

HISTORIC STRUCTURE REPORT

FINAL REPORT

JUNE 2004



WASHINGTON MONUMENT AND ASSOCIATED STRUCTURES

VOLUME I – WASHINGTON MONUMENT

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**WASHINGTON MONUMENT AND ASSOCIATED STRUCTURES
HISTORIC STRUCTURE REPORT**

VOLUME I – WASHINGTON MONUMENT

FINAL REPORT

PREPARED FOR
National Park Service
Denver Service Center
AND
National Park Service
National Capital Region

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COVER ILLUSTRATION: The Washington Monument and grounds today. (John Milner Associates, Inc., 2003)

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CHAPTER FIVE: CONDITION ASSESSMENT

EXTERIOR

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INTERIOR

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CHAPTER ONE
MANAGEMENT SUMMARY

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CHAPTER ONE

MANAGEMENT SUMMARY

1.1 EXECUTIVE SUMMARY

1.1.1 INTRODUCTION

The Washington Monument in Washington, D.C., is the United States of America's primary memorial to the nation's first president, George Washington. As a powerful symbol of the nation's capital, the monument is one of the city's most heavily visited sites. The Monument Grounds are situated at the monumental core of the capital city and have been the site of significant public events, ceremonies, and demonstrations for over a century. In November 2001, the National Park Service (NPS) initiated a design process that would have resulted in the construction of a new visitor facility and permanent security improvements in order to protect the Washington Monument and its visitors while improving the visitor experience, preserving the monument structure, improving accessibility, and retaining public activities on the grounds.

1.1.2 SCOPE

The NPS retained Grunley-Walsh Joint Venture, LLC (Grunley-Walsh) of Rockville, Maryland, with the design team of Hartman-Cox Architects of Washington, D.C., and Olin Partnership of Philadelphia, Pennsylvania, to prepare conceptual design plans for a new visitor facility and permanent security improvements. The proposed visitor facility was designed to be a below-grade structure, entered on 15th Street through the existing Monument Lodge, which would be modified with an addition on the west. The new below-grade visitor facility was to be connected to a below-grade pedestrian concourse through which visitors would access the Washington Monument. Permanent security improvements included an underground security screening facility, a landscaped vehicle-barrier system of low-walled terraces and walkways, removal of the above-ground queuing area and the present interim security building from the monument plaza, subtle regrading of the monument's knoll, rehabilitation of the monument plaza, and removal of the 16th Street parking lot.

Conceptual plans for the visitor facility, security improvements, and the associated landscape design were granted preliminary approval by the National Capital Planning Commission (NCPC) in the spring of 2003. The planning and review processes were continuing throughout the preparation of this report, with construction of the approved design to be implemented by Grunley-Walsh.

In February 2003, John Milner Associates, Inc. (JMA) of West Chester and Philadelphia, Pennsylvania, and Alexandria and Charlottesville, Virginia, was retained by Grunley-Walsh to prepare the joint Historic Structure Report (HSR) and Cultural Landscape Report (CLR) for the

Washington Monument and Grounds. The HSR and CLR were required as part of a Programmatic Agreement between the National Park Service and the Advisory Council on Historic Preservation for the purpose of understanding the architectural resources in order to inform decisions relating to the proposed visitor facility and security improvements. The two documents build upon historical research and documentation previously conducted by Oehrlein & Associates Architects and Robinson & Associates, Inc. of Washington, D.C. Because of the immediate need for implementation of the visitor facility and security improvements, the reports were to be completed by the fall of 2003. However, in October 2003, plans for the proposed underground security screening facility were under reconsideration and the completion date for this report was pushed back to June 2004. The landscape improvements were scheduled to move ahead as planned.

The HSR was commissioned to address both the Washington Monument and its associated structures, the Washington Monument Lodge (hereinafter referred to as the Monument Lodge) and the Survey Lodge, that are located in the Washington Monument Grounds (see figures 1.1, 1.2 and 1.3). The goals of the HSR are to:

- Develop historical background for the Washington Monument, Monument Lodge, and Survey Lodge;
- Determine the developmental history and use for the buildings, and document changes as they evolved from early design development through the present day;
- Document through a combination of narrative and graphics the existing conditions of the buildings; and
- Provide preferred treatment recommendations for managing the historic resources.

The HSR for the Washington Monument and Associated Structures has been prepared in three volumes: Volume I – Washington Monument, Volume II – Monument Lodge, and Volume III – Survey Lodge. The companion Washington Monument Grounds CLR addresses the site.

1.1.3 HSR METHODOLOGY

This HSR has been prepared in accordance with the guidance offered in the most recent versions of various federal standards documents, many of which are cited for their relevance in the scope of work for the project:

- *NPS Director's Order Number 28: Cultural Resource Management Guidelines*
- *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings (1995)*
- *Uniform Federal Accessibility Standards (UFAS) or the Americans with Disabilities Act Accessibility Guidelines (ADAAG), whichever provides greater accessibility*
- *NPS Director's Order Number 10A: Standards for Design and Construction (1997)*

- National Register Bulletin 15: *How to Apply the National Register Criteria for Evaluation*
- Preservation Brief No. 17: *Architectural Character: Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character* (1999)
- *Chicago Manual of Style*, 14th ed.

The HSR for the Andrew Johnson Homestead, prepared by the NPS, the HSR for Buildings 32, 33, and 33A at Harpers Ferry National Historical Park, prepared by Laura L. Simpkins, and the CLR for the Lincoln Memorial, prepared by the NPS, served as models for report preparation, organization, and format.

Team members representing Grunley-Walsh, the NPS, and JMA met in the Alexandria offices of JMA on February 13, 2003, to discuss the project, its scope, schedules, and specific administrative procedures. The scope of work for the HSR is included in Appendix A: Scope of Work.

Historical research in support of the HSR focused on the consolidation of materials provided by the NPS. These materials, gathered by Oehrlein & Associates Architects and Robinson & Associates, Inc., were supplemented with limited additional investigation by JMA. In the spring of 2002, Robinson & Associates, visited document repositories (online or in person) and reviewed books, reports, documents, maps, drawings, and photographs and copied or borrowed those sources relevant to the project. The collected documents were provided to the JMA team by the NPS. Research conducted by Robinson & Associates focused on information available at the archives at the Library of Congress, Prints and Photographs Division; Martin Luther King Library, Washingtoniana Division, Historical Photo Collection; National Archives and Record Administration, Cartographic Division, Record Group (RG) 79, Still Pictures Division, RG 42, RG 66, and RG 328; Smithsonian Archives, Washington Monument Files; Historical Society of Washington, D.C., CHS Photo Collection; and NPS, National Capital Region files, National Capital Region electronic drawing files, National Capital Region digital photographs, and the "Lockwood" files held at the Jefferson Ranger Library, National Capital Parks – Central.

Subsequently, JMA conducted a thorough review and analysis of the documents provided from these sources to support the historical findings documented in the HSR. Each item was reviewed for information relative to the history and development of the Washington Monument, Monument Lodge, and Survey Lodge. JMA conducted limited directed research in April and May 2003 to answer specific questions related to the structures. This research included a review of contextual sources at the Library of Congress, selected resources focusing on construction contracts and development of recreation within RG 42 of the National Archives, and annual reports from the Corps of Engineers, Office of Public Buildings and Public Parks, and the National Park Service available at the U.S. Department of Interior Library. Online reviews of National Capital Planning Commission documents were also conducted.

JMA conducted field investigations during the months of March, May, and June 2003. The Washington Monument, Monument Lodge, and Survey Lodge were surveyed to verify the

existing conditions information provided by the NPS and to assess the historical development, physical condition, and integrity of each structure. Field investigations included survey of readily accessible areas and documentation of conditions on historic drawings and field sketches. No destructive materials testing or fabric investigations were carried out. The structures were photographed using color as well as black-and-white film.

The documentation of existing conditions was developed through cross-referenced narrative, graphic, and photographic materials and organized in accordance with the framework established in the NPS Cultural Resource Management Guideline, Chapter 8: Management of Historic and Prehistoric Structures, and *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings*. Existing conditions documentation was subsequently prepared through the review of existing architectural drawings and historic photographs; examination of available park documents, park files, and NPS reports; field investigations; and review of photographs taken in the field. Photographs of architectural features were used to consider and illustrate the various architectural characteristics of the historic structures included in this report. These representative photographs support the narrative descriptions of key architectural features and are referenced in the text. A binder containing all of the existing conditions photographs and negatives has been provided to the NPS to supplement the representative photographic coverage included in the report. Black-and-white photographs of the Washington Monument, Monument Lodge, and Survey Lodge documenting primary architectural features have been provided as the archival record of the historic structures prior to the implementation of security improvements.

1.1.4 HISTORICAL SUMMARY

In 1791, Pierre L'Enfant proposed a site for an equestrian monument to George Washington at the western terminus of the National Mall to be the central focus of the monumental core of his urban design for the nation's new capital city. The statue was never commissioned. In 1833, the Washington National Monument Society was founded to remedy the lack of an appropriate memorial to George Washington in the nation's capital. The society raised funds and elected to hold a design competition for a suitable monument in 1836. Several designs were submitted, including one by notable architect Robert Mills, but the society did not select a design at this time. Fund-raising continued, and in 1845 the society selected a design by Robert Mills at an estimated cost of \$200,000. Mills's design called for a 600-foot obelisk surrounded by a 250-foot diameter, 100-foot-tall pantheon. Construction of the monument was begun in 1848, but temporarily halted in 1854 due to a lack of funds.

The monument remained partially complete until after the Civil War, when interest in its construction as a symbol of a re-united nation was renewed. Funding appropriations were slow in coming during the period of Reconstruction; however, the enthusiasm for the Centennial celebrations provided motivation for completion of the monument, and ownership was transferred to the federal government in 1876. The Army Corps of Engineers was commissioned to study the integrity of the foundations, and structural modifications were begun in 1878. Lt. Col. Thomas Lincoln Casey was appointed by the Joint Commission as Engineer in Charge of

the project. The foundation-strengthening work was completed in 1880, and construction resumed on the obelisk that same year. Casey developed an internal iron structure for the monument to support the work platforms and the steam-powered hoist. Casey also altered the final height of the Washington Monument and adjusted the proportions of the pyramidion to conform to those of known ancient Egyptian obelisks. The final design was a 500-foot obelisk culminating in a 55-foot steeply pitched pyramidion. The Washington Monument sits atop a grassy knoll with land gently sloping to every side along the banks of the Potomac River. Though it appears natural, this graceful hillock is the result of a large amount of fill brought to and sculpted on the site to support the foundation of the monument.

The Washington Monument was dedicated in 1885 and opened to the public in October of 1888. Since that time to the present, it has served as a major tourist attraction in the nation's capital. Subsequent repair renovation campaigns have been undertaken to maintain the integrity of the monument and improve visitor comfort and safety. Major exterior restoration was performed in 1934, 1964, and 1997-2000. The interior public spaces were substantially modified in 1904, 1913, 1958, 1974-76, 1992, and 1997-2000. The original steam-powered elevator was replaced in 1901 with an electric elevator. The elevator was subsequently renovated in 1925, 1958, and 1997-2000.

The Monument Lodge, constructed as a waiting room and comfort station for Washington Monument visitors, is located 480 feet to the east of the monument along 15th Street. The design for the Monument Lodge by architect William M. Poindexter was accepted in 1887, constructed in 1888, and the building opened to the public in January of 1889. The exterior was styled as a rusticated Greek temple with rock-faced marble and granite-masonry rubble from the construction of the Washington Monument, which is laid in a random-coursed ashlar pattern. The building originally contained a waiting room, keeper's room, archive room, and public men's and women's toilets. The toilet rooms were expanded in 1911-17 and again in 1931. The waiting room was renovated in 1910-11 and 1943. An outdoor concession stand was added to the west façade in 1948. In 1963, the outdoor concession stand was replaced with a larger enclosed concession addition. The Monument Lodge interior was renovated in 1971 and 1995. The Monument Lodge continues to serve as a gift shop, food-vending facility, and comfort station.

The Survey Lodge, originally constructed to house the steam-generating plant for the Washington Monument elevator, is located approximately 750 feet southwest of the monument. From the date of its completion in 1886 until 1923, the Survey Lodge, then known as the Boiler House, housed a steam boiler that provided steam to the Washington Monument via pipes housed in an underground tunnel. The steam was used to power the steam elevator in the monument. Like the Monument Lodge, the Survey Lodge is constructed of refuse marble and granite from the Washington Monument construction site. The original structure was ell-shaped, but in 1901, the Survey Lodge was expanded to its present rectangular form. It was enlarged to house the steam-powered electric dynamo for the new electric elevator installed in the monument. In 1923, the electric power source for the monument elevator was converted to the local public electric utility, eliminating the need for the steam-generating boiler in the Survey Lodge. The building acquired the name Survey Lodge after its use by survey crews of the

National Park Service in the 1930s. Roof repairs were made in 1932 and again in the 1960s. In the 1970s, the Survey Lodge was converted to the headquarters for Mall Operations of National Capital Parks – Central. A major rehabilitation project, including a complete renovation of the interior, was undertaken in 1989 and completed in 1993.

1.1.5 EVALUATION OF SIGNIFICANCE

Each component of the Washington Monument, including the Washington Monument Grounds, the Washington Monument, the Monument Lodge, and the Survey Lodge, has been evaluated for significance by JMA. The detailed significance evaluation for the Washington Monument Grounds can be found in a companion to this document, the Washington Monument Grounds CLR. The detailed significance evaluations for the Washington Monument, the Monument Lodge, and the Survey Lodge are located in their individual HSRs. The following is a summary of the findings contained in the above-referenced CLR and HSR documents.

The Washington Monument Grounds appear to possess national-level significance as a historic designed landscape under National Register Criterion C within the areas of Architecture, Community Planning and Development, Engineering, and Landscape Architecture for the period 1791 through 1943. As noted in the existing National Register Documentation for the property, the site derives its primary significance from its role as the nation's foremost memorial to its first president and from the pivotal role the monument and its site play in the urban design of the nation's capital. This significance extends from the initial conception of the National Mall area through the completion of the Jefferson Memorial in 1943.

Preliminary investigations into the history of the Washington Monument Grounds have also suggested that the site is likely significant within the areas of Politics/Government and Social History, as a social and political forum and a national meeting ground for expressing American rights and freedoms, with the monument serving as a symbolic backdrop. Further investigation into the extent of the area and contexts associated with use as a political forum will be required to fully determine the areas, periods, and aspects of this significance. It is possible, however, that the significance of the site as a national gathering space may extend to the present day due to the ongoing nature and importance of these uses. As such, the site would meet the eligibility requirements of Criterion Consideration G for events and associations that are less than fifty years old. The Washington Monument Grounds also appear to be significant at a local level in the area of Recreation/Entertainment for the role the site has played over many decades in providing passive and active recreational opportunities for D.C.-area residents and visitors alike.

The Washington Monument appears to possess significance under National Register Criterion C within the area of architecture as an example of the early-nineteenth-century movement to commemorate prominent Americans, as embodying the principles of Egyptian Revival architecture in its spare obelisk form, as an engineering milestone, and for its association with its designers, Robert Mills and Thomas Lincoln Casey. The Washington Monument is listed on the National Register of Historic Places. The 1980 documentation form indicates that the monument is significant in the areas of Architecture, Engineering, Landscape Architecture, and Commemoration. The Washington Monument is also a National Historic Civil Engineering

Landmark. The Washington Monument is listed as a critical element of the larger National Mall area property as listed on the National Register of Historic Places in 1994 in the L'Enfant-McMillan Plan for the City of Washington. This nomination indicates that the National Mall area is significant under Criteria A, B, and C in the areas of Community Planning and Development, Landscape Architecture, Politics/Government, and Transportation for the period 1790–1943.

The existing National Register Documentation for the Washington Monument establishes a period of significance of 1848–1889. As a result of the research and analysis conducted as part of this HSR, it is recommended that this period of significance be expanded to include the period 1848–1914. This period includes the original construction period of the Washington Monument along with the construction of important interior features, such as the first-floor lobby with its marble wainscoting and terrazzo floor.

The Monument Lodge appears to possess significance under National Register Criterion C within the area of Architecture for its significance as an early comfort station and visitor center prototype. It embodies period architectural characteristics in its style: a Greek temple form with Victorian embellishments, and its method of construction: a marble- and granite-clad brick structure with a vaulted masonry roof. It is also significant as the work of William Poindexter, a prominent local architect of the late-nineteenth century. The Monument Lodge appears to be a contributing element of the Washington Monument due to its historical association, physical relationship, and function as a support facility for those working in and visiting the Washington Monument. The existing National Register documentation for the Washington Monument, including the Monument Lodge, establishes a period of significance of 1848–1889. As a result of the research and analysis conducted as part of this HSR, it is recommended that this period of significance be expanded to include the period 1888 to 1910. This period includes the construction of the Monument Lodge and the addition of important interior features, such as the terrazzo floors and marble wainscoting in 1910.

The Survey Lodge appears to possess significance under National Register Criterion C within the area of Architecture. Constructed in the period of 1886–1901, the Survey Lodge is an example of an aesthetically designed mechanical building. It was built to support the function of the Washington Monument and is linked to the monument through its location on the monument grounds, through its use of waste materials from the monument's construction, and through its historic function providing steam for the monument's elevator engines. The existing National Register documentation for the Washington Monument, including the Survey Lodge, establishes a period of significance of 1848–1889. As a result of the research and analysis conducted as part of this HSR, it is recommended that this period of significance be expanded to include the period 1886 to 1901. This period includes the construction of the Survey Lodge and the addition in 1901 to accommodate the electric dynamo and generator to power the new electric elevator of the Washington Monument.

1.1.6 SUMMARY OF CONDITION AND INTEGRITY

The Washington Monument, its attached interim security building, and the surrounding hardscape features of the monument site are all currently in good condition. The historic exterior

masonry of the monument, its historic and modern interior finishes, and the interim security building only require maintenance-level repairs to ensure their continued preservation. Maintenance-level repairs are also required for site features such as exterior lighting, paving, and flagpoles.

The exterior masonry of the Washington Monument is in good condition, with minor deterioration from weathering and building settlement evident at joint lines and masonry corners. Long vertical cracks above the 150-foot level currently appear to be monitored for movement. This monitoring should continue, and structural investigations should be undertaken to ensure the longevity of the masonry. The interior structural masonry and iron stair structure are in good condition, exhibiting minor deterioration from age, wear, and maintenance work. Finishes at the entry level, the elevator re-entry (490-foot) level, the observation (500-foot) level, and the elevator mechanical platform are in excellent condition. The elevator system is currently in good working order. The only area of active deterioration is located in the below-grade mechanical area known as Bunker 1, which is located to the west of the monument below the plaza level. The concrete ceiling of Bunker 1 is exhibiting signs of active deterioration and should be investigated to determine appropriate repair methods.

The exterior of the Washington Monument has excellent integrity. The 1889 appearance of the monument has been altered only by the installation of aircraft-warning lights in the pyramidion in 1958, and the construction of the interim security building at the east entrance in 2000. These alterations have not significantly diminished the imposing presence of the marble obelisk.

The integrity of the interior of the monument is good; though few finishes remain from the National Register period of significance in the entry-and-observation-level areas, the central shaft retains significant materials and features dating to 1848–1889. Renovations to the interior of the monument have covered or removed the historical finishes in the ground-level entry area and the 500-foot observation level; in contrast, changes to the central iron stair structure have minimally affected the historical materials. At the ground-level entry area, the terrazzo floor and marble wainscot date to the 1904 and 1913 renovations.¹ The remainder of the current finishes date to the 1992 renovation. In the mechanical room on the north, the 1886–1903 appearance of the ground floor entry area is retained with exposed gneiss foundation walls and 1886 stone flooring. The masonry in the monument shaft interior has remained untouched, with the exception of the installation of memorial stones, which have been inserted in the interior shaft from the beginning of its construction up to the present time. As part of the 1997–2000 renovation, all new finishes were installed at the observation (500-foot) level, including new floors, elevator housing, and glass panels to protect the interior monument masonry within visitors' reach. All of the finishes at the elevator re-entry (490-foot) level were also replaced in 1997–2000.²

1.1.7 RECOMMENDATIONS FOR TREATMENT AND USE

The approved ultimate treatment of the Washington Monument is preservation for its continued use as a memorial and cultural tourist attraction. The preservation of the monument and improvement of visitor facilities are called for in the National Park Service (NPS) Revised

Development Concept Plan (DCP), approved by the National Capital Planning Commission (NCPC) in January 2003. The Revised DCP incorporates planning elements from the 1993 DCP such as improvements to the Washington Monument Grounds, provision for an underground visitor facility accessed through the Monument Lodge, and a redesign of the monument plaza. In addition to these planning goals, the Revised DCP includes the construction of an addition to the Monument Lodge, a skylight over the proposed underground visitor facility, an underground passage from the new underground facility to the monument, and construction of low retaining-wall vehicle barriers and pedestrian pathways around the monument.³ The purpose of the proposed work is to improve security, visitor flow, and accessibility, while retaining recreational areas, preserving the quality of the cultural landscape, and, listed as the highest priority, preserving the Washington Monument. Approval for the Revised DCP was based on a "Finding of No Significant Impact"⁴ for the proposed action as assessed in the "Washington Monument Permanent Security Improvements Environmental Assessment."⁵

The ultimate treatment of the Washington Monument is preservation of the structure in its current condition. In the "Washington Monument Permanent Security Improvements Environmental Assessment," the NPS has assessed alternatives to achieve the most appropriate and effective security improvements in order to ensure the preservation of the Washington Monument and improve security for the monument and its visitors. The Environmental Assessment presented two action alternatives A and B with a third no-action alternative. The two action alternatives A and B will be reviewed here. Alternative A involves the currently proposed underground passage and entrance and is the preferred alternative. Based on the scope of proposed work, Alternative A will be discussed as the rehabilitation of the Washington Monument. Alternative B includes new above-ground facilities and an above-ground security fence providing a passage from the screening areas to the monument. Since Alternative B involves no alteration to the monument, it will be discussed as the preservation of the Washington Monument. The no-action alternative will not be discussed, as it does not address the NPS objectives of improving security, visitor access, and visitor facilities.

In Alternative A, the monument plaza is to be redesigned with granite paving and benches. Though the form of the plaza and the ring of flags are deemed as contributing features, the materials of the current plaza are non-contributing and can be replaced. The proposed design would improve the appearance of the plaza and would provide additional seating for visitors. The proposed scope of work involves the rehabilitation of the Washington Monument; rehabilitation allows more aggressive repairs, alterations, and additions to historical structures while preserving significant historical features and materials. Under the proposed plan, the new entrance would significantly alter the visitor's experience of the monument, as visitors would approach the structure from underground. The visitor would also bypass the historical interior finishes in the ground-floor lobby dating to 1904 and 1913. Alternative A would not involve any additions or accretions to the exterior of the monument and would restore the exterior to its appearance prior to the construction of the interim security building. However, the new entrance would be constructed through the existing foundation, involving significant removal and alteration of historical fabric. The 1878-1880 strengthening of the original 1848 stepped gneiss foundation is an important part of the engineering history of the Washington Monument. A significant amount of the original gneiss foundation would necessarily have to be removed, and possibly portions of

the 1878–1880 concrete underpinning of the foundation, as well. The alteration would be irreversible, causing a permanent change in the monument's structure.

Alternative B provides for the preservation of the monument. Under Alternative B, new above-grade facilities would be constructed near the existing Sylvan Theater to the southeast of the monument. The two proposed buildings would provide ticketing, screening, educational and interpretive facilities, and other visitor services. After screening, visitors would be escorted by law enforcement personnel through an above-ground, double-fenced security pathway to the east entrance of the monument. Alternative B was found to have negative visual impacts on the Washington Monument Grounds, altering the swath of open grass at the base of the monument with the proposed new security fence. This alternative would, however, preserve the monument in its current condition and would be easily reversible in the future. There would be no significant alteration in the historical foundation. The historical visitor experience of entering the monument from the east would be retained.

JMA's recommendation is that although Alternative B has less impact on the historical fabric, Alternative A preserves the character, appearance, and use of the monument and grounds. Alternative A also fulfills the NPS project objectives of improving security, visitor flow, and accessibility while retaining recreational areas, and preserving the quality of the cultural landscape. As proposed, Alternative A is an appropriate treatment with the following recommendations:

- The implementation of the design must ensure that no structural damage will occur to the Washington Monument over the long term.
- The design must minimize the removal of historical fabric.
- Prior to removal of historical fabric, the current historical structure and material to be disturbed must be documented. Any information that would contribute to the understanding of historical construction methods and materials should also be documented. Historical materials should be analyzed to gain information on their original components.
- Any historical material that is removed should be reused and interpreted within the new construction, possibly within the proposed concourse or new visitor facility.
- The design should be implemented by structural engineers and architects with significant experience in rehabilitating historic structures.

1.2 ADMINISTRATIVE DATA

1.2.1 NAMES AND LOCATION OF STRUCTURES

The Washington Monument, the Washington Monument Lodge, and the Survey Lodge are located in the Washington Monument Grounds. The site is positioned within Washington, District of Columbia, immediately west of the National Mall. The Washington Monument Grounds are typically defined as District Reservation 2, a roughly 106-acre area bounded by 14th Street on the east, Constitution Avenue on the north, 17th Street on the west, and the Tidal Basin

on the south. For the purpose of the joint HSR/CLR, the study area has been slightly modified to include approximately 75 acres bounded by 14th and 17th Streets, and Constitution and Independence Avenues.

The Washington Monument stands on an elevated grassy knoll in the southeast quadrant of the study area. The Washington Monument Lodge is located approximately 480 feet east of the Washington Monument adjacent to 15th Street. The Survey Lodge is located approximately 750 feet southwest of the Washington Monument near Independence Avenue.

1.2.2 PROPOSED TREATMENT OF THE STRUCTURE

Proposed Treatment for the Washington Monument: Preservation.

Source Documents:

- National Park Service. *Development Concept Plan*. 1993.
- National Park Service. *Washington Monument Permanent Security Improvements Environmental Assessment*. Washington, D.C., April 2002.
- National Park Service. *Decision Notice and Finding of No Significant Impact – Washington Monument Permanent Security Improvements Environmental Assessment*. Washington, D.C., July 2002.
- National Park Service. *Revised Development Concept Plan*. January 9, 2003.

1.2.3 RELATED STUDIES AND DOCUMENTS

The Washington Monument has been the subject of significant historical documentation including numerous drawings, photographs, reports, studies, documents, and papers. For the purpose of this HSR, the documents specifically related to the history of the Washington Monument, the Monument Lodge, and the Survey Lodge, and the proposed visitor facility and security modifications were the primary references and are listed in the bibliography. Key documents directly related to this HSR include the following:

- Historic American Building Survey, National Park Service, U. S. Department of the Interior. *Washington Monument*, No. DC-428. Aaron V. Wunsch. Washington, D.C., 1994.
- National Park Service. *A General History of the West Potomac Park and Washington Monument Grounds Cultural Landscapes*. Scott G. Shultz. Washington, D.C., 1995.
- National Park Service. *Decision Notice and Finding of No Significant Impact – Washington Monument Permanent Security Improvements Environmental Assessment*. Washington, D.C., July 2002.
- National Park Service. *National Register of Historic Places Inventory – Nomination Form, Washington Monument*. Donald C. Pfanz. Washington, D.C., 1980.
- National Park Service. *Preliminary Opinion of the Design Proposal as it Relates to the Washington Monument Grounds Cultural Landscape*. Regional Historical Landscape

Architect, Regional Historian, National Capital Region, and Chief, Division of Resource Management, National Capital Parks - Central. Washington, D.C., July 15, 2002.

- National Park Service. *Preliminary Opinion of the Design Proposal as it Relates to the Washington Monument Lodge*. Regional Chief Historical Architect, National Capital Region, and Chief, Division of Resource Management, National Capital Parks - Central. Washington, D.C., July 19, 2002.
- National Park Service. *Preliminary Research Findings – Cultural Landscape Report – Washington Monument Grounds*. Oehrlein & Associates Architects with Robinson & Associates, Inc. Washington, D.C., June 10, 2002.
- National Park Service. *Preliminary Research Findings – Historic Structures Report – Washington Monument Lodge*. Oehrlein & Associates Architects with Robinson & Associates, Inc. Washington, D.C., June 10, 2002.
- National Park Service. *Washington Monument Permanent Security Improvements Environmental Assessment*. Washington, D.C., April 2002.
- National Park Service. *Washington Monument – Proposed Renovation of Entry Level Lobby*. Notter Finegold & Alexander, Inc., April 1991.

1.2.4 CULTURAL RESOURCE DATA

The Washington Monument, Washington Monument Lodge, Survey Lodge, and the Washington Monument Grounds are administered by the National Park Service (NPS) as part of National Capital Parks – Central. The NPS inventory of National Register properties is called the List of Classified Structures (LCS). Each LCS structure is assigned a unique identification number. The identification numbers for the structures evaluated in the HSR are as follows:

- Washington Monument – LCS ID No. 00212000
- Washington Monument Lodge – LCS ID No. 100069
- Survey Lodge – LCS ID No. 100069

The Washington Monument, including the Monument Grounds, the Washington Monument, the Washington Monument Lodge, the Survey Lodge, and associated site features, was listed on the National Register of Historic Places on May 19, 1981. The 1980 National Register documentation indicates that the Washington Monument is nationally significant for its architecture and engineering between 1848 and 1889 within the areas of Architecture, Landscape Architecture, Engineering, and Commemoration. The Washington Monument Lodge and the Survey Lodge are included in the 1980 National Register documentation.

1.3 RECOMMENDATIONS FOR FUTURE RESEARCH

Additional avenues for research related to the Washington Monument include the review of studies and documents that were identified during the preparation of the HSR but not made available by the NPS or were outside the scope of this report. The location and assembly of these

documents would assist future research. The following documents have been identified for future study:

- Thomas Lincoln Casey Papers on the Washington Monument, at the Society for the Preservation of New England Antiquities (SPNEA) for information on the construction of the Washington Monument, the Monument Lodge, and the Survey Lodge.
- Review of Record Group 42 of the National Archives, College Park, Md., for annual and quarterly reports for the National Park Service – National Capital Region for information on the development of the Washington Monument, the Monument Lodge and, the Survey Lodge.
- *Evaluation of the Washington Monument*. Oehrlein and Associates Architects. 1992.
- Recent construction documents or memoranda (1970-present) from National Park Service – National Capital Region files and Denver Service Center files relating to recent work at the Washington Monument, the Monument Lodge, and the Survey Lodge.
- Field notes, photographs, and other documents pertaining to the 1997–2000 restoration work at the Washington Monument in the National Park Service – National Capital Region and/or National Capital Parks-Central files.
- Interviews with National Park Service staff involved in the 1997–2000 restoration work at the Washington Monument.
- Memorial Stone restoration photographs by Judy Jacob, located in the Building Conservation Branch, Northeast Cultural Resources Center of the National Park Services in Lowell, Massachusetts.

Archeological investigations are not included in the scope of this HSR. Although the Washington Monument Grounds are in great part covered with fill, there is some potential for both prehistoric and historic archeological resources. Refer to the companion Washington Monument Grounds CLR for a more detailed discussion of potential archeological investigations.

ENDNOTES

¹ “Floor Plan of Waiting Room Washington Monument, Measurements for Marble Wainscoting,” Approved 20 October 1904; [Architectural Drawing] File 74.2-7; NCP 807/80044; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, MD; “Plans Small Additional Waiting Room, Washington Monument,” Approved 8 May 1913; [Architectural Drawing] File 74.20-18; NCP 807; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.

² “Sheet No. A2 Sup, 490’ Level Interior Elevations, Interior Renovations Washington Monument,” 24 January 2000, Technical Information Center, Denver Service Center, National Park Service; “Sheet No. A3 Sup, 500’ Level North & East Interior Elevations, Interior Renovations Washington Monument,” 24 January 2000, Technical Information Center, Denver Service Center, National Park Service; “Sheet No. A6, 490’ and 500’ Level Floor Patterns, Interior Renovations Washington Monument,” 24 January 2000, Technical Information Center, Denver Service Center, National Park Service; “Sheet No. A7, 490’ Level Reflected Ceiling Plan & Details, Interior

Renovations Washington Monument," 24 January 2000, Technical Information Center, Denver Service Center, National Park Service.

³ National Capital Planning Commission, "Washington Monument Grounds Revised Development Concept Plan and Preliminary Site and Building Plans for Visitor and Security Improvements," 9 January 2003 (NCPC File Nos. 1303 and 6152).

⁴ National Capital Planning Commission, "Decision Notice and Finding of No Significant Impact. Washington Monument Permanent Security Improvements Environmental Assessment," July 2002.

⁵ National Park Service, U.S. Department of the Interior, "Washington Monument Permanent Security Improvements Environmental Assessment," April 2002.

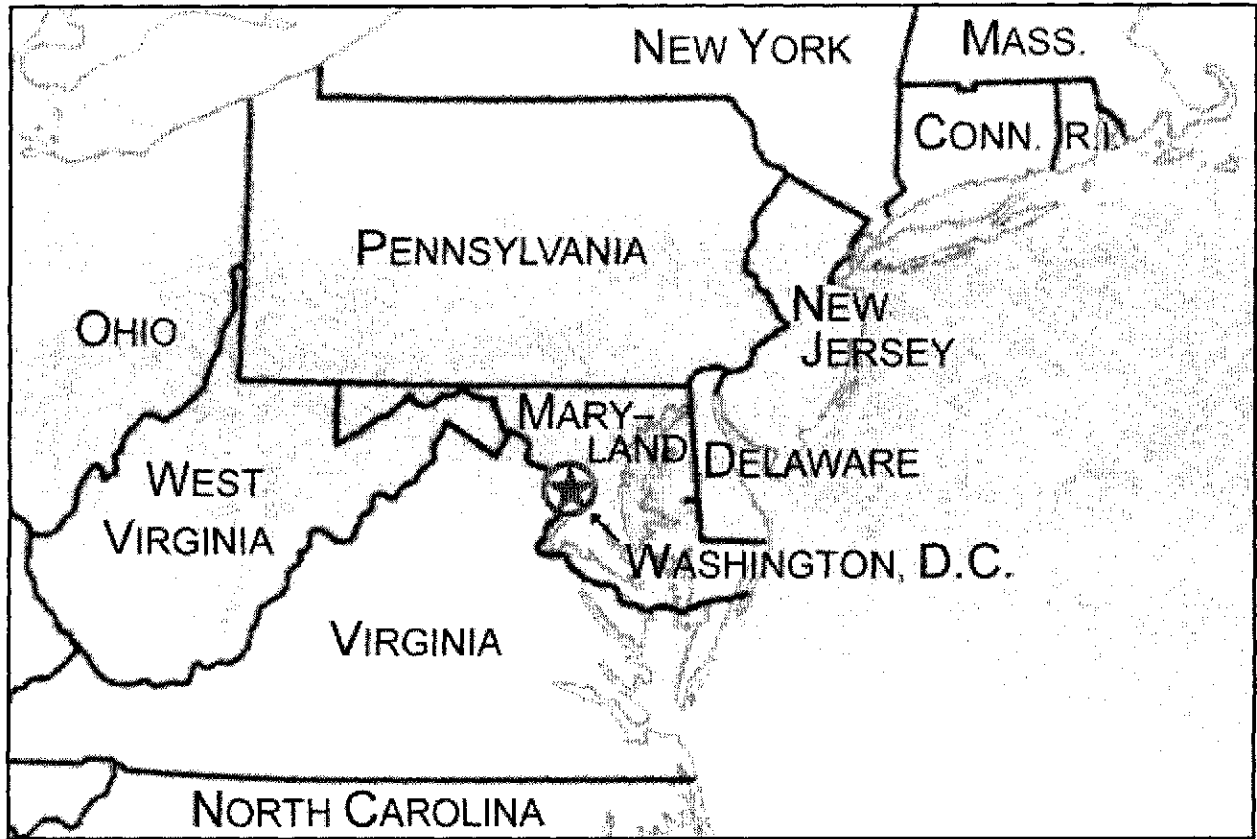


Figure 1.1: Site location map.

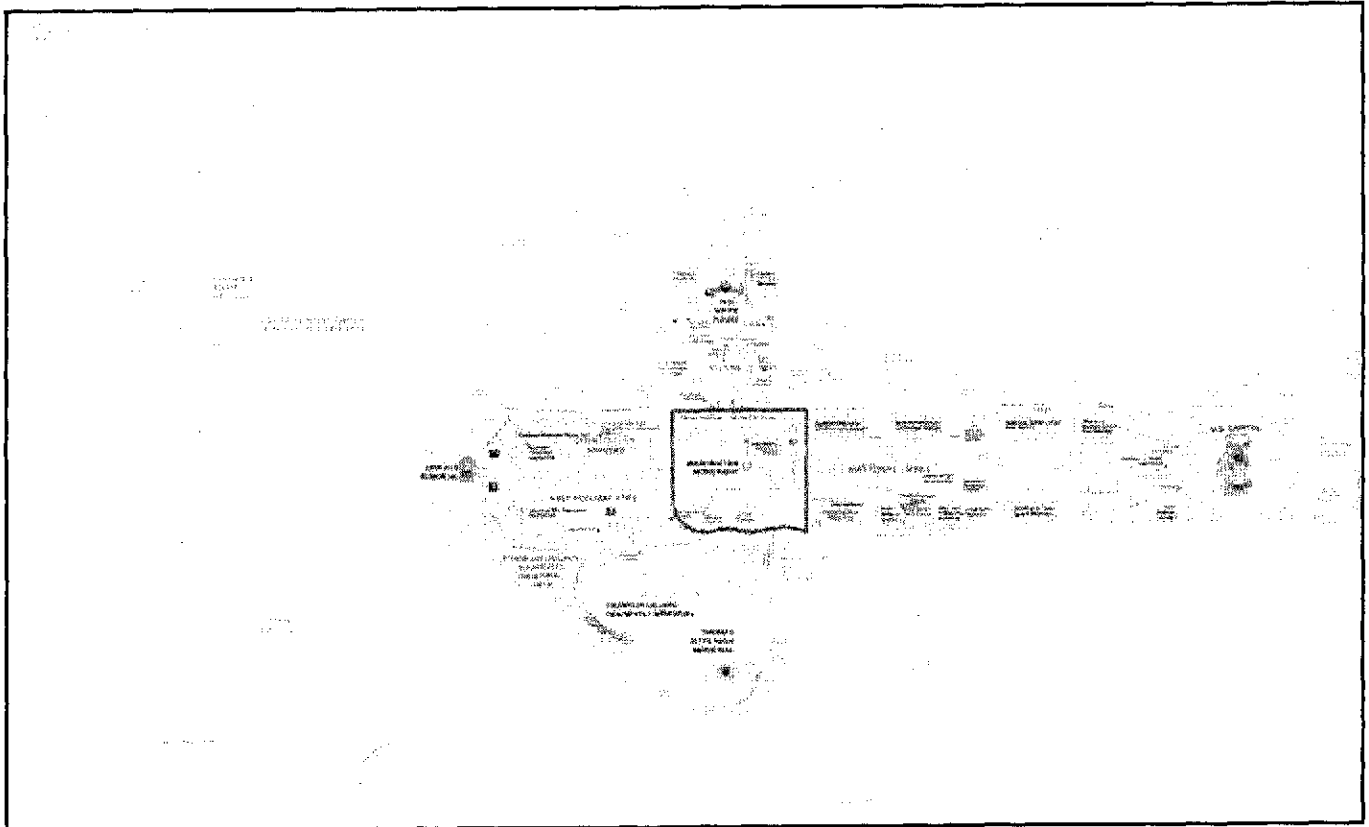
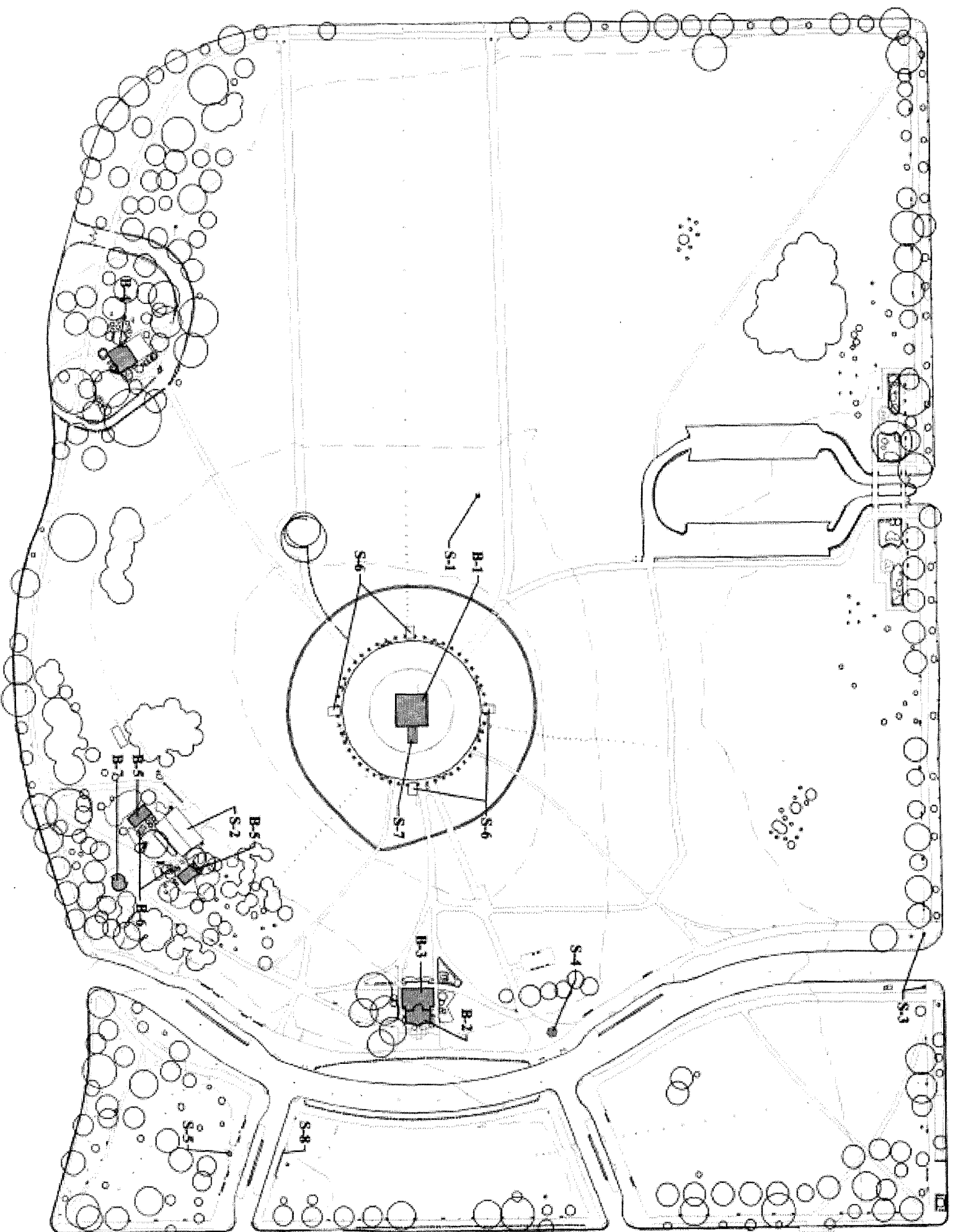


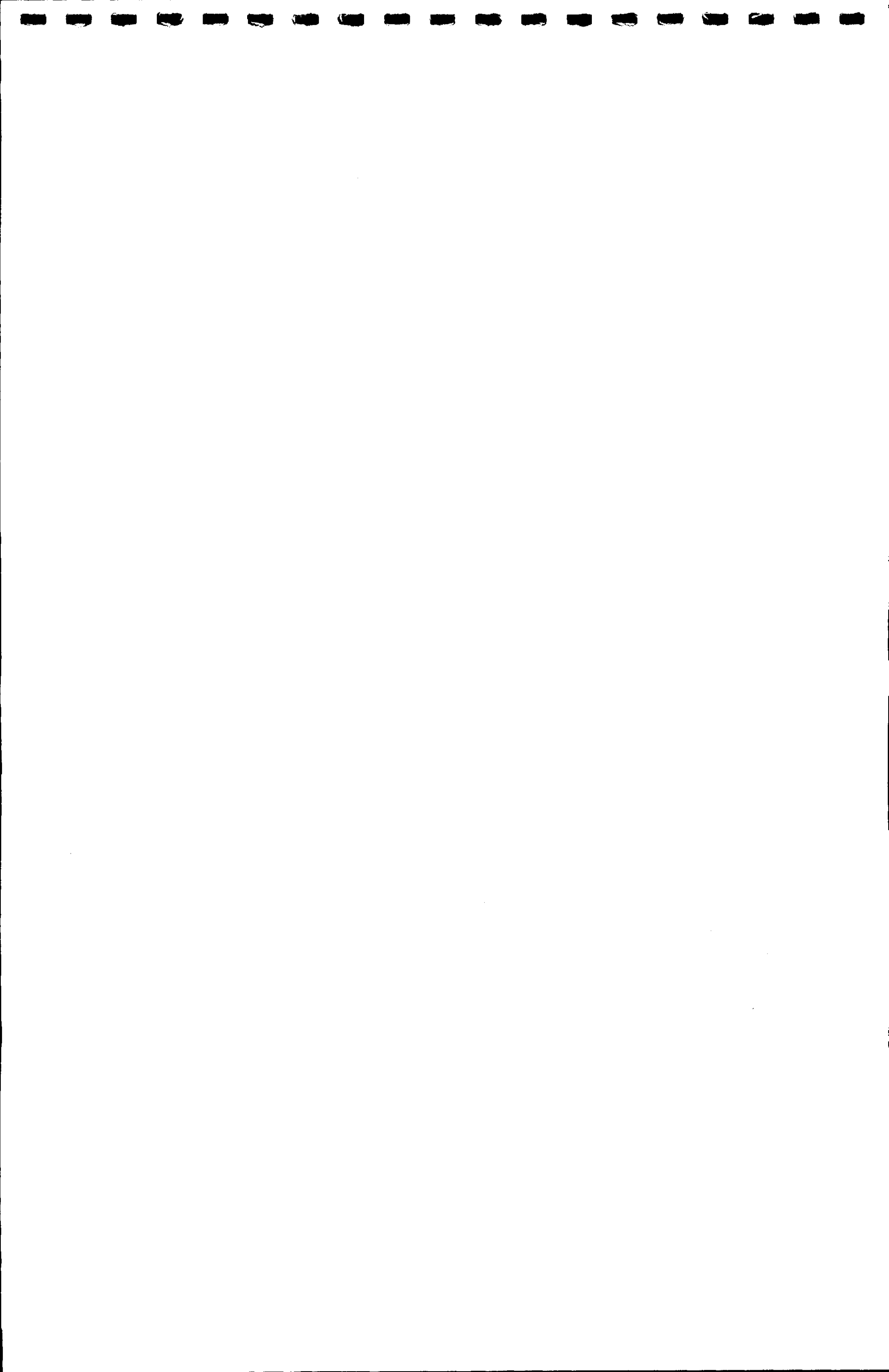
Figure 1.2: Site vicinity map.



- Buildings & Structures**
- B-1 Washington Monument
 - B-2 Monument Lodge
 - B-3 Monument Lodge addition
 - B-4 Survey Lodge
 - B-5 Sylvan Theatre dressing rooms
 - B-6 Sylvan Theatre sheds
 - B-7 Comfort station
 - S-1 Jefferson Pier survey marker
 - S-2 Sylvan Theatre stage
 - S-3 Bulfinch gateposts (2)
 - S-4 Ticket kiosk
 - S-5 Bus tour kiosk
 - S-6 Light vaults
 - S-7 Monument entry station
 - S-8 Granite retaining wall

- Legend**
- Building
 - Courtyard
 - Fence
 - James' Vestibule
 - Road
 - Sidewalk
 - Tree

Figure 1.3: Washington Monument Grounds, buildings, and structures.



Part I – Developmental History

CHAPTER TWO
HISTORICAL BACKGROUND AND CONTEXT



CHAPTER TWO

HISTORICAL BACKGROUND AND CONTEXT

2.1 PRE-1832: UNBUILT MEMORIALS TO GEORGE WASHINGTON

As early as the end of the Revolutionary War, there were proposals to memorialize George Washington. One of the earliest was proposed in 1783 when the Continental Congress resolved to erect an equestrian statue of General Washington “at the place where the residence of Congress shall be established.” This statue would commemorate Washington’s success as a military leader.¹

After the ratification of the Constitution in 1787, the search for a permanent capital began. George Washington oversaw the committee that in 1790 selected the 100-square-mile diamond-shaped district at the fork of the Potomac River between Georgetown and Alexandria as the new capital city. Major Pierre Charles L’Enfant developed a plan for the new capital city of Washington within this District of Columbia. L’Enfant’s plan employed Baroque-influenced ceremonial spaces linked by grand radial avenues while respecting the natural contours of the land in accord with English picturesque landscape ideals. The central feature of this plan was a T-shaped ceremonial space, or Mall, that linked the Capitol and President’s House. L’Enfant intended this space to become a center of intellectual and artistic life within the city. Within this mall was planned a tree-lined central avenue extending west from the Capitol, which would terminate at an equestrian statue of George Washington located at the crossing of this axis west from the Capitol and the axis south from the President’s House.²

After Washington’s death in 1799, there was renewed interest in building a memorial to him, and over the next several decades there were several additional plans to commemorate George Washington in his namesake city. John Marshall proposed building a mausoleum for Washington, and Martha Washington even granted permission for her husband’s remains to be moved from Mount Vernon.³ In 1800, South Carolina representative Robert Goodloe Harper proposed, on the advice of Benjamin Latrobe, a pyramidal mausoleum for Washington in front of the Capitol.⁴ The equestrian statue first authorized in 1783 was again brought before Congress in 1816, 1819, and 1824. In all of these attempts to honor Washington, Congress failed to provide authorization or funding.⁵ In 1832, to celebrate the centennial of Washington’s birth, Congress did authorize John Vanderlyn to copy Gilbert Stuart’s painting of Washington as a full-length portrait and Horatio Greenough to sculpt a statue of Washington based on Houdon’s bust of the founding father.⁶ The bronze equestrian statue of Washington first authorized by Congress in 1783 was finally commissioned from sculptor Clark Mills in 1853 and installed in Washington Circle.⁷

2.2 1833–1854: PLANNING AND INITIAL CONSTRUCTION PHASE

The 1832 centennial of Washington's birth brought to greater public attention the lack of a monument to Washington in the nation's capital. Congress had yet to make provisions for a suitable monument, and so on September 26, 1833, prominent Washington citizens, including Chief Justice John Marshall and George Watterston, Librarian of Congress, founded the Washington National Monument Society. Chief Justice John Marshall served as the society's first president, with James Madison assuming this role after Marshall's death.⁸

The Washington National Monument Society sought to raise funds for construction of a monument from the general public. For this purpose, they used bonded agents who were nominated for this task by senators, representatives, and other public figures. These agents initially received a ten-percent commission on all funds that they collected. In an effort to make the monument a national effort and allow all citizens to contribute, donations were initially limited to \$1 per person per year.⁹

By August 1836, the Washington National Monument Society had raised over \$28,000 and in order to maintain public and congressional interest and support of the project, they advertised a call for designs for a monument to Washington, with an estimated cost of not less than \$1,000,000. Several designs were submitted, including one by Robert Mills. The society felt that none of the designs was "coextensive with the Nation" and did not select a design at this time.¹⁰

The flow of donations to the Washington National Monument Society greatly slowed after the Panic of 1837 with its accompanying economic downturn. The \$1 limit on individual donations also adversely affected fund-raising progress. The slow pace of fund-raising and the validity of agent-generated collections were questioned by Congress in 1839, and throughout the direct involvement of the society with the Washington Monument.¹¹ The society defended its methods and, in an effort to spur fund-raising, rescinded the \$1 limit on donations and increased the agent commission to twenty percent. Even with these modifications, the rate of fund collection "did not meet the expectations of the Society."¹²

Still without a selected design and facing increasing criticism from Congress on the slow pace of fund-raising, in November 1844, the Washington National Monument Society formed a committee "to procure a suitable design" for the monument.¹³ In April 1845, this committee selected a design by Robert Mills, estimated to cost \$200,000 to complete with \$50,000 of that cost for completion of the shaft.¹⁴ This design was formally adopted by the Society on November 18, 1845.¹⁵

This Robert Mills design was for a 600-foot-tall obelisk with a nearly flat top, surrounded by a colonnaded rotunda 200 feet in diameter and 100 feet tall with 30 12-foot-diameter columns forming a gallery or "National Pantheon" with statues of 30 prominent Revolutionary War heroes and signers of the Declaration of Independence. The rotunda was to be crowned with a statue of Washington driving a chariot. Visitors would enter the obelisk through two 15-foot-tall,

6-foot-wide portals on the east and west elevations. Each entrance had a heavy pediment and entablature with a winged ball and asp over each door. The size and scale of these entrances was in keeping with the massive pantheon planned by Mills. Guests would travel to the observatory at the top of the obelisk by a "railway" (see figure 2.1).¹⁶

By 1847, the Washington National Monument Society had \$87,000 on hand and deemed this a sufficient amount to begin construction. The society began petitioning Congress to provide a suitable site for the monument, preferably on the Mall. Due to earlier congressional criticism of the society, they also formed a committee to investigate potential privately held sites for the monument.¹⁷

The Washington National Monument Society's petitioning of Congress for a public site upon which to build a monument to Washington was successful. On January 31, 1848, Congress passed a resolution authorizing the president of the United States and the board of managers of the Washington National Monument Society to select a site from the public grounds and reservations in the capital. On April 12, 1848, President Polk executed a deed granting the Washington National Monument Society Reservation 3, approximately 37 acres along the Potomac River.¹⁸ This site included the area selected by L'Enfant for an equestrian statue of Washington, the crossing of the east-west axis west from the Capitol and the north-south axis south of the White House.

While L'Enfant's 1791 plan of Washington showed an equestrian statue of George Washington placed at the intersection of the cross-axes from the President's House and the Capitol,¹⁹ the foundations for the Washington Monument were actually laid 371.6 feet east and 123.17 feet south of this intersection.²⁰ The selection of this specific site for the monument has been the subject of much speculation by historians because the records of the Washington National Monument Society contain little mention of the selection of the actual site of the monument. There are several theories to explain this off-axis position. Since the intersection of the axes was on the banks of the Tiber Creek where it met the Potomac River, it is likely that the land was considered unable to support the weight of so large a monument and the foundations were built on firmer land south and east of this intersection.²¹ The site at the cross-axes may have also required expensive land-filling operations to support the monument with its large pantheon and was therefore deemed an unsuitable site.²² Another possible factor affecting the monument's placement is the fact that when construction of the monument began, the Mall was not symmetrical about the Capitol axis. The presence of the Washington Canal along the north edge of the Mall shifted the east-west center line of the Mall south of the Capitol axis. The present monument site would have been at the approximate north-south center of the Mall as it existed in 1848.²³

The Washington National Monument Society had insufficient funds on hand to build the entire Mills-designed monument, and so Robert Mills modified his design. Mills proposed building only the 500-foot-tall obelisk. Instead of standing on a circular pantheon, the obelisk would rest on a series of massive steps, which would also serve as a foundation. The pantheon or other appropriate base could be completed later as funds became available.²⁴

Work began on the monument's foundations in June 1848. Large, rough, untooled blocks of bluestone gneiss were used to construct the foundation. These, and all building materials for this initial phase of construction, arrived at the site from a wharf on the Potomac.²⁵ Before construction began, Mills chose the Jefferson Stone for use as a permanent benchmark to measure any settlement of the structure.²⁶

With great pomp and ceremony, the cornerstone of the Washington Monument was laid July 4, 1848. President James K. Polk led a parade from the Capitol that included members of the Cabinet and Congress, military units, fire companies and bands. Grandmaster Benjamin B. French of the Grand Lodge of Free and Accepted Masons of the District of Columbia formally laid the 24,500-pound white-marble cornerstone, complete with a memento-filled zinc case. Grandmaster French wore the same Masonic apron and sash that Washington had worn when he laid the cornerstone of the Capitol in 1793.²⁷ A two-hour oration was given by Speaker of the House Robert C. Winthrop in which he stated, "Let the column which we are about to construct be at once a pledge and an emblem of perpetual union! Let the foundations be laid, let the superstructure be built up on and cemented, let each stone be raised and riveted in a spirit of national brotherhood!" That evening, a grand fireworks display completed the festivities.²⁸ This celebration was the precursor to the annual 4th of July celebrations held on the Monument Grounds through the 1850s.²⁹

Work on the Washington Monument progressed rapidly, given that the marble was dressed and polished by hand, rather than by machine as was becoming popular in other cities.³⁰ The Monument Grounds soon took on the appearance of a busy construction site, with the construction of various outbuildings, including a dwelling for the day watchman, an office and reception room for visitors, an engine house, a saw shed, a stonemasons shop and shed, two stone block sheds, a carpenters' shop, a smiths' shop, a cement house, a feed house, and a stable.³¹ By the end of the 1848 work season, the foundations were complete, and by 1852, the walls had reached a height of 126 feet (see figure 2.2).³²

As construction progressed, the Washington National Monument Society continued to seek additional contributions to allow construction to continue. Immediately after the cornerstone was laid, the Society took advantage of the public interest in the project to distribute a special appeal for funds to the general public, as well as an appeal for all public and private students to each contribute a penny a month. In 1850, an appeal was made to all banks in the United States. This was followed by an appeal made in conjunction with the census. The census officers would be given a 15% commission on contributions they collected. None of these appeals met the society's expectations.³³

In 1849, as a measure of support for the project, some citizens of Alabama proposed donating to the Washington National Monument Society a block of Alabama marble for insertion into the interior of the monument. The society accepted this gesture and encouraged other states and territories to contribute in this manner. Many of these early donated stones extolled the virtues of Washington and the country that he helped found. Later, Indian tribes, social societies, professional organizations, labor unions, businesses, individuals and foreign countries were

permitted to donate stones for the monument. Some of these later stones made no mention of Washington or the country.³⁴ These presented stones were stored and displayed in a lapidarium built on the Monument Grounds until they were inserted into the monument. By 1854, 92 of these presented stones, including a stone from each state and two of the territories, had been inserted into the interior of the monument.³⁵

On March 6, 1854, members of the Know-Nothing political party raided the Monument Grounds and stole a stone from the Temple of Concord in Rome that had been given for use in the monument by the Pope. The Know-Nothings held anti-immigrant and anti-Catholic beliefs. After this theft, donations to the Washington National Monument Society, already slow, stopped amidst public furor over this act of vandalism. The society advertised a \$100 reward for information on the theft, but even today, the location and fate of this "Pope Stone" is not known with certainty.³⁶

Even with this setback, work on the monument continued through the 1854 building season, ending at a height of 152 feet above the foundations. At the end of this season, the funds of the Washington National Monument Society were exhausted, having spent a total of \$230,000 on construction to that date. The society then appealed to Congress for additional funding to continue construction, since their recent private fund-raising efforts had been largely inadequate.³⁷

2.3 1855-1875: PAUSE IN CONSTRUCTION

The Washington National Monument Society's 1854 congressional appeal was almost successful. On February 22, 1855, the House of Representatives recommended a donation of \$200,000 to the society to allow construction to continue. This resolution was rescinded once it became known that, also on that date, members of the Know-Nothing party held illegal elections for officers of the Washington National Monument Society and forcefully took over the Monument Grounds. The Know-Nothings felt that the society had hired too many foreign-born and Catholic workers. This action created two rival boards governing the Washington National Monument Society. Congress refused to consider financial aid to the monument until this situation was resolved.³⁸

The Know-Nothing-controlled society occupied the Monument Grounds and added two additional courses, or four vertical feet, to the monument shaft.³⁹ Much of this stone was taken from the refuse stone found on the grounds and was later found to be of poor workmanship and removed. After their own rousing failure to complete the Washington Monument, the Know-Nothings returned control of the Monument Grounds and the records to the original Washington National Monument Society in 1858.⁴⁰

The decline in public trust of the Washington National Monument Society because of the theft of the "Pope Stone" and the Know-Nothing illegal election precluded further-fund raising.⁴¹ This situation was exacerbated by the impending political and social conflict. Realizing their situation, both financially and politically, the Washington National Monument Society

maintained the monument and grounds as best they could and waited for a more favorable climate in which to complete their project. The Washington Monument would stand unfinished for almost two decades (see figure 2.3).⁴²

That truncated shaft, with its untidy surroundings, looked only like an insult to the memory of Washington. It symbolized nothing but an ungrateful country, not destined – as, God be thanked, it still was – to growth and grandeur and imperishable glory, but doomed to premature decay, to discord, strife, and ultimate disunion.⁴³

The Civil War and the increased needs of the growing city and military presence led to the impressment of the Monument Grounds into military service. In May 1861, Lt. Bickworth, U.S. Army, was ordered by President Lincoln “to use the Monument Grounds for Cattle belonging to the Government” as part of the supply effort for Union troops (see figure 2.4).⁴⁴

The Washington National Monument Society attempted to take advantage of the end of hostilities and restoration of the Union to resume construction of the Washington Monument. Some saw the completion of the monument as a symbol of a mended nation. The first post-war meeting of the Washington National Monument Society was held on February 22, 1866, to mark Washington’s birthday, as were many meetings of the Washington National Monument Society. President Andrew Johnson⁴⁵ addressed the Society: “Let us restore the Union, and let us proceed with the monument as its symbol until it shall contain the pledge of all the States of the Union.”⁴⁶ Despite this presidential endorsement, the society’s fund-raising efforts, through appeals to the general public and Congress, continued to be unsuccessful.

After the Civil War, the Washington Monument Grounds was known as ‘Murder’s Row,’ home to unsavory characters.⁴⁷ This unsanctioned use of the grounds continued until 1870 when Congress established a territorial government for the District of Columbia. Under the direction of Alexander “Boss” Shepherd, vice president of the Board of Public Works, and Orville E. Babcock, head of the Army Corps of Engineers’ Office of Public Building and Grounds (OPB&G),⁴⁸ this government carried out many public improvements.⁴⁹ In 1872, the OPB&G began work to improve the Washington Monument Grounds, then described as “in very bad condition, a portion overflowed at high tide, the rest ungraded, without drains, roads, walks, trees or shrubbery.”⁵⁰ To improve the grounds and make them publicly accessible, the OPB&G built several tree-lined, curving gravel roads through the grounds.⁵¹ All of these improvements were to make the grounds more accessible and attractive for the public. Low lands near the Potomac River were drained, creating two lakes and expanding the monument grounds.⁵² As part of the filling efforts to create these two lakes and the roads around the Monument Grounds, the superstructure of the Jefferson Stone was broken up and removed from the grounds in August 1872. The importance of this marker was not realized until work resumed on the Washington Monument and attempts were made to determine if the monument had settled. It was then realized that the Jefferson Stone had been Mills’s bench mark for the monument. After much debate as to the original stone’s location and function, the Jefferson Stone Marker was rebuilt on the foundations of the original Jefferson Stone in December 1889.⁵³

2.4 1876–1888: COMPLETION OF THE WASHINGTON MONUMENT

The celebrations for the Bicentennial helped to bring attention to the national embarrassment of an incomplete Washington Monument. Speeches in favor of completing the monument were made by public officials and it was also promoted by newspaper editorials.

At present, the monument is a reflection upon the whole country. It seems as if the admiration and respect felt by our people for the founder of our Republic had met with a great check, and that the gratitude for his eminent services had completely died out. The appearance of this half-finished pile of marble seems to mark us as a fickle people, anxious one day to do honor to the greatest character in our history, the next quite indifferent whether his memory is honored or not.⁵⁴

Finally on July 5, 1876, after much lobbying by the Washington National Monument Society, Senator John Sherman introduced legislation authorizing the federal government to assume responsibility for completion of the monument. On August 2, 1876, this resolution passed unanimously.⁵⁵ It provided \$200,000 for completion of the monument, to be divided into four equal annual installments. One condition of this funding was for the Washington National Monument Society to return ownership of the Washington Monument and Grounds to the federal government. The society could continue to raise funds for the monument as well as act as an advisor in the completion and maintenance of the monument, but a Joint Commission for the Completion of the Washington Monument, established by Senator Sherman's resolution, would oversee the completion of the monument.⁵⁶ The actual construction work was to be carried out by the U.S. Army Corps of Engineers with Lt. Col. Thomas Lincoln Casey as engineer in charge.

Once appointed, the joint commission spent two years deciding how best to complete the monument. The alternatives considered included completion of the monument with the national pantheon as originally designed by Robert Mills, completion of the Mills's obelisk, or using the incomplete monument as a base for a new monument design.⁵⁷

The ability of the foundations to support the completed monument was the subject of much study and debate. In 1874, as part of an earlier attempt to complete the monument, 1st Lt. William Marshall had studied the foundations and reported that the foundations were secure and did not require strengthening. He did recommend reducing the weight bearing on the foundation by reducing the monument's height to 400 feet, using brick to build the walls above 250 feet, and building a roof of cast-iron plates. A review of Marshall's work by the Corps of Engineers Board of Engineers for Fortifications disagreed with this assessment.⁵⁸ In June 1878, Congress approved \$36,000 to be spent strengthening the foundations, with Casey to design the work.⁵⁹

Thomas Lincoln Casey developed a remarkable plan for reinforcing the existing foundations by constructing massive concrete footings below the original foundations and building massive concrete buttresses that tied together the new footings and original foundation (see figure 2.5). This digging into and under the foundations was skillfully planned so as not to endanger the

stability of the monument. The earth below the existing foundations was excavated in four-foot-wide tunnels that were then filled with concrete. This new slab would be tied to the existing foundation through a series of twelve concrete buttresses, partially excavated into the existing foundation (see figure 2.6).⁶⁰ The work of strengthening the foundation began in February 1879⁶¹ and was completed May 28, 1880 (see figure 2.7).⁶² When completed, this work had not caused any cracks or damage of any kind to the monument, a testament to Casey's skill as an engineer and construction manager.⁶³

In preparing a plan for strengthening the foundations, Thomas Lincoln Casey developed a design for the completed monument. Casey's design was for a plain obelisk, without Mills's pantheon and without applied Victorian embellishment. In the process of developing this design, Casey received advice from George Perkins Marsh, the American ambassador to Italy on the proper form of obelisks. Marsh had studied Egyptian obelisks in Rome and provided Casey with their proportions. Casey's redesign of the obelisk reflected this information and called for a 555-foot-tall unadorned obelisk with a marble exterior and granite interior. The 500-foot shaft would be capped with a steeply pitched pyramidion of iron and glass. The outer masonry structure would be fitted with an interior skeleton of iron supporting the platform elevator for building materials during construction and the later passenger elevator and stairs. This obelisk was 45 feet shorter than Mills's design but had a much steeper pyramidion.⁶⁴

This design had its detractors, whom the Washington National Monument Society countered in a presentation to Congress:

It has been objected in some quarters that the ancient obelisks were all monolithic – massive single stones, cut whole from the quarry; but our country has been proud to give examples of both political and material structures which owe their strength to union; and this Monument to Washington will not be the less significant or stately from embodying the idea of our national motto, "*E pluribus unum.*"⁶⁵

Congress approved Casey's preliminary design in the spring of 1880.⁶⁶

As part of the preparations for resumption of construction and an influx of workers and equipment, including five boom derricks and two steam engines, Lt. Col. Casey had many outbuildings built, including a carpenters' and rigging shop, a cement storehouse, a three-forge blacksmith shop, and three stonecutting sheds. Once again, a railroad was built on the grounds to facilitate handling of the stone. During this second phase of construction, all materials were transported directly to the building site by railroad. The railroad tracks extended through the stonecutting sheds to the east entry of the monument to facilitate material handling (see figure 2.8).⁶⁷

Once the new foundations were complete, a steep earthen embankment was built over them. This terrace was later expanded with fill that included pieces of bluestone gneiss removed from the original foundations as part of the foundation expansion. This stone was added to the fill to

provide greater support to the foundation.⁶⁸ As work on the monument progressed, the sides of the embankment were graded and sown with rye and grass seed to prevent the terrace slopes from washing out and to control the dust that could damage machinery on site.⁶⁹

Once the foundations were strengthened, Thomas Lincoln Casey turned his attention to construction of the shaft. In order to gain a stronger bed for the new work, the inferior stonework installed during the Know-Nothing regime was removed and the new work begun at a height of 150 feet. The line currently visible around the monument at 150 feet is due to differences in weathering between the old stone and the new stone.⁷⁰ Before any new stone could be laid in the shaft, the interior iron structure needed to be installed. The interior structure was composed of eight iron Phoenix columns supporting the elevator and stair. These columns were built in 20-foot segments. The interior structure was built 20 feet higher than the top of the shaft and then the exterior walls were built an additional 20 feet higher. Then another 20 feet was added to the interior structure and the process was repeated.⁷¹

Improved technology in materials, such as the Phoenix iron columns that Casey used as the interior structure, and equipment, including the machine-dressed and quarried stone and Otis Brothers steam hoist for carrying stones to the top of the obelisk, allowed work during this second phase of construction to progress faster and more regularly than during the initial construction phase (see figure 2.9). The regularity of congressional appropriations, rather than the sporadic public donations that funded the first phase, also improved the pace of construction.⁷²

On August 7 1880, construction resumed on the obelisk shaft with the laying of a second "cornerstone" at the 150-foot level. Work on the shaft progressed smoothly through the next four building seasons, despite problems maintaining a steady supply of stone and other materials, including the iron columns. The top of the shaft, the 500-foot level, was completed on August 9, 1884 (see figure 2.10).⁷³

As construction on the obelisk progressed, it became apparent that Thomas Lincoln Casey's initial design for the pyramidion was not satisfactory. In consultation with Bernard Richardson Green, one of his assistant engineers, Casey designed a remarkable cap for the Washington Monument (see figure 2.11). Casey's 1884 pyramidion design met difficult criteria: the pyramidion needed to be as light as possible so as not to further burden the structure, yet it needed to be strong enough to resist the wind at a height of 550 feet. It also needed to be of a material that would not discolor the marble shaft below, unlike his earlier design which called for an iron and glass pyramidion. Casey's 1884 pyramidion design was solely marble. The weight of the pyramidion stones is not carried by the courses below, but rather by 12 marble ribs, integral to the marble facing stones. These ribs begin at the 470-foot level. The corner ribs join halfway up the pyramidion and the center ribs meet at the apex to form a keystone. These marble blocks are joined by precisely cut joints, most of which were originally intended to be open and were detailed to shed as much water as possible.⁷⁴

On December 6, 1884, the capstone for the Washington Monument was set in place (see figure 2.12). At the very apex of the monument was set a small cast-aluminum pyramidal cap. William

Frishmuth of Philadelphia cast the 100-ounce, 5.6-inch-wide and 8.9-inch-tall cap. At the time, aluminum was a very precious metal, as modern methods of refining the ore had yet to be perfected. The monument's aluminum cap was one of the largest pieces of aluminum cast up to that time. It was even displayed in the windows at Tiffany's of New York before it was installed at the top of the monument.⁷⁵ Aluminum was chosen for several reasons: it would not tarnish and discolor the marble below and, as a good conductor of electricity, it would serve well as the connector for a series of small lightning rods on the pyramidion.⁷⁶

The stone exterior of the monument is entirely self-supporting. The iron-columned interior structure supports the elevator and stairs and was the tallest iron frame at the time the Washington Monument was built. The monument was the tallest structure in the world when completed and remains the world's tallest free-standing stone masonry structure.

