encouraged to provide curb cuts at the intersections of Memorial Drive and Chestnut and Market Streets so that handicap visitors can safely cross from the Arch to the Old Courthouse.

Suggestions for Future Design: When funding becomes available, two pedestrian overpasses should be constructed to connect the Arch grounds with the Old Courthouse and city. The concept for the overpasses was conceived by Eero Saarinen and studied by his associates and by the local firm of Harland Bartholomew.[305]

The pedestrian overpasses should be compatible with the original Saarinen concept. Consider hiring Kiley and/or former associates of Eero Saarinen to design the pedestrian overpasses.

- The parking garage is a contributing feature to the overall design concept and should be maintained.

Recommended Action: Maintain amicable relations with Bi-State Development Agency and encourage appropriate and prompt maintenance of the Arch parking garage. If replacement of the amur maple (Acer ginnala) trees located in the planters on the top deck of the garage becomes necessary, replace with a species that can tolerate hot, dry conditions and live in a very limited planting space. If a plant species already used on-site can tolerate these conditions, that species should be considered to maintain a limited plant palette.[306]

Suggestions for Future Design: The concept of the garage, its' location, size, and height are important aspects to maintain. The materials and design details are less important to maintain. Height additions to the garage would be intrusive to the cultural landscape and are therefore not acceptable. If more parking becomes necessary in the future it will have to occur off-site.

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[305]The studies produced by Eero Saarinen and Associates and the design produced by Harland Bartholomew and Associates are on file in the JNEM Archives, uncatalogued collection. These studies should be consulted when funding for the overpasses becomes available. The overpasses should conform with original proposal in that there should be two, they should begin on the Arch grounds and terminate in Luther Ely Smith Square.

[306]Dan Kiley, interview with Gina Bellavia, Mary Hughes, and Gregg Bleam, June 13, 1996 (transcript on file in the JNEM Archives). Mr. Kiley suggested using the Sargent Crabapple. Aspects such as local availability, culture, sun and soil preference, and resistance to insects and disease should be considered.

Water Features

- The north and south ponds are significant contributing features and should be maintained.

Recommended Action: Maintain the existing ponds according to accepted NPS policies and standards.

Suggestions for Future Design: Design alternatives for the installation of an aeration system for both ponds should be studied and implement to mitigate the algae problem.

- Fountains on the north and south axis of the Arch (in the north and south triangles) would further enhance the design concept.

Recommended Action: When funding becomes available, fountains and pedestrian "plazas" at the north and south triangles should be constructed to reflect the original design concept.

Suggestions for Future Design: A low, bubbling type fountain should be designed and constructed at the north and south triangles. These areas should be paved with cobblestones or a compatible material. Benches, compatible in design and materials with the existing benches, should be grouped at these "plazas."[307] Consider hiring Dan Kiley to design these pedestrian plazas.

Furnishings & Objects

- The concrete benches are significant contributing features and should be maintained according to NPS policies and standards.

Recommended Action: Maintain the benches according to NPS policies and standards.

Suggestions for Future Design: If the benches deteriorate beyond repair or if funding becomes available, replace the concrete bench tops (the seat) with local limestone, stone, or slate.[308] If additional benches are necessary, they should be compatible with the originals in design, color, texture, and material.

- The light standards are non-contributing features but are functionally necessary for the safety of employees and visitors.

Recommended Action: Maintain the existing light standards and fixtures as necessary.

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[307]Ibid. Transcript on file in JNEM Archives. Mr. Kiley suggested a low-bubbling fountain in the center of a paved pedestrian plaza.

[308]Ibid. Mr. Kiley suggested the change to the benches which conforms with Saarinen and Kiley's original design for benches on the levee. See drawing number SD14 Details, JNEM Archives, Record Unit 120, drawer 23, folder 7.

Suggestions for Future Design: If replacement of the existing light standards becomes necessary in the future, they should be replaced with a more contemporary style to be more in keeping with the original Saarinen design.[309]

- The trash receptacles are non-contributing, but are functionally necessary features.

Recommended Action: Replace the existing trash receptacles with uniform, modern substitutes. The receptacles should be carefully placed so as not to be visually intrusive.

- The drinking fountains are non-contributing, but are necessary features for the comfort of the visitors. The existing fountains do not meet Americans with Disabilities Act (ADA) standards.

Recommended Action: Replace the existing drinking fountains with uniform, modern substitutes which meet ADA standards and maintain them in operating condition.

- The information kiosk is non-contributing but it is an important directional tool to guide visitors to the site.

Recommended Action: Utilize the kiosk to the greatest benefit to the park. Continually update information and post special events occurring at both the Arch and the Old Courthouse. Consider providing information about local eating establishments, alternative public transportation, and accommodations.

- The NPS entrance signs are non-contributing but are important features identifying the park as part of the National Park Service.

Recommended Action: If replacement of the entrance signs becomes necessary in the future, they should be replaced with uniform, modern substitutes that are not visually intrusive.

Suggestions for Future Design: Prepare a comprehensive signage plan which identifies appropriate size, font, color, style, and locations for all types of signs needed on site. Consider installing wayside exhibits which identify the importance of the landscape and some of the significant character-defining features. Consider hiring Dan Kiley or an architect from the former office of Eero Saarinen & Associates (identified earlier in this chapter) to prepare a signage plan.

- The chain-link fences are non-contributing features but are necessary for the safety and security of employees, visitors, and NPS equipment and vehicles.

Recommended Action: Perform bi-annual condition assessments of the chain-link fences and replace with uniform, heavy-gauge (11) galvanized steel wire mesh and galvanized steel posts and rails in-kind as necessary.

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[309]Consult Bega, Catalog Number Six, page 167 for an appropriate style light fixture. This catalog and style was recommended by Dan Kiley in an interview with Gina Bellavia, June 13, 1996. A copy of the Bega catalog is on file in the JNEM Archives, uncatalogued collection.