The formal dedication of the Washington Monument was held February 21, 1885. Representatives of all branches of government, the armed forces, many social organizations, including several Masonic lodges, and others braved the snow and cold weather to witness the ceremony (see figure 2.13).⁷⁷

In his speech to the crowd, Thomas Lincoln Casey said, "the resources of modern engineering science have supplied means for the completion of the grandest monumental column ever erected in any age of the world."⁷⁸

The Hon. Robert C. Winthrop, who had delivered an oration at the 1848 cornerstone-laying ceremony, also spoke:

America is certainly at liberty to present new models in art as well as in government, or to improve upon old ones; and, as I ventured to suggest some years ago, our monument to Washington will be all the more significant and symbolic in embodying, as it does, the idea of our cherished national motto, *E pluribus unum*. That compact, consolidated structure, with its countless blocks, inside and outside, held firmly in position by their own weight and pressure, will ever be an instructive type of the national strength and grandeur which can only be secured by the union of "many in one."⁷⁹

The ceremony ended with President Chester Arthur's formal dedication of the Washington Monument "to the immortal name and memory of George Washington." That evening, a stunning fireworks display was held at the monument that included displays of national emblem rockets in red, white, and blue, depictions of Niagara Falls, agricultural implements, mechanical tools, and Washington resigning his commission to Congress, with a finale of Washington flanked by Liberty and Columbus.⁸⁰

Even though the exterior of the Washington Monument was complete, there was still much work to be done before the monument could be opened to the public. The remaining "presentation blocks" needed to be inserted into the interior walls,⁸¹ the steam stone-and-equipment hoist

needed to be converted for passenger use, the interior wooden stair components required replacement with ironwork, the engine and boiler houses needed to be relocated or hidden from view, and the grounds completed.⁸²

Thomas Lincoln Casey originally intended to block up both of the large entrances to the monument. He felt that these entrances had been designed to complement Mills's large national pantheon and were no longer in keeping with the simplicity of the obelisk's current form.⁸³ In place of Mills's pantheon, Casey would have enlarged the terrace surrounding the base of the monument and supported it with a balustrade-topped masonry wall ornamented with bas reliefs. Four double stairs would lead to the top of the terrace while a tunnel under the terrace would provide access to the interior of the monument. After negative comments on such a plan by some congressmen, due to its artistic merits and high cost, estimated to be \$612,300, Casey proposed a simpler plan. This plan called for expanding the existing terrace so that it gradually sloped into the existing landscape, and planting trees and shrubs around this mound. This proposal had an estimated cost of \$166,800.⁸⁴

As the Washington Monument was being readied to receive the public, so too were the Monument Grounds. The Office of Public Buildings and Grounds had improved portions of the grounds with roads and trees in the 1870s,⁸⁵ but the on-going construction restricted public use of the park. The grounds were also expanding in size due to the filling of the Potomac Flats. This filling created the modern Tidal Basin and Washington Channel. Throughout the construction of the monument, those portions of the grounds unaffected by the construction were maintained by regrading roads, reseeding bare spots, and mowing grass for hay.⁸⁶ Once the superstructure of the monument was complete, work began to improve the grounds immediately around the monument.

The plan adopted for improving the grounds was the more naturalistic and less expensive plan proposed by Casey in 1884: that of a gradually sloping hill that was an extension of the earthen terrace surrounding the monument's foundations. Roads and paths would be laid out on the grounds, in concurrence with the existing roads and carriageways on the grounds.⁸⁷

As part of the improvement of the grounds around the Washington Monument, the construction buildings were slowly removed. The boiler with its tall chimney was moved to a new stone building 750 feet southwest of the monument, now known as the Survey Lodge. A brick tunnel carrying live and exhaust steam pipes connected the boilers with the monument's steam elevator engine.⁸⁸

A small lodge for "public comfort and for the Washington National Monument Society" was built east of the Washington Monument. Architect William Poindexter designed the lodge and Lane and Malnati constructed it.⁸⁹ This building, now the Monument Lodge, initially served as the meeting place for visitors hoping to ascend the monument, and housed the office of the monument custodian, archives for the Washington National Monument Society, and public toilet facilities.⁹⁰

In March 1887, a contract was made with Thomas Lyons to deposit approximately 250,000 cubic yards of fill around the base of the Washington Monument to create a naturalistic hill and to fill in Babcock Lake north of the monument.⁹¹ As this filling was completed, roads and paths of a variety of materials, including granolithic pavement,⁹² plank walks, and graveled carriageways were built leading from the boundaries of the grounds to the Washington Monument.⁹³

The Washington Monument was formally opened to the public on October 9, 1888. Once the monument was complete, the Joint Commission was disbanded and control of the monument and grounds was transferred to the Office of Public Buildings and Grounds.⁹⁴ By December 1889, "the drive about the monument is . . . becoming quite a popular one," fulfilling the intentions of the designers of the grounds (see figure 2.14).⁹⁵

2.5 1889–PRESENT: MEMORIAL AND TOURIST ATTRACTION

Once completed, the Washington Monument and Grounds were maintained and renovated to meet the changing needs of Washington, D.C.'s residents and visitors. The Washington Monument became a popular tourist attraction and its grounds became popular as a place of public assembly, for recreation, for entertainment, and for celebration. Early examples of such gatherings included the April 1892 and October 1902 encampments of the Grand Army of the Republic,⁹⁶ and the August 1895 encampment of the Knights of Pythias.⁹⁷

In 1901, Senator James McMillan of Michigan introduced a bill that formed a Senate Park Commission charged with developing a new vision for Washington, D.C. The Senate Park Commission, also known as the McMillan Commission, included Daniel H. Burnham, Charles F. McKim, Frederick Law Olmstead, Jr., and Augustus St. Gaudens. This commission looked back to L'Enfant's 1791 design for the capital for inspiration for their own plan of the city, which they presented to Congress in 1902. In part, the McMillan Plan called for relandscaping and redesigning the ceremonial core, the Capitol Grounds and Mall, by extending the cross-axis west and south of the Washington Monument.⁹⁸ The Washington Monument was the center of an expanded cross-axis around which the McMillan Commission planned a Monument Garden, the "gem of the Mall system": a formal sunken garden west of the monument, accessed by a grand staircase, filled with bosquets, reflecting pools, fountains, and sculpture. This garden would reinforce the north-south axis between the White House and the proposed memorial south of the Tidal Basin, counter-balancing the off-axis placement of the Washington Monument (see figure 2.15).⁹⁹

Due to lack of funding appropriations, none of the elements proposed by the McMillan Plan were immediately implemented. The McMillan Plan did influence the development of the Mall area and was partially implemented in the 1930s. The Monument Gardens plan for the Washington Monument Grounds was never realized.

After the Washington Monument opened to the public in 1888, there were many ongoing maintenance and improvement projects. The interior iron framework was routinely repainted. The Washington Monument elevator power source was upgraded from steam to electricity in

1901. This shift in power source was to replace the inefficient steam system and also to provide an independent power source for the various buildings on the Washington Monument Grounds. The change to electricity necessitated a new electric elevator, which began public service in July 1901. The new electric elevator carried visitors to the observation level in a speedy five minutes, rather than the 10-to 12-minute trip of the original steam elevator.¹⁰⁰ This elevator was in turn replaced in 1926 with an even faster elevator, which made the trip in 70 seconds.¹⁰¹ Other early improvements included upgrading the interior lighting system¹⁰² and creation of a waiting room on the lower floor for Washington Monument visitors waiting for the elevator.¹⁰³

Beginning in 1920, a ceremony commemorating Washington's birthday was held at the Washington Monument. These ceremonies continue to the present day. This first ceremony included placing 48 American flags, one for each state in the Union, in a circle around the base of the monument, presentation of wreaths from all the states, and patriotic speeches.¹⁰⁴ The flags were only a temporary feature, removed after each ceremony.¹⁰⁵

The Washington Monument was also the site of several suicides and accidents.¹⁰⁶ These accidents led to the addition of safety features such as grating around the elevator shaft and bars over the pyramidion windows.¹⁰⁷

Memorial stones continued to arrive from states that had not previously contributed stones to the monument. These were often dedicated and inserted with great fanfare. President Calvin Coolidge spoke at the April 15, 1924, dedication of the Arizona memorial stone:

The placing of a State stone involves a tribute to Washington the man, the leader, the founder. The symbolism is altogether different from that of adding a star to the flag when a new state is admitted. Here today we are paying another tribute to the man whose vision and courage made possible our national existence. It was a fine conception, this, of placing a stone for every State in the Monument to Washington.¹⁰⁸

In 1928, Congress passed a bill appropriating \$5,000,000 to fulfill the McMillan Plan under the authorization of a congressional committee, with \$30,000 set aside specifically for preparing plans for the improvement of the Monument Grounds.¹⁰⁹ In 1930, an Advisory Committee was established to guide the preparation of plans for the Washington Monument Grounds.¹¹⁰ The initial concern of the Advisory Committee was maintaining the stability of the Washington Monument while improving the grounds. The McMillan Plan for the Monumental Garden would have required creating a sunken garden west of the Washington Monument that would have extended below the bottom of the monument's foundations and would also have placed a large amount of fill on the eastern side of the monument. A series of soil borings and studies were done to determine the composition and stability of the subsoil around the monument.¹¹¹ These borings revealed that, if built as planned, the Monument Garden would "seriously endanger the stability of the Monument."¹¹² Frederick Law Olmsted, Jr., and William A. Delano developed two additional design schemes for the Monument Grounds. Neither of these met with the unconditional approval of engineers and neither was implemented.¹¹³

On August 10, 1933, the Office of Public Buildings and Public Parks, and all the lands that they controlled, were reorganized as part of the National Park Service in the Department of Interior.¹¹⁴

In the 1920s, those caring for the Washington Monument noticed that some cracks and discoloration were appearing on the monument exterior. It was not until after the park was transferred to the National Park Service that funds became available to remedy these and other problems. In 1934, the National Park Service and Works Progress Administration began the task of cleaning and repairing the exterior of the monument. The entire monument was encased with a steel-tube scaffolding, the joints repointed, cracks repaired, dutchmen installed, the lightning protection system repaired, and the monument's exterior cleaned (see figure 2.16).¹¹⁵

The advent of air travel necessitated the nighttime lighting of the monument. However, the first nighttime lighting of the monument was done for entertainment. During the summer of 1925, the Powhatan Hotel shone search lights on the monument.¹¹⁶ The government then installed search lights on the Navy Building in 1929, to warn pilots of the monument.¹¹⁷ These search lights were replaced by on-site floodlights and four red blinking lights in the pyramidion in 1931.¹¹⁸

As part of the buildup in military and governmental personnel in Washington, D.C., during World War II, several temporary federal office buildings were built on the Mall. On April 28, 1942, the National Park Service transferred 22.1689 acres of the Washington Monument Grounds to the Public Buildings Administration, "for the purpose of constructing thereon a temporary building for National Defense purposes." These buildings were to be removed within a year of the end of the war.¹¹⁹ Three Temporary Federal Office Buildings, T-3, T-4, and T-5, were built on the northwest portion of the Monument Grounds.¹²⁰ These buildings were not removed until 1964.¹²¹ Despite this encroachment on the grounds, they continued to host many public gatherings during the war, including war-bond drives, elaborate Fourth of July celebrations, and military reviews (see figure 2.17).¹²²

With the dedication of the Jefferson Memorial in 1943 and the completion of the cross-axis envisioned by the McMillan Plan, attention turned to the development of the Washington Monument Grounds. The desire to remove visitors' automobiles and the World War II temporary buildings, and to better integrate the Monument Grounds into the larger Mall, led to several planning proposals, although none were fully implemented.

In contrast to the many patriotic events held on the Monument Grounds and the Mall before and during World War II, in the 1960s and 1970s the Mall and the Monument Grounds served as a backdrop for numerous rallies and marches protesting government policies ranging from civil rights to war. These included the 1963 March on Washington for Jobs and Freedom, the 1969 Peace Moratorium (see figure 2.18), and the Spring Offensive of 1971.

Mission 66 projects at the Washington Monument included the 1957 and 1958 replacement of the existing exterior lighting system with the current configuration of floodlights,¹²³ the installation of permanent flagpoles in a circle around the base of the monument to replace the

temporary flagpoles used since 1920,¹²⁴ and the prohibition of cars around the base of the Washington Monument in 1960.¹²⁵ Another Mission 66 project was the replacement of the elevator and accompanying modifications to the circulation system to increase the capacity of the monument.¹²⁶ The second exterior cleaning and repair of the monument was also a Mission 66 undertaking.¹²⁷ Other planned, but not executed, Washington Monument Mission 66 Program elements included construction of a new plaza and pedestrian paths and re-opening the west entrance to the monument for use of exiting visitors.¹²⁸

In preparation for the Bicentennial celebrations, the Washington Monument interior systems and finishes were repaired and improved. This included the installation of a new air-temperature-control system, and installing new granite flooring and marble paneling in the entrance and lobby. The lightning protection system was also improved.¹²⁹

The Washington Monument underwent extensive restoration, repair, and upgrading in the 1990s. The interior lobby was remodeled from 1992 to 1994.¹³⁰ In 1997, the electrical, mechanical, heating, communications, and elevator systems were all upgraded and repaired. This was the first phase in the Washington Monument Restoration: It Stands for All.¹³¹ Phase II of the monument restoration began in 1998 with the construction of a Michael Graves-designed aluminum scaffolding, enclosed in blue-gray mesh in horizontal and vertical stripes to resemble ashlar stone joints around the entire monument. The exterior was then cleaned and repaired for the third time in its history (see figure 2.19).¹³²

Throughout the second half of the twentieth century there have been numerous design programs for the Washington Monument Grounds that sought to unify the grounds' landscape design and improve visitor facilities. None of these plans was implemented. The 1973 Washington Monument Visitor Facility Comprehensive Design Program by Skidmore, Owings, and Merrill investigated the possibility of constructing an underground visitors' center around the Washington Monument's foundations.¹³³ A 1981 Development Concept Plan included a redesign of the monument plaza.¹³⁴ A further redesign of the monument plaza was part of the 1989 revisions to the 1981 Development Concept Plan.¹³⁵ The current Development Concept Plan was formulated in 1993 and also included redevelopment of the monument plaza (see figures 2.15, 2.20 and 2.21).¹³⁶

Increased security concerns led to the installation of a ring of Jersey barriers around the base of the Washington Monument in August 1998.¹³⁷ An interim security addition was built adjoining the east elevation of the monument in the fall of 2001 to screen visitors and their belongings.¹³⁸ Proposals were sought for developing a permanent vehicular barrier system around the monument and for constructing a visitor facility connected to the monument. The chosen design was Olin Partnership's design for an underground visitors' facility entered through a rehabilitated Monument Lodge and connecting to the monument through an underground passageway. The proposed design also called for two 2 12-foot-wide walkways with low retaining walls looping around the monument to act as vehicle barriers.¹³⁹ With modifications, this proposal received conceptual approval from the National Capital Planning Commission, the Commission of Fine Arts, and the Historic Preservation Review Board.¹⁴⁰

2.6 EVALUATION OF SIGNIFICANCE

Based on an evaluation undertaken as part of this Historic Structure Report and earlier evaluations, the Washington Monument on the Washington Monument Grounds appears to possess significance under National Register Criterion C within the area of architecture, as an example of the early-nineteenth-century movement to commemorate prominent Americans, as embodying the principles of Egyptian Revival architecture in its unadorned obelisk form, as an engineering milestone, and for its association with its designers, Robert Mills and Thomas Lincoln Casey. The Washington Monument is listed on the National Register of Historic Places along with other elements of the Washington Monument Grounds, including the Monument Lodge and the Survey Lodge.¹⁴¹

The Evaluation of Significance for the Washington Monument Grounds can be found in a companion to this document, the *Washington Monument Grounds Cultural Landscape Report*, submitted to the National Park Service by John Milner Associates in 2003. The significance evaluations for the Washington Monument Lodge and the Survey Lodge are located in their individual Historic Structure Reports, also companions to this document.

The Washington Monument is listed on the National Register of Historic Places. The 1980 documentation form indicates that the monument is significant in the areas of Architecture, Engineering, Landscape Architecture, and Commemoration. The Washington Monument is also a National Historic Civil Engineering Landmark.

The existing National Register Documentation for the Washington Monument establishes a period of significance of 1848–1889. As a result of the research and analysis conducted as part of this Historic Structure Report, it is recommended that this period of significance be expanded to include the period 1848–1914. This period includes the construction of the Washington Monument and the construction of important interior features, such as the first-floor lobby with its marble wainscoting and terrazzo floor. These elements, while not original to the Washington Monument, were added early in its history in order to accommodate growing numbers of visitors and have achieved significance since their installation.

The Washington Monument is also listed as a critical element of the larger National Mall area property listed on the National Register of Historic Places in 1997 as the L'Enfant-McMillan Plan for the City of Washington. This nomination indicates that the National Mall area is significant under Criteria A, B, and C, in the areas of Community Planning and Development, Landscape Architecture, Politics/Government, and Transportation, for the period 1790–1943.

The Washington Monument derives its primary significance from its role as the nation's foremost memorial to its first president and from the pivotal and symbolic role the monument and its site play in the urban design of Washington, D.C. This significance extends from the initial conception of the National Mall area in Pierre Charles L'Enfant's 1791 plan for the capital, which included a centrally placed equestrian statue of George Washington, near the current location of the Washington Monument, through the completion of the Jefferson

Memorial in 1943. As a commemorative structure, the monument appears to meet Criterion Consideration F for Commemorative Properties, for its design, age, tradition, and symbolic value. The Washington Monument also appears to possess significance as an important example of Egyptian Revival architecture and as a feat of structural engineering. It is significant as the work of Robert Mills, a notable nineteenth-century American architect, whose design for an obelisk surrounded by a circular pantheon formed the basis of the first phase of construction. It is also significant as the work of Thomas Lincoln Casey who, as engineer in charge of completing the Washington Monument, resolved the engineering problems of the initial design related to the inadequate foundations, designed the innovative interior structure of Phoenix columns, developed an ingenious method for capping the monument with an all-marble pyramidion, and redesigned the monument in accordance with the proportions of true Egyptian obelisks. Casey saw the completion of the Washington Monument as the world's tallest structure at the time, which still remains the world's tallest free-standing stone masonry structure. The construction period for the Washington Monument extends from 1848 through the initial completion of the knoll over its base in 1889.

The Washington Monument also appears to have significance within the areas of Politics/Government, Social History, and Commemoration. This significance is addressed in the 1997 L'Enfant Plan National Register Nomination. This area of significance will be examined when the Washington Monument National Register Nomination is updated. The Washington Monument and Grounds have served as a political and social forum, and as a ceremonial gathering site. Since well before its completion, the Washington Monument has served as a symbol of the nation, of unifications, and of rights and values espoused in our governmental system and ideals. The symbolism of the monument, erected to honor the nation's first President and one of its founders, and its pivotal location as the linchpin of the National Mall area have influenced its evolution into a national focal point for expressing opinion, debating the role of government, celebrating joy, and mourning tragedy. Beginning as early as 1866, President Andrew Johnson, who was also president ex officio of the Washington National Monument Society, summarized this symbolism: "Let us restore the Union, and let us proceed with the Monument as its symbol until it shall contain the pledge of all the States of the Union."¹⁴² The Washington Monument and Grounds has served a wide array of functions relating to its symbolic role as a national social and political forum, including inaugurations, rallies, parades, protests, presidential addresses, performances, and celebrations, notably the annual Fourth of July celebration.

Since the beginning of its construction, the Washington Monument has served as the nation's principal monument to George Washington, both as the father of the country and as a symbol of the nation that he helped to found. Its location near the intersection of the axes extending from the Capitol and the President's House and as part of the National Mall area, along with its symbolism, have led the Washington Monument and grounds to serve as a social and political forum for celebration, debate, and protest.

The earliest large-scale public monuments in America were built in the early nineteenth century, primarily to commemorate the heroes of the American Revolution. These monuments looked to

existing European models, which commonly took the form of a column or obelisk. The first obelisks were built at altars to the Egyptian sun god Ra, and became symbols of the sun and of Ra. American monuments of this period sought to recall the ideals and values of the founders and heroes of the nation, and thereby encourage patriotic feelings. In 1813, Robert Mills designed a 175-foot-tall columnar monument to George Washington for Baltimore. This monument consisted of a rectangular base below a simple, unfluted column topped with a statue of Washington. Bunker Hill Monument, a 221-foot-tall granite obelisk, built beginning in 1825, was the first monumental obelisk in America.¹⁴³ For his entry in the Washington National Monument Society's 1836 design competition for the Washington Monument, Mills chose a 600-foot-tall obelisk surrounded by a 220-foot-diameter, 100-foot-tall pantheon. Mills drew upon several sources for his Washington Monument design. The Comte de Caylus's 1759 reconstruction of the Mausoleum of Helicarnassus was an obelisk mounted on a colonnaded base decorated with sculptural figures. As the earlier proposals for a monument to Washington were intended to serve as a mausoleum, this famous tomb was an appropriate model for the Washington Monument. Jacques Molinos and Jacques Le Grand's 1792 design for a monument to Mirabeau on the site of the Bastille was a simply adorned obelisk on a colonnaded rotunda. The use of this monument as a model for Mills's Washington Monument was based on the association of Mirabeau and Washington as great heroes of democratic revolution.¹⁴⁴

The Washington Monument is significant for its association with Robert Mills, its original designer, and as one of his masterworks. Robert Mills, considered the first American-born professional architect, was appointed the architect of public buildings in Washington, D.C. In this capacity he designed the Treasury Building, Patent Office, and Post Office. In these and other designs for institutions of the capital, Mills followed an iconographic program that would have made Washington, D.C., into a museum of world architecture. His Doric Patent Office took the form of a temple, the Ionic Treasury Building was a stoa, and the Corinthian Post Office was based on a palazzo. His design for the Smithsonian drew on medieval architectural forms. The Egyptian obelisk and Greek pantheon that Mills designed for the Washington Monument would have added to this architectural museum.¹⁴⁵

Thomas Lincoln Casey, an engineer with the U.S. Army Corps of Engineers, and eventually the chief of engineers, oversaw the redesign and completion of the Washington Monument. Casey was a graduate of West Point, served as a military engineer in the Washington Territory, where he constructed wagon roads through virgin forest, and in coastal Maine during the Civil War, where he built fortifications, including Fort Knox on the Penobscot River. In 1877, he was transferred to the Office of Public Buildings and Public Parks, where he was in charge of constructing part of the State, War, and Navy Building, and the Washington Aqueduct, as well as the Washington Monument.¹⁴⁶ Casey faced a complex task in completing the Washington Monument. The structure had stood unfinished for almost a quarter-century, had inadequate foundations, was designed to be the world's tallest structure at that time, and its design was the subject of not just public but congressional scrutiny. Casey overcame all of these obstacles by using "the resources of modern engineering science...for the completion of the grandest monumental column ever erected in any age of the world."¹⁴⁷ Casey organized the strengthening of the original foundations by tunneling under them to build a larger base and excavating into

them to build large buttresses, all without causing damage to the obelisk, which then stood 156 feet tall. Casey organized the construction and labor force using the most modern technology available to him, enabling him to complete the monument, adding almost 400 feet of masonry in four years. The design of the pyramidion alone is testament to the ingenuity of Casey and his assistant engineer Bernard R. Green. The pyramidion successfully met the conditions of being as light as possible so as not to further burden the structure, yet strong enough to resist wind forces at a height of 550 feet, and also of a material that would not stain the obelisk below. The design of the pyramidion with its integral marble support ribs and open and yet water-resistant masonry joints is a marvel of engineering science.

ENDNOTES

Abbreviations:

- E495 Letters Sent, Entry 495, Records of the Engineer in Charge, 1876 – 1892
- NAB National Archives Building, Washington, D.C.
- NPS-NCR National Park Service-National Capital Region
- OPB&PP Office of Public Buildings and Public Parks
- RG42 Records of the Joint Commission for the Completion of the Washington Monument, 1876–1892

¹ Quoted in Frederick L. Harvey, *History of the Washington National Monument and the Washington National Monument Society* (Washington, D.C.: GPO, 1903), 13, 14.

² Elizabeth J. Barthold, *L'Enfant-McMillan Plan of Washington, DC – HABS No. DC-668*, ed. Sara Amy Leach (Washington, D.C.: Department of the Interior, National Park Service, Historic American Buildings Survey, 1993), 4.

³ Louis Torres, *"To the Immortal Name and Memory of George Washington": The United States Corps of Engineers and the Construction of the Washington Monument* (Washington, D.C.: Government Printing Office, 1984), 3.

⁴ Torres, *Corps of Engineers*, 3–5.

⁵ Torres, *Corps of Engineers*, 5.

⁶ Torres, *Corps of Engineers*, 6. Greenough's statue of Washington was completed in 1841 and initially displayed in the Capitol rotunda. This statue depicted Washington in Roman dress, seated dressed in a toga. This sculpture, seen as some as disgracing Washington by showing him half-dressed, was not well received by the general public (Harvey, *Washington National Monument Society*, 20).

⁷ Harvey, *Washington National Monument Society*, 20.

⁸ Harvey, *Washington National Monument Society*, 21–23.

⁹ Harvey, *Washington National Monument Society*, 24–25.

¹⁰ Quoted in Pamela Scott, "Robert Mills and American Monuments," in *Robert Mills, Architect*, ed. John M. Bryan (Washington, D.C.: American Institute of Architects Press, 1989), 158.

¹¹ U.S. Congress, House, *Report of the Select Committee on Washington National Monument*, 43d Cong., 1st sess., 1874, H. Rept. 485, 2.

¹² Harvey, *Washington National Monument Society*, 33–35.

¹³ In May 1844, the House Committee on Public Buildings and Grounds proposed building a monument to Washington on part of Reservation 2 bounded by B St., 7th St., 12th St., and the Canal, and near the Patent and Post Office Buildings, to be built according to a design proposed by the Committee on Public Buildings and Grounds, built using funds collected by the Washington National Monument Society and from the sale of public lots. Congress did not act upon this resolution (Harvey, *Washington National Monument Society*, 35–37).

¹⁴ There is evidence for at least three designs for a Washington Monument in Mills's 1836–1840 journal (Scott, "American Monuments," 158).

¹⁵ Scott, "American Monuments," 158.

¹⁶ Quoted in Harvey, *Washington National Monument Society*, 26–28.

¹⁷ Harvey, *Washington National Monument Society*, 41.

¹⁸ House, *Select Committee*, 1874, 2-3.

¹⁹ The Jefferson Stone marked the intersection of these cross-axes. While Thomas Jefferson was president, he sought to create a national meridian. Jefferson's prime meridian ran in a north-south direction through the President's House. A meridian established in 1791 had passed through the Capitol. Jefferson wanted to establish an American prime meridian so that the young country would be self-sufficient, not relying on a prime meridian located in another country, such as Britain's Greenwich Prime Meridian. Jefferson also saw the establishment of a national meridian as a way to regulate time, and to assist in the mapping, survey, and settlement of western lands (Silvio A. Bedini, *The Jefferson Stone* [Frederick, Md: Professional Surveyors Publishing Co., 1999], 12–14). To establish this First Meridian of the United States, he had three meridian stones erected along this meridian line in Washington, D.C.: the Meridian Stone, on Peter's Hill (now Meridian Hill); the Jefferson Stone, at the intersection of the north-south line through the center of the President's House and the east-west line through the center of the Capitol; and the Capitol Stone, set at the intersection of the north-south line through the President's House and the east-west line from the southern end of the Capitol (Bedini, *Jefferson Stone*, 138–139). The Meridian Stone and the Capitol Stone were single-stone obelisks, but the location of the Jefferson Stone at the edge of the Tiber Creek required a more substantial construction. The Jefferson Stone was built on a 6-foot-6-inch-deep foundation with a structure of 4 large freestone slabs as the walls, with the center filled with broken stone and cement. This pier was capped with a slab of brownish sandstone about 10-inches-by-10-inches square with the lines of the two axes carved into the top (Bedini, *Jefferson Stone*, 34). Tradition has it that the Jefferson Stone was set in place 18 December 1804 (U.S. Army Corps of Engineers, *Annual Report to the Chief of Engineers, U.S. Army*, Washington, D.C.: GPO, 1898; Donald C. Phanz, "Washington Monument," *National Register – Documentation of Existing National Register Property*. [Washington, D.C.: Department of the Interior, National Park Service, 1980], item 8, p. 1). This is the date inscribed into the current Jefferson Stone Monument as the date of erection of the original Jefferson Stone. Bedini's recent study suggests that the original Jefferson Stone was actually erected in October 1804 and the date of 18 December 1804 is the date of the bill sent to President Jefferson by surveyors Briggs and King for erection of the three meridian stones (Bedini, *The Jefferson Stone*, 111). The Jefferson Stone stood approximately 3

to 4 feet above grade on the landside and 6 feet above the bank of the Tiber Creek. After the erection of these three meridian stones, it appears that Jefferson did little to promote the use of the national meridian. Through the mid-nineteenth century, the Jefferson Stone served as a bench mark for surveyors and as a guy-post for boats using the Washington Canal, hence its alternate name, the Jefferson Pier (Bedini, *Jefferson Stone*, 139).

²⁰ Elizabeth J. Barthold, *The National Mall and Monument Grounds (Reservation Numbers 2, 3, 3A, 3B, 4, 5, 6, 6A; HABS No. DC-687)*, (Washington, D.C.: Department of the Interior, National Park Service, Historic American Buildings Survey, 1993), 7.

²¹ Torres, *Corps of Engineers*, 15–16.

²² Pamela Scott, "This Vast Empire": The Iconography of the Mall, 1791–1848," in *The Mall in Washington, 1791–1991*, Studies in the History of Art, 2nd ed., ed. Richard Longstreth, no. 30 (Washington, D.C.: National Gallery of Art, 2002), 52.

²³ Scott, "American Monuments," 168.

²⁴ Torres, *Corps of Engineers*, 15.

²⁵ Aaron V. Wunsch, *Washington Monument, HABS No. DC-428* (Washington, D.C.: Department of the Interior, National Park Service, Historic American Building Survey, 1994), 3.

²⁶ Robert Mills to board of managers of Washington National Monument Society, 1 November 1848; Proceedings of the Society, 1833–1951, Entry 418; Records of the Washington National Monument Society, 1833–1951; Record Group 42; National Archives Building, Washington, D.C.

²⁷ Harvey, *Washington National Monument Society*, 43–44.

²⁸ Harvey, *Washington National Monument Society*, 130.

²⁹ Harvey, *Washington National Monument Society*, 328.

³⁰ Torres, *Corps of Engineers*, 17.

³¹ "Inventory of Property Belonging to the W. N. Monument Society as reported by those in possession March 20, 1855," Correspondence, Entry 432; Records of the Washington National Monument Society, 1833–1951; Record Group 42; National Archives Building, Washington, D.C.

³² Torres, *Corps of Engineers*, 20.

³³ Harvey, *Washington National Monument*, 49–50.

³⁴ Torres, *Corps of Engineers*, 21.

³⁵ Frank Freidel and Lonelle Aikman, *George Washington Man and Monument* (Washington, DC: Washington National Monument Association, 1973), 39.

³⁶ Harvey, *Washington National Monument Society*, 52–54.

³⁷ Harvey, *Washington National Monument Society*, 54.

³⁸ Torres, *Corps of Engineers*, 26–27.

³⁹ Harvey, *Washington National Monument Society*, 63.

⁴⁰ Torres, *Corps of Engineers*, 26.

⁴¹ On March 22, 1859, Congress incorporated the Washington National Monument Society to provide legal authority for the mission of the society. This was to protect the society from another incident like the Know-Nothing illegal action (Torres, *Corps of Engineers*, 27).

⁴² Wunsch, *Washington Monument*, 8.

⁴³ Speech of Hon. Robert C. Winthrop, at dedication of Washington Monument, 21 February 1885, quoted in Harvey, *Washington National Monument Society*, 239.

⁴⁴ Lt. Bickworth to Washington National Monument Society, 7 May 1861, Records Relating to the Design and Construction of the Monument, Monument Grounds, and Offices of the Society, Entry 436; Records of the Washington National Monument Society, 1833–1951; Record Group 42; National Archives Building, Washington, D.C. The grounds were enclosed with a fence and initially only 45 head of cattle were quartered on the grounds and one of the outbuildings was used for hay storage. By the end of the war, the number of cattle kept on the grounds had increased, and extensive horse stables, officers' quarters and mess, a civilian bunkhouse, and a slaughterhouse had all been built on the grounds (George A. Olszewski, *A History of the Washington Monument 1844–1968* [Washington, D.C.: Department of Interior, National Park Service, Office of History and Historic Architecture, Eastern Service Center, 1971], 24).

⁴⁵ After the death of James Madison, second president of the Washington National Monument Society, the society had as its president ex-officio the president of the United States. The first to hold this honor was Andrew Jackson (Harvey, *Washington National Monument Society*, 25).

⁴⁶ Harvey, *Washington National Monument Society*, 74

⁴⁷ Barthold, *The National Mall*, 11.

⁴⁸ The Office of Public Buildings and Public Grounds was created in 1867 to oversee control of federal lands and buildings within the District of Columbia (Barthold, *L'Enfant-McMillan Plan*, 21).

⁴⁹ Barthold, *L'Enfant-McMillan Plan*, 5–6.

⁵⁰ War Department, U.S. Army Corps of Engineers, *Annual Report to the Chief of Engineers, U.S. Army* (Washington, D.C.: GPO, 1872).

⁵¹ O. E. Babcock, *Annual Report of Major O. E. Babcock, Corps of Engineers, Commissioner of Public Buildings and Grounds* (Washington, D.C.: GPO, 1872); O. E. Babcock, *Annual Report of Major O. E. Babcock, Corps of Engineers, Commissioner of Public Buildings and Grounds* (Washington, D.C.: GPO, 1873); O. E. Babcock, *Annual Report upon the Improvement and Care of the Public Buildings and Grounds in the District of Columbia and Washington Aqueduct, in Charge of O. E. Babcock, Col. of Engineers, Bvt. Brig. General, U.S.A., being Appendix HH of the Annual Report of the Chief of Engineers for 1875* (Washington, D.C.: GPO, 1875); Thomas Lincoln Casey, *Annual Report upon the Improvement and Care of the Public Buildings and Grounds in the District of Columbia and Washington Aqueduct, in Charge of Thos. Lincoln Casey, Lieut. Col. of Engineers, Bvt.*

Colonel, U.S.A., being Appendix LL of the Annual Report of the Chief of Engineers for 1879 (Washington, D.C.: GPO, 1879).

⁵² Thomas Lincoln Casey, *Annual Report upon the Improvement and Care of the Public Buildings and Grounds in the District of Columbia and Washington Aqueduct*, by Thos. Lincoln Casey, Lieut. Col. of Engineers, Bvt. Colonel, U.S.A., in charge from March 3, 1877 until June 30, 1877, being Appendix KK2 of the Annual Report of the Chief of Engineers for 1877 (Washington, D.C.: GPO, 1877).

⁵³ Theodore A. Bingham, *Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia*, by Theo. A. Bingham, Capt., Corps of Engineers, Col. U.S.A., being Appendix CCC of the Annual Report of the Chief of Engineers for 1898 (Washington, D.C.: GPO, 1898). The Jefferson Stone Marker currently on the Monument Grounds originally carried the inscription: "POSITION OF JEFFERSON PIER ERECTED DEC. 18. 1804. RECOVERED AND RE-ERECTED DEC. 2, 1889. BEING THE CENTRE POINT OF THE DISTRICT OF COLUMBIA." At an unknown time, the erroneous line "BEING THE CENTRE POINT OF THE" was crudely carved out (Bedini, *Jefferson Stone*, 110-111).

⁵⁴ David D. Porter, Admiral, to Washington National Monument Society, 19 November 1874, quoted in Harvey, *Washington National Monument Society*, 83.

⁵⁵ U.S. Public Law No. 129, 45th Cong., 1st sess., 2 August 1876.

⁵⁶ Harvey, *Washington National Monument Society*, 90. This Joint Commission was comprised of the president, the supervising architect of the Treasury, the architect of the Capitol, the chief engineer of the U.S. Army, and the first vice president of the Washington National Monument Society.

⁵⁷ Torres, *Corps of Engineers*, 37, 52-54. The latter alternative, of completing the monument to a wholly new design, had much public and congressional support, although the Washington National Monument Society vehemently opposed this suggestion. Artistic tastes had changed since construction of the monument began and its simple obelisk form was out of favor, and many favored a more elaborately decorated monument. Mills's design for a national pantheon encircling the base of the monument was widely disliked and its construction was not seriously considered.

⁵⁸ U.S. Congress. House. *Report of the Select Committee on the Washington National Monument*. 43d Cong., 1st sess., 1874. H. Rept. 485, 4-6.

⁵⁹ Work begun on strengthening the foundations in January 1879 was finished May 29, 1880 (U.S. Congress, Senate, *Annual Report of the Joint Commission for Completion of the Washington Monument*. 47th Cong., 1st sess., 1881, Mis. Doc. No. 19, 2).

⁶⁰ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to W. W. Corcoran, chairman of the Joint Commission for Completion of the Washington Monument, 27 July 1878; v. 1, p. 6; E 495; RG 42; NAB.

⁶¹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, *Report of Operations Upon Completion of the Washington Monument for the Month of February 1879*, 3 March 1879; v. 1; E 495; RG 42; NAB.

⁶² Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, *Report of Operations Upon Completion of the Washington Monument for the Month of May 1880*, June 1880; v. 2, p. 95, E 495; RG 42; NAB.

⁶³ Torres, *Corps of Engineers*, 59. In his search for qualified men to carry out this delicate operation, Lt. Col. Casey recruited miners from Nevada and from the concurrent tunneling operation for Baltimore's water supply (Torres, *Corps of Engineers*, 65).

⁶⁴ Torres, *Corps of Engineers*, 56-57.

⁶⁵ Quoted in Harvey, *Washington National Monument Society*, 97.

⁶⁶ Torres, *Corps of Engineers*, 56-57.

⁶⁷ U.S. Congress, Senate, *Annual Report of the Joint Commission for Completion of the Washington Monument*, 47th Cong., 1st sess., 1881, Mis. Doc. No. 19, 2.

⁶⁸ U.S. Congress, Senate, *Annual Report of the Joint Commission for Completion of the Washington Monument*, 47th Cong., 1st sess., 1881, Mis. Doc. No. 19, 2.

⁶⁹ Lt. Col. Thomas Lincoln Casey, Engineer in Charge, to General H. G. Wright, Chief of Engineers, 4 May 1882; vol. 3, p. 64, Entry 495; RG 42; NAB.

⁷⁰ U.S. Congress, Senate, *Annual Report of the Joint Commission for the Completion of the Washington Monument*, 46th Cong., 3d sess., 1880, Mis. Doc. 9, 2-4.

⁷¹ U.S. Congress, Senate, *Annual Report of the Joint Commission for the Completion of the Washington Monument*, 46th Cong., 3d sess., 1880, Mis. Doc. 9, 2-4.

⁷² Wunsch, *Washington Monument*, 9.

⁷³ U.S. Congress, Senate, *Annual Report of the Joint Commission for the Completion of the Washington Monument* 48th Cong., 2d sess., 1884, Doc. 8, 2-4.

⁷⁴ Bernard R. Green, Civil Engineer, "Notes on Project for a Marble Pyramidion for the Washington Monument, represented in four sheets of drawings on file in the Engineer Office," 4 August 1884, Box 41, folder 21, Casey Family Papers, Society for the Preservation of New England Antiquities (SPNEA), Boston, Mass.

⁷⁵ Torres, *Corps of Engineers*, 81.

⁷⁶ These lightning rods were connected to each other and to the interior iron columns, which were grounded to a well dug in the center of the foundation (Torres, *Corps of Engineers*, 91-92).

⁷⁷ Harvey, *Washington National Monument Society*, 104-105.

⁷⁸ Quoted in Harvey, *Washington National Monument Society*, 224.

⁷⁹ Quoted in Harvey, *Washington National Monument Society*, 242.

⁸⁰ Harvey, *Washington National Monument Society*, 107.

⁸¹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Brig. Gen. John Newton, chair of Building Committee, 8 April 1885, v. 4, p. 98; E 495; RG 42; NAB. While 92 memorial stones, or presentation blocks as Thomas Lincoln Casey referred to them, were inserted into the monument before construction stopped in

1858, 8 of these were removed as part of the preparatory work for restarting construction. Casey did not add any of the remaining unused blocks to the interior during construction, but instead provisions to do this work once the obelisk was completed (Torres, *Corps of Engineers*, 93).

⁸² U.S. Congress, Senate, *Annual Report of the Joint Commission for Completion of the Washington Monument* 49th Cong., 1st sess., 1885, Doc. 6, 3-4.

⁸³ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Brig. Gen. John Newton, chair of Building Committee, 8 April 1885. v. 4, p. 98; E 495; RG 42; NAB.

⁸⁴ Joint Commission for Completion of the Washington Monument, Proceedings, 24 April 1882; Proceedings of the Society, 1833-1951, Entry 418; Records of the Secretary, 1833-1951; Records of the Washington National Monument Society, 1833-1951; RG 42; NAB.

⁸⁵ In 1875-1876, 961 evergreens, maples, elms, and other varieties "suited to the grounds" were planted (O. E. Babcock, *Annual Report upon the Improvement and Care of the Public Buildings and Grounds in the District of Columbia and Washington Aqueduct, in Charge of O. E. Babcock, Col. of Engineers, Bvt. Brig. General, U.S.A., being Appendix GG of the Annual Report of the Chief of Engineers for 1876* (Washington, D.C.: GPO, 1876). In 1877-1878, 1274 deciduous and evergreen trees and shrubs were planted on the grounds (Thomas Lincoln Casey, *Annual Report upon the Improvement and Care of the Public Buildings and Grounds in the District of Columbia and Washington Aqueduct, in Charge of Thos. Lincoln Casey, Lieut. Col. of Engineers, Bvt. Colonel, U.S.A., being Appendix KK of the Annual Report of the Chief of Engineers for 1878* [Washington, D.C.: GPO, 1878]).

⁸⁶ Hay for use of animals belonging to the Corps of Engineers was made from the Monument Grounds and the Smithsonian Grounds (A. F. Rockwell, *Annual Report upon the Improvement and Care of the Public Buildings and Grounds in the District of Columbia, by A. F. Rockwell, Colonel, U.S. Army, being Appendix RR of the Annual Report of the Chief of Engineers for 1883* [Washington, D.C.: GPO, 1883]; John M. Wilson, *Annual Report upon the Improvement and Care of the Public Buildings and Grounds in the District of Columbia, by John M. Wilson, Lieut. Col. of Engineers, Col. U.S.A., being Appendix VV of the Annual Report of the Chief of Engineers for 1885* [Washington, D.C.: GPO, 1885]; John M. Wilson, *Annual Report upon the Improvement and Care of the Public Buildings and Grounds in the District of Columbia, by John M. Wilson, Lieut. Col. of Engineers, Col. U.S.A., being Appendix TT of the Annual Report of the Chief of Engineers for 1886*. [Washington, D.C.: GPO, 1886]).

⁸⁷ Torres, *Corps of Engineers*, 95.

⁸⁸ Col. Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, Advertisement and Specifications for Boiler House at the Washington Monument, 3 October 1885; Contracts, Entry 512; Records of the Engineer in Charge, 1876-1892, Records of the Joint Commission for the Completion of the Washington Monument, 1876-1892; RG 42; NAB.

⁸⁹ U.S. Congress, House, *Annual Report of the Joint Commission for Completion of the Washington Monument*. 49th Cong., 2d sess., 1887. Mis. Doc. 57, 2-3.

⁹⁰ House, *Annual Report*, 1887, 2-3.

⁹¹ House, *Annual Report*, 1887, 2.

⁹² Lt. Col. John M. Wilson, *Annual Report Upon the Improvement and Care of Public Buildings and Grounds and Completion of the Washington Monument, in the District of Columbia, Appendix AAA of the Annual Report of the Chief of Engineers for 1889* (Washington, D.C.: GPO, 1889), 2831. Granolithic pavement was made of

an 8-inch bed of coarse material, laid in two layers, topped with a 3.5-inch layer of hydraulic cement concrete marked with slab or flag divisions. Four square 5/16-inch iron rods were laid into the concrete and packed with the granolithic mixture (a composition of Portland cement and broken granite with a square or "cubed" fracture) spread 1-½ inches thick. To make the final surface slip-resistant, a coating of dry cement and sand was floated over the granolithic layer.

⁹³ G. M. Thomas, custodian, to Col. John M. Wilson, U.S.A., "Report of Operations upon the Washington Monument for the month of January 1889," 31 January 1889; Copies of Letters Sent by the Custodian of the Monument, Entry 529; Records of the Engineer in Charge of the Monument, 1879-1929; RG 42; NAB.

⁹⁴ War Department, U.S. Army Corps of Engineers, *Annual Report to the Chief of Engineers, U.S. Army* (Washington, D.C.: GPO, 1889).

⁹⁵ John F. Mount to Col. O. H. Ernst, Engineer in Charge of the Washington Monument, Report relating to the Washington Monument for the month of December 1889, 2 January 1890; Box 1, p. 135; Copies of Letters Sent by the Custodian of the Monument, Entry 529; Records of the Engineer in Charge of the Monument, 1879-1929; RG 42; NAB.

⁹⁶ John M. Wilson and Oswald H. Ernst, *Annual Report upon the Improvement and Care of the Public Buildings and Grounds and Care and Maintenance of the Washington Monument in the District of Columbia*, by John M. Wilson, Lieut. Col., Corps of Engineers, Col., U.S.A., and Oswald H. Ernst, Major, Corps of Engineers, Col., U.S.A., being Appendix CCC of the Annual Report of the Chief of Engineers for 1893 (Washington, D.C.: GPO, 1893); Thomas W. Symons and Theodore A. Bingham, *Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia*, by Thomas W. Symons, Major, Corps of Engineers, U.S.A., and Theo. A. Bingham, Major, Corps of Engineers, Col. U.S.A., being Appendix EEE of the Annual Report of the Chief of Engineers for 1903 (Washington, D.C.: GPO, 1903).

⁹⁷ War Department, U.S. Army Corps of Engineers, *Annual Report to the Chief of Engineers* (Washington, D.C.: GPO, 1895).

⁹⁸ Barthold, *L'Enfant-McMillan Plan*, 43.

⁹⁹ U.S. Congress, House, *Improvement of the Washington Monument Grounds*, House Document No. 528, 72d Cong., 2d sess., 1934, 4.

¹⁰⁰ Theodore A. Bingham, *Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia*, by Theo. A. Bingham, Capt., Corps of Engineers, Col. U.S.A., being Appendix DDD of the Annual Report of the Chief of Engineers for 1901 (Washington, D.C.: GPO, 1901).

¹⁰¹ Office of Public Buildings and Public Parks of the National Capital, *Annual Report of Director of Public Buildings and Public Parks of the National Capital* (Washington, D.C.: GPO, 1927).

¹⁰² Theodore A. Bingham, *Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia*, by Theo. A. Bingham, Capt., Corps of Engineers, Col. U.S.A., being Appendix DDD of the Annual Report of the Chief of Engineers for 1902, (Washington, D.C.: GPO, 1902).

¹⁰³ Charles S. Bromwell, *Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia*, by Chas. S. Bromwell, Captain, Corps of Engineers, U.S.A., being Appendix DDD of the Annual Report of the Chief of Engineers for 1905 (Washington, D.C.: GPO, 1905). When the monument opened to the public, visitors gathered at the Monument Lodge before walking to the monument, but larger-than-expected crowds lead to the abandonment of this role for the Monument Lodge.

¹⁰⁴ "Unusual Tributes Paid Washington in Services Here," *Evening Star*, 23 February 1920, 1.

¹⁰⁵ The display of a ring of flags, one for each state, was a feature of the annual Washington birthday celebrations, and by the 1940s, the flags were flown during the 4th of July celebrations (Michael D. Hoover, *Origins and History of the Washington Monument Flag Display*, Washington, D.C.: National Park Service, unpublished report, 1992).

¹⁰⁶ In 1915, Mrs. Mae Cockrell committed suicide by jumping down the elevator shaft (Torres, *Corps of Engineers*, 217). A. Birney Serp jumped out of one of the pyramidion windows in 1923. In November 1926, two men, H. C. Andrews and Blonnie Ward, jumped from windows of the Pyramidion (Office of Public Buildings and Public Parks of the National Capital, *Annual Report of Director of Public Buildings and Public Parks of the National Capital*, Washington, D.C.: GPO, 1927), 15.

¹⁰⁷ Office of Public Buildings and Public Parks of the National Capital, *Annual Report of Director of Public Buildings and Public Parks of the National Capital*, Washington, D.C.: GPO, 1927.

¹⁰⁸ U.S. Congress. Senate, *Arizona State Memorial Stone Proceedings Held in the Washington Monument Washington, DC, at the Dedication of a Memorial Stone Placed in the Monument by the State of Arizona*, 68th Cong., 1st sess., 1924, Sen. Doc. 109, 11 – 13.

¹⁰⁹ U.S. Congress, House, *Improvement of the Washington Monument Grounds*, House Document No. 528, 72d Cong., 2d sess., 1934, 5–6.

¹¹⁰ House, "Improvement of the Washington Monument Grounds," 1934, 6. This Advisory Committee was composed of Frederick Law Olmstead, Jr., landscape architect, William A. Delano, architect, L. Vipond Davies, civil engineer and foundation expert, Lazarus White, civil engineer and underpinning expert, Maj. D. H. Gillette, Corps of Engineers, and John L. Nagle, designing engineer.

¹¹¹ Office of Public Buildings and Public Parks of the National Capital, *Annual Report of Director of Public Buildings and Public Parks of the National Capital* (Washington, D.C.: GPO, 1931), 35. The first series of borings was taken in the fall of 1930 at the outer edge of the drive around the monument. In March 1931, the second set was taken further from the monument.

¹¹² House, *Improvements of the Washington Monument Grounds*, 1934, 12.

¹¹³ House, *Improvements of the Washington Monument Grounds*, 1934, 42.

¹¹⁴ Barry Mackintosh, *The National Parks: Shaping the System*, Washington, D.C.: National Park Service, Washington, D.C., 2000, web-only edition, http://www.cr.nps.gov/history/online_books/mackintosh1/index.htm, accessed 16 April 2003.

¹¹⁵ John L. Nagle, U.S. States Department of Interior, National Park Service, Eastern Division, Branch of Washington, 21 January 1935, Memorandum; Correspondence, Entry 432; Records of the Secretary, 1833–1951,

Records of the Washington National Monument Society, 1833 – 1951; RG 42; NAB; Anon., “Steel Embrace of Tallest Scaffolding is Slowly Obliterating the Monument” in *Washington Daily News*, 22 September 1934.

¹¹⁶ Olszewski, *Washington Monument 1844–1968*, 61.

¹¹⁷ Office of Public Buildings and Public Parks of the National Capital, *Annual Report of Director of Public Buildings and Public Parks of the National Capital*, Washington, D.C.: GPO, 1929.

¹¹⁸ Office of Public Buildings and Public Parks, *Annual Report*, 1931.

¹¹⁹ Irving C. Root, Supervisor, to W. E. Reynolds, Commissioner Public Buildings Administration, 28 April 1942; NPS-NCR Collection.

¹²⁰ “Approach Plan – Tentative,” 12 July 1943, Drawings #807_84215; “Approach Plan,” 20 July 1943, Drawing #807_84215a, NPS-NCR Collection; Irving C. Root, Supervisor, NCR, to W. E. Reynolds, Commissioner, Public Buildings Administration, 22 February 1945; NPS-NCR Collection.

¹²¹ Barthold, *L’Enfant-McMillan Plan*, 72.

¹²² *Evening Star*, 5 October 1945.

¹²³ In 1958, eight red aircraft warning lights were installed in the pyramidion, one above each exterior window and the current exterior floodlighting system, including four inner concrete vaults for lighting the lower 60 feet of the monument, four large concrete bunkers with hydraulically powered aluminum covers at the outer edge of the circular drive, and eight search lights mounted on pedestals 568 feet from the monument (John S. Haney, “Relighting the Washington Monument,” *Illuminating Engineering*, August 1958).

¹²⁴ In 1957, plans were made for the permanent installation of 50 flagpole bases in a circle at the outer edge of the drive around the monument. (“Flagpole Arrangement, Washington Monument,” 8 January 1957, Drawing #807_84279; NPS-NCR Collection.) Forty-eight flagpoles were installed and used for the first time on 22 February 1958, as part of the Washington birthday celebration. A 49th flag was unveiled on 4 July 1959 and the 50th flag on 4 July 1960 (Hoover, *Flag Display*, 4–5).

¹²⁵ Connie Feeley, “Separate Entrance, Exit and Plaza Planned for Remodeled Monument,” *Washington Post*, 20 January 1959. This was done for aesthetic and visitor-handling reasons. The vehicular access drive was transformed into a pedestrian path and plaza. This work was in concert with the Washington Mall Master Plan, which called for removing through traffic from the Mall (Barthold, *National Mall*, 25).

¹²⁶ National Park Service, *Annual Report – Washington National Monument, 2/22/1957–2/22/1958*, Washington, D.C.: National Park Service, 1959.

¹²⁷ Wunsch, *Washington Monument*, 6.

¹²⁸ National Park Service, Department of the Interior, *Outline of Future Plans for Improvements in the Vicinity of the Washington Monument Under the National Park Service MISSION 66 Program*, Washington, D.C.: Department of Interior, National Park Service, 1959.

¹²⁹ Wunsch, *Washington Monument*, 7.

¹³⁰ Wunsch, *Washington Monument*, 7.

¹³¹ Brian Moor, "Washington Monument to Undergo \$5 Million Face Lift," *Washington Post*, 4 July 1997, sec. B, 1.

¹³² Gabriel Escobar, "One Last Party Before Monument Goes Under Wraps," *Washington Post*, 3 July 1998, sec. A, 1.

¹³³ *Visitor Facility for the Washington Monument, Washington D.C. Comprehensive Design Program and Engineering Feasibility Design Program*, prepared by Hartman-Cox Architects for National Park Service, September 20, 1973.

¹³⁴ National Park Service, *Development Concept Plan: Washington Monument Grounds (Revisions to the 1981 Development Concept Plan)* (Washington, DC: National Park Service, April 1989), 7.

¹³⁵ National Park Service, *Development Concept Plan* (1989), 5, 8.

¹³⁶ National Park Service, *Process of Implementation for Grounds Improvement and Accessibility, Washington Monument Grounds*, May 1993.

¹³⁷ Linda Wheeler, "Security on the Mall," *Washington Post*, 21 December 2001, A1, 12.

¹³⁸ Benjamin Forgey, "Quick Fix Breaks the Monumental Mood," *Washington Post*, 14 August 2001, sec. C, p. 1-2.

¹³⁹ National Capital Planning Commission, "Commission Action: Washington Monument Grounds, Revised Development Concept Plan and Preliminary Site and Building Plans for Visitor and Security Improvements," 9 January 2003, 5.

¹⁴⁰ National Capital Planning Commission, *Design Concept (Visitor and Security Improvements) Washington Monument Grounds Washington, D.C., Report to the National Park Service*, 7 February 2002, NCPC File No. 1303/6152.

¹⁴¹ Donald C. Phanz, "Washington Monument," *National Register - Documentation of Existing National Register Property*, Washington, D.C.: Department of the Interior. National Park Service, 1980.

¹⁴² Torres, *Corps of Engineers*, 30.

¹⁴³ Robert Blythe, et al., "Kings Mountain National Military Parks: Historic Resource Study, Atlanta: National Park Service, 1995, 64-65.

¹⁴⁴ Scott, "The Iconography of the Mall," 50-51.

¹⁴⁵ Scott, "Iconography of the Mall," 50-51.

¹⁴⁶ Torres, *Corps of Engineers*, 7.

¹⁴⁷ Quoted in Frederick L. Harvey, *Washington National Monument Society* (Washington, D.C.: GPO: 1903), 224.

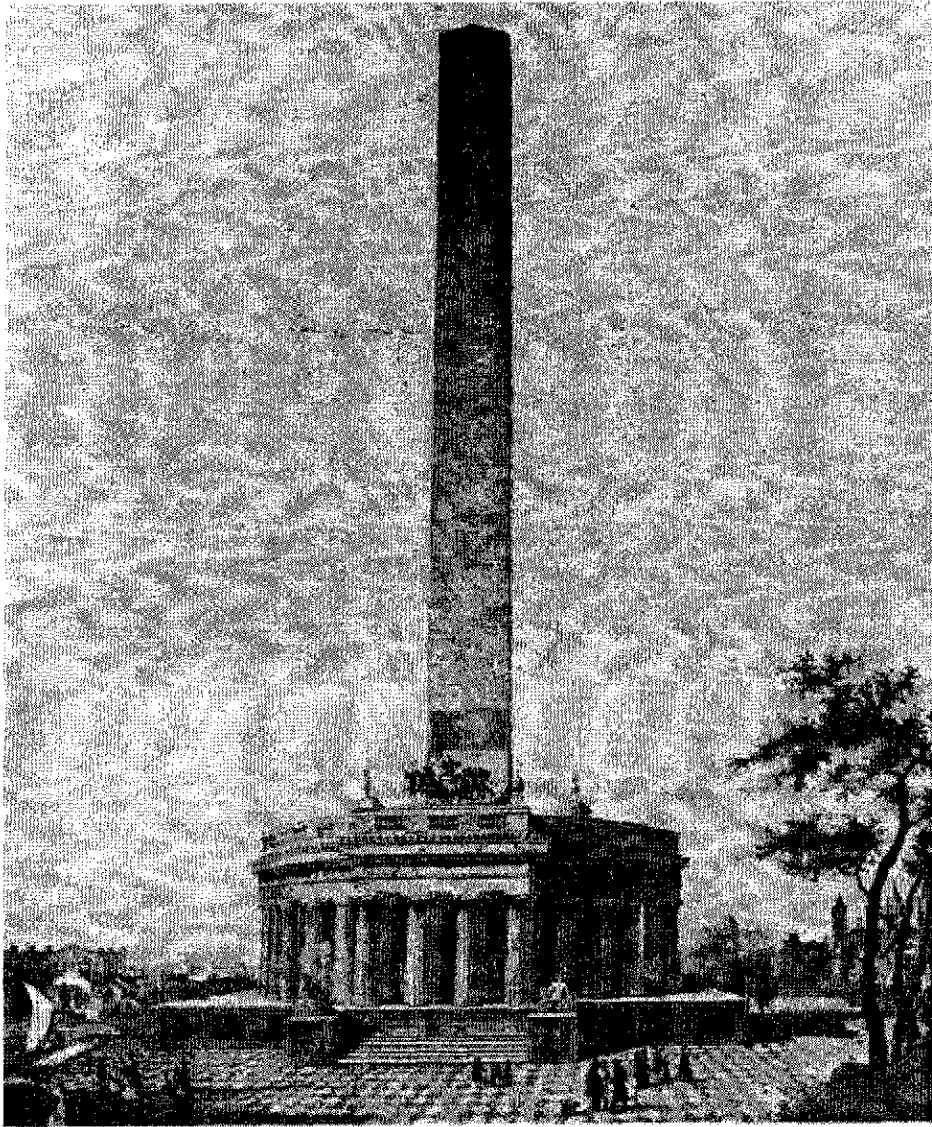


FIGURE 2.1: 1854 ENGRAVING OF ROBERT MILLS'S DESIGN FOR THE WASHINGTON MONUMENT.

ROBERT MILLS'S original drawing for the Washington monument. Taken from a 1939 reprint of the engraving based on 1854 original drawings, which contributed toward the monument. The particular engraving which this report refers to is a reprint of a design which was prepared by a student in Washington. Near the close of the first year of the design, and in the eight months after the above design was completed, the student, who was the Treasury building and the canal which cut through the city, to his construction. The monument was designed to be 555 feet high with the base 100 feet high. When the monument was partially completed, it was found that the top of the shaft would be insufficient to support the weight of the shaft, and the height was reduced to 555 feet and the bearing surface of the shaft was increased to 100 feet. The monument was designed to be 555 feet high with the base 100 feet high.

Figure 2.1: 1939 reprint of 1854 engraving of Robert Mills's design for the Washington Monument. (*Federal Architect* [July 1939], 10; File unknown, Washingtoniana Division, Martin Luther King, Jr. Memorial Library, Washington, D.C.)

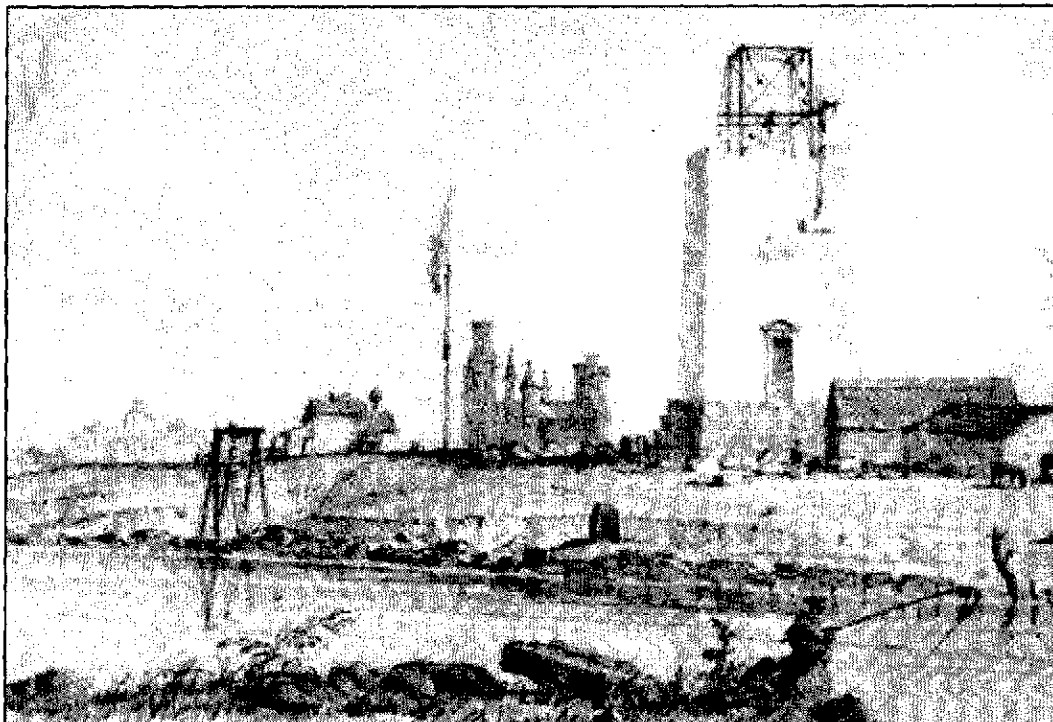


Figure 2.2: November 16, 1851, watercolor of the Washington Monument by Seth Eastman.
(Longstreth, ed. *Mall in Washington*, 195, plate XL.)

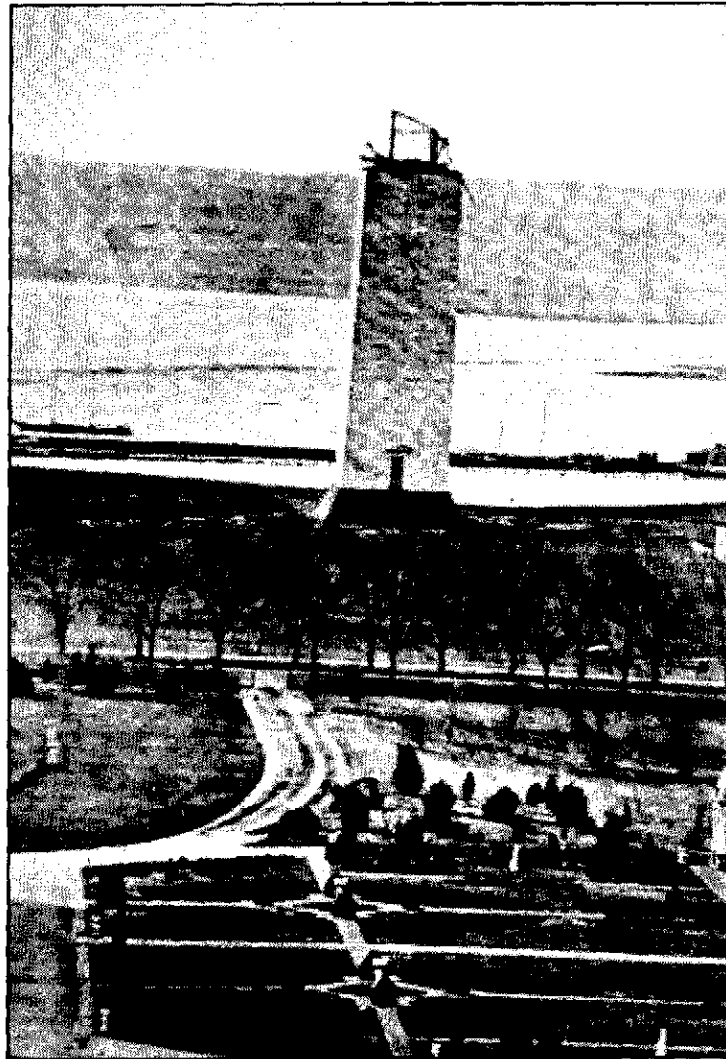


Figure 2.3: Ca. 1875 photograph of the unfinished Washington Monument. (Prints and Photographs Division, LC-USZ62-90246, Library of Congress, Washington, D.C.)

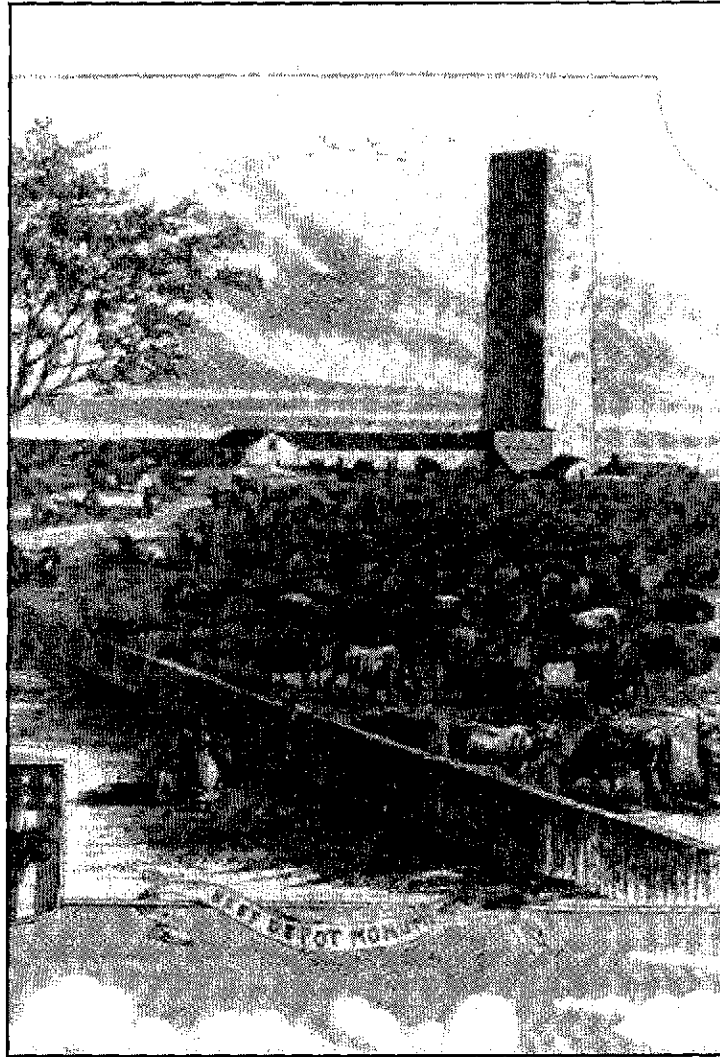


Figure 2.4: The Washington Monument Grounds as a grazing and holding area for the Union Army's beef cattle during the Civil War. (Prints and Photographs Division, LC-USZ62-59908, Library of Congress, Washington, D.C.)

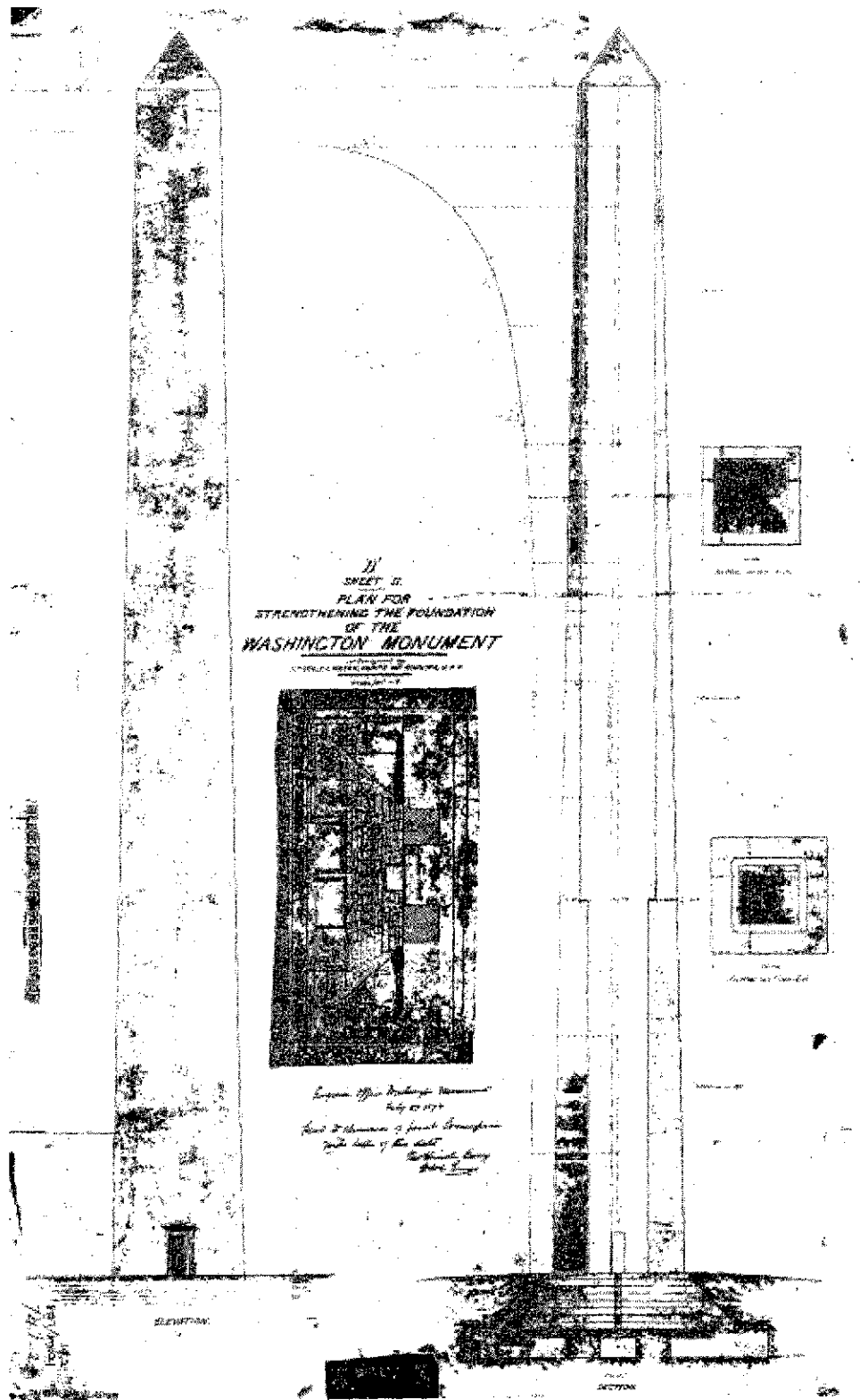


Figure 2.5: Thomas Lincoln Casey's "Plan for Strengthening the Foundation of the Washington Monument." (T. L. Casey, "Plan for Strengthening the Foundation of the Washington Monument, B, Sheet II;" 27 July 1878; Drawing 807_80021, Denver Service Center, National Park Service.)

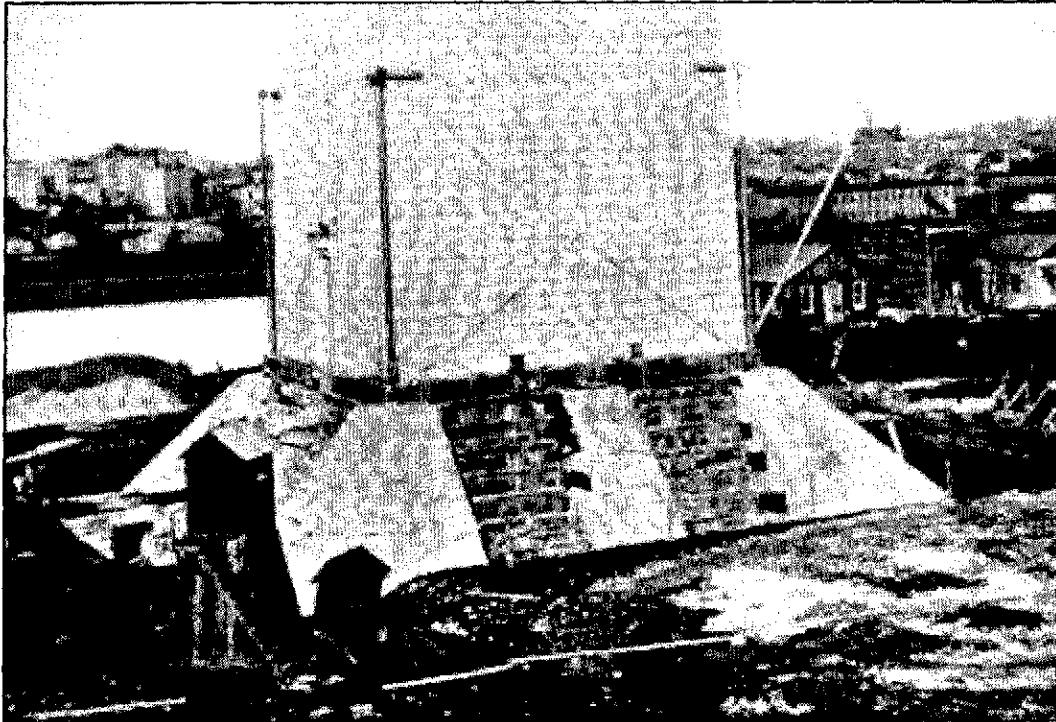


Figure 2.6: Buttressing Foundation, Washington Monument. ("Buttressing Foundation, Washington Monument, from the southwest." 20 January 1880; Prints and Photographs Division, LC-USZ62-15296, Library of Congress, Washington, D.C.).

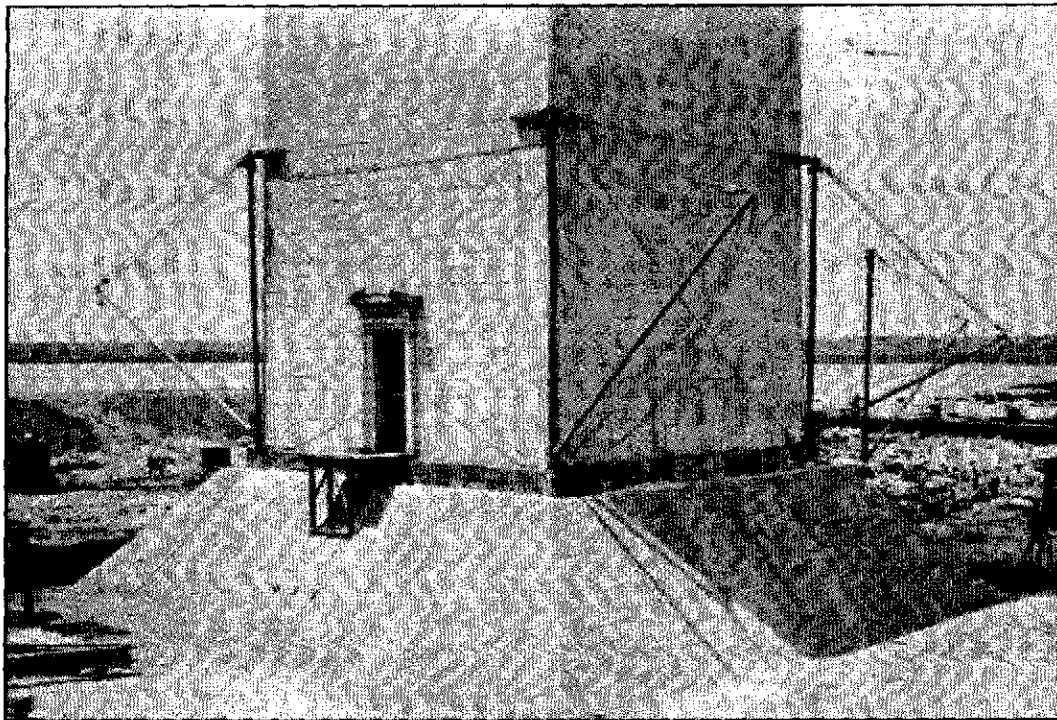


Figure 2.7: Completed strengthening of the Washington Monument foundation. ("Washington Monument, Strengthening Foundation Completed May 28th, 1880." June 1880; Prints and Photographs Division, LC-USZ62-15294, Library of Congress, Washington, D.C.)

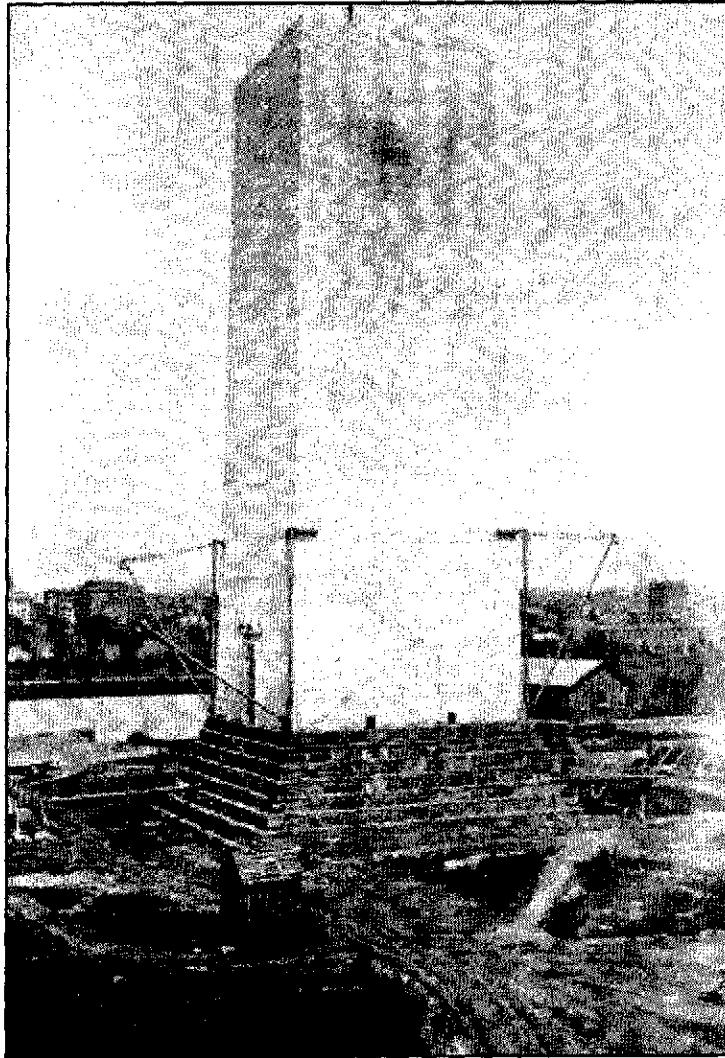


Figure 2.8: August 14, 1879, photograph of the Washington Monument. (Prints and Photographs Division, LC-USZ62-10828, Library of Congress, Washington, D.C.)

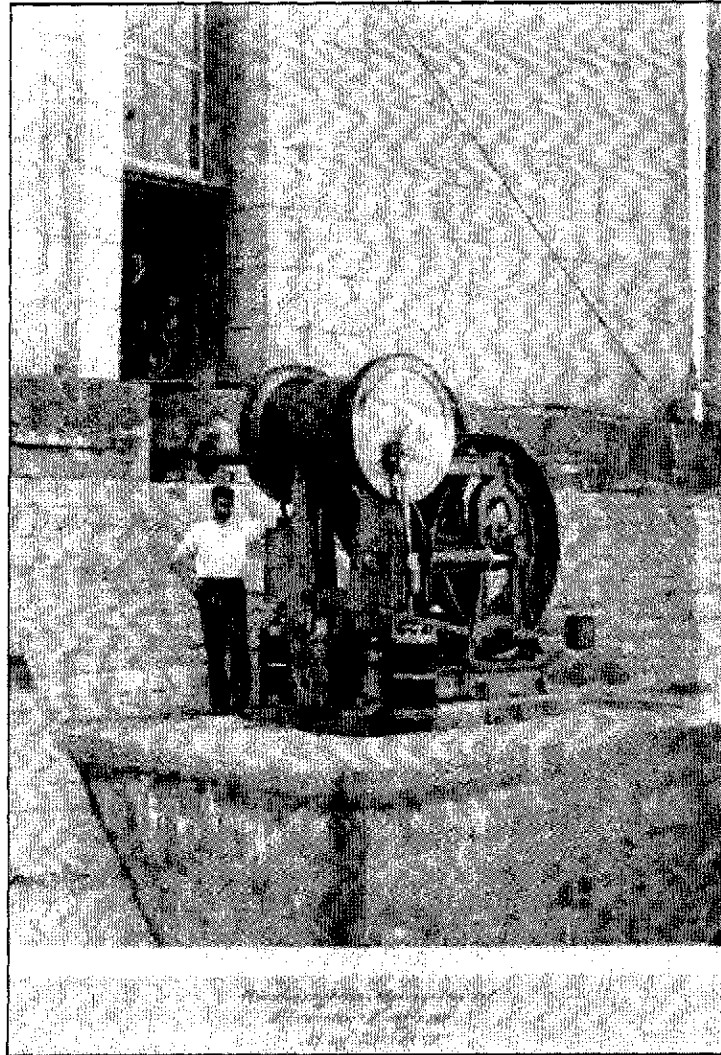


Figure 2.9: Washington Monument elevator engine and west elevation. ("Washington Monument, Elevator Engine." 25 May 1880; Prints and Photographs Division, LC-USZ62-15295, Library of Congress, Washington, D.C.)

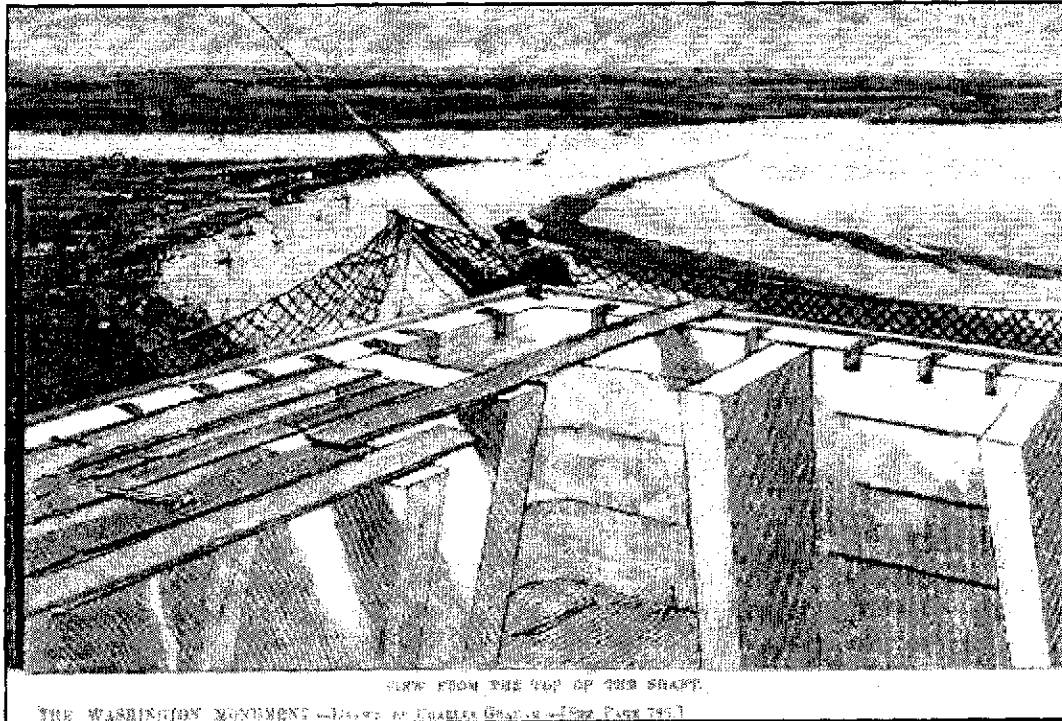


Figure 2.10: Charles Graham drawing of start of pyramidion construction. (Charles Graham. "View from the Top of the Shaft." *Harper's Weekly*, v. XXVIII, no. 1458, 20 November 1884, p. 790.)

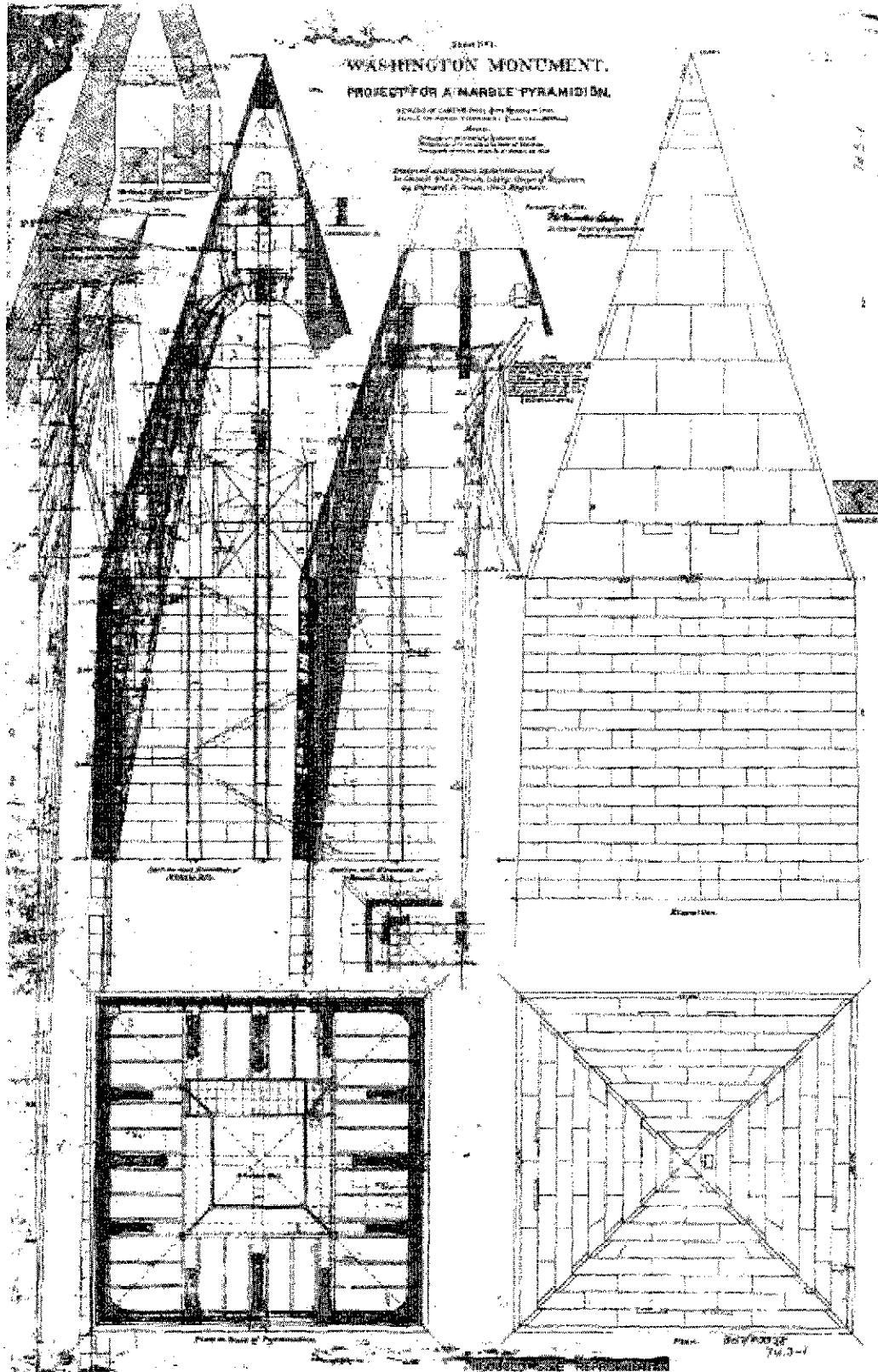


Figure 2.11: "Project for a Marble Pyramidion." (Thomas Lincoln Casey and Bernard R. Green. "Project for a Marble Pyramidion," 19 January 1884; Drawing 807_80028, Technical Information Center, Denver Service Center, National Park Service.)



Figure 2.12: Setting the capstone on the Washington Monument, December 6, 1884. (S. H. Nealy. "572 feet high – Setting the Capstone on the Washington Monument." *Harper's Weekly*, 20 December 1884, p. 839; Prints and Photographs Division, LC-USZ62-89199, Library of Congress, Washington, DC.)

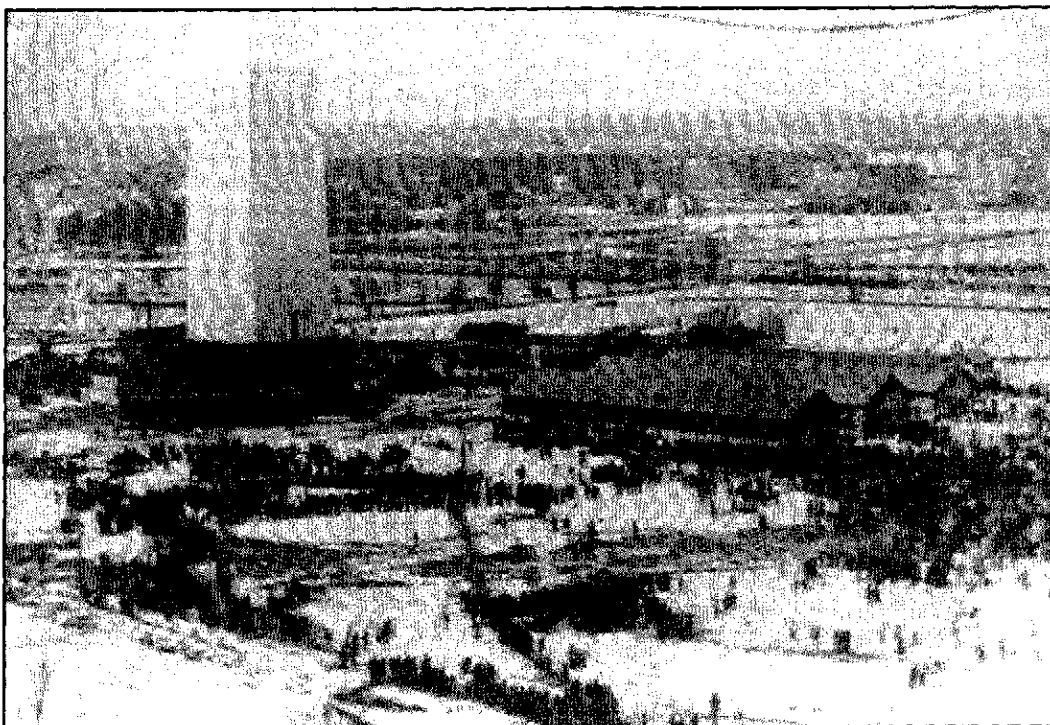


Figure 2.13: Dedication of the Washington Monument, February 21, 1885 (“Dedication of the Washington Monument, February 21, 1885.” Prints and Photographs Division, LC-USZ62-89199, Library of Congress, Washington, D.C.)



Figure 2.14: Ca. 1890 view of the Monument Lodge and the Washington Monument, looking west. (File 8924; Historical Society of Washington, D.C.)

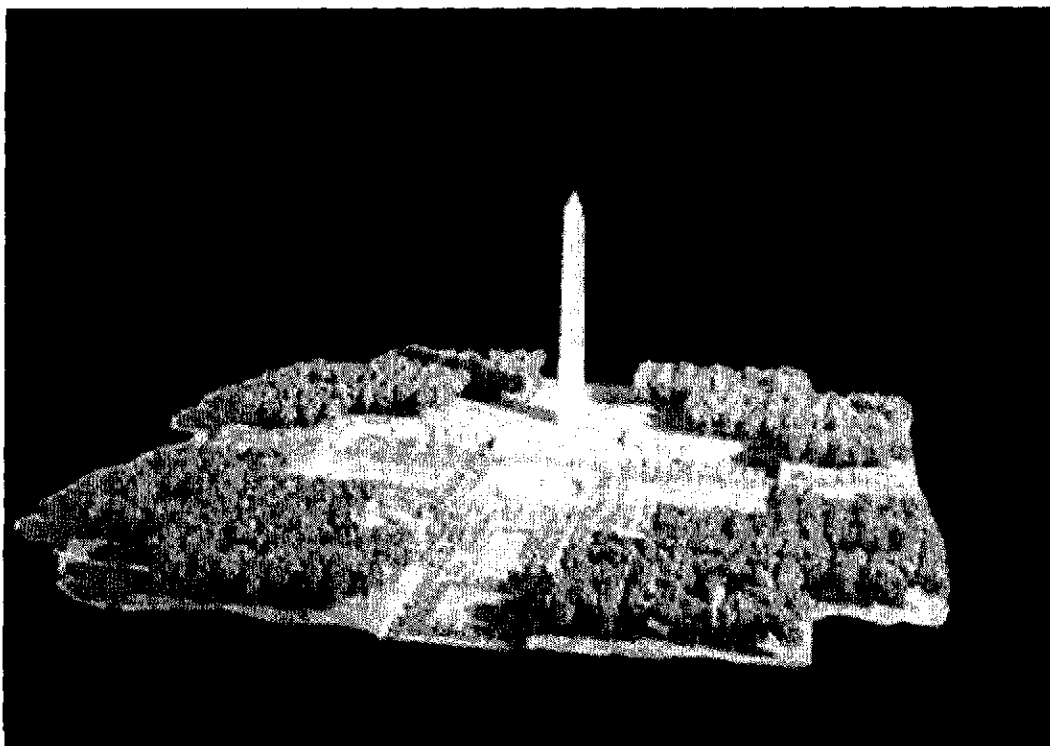


Figure 2.15: Model of the 1901 – 1902 Senate Park Commission Plan for Monument Gardens. (Prints and Photographs Division, LC-H824-M04-021-030, Library of Congress, Washington, D.C.)

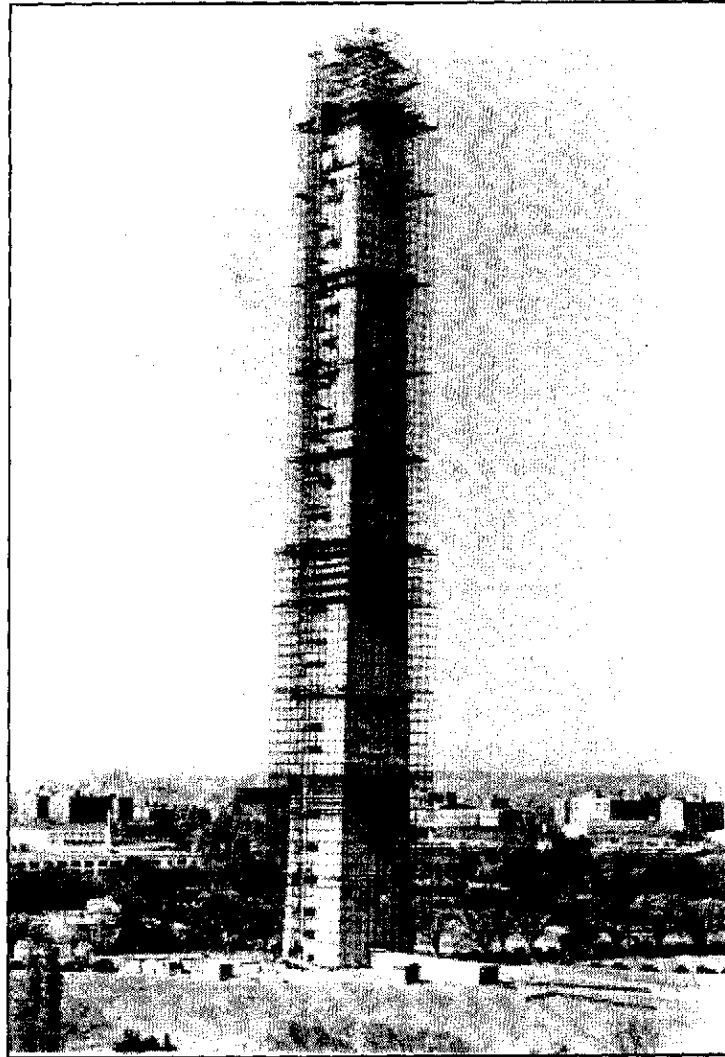


Figure 2.16: 1934 view of the Washington Monument encased in scaffolding for exterior cleaning and repairs. (File 1776; Historical Society of Washington, D.C., Washington, D.C.)

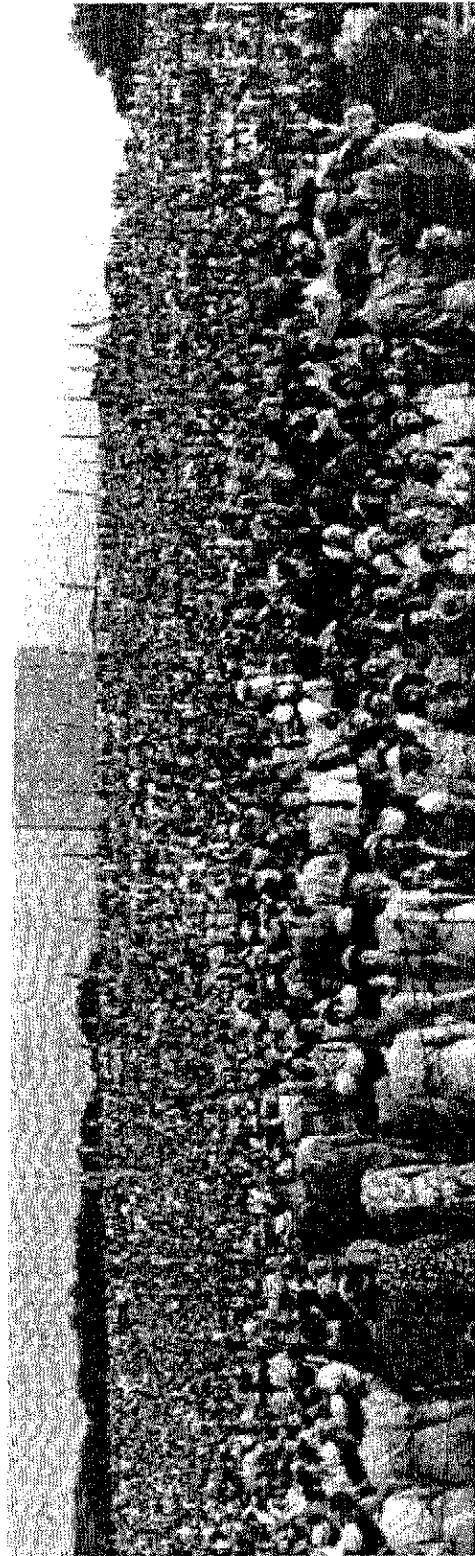


Figure 2.17: July 4th, 1944 celebrations at the Washington Monument. (Prints and Photographs Division, Lot 4719, Library of Congress, Washington, D.C.)



Figure 2.18: November 16, 1969, anti-war march that drew an estimated 250,000 people to the Washington Monument Grounds. (Picketing file 154633, Washingtoniana Division, Martin Luther King, Jr. Memorial Library, Washington, D.C.)

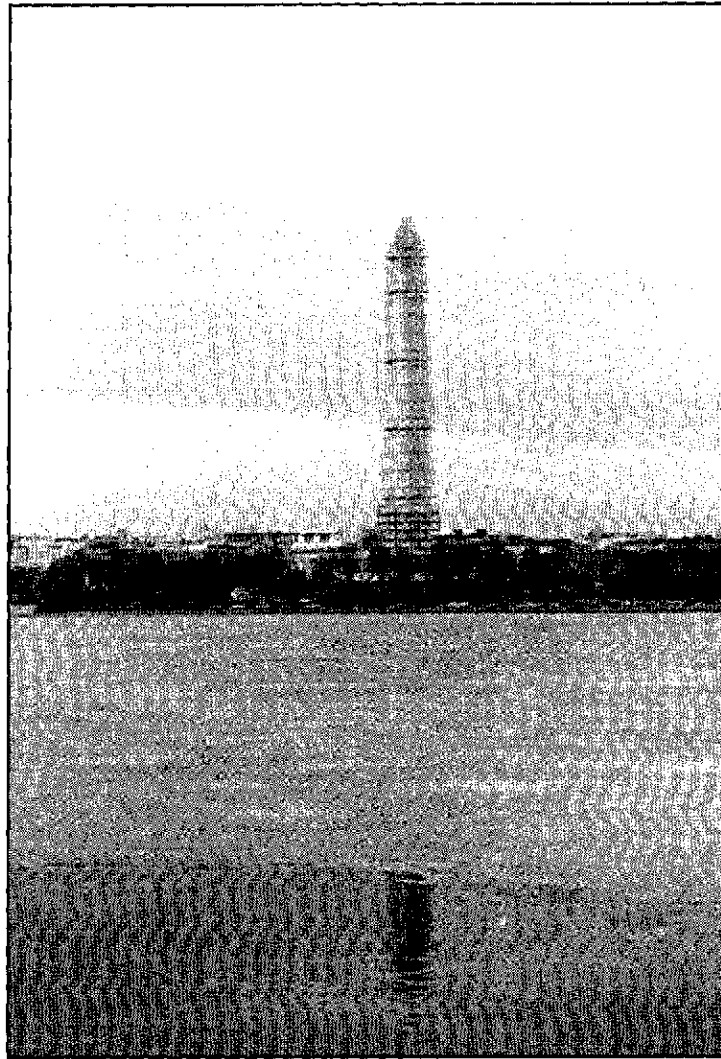


Figure 2.19: 1999 view of the Washington Monument encased in scaffolding for exterior cleaning and repairs. ("Washington Monument," ROCR 42-19; National Park Service, National Capital Region, Historic Architecture Program.)

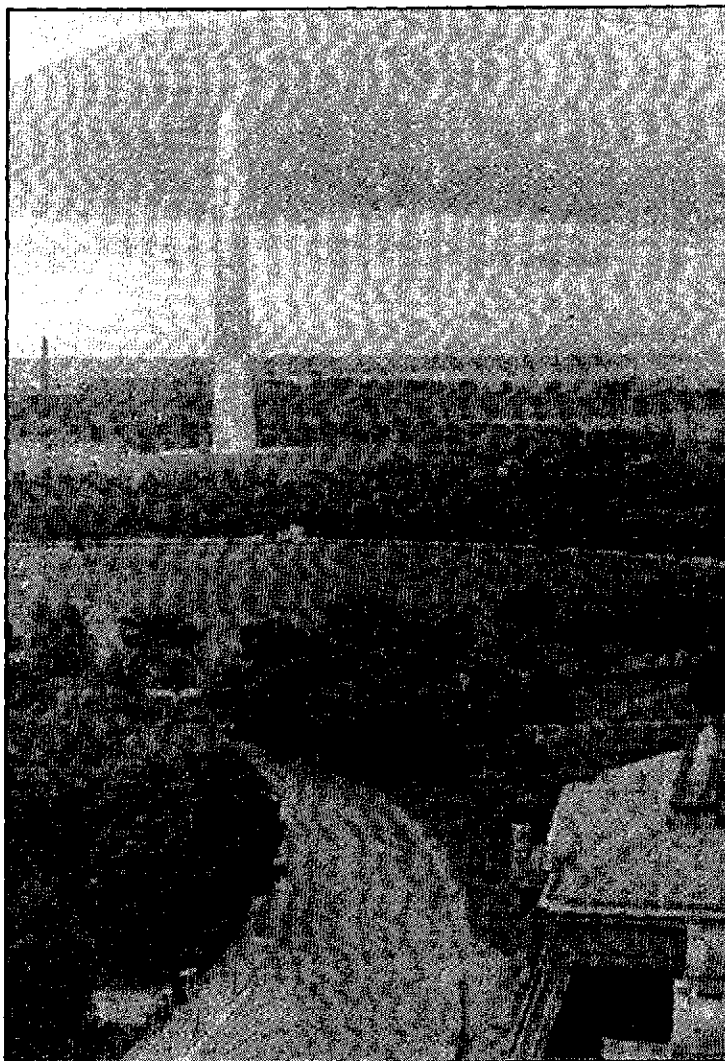


Figure 2.20: 1902 view of the Washington Monument from the White House. (Prints and Photographs Division, LC-USZ62-40121, Library of Congress, Washington, D.C.)

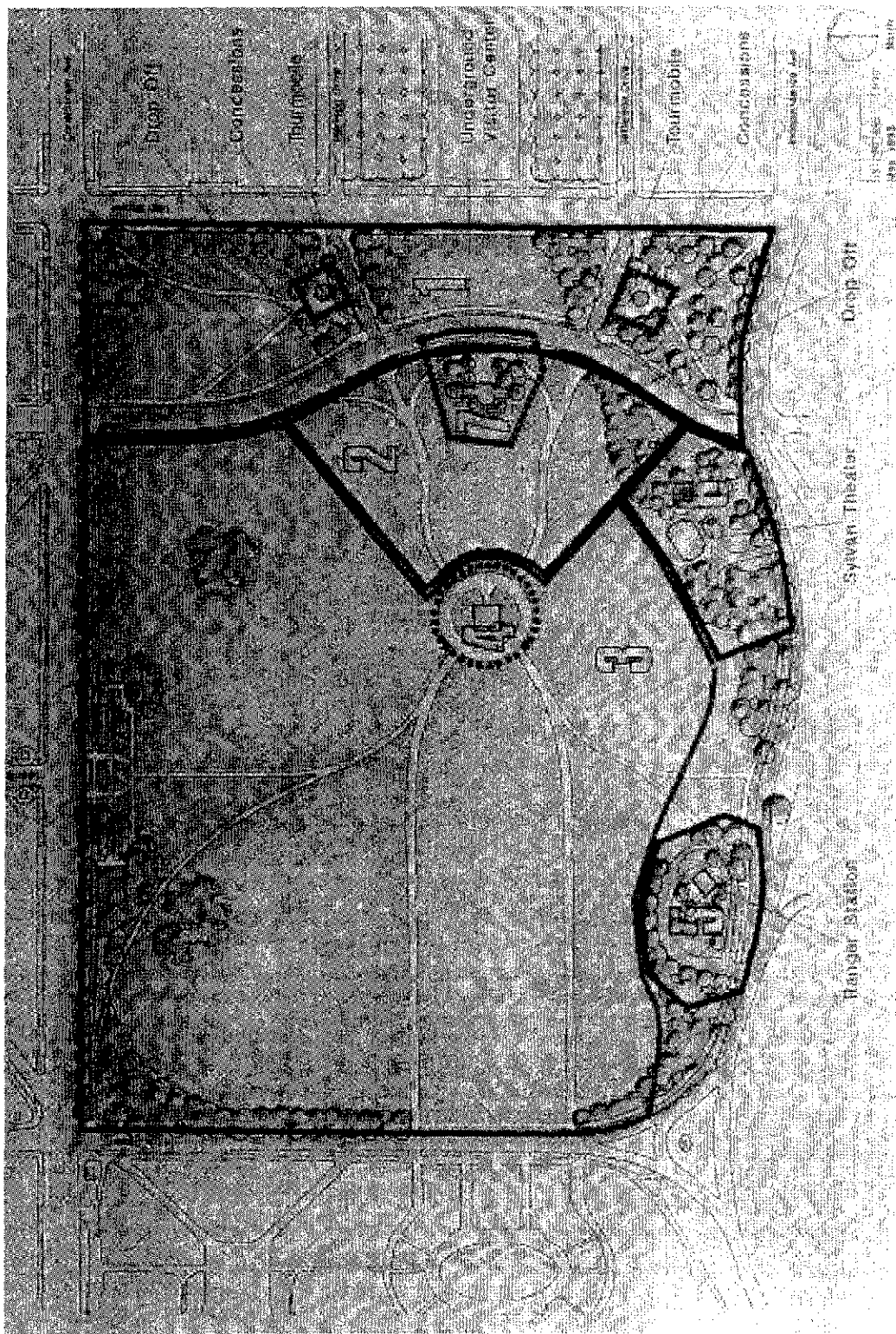


Figure 2.21: 1993 Development Concept Plan for the Washington Monument Grounds (National Park Service, Department of the Interior, *Process of Implementation for Grounds Improvement and Accessibility, Washington Monument Grounds*. Washington, D.C.: Department of Interior, National Park Service, May 1993.)

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Part I – Developmental History

CHAPTER THREE
CHRONOLOGY OF DEVELOPMENT AND USE

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CHAPTER THREE

CHRONOLOGY OF DEVELOPMENT AND USE

The Washington Monument has endured as a memorial to George Washington and a Washington, D.C., tourist attraction from its opening in 1888 to the present day. The monument is a 555-foot 5 1/8-inch-tall masonry load-bearing structure in the form of an Egyptian obelisk, standing near the cross axes of the Washington Mall. Its construction advanced in phases. The first phase of construction saw the completion of the monument up to 152 feet during 1833–1854. Construction stopped in 1854 because of a lack of funds. Its completion was further delayed by political factionalism and the outbreak of the Civil War. The final phase of construction from 1877–1888 involved the strengthening of the original foundation, constructing the remaining portion of the shaft and the pyramidion, and the completion of the Monument Grounds and surrounding knoll. While mechanical and electrical systems have been routinely upgraded, interior spaces renovated for public use, and service spaces rehabilitated, the exterior of the monument has had few major material changes to its 1888 structure or appearance. Minor alterations on the exterior include the installation of aircraft-warning lights in 1958 and construction of the interim security building at the base of the monument in 2001. The interior has seen greater changes, principally at public spaces, including the first-floor waiting area, the 500-foot observation level, and the 490-foot level. The waiting room was renovated in 1904–1913, but major alterations were carried out in all of the public spaces in 1958, 1974–1976, 1992, and 1997–2000. Renovations in the elevator and other mechanical systems have initiated alterations in the service spaces and the central iron elevator shaft and stair structure, most notably in 1901, 1925, 1958, and 1997–2000.

3.1 1833–1854: FIRST PHASE OF CONSTRUCTION

Since L'Enfant's plan of 1791, a memorial to George Washington, originally in the form of an equestrian statue, had been intended for the site at the cross axes of the north-south axis from the White House and the east-west axis from the Capitol. However, serious fund-raising and design submissions did not begin until the creation of the Washington National Monument Society in 1833, spurred by the centennial of Washington's birth in 1832. Robert Mills's design for a 600-foot obelisk with a circular colonnade at its base was selected in either 1836 or 1845.¹ However, due to fund-raising shortfalls, the design was revised in 1848 by the deletion of the colonnade and the reduction of the obelisk to a height of 500 feet.²

In 1848, the planned obelisk was to be sited at the cross axes of the White House and Capitol, as laid out in L'Enfant's 1791 plan.³ However, the site for the obelisk was moved approximately 370 feet east of the White House axis and 123 feet south of the Capitol axis for reasons that are

still in dispute.⁴ The foundation for the Washington Monument was laid in 1848. The stepped footing, constructed of rough, untooled gneiss masonry laid in pure lime mortar, was 80-foot square and 23 feet 4 inches deep.⁵ William Early of Washington, D.C., supplied the gneiss,⁶ which came from the quarry of Timothy O'Neale, Seneca Creek, near Little Falls, D.C.⁷ The obelisk wall construction consisted of an outer wythe of white facing marble, in 2-foot-high courses, squared, dressed, and laid in tight joints, with an inner wythe of squared and roughly dressed gneiss. The core was of undressed, uncoursed, gneiss rubblework, possibly laid with a Portland cement-based mortar.⁸ The base of the obelisk shaft was 55-feet 1 ½-inches square and the walls varied in thickness from 12-feet thick at the base to 11-feet 8 ½-inches thick at the 150-foot level. The large-crystal, white Cockeysville marble was supplied by Thomas Symington from his Texas quarry near Baltimore.⁹ The exterior marble was finished smooth by rubbing, which involved smoothing the stone with a powdered abrasive. The only ornamentation on the obelisk was the heavy pediment and entablature over the east and west entrances, each decorated with a winged ball and asp.¹⁰

Contemporary accounts describe the construction site as a bustling, noisy affair with the noise of hammers by "a score or two of stonecutters fashioning the marble," accompanying the sound of "the powerful steam engine lifting the blocks to their lofty beds," and the sights, sounds and smell of a throng of "oxen, horses, and laborers on two feet."¹¹ During this period, the marble stones were dressed by hand, even though this process had become largely mechanized in New York by this date.¹² Ninety-two memorial stones donated to the Washington Monument were laid within the gneiss shaft stonework.¹³ In the fall of 1854, the funds raised by the Washington National Monument Society were exhausted and construction on the monument stopped when the structure had reached 152 feet.

3.2 1855–1876: PAUSE IN CONSTRUCTION

Construction of the monument was further delayed by political upheaval. Members of the nativist Know-Nothing movement, then at the height of their fleeting political power, seized control of the monument during 1855–58. Though several rows of masonry were laid during this period, these courses were later removed because of the poor quality of the work. In 1858, after the defeat of their presidential candidate in the election of 1856, the Know-Nothings returned the records and control of the monument to the Washington National Monument Society, which was incorporated by an act of Congress on February 22, 1859. At this date, the records of the National Monument Society stated that the monument, memorial stones, equipment, and support structures were in a state of disrepair.¹⁴ It was noted in 1859 that "a few blocks of the lowest courses have slightly chipped at the edges, owing to the joints having been laid rather closely."¹⁵ An 1874 report attributed this chipping to improperly cut joints. The marble facing stones were dressed to form flush joints at the face but were then cut on a bevel towards the rear of the stone, placing stress at the joints, which caused the chipping.¹⁶ An 1859 report concluded that the foundation was adequate to support the monument as planned.¹⁷ However, the impending hostilities and eventual outbreak of the Civil War (1861–65) effectively stopped all further studies and construction of the monument.¹⁸ An official report on the committee's activities stated that the committee "had no more than well organized and ranged itself in the line of duty

when the war came on, and their only work on the monument was to put it in a good condition to be preserved.”¹⁹

Work on the Washington Monument did not resume until the 1870s when the Army Corps of Engineers was commissioned to undertake studies of the structural capacity of the existing foundation. The 1859 report, stating that the existing foundation was adequate, was disputed after the end of the Civil War, spurring more studies. Lieutenant W. L. Marshall of the U.S. Army Corps of Engineers produced a preliminary report on the monument in February 1873,²⁰ followed by a second more in-depth report in April 1874. Marshall reported that the existing gneiss foundation would only support a monument constructed of 400 feet of marble masonry with brick backing and an apex constructed of cast-iron plates, I-beams, and rods.²¹ The results of this report were also disputed, leaving open the question of the stability of the foundation.

Funding could not be secured for the completion of the Washington Monument in the political and financial atmosphere of the Reconstruction period, despite entreaties to the U.S. Congress by members of the National Monument Society. However, the enthusiasm for the approaching Centennial celebrations of 1876 provided the motivation to secure funds for its completion. In 1874, Congress resolved to provide funds for the completion of the monument.²² As a result, in 1876, ownership of the monument was transferred to the federal government, funds were appropriated for its completion, and the Joint Commission was created to oversee the completion of the monument. Because of the inconclusive nature of earlier studies, the 1876 congressional act required further studies to determine the structural capacity of the existing stepped gneiss foundation.

3.3 1877–1888: FINAL CONSTRUCTION OF MONUMENT AND KNOLL

Completion of the Washington Monument occurred in four main stages: strengthening the foundation (1878–1880), construction of the central iron structure and monument shaft (1880–1884), construction of the pyramidion (1884), and completion of the monument and grounds (1885–1888). Strengthening of the foundation involved underpinning the existing stepped gneiss foundation with concrete and then removing portions of the existing foundation in order to construct concrete buttresses around the entire foundation. Construction of the central iron structure occurred in tandem with construction of the monument shaft, with the central iron structure providing access, platforms, and support for the steam hoist and other necessary machinery needed to construct the masonry shaft. Following completion of the shaft, the pyramidion was rapidly constructed. The final work at the monument entailed converting the monument and grounds from a construction site to a public memorial space, involving final finishing of the monument, modification and construction of ancillary structures, and completion of the monument knoll.

3.3.1 STRENGTHENING THE FOUNDATION (1878–1880)

In 1878, the Joint Commission appointed Lieutenant Colonel Thomas Lincoln Casey as engineer in charge of the strengthening of the existing foundation and the completion of the Washington Monument.²³ Casey produced a detailed report in July 1878 on the current condition of the monument with recommendations for its completion.²⁴ Based on calculations of the pressure

placed on the existing foundation through the combined forces of masonry weight and wind pressure, Casey reported that "it is not believed the monument could be carried to the desired height upon a foundation of no greater spread than that possessed by the present one."²⁵ The foundation was too narrow and too shallow; it could not support the obelisk as designed by Mills without modification to either the foundation or the structure. Two possible solutions were proposed to strengthen the existing foundation of the monument. The first proposed to build up the earth around the base of the foundation to prevent lateral displacement. The second solution involved underpinning the existing foundation to increase the spread of the foundation to distribute the load over a greater area. Casey recommended that the second solution be adopted.

Underpinning the foundation involved pouring a mass of Portland cement concrete 126 feet 6 inches square at a depth of 12 feet 4 inches below the existing foundation. To lock the old foundation with the new and to distribute the weight of the structure, Casey proposed to construct three concrete buttresses on each side of the foundation twelve in total. The buttresses would be constructed around the existing foundation, and locked into the newly poured concrete underpinning. To stabilize the foundation during this work, Casey proposed to construct either a leg of concrete under the center of the foundation, using an existing two-foot-square well, or, the preferred option, a set of masonry cross walls under the center of the foundation.²⁶ The Joint Commission approved Casey's plan for strengthening the foundation of the monument in October of 1878 and excavation commenced early in 1879 (see figure 3.1).²⁷ The time between approval and excavation was spent preparing the site for construction: erecting new buildings and repairing existing structures for workshops, building roads, erecting concrete mixers, constructing derricks, assembling steam engines, and collecting construction materials such as locally available broken stone, pebbles, sand, and Portland cement from J.B. White and Bros., Swanscombe, England.²⁸

The method of underpinning the existing foundation began with excavating the earth from around the existing foundation (see figure 3.2). The floor of the excavated area was level with the foundation footings, which were exposed for 46 feet in length, leaving the corners of the foundation unexcavated. Water that accumulated in the excavated areas was removed by a system of drains. Railroad tracks were laid to provide for both the removal of earth and the transportation of the fresh concrete to the excavated areas. After excavation around the foundation was complete, tunneling began under the structure in small increments in order to introduce concrete in thin vertical rises. The cuts were excavated in pairs, one each on opposite sides of the monument, to reduce the risk of destabilizing the monument.²⁹ Each cut measured approximately 4 feet wide, 41 feet 3 inches long and approximately 12–13 feet deep. Heavy timbers, planking, and screw jacks were introduced into the cut to hold back the surrounding earth. As soon as excavation was complete in each cut, the cut was filled with an aggregate-rich concrete in proportions of 1 cement: 2 sand: 3 pebbles: 4 broken stone. The concrete was rammed in place with cast-iron rammers produced specifically for this purpose. The layers of concrete were connected to each other by dowel stones set in the face of the concrete layers as the work progressed. The screw jacks were removed as the concrete was built up. However, the timbers and planking on the sides were left in place until the adjacent cuts were made. When the concrete was poured to a level that restricted the use of the cast-iron rammers, the concrete was introduced using small gunny sacks and forced home by means of a "heavy timber suspended

from a trestle and worked by six or eight men in a horizontal direction as a battering ram.” This process was repeated until the concrete was fully consolidated. To ensure that all cavities were completely filled, two cast-iron pipes were laid at the base of the old gneiss foundation and built in as the concrete was installed. These pipes were removed when the concrete had hardened, forming two channels extending 18 feet below the monument, which were used to introduce grout to fill any cavities.³⁰ However, cracks were found later in the concrete underpinning when the sides were exposed in order to pour the adjacent cut. The cracks ran vertically under, or no more than 5 feet from, the outer edge of the old foundation.³¹ No method of crack repair is mentioned in Casey’s monthly reports during the underpinning work. In order to monitor any settlement in the structure during the underpinning work, bench marks and leveling stations were established.

In September 1879, when the underpinning was nearly complete, construction began on the concrete buttresses. Construction of the buttresses occurred in pairs on either side of the monument in an effort to avoid uneven settlement. In preparation for pouring each buttress, a 12-foot wide cut was made in the existing gneiss foundation to a depth of 5 feet under the outer edge of the marble face. The gneiss masonry was left rough and the joints were cut out to improve the bond between the gneiss masonry and the concrete buttress. Each buttress was 12 feet wide, with the bottom locked into a depression cut into the foundation underpinning in order to transfer the load. Wooden formwork was used to form the sides during construction of each buttress (see figure 3.3).³² The buttresses were constructed of concrete composed of 1 cement: 1.5 sand: 2.25 pebbles: 3 broken stone (see figure 3.4).³³ During preliminary construction of the buttresses in October 1879, Casey made two modifications to his original plans for the strengthening of the Washington Monument foundation. Casey believed that his proposed plan of constructing masonry cross walls or a central leg of concrete under the center of the foundation should be abandoned. Instead, he proposed that the central portion of earth under the gneiss foundation, measuring 44 feet on a side and 13 feet deep, be left untouched. The second modification was to expand the extent of the buttresses so that the entire gneiss foundation was encapsulated in a continuous concrete buttress.³⁴ The Building Committee of the Joint Commission approved the modifications on 21 October 1879.³⁵ The foundation underpinning was complete by May 1880 when the concrete buttress mass enclosed the entire gneiss foundation (see figures 3.5 and 3.6). The new foundation was 126 feet 5 ½ inches square and 36 feet 10 inches deep.³⁶ A terrace of earth, 30 feet wide and 17 feet high, was constructed in July 1880 to cover the completed foundation.³⁷

During the strengthening of the foundation, the ultimate design of the Washington Monument was revised through consultation with George Marsh, U.S. ambassador to Italy. Marsh advised on the proportions of existing ancient Egyptian obelisks: the shaft height is 10 times the width of the base, the top of the shaft is 2/3 to 3/4 the width of the base, and the height of the pyramidion is equal to the width of the base.³⁸ Casey altered the final height of the Washington Monument and adjusted the proportions of the pyramidion according to Marsh’s recommendations. The final design was a 500-foot obelisk culminating in a 55-foot steeply pitched pyramidion 34 feet 5 ½ inches square at its base.³⁹

3.3.2 CONSTRUCTION OF MONUMENT SHAFT (1880-1884)

In preparation for construction of the monument shaft, new blocks, falls, and supports were erected to allow access to the top of the shaft during July 1878,⁴⁰ swinging platforms were constructed at the top corners of the shaft in June 1879,⁴¹ and 8-foot-wide safety netting installed beneath the platforms in August 1880.⁴² Casey developed an internal cast-iron structure for the monument consisting of cast-iron columns supplied by Phoenix Iron Co. of Phoenixville, Pennsylvania, J. B. and J. M. Cornell, New York, New York,⁴³ and H. A. Ramsay and Son, Baltimore, Maryland.⁴⁴ The columns were composed of 20-foot-long flanged longitudinal sections of 5/8-inch thick cast-iron bolted together at the flanges into a cylindrical form. The eight columns were set in a square-within-a-square configuration, connected at the joints by peripheral girders and braced by diagonal members.⁴⁵ The outer columns provided support for cast iron stairs and platforms constructed of I-beams. The outer Phoenix columns were 7-1/4 inch in diameter and were set at the four corners of a 15-foot 8-inch square. Landings were constructed alternately on the east and west at 10-foot increments (see figure 3.7). The cast-iron I-beams of the platforms passed through the two east and two west columns with their ends secured within the masonry of the north and south walls. Stairs ran between the east and west platforms on the north and south sides of the monument, with their interior sides bolted to the Phoenix columns (see figure 3.8). Ultimately, the stairs and platforms were to be finished with cast-iron plates; however, during construction they were temporarily covered with wood. During construction of the monument shaft, the four outer columns each also supported a crane arm that swiveled to give access to a quarter of the shaft wall. Each arm had an 18-foot mast and a 19-foot 6-inch-long boom with a traveling car and hoisting pulleys.

The inner Phoenix columns supported the Otis Brothers & Co. steam hoist used in raising materials to the top of the shaft (see figures 3.7 and 3.8). The inner columns were 6 inches in diameter, set at the corners of a 9 foot 9 1/2-inch square, and securely braced to the outer columns. The guides and ratchets for the hoist's safety mechanism were located on the northwest and southeast inner columns. An iron framework at the top of the inner columns carried the hoist ropes, pulleys, and other mechanisms for the steam hoist.⁴⁶ John A. Roebling & Sons, Trenton, New Jersey, supplied the hoist ropes.⁴⁷ During construction, the tops of the columns were stabilized by ties and braces. The steam hoist supported a maximum of 6 tons and hoisted mainly dressed dimensional stone, which was rolled onto the car using a system of railroad tracks.⁴⁸ The winding drum of the hoist was installed in a drum pit measuring 16 feet 6 inches long, 10 feet wide, and 7 feet 10 inches deep through the center of the floor at the interior of the monument. The floors of the drum pit were finished in concrete and the walls were constructed of one cast-in-place piece of concrete in the same proportions as that used in the buttresses. Granite blocks placed on this floor level held the foot plates of the Phoenix columns.⁴⁹

Installation of the central iron structure began in January 1880. Lightning rods were attached to the base of the columns and sunk into the earth at the bottom of a brick-lined well, dating to the construction of the original gneiss foundation, some 17 feet below the base of the drum pit.⁵⁰ By March 1880, the iron framework reached a height of 180 feet with temporary wooden steps and platforms.⁵¹ From April to July 1880, Otis Brothers & Co. was engaged in setting up the guides

for the elevator platform and assembling the steam engine for the hoist. The arms for the derricks at the top of the shaft were completed and hoisted into position in June 1880.⁵²

Prior to laying new masonry, approximately 6 feet of existing masonry, or 3 courses, were removed from the top of the shaft down to a height of 150 feet. The mortar in these courses had begun to deteriorate from the action of frost and weather. The stones at these courses were small and were believed to be refuse material from the first period of construction, laid during the Know-Nothing period of control. The inner core of rubble gneiss and mortar from the 1854 construction was then removed from the top course of existing masonry, and the core was filled with a Portland cement grout to fill any cavities and to form a level base for the new construction.⁵³ The shaft wall was then reset beginning at the 150-foot level to the diminished thickness required in the new design plans.

Construction of the monument shaft from 150 to 500 feet commenced in April 1880 and was completed in August 1884.⁵⁴ The construction season generally began in April or May and continued through to November or December, with frequent stops caused by shortage of materials or weather. Between the 150-foot and 170-foot levels, the center shaft was widened approximately 6 feet by reducing the thickness of the walls. The wall thickness tapered from 8 feet 7 ½ inches at the 160-foot level to 1 foot 6 ½ inches thick at the 500-foot level. The walls of the obelisk between the 150-foot and the 452-foot level were bonded, ashlar masonry in 2-foot high courses consisting of an outer wythe of white marble and inner wythes of granite.⁵⁵ The inner corners of the granite masonry in the new construction were rounded. Above the 260-foot level, the marble headers extended through the entire wall to the face of the interior shaft. From the 440-foot to the 452-foot levels, galvanized iron cramps were "freely used" to reinforce adjacent stones of the masonry wall construction. Above the 452-foot level, the thinning monument walls were constructed of a single wythe of marble.⁵⁶ The upper 30 feet of shaft masonry was strengthened with mortises and tenons in order to support the ribs of the pyramidion.⁵⁷ The marble laid at the 150- through 170-foot levels was originally finished by rubbing to match the earlier work. Above the 170-foot course, stones were tooled with a chisel and the stones at the 150-170 foot courses were later retooled with a chisel to match.⁵⁸ The marble was supplied primarily by Hugh Sisson from the Beaver Dam Quarry, Cockeysville, Maryland,⁵⁹ with a few blocks supplied by John A. Briggs from the Lee Marble Quarry, Sheffield, Massachusetts.⁶⁰ Granite for the backup was provided from several locations, listed in order of quantity supplied: Davis Tillson, Rockland, Maine,⁶¹ Cape Anne Granite Co., Boston, Massachusetts,⁶² Bodwell Granite Co., Rockland, Maine,⁶³ and William S. White, Hurricane Island, Maine.⁶⁴

Rough-cut quarry stones were delivered to the site by a specially laid railroad line. The track branched off from the main Baltimore and Potomac Railroad line on Maryland Avenue and ran down 14th Street to the monument grounds. A light rail line connected with this branch in order to bring the stones directly to the cutting sheds. Granite from Maine arrived by ship.⁶⁵ The stones were then dressed in one of 3 stone cutting sheds erected on the monument grounds. Each shed was 152 feet long and was equipped with railroad tracks and a crane to move the large blocks.⁶⁶ The number of stonecutters employed varied according to the amount of material that was supplied. From the cutting shed, another system of railroad tracks transported the dressed

masonry to the bottom of the earthen terrace at the base of the monument. Here, a boom derrick raised the dressed stone into another railroad car, which ran on tracks leading directly through the east entrance of the monument and onto the bed of the steam hoist (see figure 3.9).⁶⁷ The dressed stone was then raised to the top of the shaft on the steam hoist where it was put in place by derricks. During preliminary trials, 4 blocks of stone were raised 170 feet from the ground and set in position within an hour. To further facilitate the masonry work, a steam-powered pump forced water to the top of the shaft, and a speaking tube and bells were installed for communication between the ground level and the top of the shaft.⁶⁸ During the work, various methods were used to measure the progressive height of the monument and to monitor any changes in settlement; measurements were taken using various devices, including plumb bobs or "plummets," bronze bolts installed at known heights, and pipes inserted into the concrete foundation at known locations.⁶⁹

Work progressed on the monument shaft in 20-foot increments with work proceeding first on the iron frame, which supported the hoist and cranes, until it projected 30 feet above the completed masonry; then, the next 20 feet of masonry were laid and the process began again with the construction of another 20 feet of the iron frame.⁷⁰ During the construction of the iron frame, the 20 feet of newly laid masonry was pointed through the use of swing scaffolds.⁷¹ The entire process was known as the "shift." Casey described the work involved in a shift in his report for the month of August 1881:

This operation technically known upon the works as a "shift" consists in raising the safety net to the top of the finished masonry; then in hoisting upon the top of the wall all the Phoenix columns and other pieces of iron to be introduced into the structure, including among other parts one entire stairway and one entire platform; then in the erection of the spars and wooden frame work required in the process; then in taking down the derrick arms; next in fastening the car near the top of the shaft and in removing the hoisting ropes from the upper sheaves; then in dismantling all the overhead iron framing, ties, and braces, used in connection with the overhead wheels of the elevator, including the wheels themselves; then in taking off the four ten-foot Phoenix columns on the east side of the structure. The frame is then ready for building upon and the twenty foot Phoenix columns for the extension are at once placed in position, the II Beam of the platform and the stair carriage which fall within this part of the frame being introduced at their proper levels. In succession all the overhead iron frames, elevator wheels, ties and braces, the derrick arms, guide racks, and ratchets etc, are put in position. A sufficient length of the hoisting ropes is backed off of the lower drum and the ropes being carried over the sheaves they are made fast to the car, when the iron frame work and hoisting machinery are ready for use.⁷²

When the shaft had attained a height over 200 feet, a temporary elevator car was constructed for use during the "shift" so that the workmen did not have to run up and down the shaft with equipment.⁷³

3.3.3 CONSTRUCTION OF PYRAMIDION (1884)

Casey proposed the final design for the construction of the pyramidion in 1884. He rejected his original proposal for the pyramidion dating to 1878, which called for a roof of iron and glass.

Casey felt that an iron roof would discolor the marble below and possibly crack the marble from differences in thermal expansion. Instead, Casey proposed that the pyramidion be constructed of the same marble as the shaft walls. The roof would be covered with large blocks of marble in order to minimize the number of joints and the possibility of leakage. The large marble blocks of the roof would be supported completely by arched masonry ribs, three on each side, which would spring from the wall surface 30 feet below the top of the shaft:

At the top of the shaft the middle rib projects 6 feet from the face of the wall in a direction perpendicular to it and the two outside ribs project 4 feet 6 inches in the same direction. The middle ribs are continued up, sloping inwards until at a height of 29 feet above the top of the shaft, they are connected by voussoir stones thus forming high pointed arches. The side ribs are continued up until they meet upon the hips of the roof, at which points their horizontal thrusts are transmitted the one to the other, through the medium of horizontal brace-stones passing through the central ribs...the ribs will be strengthened by cutting mortises and tenons on the builds and beds of the several courses.

Casey proposed provisions for future maintenance: "Near the apex of the roof an opening will be placed from which a collar can be attached around the top stone and from which collar workmen can be lowered away to any part of the exterior walls of the structure." Two openings would be opened on each face near the base of the pyramidion to provide for observation, ventilation, and access for maintenance; these openings would be fitted with marble shutters hung on bronze frames. The platform at the 500-foot level would be extended to the edges of the shaft wall and constructed to support the weight of the machinery required to construct the pyramidion.⁷⁴

The pyramidion is 34 feet 5 1/2 inches square at its base and rises 55 feet 5 1/8 inches above the monument shaft, composed of 12 courses of stone and a capstone at the apex. The pyramidion structure is supported on a system of 12 notched marble ribs, which spring from the interior shaft walls starting at the 470-foot level. The ribs carry the roof covering of 7-inch-thick white marble slabs, carved with brackets on the interior (see figure 3.10). The pyramidion structure and masonry joints were carefully designed so that the ribs would support the entire weight of the roof-covering stones. The joints were crafted to allow for movement of the stone without compromising the structural stability of the structure. Above the 500-foot level, the courses of the pyramidion were labeled A-M (no course J) from bottom to top. The 8 ribs at the corners of the pyramidion eventually joined together at course E and stopped at course F. The 4 ribs at the center of each face intersected and locked together at course H, and then extended higher and crossed again at course K. The joints of the arched ribs stones were very fine, not exceeding 3/32 inch, and were set with a rich Portland cement mortar with small pieces of sheet lead set at the corners. Iron truss rods, installed in order to give equal tension on both sides of the rib, further reinforced the arches.

The roof-covering stones were designed to accommodate movement from expansion. The notch joint where the roof-covering stones hung onto the arched ribs was the point where the weight of the roof stone was transferred directly to the ribs, rather than to the lower course of roof stones. The notch joints were closely cut and left "dry," containing no mortar and only a little lead at the top lightly caulked to keep the water out. In order to avoid lifting and dislocation of roof-

covering stones, the horizontal joints between courses of roof-covering stones were angular-cut rabbet joints. The center plane of the rabbetted joint that was parallel to the face of the covering stones was the only point of contact between stones. The planes above and below the center had a gap measuring 1/8-inch in width between stones, which was left open. The open joints would accommodate the vertical expansion of the roof-covering stones, which might add additional loads and stresses on the arched ribs, compromising the structure. Mortar was only used in the lower and upper two horizontal courses of the pyramidion.⁷⁵ Vertical joints in the roof-covering stones were tongue-and-groove joints, set close and left "dry," in order to prevent damage caused by horizontal, or sideways, expansion of the roof-covering stones. Tongue-and-groove joints at the hip joints were the only vertical joints filled with mortar.