Suggestions for Future Design: Consider planting vines at the base of the fences to provide additional screening of the railroad tracks if shrub and groundcover plantings are not implemented as recommended earlier (page 197).[310]

- The memorial plaques (Saarinen, Luther Ely Smith, Joseph Pulitzer, Lewis and Clark, and 1993 Flood) are non-contributing to the significance of the landscape but have other historic and interpretive values as memorials.

Recommended Action: Maintain the memorial plaques in place.

[310]Dan Kiley interview with Gina Bellavia, Mary Hughes, and Gregg Bleam, June 13, 1996 (transcript on file in the JNEM Archives). Mr. Kiley suggested planting vines on the fence to screen the railroad tracks. If shrub beds are planted along the slopes on the west side of the tracks as originally proposed, the planting of vines will not be necessary as the incompatible function will already be screened from view. If those plantings are not completed, the vines to consider for this purpose as suggested by Mr. Kiley are as follows: Virginia Creeper (Parthenocissus quinquefolia), Boston ivy (Parthenocissus tricuspidata), English ivy (Hedera helix), and honeysuckle (Lonicera fragrantissima). The decision to plant vines should be balanced with maintenance and management concerns such as availability, resistance to disease and insects, existing site conditions, and level of maintenance required.

GENERAL RECOMMENDATIONS:

MAINTAIN ALL EXISTING CHARACTER-DEFINING FEATURES BY ACTIVE PRESERVATION MAINTENANCE.

AMEND THE 1977 NATIONAL REGISTER NOMINATION TO REFLECT CULTURAL LANDSCAPE RESOURCES.

MAINTAIN EXISTING TOPOGRAPHY TO THE EXTENT POSSIBLE.

MAINTAIN EXISTING OVERALL SITE DESIGN INCLUDING CIRCULATION, PLACEMENT OF BUILDINGS, & SPATIAL QUALITY TO THE EXTENT POSSIBLE.

MAINTAIN MONOCULTURE PLANTING & SPACING.

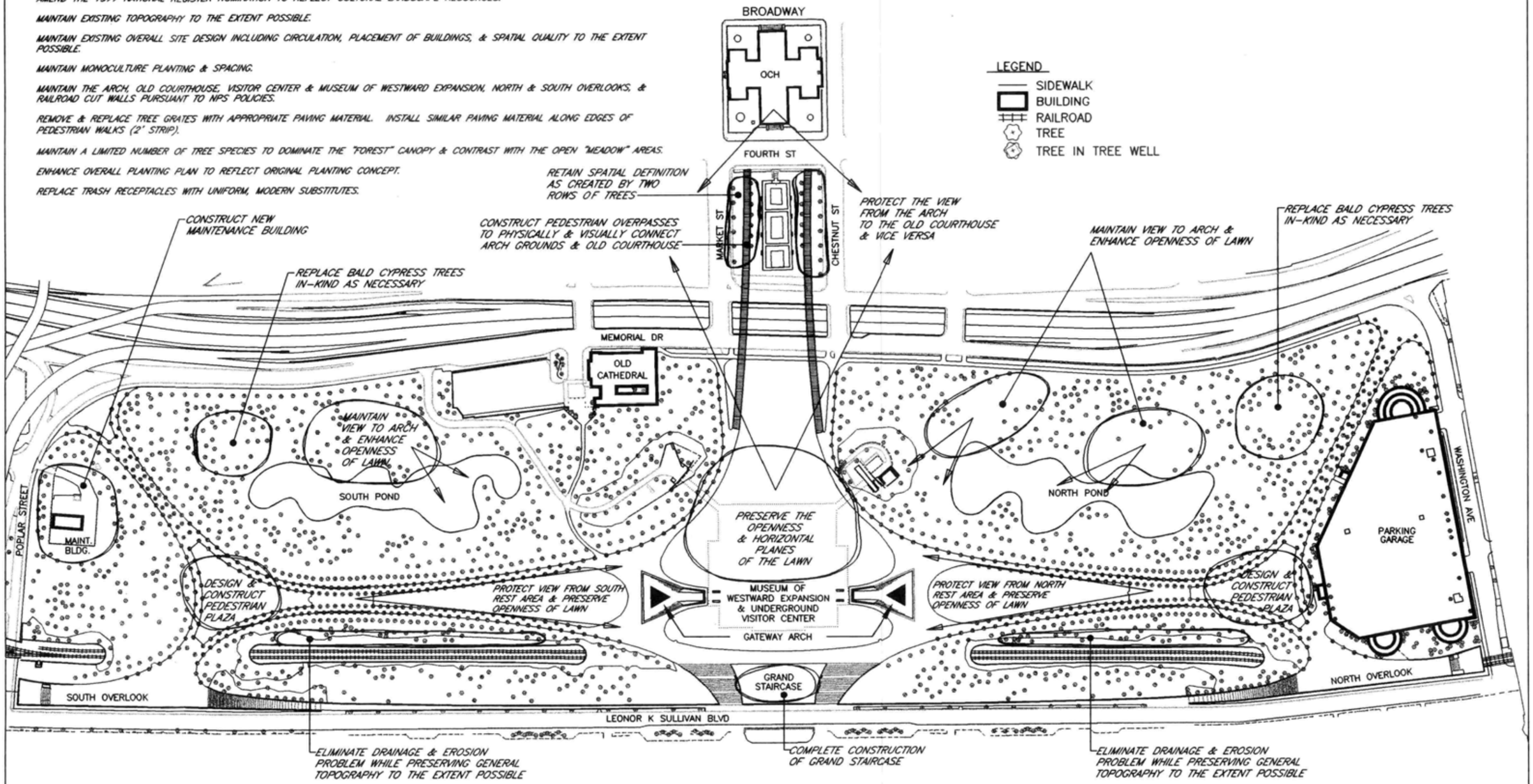
MAINTAIN THE ARCH, OLD COURTHOUSE, VISITOR CENTER & MUSEUM OF WESTWARD EXPANSION, NORTH & SOUTH OVERLOOKS, & RAILROAD CUT WALLS PURSUANT TO NPS POLICIES.

REMOVE & REPLACE TREE GRATES WITH APPROPRIATE PAVING MATERIAL. INSTALL SIMILAR PAVING MATERIAL ALONG EDGES OF PEDESTRIAN WALKS (2' STRIP).