All open joints were to be kept free of dust and dirt as part of future maintenance to allow for expansion. It was suggested that light caulking, such as yarn of oakum (hemp) or cotton, could be installed in troublesome leaking joints, if necessary.⁷⁶ In 1884, Bernard R. Green, U.S. Army Corps of Engineers, suggested an appropriate maintenance schedule to ensure the preservation of the pyramidion. He recommended that the interior and exterior of the pyramidion be inspected every five years in order to clean open joints and repoint mortared joints. The collection of dust and dirt in the joints could cause lifting and displacement of stones and also lead to discolored streaking.⁷⁷

Construction of the pyramidion began with the construction of courses 472 to 500 of the monument shaft, completed in August 1884. These courses contained the base of the ribs that would support the masonry roof structure.⁷⁸ The four center columns of the central iron structure were raised to 517 feet; the four outer Phoenix columns terminated at the 500-foot level. A horizontal boom derrick was erected in preparation for construction of the pyramidion and scaffolding was constructed at the base of the pyramidion, supported on I-beams run through holes in the wall at the 498-foot level. An iron I-beam balcony, with wood plank covering and railing, projected 8 feet off the east face for holding machinery and materials. Construction work on the pyramidion stretched into the evening hours with the aid of two locomotive headlights; one was installed at the Treasury Building and the other on the Smithsonian Institution.⁷⁹ All of the stone for the pyramidion was delivered by October 1884, and was dressed by November 1884. The arched ribs were constructed over centering with construction commencing in September 1884.⁸⁰ Construction proceeded rapidly and the capstone and the solid aluminum apex, manufactured by William Frismuth, Philadelphia, Pennsylvania, were set in place on December 6, 1884. The aluminum apex was secured in place by a copper rod passing through the capstone.⁸¹ The estimated total weight of the completed pyramidion was 300 tons.

In 1885, the pyramidion structure was completed with the removal of the scaffolding, the installation of a lightning-protection system, and the completion of the marble shutters for the eight openings at the 500-foot level.⁸² The scaffolding was completely removed in January 1885, in advance of the dedication ceremony in February. The copper rod installed through the capstone was part of the lightning-protection system. Additional gold-plated copper rods and points were fastened to the aluminum apex and installed along the corners of the exterior of the pyramidion. At the bottom, the exterior rods and points were connected by copper rods to the central iron structure. The iron structure had been grounded through the well at the base of the

monument during construction. Ledig and Herrlein and Sons, Philadelphia, Pennsylvania, manufactured the copper lightning-protection system, which was completely installed in October 1885.⁸³ The marble shutters were installed in four pairs, with one pair for each side of the monument. Each pair was designed so that one opened to the left and one opened to the right. Each marble shutter was hung in a rabbetted frame of statuary grade bronze that was cast in one piece. The hardware of the frame was both bronze, such as the swivel bolt, cam latches, keepers, and padlock and bolt, and galvanized wrought iron, such as the crane, guide rod and support, and shields to protect the shutters when open. The shutters were waterproofed with a strip of pure rubber gum packing attached to the frame with bronze screws.⁸⁴ Stokes and Parrish of Philadelphia, Pennsylvania, provided the shutter hardware, and the shutters were installed in 1885.⁸⁵

3.3.4 COMPLETION OF MONUMENT AND GROUNDS (1885–1888)

The Washington Monument was formally dedicated in February 1885. With the completion of the monument masonry, the work focused on converting the monument and grounds from a construction site to a public space. The work involved fitting out the interior of the monument, such as installing lights and permanent ironwork in the central iron structure, constructing a new floor at the ground level, installing the donated memorial stones, and converting the steam hoist into a passenger elevator. The east and west entrances were also modified. Within the grounds, the remaining work involved modifying existing structures, constructing new buildings, removing redundant structures and machinery, and completing the final form of the earthen terrace at the base of the monument.⁸⁶ Two ancillary structures were constructed on the grounds: a new Boiler House, now known as the Survey Lodge, replaced the existing boiler structure and a marble lodge, now known as the Monument Lodge, housed a waiting room for visitors and office and archive space.⁸⁷ By March 1887, an average of 125 visitors a day climbed to the top of the monument.⁸⁸ The Washington Monument was opened to the general public in October 1888.⁸⁹

The shaft of the monument was first lit with incandescent lights in 1885. Prior to the installation of these lights, the ascent to the top was done in darkness. Lights were installed by the U.S. Electric Lighting Company, Washington, D.C., in time for the dedication in February 1885; however, the work was not completed according to the specifications until November 1885. The lights were powered by a steam-powered 2000 candlepower dynamo, which was eventually installed in the enlarged engine house.⁹⁰

In order to complete the central iron stair structure, the temporary wooden coverings on the stairs and platforms of the central iron structure were replaced with permanent iron plates, and hand railings and elevator fronts installed. Snead & Co., Ironworks of Louisville, Kentucky, furnished and installed the permanent iron treads, platforms, handrails, and screens. The work began in December 1885 and was completed in April 1886.⁹¹

During construction of the monument, the ground floor was open to the gneiss foundation and drum pit below. In order to finish the monument, the first floor was framed with iron beams, spanned with cast-iron plates and paved with North River bluestone pavers (see figure 3.11). The 3-inch-thick bluestone flagstones were rubbed smooth and laid in a diamond pattern with straight

borders. The flagstones were laid and grouted with Portland cement. Corbel stones were installed at the top edges of the drum pit in order to support the flagstones above. Openings were cut and fitted with cast-and wrought-iron plates in order to give access to the drum pit and shaft trench under the floor.⁹² Contractors Haliday and Wilson completed the floor in August 1886.⁹³ At completion, the ground floor was open to the shaft above. The floor plan consisted of a narrow hall around the elevator shaft, with the west alcove leading to the blocked-up west entrance, and an east foyer to the main east entrance.

The steam hoist elevator used so reliably during the construction of the monument was converted from a construction hoist to a passenger elevator in preparation for visitors. Otis & Brothers Co. was commissioned to convert its steam hoist into a steam-fueled passenger elevator. The machinery was not significantly modified; the steam engine used during construction was retained. The main alteration was the exchange of the hoist bed for a passenger car (see figure 3.12). Casey wanted a passenger elevator car with seats and soft wall linings. The new passenger elevator was ready by December 1886 and took 10–12 minutes to ascent.⁹⁴ No government funds were appropriated to run the elevator until October of 1888, when the elevator was overhauled and set in working order again.⁹⁵

Donated memorial stones, which had been stored within a lapidarium on site throughout the construction, were inserted into the shaft walls after construction was complete at the pyramidion. Most of the stones were placed into the wall at a thickness of 4–7 inches and mortared in place with a cement mortar mix. Thin stones were installed in the shaft walls using bronze expansion bolts.⁹⁶ By September 1885, 53 memorial stones were set within the interior walls of the monument shaft.⁹⁷ Eleven more stones were inserted within the interior masonry by February 1887.⁹⁸

At the entrance to the monument, the 1854 marble jambs, entablature, and pediment of the east and west entrances were dressed down to better fit the simplified obelisk structure as completed in 1885. By December 1885, the west entrance was closed up, and the east entrance was shortened to 8 feet and fitted with double marble doors on heavy bronze hinges, further supported by steel friction rollers.⁹⁹ The marble for closing and shortening the entrances, and for the marble doors, was supplied by Hugh Sisson from the Beaver Dam Quarry, Cockeysville, Maryland.¹⁰⁰ In order to match the finish used on the original marble masonry, the marble at the entrances was finished smooth by rubbing. This work was a compromise of Casey's proposed plan to close up both east and west entrances, and enter the monument from below through a passage in the earthen terrace at the base of the monument, which led up to the ground-floor level under the east entrance. The underground entrance was abandoned because of concern that it would weaken the concrete underpinning.¹⁰¹ The east entrance was kept open in summer months in order to ventilate the shaft interior, which was drenched with water from condensation.¹⁰²

3.3.4.1 ENGINE HOUSE

As part of the necessary structures required during construction, an engine room and boiler house for the steam hoist were constructed to the west of the obelisk (see figure 3.13). The engine and boiler structures housed the machinery used to power the steam hoist during the construction of

the monument. The engine house was located just to the west of the monument, while the boiler house was located approximately 20 feet to the west of the engine house. Originally, the engine and boiler houses were above-grade brick structures with wooden roofs; the engine house had a concrete floor and the boiler house had floors paved with bricks on edge. The foundation of the engine house was partially covered during the construction of the earthen terrace in 1880–1881. The boiler house remained above ground, but was surrounded by earth on the north, east, and south sides when the earthen terrace was enlarged in 1881. Prior to filling in the earth for the terrace, the brick structures were reinforced with dry-laid stone walls to help support the surrounding earth (see figure 3.14).¹⁰³

In order to accommodate the new dynamo and engine required for the incandescent lights in the monument shaft, the engine house was enlarged (see figure 3.15). In 1886, the existing engine house is described as a “pit containing the engine on the west side of the Monument, and now covered by a temporary wooden building.” The specifications called for extending this structure to the south and west, providing new areas on the north and south and a toilet and entrance stairway on the west, and constructing a new roof of iron, concrete, and copper. The excavation for the extension disturbed the stone walls constructed during the earlier terrace construction. The existing south and west walls and the upper portion of the north wall were dismantled. The floors were constructed of concrete, and the walls of brick laid in hydraulic-cement mortar with a granite coping. The west entrance stairs were constructed of granite. Light entered the engine room through two window wells constructed on the north and south, which were fitted with wood windows. The roof was constructed of iron rafters, notched into the granite coping stones; the iron rafters supported arched corrugated sheet iron, which was then covered with concrete, and the entire structure roofed with flat locked, copper sheeting. A scuttle was incorporated into the north half of the roof structure.¹⁰⁴ The roof did not project above the encircling terrace. The perimeter of the engine room at plaza level was edged with granite curbing and 2-foot-6-inch-high gas pipe railing. The boilers were moved to the new boiler house, now the Survey Lodge, constructed in 1886 to the southwest of the monument, and the old boiler house was dismantled. The engines housed in the new engine house were connected to the steam boilers in the new boiler house by steam pipes running through a brick-lined tunnel.¹⁰⁵ The work on the engine house and steam pipe tunnel was completed by contractors James B. Haliday and William A. Wilson in August 1886.¹⁰⁶

3.3.4.2 CONSTRUCTION OF MONUMENT KNOLL

The area around the base of the completed monument was filled and landscaped as a knoll. Begun in 1880 as an earthen terrace, the knoll was not completed until 1889. A mound of earth had been proposed as a proper base for the monument in 1873. First-Lieutenant W. L. Marshall reported that the base of the monument should be covered by “a simple terrace of earth of proper dimensions...presenting the appearance of a massive obelisk shooting vertically from the solid earth.”¹⁰⁷ An initial earthen terrace was constructed to cover the enlarged foundation during 1880–1881. The original terrace, 30 feet wide and 17 feet high, was widened on all sides in July 1881.¹⁰⁸ Approximately 1500 cubic yards of refuse stone removed from the old foundation was used to fill in the enlarged earthen terrace.¹⁰⁹ The enlarged terrace measured 175 feet square at the crest and 220 feet square at the base.¹¹⁰ The embankment was sown with rye and grass seed in 1882 to prevent erosion and keep down the dust during construction.¹¹¹

At the time of the completion of the monument structure in 1884, the final appearance of the base of the monument remained in question. One proposal envisioned a grand marble terrace crowning the earthen terrace, embellished with statues and sculpture. The east and west entrances to the monument would be closed with marble and visitors would enter the monument from an underground passage through the earthen terrace and up under the east entrance. The second proposal was to expand the terrace into a naturalistic knoll:

The other method of finish proposed is to fill earth about the present terrace, and joining with it, and to extend this filling so far from the Monument as to fade the slopes of the embankment gradually into the surrounding surfaces, and this to be done with so much skill as to give to the mound an appearance as far from artificial as possible... with a pavement to be put around the foot of the Monument and far enough from it to prevent the storm waters from washing out the filling....¹¹²

The Joint Commission approved the naturalistic knoll proposal in 1884. The existing earthen terrace was extended again on all sides. A topographical map made of the grounds in 1886 guided the earth-filling work.¹¹³ In November 1887, Schillinger Artificial Stone had completed a 10-foot-wide “granolithic” pavement with curb around the base of the monument to prevent erosion of the knoll.¹¹⁴ By December 1888, T. H. Lyons, contractor, had deposited 250,000 cubic yards of earth around the base of the monument to build up the knoll.¹¹⁵ The completion of the monument knoll marked the end of the monument grounds as a construction site; from 1889, it functioned primarily as a memorial and grounds for the public.

3.4 1889–PRESENT: MEMORIAL AND TOURIST ATTRACTION

After completion of the monument and grounds, the exterior masonry required periodic maintenance campaigns in 1934, 1964, 1974–76, and 1997–2000. Each campaign required careful planning and, in 1934 and 1997–2000, impressive scaffolding engineering. All of the campaigns involved replacement in-kind and maintenance repairs believed to be appropriate to preserve the structure in its original appearance. Interior work on the monument focused on improving the visitor’s experience and updating the mechanical and electrical systems. During the first half of the twentieth century, the public space improvements primarily involved work on the first-floor waiting room. However, in 1958 the 500-foot observation level was improved and the 490-foot elevator re-entry level was enlarged and became an integral part of the visitor experience. The public spaces were renovated again in 1974, 1992–1993, and 2000. Alterations to the service spaces and central iron structure were planned in conjunction with the series of elevator replacement projects carried out in 1901, 1925, 1958, and 1997–2000.

3.4.1 1889–PRESENT: EXTERIOR WORK

Prior to the first major exterior restoration in 1934, the exterior of the Washington Monument underwent small changes, particularly around the observation windows in the pyramidion and at the west entrance. The minor improvements included fitting the observation windows with wood frame storm windows in 1890 and wood shutters in 1904–05, installing gutters over the pyramidion windows in 1924, and placing red aircraft-warning lights in one window of the pyramidion in 1931.¹¹⁶ The east entrance saw changes in the installation of wood-frame storm doors in 1890, which were replaced with new wood doors and storm doors in 1901–02. Wood

gates were installed at the east entrance and were later replaced by iron gates and a revolving door in 1904–1905, followed by the installation of bronze gates in 1932.¹¹⁷

The first major stone cleaning and repair project at the Washington Monument took place in 1934 as a Public Works Administration Federal Project. The goal of the project was to “preserve the monument in its traditional appearance, and to carry out all proposed work in such a manner as to leave as little evidence as possible of any work having been done.”¹¹⁸ The monument was exhibiting spalling on the exterior surface, damaged face blocks, significant water movement through joints, open joints, and soiling. From courses 0 to 76, 164 stones needed replacement, primarily at the corners, 370 stones required cutting and pointing, and 22 required dutchman repairs. From courses 77 to 262, only two stones required replacement, 106 stones demanded cutting and pointing, and 13 stones required dutchman repairs. Masonry repairs involved 181 stones on the west elevation, 115 stones on the south elevation, 198 stones on the east elevation, and 183 stones on the north elevation (see figure 3.16).

Starting in July 1934, the entire exterior was scaffolded with tubular-steel scaffolding. Spalling was particularly severe in the lower 150 feet of the shaft constructed 1848–1854. In order to prevent further spalling caused by stress on the marble facing, all of the horizontal and vertical joints below the 150-foot level were widened to 3/16 to ¼ inch, cut back 1 1/8 inches from the face, and pointed with a soft lime and cement mortar. Open joints above the 150-foot level were repointed; the horizontal joints were found to be sound, but the vertical joints were nearly all open, with some containing moss. Several of the facing stones had deteriorated to such an extent by crushing that they warranted replacement with marble dutchman repairs. The damaged facing stones were located primarily at the corners, with the largest portion below the 50-foot level. A cracked stone in the pyramidion, damaged by lightning in 1885, was repaired. Joints in the pyramidion were caulked with a plastic pointing compound. The copper lightning-rod system on the pyramidion, consisting of a system of copper points at the top and sides of the pyramidion connected and grounded with copper wire, was repaired where it had been damaged by lightning. Joints at the lightning-rod points were caulked with sealant (see figure 3.17). Approximately 107 of the original gold-plated rods and tips were stolen from the pyramidion during construction.¹¹⁹ Forty holes were drilled into the gneiss backup from the ground level to the 150-foot level in an attempt to grout voids in the rubble core. However, few large voids were discovered. The entire monument exterior was then cleaned with softened water and vegetable fiber brushes. The work was completed by Alexander Howie, Inc., on January 16, 1935.¹²⁰

The first change in the exterior appearance of the Washington Monument occurred in 1958 with the installation of eight red aircraft-warning lights in the pyramidion. Two 14-inch-diameter holes were cut in the masonry, one above each window, on all four sides of the pyramidion (see figure 3.18). The holes were covered with a clear lens held in place by monel clips screwed into the masonry. A red warning light was installed at each hole, mounted on the interior. New floodlights were also installed at this date; these replaced floodlights installed in 1931. The aluminum flagpoles were also installed at the perimeter of the monument plaza at this date, replacing earlier wooden poles.¹²¹

The exterior was cleaned and repaired again in 1964. Work was performed from exterior rigging rather than scaffolding. Masonry work involved enlarging every tenth horizontal masonry joint from the 8-foot to 488-foot level in order to install backer rod and sealant expansion joints. Open joints were repointed with a white cement mortar. A 1961 report noted that repointing was required at approximately 60 percent of the masonry joints from the ground to the 150-foot level and at approximately 20 percent of the joints from the 150' to 500-foot level.¹²² Thin cracks were repaired with an epoxy resin; large cracks, greater than 2 inches in width, were repaired with backer rod and sealant with marble chips pressed into the sealant repair. Spalls less than 1½ inch in depth and 110 square inches in volume were patched with epoxy resin mixed with marble aggregate. Larger spalls were patched with marble dutchman repairs (see figure 3.19). Marble dutchman repairs were reinforced with anchors sunk ¾ inches into the dutchman and set in a full bed of mortar. The entire exterior was cleaned by power washing with water. Finally, the exterior marble was coated with a water-based silicone emulsion containing 5% silicone.¹²³

Maintenance work was carried out again in 1974–1976 in anticipation of the Bicentennial celebrations. The work was again done with exterior rigging. The lightning rods at the pyramidion were restored. Repointing was carried out on the exterior from the 470-foot level to the peak and also on the interior at the 490-foot and 500-foot levels (see figure 3.20).

The most recent exterior work was completed 1997–2000. The entire structure was scaffolded and draped in blue cloth in an ashlar masonry pattern, designed by architect Michael Graves. The extremely popular scaffolding received more attention than the maintenance work it was designed to facilitate. The work included resealing the lenses at the aircraft-warning light holes and installing new bulletproof glass in the 500-foot observation level windows. Masonry work involved removing the sealant and backer rod installed in 1934 and repointing these joints with mortar. Cementitious patch repairs that had failed or discolored were removed and replaced. Large deteriorated stones were replaced with 1-foot-thick dutchmen, anchored into the sound stone backup. Vertical cracks that had opened since the 1973 work, most noticeably in the center section, were sealed and monitors installed for future investigation (see figures 3.21, 3.22, and 3.23).

In 2001, in response to security concerns, an interim security building was constructed at the east entrance to the monument. The interim security building is a one-story, flat-roofed structure with walls of synthetic stucco. Visitors to the monument are now screened in this addition before proceeding through the east entrance.

3.4.2 1889–PRESENT: INTERIOR WORK – PUBLIC SPACES

Visitors to the Washington Monument were initially intended to convene in the waiting room of the Monument Lodge, completed in 1889 and sited approximately 480 feet to the east of the monument. However, very soon the numbers of visitors at the monument overwhelmed the small waiting room of Monument Lodge and an additional waiting room was required for visitors within the monument itself, particularly in winter. As early as 1889, steam pipes were placed around the walls of the ground floor of the monument for the comfort of waiting visitors.¹²⁴ In 1903, the first floor of the monument was converted into a temporary winter waiting room by cleaning out a storeroom that had occupied the west alcove since 1889 and laying cocoa matting

on the granite floor. The wooden steps at the entrance to the elevator were also replaced at this date with cast-iron steps with brass handrails.¹²⁵

In 1904, the monument waiting room was improved by constructing new steel I-beam framing for the ground floor and installing new concrete walls, ceiling, and, presumably, floors. At this date, the waiting room was L-shaped, occupying the south and west sides of the ground floor. The north side contained the final descending stair and mechanical equipment and was closed off from the main waiting area. A wood door separated the west alcove from the waiting room area. The floor was covered with terrazzo featuring decorative marble mosaic inlay. Walls were plastered and decorated with a coved crown molding and a two-toned marble wainscot (see figure 3.24). Four oak settees were added for waiting visitors. Entrance doorways to the waiting room had glazed wood doors.¹²⁶ In 1913, the 1904 waiting-room improvements were carried into the west alcove, which had been separated by a doorway from the main waiting area (see figure 3.25). The floors of the alcove were covered with terrazzo incorporating a central wreath mosaic copied from the 1904 work. The walls of the alcove were treated with the same plaster and marble wainscoting as installed in the 1904 renovations. From photos dating from the 1940s, the waiting room appears little changed from the 1913 era, with the exception of the installation of a row of display cases on the south wall of the elevator shaft in 1941 (see figures 3.26, 3.27, 3.28, and 3.29).

Few changes were made to the 500-foot observation level within the early years of the monument. An oil heating stove was installed for the comfort of the men on guard and, in 1893, a small board partition enclosure was constructed at the southeast corner. The enclosure was built to protect the men from the cold, wind, and rain that penetrated the pyramidion at this level.¹²⁷ The board enclosure was cleaned and painted, and fitted with an electric heater in 1904–1905.¹²⁸ In the 1940s, the central elevator shaft dominated the 500-foot observation level and most non-masonry surfaces were finished with a white covering (see figure 3.30). The board enclosure at the southeast corner had evolved into a guard room by this date.

The visitor's experience of the Washington Monument changed in 1958. The 1958 upgrade of the elevator systems corresponded with new circulation patterns for visitors taking the elevator. Previously, visitors entered the elevator from the east, ascended to the 500-foot observation level, re-entered the elevator at the 500-foot level, descended directly to ground level, and departed again on the east. After 1958, visitors in the waiting-room area entered the elevator from the west, ascended to the 500-foot observation level, and then descended by corner stairwells to the newly expanded 490-foot level where they re-entered the elevator and descended to the ground floor, exiting on the east (see figure 3.31). This new circulation plan involved fitting out the 490-foot level with new framing, floor plates, screens, and railings, expanding the existing stair platform to cover the entire 490-foot level. The guard room on the 500-foot observation level was removed to make way for a new stairwell at the southeast corner as a second means of egress to the 490-foot level. The guard room was relocated to the northwest corner of the 500-foot level.¹²⁹

After 1958, the waiting room, 500-foot observation level, and 490-foot elevator re-entry level were treated simultaneously when upgrading the public spaces to improve the visitor's

experience. By 1976, the elevator was the only transport available to visitors to the Washington Monument. In 1971, the Washington Monument central stairwell was closed to all up traffic and, in 1976, the stairwell was closed to all traffic except under special arrangement. During the 1974–76 renovations, all of the interior public spaces were improved and particular attention was paid to providing a waiting area at the 490-foot level for those waiting to descend in the elevator. At the first floor, in the east entrance passage to the elevator lobby, a step in the granite-paved flooring was removed, and the area was leveled with bridge supports upon which new granite flooring was installed. The walls of the entrance passage were faced with 4-inch-thick marble from floor to ceiling. The revolving doors between the entrance passage and the elevator lobby, installed as recently as 1972 (see figure 3.32), were replaced with new glass double doors. A new suspended acoustic ceiling was installed. In the elevator lobby, just to the east of the elevator shaft, an open section of the floor at the east threshold of the elevator was covered with reinforced concrete. A new suspended ceiling was installed here as well. In the waiting room, new marble seats were constructed along the south walls and in the west alcove. The existing plaster ceiling was removed and replaced (see figures 3.33 and 3.34).

At the upper levels, the 1974–1976 work involved the renovation of finishes. At the 500-foot level, a new epoxy, marble-chip floor was laid and the northwest guard room and southwest equipment room received new aluminum doorways with glazed aluminum doors. The northeast and southeast corner stairs were given new treads (see figure 3.35). The eight observation windows were glazed with bulletproof glass and the shutters removed.¹³⁰ At the 490-foot level, the floor was covered with the same epoxy, marble-chip flooring. The stone walls were covered from floor to ceiling with a glazed aluminum framing system. Box seats constructed of plywood and steel were placed in the niches between the pyramidion ribs. A suspended acoustic ceiling, similar to that of the entrance lobby, was installed (see figure 3.36).

The next round of improvements to the public spaces of the Washington Monument occurred during the 1992 and 2000 restoration and renovation work. Significant changes were made in the visitor's experience, particularly in the elevator's descent; this will be discussed in the following section. In 1992–1993, the waiting room was renovated to its current configuration (see figures 3.37, 3.38, 3.39, 3.40, 3.41, and 3.42). The marble wainscot and mosaic floor, dating to 1904 and 1913, were restored. The 1974 suspended ceilings were removed to return the space to its full 1913 height. The existing glass-and-aluminum doors at the east elevator lobby were replaced with frameless glass doors with glass transom extending the full height of the entry space. The marble slabs installed in 1974 over the original marble walls of the east and west portals were removed and marble dutchmen installed to repair anchor holes. The elevator was fitted with new bronze doors. A new limestone surround was installed at the east elevator entrance, designed to mimic the 1848–1885 door surrounds decorated with a winged ball and asp. Bronze inscriptions, swags, and bas relief plaque were mounted on the walls.

The 500-foot observation level and 490-foot elevator-entry level were remodeled in 2000. The finishes were completely upgraded to their present configuration (see figures 3.43, 3.44, 3.45, and 3.46). Both floors received new thin-set, epoxy terrazzo flooring, and the masonry walls were covered with protective glass panels hung on metal framing. At the 500-foot observation level, the northwest and southwest utility closet areas were fitted with new doors, and the

observation windows received new handrails, steps, and lighting. At the 490-foot level, a suspended, coffered ceiling with recessed lighting was installed. A bookshop stall was constructed at the northwest corner and new exhibits were installed throughout. The steps between both floors were refinished with new handrails, guardrails, stair risers, and treads.

3.4.3 1889–PRESENT: INTERIOR WORK – ELEVATOR, CENTRAL IRON STRUCTURE, AND SERVICE SPACES

Much of the work on the interior central iron structure and ancillary service spaces correlate to the periods of renovation of the elevator systems occurring in 1901, 1925, 1958, and 1997–2000. The central iron structure supported the elevator cab as well as the stairs and stair platforms, while the service spaces provided room for the elevator equipment and monument maintenance staff. Upgrades in the elevator systems necessarily involved alterations in these elements due to their close association.

3.4.3.1 1889–1900: ELEVATOR WITH STEAM ENGINE

From 1889–1900, visitors could reach the 500-foot observation level in the Otis Brother & Co. elevator driven by the steam engine that had fueled the hoist during construction. The boilers for the steam engine were located in the Boiler House. Steam was piped to the engine in the monument engine room through an underground steam tunnel. During the period of the steam-driven elevator, the below-grade engine house underwent routine maintenance on the structure and its equipment. Maintenance work included painting wood trim, doors, handrails, and steam pipe coverings, whitewashing the walls, and repainting the roof.¹³¹ In 1896–1897, the copper roof of the engine house was blown off in a storm and was replaced and repainted.¹³²

Soon after completion of the monument, the interior iron structure was repainted. Repainting was carried out from 1892–1897 with the elevator drum pit painted with red lead paint and the interior of the shaft with white zinc paint.¹³³ During 1898–1900, the interior iron structure was repaired by reinforcing the deteriorated iron tie-rods that cross-braced the Phoenix columns.¹³⁴

3.4.3.2 1901–1924: ELECTRIC ELEVATOR

Plans to replace the inefficient steam engine with an electric one were discussed in 1897–1898. An 1878 text noted that steam engines of the period required five times the theoretical energy required to perform a unit of work because of heat loss. Steam boilers alone only utilized three-fourths of the energy from burning coal, losing one-fourth to heat loss.¹³⁵ The situation was exacerbated at the monument by the 800 feet of pipe carrying steam between the boiler pit and the elevator engine. It was reported that one boiler was utilized almost solely to keep these pipes hot.¹³⁶ Much of the energy was lost through condensation of steam in these pipes and through the inefficiency of the old steam engine.

In 1900, it was estimated that it would be cheaper to produce energy on site rather than connect to a private company, especially considering that the closest public electricity connection was 2,000 feet from the monument.¹³⁷ A new electric dynamo and engine would be located in an addition to the Boiler House structure, renamed the Power House. The electric dynamo and

engine would be connected to the motor, to be housed in the monument engine room, with cable laid in the existing steam tunnel. This upgrade would lighten the elevator and would provide additional power for lighting the Washington Monument.¹³⁸ Federal funding for the electric elevator project was appropriated in 1900 and work completed in 1901.¹³⁹ In 1904–05 and again in 1918–1919, new hoisting and counterweight cables were installed in the existing elevator system.¹⁴⁰ In 1923, the Washington Monument was connected with the public power-supply system and the dynamo and engine located in the Power House were no longer used to fuel the elevator.

The former engine room at the monument was renamed the motor room after the installation of the electric elevator equipment. In 1900–1901, the motor room received a new wood floor, new hopper and flush tank, and a fresh coat of paint for the woodwork.¹⁴¹ Four clothes lockers and additional shelving were installed for the maintenance staff in 1904.¹⁴² The damaged wood wainscoting was replaced in 1906–1907 and the wooden floor, subject to rot, was replaced with a cement floor.¹⁴³ In 1908–1909, a new 4-foot vertical concrete wall was built against the sloping foundation of the monument, which formed its east wall, in order to make a 3 ½-foot-wide shelf.¹⁴⁴ The motor room walls were plastered with cement mortar in 1910–1911.¹⁴⁵ No major changes occurred in the central iron structure during this time, though it was routinely repainted.¹⁴⁶

3.4.3.3 1925–1957: ELEVATOR REPLACEMENT

The monument elevator was replaced for the second time in 1925–1926. A new asbestos wood fiberboard elevator penthouse was constructed in the upper pyramidion and the new elevator system was opened to the public in July 1926 (see figure 3.47).¹⁴⁷ The 1925 elevator system no longer required a substantial motor to be housed in the monument motor room. The motor room was then converted to a guard room in 1931 (see figure 3.48). The new guard room had a concrete slab roof and new steps constructed to the north within the area of the previous north window well. The southeast half of the south window well was retained. At plaza level, the north steps and south window well had granite curbing and pipe railing to the east. The west portions were covered with metal grates. The concrete roofing of the new guard room was a part of overall site improvements at the monument, including installation of new concrete pavement, benches, and floodlights around the monument plaza.

For safety reasons, the central iron stair was modified after the elevator renovation of 1925–26. Two suicides at the monument in 1926 led to proposals for new enclosures at the elevator shaft and upper landings.¹⁴⁸ In 1929, wire screening and new guardrails were installed around the elevator shaft (see figure 3.49). Further safety measures were implemented in 1938 with the addition of extended metal platforms at every 10-foot stair landing to form exit platforms from the elevator in case of emergency.¹⁴⁹

As part of the 1934 restoration work, it was noted that condensation continued to be a problem within the monument shaft, particularly when it pooled on landings and dripped down into the stairwell. Heating was suggested as a method of stopping condensation; however, no new mechanical systems were included in the 1934 work.¹⁵⁰ Heating was installed in the monument in 1940, and remained in use until 1994.¹⁵¹

3.4.3.4 1958–1997: ELEVATOR REPLACEMENT

As mentioned earlier, the 1958 elevator renovation was the third elevator replacement and involved a change in the visitor's experience of the Washington Monument. The new elevator stopped at both the 500-foot and 490-foot levels and had doors on both the east and west. The upgrade involved significant changes at the 500-foot observation level and 490-foot level. It also affected the guard-room space. The old guard-room space was required to house new elevator equipment. In 1958, a new concrete guard-room addition with a concrete slab roof was added to the northwest corner of the old guard-room, now called the new equipment room (see figures 3.50 and 3.51). The new elevator system did not require major changes in the central iron structure. During the 1960s, the interior central stair was inspected, cleaned, and painted on a biannual basis. As part of the 1974–76 renovations, repairs were made to the stair structure, one new emergency exit platform was constructed, and numerals were installed at each 10-foot stair landing.¹⁵² Other alterations to the monument shaft interior included the cleaning and repairing of the memorial stones by a trained sculptor in 1978.¹⁵³ The HVAC system in the monument was overhauled in 1988 to improve the conditions within the public spaces and the monument shaft.

3.4.3.5 1997–PRESENT: PRESENT ELEVATOR SYSTEM

During the 1997–2000 renovation of the Washington Monument, the elevator system was again upgraded to its current configuration. The new elevator system was intended to return a small portion of the stairway descent experience, prohibited except by special arrangement since 1976. The new and current elevator system slows on its descent to allow for viewing of three clusters of memorial stones laid in the inner walls of the monument. A synchronized system of interior lighting and elevator movement allows for controlled viewing of the highlighted stones. The interpretive stops during the descent of the elevator required alterations at the three stair landings in the central iron structure to allow for adequate viewing. Railings and wire screens were removed and lights and glass installed at each of the three viewing levels. As part of this project, a comprehensive stone conservation treatment was carried out on the monument memorial stones according to their state of deterioration. The project involved cleaning the stones, inpainting epoxy fills dating to 1978, installing new fills, consolidating powdered and flaking stone surfaces, erecting bronze plaques next to severely deteriorated stones, and documenting the stone before and after treatment.¹⁵⁴ The 1958 guard and equipment room, noted as Bunker 1 in the architectural plans, was also refinished and upgraded during the 1997 renovations (see figure 3.52). Work involved changes primarily to the finishes and no new construction occurred.

ENDNOTES

Abbreviations:

- E 484 Letters Received, Entry 484; Records of the Engineer in Charge, 1876–1892
- E 495 Letters Sent, Entry 495; Records of the Engineer in Charge, 1876–1892
- E 512 Contracts, Entry 512; Records of the Engineer in Charge, 1876–1892
- NAB National Archive Building, Washington, D.C.
- NPS-NCR National Park Service-National Capital Region

GPO	Government Printing Office
RG 42	Records of the Joint Commission for the Completion of the Washington Monument, 1876–1892
RG 79	Records of the National Park Service, Record Group 79

¹ The exact date of the acceptance of Robert Mills's design varies in the literature. See Frederick L. Harvey, *History of the Washington National Monument and the Washington National Monument Society* (Washington, D.C.: GPO, 1903); Pamela Scott, "Robert Mills and American Monuments" in *Robert Mills, Architect*, ed. John M. Bryan (Washington, D.C.: American Institute of Architects Press, 1989); Louis Torres, "To the immortal name and memory of George Washington": *The United States Army Corps of Engineers and the Construction of the Washington Monument* (Washington, D.C.: GPO, 1985).

² Torres, *Corps of Engineers*, 11, 13, 15.

³ U.S. Congress, House, *Report of the Select Committee on the Washington National Monument* (43d Cong., 1st sess, 1874, H. Rept. 485), 2–3.

⁴ The reasons given for the construction of the Washington Monument away from the exact cross axes have included the poor quality of the soil (Torres, *Corps of Engineers*, 15–16), the presence of the Jefferson Pier Marker at the cross axes at this date (Scott, "American Monuments," 1989), or because of the proximity of the Potomac River to the cross axes during this period (Pamela Scott, "This Vast Empire: The Iconography of the Mall, 1791–1848," in *The Mall in Washington, 1791–1991*, Studies in the History of Art, 2nd ed., ed. Richard Longstreth, no. 30 [Washington, D.C.: National Gallery of Art, 2002], 52).

⁵ Thomas Lincoln Casey, Lt. Col. Engineer, to Hon. W. W. Corcoran, Chairman, Joint Commission for Construction of the Washington Monument, 27 July 1878 (v. 1, p. 8–14, E 495; RG 42; NAB), 9.

⁶ Aaron V. Wunsch, *Washington Monument, No. D.C.-428* (Washington, D.C., United States Department of the Interior, National Park Service, Historic American Building Survey: 1994), 3.

⁷ Thomas Lincoln Casey to Brig. Gen. H. G. Wright, Chief of Engineers, Chairman, Building Committee of Joint Commission, 1879; v. 1, p. 219, E 495; RG 42; NAB.

⁸ This was surmised in Engineer Thomas Casey's report of 1878. See Casey to Corcoran, 27 July 1878, 9.

⁹ George J. Olszewski, *A History of the Washington Monument 1844–1968* (Washington, D.C.: Department of Interior, National Park Service, Office of History and Historic Architecture, Eastern Service Center, 1971), 4–6.

¹⁰ Torres, *Corps of Engineers*, 23.

¹¹ Anon., "Local Matters" in *The Daily National Intelligencer*, 8 June 1859.

¹² Torres, *Corps of Engineers*, 17.

¹³ Torres, *Corps of Engineers*, 22.

¹⁴ *Proceedings of the National Monument Society, Records of the Secretary*, 13 October 1858, Entry II6, Schedules and Letters Received Relating to Building Materials for the Completion of the Monument and Lodge and to the Disposition of Memorial Stones Not Placed in the Monument, Entry 530; Records of the Custodian, 1879–1929; RG 42; NAB.

¹⁵ "Letter from J. C. Ives, First Lieut. Topographical Engineers, Engineer Washington Nat. Monument" reprinted in *Daily National Intelligencer*, 26 August 1859.

¹⁶ W. L. Marshall, First Lieutenant of Engineers, report dated 20 April 1874 in U.S. Congress, House, *Serial No. 1802, Report of the Joint Commission Created to Direct and Supervise the Completion of the Washington Monument*, 8 November 1877 (45th Cong., 2nd sess., 1877).

¹⁷ J.C. Ives, Lieutenant Topographical Engineers, report dated 10 August 1859 in *Foundation of the Washington National Monument*, 1873; Records Relating to the Design and Construction of the Monument, to the Monument Grounds, and to the Offices of the Society, 1850-90 Records of the Secretary; Records of the Washington National Monument Society; RG 42; NAB.

¹⁸ Wunsch, *Washington Monument*, 8.

¹⁹ U.S. Congress, House, *Washington National Monument*, 19 April 1872 (1st sess., 1872, H. Rept. 48), 38.

²⁰ W. L. Marshall, First Lieutenant of Engineers, to A.A. Humphreys, Chief of Engineers, United States Army, 19 February 1873 in U.S. Congress, House, *Serial No. 1802, Report of the Joint Commission Created to Direct and Supervise the Completion of the Washington Monument*, 8 November 1877 (45th Cong., 2nd sess., 1877).

²¹ Marshall, report dated 20 April 1874 in *Report of the Joint Commission*.

²² U.S. Congress, House, *Washington National Monument*, 1 May 1874 (43d Cong. 1st sess., II. Rept. 485), 8.

²³ Torres, *Corps of Engineers*, 44.

²⁴ Casey to Corcoran, 27 July 1878.

²⁵ Casey to Corcoran, 27 July 1878, 10.

²⁶ Casey to Corcoran, 27 July 1878, 12-13.

²⁷ Thomas Lincoln Casey to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of October 1878," November 1878, E 484; RG 42; NAB; and Thomas Lincoln Casey to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of February 1879," 3 March 1879; v. 1, E 495; RG 42; NAB.

²⁸ Thomas Lincoln Casey to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of October 1878," November 1878, E 484; RG 42; NAB; and Thomas Lincoln Casey to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of November 1878," December 1878; v. 1, p. 119, E 495; RG 42; NAB; and J.B. White and Bros. to Lieut. Col. Thomas Lincoln Casey, 24 October 1878; Letters Received, Entry 492; Records of the Engineer in Charge, 1876-1892; Records of the Joint Commission for the Completion of the Washington Monument, 1876-1892; RG 42; NAB.

²⁹ The cuts under the existing foundation were numbered from 1 to 18 on each face. The east and west sides of the existing gneiss foundation were fully excavated by 9 February 1879. Excavation began on the north and south sides of the monument in February and was completed in March 1879. The cuts were excavated and filled as follows: nos. 5 and 15 on east and west (February 1879), no. 9 north, no. 11 south, no. 11 east (March 1879), nos. 5, 11, and 15 north, no. 9 east, nos. 5, 9, and 15 south, nos. 9 and 16 west (April 1879), nos. 4, 8, and 16 north, nos. 4,

12, and 16 east, no. 4, 8, and 12 west (May 1879), no. 12 north, no. 12 south, no. 8 east (June 1879), nos. 6, 7, and 14 north, nos. 6, 7 and 14 east, nos. 6, 13, and 14 south, nos. 13 and 14 west (July 1879). The corners were excavated in July 1879. The cuts continued to be excavated and filled: nos. 13, 1, 18 and 3 north, nos. 18, 1, 13, and 17 east, nos. 7, 1, 3 south, nos. 7, 1, and 18 west (August 1879), nos. 17 and 2 north, no. 2 east, nos. 2, 18, and 17 south, nos. 3, 17, and 2 west (September 1879). The final cuts, nos. 10 on all four sides, were completed in October 1879. See Casey, "Report of Operations for the Month of February 1879," 3 March 1879; and Thomas Lincoln Casey to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of March 1879," 3 April 1879; v. 1, E 495; RG 42; NAB; and Thomas Lincoln Casey to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of April 1879," 3 May 1879; v. 1, E 495; NAB; and Thomas Lincoln Casey to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of May 1879," June 1879; v. 1, E 495; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of June 1879," July 1879; v. 1, p. 216, E 495; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of July 1879," 5 August 1879; v. 1, p. 254, E 495; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of August 1879," 3 September 1879; v. 1, p. 294, E 495; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of September 1879," 4 October 1879; v. 1, p. 315, E 495; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of October 1879," 5 November 1879; v. 1, p. 340, E 495; RG 42; NAB.

³⁰ Casey, "Report of Operations for the Month of February 1879," 3 March 1879.

³¹ Casey, "Report of Operations for the Month of May 1879," June 1879.

³² Casey, "Report of Operations for the Month of September 1879," 4 October 1879.

³³ Casey, "Report of Operations for the Month of October 1879," 5 November 1879.

³⁴ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Brig. Gen. H. G. Wright, Chairman of the Building Committee, Joint Commission for Completion of the Washington Monument, 15 October 1879, E 484; RG 42; NAB.

³⁵ Joint Commission for the Completion of the Washington Monument, 21 October 1879; Proceedings, Entry 482; Records of the Joint Commission for the Completion of the Washington Monument, 1876-1892; RG 42; NAB.

³⁶ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of May 1880," June 1880; v. 2, p. 95, E 495; RG 42; NAB.

³⁷ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Brig. Gen. H. G. Wright, Chairman of the Building Committee, Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Year ending November 30 1880," 1 December 1880; v. 2, p. 256, E 495; RG 42; NAB.

³⁸ George P. Marsh to Sen. George F. Edmunds, 25 April 1879 in U.S. Congress, House, *Memorial of the Committee of the National Monument Association, Relative to the Completion of the Washington Monument* (46th Cong., 3d sess., 1880, Mis. Doc. 37).

³⁹ Wunsch, *Washington Monument*, 9.

⁴⁰ Thomas Lincoln Casey to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of July 1878," 2 August 1878, E 495; RG 42; NAB.

⁴¹ Casey, "Report of Operations for the Month of June 1879," July 1879.

⁴² Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of August 1880," September 1880; v. 2, p. 196, E 495; RG 42; NAB.

⁴³ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and J. B. and J. M. Cornell, "Articles of Agreement," 11 May 1882, E 512; RG 42; NAB.

⁴⁴ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and H. A. Ramsay and Son, "Articles of Agreement," 21 April 1884, E 512; RG 42; NAB.

⁴⁵ Carl W. Condit, *American Building: Materials and Techniques from the First Colonial Settlements to the Present*, ed. by Daniel J. Boorstin, 2d ed. (Chicago: The University of Chicago Press, 1982), 92.

⁴⁶ Casey, "Report of Operations for the Year ending November 30 1880," 1 December 1880.

⁴⁷ Casey, "Report of Operations for the Month of May 1880," June 1880.

⁴⁸ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Otis Brothers & Co., 20 August 1879; v. 1, p. 273, E 495; RG 42; NAB.

⁴⁹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of November 1879," 2 December 1879; v. 1, p. 352, E 495; RG 42; NAB.

⁵⁰ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of January 1880," February 1880; v. 2, p. 20, E 495; RG 42; NAB.

⁵¹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of March 1880," 7 April 1880; v. 2, p. 29, E 495; RG 42; NAB.

⁵² Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of April 1880," May 1880; v. 2, p. 70, E 495; RG 42; NAB; and Casey, "Report of Operations for the Month of May 1880," June 1880; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of June 1880," 6 July 1880, E 484; RG 42; NAB.

⁵³ Casey, "Report of Operations for the Month of August 1880," September 1880.

⁵⁴ Construction of the shaft progressed in the following manner (numbers correspond to height from ground, each course was 2 feet high):

August 1880 - Courses 152 and 154 (John Briggs, Sheffield, Massachusetts, marble, and/or Hugh Sisson, Cockeyville, Maryland, marble, and Davis Tillson, Rockland, Maine, granite)

September 1880 - Courses 156-160 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Davis Tillson, Rockland, Maine, granite)

October 1880 - Courses 162-168 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Davis Tillson, Rockland, Maine, granite)

November 1880 - Courses 170 and 172 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Davis Tillson, Rockland, Maine, granite)

December 1880 - Courses 174 and 176 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Davis Tillson, Rockland, Maine, granite). All joints and lewis holes in the masonry were filled with Portland cement and the top of the shaft was covered with canvas for winter.

March-April 1881 - Courses 178-182 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Davis Tillson, Rockland, Maine, granite)

May 1881 - Courses 184-190 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Davis Tillson, Rockland, Maine, granite)

June 1881 - Courses 192-204 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Davis Tillson, Rockland, Maine, granite)

July 1881 - Courses 206-210 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Davis Tillson, Rockland, Maine, granite)

August 1881 - Courses 212-228 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Davis Tillson, Rockland, Maine, granite)

September 1881 - Course 230 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Davis Tillson, Rockland, Maine, granite)

November 1881 - Courses 232-244 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Davis Tillson, Rockland, Maine, granite and/or Cape Ann, Boston, Massachusetts, granite)

December 1881 - Courses 246-250 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Cape Ann Granite Co., Boston, Massachusetts, granite)

May 1882 - Courses 252-270 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Cape Ann Granite Co., Boston, Massachusetts, granite)

June 1882 - Courses 272-282 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Cape Ann Granite Co., Boston, Massachusetts, granite)

July 1882 – Courses 284–288 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Cape Ann Granite Co., Boston, Massachusetts, granite)

August 1882 – Course 290 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Bodwell Co., Rockland, Maine, granite)

September 1882 – Courses 292–308 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Bodwell Co., Rockland, Maine, granite)

October 1882 – Courses 310–318 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Bodwell Co., Rockland, Maine, granite)

November 1882 – Courses 320–330 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Bodwell Co., Rockland, Maine, granite)

December 1882 – Courses 332–340 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Bodwell Co., Rockland, Maine, granite)

May 1883 – Courses 342–350 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and Bodwell Co., Rockland, Maine, granite)

June 1883 – Courses 352–370 (Beaver Dam Quarry, Cockeyville, Maryland, marble and William S. White, Hurricane Island, Maine, granite)

October 1883 – Courses 372–390 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and William S. White, Hurricane Island, Maine, granite)

November 1883 – Courses 392–410 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and William S. White, Hurricane Island, Maine, granite)

April 1884 – Courses 410–416 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and William S. White, Hurricane Island, Maine, granite)

May 1884 – Courses 418–446 (Beaver Dam Quarry, Cockeyville, Maryland, marble, and William S. White, Hurricane Island, Maine, granite)

June 1884 – Courses 448–470 (Beaver Dam Quarry, Cockeyville, Maryland, marble)

July 1884 – Courses 472–490 (Beaver Dam Quarry, Cockeyville, Maryland, marble)

August 1884 – Course 500 (Beaver Dam Quarry, Cockeyville, Maryland, marble)

See Casey, "Report of Operations for the Month of August 1880," September 1880; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of September 1880," 8 October 1880; v. 2, p. 226, E 495; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of October 1880," 4 November 1880; v. 2, p. 238, E 495; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of November 1880," 2 December 1880; v. 2, E 495; RG 42; NAB; and

Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of December 1880." 5 January 1881, E 484; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of May 1881," 2 June 1881, E 484; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of June 1881," July 1881, E 484; RG 42; NAB; Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of July 1881," 4 August 1881, E 484; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of August 1881," 5 September 1881, E 484; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of September 1881," 6 October 1881, E 484; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of November 1881." 2 December 1881, E 484; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of December 1881." 4 January 1881, E 484; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of May 1882," 3 June 1882; vol. 3, p. 81, E 495; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of July 1882," 3 August 1882; v. 3, p. 111, E 495; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of August 1882," 5 September 1882. v. 3, E 495; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of September 1882," 5 October 1882. v. 3, p. 81, E 495; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of October 1882," 3 November 1882; v. 3, p. 138, E 484; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of November 1882," 2 December 1882; v. 3, p. 145, E 484; RG 42; NAB; U.S. Congress, Senate, *Annual Report of the Joint Commission for the Completion of the Washington Monument*, (47th Congress, 2d sess., 1882, Doc. 13), 2; Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of May 1883," 1 June 1883, E 484; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Building Committee, Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of June 1883." 3 July 1883, E 484; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Building Committee, Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of October 1883," 3 November 1883; E 484; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Building Committee, Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of November 1883," 3 December 1883, E 484; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of April 1884," 3 May 1884. v. 3, p. 346, E 495; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Building Committee, Joint Commission for Completion of the Washington Monument,

"Report of Operations Upon Completion of the Washington Monument for the Month of May 1884," 4 June 1884, E 484; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Building Committee, Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of July 1884," August 1884, E 484; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Building Committee, Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of August 1884," 4 September 1884, E 484; RG 42; NAB.

⁵⁴ Casey, "Report of Operations for the Month of November 1883," 3 December 1883.

⁵⁵ The original design called for a bluestone (gneiss) backing for the inner shaft walls. However, because of the extra cost involved, the bluestone was replaced with coursed granite based on Casey's recommendations. The Joint Committee approved the use of granite in July 1879. See Joint Commission for the Completion of the Washington Monument, 17 July 1879, Proceedings, Entry 482; Records of the Joint Commission for the Completion of the Washington Monument, 1876-1892; RG 42; NAB.

⁵⁶ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Year of 1884," 1 December 1884; v. 4, p. 39, E 495; RG 42; NAB. See Sheet No. A02, Masonry Construction Washington Monument, December 1997; [Architectural Drawing] NCP 807/41026 4 of 8; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.; and Sheet No. A03, Masonry Construction Coursing Details Washington Monument, December 1997; [Architectural Drawing] NCP 807/41026 5 of 8; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Services Division, College Park, Md.

⁵⁷ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Brig. Gen. H. G. Wright, Chief of Engineers, U.S.A., Chairman of Building Committee, Joint Commission for Completion of the Washington Monument, 19 January 1884; E 484; RG 42; NAB.

⁵⁸ Casey, "Report of Operations for the Month of November 1880," 2 December 1880.

⁵⁹ Hugh Sisson was contracted to provide 40,000 cubic feet of marble on 9 July 1880; 36,000 cubic feet of marble on 17 March 1881; 39,000 cubic feet (more or less) on 19 May 1882; 42,000 (more or less) cubic feet of marble on 20 July 1883. See Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and Hugh Sisson, "Articles of Agreement," 9 July 1880; E 512; RG 42; NAB; and Thomas Lincoln Casey, Lieutenant Colonel, Engineer in Charge, to Gen. H. G. Wright, Chairman of Building Committee, Joint Commission for Completion of Washington Monument, May 1881; E 484; RG 42, NAB; Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and Hugh Sisson, "Articles of Agreement," 19 May 1882; E 512; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and Hugh Sisson, "Articles of Agreement," 20 July 1883; E 512; RG 42; NAB.

⁶⁰ Lee Marble Co. was contracted to provide 42,000 (more or less) cubic feet of marble on 18 April 1883. Only 3 blocks of marble were accepted before this contract was annulled 2 July 1883. See Casey, "Report of Operations for the Month of June 1883," 3 July 1883.

⁶¹ Davis Tillson was contracted to provide 40,000 cubic feet of rough granite on 12 July 1880. See Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and Davis Tillson, "Articles of Agreement," 12 July 1880; E 512; RG 42; NAB.

⁶² Cape Ann Granite Co. was contracted to provide 26,000 cubic feet (more or less) of rough granite on 18 May 1881. See Casey, to Wright, May 1881.

⁶³ Bodwell Granite Co. was contracted to provide 23,000 cubic feet (more or less) of rough dressed granite on 22 May 1882. See Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and Bodwell Granite Co., "Articles of Agreement," 22 May 1882; E 512; RG 42; NAB.

⁶⁴ William S. White of Rockland Maine was contracted to provide 10,000 cubic feet of rough-cut granite from Hurricane Island, Maine, on 3 April 1883. Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and William S. White, "Articles of Agreement," 3 April 1883; E 512; RG 42; NAB.

⁶⁵ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of February 1881," 7 March 1881; E 484; RG 42; NAB.

⁶⁶ Casey, "Report of Operations for the Month of August 1880," September 1880.

⁶⁷ A dry stone wall, 20 feet by 6 feet by 10 feet high, supported this railroad bed at the east entrance while the earth terrace was being constructed. Later, a raised track leading into the east entrance was constructed over the terrace. See Casey, "Report of Operations for the Month of June 1880," 6 July 1880.

⁶⁸ Casey, "Report of Operations for the Month of August 1880," September 1880; and Casey, "Report of Operations for the Month of June 1881," July 1881.

⁶⁹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of October 1881," 4 November 1881; E 484; RG 42; NAB.

⁷⁰ U.S. Congress, Senate, *Annual Report of the Joint Commission for the Completion of the Washington Monument*, (46th Cong., 3d sess., 1880, Misc. Doc. 9), 2-4

⁷¹ Casey, "Report of Operations for the Month of October 1880," 4 November 1880.

⁷² Casey, "Report of Operations for the Month of July 1881," 4 August 1881.

⁷³ Casey, "Report of Operations for the Month of July 1881," 4 August 1881.

⁷⁴ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Brig. Gen. H. G. Wright, Chief of Engineers, U.S.A., Chairman of Building Committee, Joint Commission for Completion of the Washington Monument, 19 January 1884; E 484; RG 42; NAB.

⁷⁵ Bernard R. Green, Civil Engineer, "Notes on Project for a Marble Pyramidion for the Washington Monument," 4 August 1884; Box 41; Folder 25; Casey Family Papers; Society for the Protection of New England Antiquities, Boston, Massachusetts.

⁷⁶ Green, "Notes on Project for a Marble Pyramidion," 4 August 1884.

⁷⁷ Green, "Notes on Project for a Marble Pyramidion," 4 August 1884.

⁷⁸ Casey, "Report of Operations for the Month of July 1884," August 1884.

⁷⁹ Casey, "Report of Operations for the Month of August 1884," 4 September 1884.

⁸⁰ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Building Committee, Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of September 1884," 7 October 1884; E 484; RG 42; NAB.

⁸¹ Casey, "Report of Operations for the Year of 1884," 1 December 1884.

⁸² Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of January 1885," 5 February 1885; v. 4, p. 74, E 495; RG 42; NAB.

⁸³ U.S. Congress, Senate, *Annual Report of the Joint Commission for Completion of the Washington Monument* (49th Cong., 1st sess., 1885, Doc. 6), 3-4.

⁸⁴ Thomas Lincoln Casey, "Advertisement and Specifications for Bronze Frames and Iron Cranes for Marble Shutters," 10 December 1884; v. 4, p. 34, E 495; RG 42; NAB.

⁸⁵ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and Stokes and Parrish, "Articles of Agreement," 23 December 1884; E 512; RG 42; NAB.

⁸⁶ Casey, "Report of Operations for the Year of 1884," 1 December 1884.

⁸⁷ See companion Historic Structure Reports for both the Survey Lodge (formerly Boiler House) and Monument Lodge.

⁸⁸ The elevator was completed but temporarily not in use at this point because of a lack of appropriated funds for its use. Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of March 1887," 5 April 1887; v. 4, p. 373, E 495; RG 42; NAB.

⁸⁹ John M. Wilson, "Appendix AAA: Annual Report upon the Improvement and Care of the Public Buildings and Grounds and Care and Completion of the Washington Monument in the District of Columbia" in *Annual Report of the Chief of Engineers for 1889* (Washington, D.C.: GPO, 1889).

⁹⁰ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of February 1885," March 1885; v. 4, p. 81, E 495; RG 42; NAB.

⁹¹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of December 1885," January 1886, v. 4, p. 250, E 495; RG 42; NAB; and Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of April 1886," 4 February 1886, E 484; RG 42; NAB.

⁹² Thomas Lincoln Casey, "Advertisement and Specifications for Stone and Iron Flooring, Completion of the Engine House and Building of Pipe Tunnel at the Washington Monument," 9 February 1886; v. 4, p. 260-268, E 495; RG 42; NAB.

⁹³ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of August 1886," September 1886; v. 4, p. 311, E 495; RG 42; NAB.

⁹⁴ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of December 1886," 1 January 1887; E 484; RG 42; NAB.

⁹⁵ John M. Wilson, Engineer in Charge of the Washington Monument, to Office of Public Buildings and Grounds, "Report of Operations Upon Completion of the Washington Monument for the Month of September 1888," 4 October 1888; v. 5, p. 71, E 495; RG 42; NAB.

⁹⁶ Thomas Lincoln Casey, "Advertisement and Specifications for Fitting and Inserting 53 Presented Stones in the Interior Walls of the Washington Monument," 10 June 1885; Proposals to Prospective Bidders, Entry 516; Records of the Joint Commission for the Completion of the Washington Monument, 1876-1892; RG 42, NAB.

⁹⁷ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of September 1885," October 1885; v. 4, p. 202, E 495; RG 42; NAB.

⁹⁸ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of February 1887," 10 March 1887; E 484; RG 42; NAB.

⁹⁹ Casey, "Report of Operations for the Month of December 1885," January 1886.

¹⁰⁰ Thomas Lincoln Casey and Hugh Sisson, "Articles of Agreement," 15 June 1885; E 512; RG 42; NAB.

¹⁰¹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Brig. Gen. John Newton, Chair of Building Committee, 8 April 1885; v. 4, p. 98, E 495; RG 42; NAB.

¹⁰² Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of August 1887," 1 September 1887; E 484; RG 42; NAB.

¹⁰³ Casey, "Report of Operations for the Month of June 1880," 6 July 1880.

¹⁰⁴ Casey, "Specifications for Stone and Iron Flooring, Completion of the Engine House and Building of Pipe Tunnel at the Washington Monument," 9 February 1886.

¹⁰⁵ U.S. Congress, House, *Annual Report of the Joint Commission for the Completion of the Washington Monument* (49th Cong., 2d sess., 1887, Mis. Doc. 57), 2.

¹⁰⁶ Casey, "Report of Operations for the Month of August 1886," September 1886.

¹⁰⁷ W. L. Marshall, First Lieutenant of Engineers, to A. A. Humphreys, Chief of Engineers, United States Army, 19 February 1873 in U.S. Congress, House, *Report to Accompany Bill H.R. 4035*, 22 February 1873.

¹⁰⁸ Casey, "Report of Operations for the Year ending November 30 1880," 1 December 1880; and Casey, "Report of Operations for the Month of July 1881," 4 August 1881.

¹⁰⁹ Casey, "Report of Operations for the Month of February 1881," 7 March 1881.

¹¹⁰ U.S. Congress, Senate, *Annual Report of Joint Commission for the Completion of the Washington Monument* (47th Cong., 1st sess., 1881, Mis. Doc. No. 19), 1-2.

¹¹¹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of April 1882," 4 May 1882; v. 5, p. 163, E 495; RG 42; NAB.

¹¹² Casey, "Report of Operations for the Year of 1884," 1 December 1884.

¹¹³ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, "Advertisement and Specifications for Earth Filling Around the Washington Monument," 15 November 1886; v. 4, p. 325, E 495; RG 42; NAB.

¹¹⁴ Installation of the "granolithic" pavement was delayed by a patent infringement case. The exact composition of the "granolithic" pavement is not known but is assumed to be of cement and aggregate. Wilson, *Annual Report*, 1889.

¹¹⁵ Casey, "Report of Operations for the Month of March 1887," 5 April 1887.

¹¹⁶ John M. Wilson, "Appendix BBB: Annual Report upon the Improvement and Care of the Public Buildings and Grounds and Care and Completion of the Washington Monument in the District of Columbia" in *Annual Report of the Chief of Engineers for 1890* (Washington, D.C.: GPO, 1890); and Charles S. Bromwell, "Appendix DDD: Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia," in *Annual Report of the Chief of Engineers for 1905* (Washington, D.C.: GPO, 1905).

¹¹⁷ Wilson, *Annual Report*, 1890; and Theodore A. Bingham, "Appendix DDD: Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia," in *Annual Report of the Chief of Engineers for 1902*, (Washington, D.C.: GPO, 1902); and Bromwell, *Annual Report*, 1905.

¹¹⁸ Anon., "Report on Repairs to Washington Monument (Public Works Administration Federal Project 365)," 7 March 1934; E 438; RG 42; NAB.

¹¹⁹ Anon., "Gold and Platinum Points Stolen from Monument Tip," *Evening Star*, 27 December 1934.

¹²⁰ Anon., "Report on Repairs to Washington Monument," 7 March 1934; John L. Nagle, United States Department of the Interior, National Park Service, Eastern Division, Branch of Engineering, Washington, Memorandum, 21 January 1935; Correspondence, Entry 432, Records of the Secretary, 1833-1951; Records of the National Monument Society, 1833-1951; RG 42; NAB.

¹²¹ Forty-eight aluminum flagpoles were installed in 1958. They were increased to 50 in number in 1960. National Park Service, "Annual Report - Washington National Monument, 2/22/1957-2/22/1958," 1958:4-5.

¹²² National Park Service, "Washington National Monument--Annual Report, January 1 to December 31, 1962," 1962, NPS-NCR Collection.

¹²³ National Park Service, National Capital Office, Design Construction, "Specifications for Washington Monument Exterior Restoration, Washington, D.C.," 20 February 1964, NPS-NCR Collection.

¹²⁴ John F. Mount, Custodian, to Col. O. H. Ernst, U.S. Army, Engineer in-Charge of the Washington Monument, "Report relating to the Washington Monument for the Month of December 1889," 2 January 1890; E 529; RG 42; NAB.

¹²⁵ Thomas W. Symons and Charles S. Bromwell, "Appendix DDD: Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia," in *Annual Report of the Chief of Engineers for 1904* (Washington, D.C.: GPO, 1904); Wilson, *Annual Report*, 1889.

¹²⁶ Bromwell, *Annual Report*, 1905.

¹²⁷ O. H. Ernst, Colonel, U.S. Army, to Mr. John Hawkins, Custodian, Washington Monument, 18 January 1893; Records Relating to Monument Maintenance, Entry 545; Records of the Custodian, 1879-1929; Records of the Engineer in Charge of the Washington Monument, 1879-1929; RG 42; NAB.

¹²⁸ Bromwell, *Annual Report*, 1905.

¹²⁹ Wunsch, *Washington Monument*, 6.

¹³⁰ Wunsch, *Washington Monument*, 7.

¹³¹ Theodore A. Bingham, "Appendix HHH: Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia," in *Annual Report of the Chief of Engineers for 1900* (Washington, D.C.: GPO, 1900).

¹³² John M. Wilson, T. A. Bingham, and John S. Sewell, "Appendix BBB: Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia" in *Annual Report of the Chief of Engineers for 1897* (Washington, D.C.: GPO, 1897).

¹³³ John M. Wilson and Oswald H. Ernst, "Appendix CCC: Annual Report upon the Improvement and Care of the Public Buildings and Grounds and Care and Maintenance of the Washington Monument in the District of Columbia" in *Annual Report of the Chief of Engineers for 1893* (Washington, D.C.: GPO, 1893); and John M. Wilson, "Appendix CCC: Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia" in *Annual Report of the Chief of Engineers for 1894* (Washington, D.C.: GPO, 1894); and John M. Wilson, "Appendix DDD: Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia" in *Annual Report of the Chief of Engineers for 1895* (Washington, D.C.: GPO, 1895); and John M. Wilson, "Appendix DDD: Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia," in *Annual Report of the Chief of Engineers for 1896* (Washington, D.C.: GPO, 1896); and Wilson, Bingham, and Sewell, *Annual Report*, 1897.

¹³⁴ Theodore A. Bingham, "Appendix DDD: Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia," in *Annual Report of the Chief of Engineers for 1901* (Washington, D.C.: GPO, 1901).

¹³⁵ See Robert H. Thurston, *A History of the Growth of the Steam-engine* (New York: Appleton and Co., 1878).

¹³⁶ Theodore A. Bingham, "Appendix CCC Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia" in *Annual Report of the Chief of Engineers for 1899* (Washington, D.C.: GPO, 1899).

¹³⁷ G. W. Baird, Commander (Chief Eng.) U.S.N. Superintendent, to Col. Bingham, 14 April 1900; E 749, Office of Public Buildings and Grounds Letters Received, 1899-1906; RG 42; NAB.

¹³⁸ Theodore A. Bingham, "Appendix CCC: Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia," in *Annual Report of the Chief of Engineers for 1898* (Washington, D.C.: GPO, 1898).

¹³⁹ Bingham, *Annual Report*, 1900.

¹⁴⁰ Bromwell, *Annual Report*, 1905; Office of Public Buildings and Public Parks of the National Capital, *Annual Report of Director of Public Buildings and Public Parks of the National Capital* (Washington, D.C.: GPO, 1919).

¹⁴¹ Bingham, *Annual Report*, 1901.

¹⁴² Symons and Bromwell, *Annual Report*, 1904.

¹⁴³ Charles S. Bromwell, "Appendix HHH: Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia," in *Annual Report of the Chief of Engineers for 1907* (Washington, D.C.: GPO, 1907).

¹⁴⁴ Spencer Cosby, "Appendix EEE: Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument and the Highway Bridge Across the Potomac River, Washington, District of Columbia" in *Annual Report of the Chief of Engineers for 1909* (Washington, D.C.: GPO, 1909).

¹⁴⁵ Spencer Cosby, "Appendix EEE: Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument and the Highway Bridge Across the Potomac River, Washington, District of Columbia," in *Annual Report of the Chief of Engineers for 1911* (Washington, D.C.: GPO, 1911).

¹⁴⁶ Bingham, *Annual Report*, 1902; and Office of Public Buildings and Public Parks of the National Capital, *Annual Report*, 1919.

¹⁴⁷ Office of Public Buildings and Public Parks of the National Capital, *Annual Report of Director of Public Buildings and Public Parks of the National Capital* (Washington, D.C.: GPO, 1926).

¹⁴⁸ Office of Public Buildings and Public Parks of the National Capital, *Annual Report of Director of Public Buildings and Public Parks of the National Capital* (Washington, D.C.: GPO, 1927).

¹⁴⁹ Wunsch, *Washington Monument*, 6.

¹⁵⁰ Anon., "Report on Repairs to Washington Monument," 7 March 1934.

¹⁵¹ Wunsch, *Washington Monument*, 6.

¹⁵² See "Sheet 2, General Notes Sections and Details," June 1974 ([Architectural Drawing] NCP 807/41001A 2 of 55; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.; and "Sheet 3, Plan 500' thru 480' Levels," June 1974 ([Architectural Drawing] NCP 807/41001A 3 of 55; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.

¹⁵³ The following stones were restored in 1978: State of Washington (310'), Addisonian Literary Society (280'), Hibernian Society of Baltimore (280'), Clisophic Society (270'), Continental Guard - New Orleans (270'), Cincinnati Fire Engine and Hose Co. (260'), Washington Erina Guard, Newark (260'), Fire Department - City of

New York (260'), Teachers of Buffalo Public Schools (250'), Grand Lodge - Maryland I.O.O.F. (200'), Turkey (190'), Free Swiss Confederation (190'), Brazil (190'), City of Baltimore (140'), Grand Lodge AF&AM - Maryland (130'), American Whig Society (130'), Corporation of the City of New York (130'), Missouri (90'). See "Terms of Agreement Regarding Cleaning and Repair of Commemorative Stones in the Washington Monument," May 1978; NPS-NCR Collection.

¹⁵⁴ Judith M. Jacob, "Conservation Treatments for the Washington Monument Commemorative Stones Using Guidelines" in *Cultural Resource Management* (No 7, 1999:16-18), 17-18.

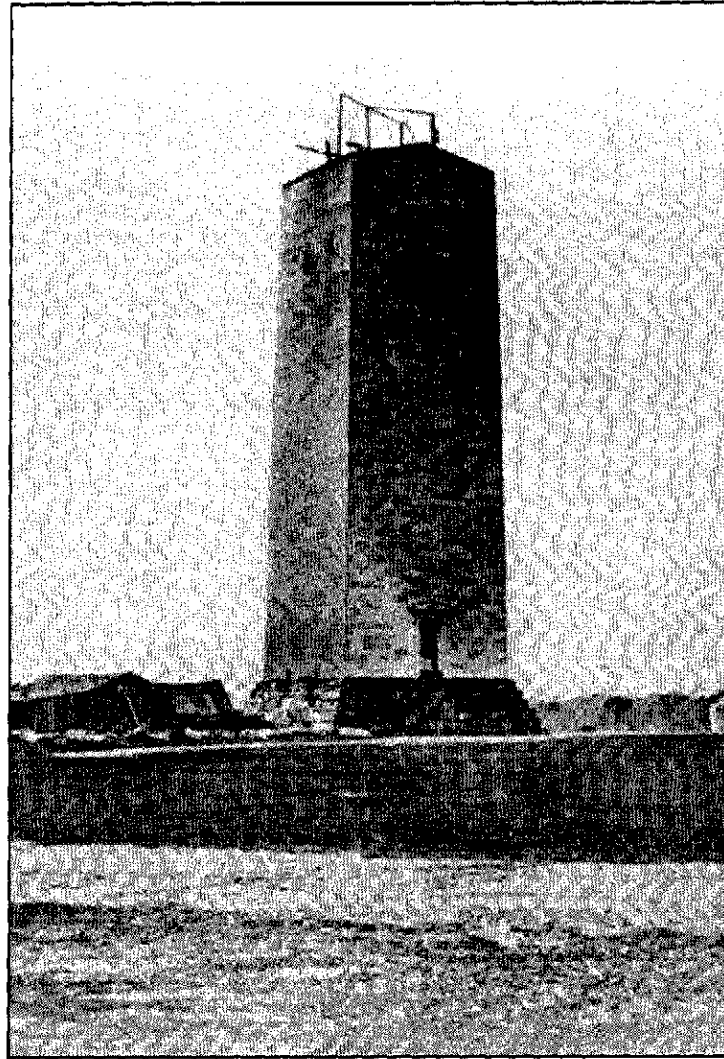


Figure 3.1: Oblique three-quarters view of Washington Monument during construction, 1878. (Photograph BH823-2, Prints and Photographs Division, Library of Congress, Washington, D.C.)