MAINTAIN A LIMITED NUMBER OF TREE SPECIES TO DOMINATE THE "FOREST" CANOPY & CONTRAST WITH THE OPEN "MEADOW" AREAS.

ENHANCE OVERALL PLANTING PLAN TO REFLECT ORIGINAL PLANTING CONCEPT.

REPLACE TRASH RECEPTACLES WITH UNIFORM, MODERN SUBSTITUTES.



North

SCALE: 1" = 240'

240 0 240 480

MAP SOURCE: 1995 KUHLMANN DESIGN GROUP; 1995 TREE INVENTORY & CONDITION ASSESSMENT

CULTURAL LANDSCAPE REPORT:
JEFFERSON NATIONAL EXPANSION MEMORIAL
PRESERVATION TREATMENT RECOMMENDATIONS

SAINT LOUIS, MISSOURI

DRAWN: CHAN	DRAWING NO. 366
TECH. REVIEW: BELLAVIA	80,020
DATE: 7/96	SHEET 6 OF 6

Summary

The landscape surrounding the Gateway Arch closely reflects the design concept originally conceived by Eero Saarinen and Dan Kiley. It is clear from the documentation presented in this report, that both the architectural features designed by Saarinen and the landscape features designed by Kiley were meant to interact to create the character of Jefferson National Expansion Memorial. The integration of architecture and landscape was of paramount importance to both masters of design.

The recommendations presented in this Cultural Landscape Report are intended to guide the rehabilitation of the landscape surrounding the Gateway Arch. The Report thoroughly documents the original design intent as proposed by Saarinen and Kiley. Park managers, working with planners and designers, can effectively accommodate contemporary management needs while retaining the character of the original design concept by conforming to the recommendations presented here.

This report should be carefully consulted prior to any new construction or removal of any landscape features. The site design of the Arch presents a unique and potentially beneficial situation to the park managers in that some of the original designers are still living. Landscape Architect Dan Kiley should continually be consulted regarding landscape maintenance practices and/or modifications. Similarly, the remaining architects from the former office of Eero Saarinen & Associates (Kevin Roche, Bruce Detmers, and Robert Burley) should be consulted with problems and/or concerns regarding the significant architectural features. Regardless of the designers, future actions which may affect any of the contributing character-defining features of this culturally significant landscape should be reviewed through the Section 106 Compliance process.

Finally, this should be a dynamic document. A "Record of Treatment" should be maintained for all landscape management activities. This record should include photographs, accounting information, narratives of the work, conditions, contractors, and materials. The information should ultimately be incorporated into an inventory condition assessment program which links visual information with a database for scheduling and documenting cyclic and emergency maintenance procedures. Changing administrative and management needs, changing preservation standards and policies, and additional research and documentation may necessitate revisions or amendment to this report in the future.

Appendix A: List of Landscape Contracts & Contractors

The following is a list of major landscape contracts and contractors who completed work on the Arch grounds. A second list of contracts, which were not researched in detail for the purposes of this report, is also included.

Kozeny-Wagner Construction Company (Construction Contract)
Contract #: 14-10-7-971-267
Project No.: JEF S363
Duration: June 1970-July 1972
Description: Site Development-Phase I; Schedule I-Grading and Drainage, Schedule II-Waterproofing and Drainage of Visitor Center, Schedule III-Seeding. The project consists of grading along the north-south axis of Arch, Visitor Center roof water proofing, drainage, and seeding.
Plans and Specs.: Drawing No.: 366/41001-C dated August 1969, revisions 1/70 and 4/70; drawn by Patten and checked by Ronscavage, EODC and Western Service Center Office of Environmental Planning and Design.
Cost: $419,955.00
Documentation: Original specifications; plans; Globe-Democrat 6/20/70

Millstone Associates, Inc. (Construction Contract)
Contract #: 4970B10107
Duration: August 13, 1971-August 1972
Description: Site Development, Phase II, Schedules I & II; sidewalks, roads to HVAC and SHIPREC. 280 tree wells, 14 concrete benches, topsoil.
Plans and Specs.: developed by NPS - 366/41009 (18 sheets)
Cost: unknown
Documentation: Specifications for Site Development Phase II; Weekly Field Reports (JNEM Archives, unprocessed Rennison Collection).

Suburban Tree Service (Construction Contract)
Contract #: 4970B20053
Work Order #: 6525-8025-404 (366-03X20025)
Project No.: JEF-S371
Duration: 11/30/71-5/15/73
Description: Planting Plan-Phase I. Grounds construction, grounds preparation, and seeding-tree planting. 573 trees including Rosehill ash, black pine, and eastern redbud. Planting along the north-south axis up to rest areas on west side and up to overlooks on east side. Levee block surrounding trees. Pines and Redbud planted on west side of RR tunnels.
Plans and Specs.: Drawing No.: 366/41006 dated August 1971 by John Ronscavage, Western Service Center Office of Environmental Planning and Design.
Cost: $135,562.50
Documentation: Completion Report dated April 16, 1974. Photograph captions on last three pages but photos not included. (JNEM Archives, unprocessed Rennison Collection).
Comments: October 1972 there was failure of Ash tree predominantly on the north end of the site. Experts judged the cause to be excess moisture and/or planting too deep.

Millstone Associates, Inc. (Construction Contract)
Contract #: 4970B2009
Duration: -June 1972
Description: Site Development, Phase II, Schedules III & IV; sprinkler system
Plans and Specs.: unknown.
Cost: unknown
Documentation: Weekly Field Reports (JNEM Archives, unprocessed Rennison Collection).

Harland Bartholomew (A/E Contract)
Contract #: CX 2000-3-0033
Work Directive #: 0033-73-1
Duration: 1/73- contract completion date unknown.
Description: Title I: preparation of topographical or field surveys, test borings, other subsurface data; Title II: adaption of Government designs, drawings, and specs., preparation of preliminary and final working drawings, advice and interpretation of plans and specs. during construction; Title III: supervision and inspection of construction, review and approval of shop drawings, preparation of operation manuals, preparation of as constructed drawings.
Plans and Specs.: Drawing No. 366/41019 resulted from this contract
Cost: $78,430.00 before change orders
Documentation: copy of contract, correspondence

Hankins Construction Company (Construction Contract)
Contract #: CX6000-4-9017
Duration: 6/21/74-11/20/74
Description: Temporary Maintenance Building
Project #: 6520-5591
Plans and Specs.: Produced by Roy J. Scown, Assistant Chief of Maintenance, JEFF. (NPS 366/60010, JNEM Archives, Record Unit 120, D-120-519).
Cost: $57,723.00
Documentation: Completion Report - Temporary Maintenance Building, (JNEM Archives, unprocessed Rennison Collection).

Sahrmann Construction Company (Construction Contract-concrete)
Contract #: CX-6000-4-9018
Work Order #: 6525-7601-503
Duration: 8/12/74-11/26/74
Description: Overlook Paving
Plans and Specs.: HBA; drawing # 366/41018A (9 sheets)
Cost: $116,330.10
Documentation: Completion Report
Notes: Other contracts as subcontractor under Schuster Engineering included ponds in 1979, and walks in 1980.

Harding Electric Company (Construction Contract)
Contract #: 6000-4-9009
Duration: 2/18/74-8/3/74
Description: Walk and Area Lighting. 45 light fixtures, standards, etc.
Plans and Specs.: DSC, J. Johanningsmeier
Cost: $148,580.98
Documentation: Completion Report-contains photographs and they show levee block around the trees

Kozeny-Wagner Construction Company (Construction Contract)
Contract #: CX6000-5-9005
Work Order #: 6520-7602-503
Duration: 7/1/75-6/10/76
Description: Monumental Entrance
Subcontractors: Allied Plumbing Contractors (drainage); Louis Payne Electric Company (electric); Valley Sod Inc.
Plans & Specs.: HBA; preliminary surveys by HBA; drawing # 366/41031
Cost: 612,137.69
Documentation: Contract, completion report; receipts; daily and weekly work reports. (JNEM Archives, unprocessed Rennison Collection).

Harland Bartholomew (A/E Contract)
Contract #: CX 2000-7-0013
Duration: 4/77- contract completion date unknown.
Description: Reformat Existing Site Development, Drawings, Specifications and Update Cost Estimates.
Plans and Specs.: HBA; Resulted in drawings 366-41037, 41039, 41035.
Cost: $94,757.18
Documentation: copy of contract, correspondence. (Denver Service Center Storage Accession No: 079-86-0008, copy on file in JNEM Archives).

Schuster Engineering (Construction Contract)
Contract #: CX 6000-8-9003
Project #: S427
Duration: 3/78 - contract completion date unknown.
Description: Site Development Phase I, II, III; Walk and Area Lighting. This project consists of the installation of: water mains, storm drainage system, electrical distribution, and paving of concrete road and walkways, and landscaping including top soiling, seeding, and tree wells.
Subcontractors: Sahrmann Contracting Company (concrete)
Gartland Company Incorporated (plumbing)
Samuel Kraus Company (engineering)
Shelton & Sons Landscaping (planting)
Plans and Specs.: HBA; drawing #'s 366/41035; 366/41037; 366/41039
Cost: $2,890,179,89 initial bid price
Documentation: Specifications for Site Development, Phases I, II, III, Walk and Area Lighting. (JNEM Archives, unprocessed Rennison Collection).

Shelton & Sons Landscaping (Construction Contract)
Contract #: CX 6000-9-9003, package 206
Project #: (I.F.B.) 6520-79A
Duration: 1978-1981; 605 days
Description: Planting Plan-Phase II. This project consists of site landscaping including (1)planting trees, shrubs, and ground cover, (2) seeding lawn areas, (3) spreading imported topsoil, (4) extension of irrigation system.
Plans and Specs.: Drawing No. 366/41047 (as constructed drawings) dated 12/78, Ronscavage, Stewart, Wenk Denver Service Center. 23 sheets
Cost: $1,031,030.20
Documentation: Work reports, correspondence, receipts, misc. (JNEM Archives, unprocessed Rennison Collection).

Schuster Engineering, Inc. (Construction Contract)
Contract #: CX 6000-9-9005, package 225
Duration: 1981
Description: entrance repairs
Plans and Specs.: unknown.
Cost: $598,951.00
Documentation: Firearms Fund Insurance Companies, correspondence, general form, status inquiry (in box labeled 'Site Development, Phases I, II, and III, Walk and Area Lighting.

Treeland Nurseries (Construction Contract)
Contract #: CX6000-5-0049; File S7212 Federal Records Center
Duration: 9/26/85-5/27/86
Description: Replace mugo pine, pyracantha, and fragrant sumac on top of levee slope, south of monumental entrance, along fenceline and open RR cut, north and south of the stairway, on slope around south service center entrance to vc, around fenced area of generator building.
Plans and Specs.: unknown.
Cost: unknown.
Documentation: Administrative History by Bob Moore, p.115, Superintendent's Annual Report for 1986, p.7.

Treeland Nurseries (Construction Contract)
Contract #: CX6000-6-0032; File S7217 Federal Records Center
Duration: 9/23/86-12/19/86
Description: Replace dead trees. Grounds crew planted 68 of these new trees, while Treeland Nurseries planted a total of 110 trees and 1,330 shrubs.
Plans and Specs.: unknown.
Cost: unknown.
Documentation: Administrative History by Bob Moore, p.115, Superintendent's Annual Report for 1986, p.7.

Other Contracts (less information known):

Saarinen & Associates (A/E Contract)
Contract #: 14-10-529-2039
Duration: 1959-1969 (contract completed by successor firm of Kevin Roche - John Dinkeloo and Associates.
Description: Design and construction documents for Gateway Arch.
Plans and Specs.: Saarinen and Associates
Documentation: Miscellaneous correspondence and contract-related material. (JNEM Archives, Record Unit 106, box 38, folder 17).
Comments: at least 6 amendments to contract (6th made in 1963). The contract was not researched extensively for the purposes of this report. Most information could potentially be found in the JNEM Archives.