Figure 3.2: View of earlier stepped stone foundation and portal door. (NPS-NCR Collection.)

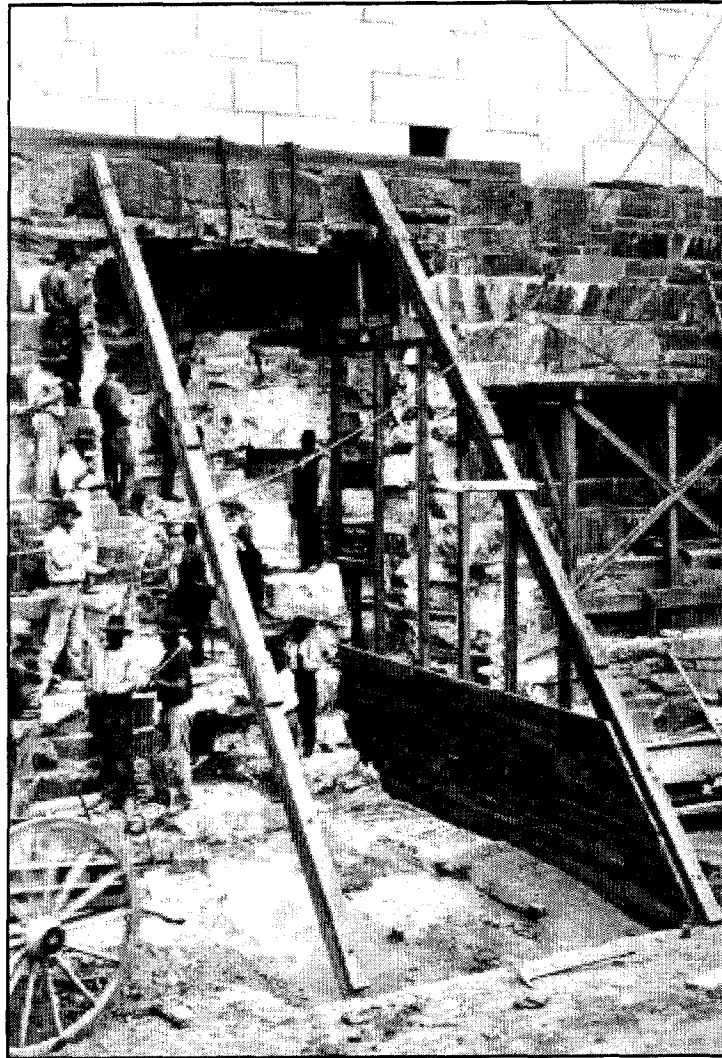


Figure 3.3: Construction of formwork for construction of concrete buttress around earlier stepped gneiss foundation, October 1879. (Prints and Photographs Division, Library of Congress, Washington, D.C.)

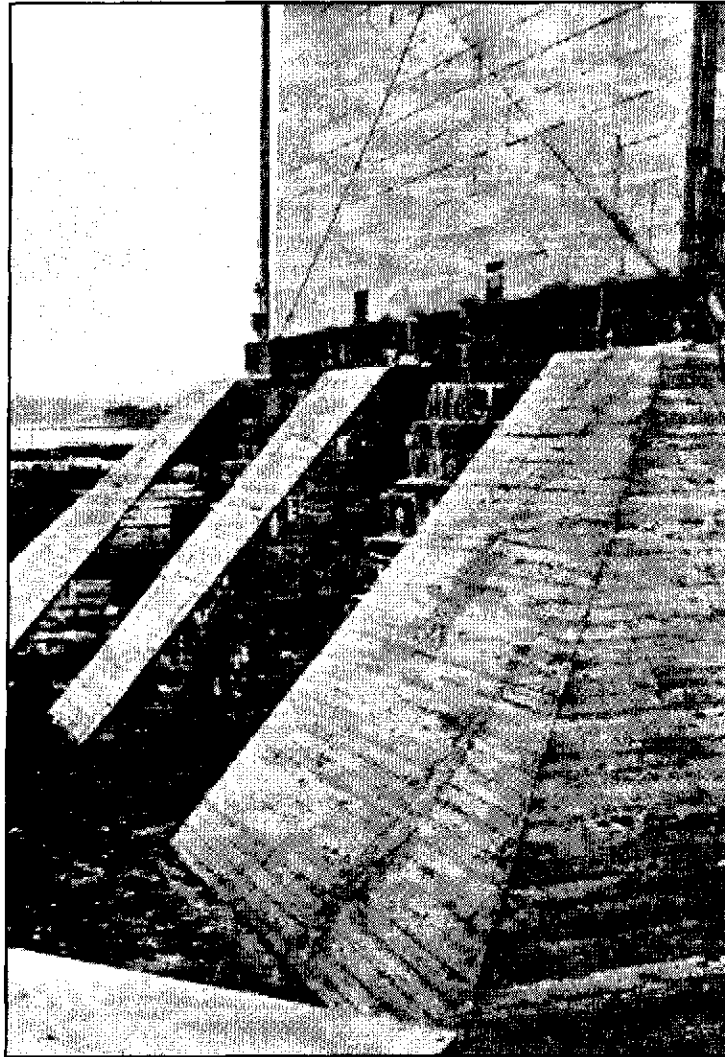


Figure 3.4: View of partial completion of concrete buttresses around earlier stepped gneiss foundation, January 1880. (Photograph USZ62-30612, Prints and Photographs Division, Library of Congress, Washington, D.C.)

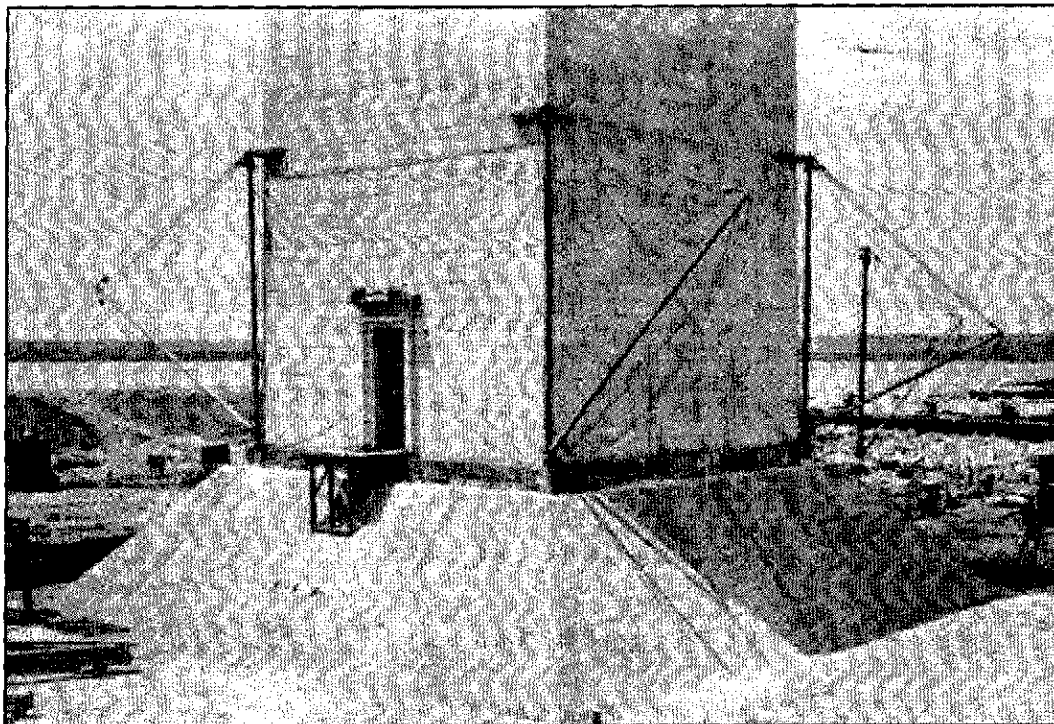


Figure 3.5: View of completed underpinning at foundation, June 1880. (Prints and Photographs Division, Library of Congress, Washington, D.C.)

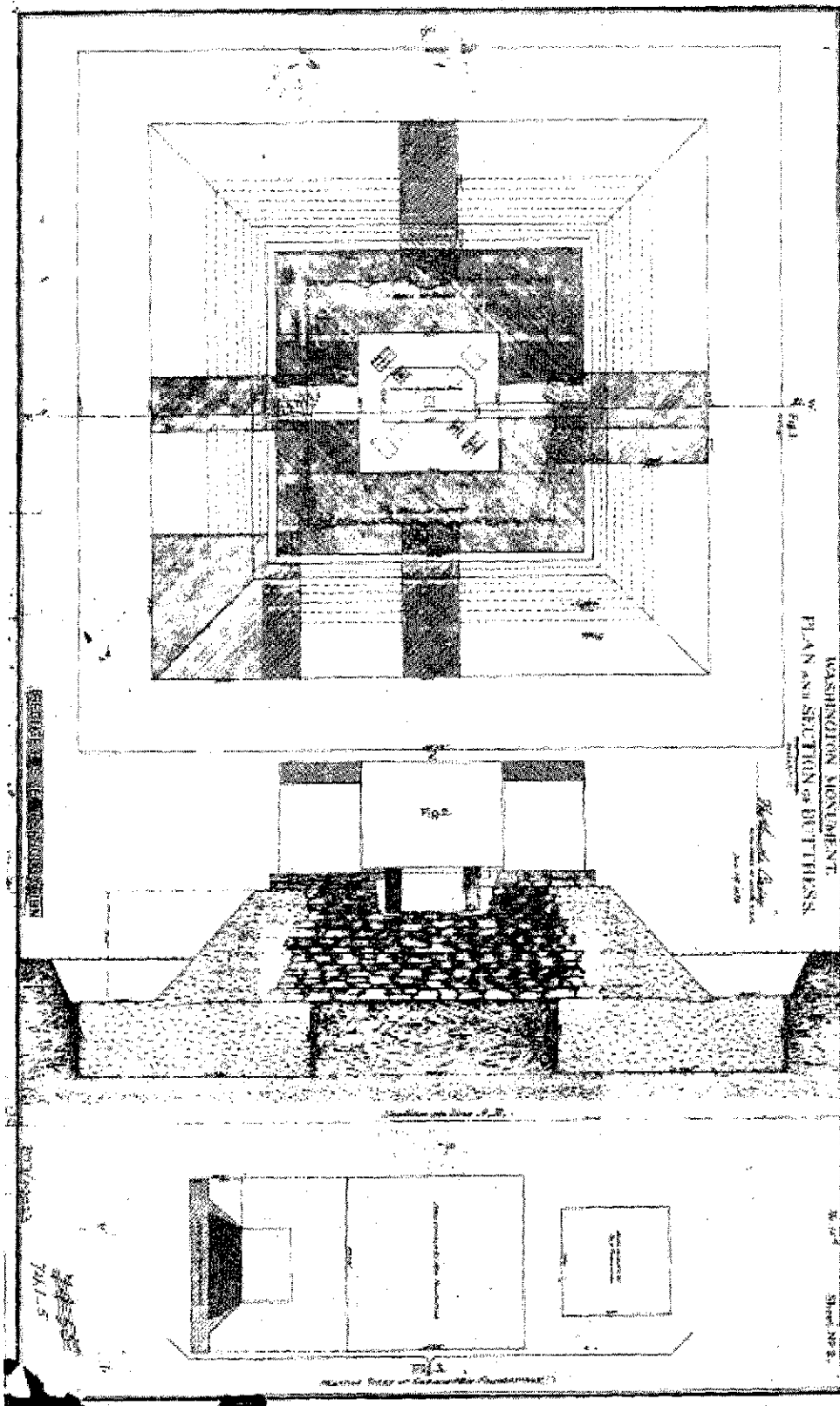


Figure 3.6: Washington Monument, Plan and Section of Buttress, 7 December 1879. ([Architectural Drawing] File 74.1-5; NCP 807/80023; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)

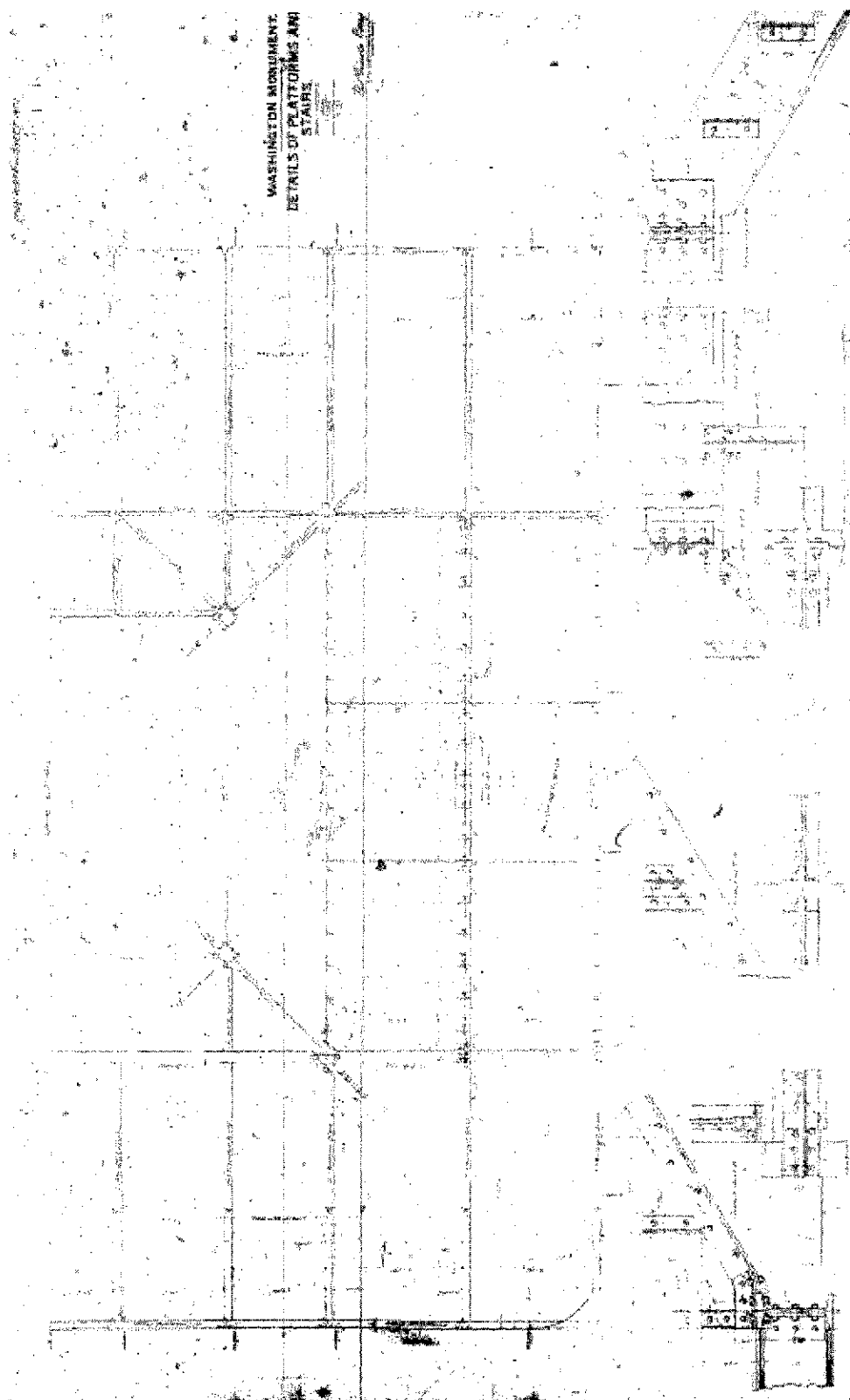


Figure 3.7: Washington Monument Details of Platforms and Stairs, September 1888. ([Architectural Drawing] File 74.4-5; NCP 807/80033 1; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)

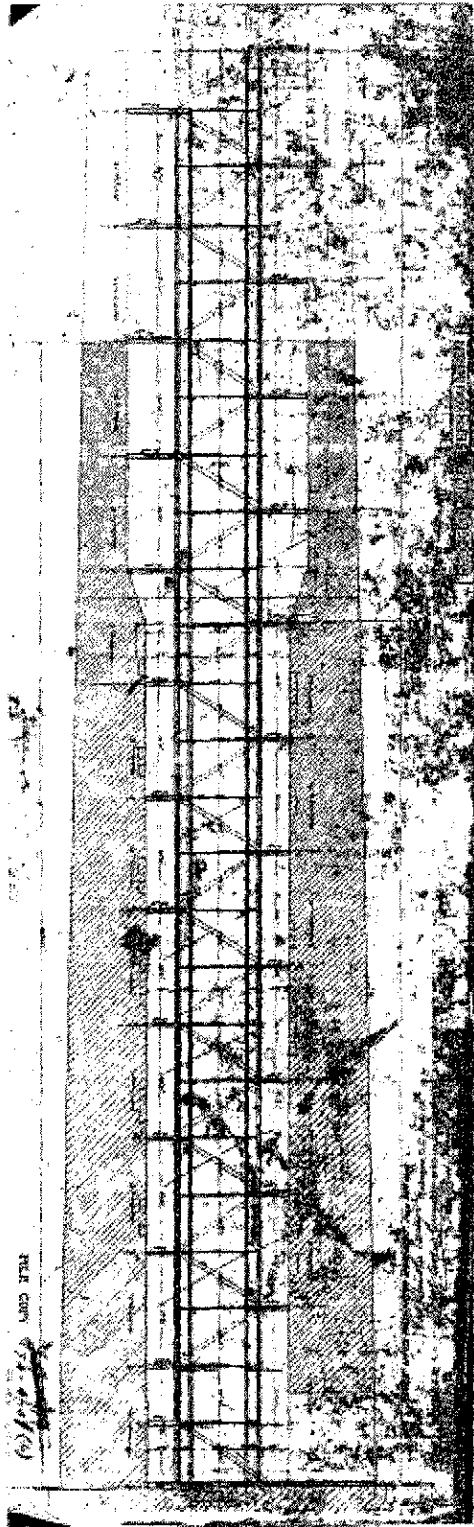


Figure 3.8: Section through Washington Monument, 14 July 1879. ([Architectural Drawing] File 74.4-31; NCP 807/80035; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)

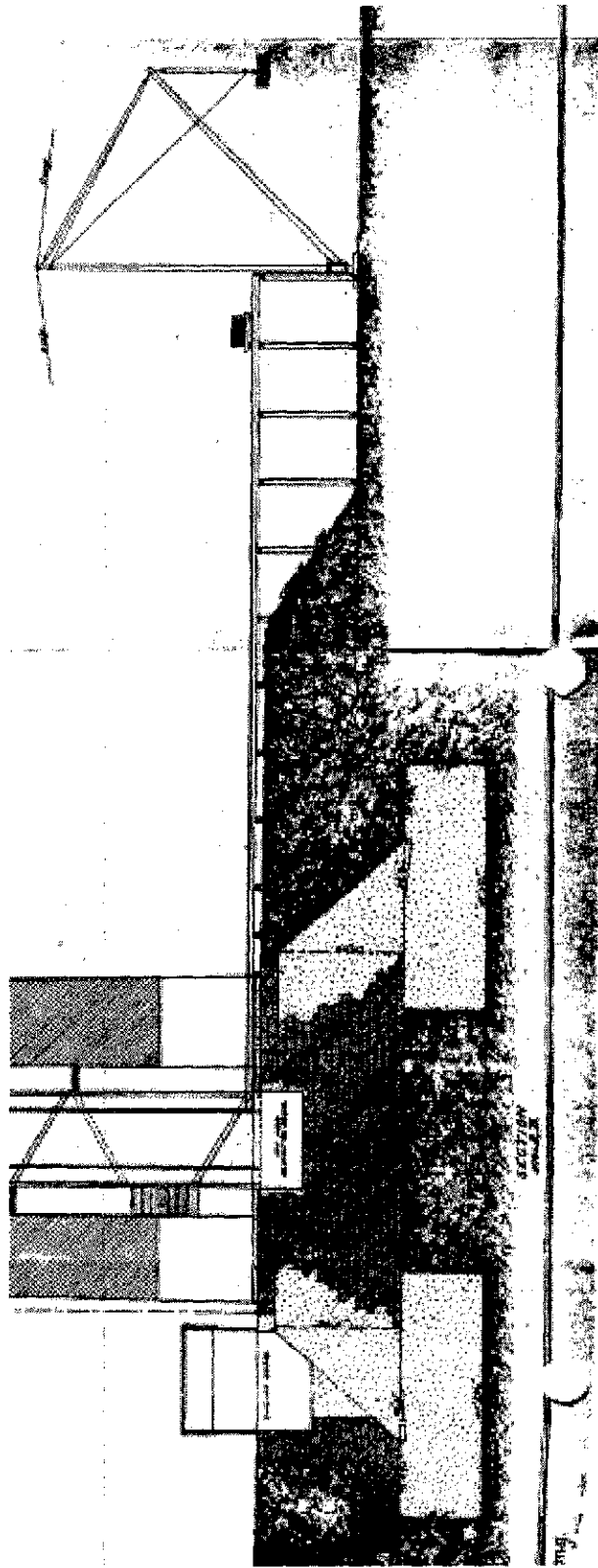


Figure 3.9: Washington Monument, Plans and Section Showing Progress of the Work 1881, 9 December 1881. ([Architectural Drawing] U.S. Congress. Senate, *Annual Report of Joint Commission for the Completion of the Washington Monument*, 47th Cong., 1st sess., 1881, Mis. Doc. No. 19.)

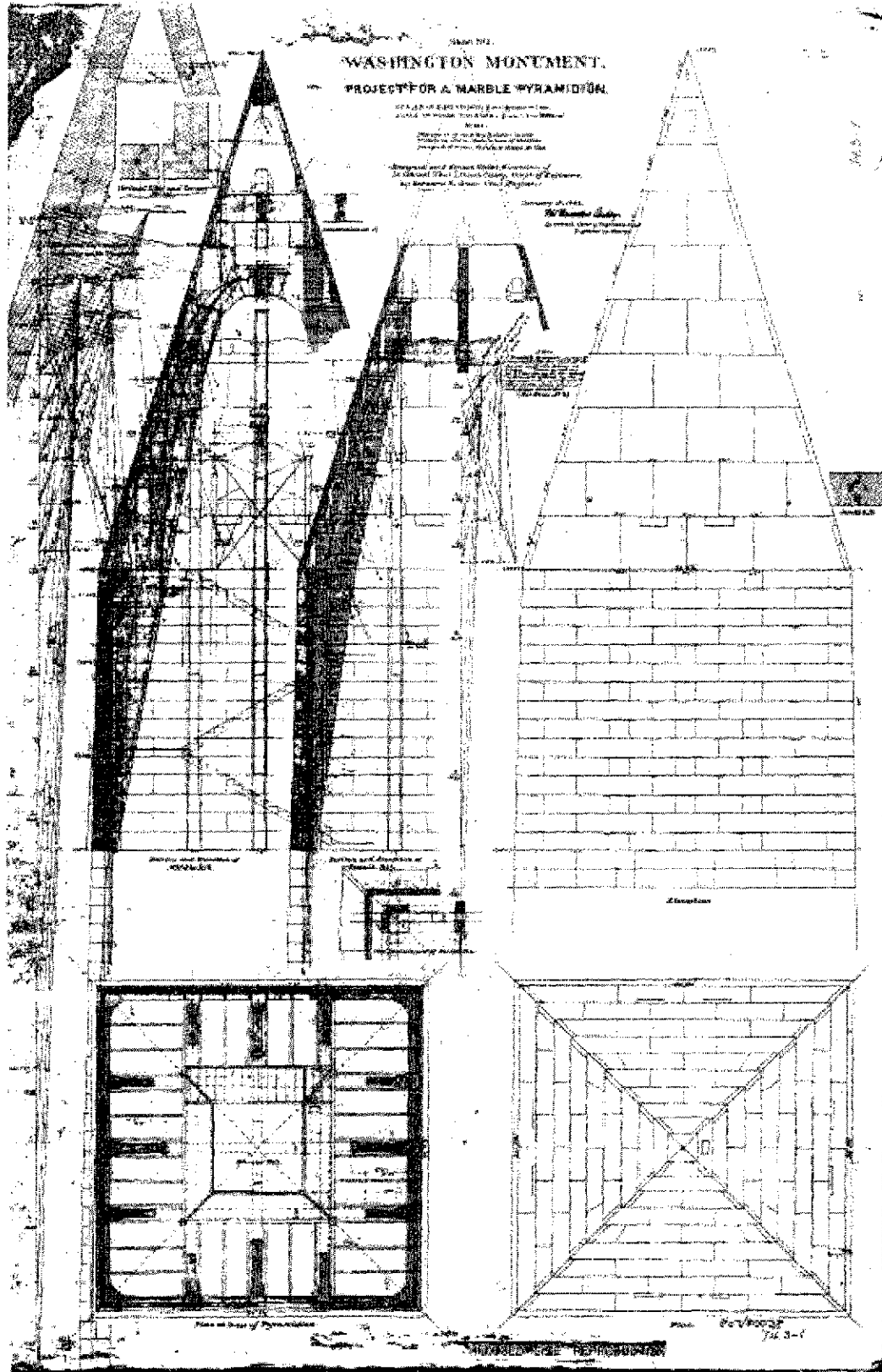


Figure 3.10: Sheet No. 1, Washington Monument. Project for a Marble Pyramidion, 19 January 1884. ([Architectural Drawing] File 74.3-1; NCP 807/80028; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)

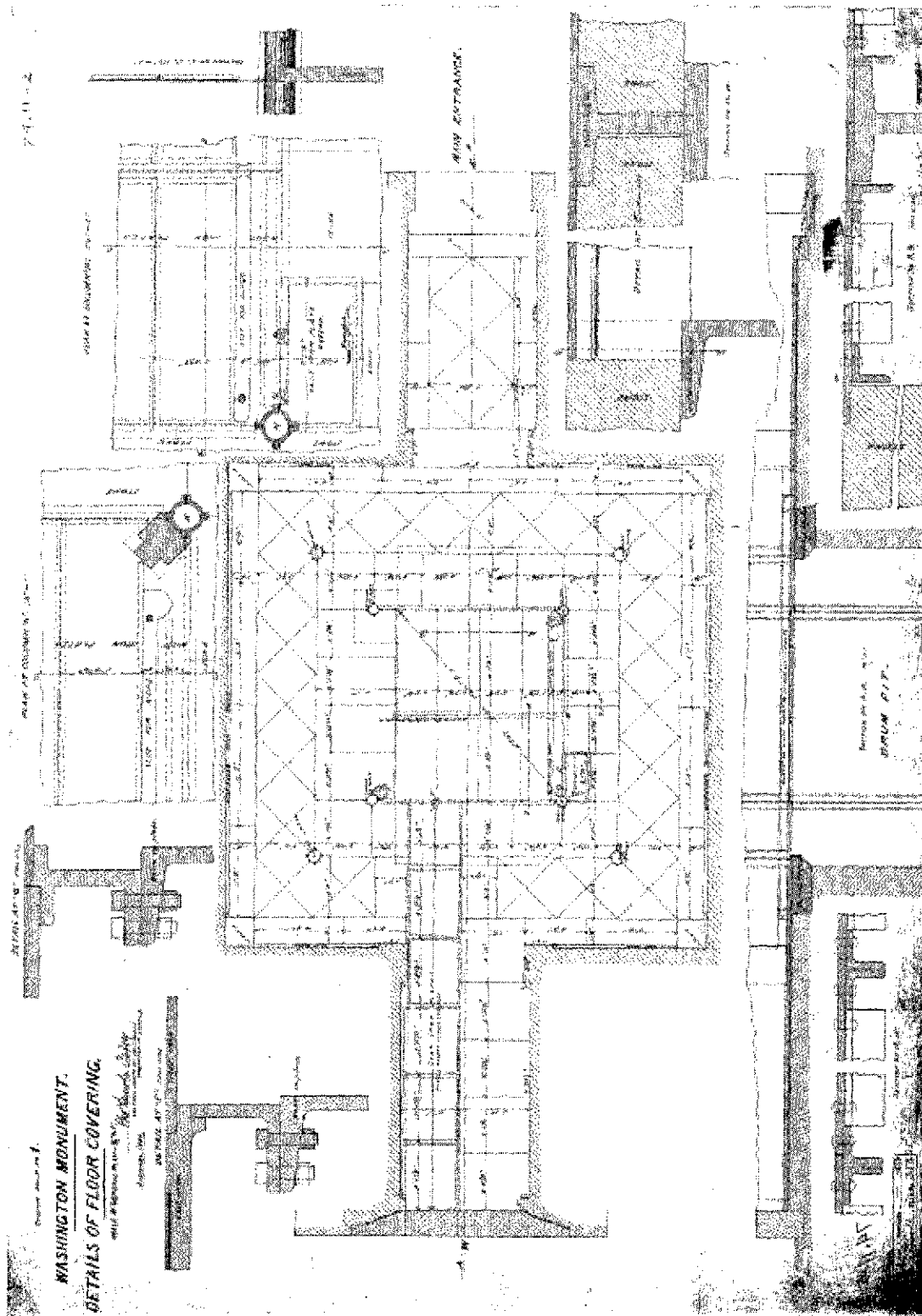


Figure 3.11: Contract Sheet No. 1, Washington Monument, Details of Floor Covering, January 1886. ([Architectural Drawing] File 74.11-2; NCP 807; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)

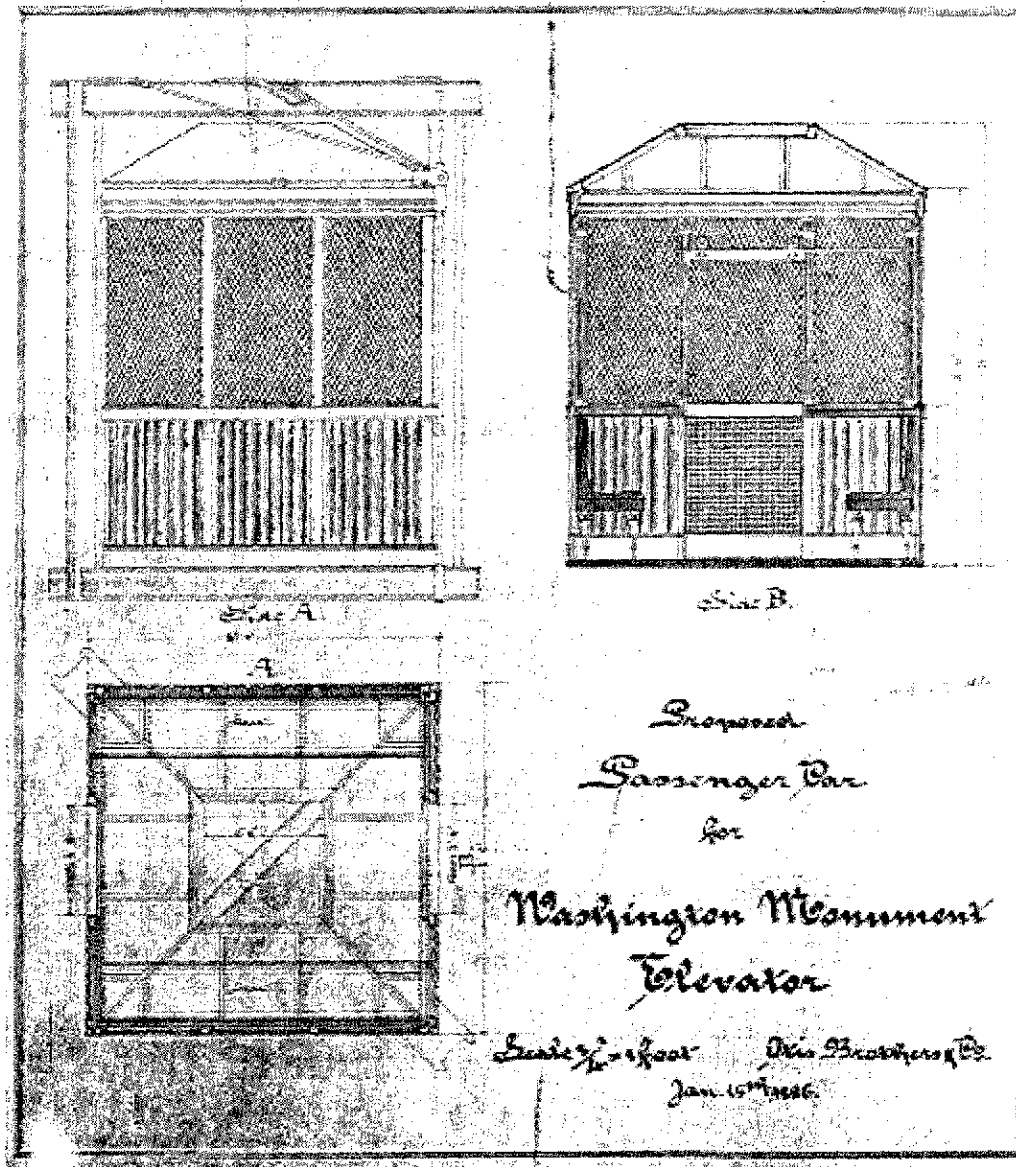


Figure 3.12: Proposed Passenger Car for Washington Monument Elevator, Otis Brothers & Co., 15 January 1886. ([Architectural Drawing] File 74-168; NCP 807; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)

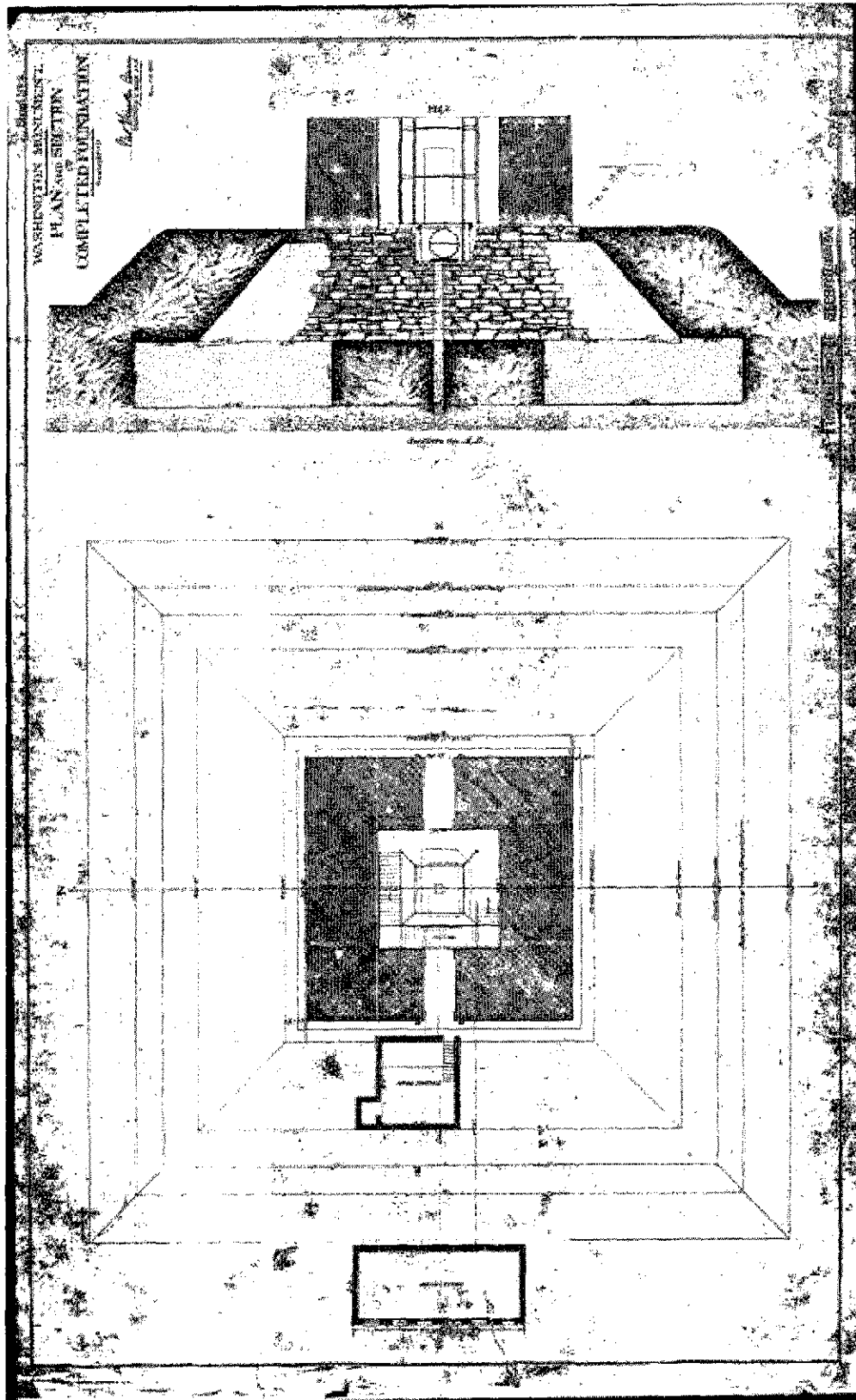


Figure 3.13: Washington Monument, Plan and Section of Completed Foundation, 1 December 1886. ([Architectural Drawing] File 74.1-9; NCP 807/80025; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)



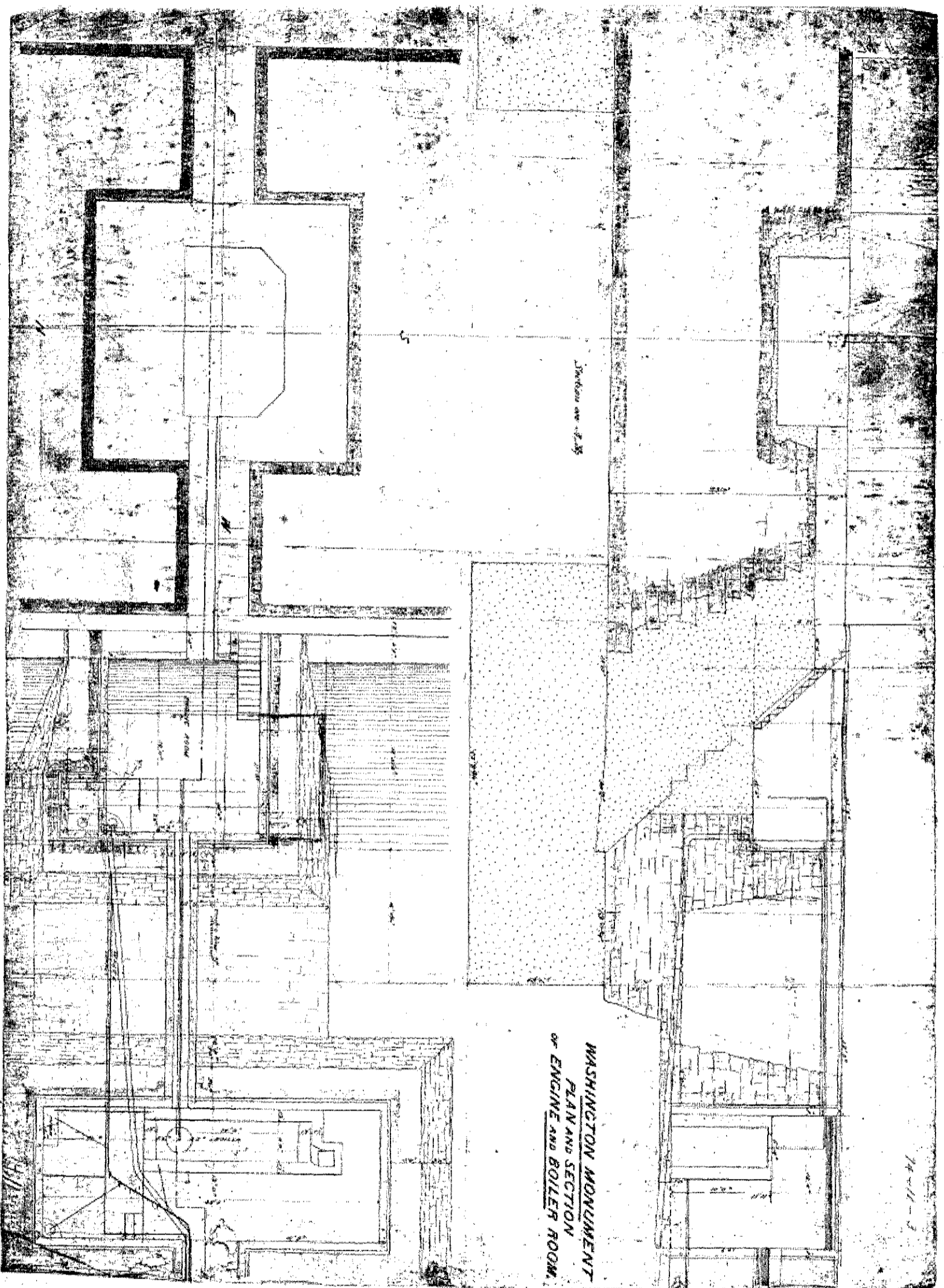
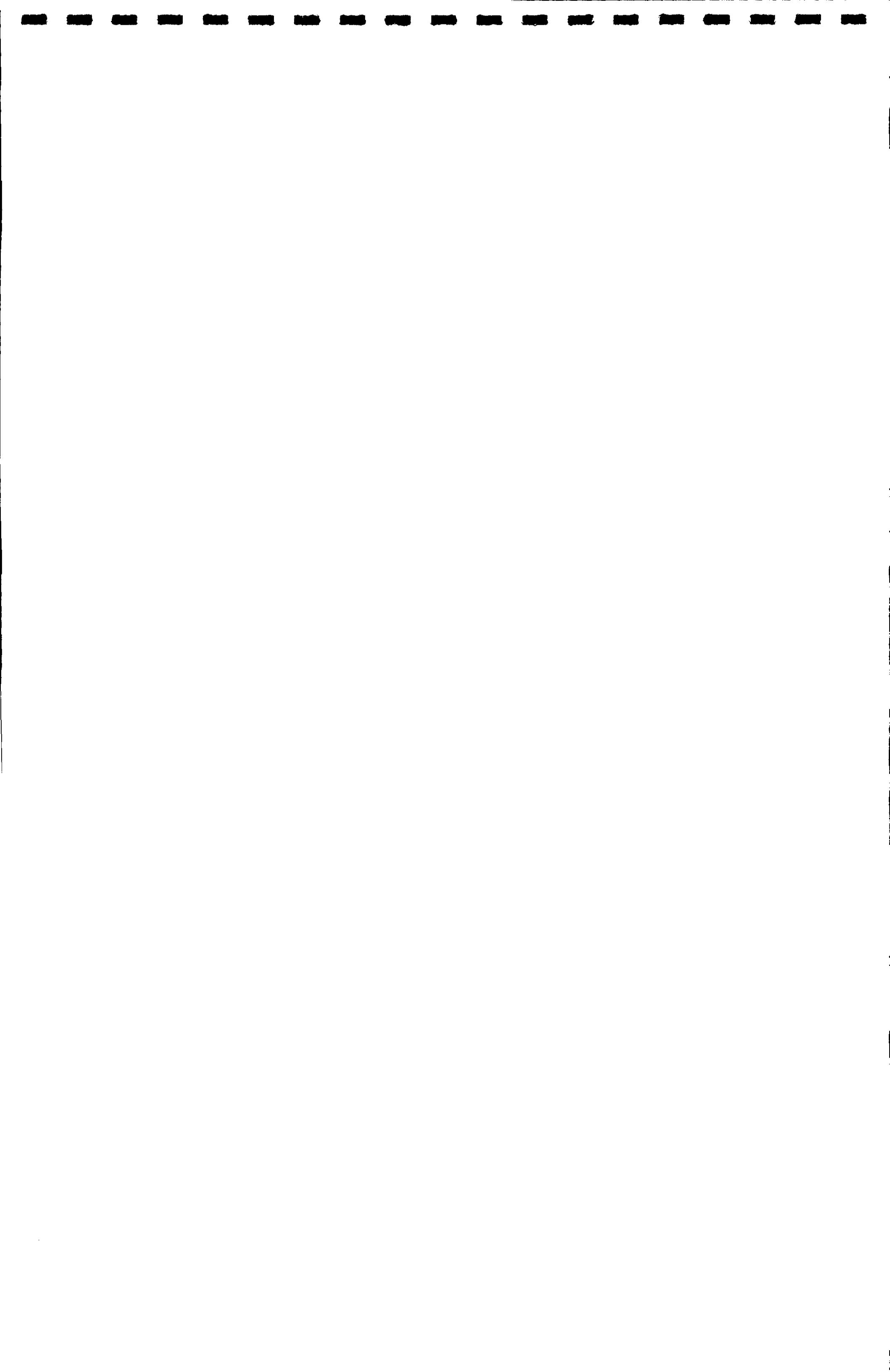


Figure 3.14: Washington Monument, Plan and Section of Engine and Boiler Room, n.d. [Architectural Drawing] File 74.11-3; NCP 807; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)



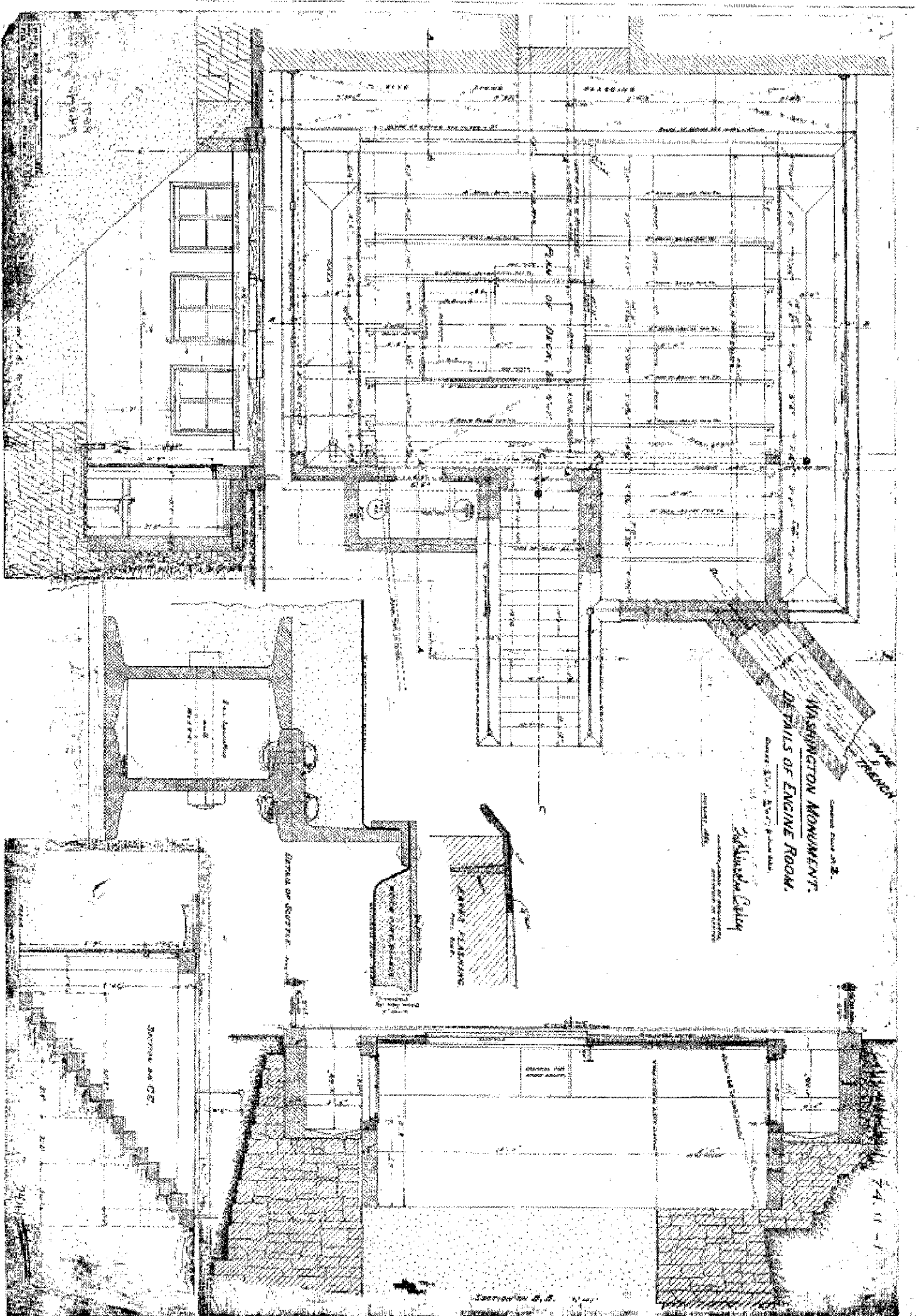
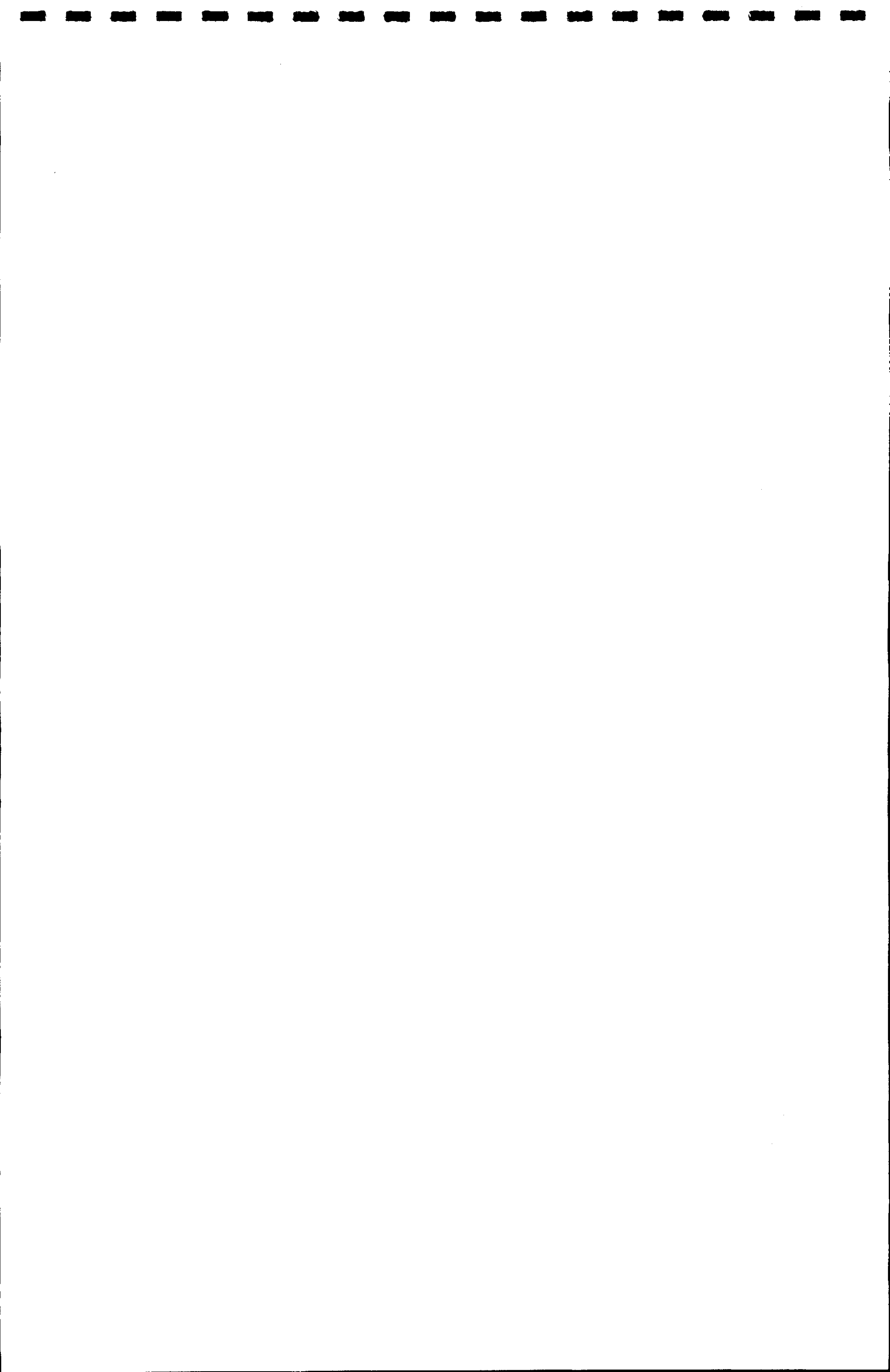


Figure 3.15: Contract Sheet No. 2, Washington Monument Details of Engine Room, January 1886. [Architectural Drawing] File 74.11-1: NCP 807; RG 79; Cartographic and Architectural Records; LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)



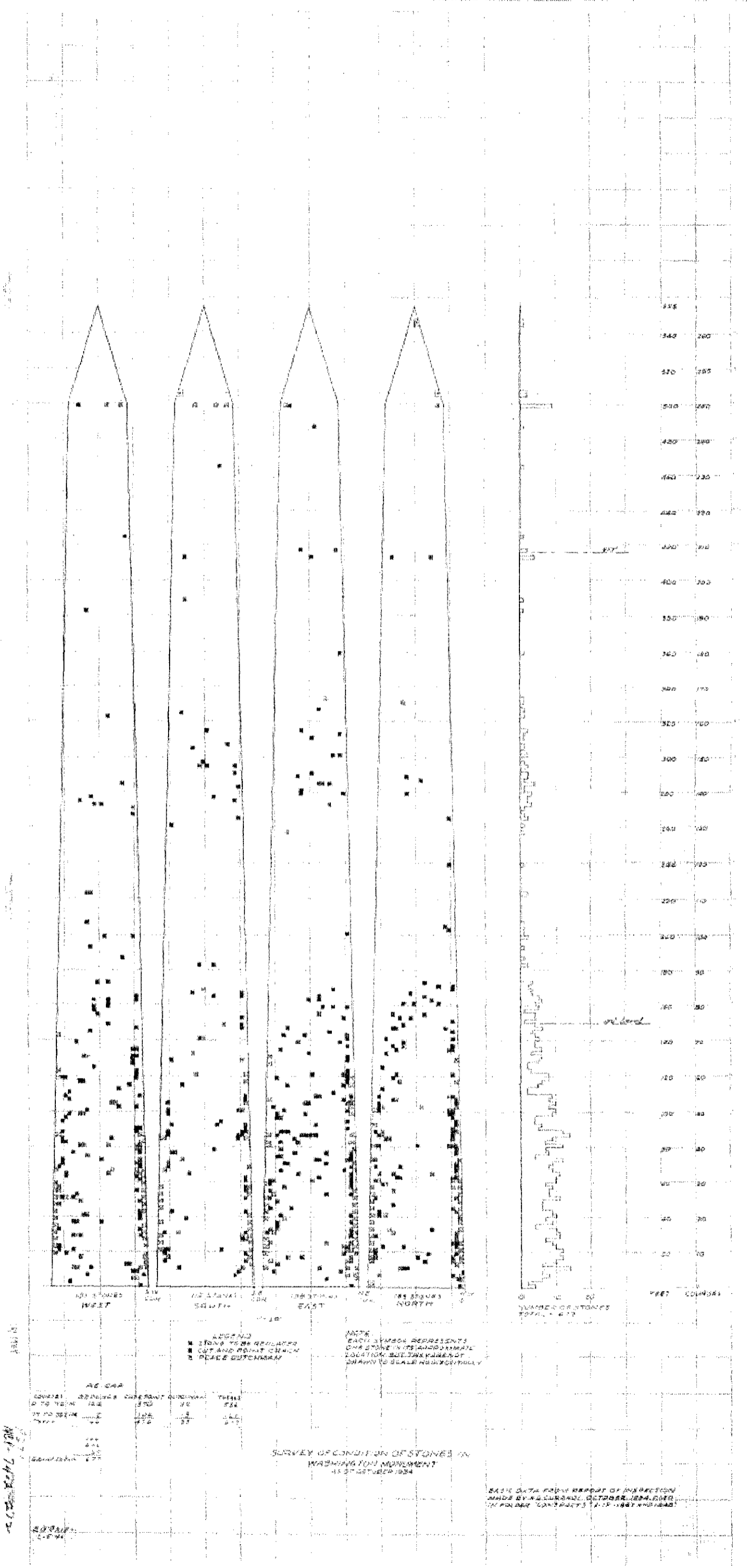


Figure 3.16: Survey of Condition of Stones in Washington Monument as of October 1934, 8 February 1946. ([Architectural Drawings], File 74-2-212; NCP 807; RG 79; Cartographic and Architectural Records LICON, Special Media Archive Division, National Archives at College Park, College Park, Md.)



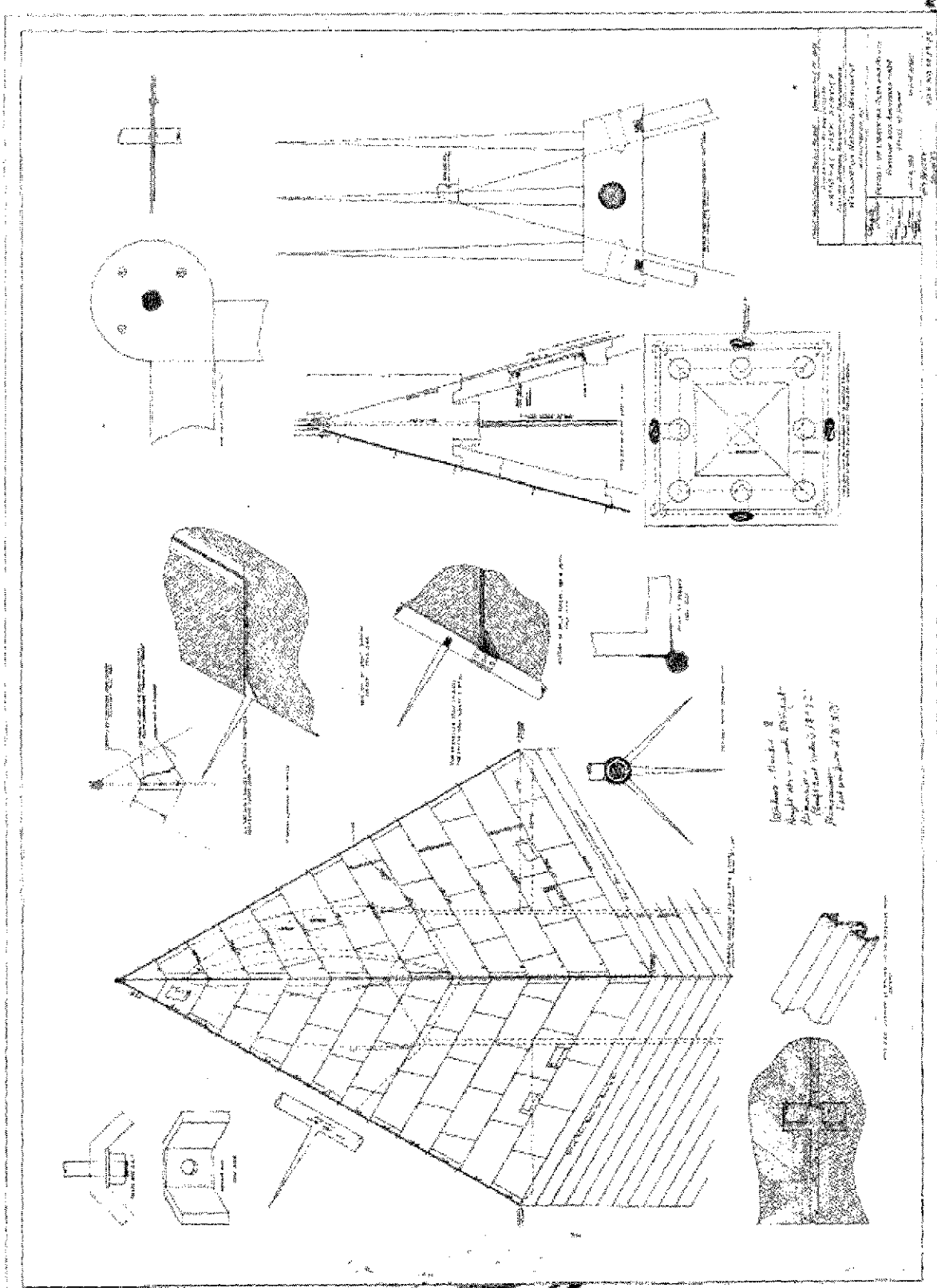


Figure 3.17: Washington National Monument, Washington D.C., Details of Lightning Rods and Points Repairs and Additions – 1934, 8 January 1935. ([Architectural Drawing] File 74.23-25; NCP 807/80077 25 of 77; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)

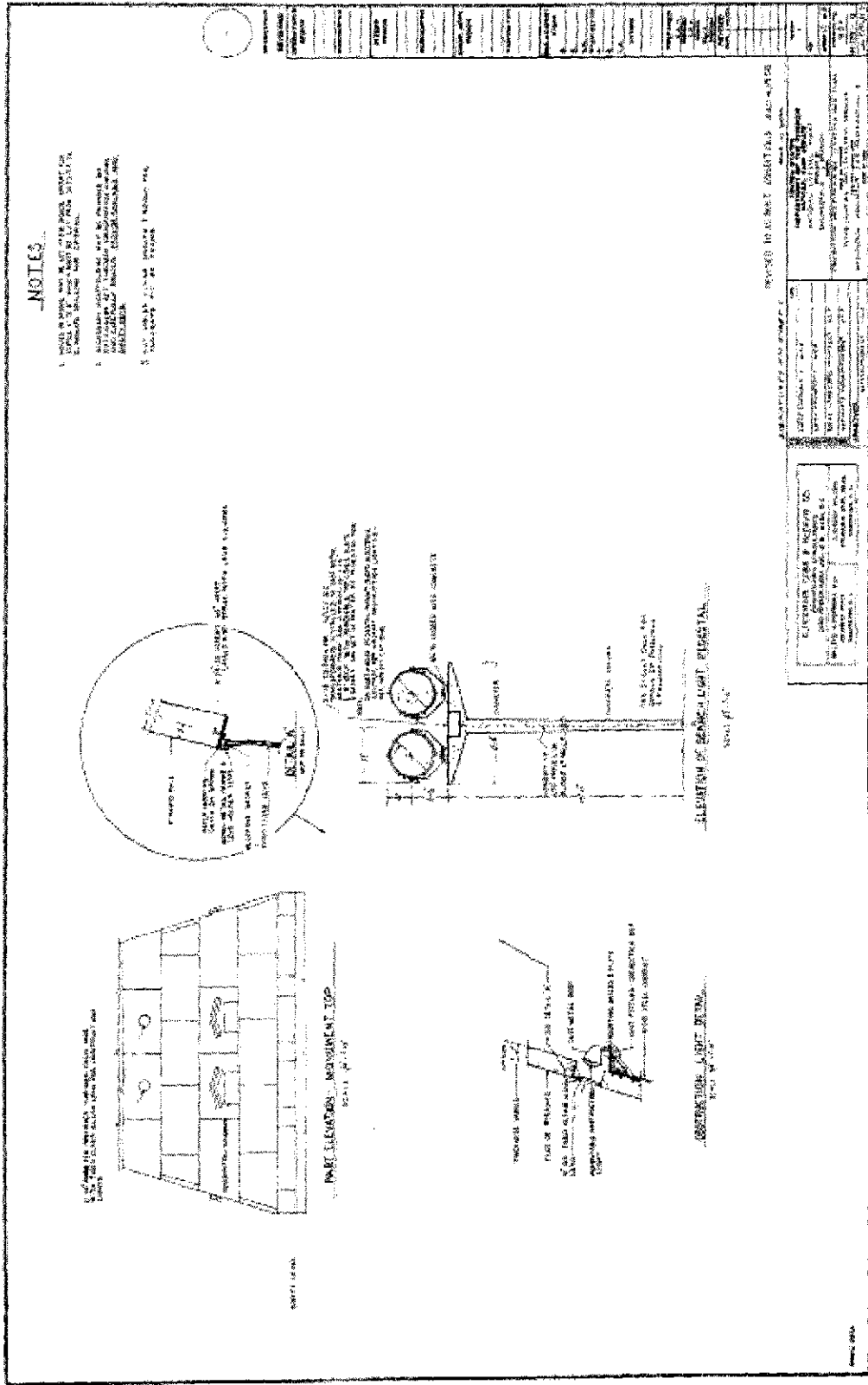


Figure 3.18: Obstruction and Pyramidion Lighting and Plan, Floodlighting and Electric Service, Washington Monument. US Reservation 2, Revised to as built conditions 4 July 1958. ([Architectural Drawing] File 44.289-13; NCP 807/84289; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)

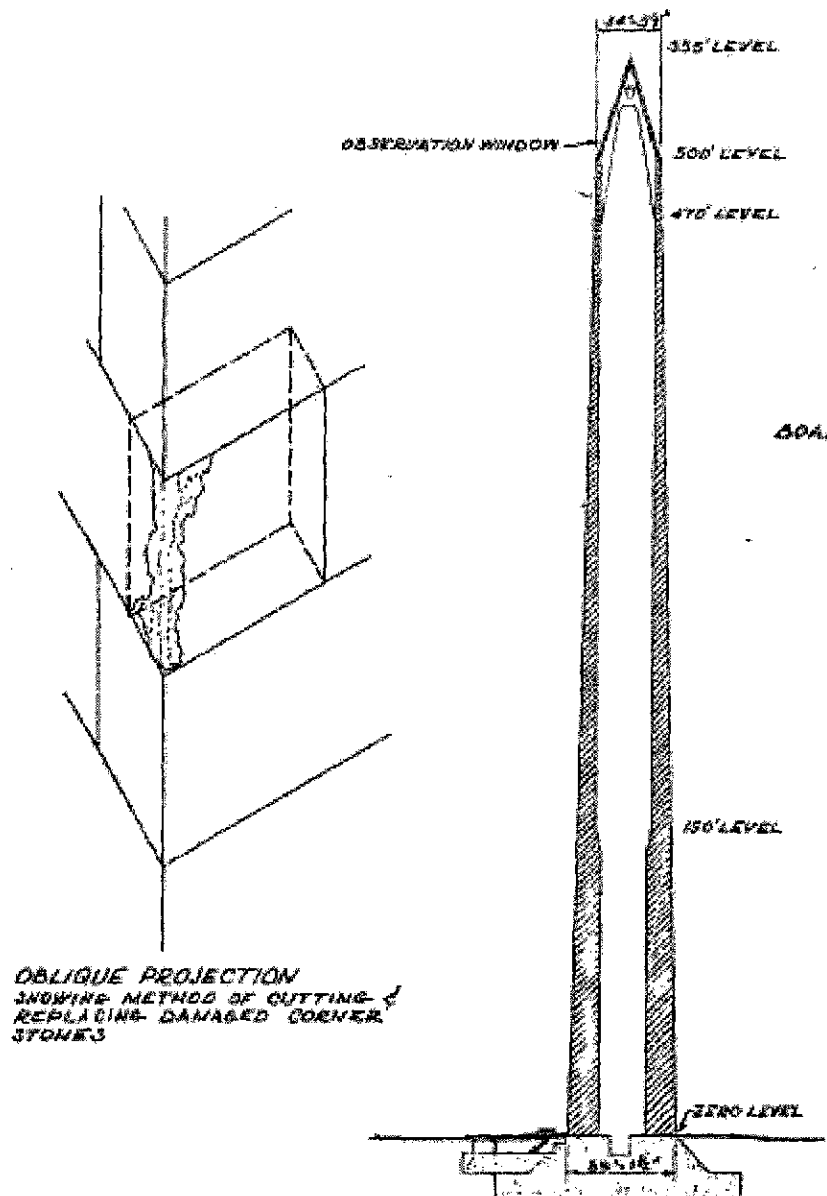


Figure 3.19: Detail of "Oblique Projection," Washington Monument Exterior Restoration, Washington Monument, US Reservation 2, January 1964. ([Architectural Drawing] File 74-174; NCP 807/80081; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)