Davey Tree Service (Construction Contract)
Duration: 1986
Description: transplant 28 'Rosehill' Ash

Fred Weber, Inc. (Construction Contract)
Duration: 1987
Description: Parking garage and landscaping

Hillside Gardens (Construction Contract)
Duration: November 1988
Description: replaced 186 trees, 18 species
Documentation: Administrative History by Bob Moore, p.115, Superintendent's Annual Report for 1986, p.7.

Hoel-Steffen (Construction Contract)
Contract #: 14-10-0232-774
Duration: 10/19/65-10/17/66
Description: Gateway Arch and Interim Visitor Center

Rock Hill Mechanical Corporation (Construction Contract)
Contract #: CX 6000-6-9011
Duration: 8/13/76-3/28/78
Description: Arch Visitor Center, Mechanical Systems Improvements
Project #: 6520-6907

Schuster Engineering, Inc. (Construction Contract)
Contract #: CX 6000-8-9004
Description: Generator Relocation

Kozeny-Wagner (Construction Contract)
Contract #: 4970B10045
Duration: c. 1971-72
Description: Visitor Center Addition

Appendix B: Sample Inventory & Condition Assessment Forms

Jefferson National Expansion Memorial

INSPECTION SHEET -VEGETATION

Category: Shrubs & Groundcover

Feature Name & ID#:	Overall form	Overhead shading	Adjacent crowding	Leaf, Shoots, Twigs	Branches,Cables	Base Roots, Soil	Rejuvenative growth	Flower, Fruit	Pests, Diseases, Weeds	Comment on condition, size age, field diagnosis,and work needed:	Further Diagnosis Needed (y/n)	Work Needed (X) Critical Work (*)	Replace Immed (I) Plan for Repl (P)	Action Completed (date)

Codes: 0=can not assess
1=satisfactory condition
2=fair, needs some work
3=poor, needs work
*=critical condition

Recommended Equipment:
-binoculars
-insect jars

Inspected by:

Date:

Jefferson National Expansion Memorial *Tree Inventory & Condition Assessment*

INVENTORY OF TREES

inspected by _____ zone # _____ date _____

Species	Origin	Contributing(C) Non-Contrib.(N)	Age (yrs)	Status	Treatment Priority? (Y/N)	Recommended Action	Comments

Origin Codes:
1 = inst. Phase I
2 = inst. Phase II
3 = replacement in-kind
4 = introduced after Phase II

Recommended Action Codes:
1 = replace in-kind
2 = replace w/ alternate species
3 = do not replace

Status Codes:
Good = Good Condition
Fair = Fair Condition
Poor = Poor Condition
Gone = Gone, removed
Threat = Threatened

Jefferson National Expansion Memorial
INSPECTION SHEET - CIRCULATION

Category: Roads & Parking Areas

Feature Name & ID#:	Potholes	Loss of surface	Puddling	Drains	Soft areas	Weeds	Debris	Edge damage	Other	Comment on condition, field diagnosis,and work needed:	Further Diagnosis Needed (y/n)	Work Needed (X) Critical Work (*)	Replace Immed (I) Plan for Repl (P)	Action Completed (date)

Codes: 0=can not assess
1=satisfactory condition
2=fair, needs some work
3=poor, needs work
*=critical condition

Recommended Equipment:
-binoculars
-insect jars

Inspected by:

Date:

Jefferson National Expansion Memorial

INSPECTION SHEET - FURNISHINGS & OBJECTS

Category:

Feature Name & ID#:	Deteriorated	Damaged	Leaning	Collapsed	Loose, missing parts	Needs refinishing	Legibility	Needs washing	Other	Comment on condition, field diagnosis,and work needed:	Further Diagnosis Needed (y/n)	Work Needed (X) Critical Work (*)	Replace Immed (I) Plan for Repl (P)	Action Completed (date)

Codes:
0=can not assess
1=satisfactory condition
2=fair, needs some work
3=poor, needs work
*=critical condition

Recommended Equipment:
-binoculars
-insect jars

Inspected by:

Date:

Appendix C: Evaluation of Landscape Features

	related to S/K concept dev.	not related to S/K concept	
Character-defining Feature	**Contributing**	**Non-contributing**	**Design Altered**
Spatial Organization	C		Y
Topography	C		Y
Buildings & Structures	-		
Gateway Arch	C		
Old Courthouse	C		
Visitor Center & Museum of WE	C		
North & South Overlooks	C		
Maintenance Building	C		Y
Mechanical Systems			
Underground Sprinkler System		N	
Underground Drainage System		N	
Site Engineering Systems			
North & South Railroad Tunnels	C		
Retaining Walls (HVAC/SHIPREC)		N	
Tree Grates		N	
Vegetation			
Railroad Tunnel Plantings		N	
Rosehill Ash Monoculture	C		Y
Bald Cypress Circles	C		Y
Plant Composition & Open Space (around north & south ponds)	C		Y
Service Area Plantings	C		Y
Views & Vistas			
Old Courthouse to Arch	C		
View from N-S Axis	C		

View from North & South Ponds	C		
View from East St. Louis	C		
Circulation			
Parking Garage	C		
Pedestrian Sidewalks	C		
Grand Staircase	C		Y
Old Cathedral Parking Lot	C		
Old Cathedral Sidewalk		N	
Interior Service Roads		N	
NPS Boundary - Roads	C		
Water Features			
North Pond	C		Y
South Pond	C		Y
Furnishings & Objects			
Benches	C		Y
Light Standards	C		Y
Trash Receptacles		N	
Drinking Fountains		N	
Information Kiosk		N	
Signs		N	
Fences		N	

Appendix D: Copy of National Register Nomination Form

Form No. 10-306 (Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR FEDERAL PROPERTIES