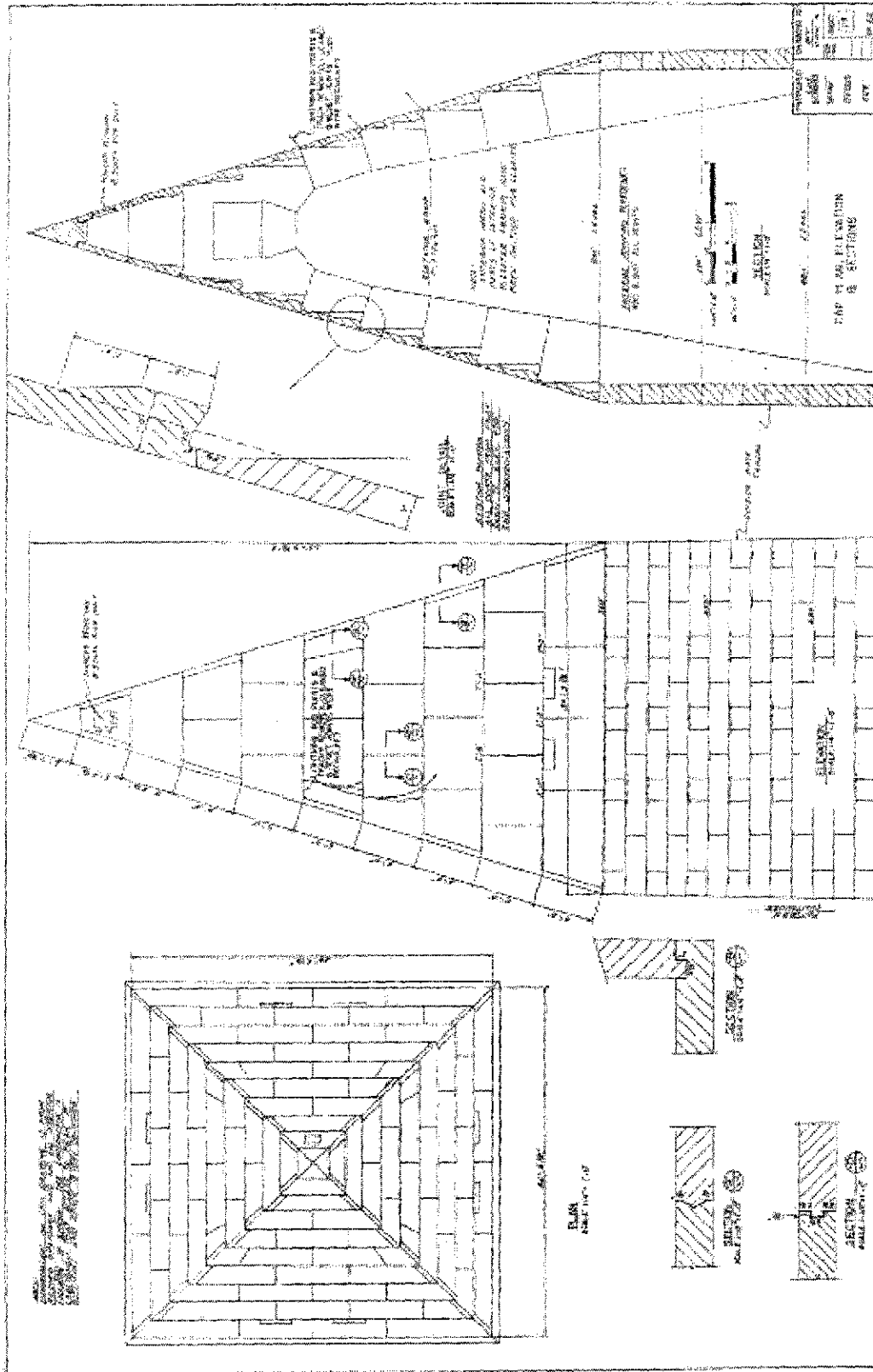


Figure 3.20: Cap Plan, Elevation & Sections, Approved 19 July 1974. ([Architectural Drawing] NCP 807/41001A 13 of 55; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)

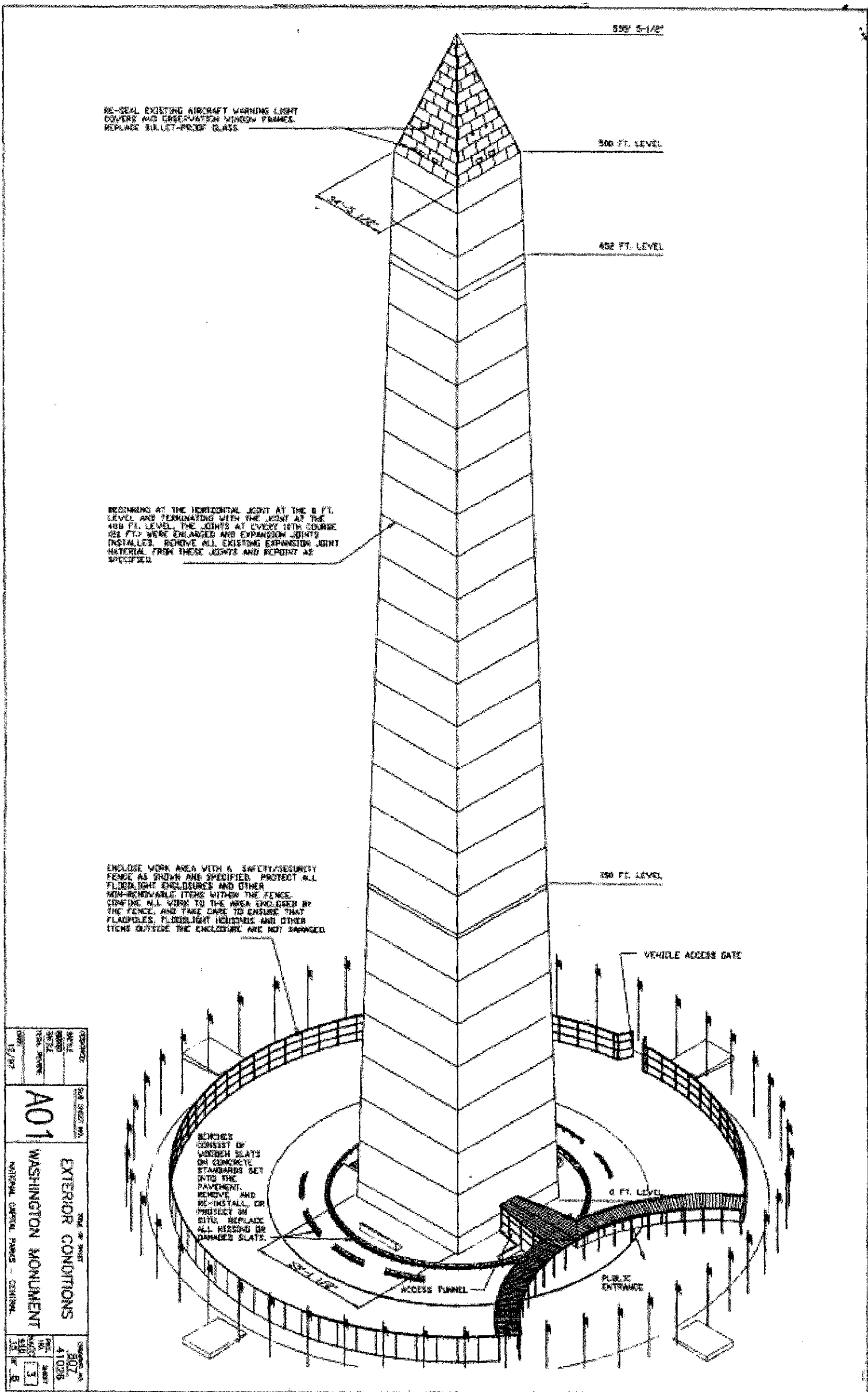


Figure 3.21: Sheet No. A01, Exterior Conditions Washington Monument, December 1997. (Architectural Drawing) NCP 807/41026 3 of 8; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)



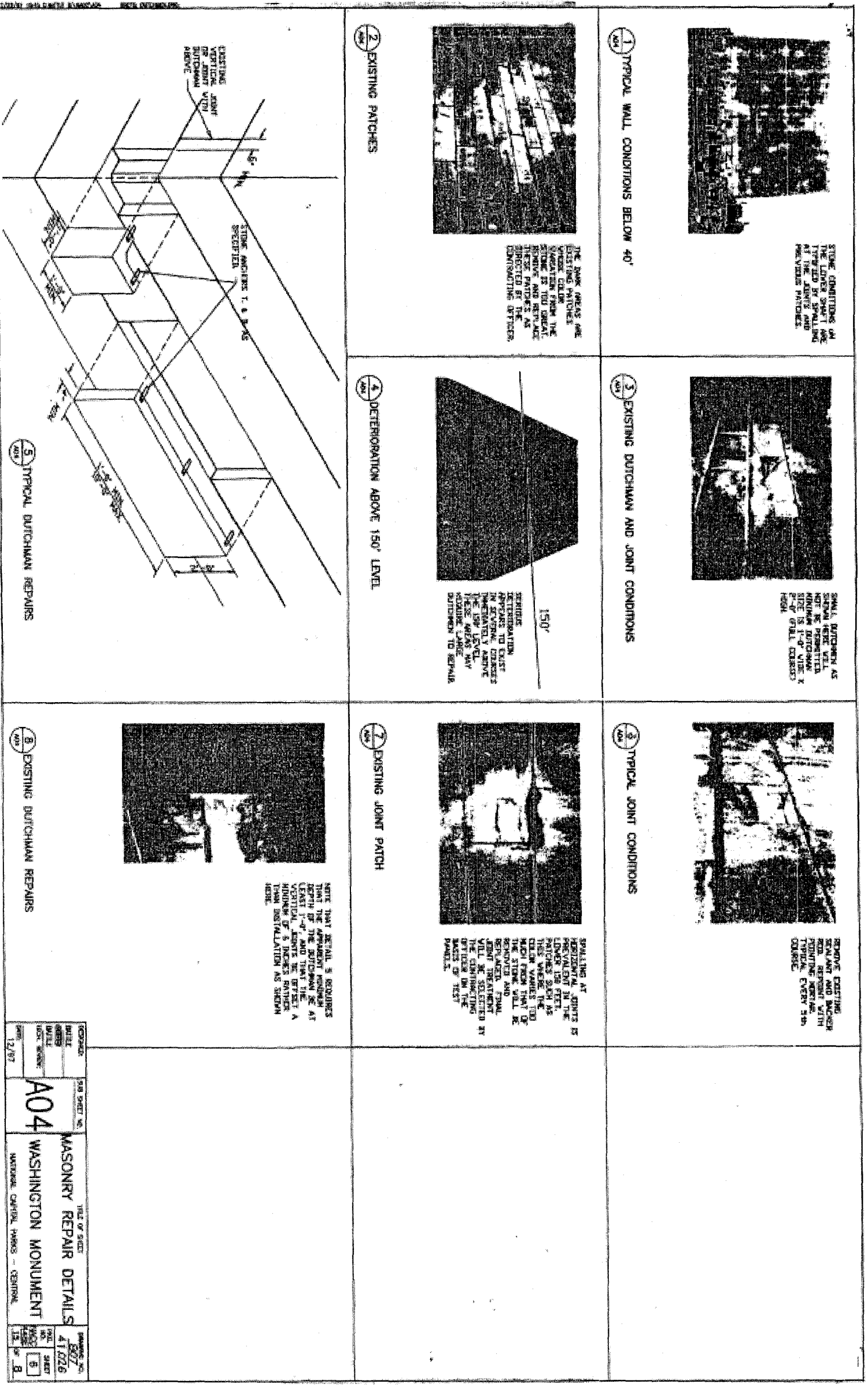
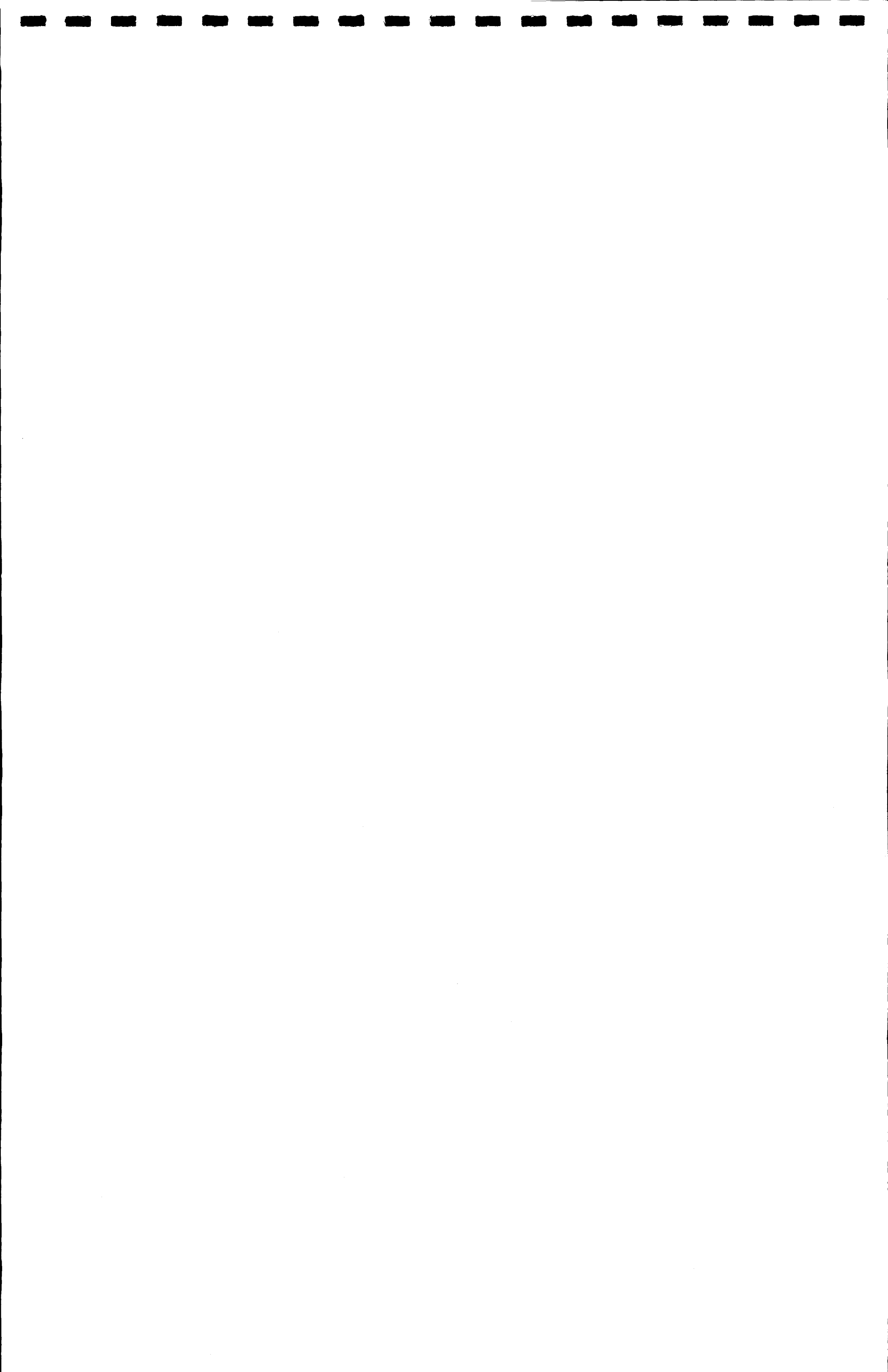


Figure 3.22: Sheet No. A04, Masonry Repair Details Washington Monument, December 1997. ([Architectural Drawing] NCP 807/41026 6 of 8; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)



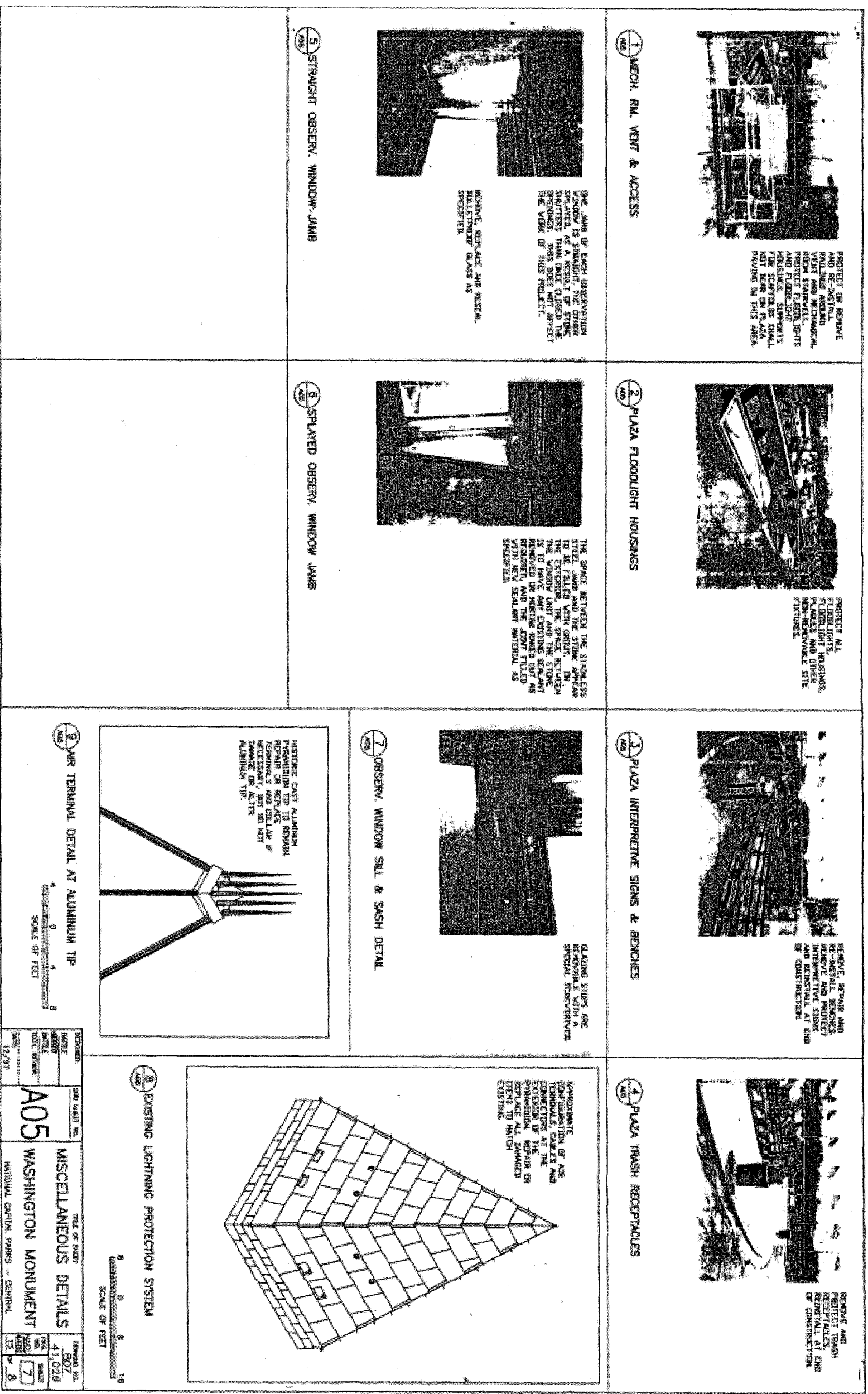


Figure 3.23: Sheet No. A05, Miscellaneous Details Washington Monument, December 1997. (Architectural Drawing] NCP 807/41026 7 of 8; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)



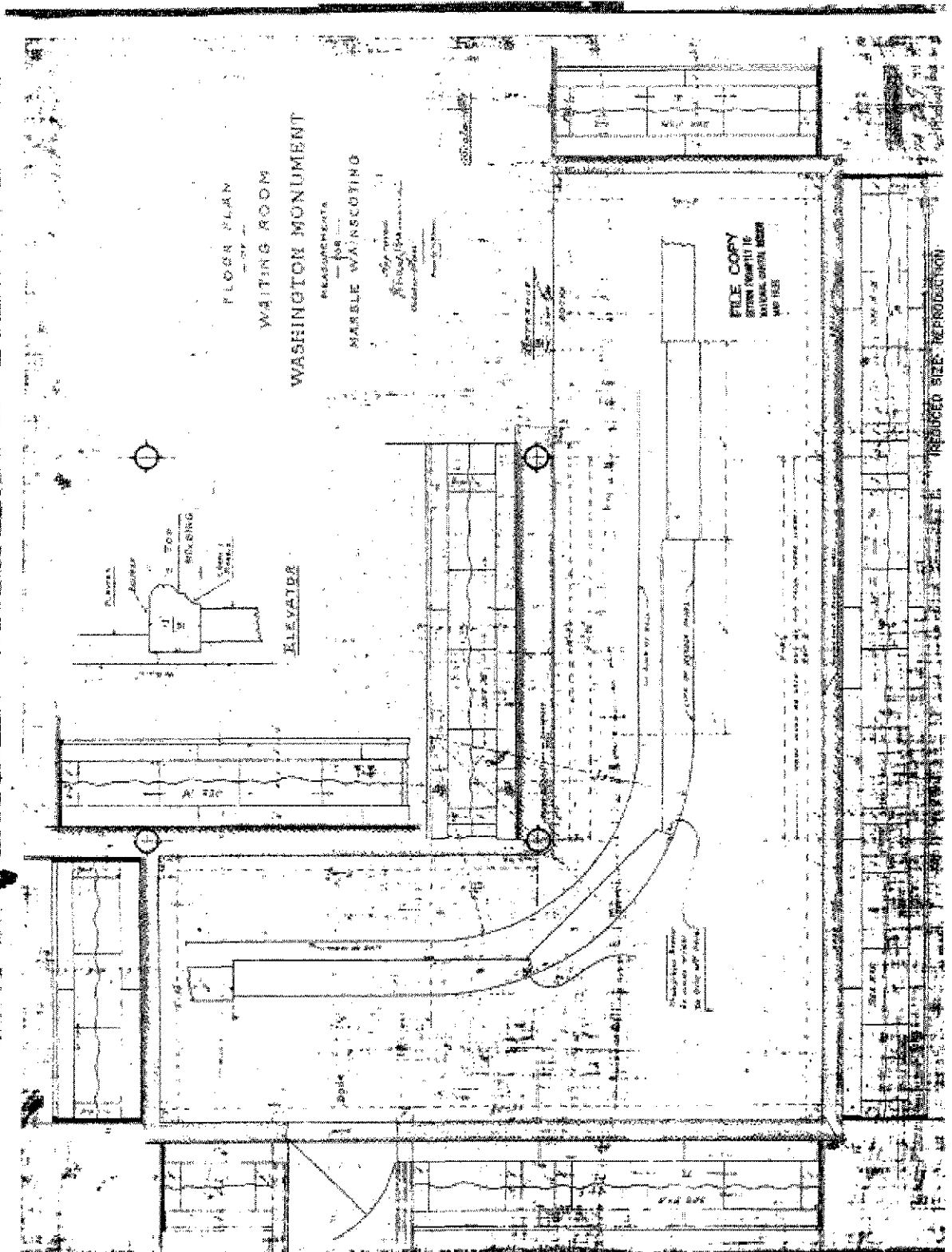


Figure 3.24: Floor Plan of Waiting Room Washington Monument, Measurements for Marble Wainscoting, Approved 20 October 1904. ([Architectural Drawing] File 74.2-7; NCP 807/80044; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)

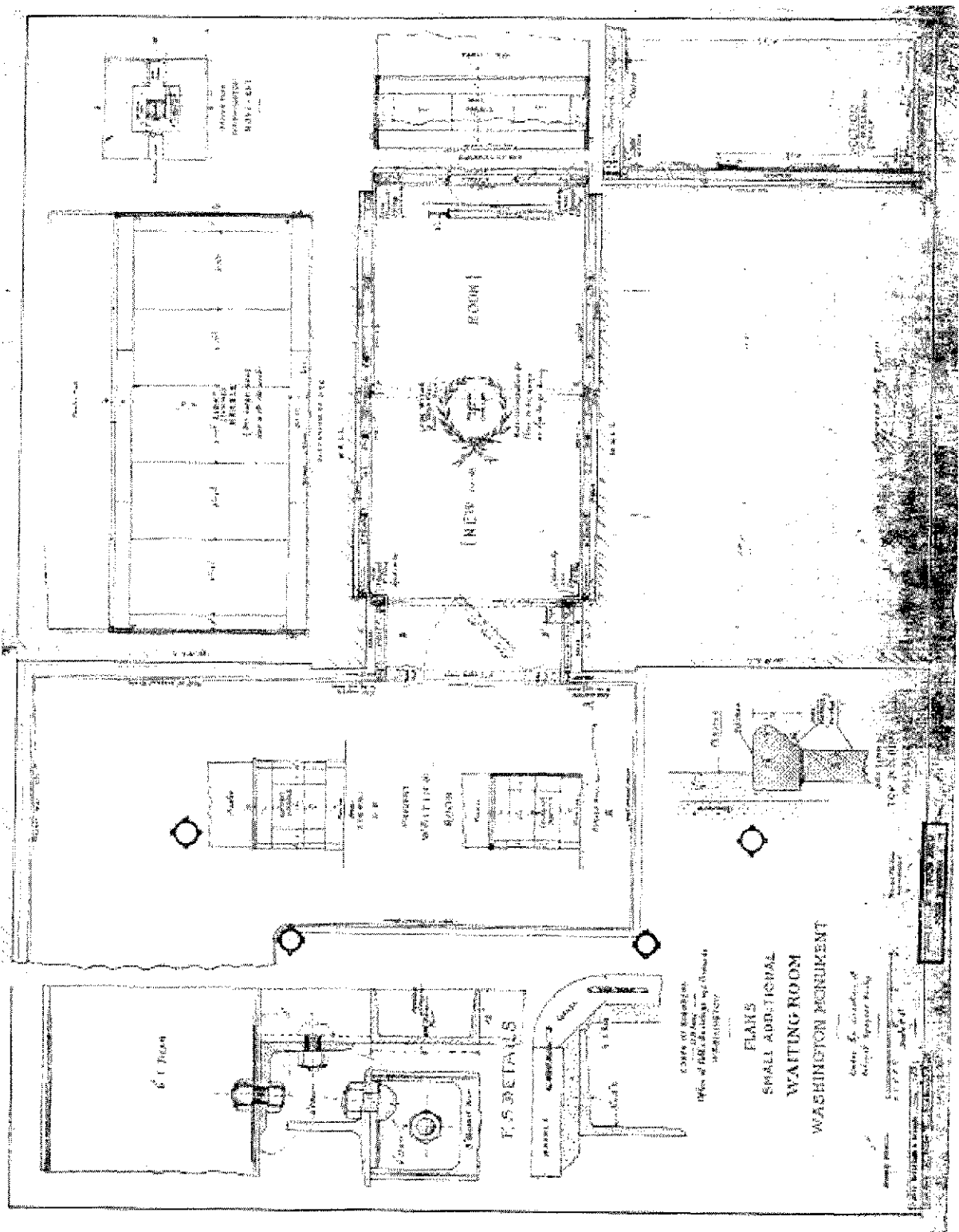


Figure 3.25: Plans Small Additional Waiting Room, Washington Monument, Approved 8 May 1913 ([Architectural Drawing] File 74.20-18; NCP 807; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, MD)



Figure 3.26: Southeast corner of Washington Monument Waiting Room, c. 1940s, NPS-NCR Collection.



Figure 3.27: Washington Monument East Entrance, looking in, c. 1940s, NPS-NCR Collection.



Figure 3.28: Washington Monument East Entrance, looking out, c. 1940s, NPS-NCR Collection.

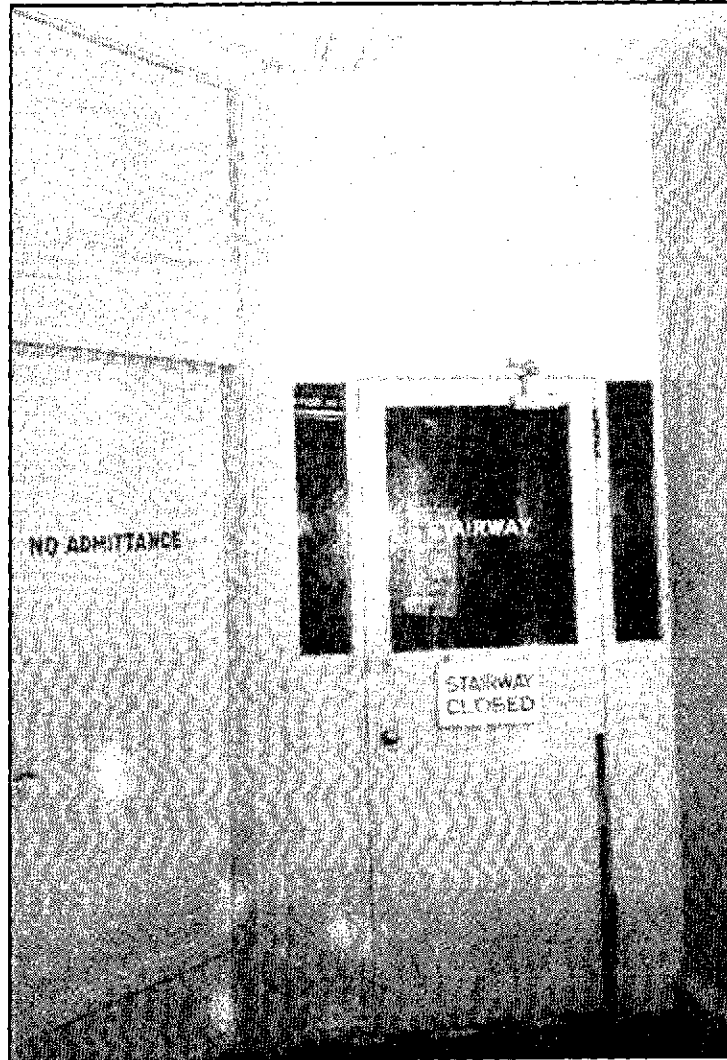


Figure 3.29: View of Stairs at 500' Level, c. 1940s, NPS-NCR Collection.

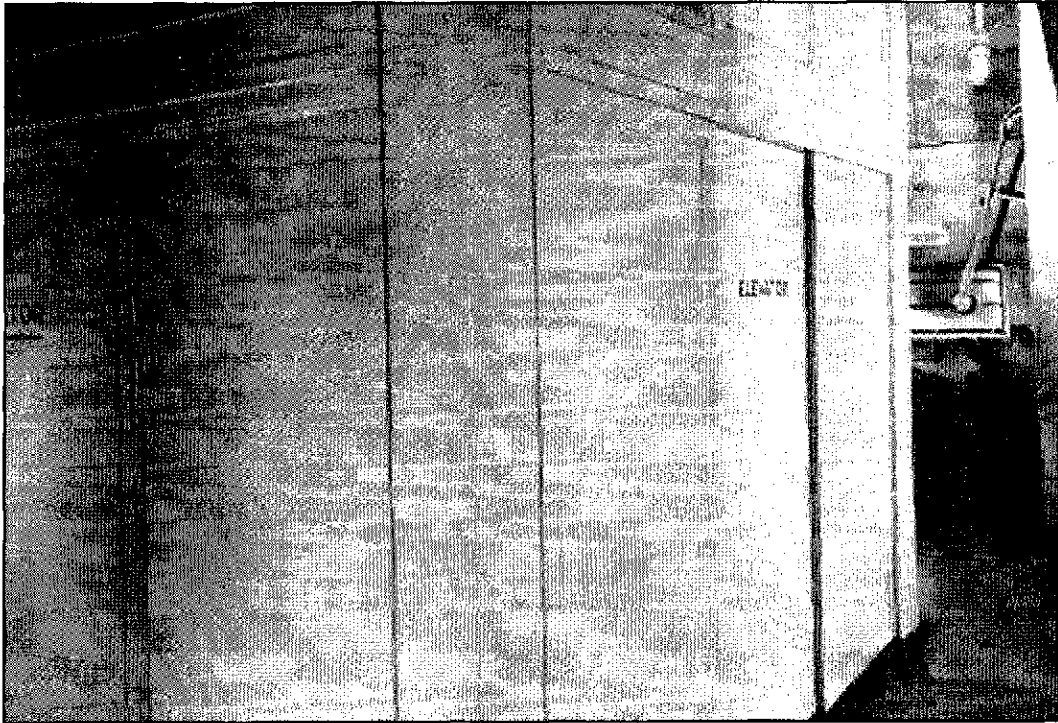


Figure 3.30: Elevator at 500' Level (Observation Level), c. 1940s, NPS-NCR Collection.

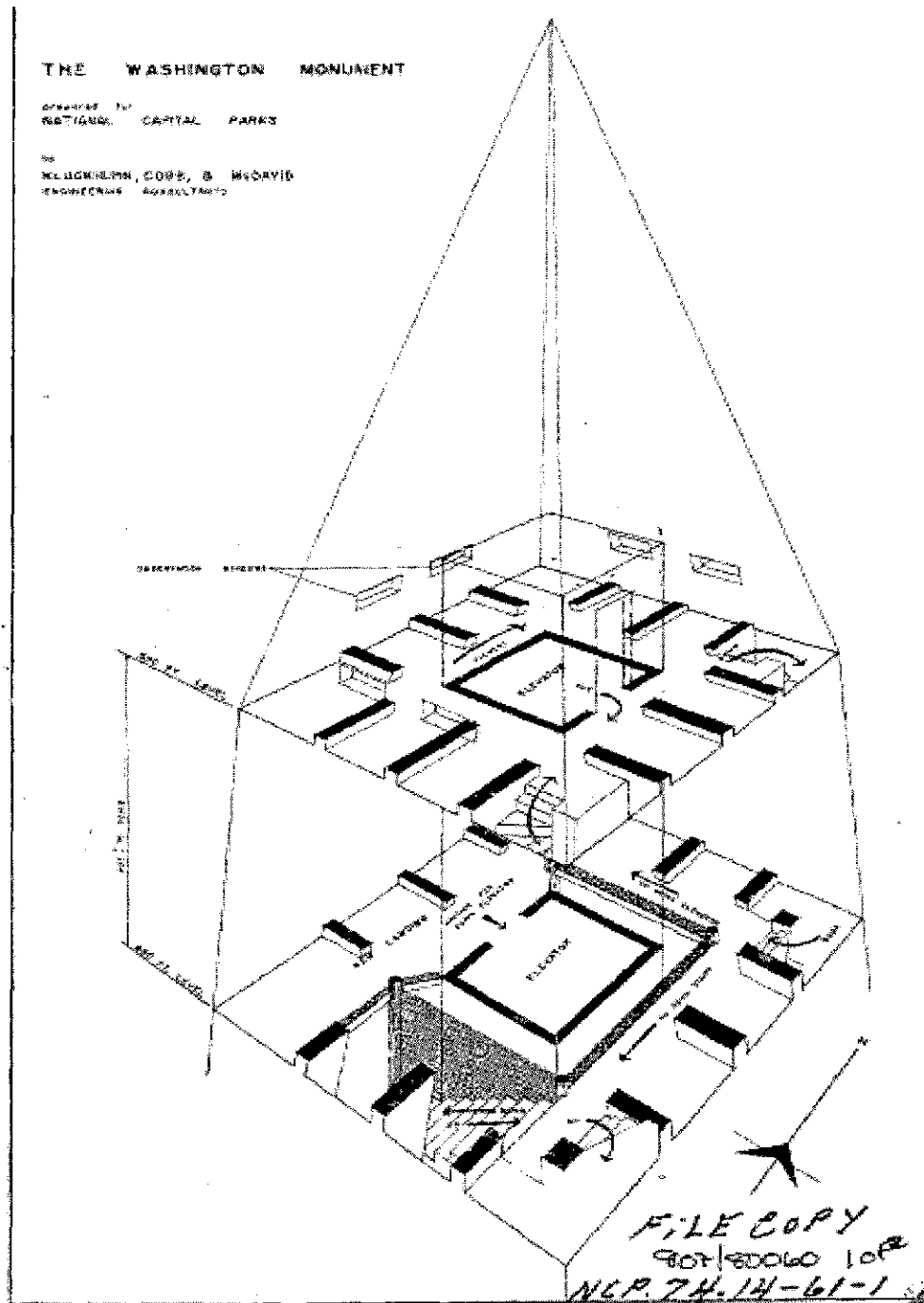


Figure 3.31: The Washington Monument (Axonometric view of 490-foot and 500-foot Levels), Kluckhuhn, Cobb, & McDavid Engineering Consultants. 1958. ([Architectural Drawing] File 74.14-61-1; NCP 807/80060 1 of 2; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)

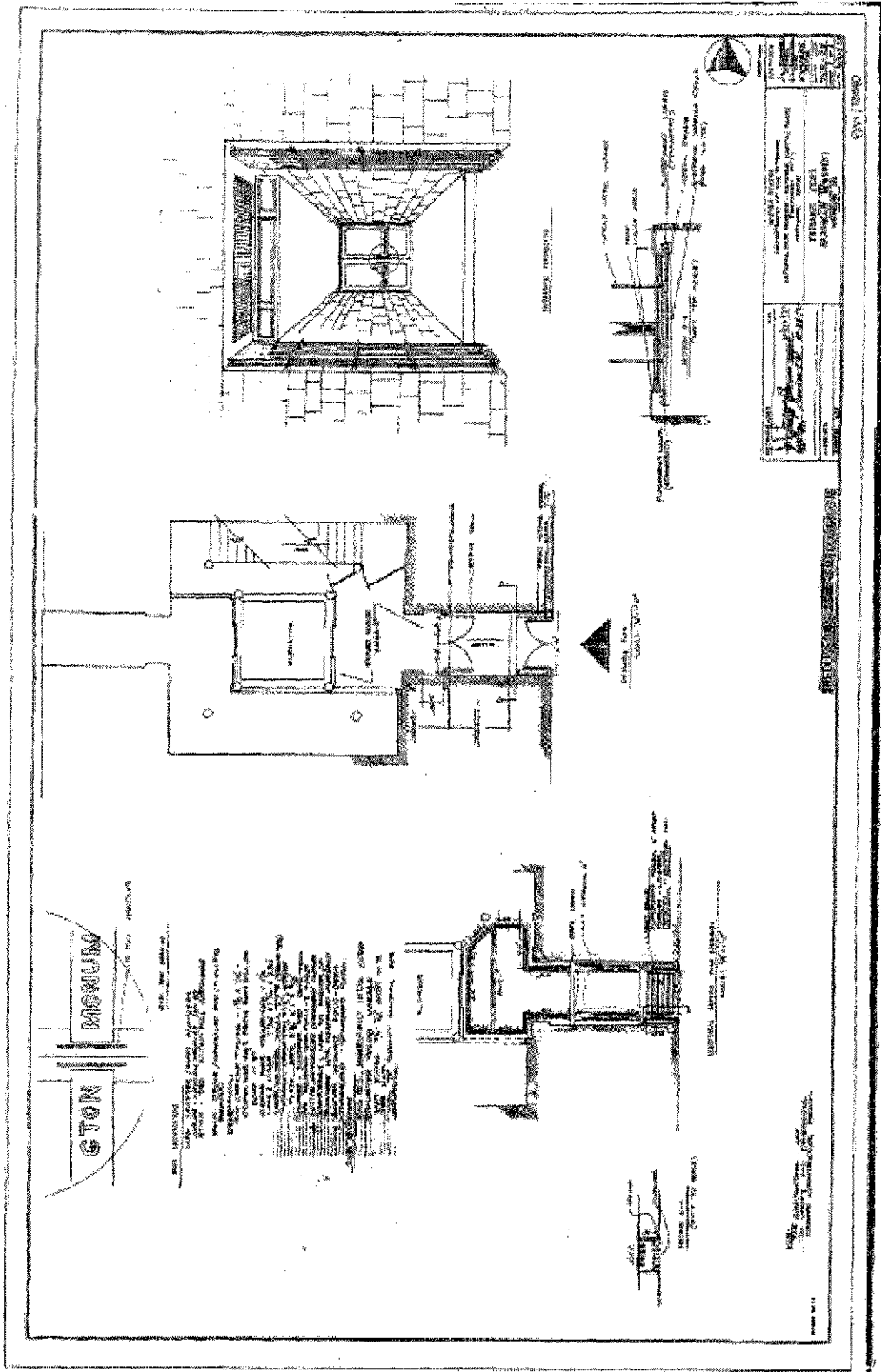


Figure 3.32: Entrance Doors, Washington Monument, 18 October 1972. ([Architectural Drawing] File 74.5-25; NCP 807/80040; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)



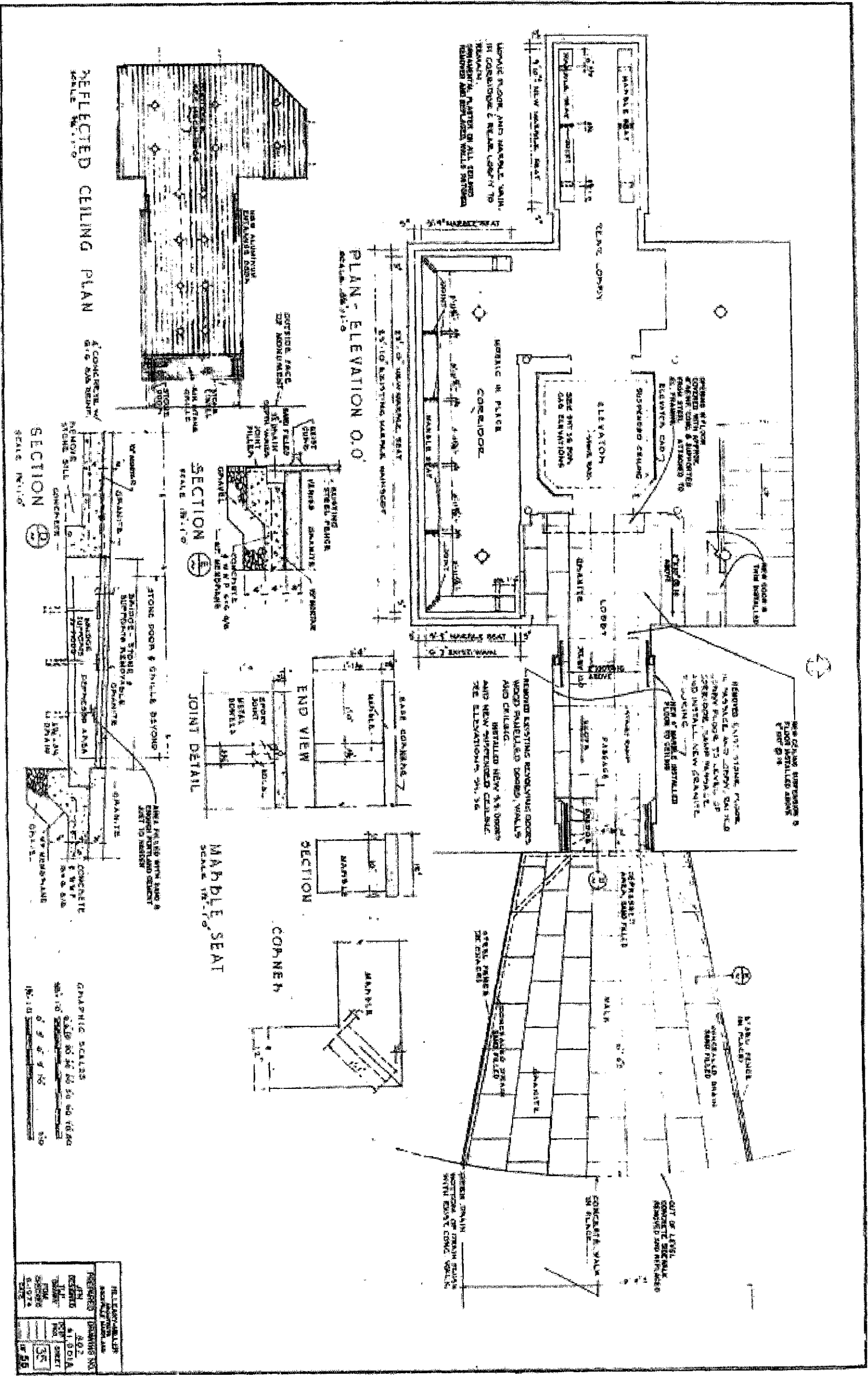


Figure 3.33: Sheet 35 (Waiting Room Renovations), June 1974. [Architectural Drawing] NCP 807/41001A 35; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)



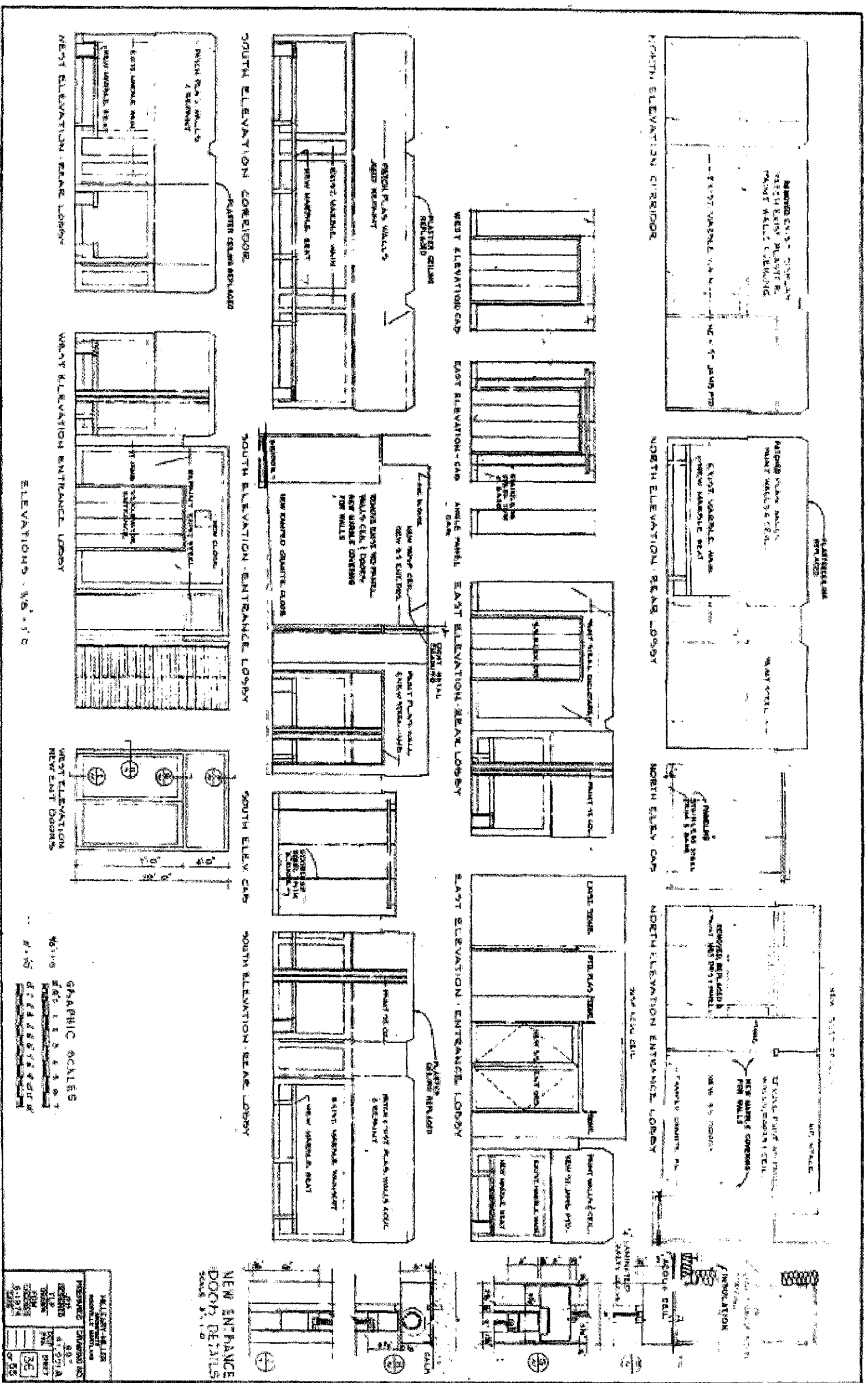
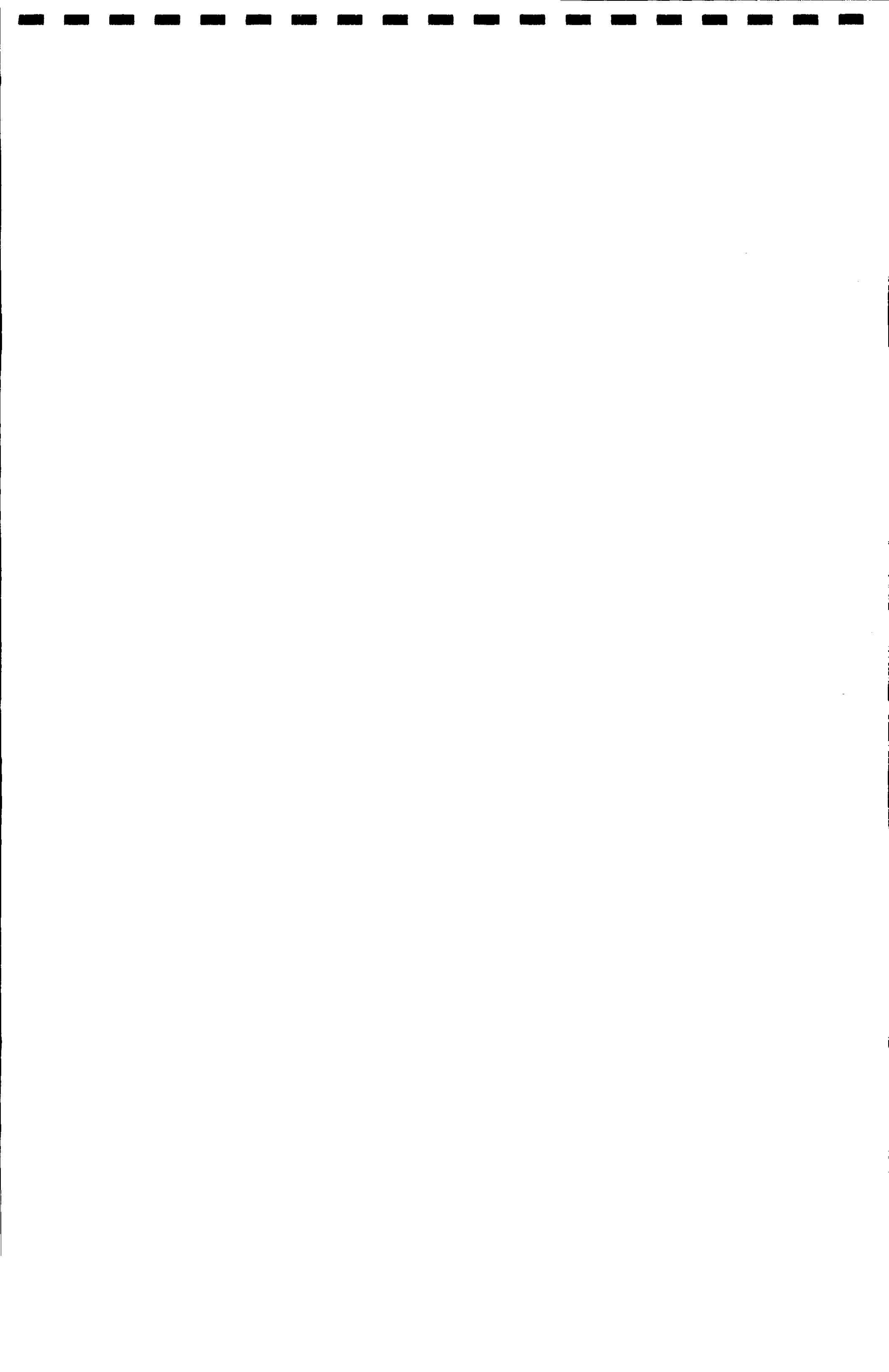


Figure 3.34: Sheet 36 (Waiting Room Elevations), June 1974. (Architectural Drawing) NCP 807/41001A 36; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)



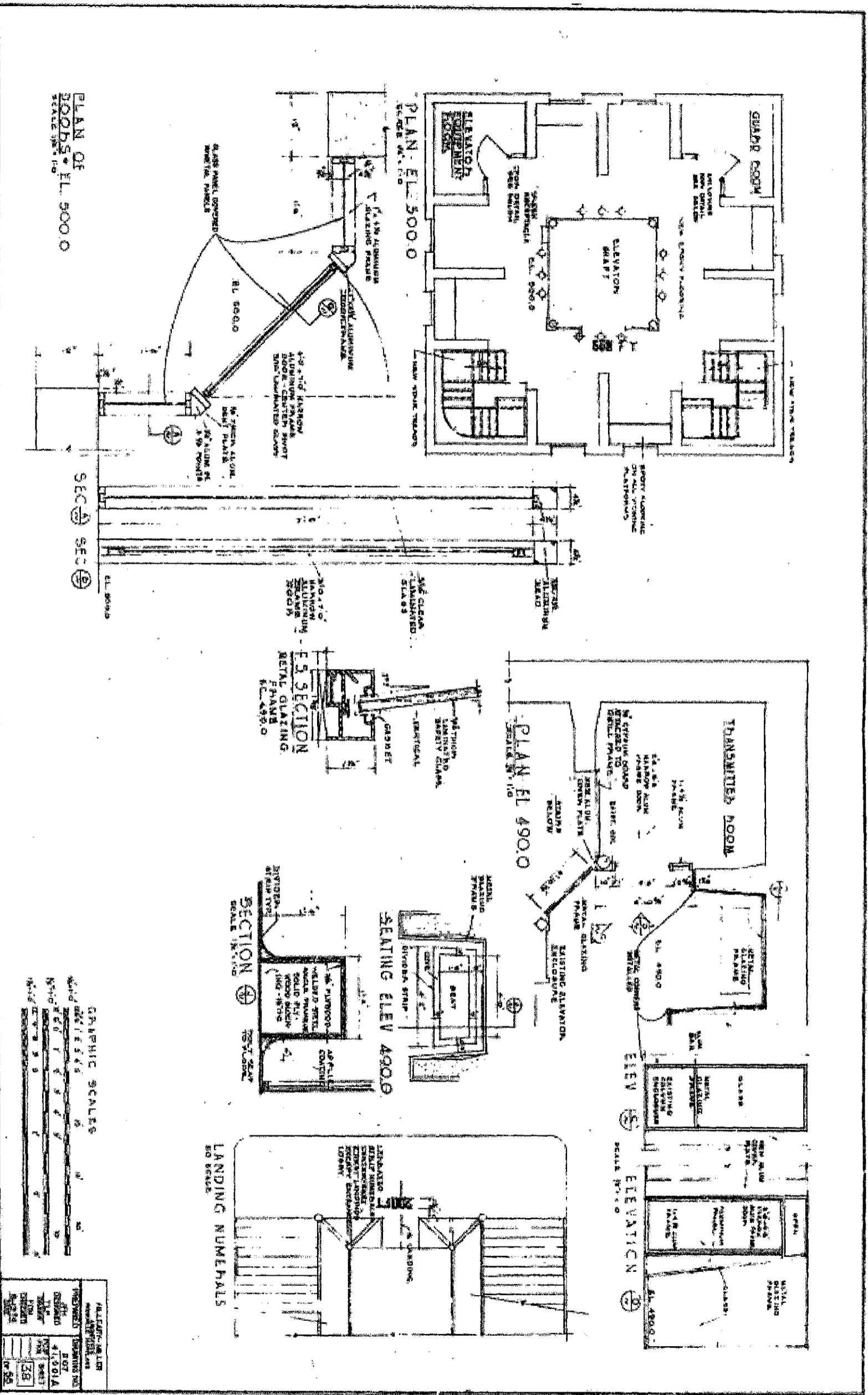


Figure 3.35: Sheet 38 (500-foot Level & Details), June 1974. [Architectural Drawing] NCP 807/41001A 38; RG 79; Cartographic and Architectural Records LICON; Special Media Archives Division, National Archives at College Park, College Park, Md.)



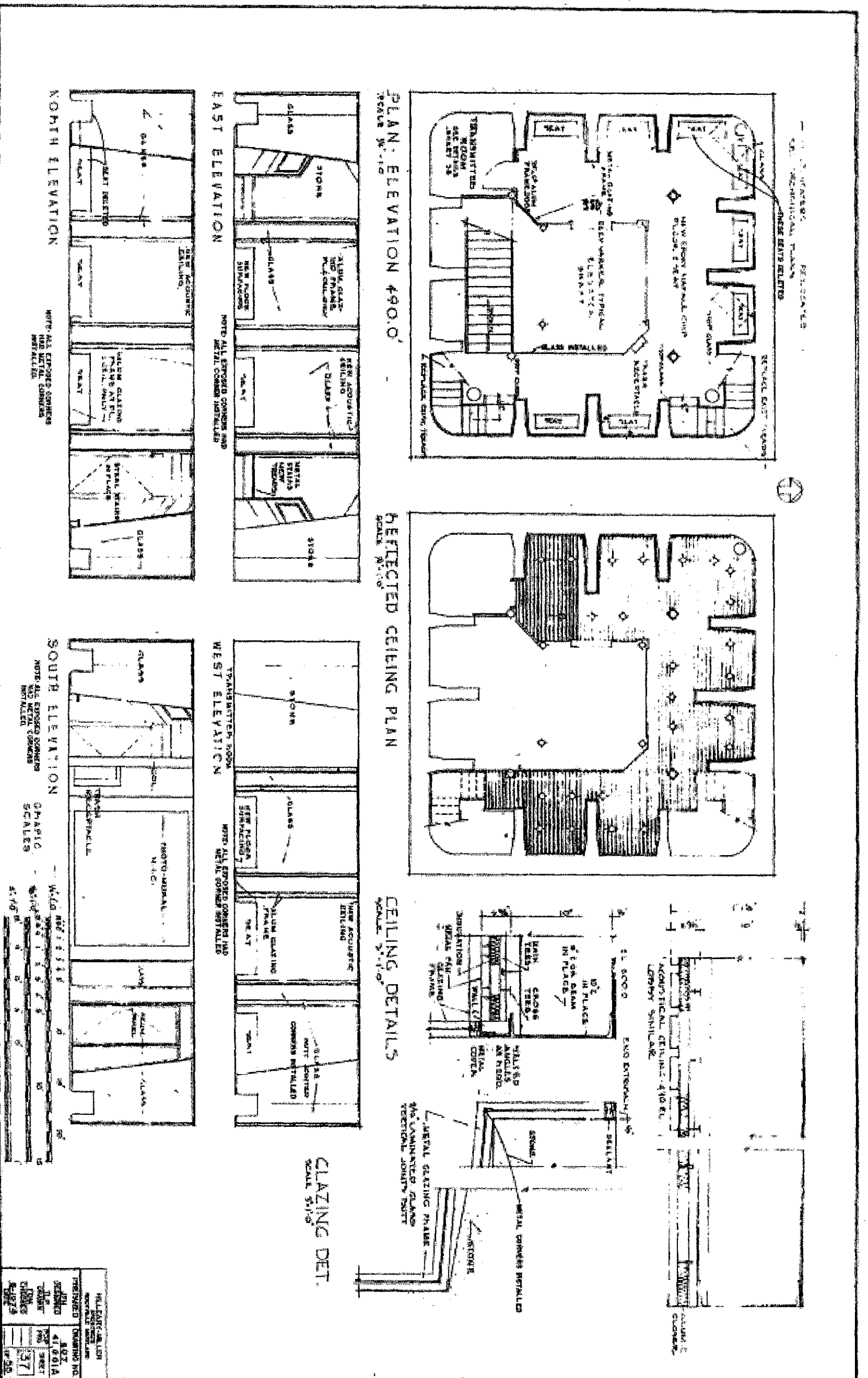
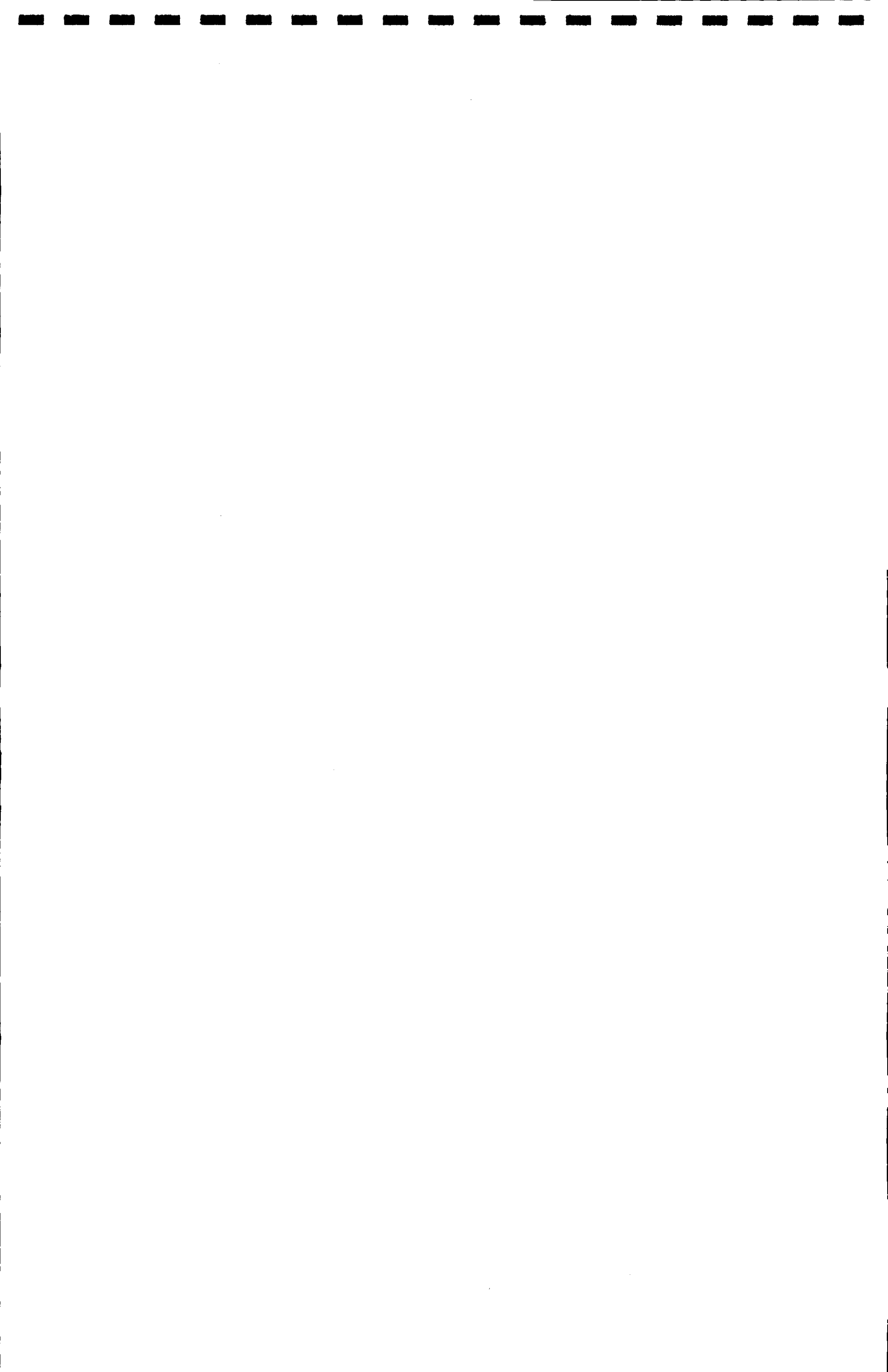


Figure 3.36: Sheet 37 (490' Level), June 1974. [Architectural Drawing] NCP 807/41001A 37; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)



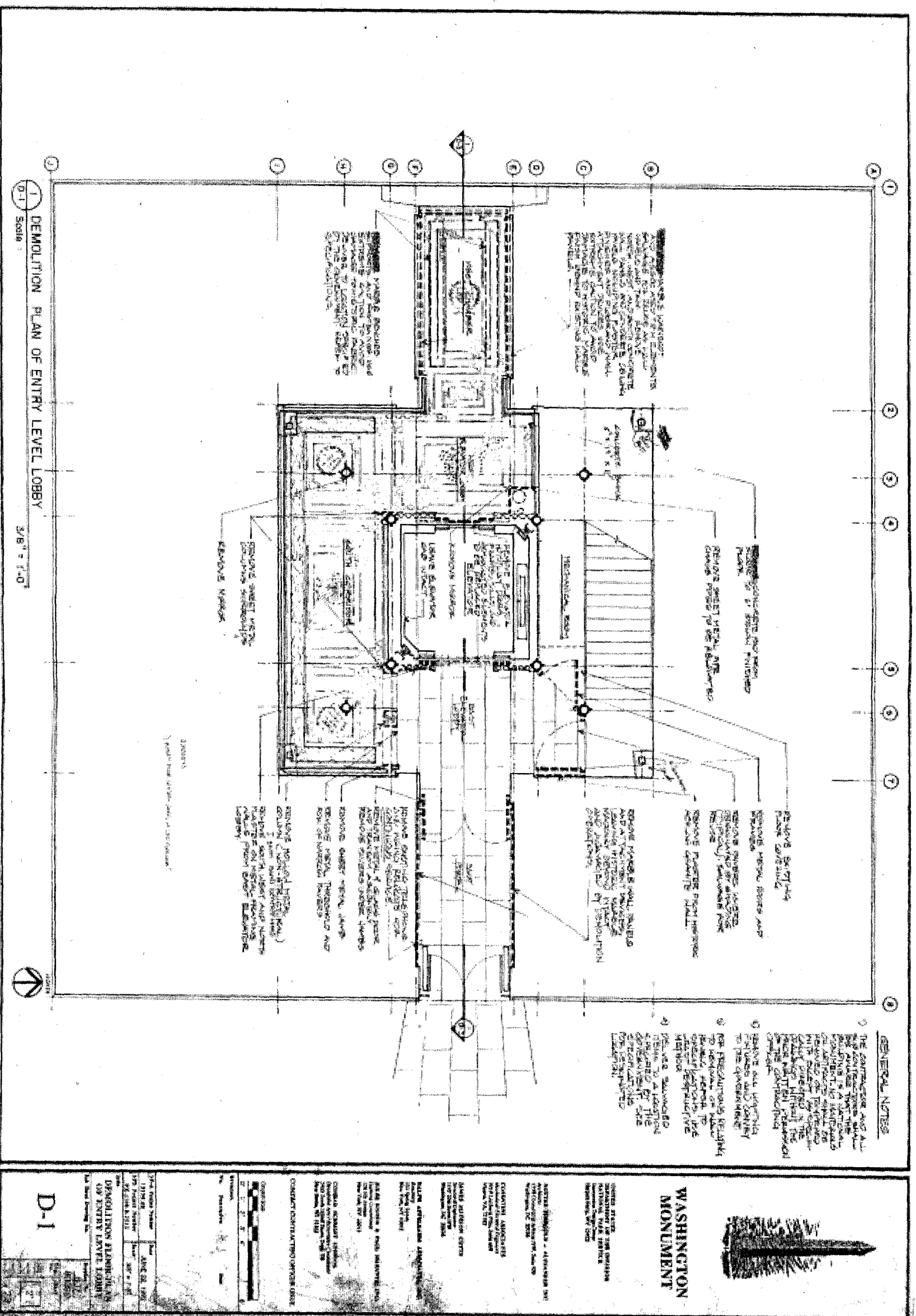
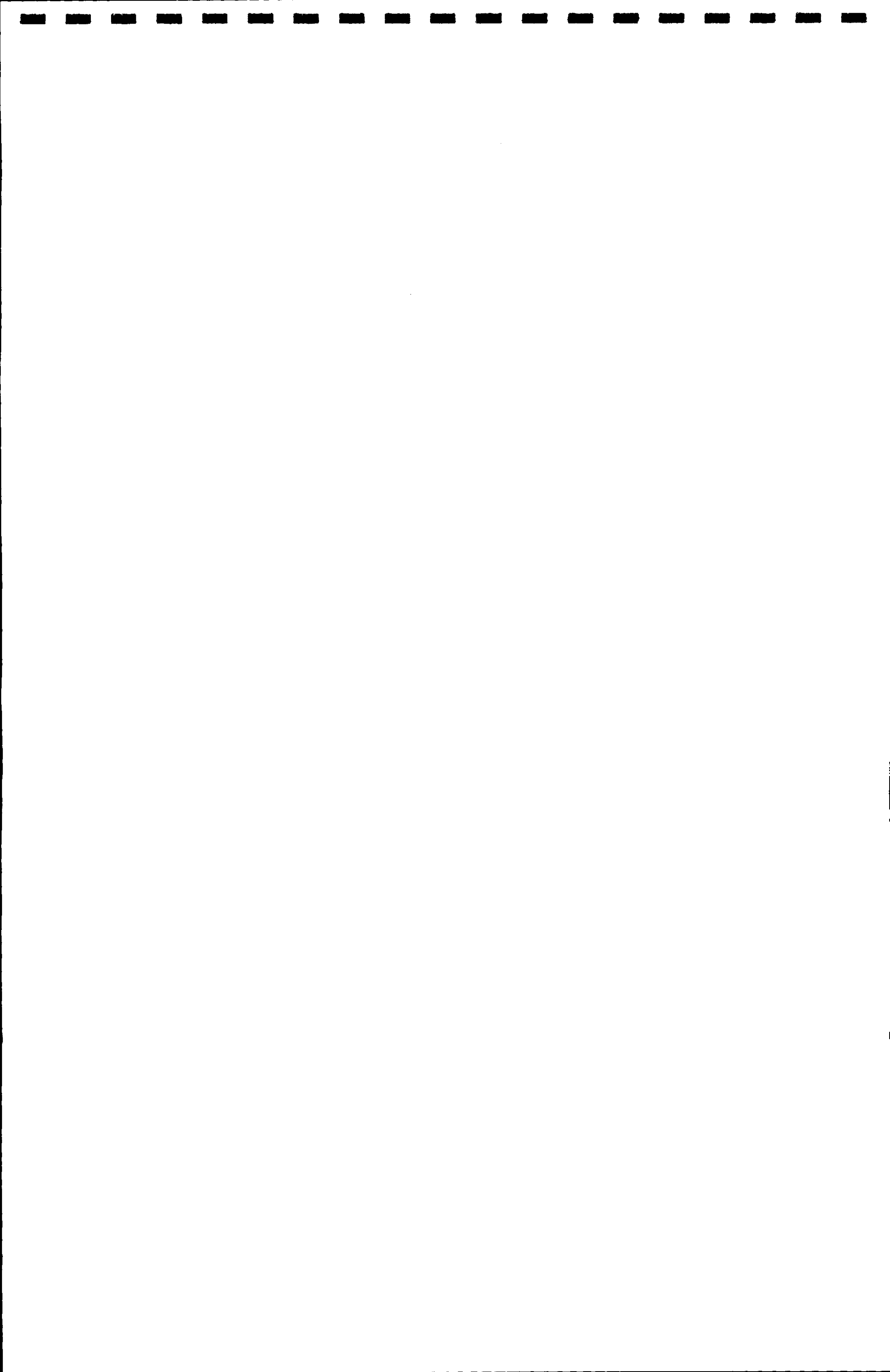


Figure 3.37: Drawing No. D-1, Demolition Floor Plan of Entry Level Lobby, Washington Monument, 22 June 1992. (Denver Service Center, National Park Service.)