432
VF JNE-072

FOR NPS USE ONLY
RECEIVED
DATE ENTERED 10-15-66

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

doc. accepted 3-4-77

1 NAME

HISTORIC
Jefferson National Expansion Memorial

AND/OR COMMON
The Gateway Arch, The Old Courthouse, and The Old Cathedral

2 LOCATION

STREET & NUMBER
11 North 4th Street — NOT FOR PUBLICATION

CITY, TOWN
St. Louis — VICINITY OF

CONGRESSIONAL DISTRICT
Third

STATE	CODE	COUNTY	CODE
Missouri	29	~~St. Louis~~ (indep. city)	510

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
X DISTRICT	X PUBLIC	X OCCUPIED	AGRICULTURE	X MUSEUM
BUILDING(S)	X PRIVATE	UNOCCUPIED	COMMERCIAL	X PARK
STRUCTURE	BOTH	X WORK IN PROGRESS	EDUCATIONAL	PRIVATE RESIDENCE
SITE	PUBLIC ACQUISITION	ACCESSIBLE	ENTERTAINMENT	X RELIGIOUS
OBJECT	IN PROCESS	YES: RESTRICTED	GOVERNMENT	SCIENTIFIC
	BEING CONSIDERED	X YES: UNRESTRICTED	INDUSTRIAL	TRANSPORTATION
		NO	MILITARY	OTHER:

4 AGENCY

REGIONAL HEADQUARTERS (If applicable)
U.S. National Park Service, Midwest Regional Office

STREET & NUMBER
1709 Jackson Street

CITY, TOWN
Omaha — VICINITY OF

STATE
Nebraska

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC.
U.S. National Park Service, MWRO

STREET & NUMBER
1709 Jackson Street

CITY, TOWN
Omaha

STATE
Nebraska

6 REPRESENTATION IN EXISTING SURVEYS

TITLE
Historic American Buildings Survey

DATE
1936 — X FEDERAL STATE COUNTY LOCAL

DEPOSITORY FOR SURVEY RECORDS
Library of Congress

CITY, TOWN
Washington

STATE
D.C.

(See Continuation Sheet, page 1)

Form No. 10-300a
(Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY -- NOMINATION FORM

FOR NPS USE ONLY
RECEIVED
DATE ENTERED

CONTINUATION SHEET ITEM NUMBER 6 PAGE 1

TITLE: List of Classified Structures

DATE: 1975

FEDERAL

DEPOSITORY FOR SURVEY RECORDS: U.S. National Park Service, Midwest Regional Office, Omaha, Nebraska

TITLE: National Survey of Historic Sites and Buildings

DATES: 1957-1962

FEDERAL

DEPOSITORY FOR SURVEY RECORDS: Office of Archeology and Historic Preservation, National Park Service, Washington, D.C.

DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
_EXCELLENT	_DETERIORATED	_UNALTERED	X_ORIGINAL SITE
X_GOOD	_RUINS	X_ALTERED	_MOVED DATE_____
X_FAIR	_UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

The business center of old St. Louis grew up along the levee, where the riverfront was the jumping-off place for journeys westward. This area declined with the growth of the railroads, and most of the historic structures disappeared. The Jefferson National Expansion Memorial, including the Gateway Arch and the two remaining historic buildings, the Old Courthouse and the Old Cathedral, now occupies the area.

The large, T-shaped district in downtown St. Louis runs along the Mississippi River between the I-40/I-70 bridge, to the south, and Eads bridge, to the north. The great majority of the district is in the rectangular, park-like portion between the two bridges, Wharf Street, and I-55/I-70. This area includes the Gateway Arch and Visitor Center, the Old Cathedral, two scenic overlooks, parking facilities, several pedestrian paths, and two not-yet-completed ponds.

The Memorial was designed by Eero Saarinen in 1947. The original design envisioned a long, T-shaped park with the New Courthouse, (eight blocks west of the present memorial) Old Courthouse, and the Gateway Arch on a grand east-west axis linked by parks and terminating at the Mississippi River. The land between the two courthouses has never been cleared and the green belt axis has never been achieved, but the visual link can be clearly seen. Only the land between the Gateway Arch and the Old Courthouse has been cleared and incorporated into the Memorial. The final link to the river's edge, a grand stairway from the Arch to Wharf Street and the levee, is now under construction.

The easternmost structure is the Gateway Arch (No. HS 4), begun in 1962 and finished in 1965. The soaring, stainless steel, stressed-skin arch is 630 feet high. An inverted catenary curve, each leg is made up of double-walled, equilateral triangle sections. Throughout, the walls of each section are connected by high-strength steel rods, making a self-supporting, stressed-skin structure.

At ground level, each section is 12 feet high, and 54 feet long on each side; at the top, the sections are 8 feet high, and 17 feet on each side. The Arch's 630-foot span straddles the underground Visitor Center and Museum of Westward Expansion. Housed at the top is an observation deck from which visitors are afforded a thirty-mile view to the east and west.

Within the Memorial boundaries, but still owned by the Roman Cahtolic Archdiocese of St. Louis, is the Old Cathedral. It was begun in 1831 from plans prepared by Joseph Laveille and George Morton (who also designed the 1826, brick courthouse replaced by the courthouse cited below) and it was finished in 1834. This (Joliet) limestone church in modified Greek Revival is rectangular in plan with a nave, two aisles, an apse, no transepts, and a steeple above the entrance. A later, one-story, addition runs along the north and east sides of the church.

The third major, and westernmost, structure in the Memorial is the Old St. Louis County Courthouse (No. HS 1). Built between 1839 and 1864, this Greek Revival, three-story, brick and stone structure was designed by several architects over the period of its construction (Henry Singleton, William Twombly, George I. Barnett, Robert S. Mitchell, Thomas D. F. Lanham, and William Rumbold), and has been altered several times, including

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a major restoration and remodeling completed in 1942. Basically a Greek Cross in plan, the junction of the four wings forms a central rotunda surmounted by a Renaissance style cast-iron dome and lantern. In the interior of the rotunda, the first three-stories are Greek Revival, but the later, upper levels, including the dome and lantern are Late Renaissance, almost Baroque, in style. This upper dome is elaborately decorated with murals, especially four lunette murals originally done by Carl Wilmar, and several later murals by Ettore Miragoli.