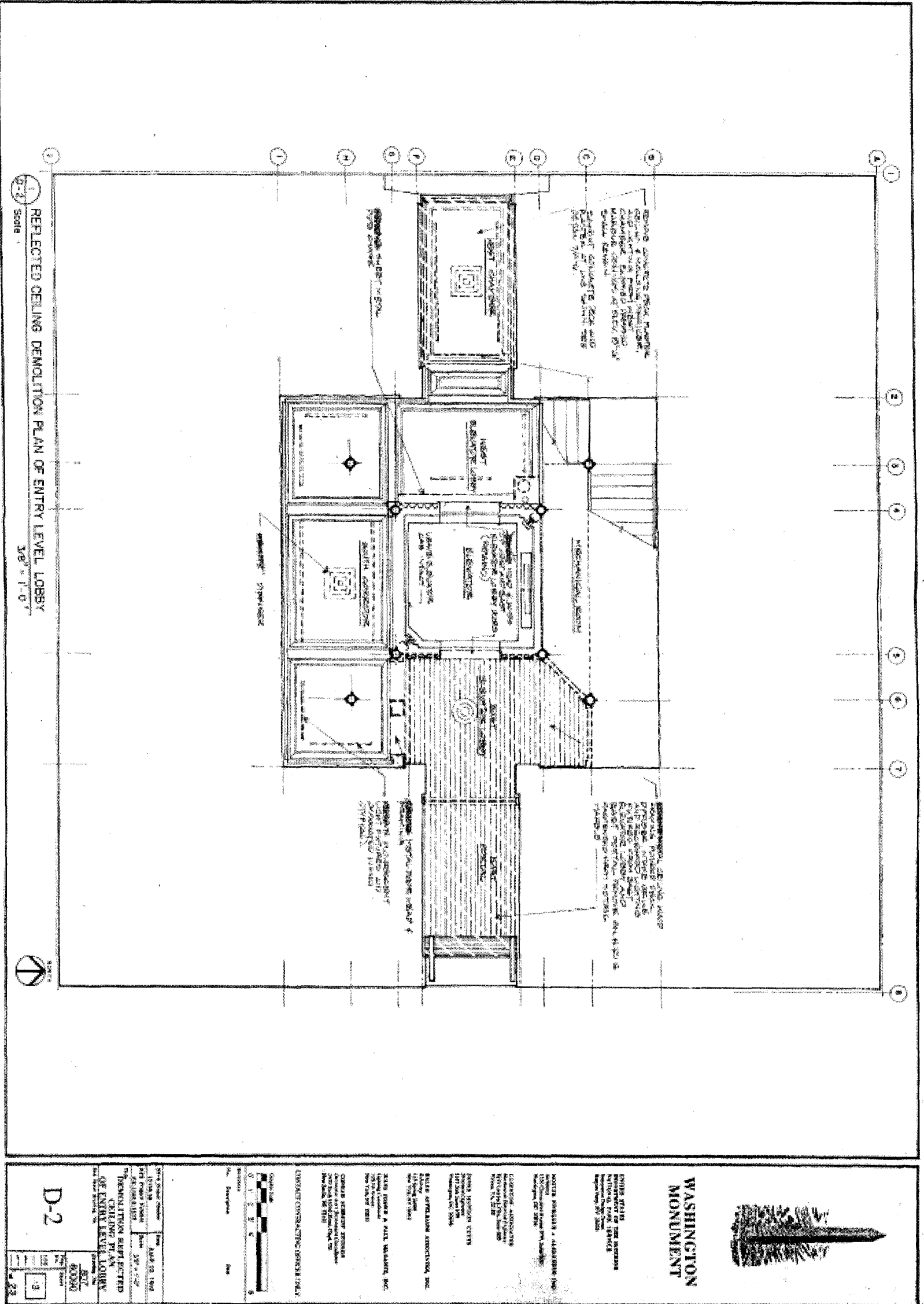
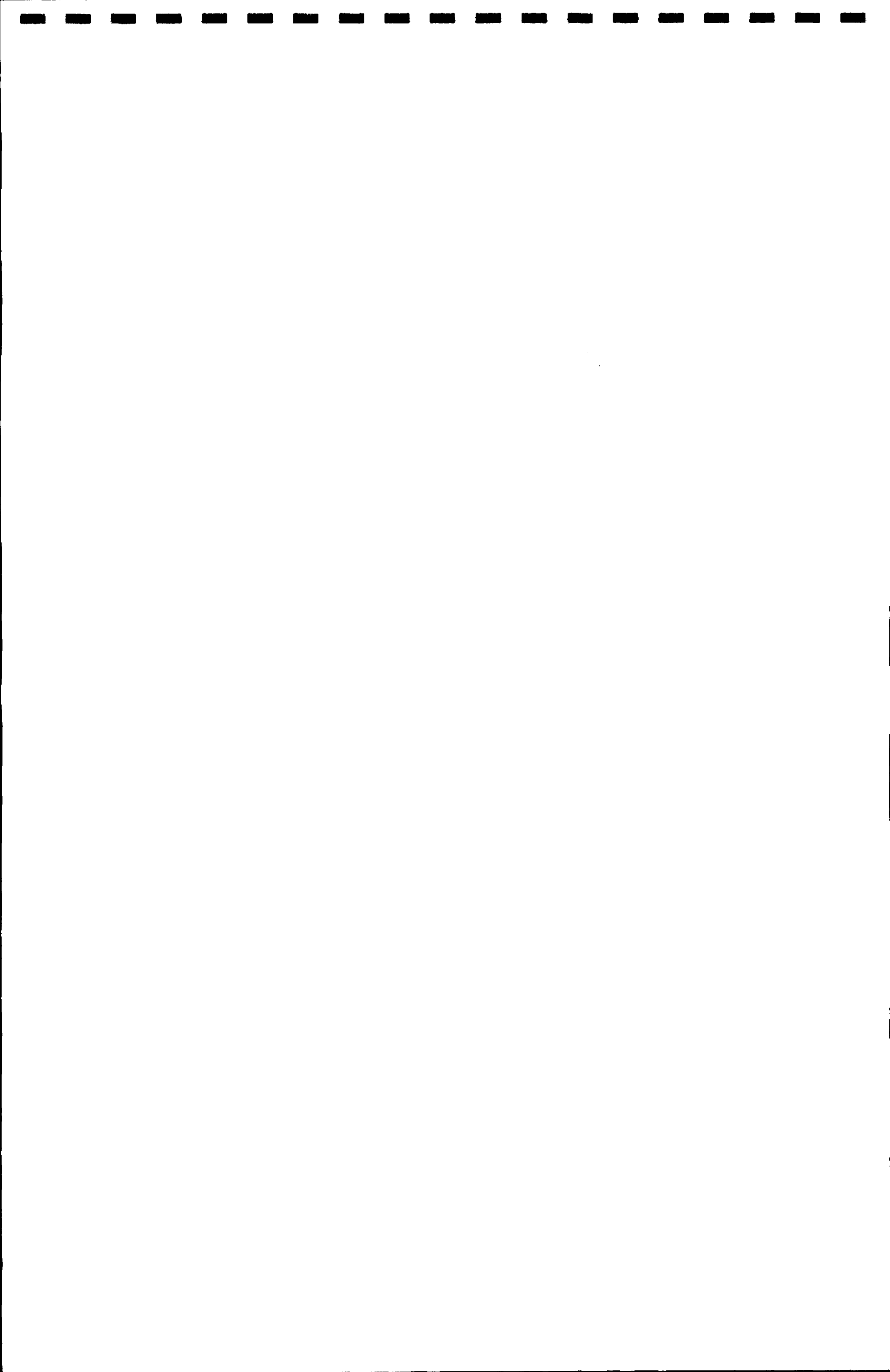
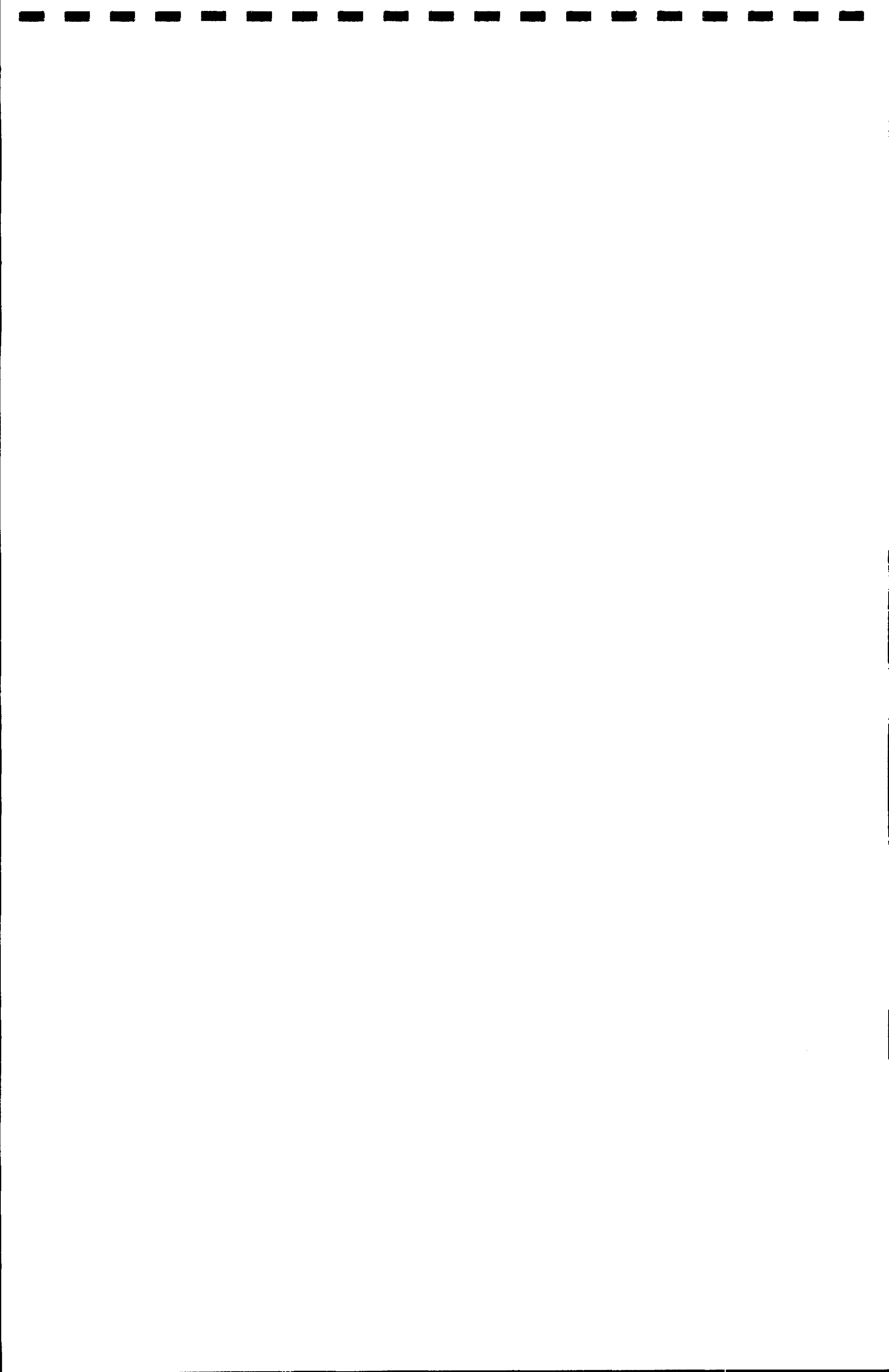
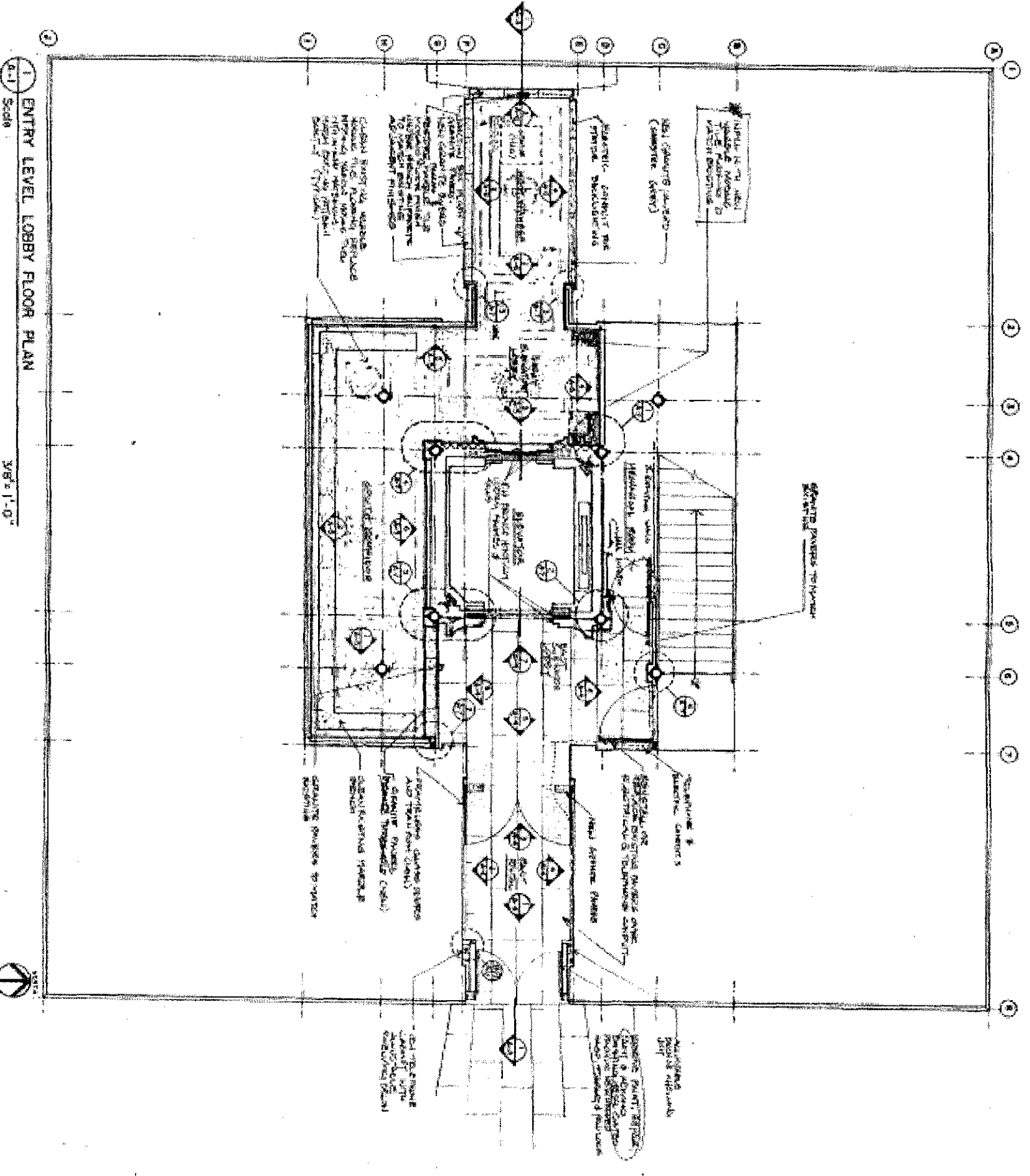



Figure 3.38: Drawing No. D-2, Demolition Reflected Ceiling Plan of Entry Level Lobby, Washington Monument, 22 June 1992. (Denver Service Center, National Park Service.)







1 ENTRY LEVEL LOBBY FLOOR PLAN
Scale: 1/8" = 1'-0"



WASHINGTON MONUMENT

UNITED STATES DEPARTMENT OF THE INTERIOR
 BUREAU OF LAND MANAGEMENT
 WASHINGTON, DC 20250

PROJECT NUMBER: 100-10000-1000
 DRAWING NUMBER: 100-10000-1000-1000

CONTRACTOR: [Name]
 ARCHITECT: [Name]

DATE: [Date]
 SCALE: 1/8" = 1'-0"

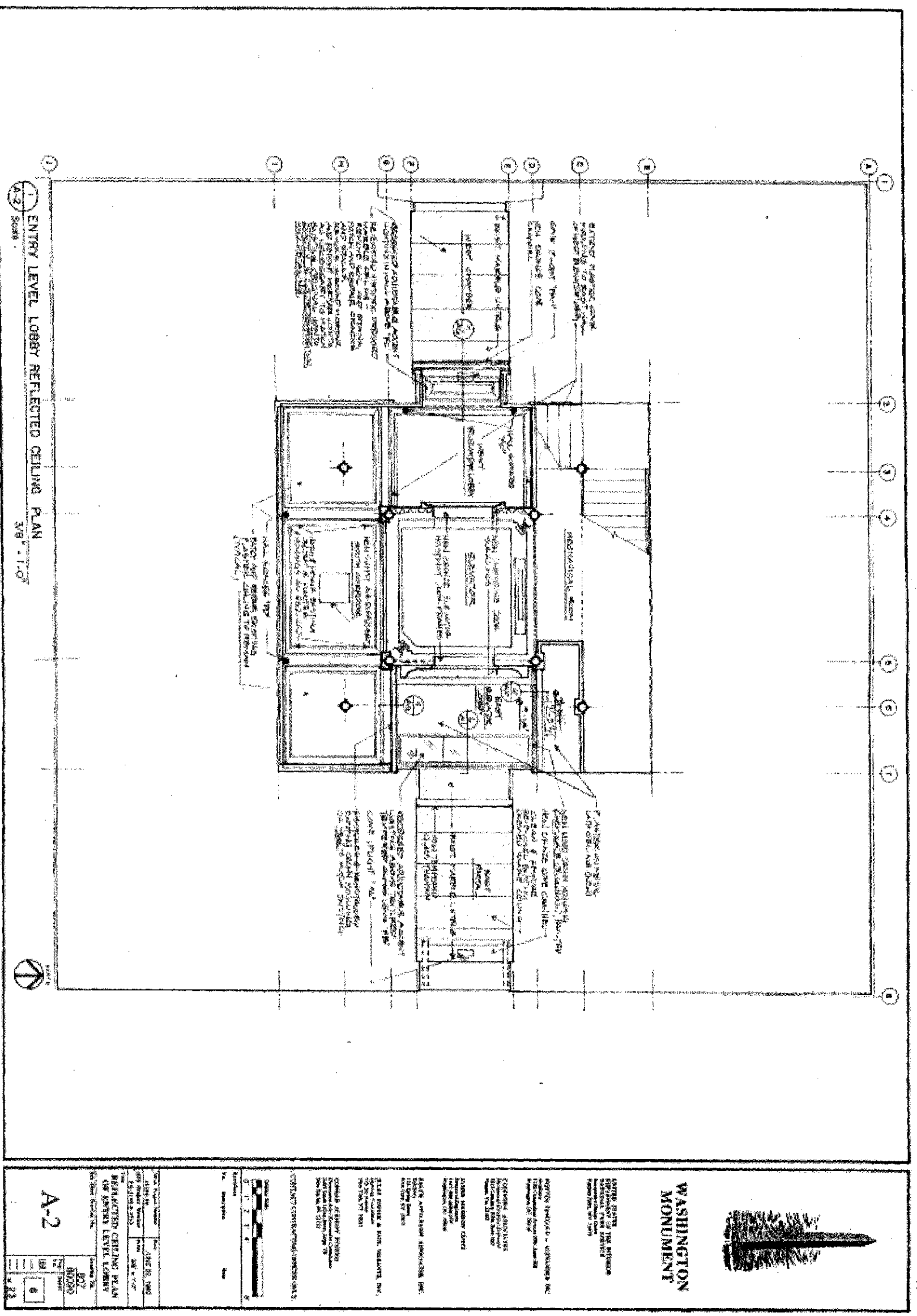
DRAWING TITLE: ENTRY LEVEL LOBBY FLOOR PLAN

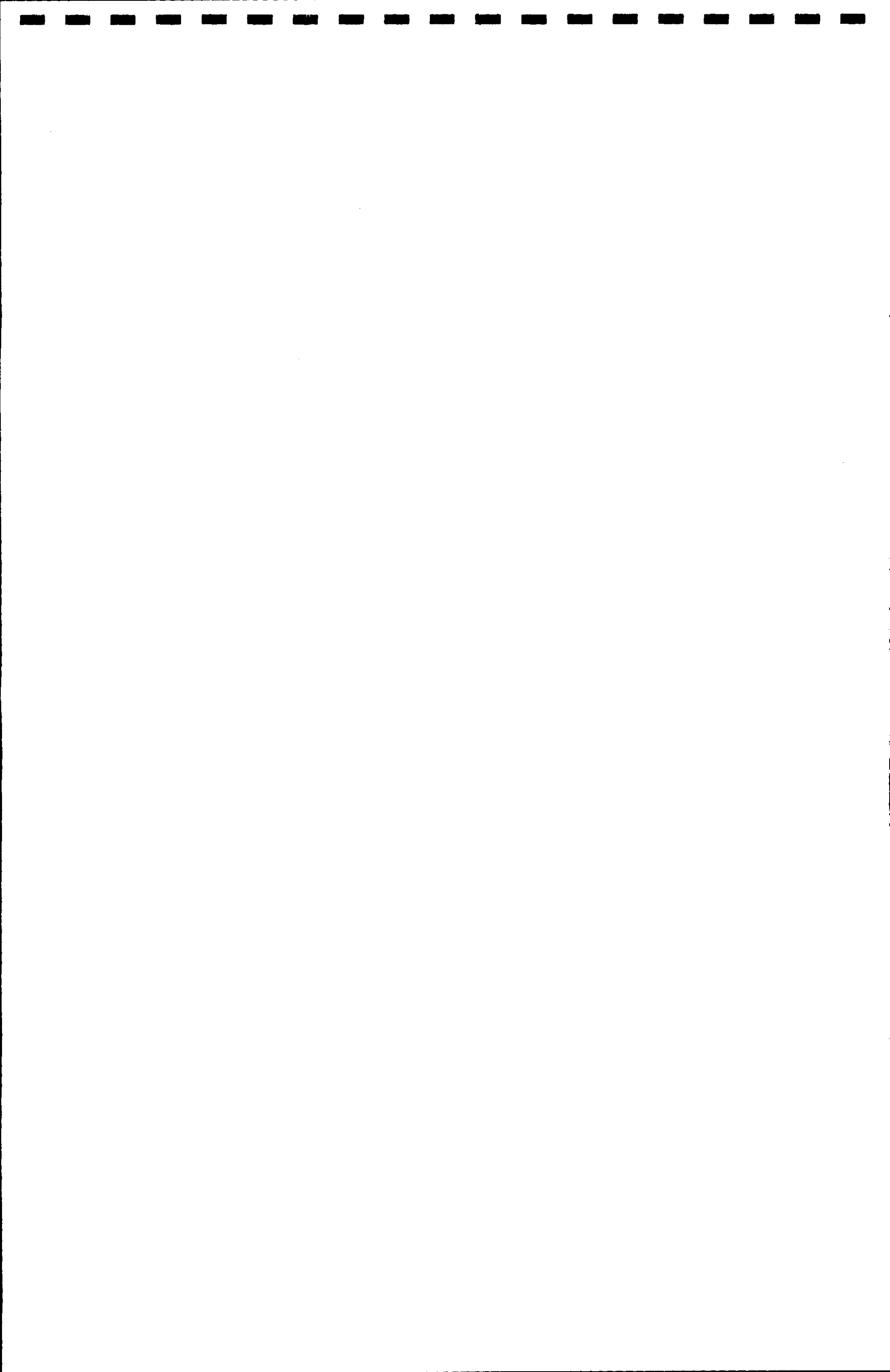
SHEET NO. 100-10000-1000-1000

PROJECT LOCATION: WASHINGTON, DC

Figure 3.40: Drawing No. A-1, Floor Plan of Entry Level Lobby, Washington Monument, 22 June 1992. (Denver Service Center, National Park Service.)







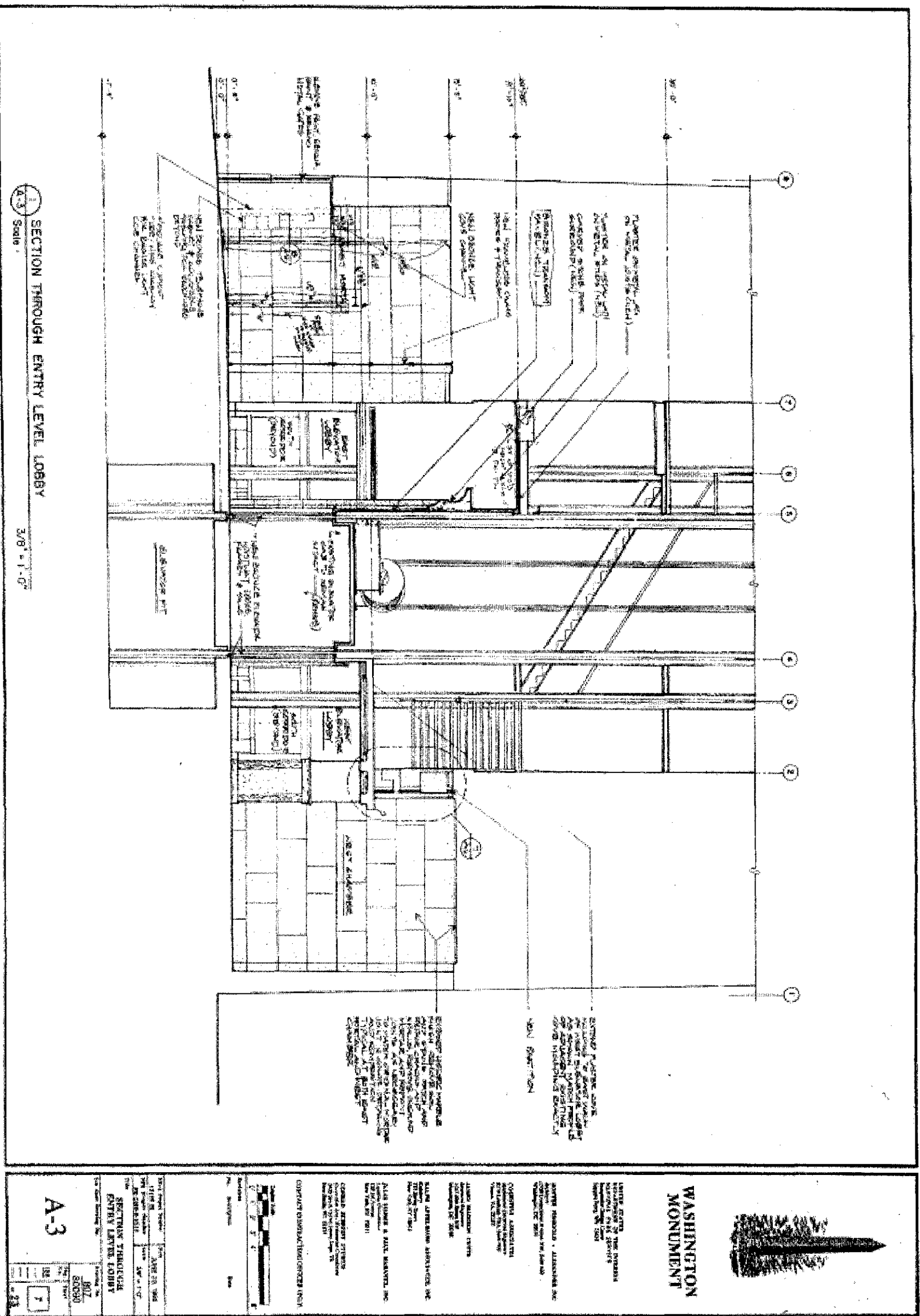
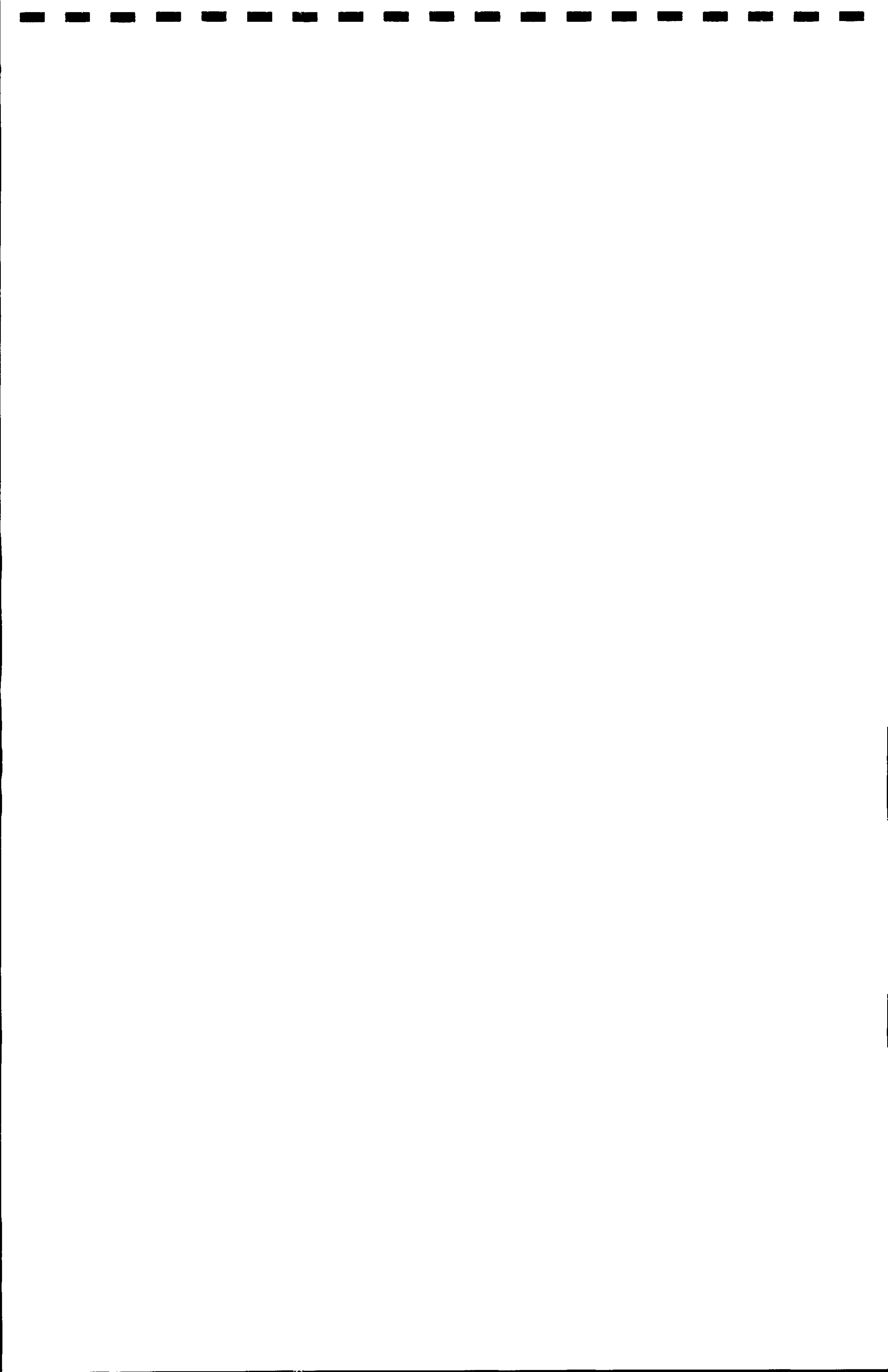


Figure 3.42: Drawing No. A-3, Section through Entry Level Lobby, Washington Monument, 22 June 1992. (Denver Service Center, National Park Service.)



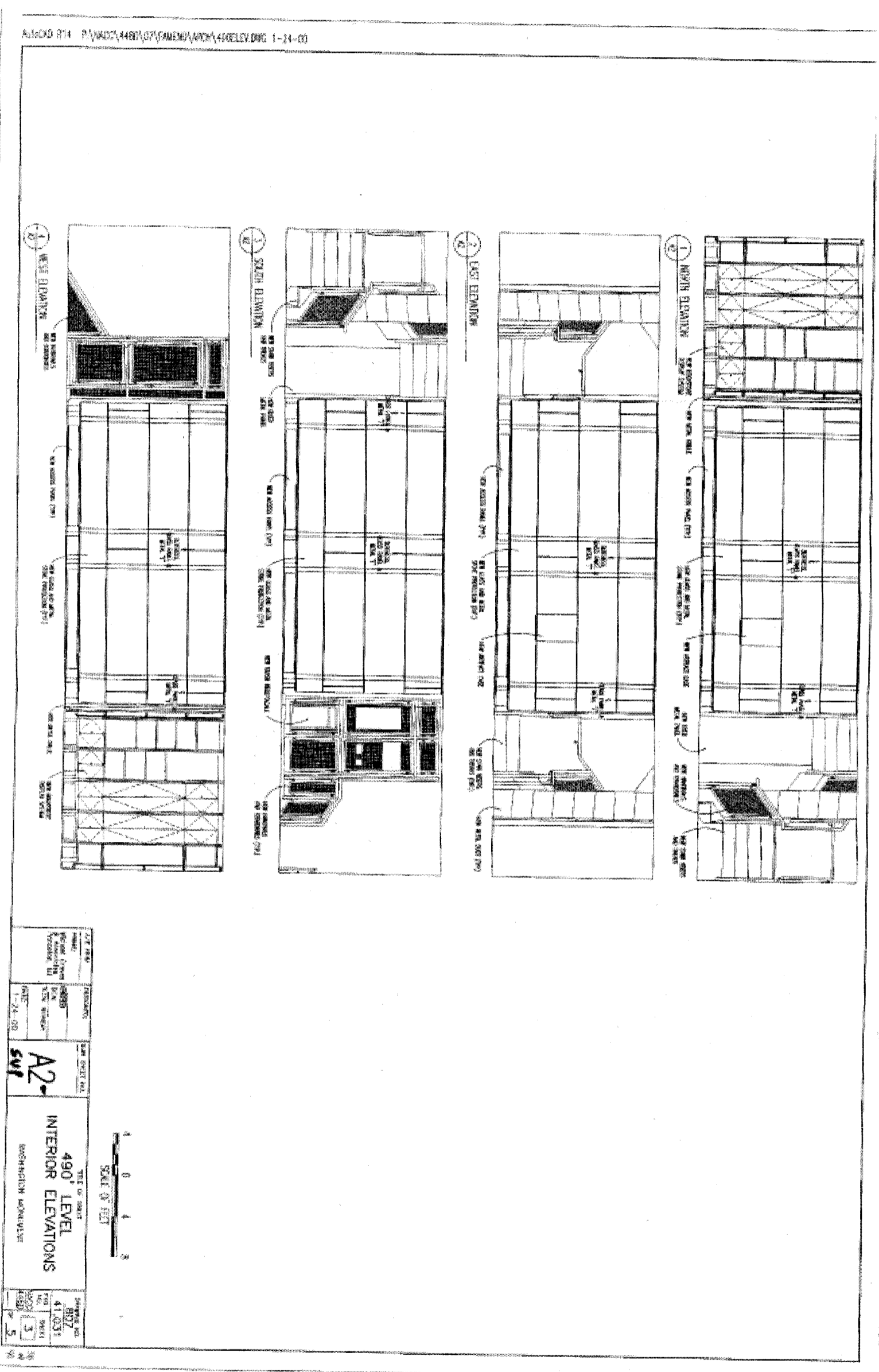


Figure 3.43: Sheet No. A2 Sup. 490' Level Interior Elevations, Interior Renovations Washington Monument, 24 January 2000. (Denver Service Center, National Park Service.)



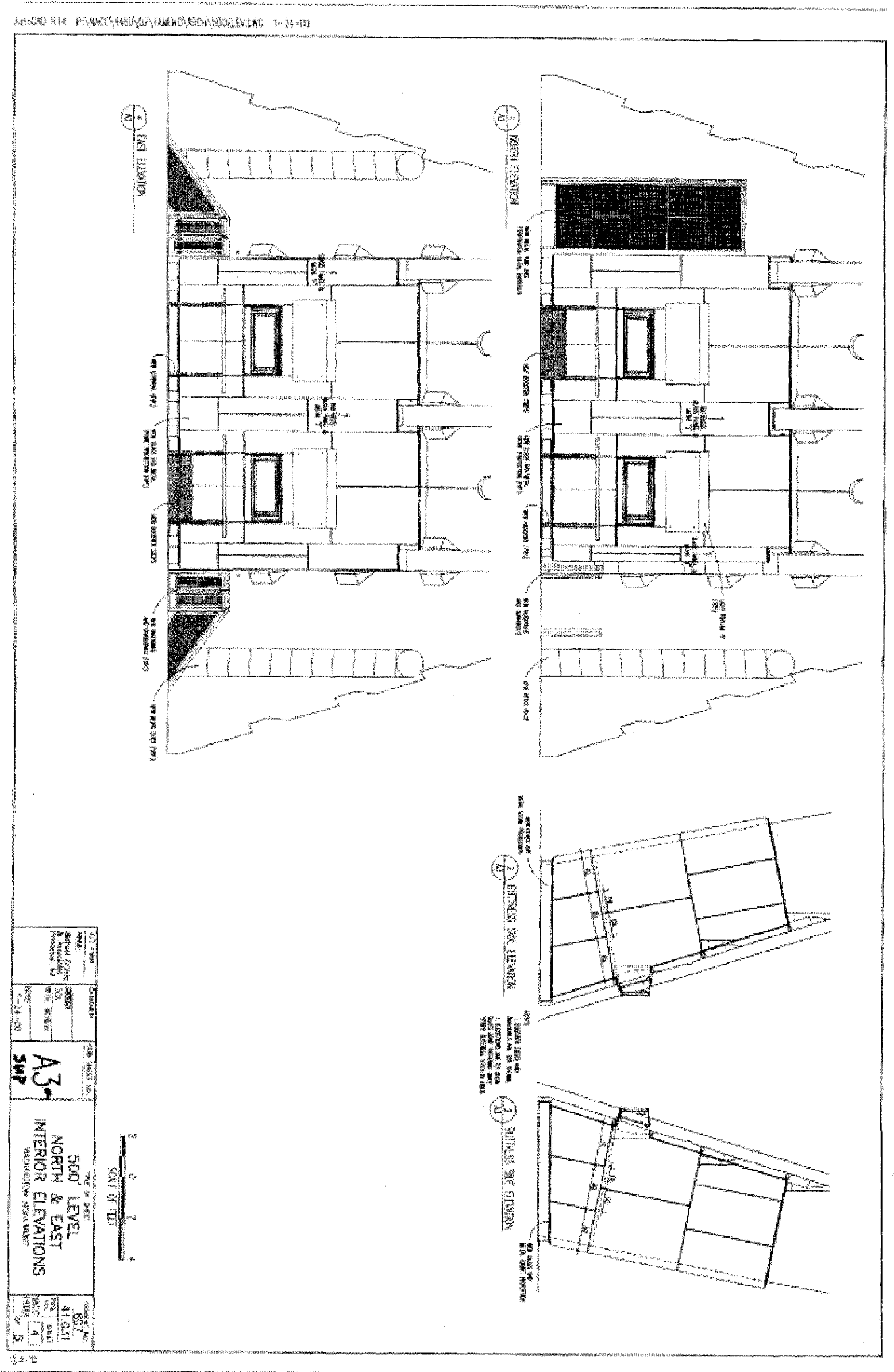
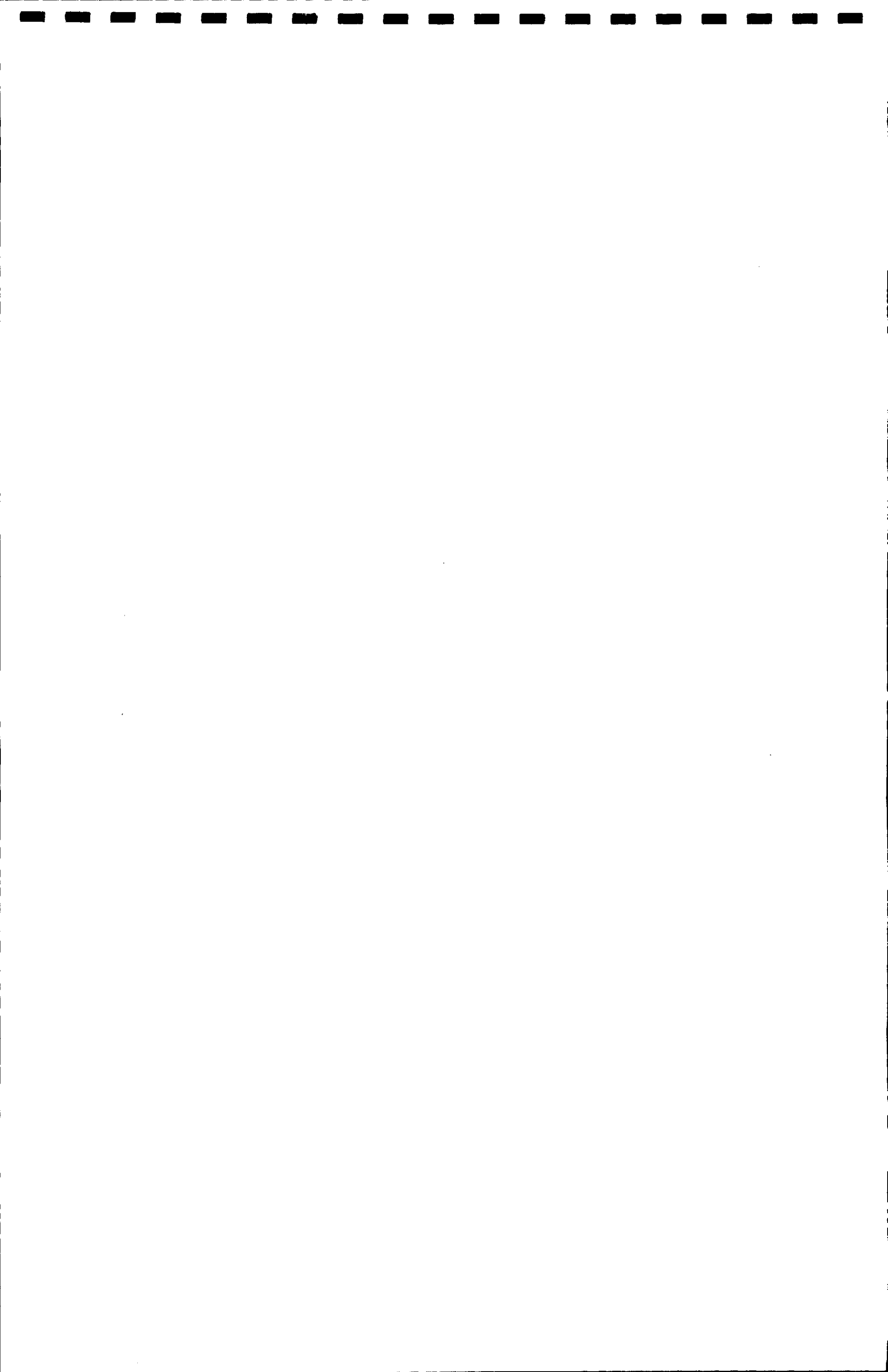


Figure 3.44: Sheet No. A3 Sup. 500' Level North & East Interior Elevations, Interior Renovations Washington Monument, 24 January 2000. (Denver Service Center, National Park Service.)



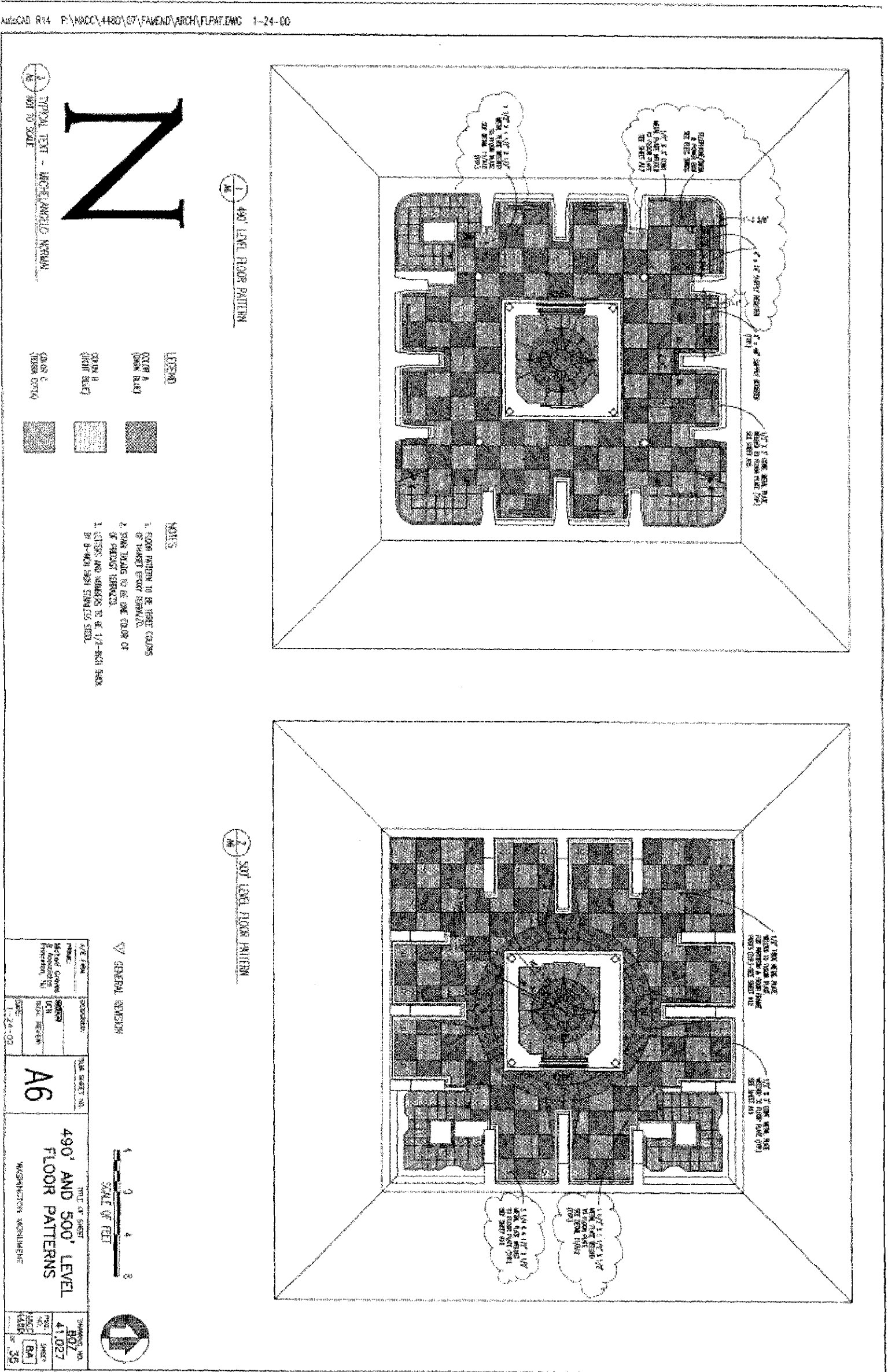
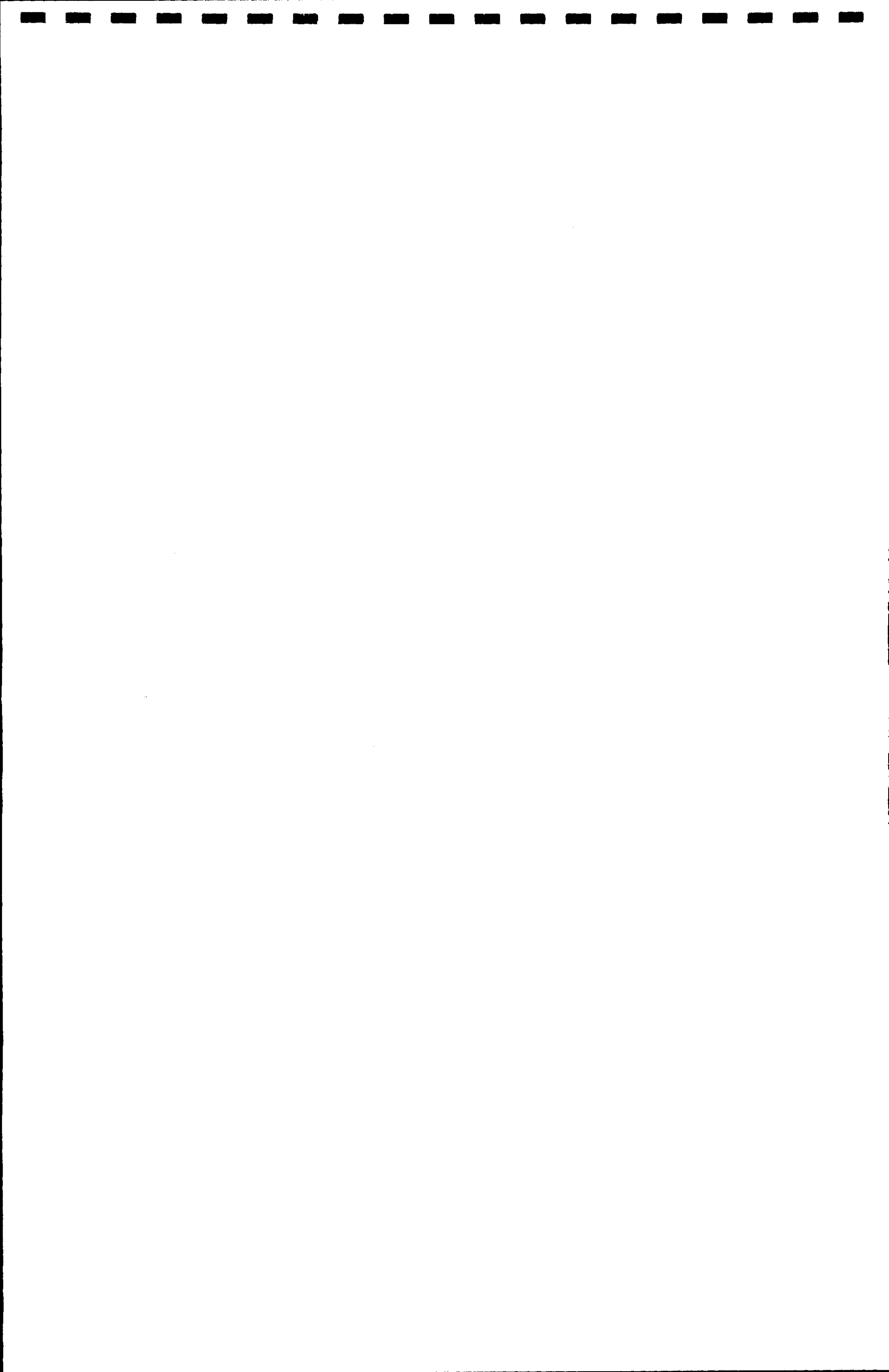


Figure 3.45: Sheet No. A6, 490' and 500' Level Floor Patterns, Interior Renovations Washington Monument, 24 January 2000. (Denver Service Center, National Park Service.)



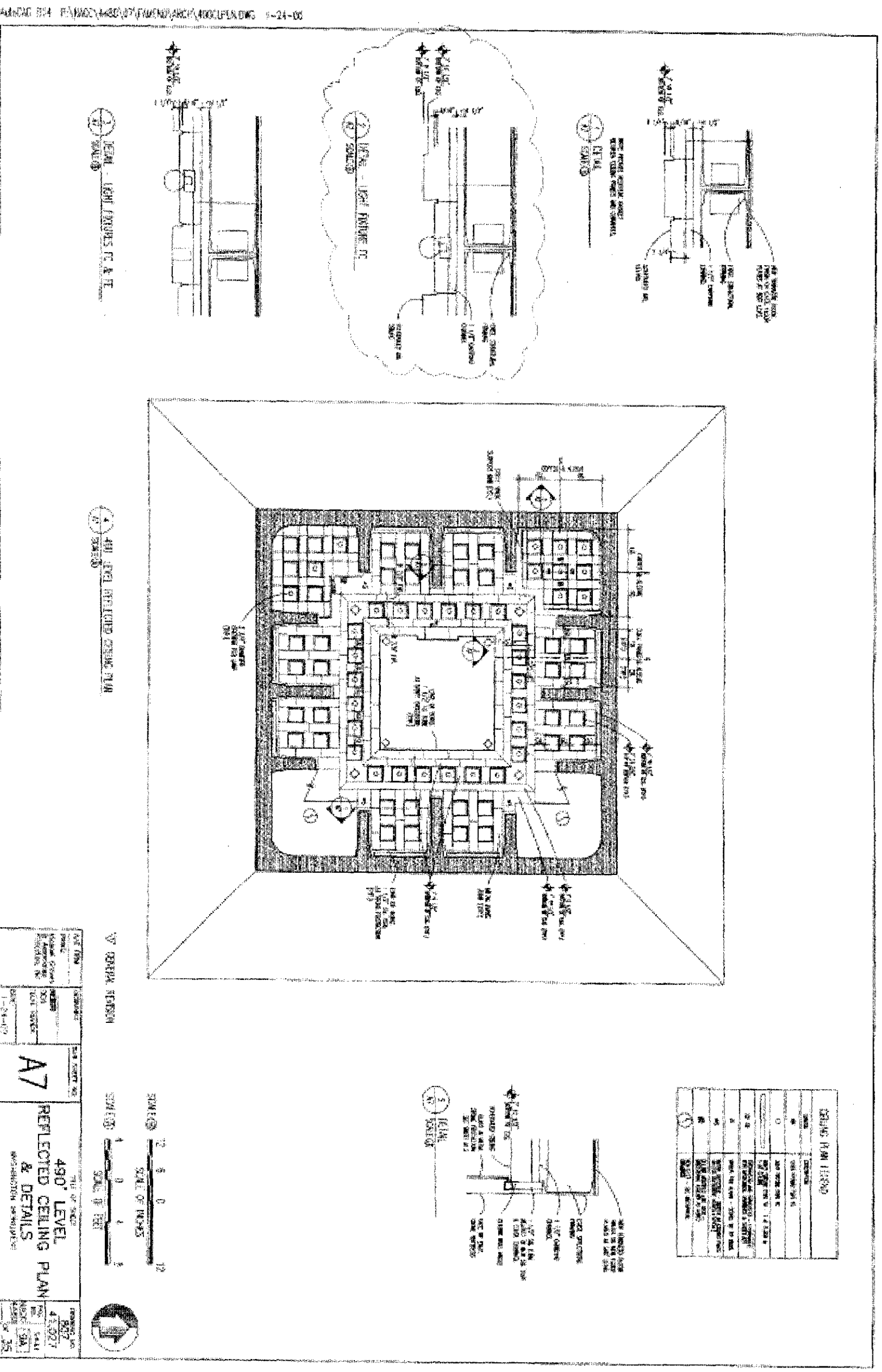
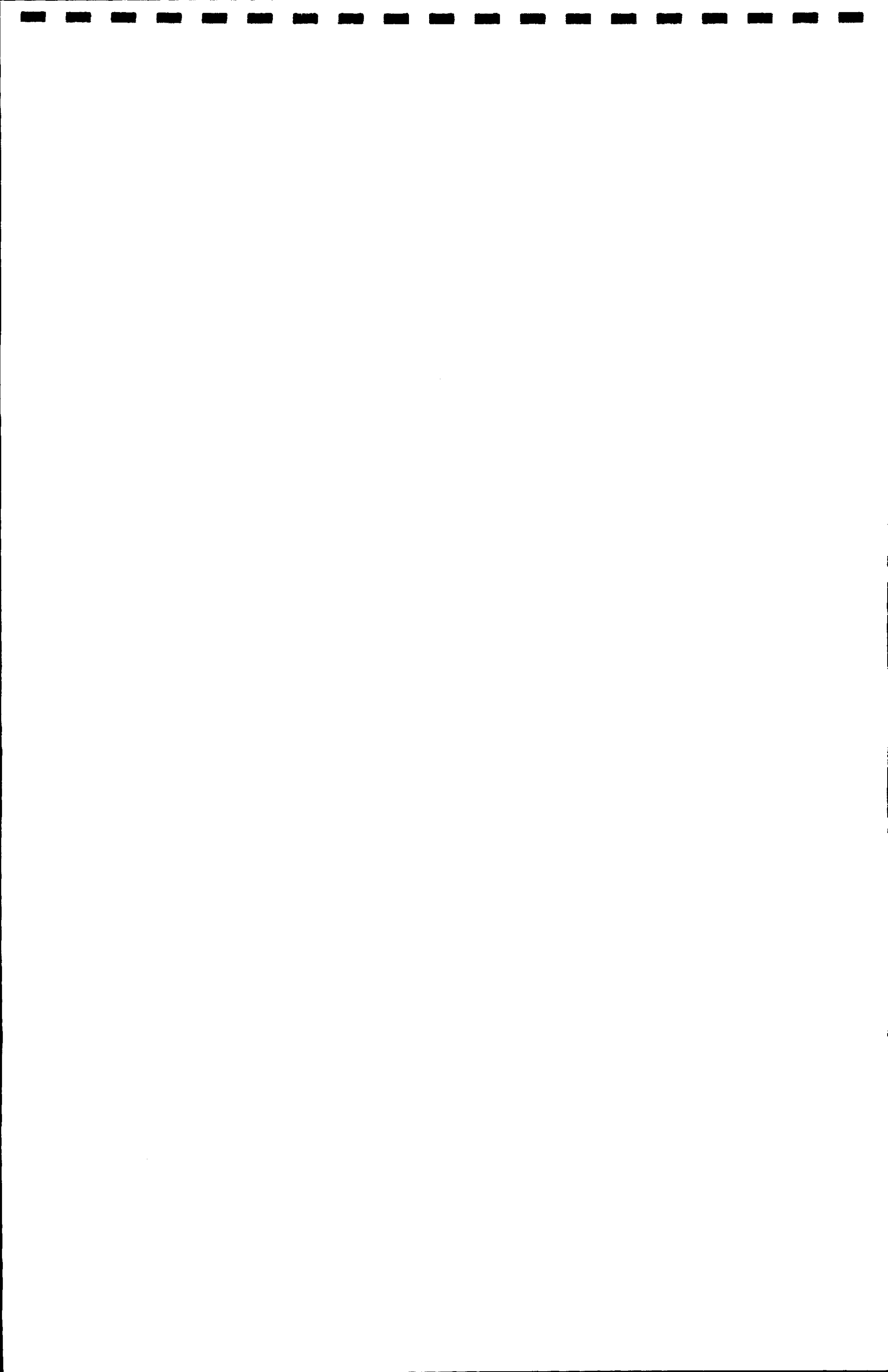


Figure 3.46: Sheet No. A7, 490' Level Reflected Ceiling Plan & Details, Interior Renovations Washington Monument, 24 January 2000. (Denver Service Center, National Park Service.)