In the northeast and southeast corners of the Park are the two scenic overlooks. Designed to afford views of the river and the surrounding scenery, they are approached by a series of steps with variable slopes that reflect the catenary slope of the Gateway Arch.

SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW			
__PREHISTORIC	__ARCHEOLOGY-PREHISTORIC	__COMMUNITY PLANNING	__LANDSCAPE ARCHITECTURE	X_RELIGION
__1400-1499	__ARCHEOLOGY-HISTORIC	__CONSERVATION	X_LAW	__SCIENCE
__1500-1599	__AGRICULTURE	__ECONOMICS	__LITERATURE	__SCULPTURE
__1600-1699	XARCHITECTURE	__EDUCATION	__MILITARY	__SOCIAL/HUMANITARIA
__1700-1799	XART	X_ENGINEERING	__MUSIC	__THEATER
X1800-1899	__COMMERCE	__EXPLORATION/SETTLEMENT	__PHILOSOPHY	__TRANSPORTATION
X1900-	__COMMUNICATIONS	__INDUSTRY	__POLITICS/GOVERNMENT	__OTHER (SPECIFY)
		__INVENTION		

SPECIFIC DATES 1935 to present BUILDER/ARCHITECT Eero Saarinen

STATEMENT OF SIGNIFICANCE

The Park was established in 1935 to memorialize the role of Thomas Jefferson and others responsible for the Nation's territorial expansion to the Pacific and of the countless pioneers who explored and settled the great American West.

To dramatize the growth and the great social, political, and economic changes that followed in the wake of the Louisiana Purchase, the National Park Service and the city of St. Louis undertook an extensive development program. In 1947, the Jefferson Nation Expansion Memorial Association held a national competition to select a design for the Memorial. The late Eero Saarinen's design was selected from more than 200 entries.

The central feature of the Saarinen Plan is the 630-foot, stainless steel Gateway Arch, symbolizing St. Louis' historic gateway role. The Arch, one of the most challenging engineering and construction projects ever attempted, is in the form of an inverted catenary curve. The catenary is the soundest of all arches, because all forces pass through the legs into the foundation. A variety of structural methods, some not normal used for buildings, unique to this structure, were employed by Saarinen. The stressed-skin design is similar to airplane structural design and allows the skin to carry all structural loads without massive interior framing. Furthermore, the design demanded ne construction techniques; the arch was erected by unique, 100-ton, steel creeper cranes mounted on steel tracks affixed to each arch leg. These cranes lifted and placed the triangular sections. After the final section was placed in the arch, the derricks crept down, taking up their tracks and polishing the surface as they went.

The Old Courthouse derives its significance from several areas - architecture, art, engineering, and law. The dome atop the Courthouse was a major feat of engineering and architectural design when it was built. In 1851, the Courthouse's fifth architect, Thomas D. P. Lanham, proposed and designed a new Renaissance style dome to replace the original, smaller dome. However, it was Lanham's successor, William Rumbold, who, between 1859 and 1862, accomplished the detailed structural design and engineering, which he patented. The lightweight iron skeletal designs of the St. Louis dome and its contemporary on the National Capitol were unique in the United States at that time, and were among the first in the world. The designers of many statehouses took their inspiration from the National Capitol, but the St. Louis dome was completed one-and-a-half years before, and in this sense was the forerunner of those that followed

The interior of Rumbold's dome, because of its lightweight structural design, allowed for a very high rotunda, so the architect and the muralists August Becker, Charles Wimar nd Leon Pomerade collaborated to redesign the old rotunda, which had been designed by George I. Barnett, the building's third architect.

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Wimar designed the original program and, by 1862, executed the four lunettes depicting the history of St. Louis. Subsequent work by Ettore Miragoli in 1880, repairs by August Becker in 1888 and 1905, restoration work by James Lyons in 1921, and a fire in 1936 have obliterated all of Wimar's program except two of his lunettes. The majority of the work visible today is a National Park Service restoration of Miragoli' nevertheless, both men were accomplished artists and the rotunda presents an impressive appearance.

An event of major political and legal importance occurred at the Courthouse in 1847, when Dred Scott sued the widow of Dr. John Emerson for his freedom. The trial verdict was rendered in favor of Mrs. Emerson. Upon appeal, this verdict was set aside and a second trial was held in 1850. These first two trials were known to have been held in the Courthouse. The State Supreme Court trial, in 1852, was probably not held in the Courthouse. The case saw its conclusion in the decision of the U.S. Supreme Court in Dred Scott vs. Sanford in 1857.

Also of note is the fact that Justice Louis Brandeis was admitted to the bar in this courthouse in 1878.

The old Cathedral, the second remaining historic building of old St. Louis, was built in 1831 to 1834, on land set aside for religious purposes by Pierre Laclede in the spring of 1764 when he founded the village of St. Louis. The building narrowly escaped destruction in the disastrous fire that swept the riverfront in 1849. The importance of the church declined sharply after the Civil War when the archdiocese moved its headquarters uptown to a new cathedral. But in 1961, Pope John XXIII designated the building "Basilica of St. Louis, King of France." This is the highest honor ever given an American Catholic church.

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(See Continuation Sheet, page

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY 90.96

UTM REFERENCES

	ZONE	EASTING	NORTHING
A	15	744,500	4,278,210
B	15	744,520	4,278,170
C	15	744,520	4,278,060
D	15	744,480	4,278,060

VERBAL BOUNDARY DESCRIPTION

E 15 744850 4278670 F 15 744640 4278760
G 15 744660 4278840 H 15 744880 4278780

(See Continuation Sheet, page 5)

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

11 FORM PREPARED BY

NAME / TITLE
Richard I. Ortega, Architectural Historian (Engineer)

ORGANIZATION
U.S. National Park Service, MWRO

DATE
3/3/76

STREET & NUMBER
1709 Jackson Street

TELEPHONE
402-221-3423

CITY OR TOWN
Omaha

STATE
Nebraska

12 CERTIFICATION OF NOMINATION

STATE HISTORIC PRESERVATION OFFICER RECOMMENDATION

YES____ NO____ NONE____

STATE HISTORIC PRESERVATION OFFICER SIGNATURE

In compliance with Executive Order 11593, I hereby nominate this property to the National Register, certifying that the State Historic Preservation Officer has been allowed 90 days in which to present the nomination to the State Review Board and to evaluate its significance. The evaluated level of significance is _X_National ____State ____Local.

FEDERAL REPRESENTATIVE SIGNATURE

TITLE DATE

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

DATE

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

ATTEST: DATE

KEEPER OF THE NATIONAL REGISTER

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The T-shaped park, starting at the intersection of Eads Bridge and Wharf Street, St. Louis, Missouri, runs south along the west side of Wharf Street for approximately 3600 feet; thence west along the north side of Poplar Street for approximately 800 feet; thence north along the east side of the Third Street Expressway for approximately 1600 feet; thence west along Market Street approximately 600 feet; thence north along Broadway approximately 300 feet; then east along Chestnut approximately 800 feet; thence north along the Expressway approximately 1400 feet; thence east along the south wall of Eads Bridge approximately 900 feet to the beginning.

Appendix E: List of Repositories and People Consulted

This list consists of all contacts made by Gina Bellavia or Gregg Bleam for the purposes of completing this *Cultural Landscape Report* and the design analysis *Evolution of a Landscape: Eero Saarinen and Dan Kiley's Collaborative Design for JNEMerson National Expansion Memorial* completed by Gregg Bleam in 1996.

Office of Dan Kiley, East Farm, Charlotte, Vermont 05445
Several interviews were conducted regarding Dan Kiley's collaboration with Eero Saarinen on the 1948 Competition plan and subsequent design evolution. Mr. Kiley also shared sketches, drawings, and correspondence from his files.

Kevin Roche and John Dinkeloo & Associates, 20 Davis St., Hamden, Connecticut 06517
Kevin Roche, John Dinkeloo, and Bruce Detmers worked at the former office of Eero Saarinen & Associates and were involved with the Arch project. Gregg Bleam interviewed Kevin Roche and Bruce Detmers regarding their part in the design process and their knowledge of Saarinen's design philosophy and his relationship with Dan Kiley. Mr. Bleam also spent a good amount of time looking through the "Saarinen Archives" and was given permission to copy most of the drawings for this project.

Bob Burley, The Burley Partnership, Waitsfield, Vermont 05673
Mr. Burley is an architect who worked for Eero Saarinen from 1956-1963. He was directly related to the Arch project and was specifically responsible for the design of the entrances into the Arch visitor center and transportation system.

Terry Boyle, Burlington, Vermont
Mr. Boyle worked at the Office of Dan Kiley from 1959-1961 and again from 1965-1967. He was directly related to the Arch project, particularly with the evolution of the landscape design.

John Ronscavage, 4195 Dover Street, Wheat Ridge, Colorado 80033
Mr. Ronscavage was a landscape architect with the National Park Service and specifically with the Western Service Center and Denver Service Center Offices of Design and Construction. He was the Team Captain for the JNEM Design Team when the NPS took over the project from Dan Kiley.

Jim Holland, 3815 N. Perry Park Road, Sedalia, Colorado 80135
Mr. Holland was a project manager with the NPS Denver Service Center and was a construction inspector during the landscape construction of the Arch grounds.

Eldridge Lovelace, 5 Brookside Lane, St. Louis, Missouri 63124
Mr. Lovelace was the project manager for Harland Bartholomew & Associates in the early 1970s when the firm was hired to complete construction documents for the Arch landscape.

Joseph Jensen, 211 Judy Street, Petersburg, West Virginia 26847
Mr. Jensen worked for both Eero Saarinen & Associates and the National Park Service and was directly involved with the Arch project.

Bob Kelly, 413 Williams Drive, Eureka, Missouri 63025
Mr. Kelly was the Facility Manager at JNEM for approximately 24 years. He was involved in site development through all major phases of landscape construction.

Mike Mayberry, 808 Marshall Road, Valley Park, Missouri 63088
Mr. Mayberry worked for Shelton & Sons Landscaping and was involved in the second major phase of landscape planting on the Arch grounds in the late 1970s.

Bob Chandler, Golden Gate NRA, Building 201, Fort Mason, San Francisco, California 94123
Mr. Chandler is a former JNEM Superintendent and was responsible for the Arch Grounds Seed Mix and the implementation of tree grates around the Rosehill Ash trees.

Nancy Baker, NPS-DSC, 12795 W. Alameda Pkwy., P.O. Box 25287, Denver, Colorado 80225
Ms. Baker was a project inspector working for the Denver Service Center in the 1980s. She was the project inspector for the final planting on the Arch grounds in 1980-81.

Bob Steenhagen, 2473 S. Carr Ct., Lakewood, Colorado 80227
Mr. Steenhagen worked at the NPS Eastern Service Center while the Arch project was being completed. According to Mr. Steenhagen, he was associated with Dan Kiley on a personal level and was not directly associated with JNEM.

Marlin Steward, NPS-DSC, 12795 W. Alameda Pkwy., P.O. Box 25287, Denver, Colorado 80225
Mr. Steward was a landscape architect with the National Capital Region when the Arch project was being completed. He helped pull together the final planting plans and irrigation plan.

Mike Hunter, NPS-DSC New River Gorge Support Office, P.O. Box 242, Glen Jean, West Virginia 25846
Mr. Hunter worked with the Denver Service Center from 1978-1980. He worked at JNEM as project manager supervising and directing work for much of the second major phase of development.

Repositories Consulted:

Denver Service Center Technical Information Center
12795 W. Alameda Pkwy.
P.O. Box 25287
Denver, Colorado 80225-0287
303.969.2134

Jefferson National Expansion Memorial - Archives
11 North Fourth Street
St. Louis, Missouri 63102
314.425.4468

The Mercantile Library Association
510 Locust Street, Sixth Floor
St. Louis, Missouri 63101
314.621.0670

Office of Dan Kiley
East Farm
Charlotte, Vermont 05445
802.425..2141

Kevin Roche and John Dinkeloo & Associates
20 Davis Street
Hamden, Connecticut 06517
203.777.7251

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