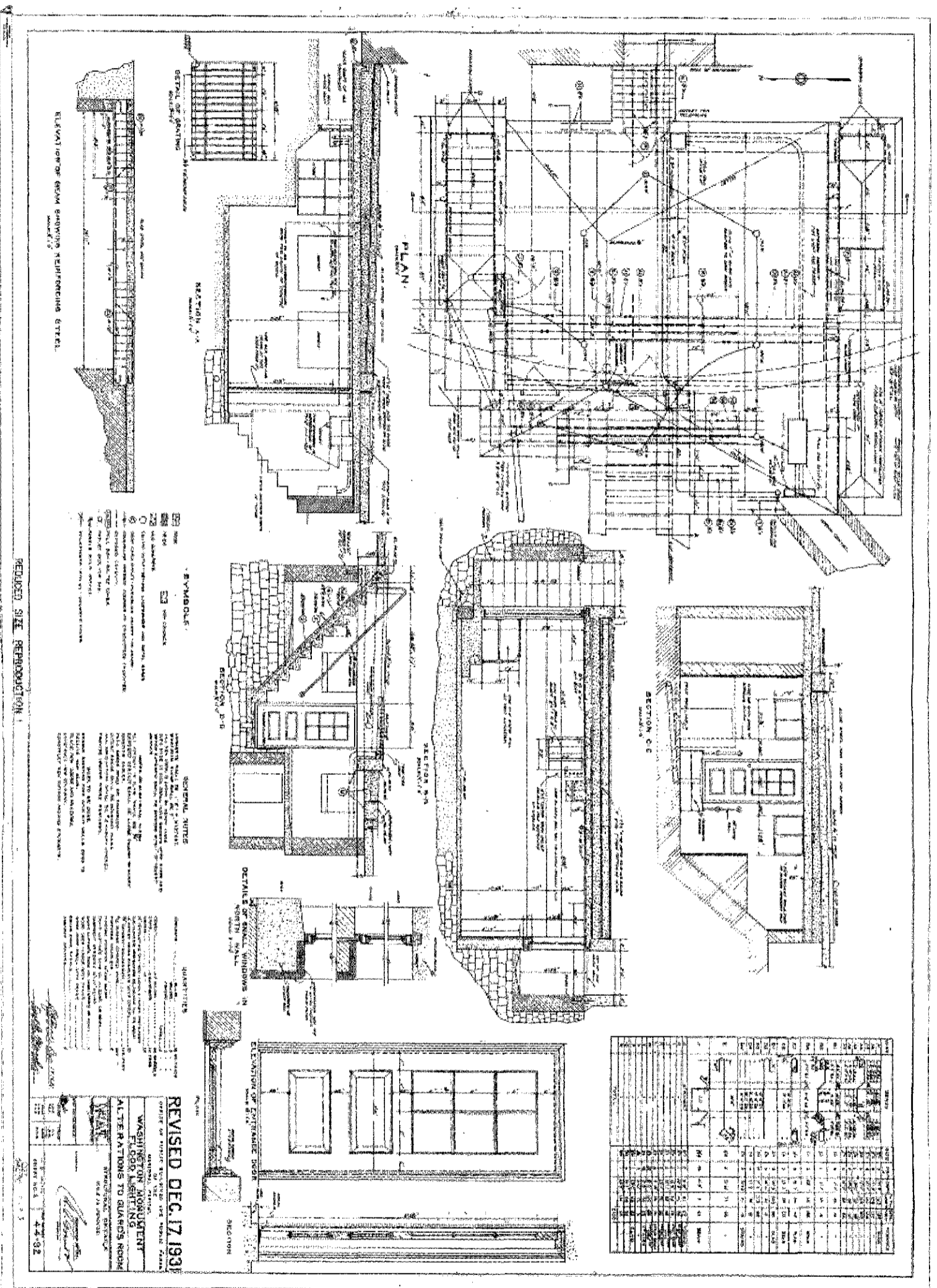


Figure 3.48: Washington Monument Flood Lighting, Alterations to Guard's Room, Revised 17 December 1931. ([Architectural Drawing] File 44-92; NCP 807/84090 3 of 3; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)



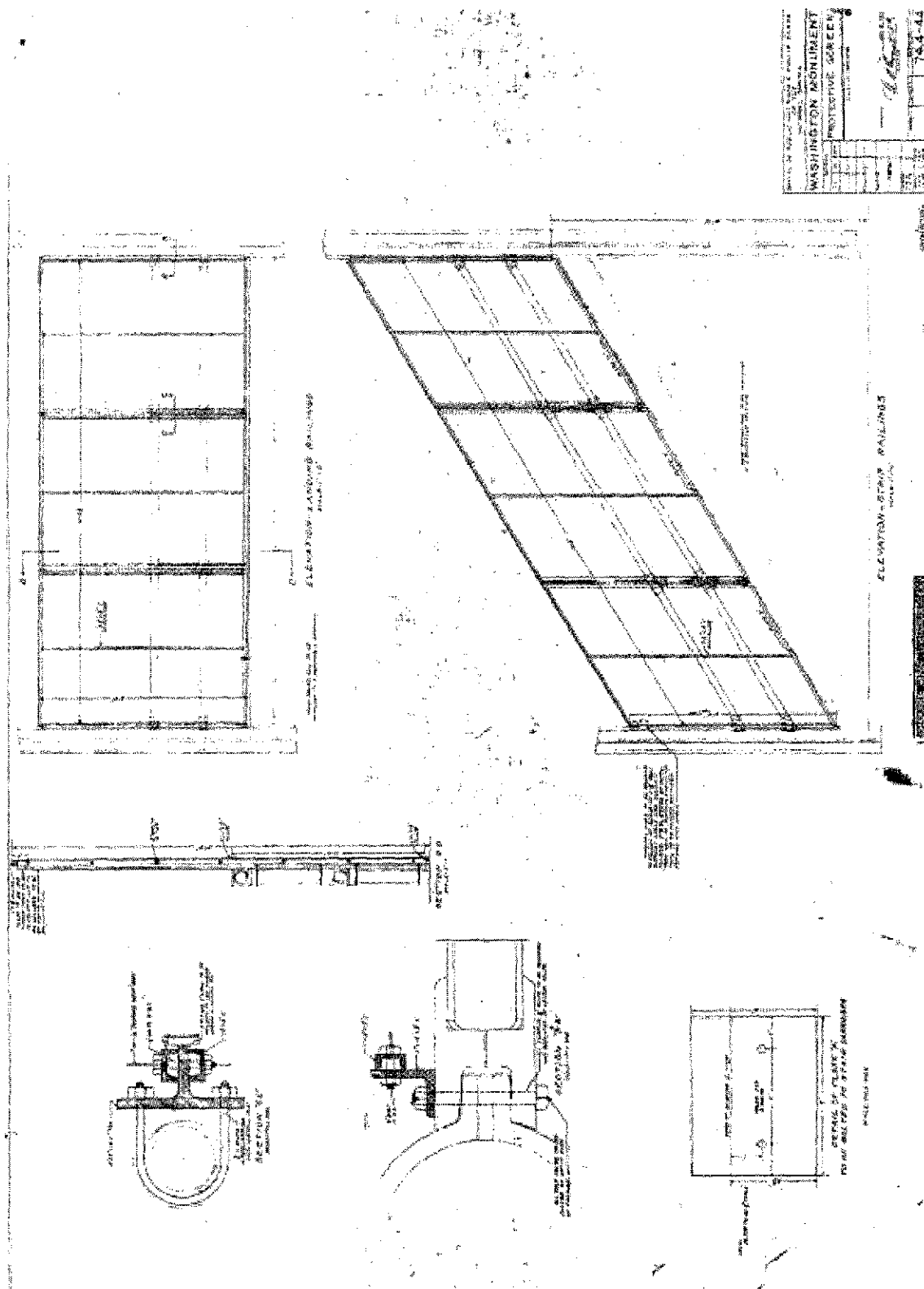


FIGURE 3.49: Washington Monument Protective Screen, January 1929. ([Architectural Drawing] File 74.4-44; NCP 807/80036; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)



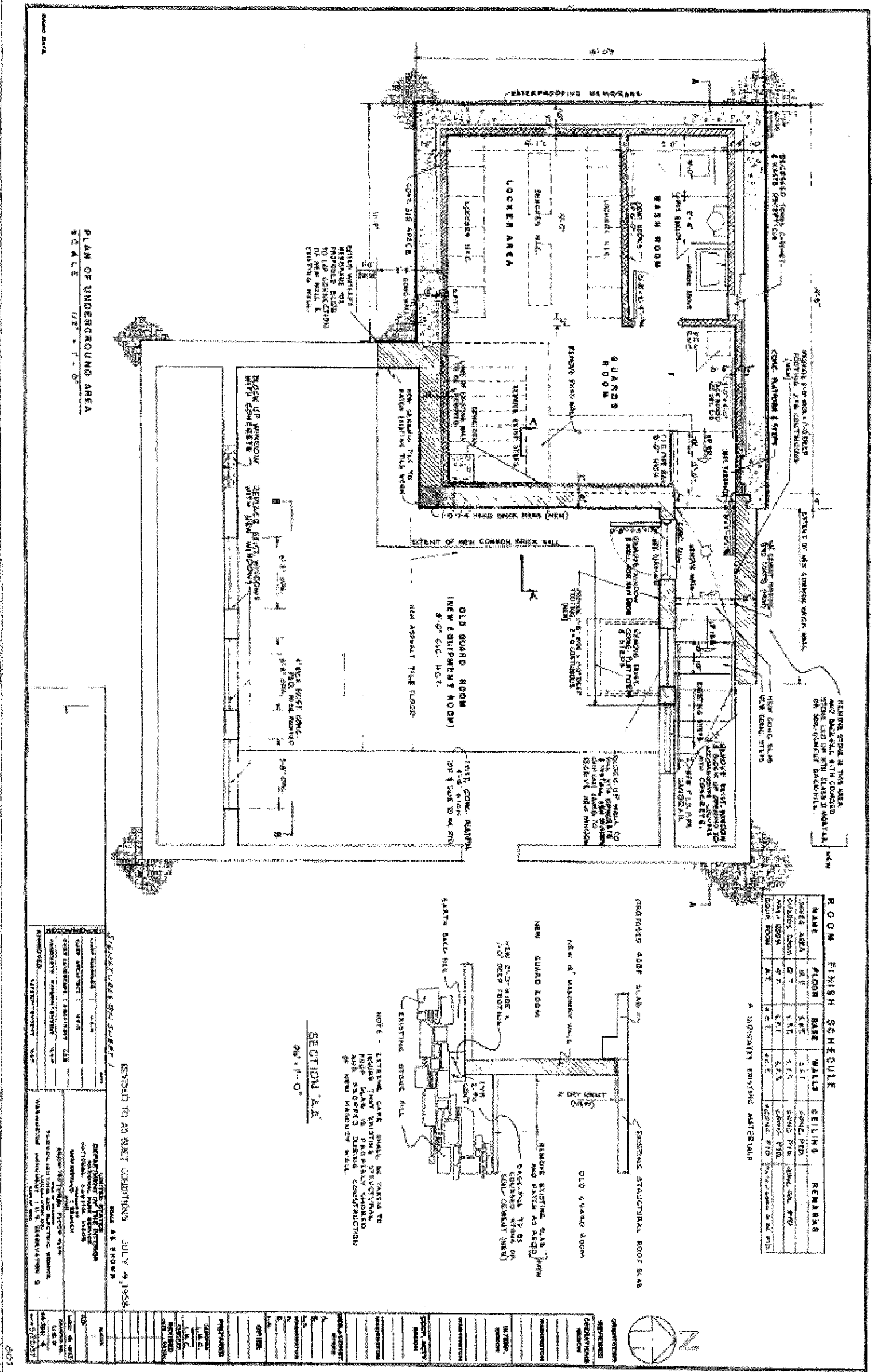
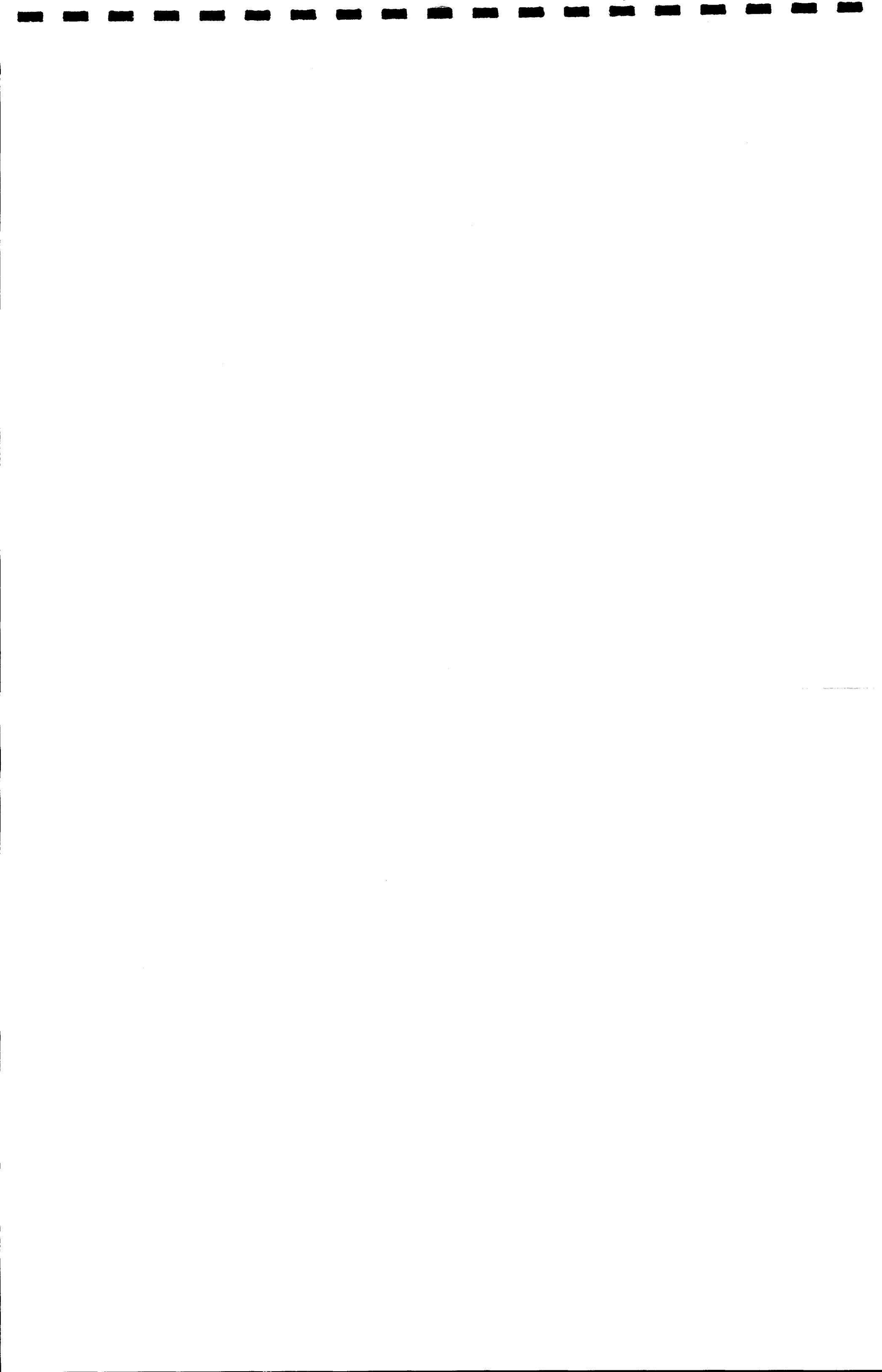


Figure 3.50: Sheet 4, Architectural Floor Plan, Floodlighting and Electric Service, Washington Monument: US Reservation 2. Revised as built conditions 4 July 1958. [Architectural Drawing] File 44-289; 4: NCP 807/84289; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)



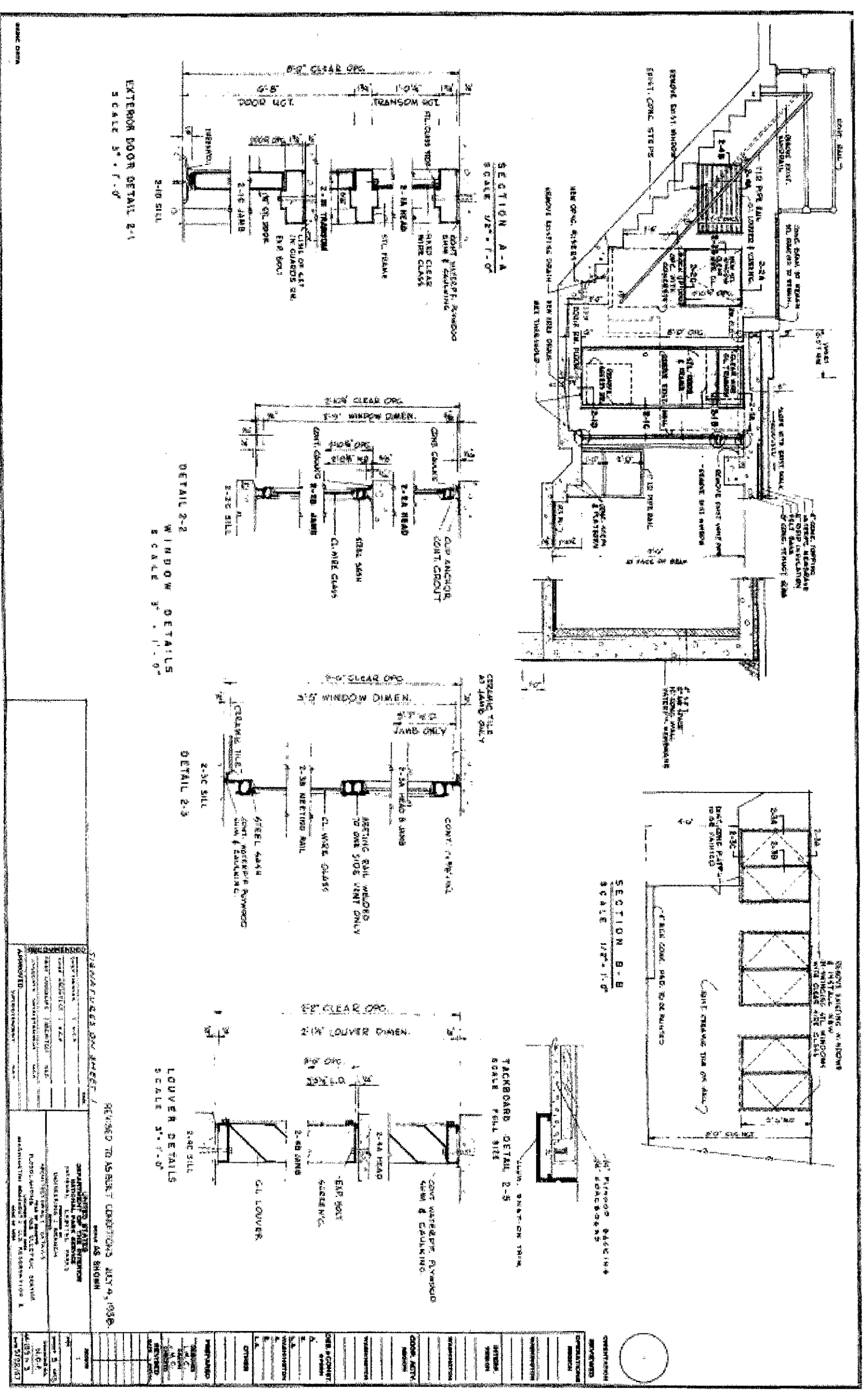
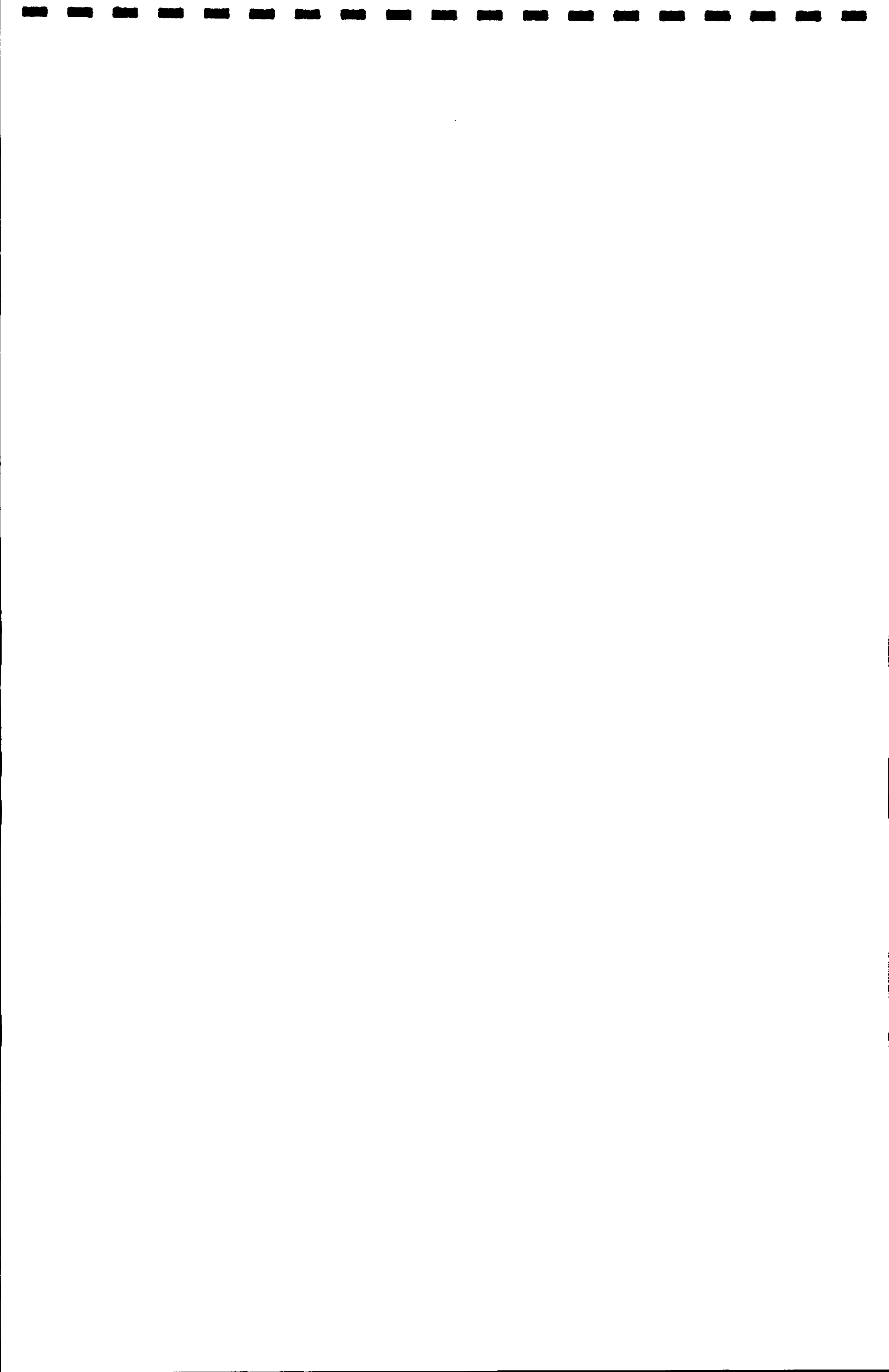


Figure 3.51: Sheet 5, Architectural: Details, Floodlighting and Electric Service, Washington Monument, US Reservation 2, Revised as built conditions 4 July 1958. [Architectural Drawing] File 44-289; 5; NCP 807/84289; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)



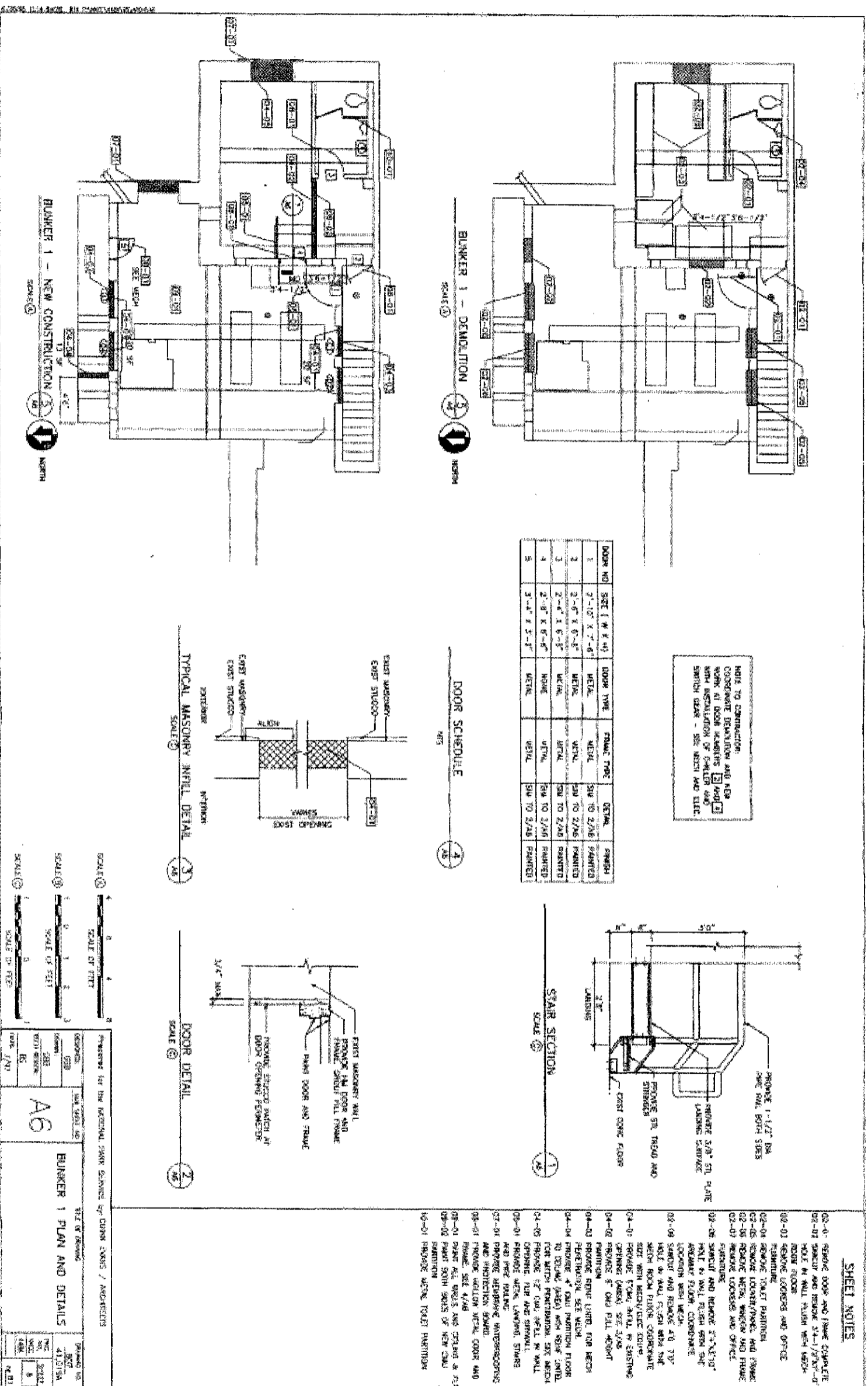
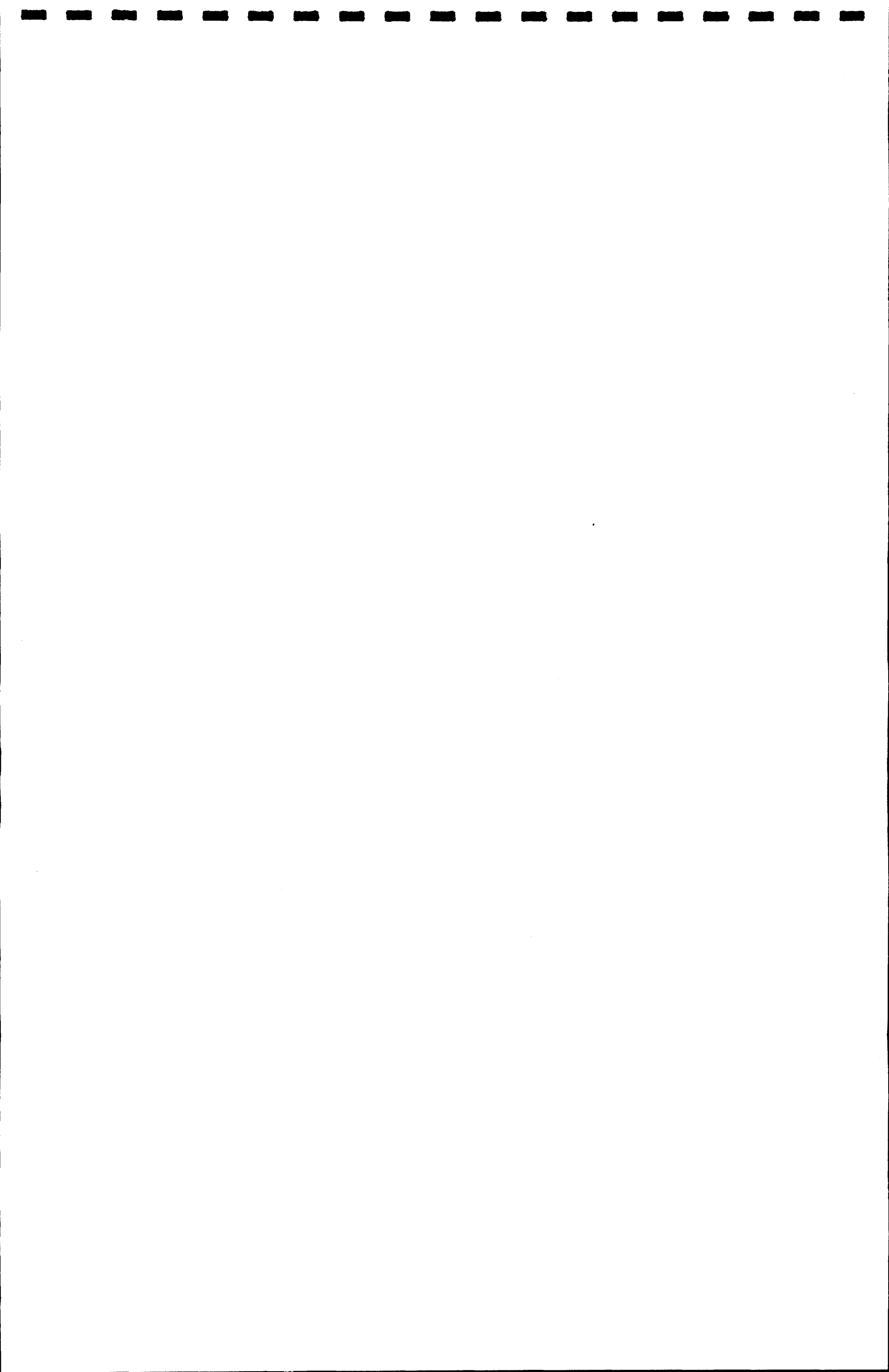


Figure 3.52: Sheet No. A6, Bunker 1 Plan and Details, July 1997. (Architectural Drawing) NCP 807/411019A 8 of 81; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)



Part I – Developmental History

CHAPTER FOUR
PHYSICAL DESCRIPTION



CHAPTER FOUR

PHYSICAL DESCRIPTION

4.1 GENERAL DESCRIPTION

The Washington Monument is sited on Reservation 2, near the crossing point of two major planning axes in Washington, D.C. It is located approximately 352 feet east of the axis defined by the White House and the Jefferson Memorial and approximately 123 feet south of the axis defined by the United States Capitol and the Lincoln Memorial. The monument sits in the center of a circular paved plaza approximately 240 feet in diameter that is lined with American flags. This plaza is part of the Washington Monument Grounds and is adjacent to the National Mall, which is under the supervision of the National Park Service and has gained significance as a local center of recreation and a national center of political and ideological debate.

The Washington Monument was constructed between 1848 and 1889 and is a stone masonry structure built in the form of an Egyptian obelisk. The monument was designed by architect Robert Mills and engineer Col. Thomas Lincoln Casey to be America's primary memorial to George Washington as the country's first president and founding father. It stands 555 feet-1¼ inches tall and has a square base 55 feet-1½ inches wide on each side.¹ The monument contains an elevator and stair to a viewing platform at the 500-foot level as well as interpretive displays and a small souvenir shop. In 2001, a small one-story interim security building was temporarily added to the monument's east façade. Known as the "pill-box," the flat-roofed faux-stucco building houses a security screening point for visitors to the monument.

4.2 SITE

The Washington Monument Grounds boundaries are Constitution Avenue to the north, 14th Street to the east, the Tidal Basin to the south, and 17th Street to the west. The Washington Monument is located slightly off center of the monument block. The monument block is predominately characterized by mown turf, which provides unobstructed views down the axes of the Mall area to other major landmarks. The monument itself sits on a slight rise, or knoll, that was constructed with fill between 1880 and 1889 to hide a substantial expansion of the original monument foundation and to provide additional stability to the soil underpinning it. Topping this knoll is a large circular plaza of two concentric rings in which the monument sits. The first ring has a diameter of approximately 147 feet and is composed of exposed aggregate concrete inset with thirteen five-pointed granite stars evenly spaced around the structure (see figure 4.1). The second ring is approximately 240 feet in diameter and is composed of asphalt with a flush curb of smooth concrete at its perimeter. Since 1960, the entire plaza has been surrounded by an evenly spaced series of 50 aluminum flagpoles flying American

flags. Each flagpole has a cleat cover box, is topped by a ball ornament, and flies an all-weather flag 24 hours a day (see figure 4.2).

Within the inner ring of the plaza, five metal floodlight boxes surround the monument base with one box on each of the north, south, and west sides, and two on the east side flanking the interim security building. These boxes are painted white, are topped by metal grilles, and house floodlights for the exterior lighting of the monument base. On the west elevation of the monument, there are three metal grates set into the concrete plaza. Two to the south of the western light box provide ventilation for a below-grade mechanical space. One to the north of the western light box covers the stair access to this mechanical space, which is referred to as "Bunker I" in the 1997-2000 restoration project drawings (see figure 4.3).²

At each corner of the Washington Monument base, an access cover for a geodetic control mark can be seen (see figure 4.4). These marks, also known as bench spots, were installed to replace eight bench spots used during construction of the upper portion of the monument shaft.³ Both the original and the replacement bench spots utilize a fixed bench mark to indicate the level and degree angle of the monument foundation. Through continual monitoring, the bench spots provide a measurement of monument subsidence over time as well as its degree off plumb. The original bench spots were cut off approximately 3 feet below grade in May of 1889 just before the monument knoll was completed.⁴ The existing geodetic control marks reference a concrete bench mark buried approximately 121 feet due west of the monument. This bench mark is roughly shaped like the Washington Monument and has a concrete footing and a stone cap. The tip of the bench mark is located approximately 1 foot-8 inches below grade under a cast-iron cover.

At the cardinal points surrounding the plaza, four large, smooth concrete electrical vaults rise from the ground. These vaults house additional floodlights for the monument and are topped with hinged stainless steel plates that operate on a hydraulic system (see figure 4.5). Installed in 1958, each floodlight vault is approximately 13 feet wide by 19 feet long by 11 feet high on the interior and protrudes approximately 1 foot-6 inches above grade.⁵ The hydraulic system on each vault is manually engaged at dusk and dawn by Park Service staff to expose the floodlights at night. The vaults remain in the closed position during the day and often unintentionally provide supplemental seating for visitors to the monument site. Primary seating is provided by eight pairs of backless metal and plastic benches approximately 6 feet-6 inches long. These benches sit on smooth concrete pads extending from the plaza that are approximately 5 feet-8 inches deep and 29 feet wide. To the east of the plaza, sitting in the convergence of two asphalt pathways, is a large bronze commemorative plaque dedicated to the "memory of George Washington" by the Washington National Monument Society (see figure 4.6). Southeast from this plaque, across one asphalt pathway, is a dual water fountain on a smooth concrete pad.

Several paths extend from the Washington Monument plaza to other parts of the monument site. The two asphalt paths previously mentioned extend to Monument Lodge and to 15th Street across from Madison Avenue. An asphalt path just south of these extends to 15th Street near Jefferson Drive. To the west of the plaza, two exposed

aggregate concrete paths extend to 17th Street with the north path diverging north to a parking area on Constitution Avenue, and the south path diverging southwest to the Survey Lodge. To the northeast of the plaza, another asphalt path extends to 15th Street. Currently, the entire monument plaza is enclosed with a ring of concrete jersey barriers and wood snow fencing, with only narrow openings left at each pathway for pedestrians.

4.3 WASHINGTON MONUMENT – EXTERIOR

The Washington Monument stands 555 feet-1½ inches tall with a base 55 feet-1½ inches wide on each side.⁶ The monument shaft tapers approximately ¼-inch per foot as it rises upward,⁷ finishing at the 500-foot level with a width of 34 feet-5⅞ inches. The shaft is topped with a pyramidion 55 feet-1⅝ inches tall that has a cast-aluminum tip. Constructed of stone masonry, the building has a white marble exterior of 2-foot high courses, a blue gneiss foundation, and an interior of blue gneiss, granite, and marble (see figure 4.7).

4.3.1 FOUNDATION

The foundation of the Washington Monument was originally constructed as a platform of rough blue gneiss masonry laid in pure lime mortar⁸ rising eight courses high and stepping back as it ascended. The stones were set as compactly as their various shapes and sizes allowed, with interstitial space filled with spalls and mortar. The base of the foundation spread over an 80-foot long square and extended for a depth of 23 feet-4 inches⁹ below the monument shaft (see figure 4.8). The center of the foundation contained a 2-foot by 2-foot well.

In 1878, after Lt. Col. Thomas Lincoln Casey assumed supervision of construction, the existing foundation was reevaluated for its structural stability and redesigned to its current configuration. Using a series of concrete buttresses, the blue gneiss foundation was underpinned and completely encased in hydraulic cement concrete. The concrete mix was, by volume, one part Portland cement, two parts sand, three parts pebble, and four parts broken stone.¹⁰

To accomplish the underpinning of the monument, Casey designed a system of tunneling and filling that over time undermined approximately 70% of the existing foundation and monument shaft (then 156 feet tall). In slices no more than 4 feet wide, and in pairs on opposite faces of the foundation, tunnels were dug under the bottom course of blue gneiss and were filled with concrete.¹¹ Adjacent tunnels of concrete were interlocked with a series of pins and formed-in-place depressions. This concrete underpinning was tied to the blue gneiss foundation by raking out spalls and mortar between stones so that introduced concrete would form a key.

After the underpinning was complete, Casey fully encased the existing blue gneiss foundation in concrete. This increased the strength of the foundation redesign by further locking the original foundation and the concrete underpinning together so they would act as one unit. Casey achieved the encasement by removing large portions of the blue gneiss foundation below the top course and inserting concrete buttresses approximately 12 feet wide. First, one buttress was inserted in the center of each face of the foundation. This

was followed by larger buttresses at each of the corners and was finished with concrete infill between them (see figure 4.9). The sides of each of the buttresses contained formed-in-place depressions to provide a key for adjacent concrete.

Casey's foundation reinforcement project increased the foundation base to a square 126 feet-5½ inches long on each side and extended it to a depth of 36 feet-10 inches below the monument shaft (see figure 4.10). The concrete mass extended 18 feet under the outer edge of the blue gneiss masonry and 5 feet under the outer face of the monument shaft.¹² To further stabilize the completed foundation, as well as provide a more aesthetically pleasing finish, the area around the monument base was re-graded to form a knoll. Knoll construction was accomplished using construction debris and fill and was completed in 1889 (see figure 4.11). Since then, further re-grading campaigns have gradually reduced the size of the knoll, blending it with the surrounding landscape.

4.3.2 SHAFT

Above the foundation knoll, the shaft of the Washington Monument exhibits two distinct construction periods as it rises. This distinction can be seen in both the visual appearance of the exterior surface of the monument and in the construction of the shaft walls. Detailed information on the marble masonry used during both periods of construction can be found in the Exterior Stone section below.

The first construction period, from 1848 to 1858, encompasses the base of the shaft to the 150-foot level. Exterior white marble masonry in this section of the monument is of coursed ashlar in a random bond pattern dressed smooth. Marble masonry units have extremely thin mortar joints and splayed vertical and horizontal abutting faces that enable a tight fit. Masonry walls range from approximately 12 feet-2½ inches thick at the base to approximately 11 feet-8½ inches thick at the 150-foot level. The walls have interior surfaces of random range blue gneiss masonry roughly finished. Wall cavities between the exterior and interior surfaces are filled with large undressed pieces of blue gneiss, spalls, and mortar (see figure 4.12). In 1880, when construction on the shaft resumed, the spalls and mortar were removed from the 150-foot level of the monument and resulting cavities were filled with hydraulic cement. This provided a sound and level surface on which construction could proceed.¹³

The second construction period, from 1880–1885, begins at the 150-foot level and continues to the top of the monument. Marble masonry in this section is of coursed ashlar with a Flemish bond and is a darker shade of white than the masonry of the base (see figure 4.13). Exterior masonry joints are slightly thicker in this section of the monument, and marble pointing was accomplished using mortar made from Lime of Teil.¹⁴ The exterior shaft walls between the 150-foot level and the 160-foot level taper sharply, enlarging the interior shaft well by approximately 6 feet-4 inches (see figure 4.14). The walls also gradually change from a square interior corner to an interior corner rounded on a 2-foot radius. Exterior wall thicknesses continue to diminish from approximately 8 feet-7½ inches thick at the 160-foot level to approximately 1 foot-6½ inches thick at the 500-foot level.

The walls of the second construction period are built of solid dressed masonry with a white marble exterior surface and an interior of coursed granite and blue gneiss (see figure 4.12).¹⁵ Above the 218-foot level, white marble headers on the exterior of the monument begin to appear on the interior surface. Above the 260-foot level, these headers emerge with enough regularity to give the masonry a “checkerboard” appearance (see figure 4.15). Above the 460-foot course, the exterior shaft walls become a single wythe of marble in thickness. The stones in this section of the monument are fitted with mortise-and-tenon joints in their bed courses, and they are attached with iron cramps to their horizontal neighbors (see figure 4.16). Intended to prevent lateral movement, these iron cramps are ¾-inch galvanized iron bars approximately 8 inches in length with a 2½-inch bend at each end.¹⁶ The cramps are set in pockets cut out of adjacent stones and are embedded in mortar.

A history of repair and restoration can be seen across the exterior of the Washington Monument. Beginning at the 8-foot course and continuing over the entire height of the monument shaft, horizontal expansion joints were installed every 20 feet in enlarged masonry joints. During the 1997–2000 monument restoration project, the expansion joint material was removed from these joints, and they were pointed with mortar.¹⁷ Also evident on the monument exterior are dutchman repairs, particularly at the corners of the monument. These repairs were installed in the monument restoration projects of 1934¹⁸ and 1997–2000¹⁹ and are readily visible due to the brightness of the white marble (see figure 4.17). Finally, an assortment of patches dating to the 1997–2000 restoration project is also apparent across all four faces of the monument shaft.

4.3.3 PYRAMIDION

The shaft of the Washington Monument is topped by a white marble pyramidion rising 55 feet-1½ inches tall. The pyramidion is composed of 12 courses, each approximately 4 feet-6 inches tall and 7 inches thick,²⁰ laid in a running bond pattern. The base course of the pyramidion rests on the top course of the monument shaft and is held in place with a mortared mortise-and-tenon joint. The stones of other pyramidion courses are carved with interior brackets. These brackets sit on a series of 12 interior marble ribs springing from the 470-foot level (see figures 4.18 and 4.19). The interior brackets of each pyramidion stone are carved with a mortise, which is separated from its rib tenon by a metal insert. The 3/32-inch sheet lead was installed in these joints to serve as a flexible shim to close any gap between stones. The metal shields also prevent abrasion between the pyramidion stones and their supporting rib stones.²¹

The pyramidion stones are joined with dry vertical mortise-and-tenon joints; mortared tongue-and-groove joints form the pyramidion corners. Horizontal joints are cut shiplap fashion, and because the pyramidion stones are completely supported by the interior ribs, these joints are left open on their horizontal surfaces by nearly ⅛ inch.²²

The stones of the 12 interior ribs are also cut with mortise-and-tenon joints. Because the rib stones act as voussoirs in an arch, stepping back to form the angled faces of the pyramidion, mortise-and-tenon joints prevent lateral movement in the rib stones while mortar is wet. This type of joint also adds strength and stability after mortar is dry. At the

top of the sixth pyramidion course, the corner ribs join to form solid vertical corner support blocks, which are tied back to the center ribs with stone beams (see figure 4.20). At the top of the seventh pyramidion course, the center ribs are tied together with a cruciform keystone 5 feet-3 inches wide on each side (see figure 4.21). The interior ribs end at the ninth course with two intersecting beams of stone.²³ For a complete description of the pyramidion stones and their joints, including instructions for care and preservation, see entry 8/4/1884 in Appendix B of this document.

On each of the four faces of the pyramidion at the base of the second course, two observation windows are cut, allowing visitors to the monument to enjoy a panoramic view of Washington, D.C., and its surroundings. The windows on the east elevation are 3 feet wide and 24½ inches tall, while the windows on the other three elevations are 3 feet wide and 18 inches tall. In 1975, these window openings were filled with bulletproof glass set in stainless-steel frames.²⁴ The glass was replaced and the frames resealed in the monument restoration project of 1997–2000.²⁵

At the top of the fourth pyramidion course, above each window, a 14-inch-diameter hole is cut through the marble. These holes are filled with 12-inch-diameter, clear-glass, convex lenses fixed in monel metal frames with monel clips.²⁶ The frames are attached to the surrounding masonry with screws lagged into the marble with lead anchors. Flashing red aircraft-warning lights, originally installed when the holes were cut in 1958, are located behind the lenses on mounting brackets.²⁷ The glass lenses and housings were repaired and resealed during the monument restoration project of 1997–2000.²⁸

The pyramidion is topped by a solid white marble capstone, cruciform in shape, which weighs approximately 3,300 pounds.²⁹ As the twelfth pyramidion course, this stone acts as a keystone, and it is capped by a cast-aluminum tip. The tip is a solid piece weighing approximately 100 ounces and is ±8.9 inches tall and ±5.6 inches square at its base.³⁰ It was cast by William Frishmuth of Philadelphia and its composition is: 97.87% Aluminum, 1.00% Iron, 0.75% Silicon, 0.30% Manganese, 0.05% Copper, 0.02% Tin, and 0.01% Sodium.³¹ It is inscribed on all four sides. The north face reads:

Joint Commission

At
Setting of Capstone.

Chester A. Arthur.
W.W. Corcoran, Chairman.
M.E. Bell.
Edward Clark.
John Newton.

Act of August 2, 1876.

On the west is the inscription:

Corner Stone Laid on Bed of Foundation
July 4, 1848.

First Stone at Height of 152 feet laid
August 7, 1880.

Capstone set December 6, 1884.

The south elevation reads:

Chief Engineer and Architect,
Thos. Lincoln Casey,
Colonel, Corps of Engineers.

Assistants:
George W. Davis,
Captain, 14th Infantry.
Bernard R. Green,
Civil Engineer.
Master Mechanic,
P.H. McLaughlin.

On the east side appears:

Laus Deo.

4.3.4 EXTERIOR STONE

Three types of marble masonry adorn the exterior of the Washington Monument: Texas Marble, Lee Marble, and Cockeysville Marble. These three types of stone are clearly delineated on the monument both visually, due to distinct color variation and veining, and microscopically, due to diverse graining and inclusions. The first marble seen on the Washington Monument was installed during the first phase of construction (1848–1854) and is known as Texas marble. This stone comes from a quarry near Texas, Maryland, and is a coarse-grained stone of almost pure calcium carbonate.³² Texas Marble was used for the first 150 feet of the monument shaft and is characterized by its pure white color, lack of significant veining, and small inclusions of mica and pyrite.

The second marble seen on the Washington Monument was installed when shaft construction resumed in 1880. Used for the first four stone courses above the 150-foot level, this marble comes from a quarry near Lee, Massachusetts. It is probably a dolomitic marble, or a marble in which the primary component is dolomite rather than calcite. An Ordovician age dolomitic marble was previously quarried in Lee for construction of the House and Senate wings of the U.S. Capitol.³³ Lee Marble is characterized by significant veining, which lends the marble an overall tan cast quite different from the previously described Texas Marble.

The third and final marble used to complete the shaft and pyramidion of the monument comes from a quarry near Cockeysville, Maryland. It is a fine-grained, clear dolomitic marble rich in magnesium and phlogopite, a type of mica. Cockeysville Marble is characterized by pale streaks or bands that lend the stone a pale-gray color.³⁴ This marble and the previously described Texas Marble are both Precambrian-age metamorphic rocks approximately 600 million years old.³⁵

All marble masonry used in the monument shaft arrived from the quarry roughly squared and not more than 2 inches off its scheduled size. Stonecutters would fashion these blocks into finish masonry units using a method called “banking up:”

The cutter draws a straight line with iron ore or black lead on the rough ashlar face to be cut as close to the edge as practical, line AB. Using a 4½-pound hammer and a pitching tool, he spalls off the excess marble above this line. With his 8-inch chisel, he chisels a draft, or narrow border, as close to his line and as level as possible. To check himself, he would smear a straight edge with red chalk and place the edge across the draft. Any high point would be reddened, but a level draft would be uniformly reddened down its entire length. Right angle to this first draft, and in the same plane, he draws a second line, BC, and repeats the cutting and checking of level. To obtain the third draft, CD, he must use his best eye, for this draft also gives him the fourth corner and the true bed of the stone. This corner must be level with the previous three for it to be true. As the account goes, “He then goes to corner C of the stone, drops on his right knee and sights, taking the draft of AB as his level, and in the same glance he catches point D, where the true bed must be cut to the remaining corner of the block.

When this is done, he straightens a draft from A to D and from D to C.” The four drafts on this bed completed, he takes a ⅞-inch hammer point and hammers off the waste to within ¼-inch of the surface of the drafts, thus bringing the center of the bed into plane with the drafts. A pean axe is applied next to the bed to work off the final ¼-inch.³⁶

This process of “banking up” can still be seen on shaft stones today as a band around the perimeter of each stone. This band was cut at a slightly different angle than the stone of the field, thus exposing a different plane of refraction to light and shadow.

4.4 INTERIM SECURITY BUILDING – EXTERIOR

The interim security building at the Washington Monument is a low, one-story structure, three bays wide and four bays deep. It currently serves as the sole entry point to the monument interior. It has a flat roof with a low parapet and metal parapet cap, and it is covered with an exterior insulation and finishing system (EIFS) scored to match the stone coursing of the adjacent monument. Constructed in 2001, the addition houses security equipment and personnel to screen visitors to the Washington Monument. All visitors must pass through this screening area before they are given access to the east entrance of the obelisk.

The north elevation of the addition is four bays wide, and each bay contains a single one-pane horizontal window set in a hollow metal frame. Between the two eastern bays, near the base of the addition, a PVC pipe protrudes through the face of the wall, providing an outlet for an interior downspout (see figure 4.22). An identical outlet is located at the west end of the wall. The east elevation is three bays wide and serves as the primary entry to the addition and to the Washington Monument. The center bay is filled with a single-light metal door set in a hollow metal frame. The door has a brushed-stainless-steel lever-type knob and stainless-steel corner guards approximately 4 feet high. It also has a stainless-steel flat-bar exit device on the interior. The entry door is flanked by two single-pane horizontal windows identical to those on the north elevation. At the top north corner of the east elevation, a red emergency light is positioned just under the roof fascia. Stainless steel corner guards approximately 4 feet tall complete this elevation. The south elevation of the security addition is four bays wide. The west bay contains a single-light metal door set in a hollow metal frame. The door has a stainless-steel lockset, pull, flat-bar exit device, and corner guards and is only used as an emergency exit. The two center bays of the south elevation each have a single-pane horizontal window identical to those on the north elevation. The east bay contains a single-light metal door set in a hollow metal frame with stainless-steel corner guards. The door has a stainless steel pull, lockset, and flat-bar exit device and is used as the primary exit for monument visitors (see figure 4.23). The entire security addition, including doors and window frames, is painted off-white. All window and door glazing is tinted a medium-gray color to aid in the transition from bright exterior space to a more dim interior.

4.5 BELOW-GRADE MECHANICAL AREA (BUNKER 1)

The below-grade mechanical area, also known as Bunker 1, is located on the site of the original engine room for the Washington Monument on a partial foundation of blue gneiss masonry.³⁷ The area is positioned beneath the monument plaza adjacent to the west side of the concrete foundation of the monument, and it is accessed through a hinged metal grate at plaza level. Historically approximately two-thirds its current size, the area served as a guard room for monument security personnel from before 1930 until the restoration project of 1997–2000.³⁸ Bunker 1 was expanded in 1958, by approximately 300 square feet, to provide space for a guard room, a rest room, and a locker room when the old guard room was renovated to house mechanical equipment.³⁹ Since the restoration of 1997–2000, Bunker 1 has become almost entirely mechanical space, though a rest room and some historic finishes remain.

Bunker 1 is accessed through a metal two-piece grate set in a metal frame that is flush with the monument plaza. The gate is kept padlocked at all times by National Park Service staff and leads to a smooth concrete stair that descends 15 risers to a concrete landing. The stair walls are plaster over brick, and there is a single 2½-inch-diameter metal-pipe handrail attached to the north wall that stops short of the stairwell grate cover. On the south wall of the stairwell, approximately halfway down the stair, a metal louvered vent covers a screen of expanded metal set in a historic window opening. The vent is smaller than the original opening, and the remainder has been filled with concrete masonry units. A small opening to the east of the vent has also been filled with concrete

masonry units. The concrete landing at the base of the stair is sloped to a central metal floor drain. Two doors open off of the landing: one to the west, leading to the guard room and rest room (see figure 4.24), and one to the south, which accesses the mechanical room, the electrical room, and a steam-pipe tunnel. At the base of each door, a single smooth concrete step ascends to room level.

4.5.1 GUARD ROOM

The guard room, more of a rest room vestibule, is entered from the east through a flush metal door set in a hollow metal frame with brushed-stainless-steel hardware, all of which was installed in 1997.⁴⁰ The door is topped by a plywood-filled transom that has been penetrated by duct and pipe. The exterior of the door, frame, and plywood are painted a dark brown, while the interior is painted salmon pink to match the guard-room décor. Immediately inside this door are a concrete landing and a single step down to the 6-inch by 6-inch, dark-red tile floor. The landing and step are bordered to the south by a 1¼-inch-diameter metal-pipe handrail, which is anchored to the floor and painted salmon pink.

The walls of the guard room are clad in 5-inch by 12-inch, salmon-pink, glazed-ceramic tile except for the south wall, which was installed in 1997⁴¹ and is of concrete masonry units painted salmon pink. The concrete ceiling of the guard room has exposed concrete beams and is also painted salmon pink. Lighting in the room is provided by a 2-foot by 4-foot suspended fluorescent fixture with a plastic lens. In the northwest corner of the room, a small wooden platform is suspended approximately 6 feet above the floor. The platform holds a small electric water heater for the adjacent rest room. Immediately below the water heater, on the north wall, is a fan-coil unit. Walls and ceilings in the guard room are covered with PVC, copper, and insulated pipe, duct, and electrical conduit. On the west wall of the room, an exhaust duct penetrates the wall above the door leading to the rest room.

4.5.2 REST ROOM

The rest room is entered from the east through a flush metal door set in a hollow metal frame with brushed-stainless steel hardware, all of which was installed in 1997.⁴² The door and frame are painted salmon pink. The walls and floor of the rest room are of the same materials and finishes as those found in the guard room, but the ceiling here is painted off-white. Exposed concrete ceiling beams in the rest room have chamfered bottom corners.

The rest room contains a white ceramic toilet, urinal, and lavatory along the north wall that appear to date to the 1958 guard-room expansion, and the toilet is enclosed by a brushed-stainless-steel partition installed in 1997 (see figure 4.25).⁴³ There is a small mirror in a brushed-stainless-steel frame above the lavatory, a hose bib located below the lavatory, and a floor drain located between the urinal and the toilet. Lighting for the rest room is provided by a 2-foot by 4-foot fluorescent fixture suspended from the ceiling and a compact fluorescent fixture with a plastic lens and metal guard mounted above the lavatory mirror. The metal guard for the fixture is currently missing. A metal paper-towel dispenser is mounted to the north wall just east of the lavatory mirror. In the upper

southwest corner of the rest room is a metal through-wall transfer duct to the electrical room, and the exhaust fan and duct for the rest room are suspended from the rest room ceiling.

4.5.3 MECHANICAL ROOM

The mechanical room of Bunker 1 is entered from the north directly from the stairwell landing. The room is adjacent to the foundation of the Washington Monument, and its concrete buttressing is partially exposed along the mechanical room east wall. Access to the mechanical room is through a flush metal door set in a hollow metal frame with brushed-stainless-steel hardware, all of which was installed in 1997.⁴⁴ The door and frame are painted dark brown. The mechanical room is dominated by mechanical and electrical equipment and controls, duct, conduit, and PVC, copper, and insulated pipe (see figure 4.26). All of the walls of the room are riddled with openings cut for duct, pipe, and conduit, and the walls are festooned with nails, screws, and other attachment devices supporting this equipment.

The 1932 poured-in-place concrete ceiling, ceiling beams, and floor of the mechanical room are exposed, and original brick and 1932 tile walls are painted off-white.⁴⁵ The ceiling is also painted off-white, and the floor is painted light gray. In the center of the mechanical room floor, a concrete pad rises to support chiller 1. The floor also contains two floor drains: one near the center of the room and one near the entry door. Lighting in the mechanical room is provided by two 2-foot by 4-foot suspended fluorescent fixtures with metal guards, as well as a single surface-mounted compact fluorescent fixture with a plastic lens and metal guard.

The brick north wall of the room contains two small openings that at one time penetrated the Bunker 1 stairwell: an opening just east of the entry door, which is filled with exhaust fan 2 and concrete masonry units, and a smaller opening further east, which is completely filled with concrete masonry units. On the east wall of the mechanical room, a solid, half-height shelf projects from the Washington Monument foundation. The shelf face is finished with 6-inch by 6-inch painted ceramic tile topped by a molded profile. The monument's sloped concrete foundation wall is covered in 3-inch by 6-inch ceramic tile painted tan. The 3-inch by 6-inch tile continues up the east wall above the monument foundation to the mechanical room ceiling.

The south wall of the mechanical room is broken by three window openings. The east and west openings are filled with metal louvers and mesh screens surrounded by concrete masonry units. The center opening is completely filled with concrete masonry units. The south wall is further characterized by 6-inch by 6-inch painted ceramic tile below chair-rail height and 3-inch by 6-inch tile above chair-rail height, though no chair rail is visible. Many of the tiles on the upper portion of the south wall have been lost, exposing the original brick wall beneath. Not far from the south wall, an elevated concrete pad rises from the floor and provides support for air handling unit 2. The west wall is exposed brick painted off-white and is fronted by a raised concrete pad that supports steam-supply and steam-condensate transfer pumps. The wall is punctured near its north end by a doorway to the electrical room.

In the southwest corner of the mechanical room, a small rectangular alcove projects out to the west. The east, south, and west walls of the alcove are finished in 6-inch by 6-inch painted ceramic tile below chair-rail height and 3-inch by 6-inch tile above chair-rail height. A molded chair rail is intact on the west and east walls approximately 3 feet above floor level. On all three walls, many tiles have been lost, exposing the original brick walls beneath; however, the north alcove wall is completely exposed painted brick. A raised concrete pad supporting steam-condensate pump and tanks P-6 sits in the southwest corner of the alcove floor. At the west end of the south wall, approximately 4 feet above floor level, is a 3-foot-square flush metal access door. The door is set in a hollow metal frame and both are painted dark brown. The access door leads to a poured-in-place concrete tunnel containing steam-supply pipes, pressure-reducing stations, and a ventilation fan. The tunnel is topped by two metal grates set in metal frames that are flush with the monument plaza.

4.5.4 ELECTRICAL ROOM

The electrical room is entered from the east through a doorway off the mechanical room. The hollow-metal-frame doorway is painted dark brown and leads to a stainless steel landing and step that are embossed with a tread pattern. The step descends to a floor of 6-inch by 6-inch, dark-red tile, and the stair and landing are bordered by a 1½-inch-diameter metal pipe handrail on two sides. The ceiling of the electrical room is poured-in-place concrete with exposed concrete beams, all of which are painted salmon pink.

The east and south walls of the electrical room are covered in 5-inch by 12-inch, salmon-pink, glazed ceramic tile except for the west end of the south wall. It is finished with plaster painted salmon pink. The west wall is of gypsum wallboard painted salmon pink, and the north wall is of ceramic tile at its west end and concrete masonry units at its east end. The concrete masonry units were installed in 1997⁴⁶ and are also painted salmon pink. The north wall has a metal through-wall transfer duct to the rest room in its top west corner. The electrical room is dominated by a bank of electrical switchboards located along the south wall of the room on a raised concrete pad painted light gray. Lighting for the room is provided by two 2-foot by 4-foot suspended fluorescent light fixtures with metal guards. All four of the electrical room walls and the ceiling are covered with control panels, circuit panels, and conduit. Also, air-handling unit 3 and unit heater 2 are suspended from the ceiling. Finally, at the west end of the north wall is a small metal cabinet that contains the "as-built" mechanical and electrical drawings from the 1997 restoration.

4.6 WASHINGTON MONUMENT – INTERIOR

4.6.1 ENTRY LEVEL

The entry level of the Washington Monument has undergone several renovation campaigns since it was completed in 1888, and very few of the original interior finishes remain. Many of the existing finishes, however, have been in place since the early twentieth century and are now considered historic in their own right. These include marble wainscoting and trim and decorative terrazzo flooring installed in 1904 and 1913.

4.6.2 ENTRY LEVEL—EAST PORTAL

The east portal is a narrow rectangular passageway running east to west from the monument entrance doors to the east elevator lobby. It has a ceiling height of approximately 15 feet-2 inches, and the interior is finished with white marble masonry dating from the original monument construction period. The walls of the portal have a series of round ghosts left from the 1992 removal of marble wainscoting and a dropped ceiling that covered the original masonry for over 80 years (see figure 4.27). The floor of the portal is ramped and is composed of granite pavers installed in 1975.⁴⁷ The pavers are 2 inches thick and sit on a ½-inch mortar bed over a concrete slab.

The east wall of the room is dominated by an opening approximately 5 feet-8 inches wide and 8 feet tall. This opening contains a set of marble double doors fixed in the open position, which are discussed more fully in the Interim Security Building Interior section below. To each side of these doors are bronze cabinets installed in the interior renovation project of 1992. The left cabinet holds adjustable bronze shelving for Washington Monument and park brochures. The right cabinet contains two telephones and additional bronze shelving. The upper telephone provides an internal service line, while the lower telephone connects to an outside line. The opening on the east wall is topped by a large bronze cornice channel, which conceals uplights for the room. Above this cornice, the remains of the original monument door opening are visible. Initially 16 feet tall, the height of the door opening was reduced in 1885 to its current configuration.⁴⁸

The west wall of the east portal contains an opening approximately 15 feet tall and 6 feet-6 inches wide. The opening is filled with a set of all-glass double doors topped by a single-pane transom, all of which was installed in 1992. The doors and transom are frameless and attached to the original marble opening with bronze patch fittings. The doors have bronze push/pull hardware and are generally propped open during monument visiting hours. The last item found in the east portal is a pair of surface-mounted conduits that enter at the east door, rise to the ceiling level to run across the top of the north wall, and continue through the top north corner of the glass transom into the east elevator lobby (see figure 4.28).

4.6.3 ENTRY LEVEL—EAST ELEVATOR LOBBY

The east elevator lobby is entered from the east and connects the east portal to the elevator, the south corridor (waiting room), the mechanical room, and the base of the original stair that leads to the observation platform on the 500-foot level. The lobby was completely renovated in 1992–1993, and only the white marble and blue gneiss masonry on the east wall remains intact from the original monument construction period. All other finishes date to the renovation. The north, south, and west walls and ceiling are finished with plaster painted off-white, and the floor is a continuation of the granite paver flooring found in the east portal.

On the east wall of the lobby, the white marble door surround is topped by a course of bright white marble with a rough finish. Above this course and flanking the door surround, the original blue gneiss interior stones can be seen. They are laid in a random course pattern and also have a rough finish. On the south side of the portal, a series of

historic graffiti adorn the marble. Carved into the marble surface are several characters, a profile of George Washington, and the date 1861 (see figure 4.29).

The north wall of the east elevator lobby steps back to provide access to the mechanical room door to the west. The north wall is plaster on both its upper and lower portions with a decorative soffit molding forming the transition between wall planes. Just above this molding is a narrow horizontal air vent set flush with the wall. Below the molding, the wall steps back to a flush metal door set in a hollow-metal frame. This door has a brushed-bronze pull and leads to the stair to the observation platform on the 500-foot level.

The west wall of the lobby is dominated by a pair of eight-panel brushed-bronze elevator doors topped by a cast-bronze panel, all set in a carved limestone door surround. The elevator doors are two-segment doors opening in the center and are approximately 4 feet wide and 7 feet tall set in a brushed bronze frame. These doors currently serve as the elevator exiting point for monument visitors. Above the doors, a 4 feet-3 inches by 5 feet-7 inches bronze panel contains a bas-relief portrait of George Washington over oak branches and "GWashington" in script. The panel sits on top of the elevator door frame, is hung on steel plates with a series of blind stainless-steel fasteners, and was installed in 1993.⁴⁹ The elevator door surround is approximately 15 feet-6 inches tall and 8 feet-3 inches wide and is carved with an Egyptian-revival motif. It diminishes in width as it rises and has a projecting cornice with carved asps and feathered wings around a sun punctuated with a six-pointed star (see figure 4.30). The rest of the west wall is of plaster painted off-white with a 5-inch base of dark green and white marble. To the north of the elevator door is a red fire alarm pull station and a narrow flush metal door set in a flush metal frame leading to the mechanical room.

The south wall of the east elevator lobby contains a full width opening with light-green and white marble corners that extend into the south corridor beyond. This opening is topped by a decorative soffit molding identical to that seen on the lobby's north wall. Above this molding is a narrow horizontal air vent set into the plaster wall and a surface-mounted speaker. The ceiling of the lobby is plaster and is inset with a large metal-framed light housing. This housing is approximately 2 feet-3 inches wide, 13 inches deep, and runs almost the full width of the lobby ceiling. It contains nine adjustable PAR accent lights behind three textured, tempered-glass lenses. The fixtures highlight the elevator doors, bronze transom panel, and carved limestone door surround on the lobby's west elevation.

4.6.4 ENTRY LEVEL-SOUTH CORRIDOR

The south corridor is rectangular in plan and connects the east elevator lobby to the west elevator lobby. The corridor serves as a waiting room for monument visitors ascending via elevator to the observation platform on the 500-foot level. The room is lined with a U-shaped marble bench with marble supports installed in 1975, and it contains two Phoenix columns painted gray. These columns are more fully discussed in the interior structure section below. The walls of the corridor are plaster, painted off-white, with a green and white marble chair rail, wainscot, and 6-inch base installed in 1904. The

marble is in two shades, with lighter green and white panels framed by darker bands 5½ inches wide. Above the light green and white marble chair rail, the east, west, and south plaster walls are decorated with a series of cast-bronze garlands installed in 1993. They are fastened to the walls at 12 inches on center and are attached with bronze posts and set screws in nylon-mesh sleeves with epoxy fill. On the south wall, two vertical half-round wall sconces located between the bronze garlands provide light for the room. Above the chair rail on the north wall is a quote in cast-bronze letters ¼-inch thick attached to the plaster wall with blind threaded fasteners. The quote was installed in 1993, and it reads:

First in war, first in peace, and first in the hearts of his countrymen,
he was second to none in the humble and the endearing scenes of private
life; pious, just, humane, temperate, and sincere; uniform, dignified,
and commanding; his example was as edifying to all around him,
as were the effects of that example lasting.

The plaster ceiling of the south corridor was replaced in 1975. It is approximately 9 feet-1 inch high and has two articulated beams with decorative plaster cove molding. The ceiling is punctuated by two smoke detectors: one in the center of the room and one at the southwest corner. The floor of the corridor is terrazzo with decorative mosaic panels surrounded by Greek-key borders (see figures 4.31 and 4.32).

4.6.5 ENTRY LEVEL—WEST ELEVATOR LOBBY

The west elevator lobby is identical in finish to the south corridor with the exception of the east wall. This wall is of plaster and is dominated by a pair of bronze elevator doors matching those found in the east elevator lobby. These doors, however, have a smaller and much more simplified limestone door surround. The surround is approximately 7 feet-9½ inches tall and 5 feet-7 inches wide and diminishes in width as it rises. This surround lacks an ornate carved cornice, and is topped instead by two surface-mounted speakers. The elevator doors in this space currently serve as the main elevator entry point for monument visitors. In the center of the plaster ceiling of this room is a square metal air diffuser and a smoke detector. Lighting is provided by two vertical half-round wall sconces flanking the west opening into the west chamber.

4.6.6 ENTRY LEVEL—WEST CHAMBER

The west chamber is currently cordoned off with metal stanchions and a velvet rope. It is dominated by a bronze reproduction statue of George Washington, installed in 1992, set on a green and white marble pedestal near the west end of the room (see figure 4.33). The west chamber is identical to the east portal in size and finish with the exception of the flooring material. The same attachment ghosts can be seen on the white marble walls and ceiling, and the outline of the original west entry can be detected on the west elevation. The east wall of this room has a full-width opening to the west elevator lobby, and the opening is topped by a large bronze cornice channel installed in 1992, which conceals uprights for the room. Above the cornice channel is a plaster partition wall of light-gauge metal framing, also installed in 1992. The partition contains a narrow horizontal air vent and a recessed metal light housing containing adjustable accent lighting for the statue. The flooring of the west chamber is terrazzo and matches the

design of the flooring in the south corridor. Installed in 1913,⁵⁰ the floor is dominated by a decorative mosaic panel with a central shield and wreath design surrounded by a Greek-key double border. The terrazzo is edged with granite pavers.

4.6.7 IRON STRUCTURE AND STAIR

The interior iron structure of the Washington Monument not only provides structural support for the stairs and elevator leading to the 500-foot-level observation platform, it provides additional strength and rigidity to the exterior masonry structure of the monument. The primary components of the interior iron structure are two sets of four Phoenix columns each, arranged in two concentric squares. The Phoenix columns are composed of 20-foot-long flanged sections of cast iron that are bolted together at the flanges to form cylindrical sections. The interior concentric square of 6-inch-diameter Phoenix columns measures 9 foot 9 1/2-inch to a side. The interior columns support the elevator, its hardware, and systems. The exterior square of 7 1/4-inch-diameter Phoenix columns measures 15 feet-8 inches to a side. The exterior columns support the stairs and platforms and are tied to the interior columns with peripheral girders.

The platforms and stairs date from the original period of construction. The first stair platform begins at the 20-foot level and is accessed by stairs leading up from the entry level that wrap around the north, west, and south interior sides of the monument (see figure 4.34). The platforms and stairs are supported by four main cast-iron I-beams, two running north-south and two running east-west at the edges of the exterior concentric square. The ends of the four main I-beams are secured into the masonry walls. Platforms are located alternately on the east and west sides of the monument every 10 feet from the 20 to 480-foot level with cast-iron stairs running along the north and south sides of the monument. The stair platforms have cross bracing in the form of eight minor cast-iron I-beams that run east-west (see figure 4.35). Platforms were modified in 1938 by installing extended metal platforms at each level to ensure that the elevator could safely access any platform. The platform surface is supported by a cast-iron plate, which is covered with terrazzo flooring. Each platform has the floor level marked with bronze numbers inset into the terrazzo; these date to 1974–76. The elevator shaft side of the platforms is lined with pipe railing.

The stairs are constructed of cast-iron treads bolted to cast-iron stringers with additional support running parallel to the stringer beams at the center of the treads (see figure 4.36). The stairs have pipe-metal railings on the elevator shaft side, which date to 1929. The stairs and platform are constructed to accommodate the curved corners of the masonry above the 150-foot level and the projection of structural buttresses above the 470-foot level (see figure 4.37).

The elevator shaft is enclosed with diamond-mesh metal screening that was installed in 1929 to improve security (see figures 4.38 and 4.39). In several locations, the 1929 security mesh has been removed as part of the 1997–2000 elevator renovations. In locations where the elevator slows on descent to allow for viewing of the memorial stones, the mesh has been replaced with a large glass panel to give elevator passengers unobstructed views of the stones (see figure 4.40). In these areas, floodlights are

synchronized with the elevator's descent and are timed to turn on as the elevator slows and passes the platform. Currently, the stairs are not accessible to the general public except by special arrangement with the National Park Service. However, metal signs, dating to 1904, still warn of a fifty-dollar fine for vandalism or "committing a nuisance" and remain as a testament of the once well-traveled stairs (see figure 4.41).

4.6.8 MEMORIAL STONES

There are 194 memorial stones set into the interior elevations of the monument (see figure 4.42). A listing of the memorial stone donors by floor level follows, with inscriptions shown in parentheses as necessary for clarification. For a complete description of each stone, including its material and condition, please refer to "Washington Monument Memorial Stones" by Mike G. Rose and "Washington Monument: Survey of Commemorative Stones" by Judy Jacob.⁵¹ One stone, reading "L + Fallon 1879," was documented in April 1996 on the 90-foot level. This stone could not be located.

30-foot level: the State of Arkansas; the State of Delaware; the State of Maine; the Franklin Fire Company of Washington, D.C.; the National Greys of Washington, D.C.; George Watterston, Secretary of the Washington National Monument Society (bronze identification plaque located above stone); Timothy O'Neale (Little Falls Quarry, District of Columbia)

40-foot level: the State of Alabama; the State of Louisiana; the City of Nashville, Tennessee; the German Benevolent Society of Washington, D.C.; the Association of Journeymen Stonecutters of Philadelphia; the Columbia Typographical Society

50-foot level: the State of Georgia; the State of Illinois; the State of Indiana; Washington Naval Lodge No. 4, Ancient York Masons; the Grand Lodge of Masons of the District of Columbia; Washington Light Infantry, Washington, D.C.

60-foot level: the State of Florida; the State of New Hampshire; the State of South Carolina; Westmoreland County, Virginia; Anacostia Tribe No. 3 of the I.O. of R.M., Washington, D.C.; the Grand Lodge of the I.O. of O.F. of New Jersey

At the 80-foot level, but viewed from the 60-foot level landing, is a stone from Thomas Carbery marking 100 feet above the base of the monument foundation.

70-foot level: the State of Connecticut; the State of Massachusetts; the State of New Jersey; the Grand Division of the Sons of Temperance, North Carolina (bronze identification plaque located above stone); the Grand Division of the Sons of Temperance, Virginia; the United Sons of America, Pennsylvania;

80-foot level: the State of Maryland; the State of Virginia; the City of Washington, D.C.; the Invincible Fire Company No. 5, Cincinnati, Ohio; R.W. Grand Lodge of the I.O. of O.F. of Indiana; the Maryland Pilgrims Association

90-foot level: the State of Mississippi; the State of Missouri; the State of Ohio; the City of Little Rock, Arkansas; the Mechanics of Raleigh, North Carolina (bronze identification plaque located above stone); the Odd Fellows of Ohio

100-foot level: the State of North Carolina; the State of Rhode Island; the State of Wisconsin; the Citizens of Thomaston, Maine; the Grand Lodge of the I.O. of O.F. of Virginia; the Independent Order of United Brothers of Maryland

110-foot level: the State of Iowa; Peter Force; the Postmasters and Assistant Postmasters of Indiana; the Grand Lodge of the State of Kentucky; the Grand Lodge of the State of New York (bronze identification plaque located below stone); the Grand Lodge of the State of Ohio

120-foot level: the State of California; the City of Frederick, Maryland; the City of Roxbury, Massachusetts; the Sons of Temperance, Rhode Island; the I.O. of O.F. of Germantown, Pennsylvania; Patmos Lodge No. 20, Ellicott Mills, Maryland

130-foot level: the City of Durham, New Hampshire; the Corporation of the City of New York; Oakland College, Mississippi; the Alumni of Washington College, Lexington, Virginia; the Grand Lodge of the State of Maryland; Mount Lebanon Lodge No. 226, Lebanon, Pennsylvania; Washington Lodge No. 21, New York City; the I.O. of O.F. of Massachusetts; the American Institute of the City of New York; the Union Society, Hillsborough, North Carolina; the American Whig Society; the Grand Division of the Sons of Temperance, Connecticut

140-foot level: the City of Baltimore, Maryland; the Grand Lodge of the State of Alabama; the Grand Lodge of the State of Georgia; the Grand Lodge of the State of Illinois; the Fort Greene Guard of Brooklyn, New York; Company I, 4th Regiment, U.S. Infantry; Engineers of the Second Division, Virginia; Masterton and Smith (New York); Hitner's Quarry (Pennsylvania); Otter's Summit, Virginia

160-foot level: the State of New York; the City of Newark, New Jersey; the City of Warren, Rhode Island; the Athenian Lodge of the I.O. of O.F. of Troy, New York; Lafayette Lodge No. 64, New York City; Eureka Lodge 177 of the I.O. of O.F. of New York City

170-foot level: the State of Vermont; the City of Boston, Massachusetts; the City of Charlestown, Massachusetts; the City of New Bedford, Massachusetts; the City of Salem, Massachusetts; Washington Lodge, Roxbury, Massachusetts

180-foot level: the State of Pennsylvania; the City of Philadelphia; the I.O. of O.F. of the City and County of Philadelphia; the Grand Lodge of the State of Pennsylvania; the Sons of Temperance, Pennsylvania

190-foot level: the Nation of Brazil; the Free Swiss Confederation; the Islands of Paros and Naxos, Greece; the Nation of Greece (inscription in Greek); the Nation of Siam; the Nation of Turkey (inscription in Turkish); the City of Bremen, Germany

200-foot level: the State of West Virginia; the City of Richmond, Virginia; the Grand Lodge of the State of Virginia; St. Johns Lodge No. 36, Richmond, Virginia; the Supreme Council of the Templars of Honor and Temperance; the Grand Lodge of the I.O. of O.F. of Maryland; the Grand Lodge of the I.O. of O.F. of the United States of America

210-foot level: the State of Kansas; the State of Michigan; the Grand Division of the Sons of Temperance, Illinois; the Grand Lodge of the State of Arkansas; the Grand

Lodge of the State of Iowa; the Grand Lodge of the State of Mississippi; the I.O. of O.F. Grand Lodge of Mississippi; the Grand Division of the Sons of Temperance, Ohio

220-foot level: the State of Minnesota; the State of Montana; the State of Nebraska; the State of Nevada; the State of Oregon; the State of Utah; the Territory of Utah (Holiness to the Lord Deseret); the Territory of Wyoming; the Cherokee Nation; a Company of Christians in the Nation of China (inscription in Chinese); the Nation of Japan (inscription in Japanese)

230-foot level: the State of Kentucky; the State of Tennessee; Hawkins County, Tennessee; the Grand Lodge of the State of Florida; the Grand Lodge of the I.O.O.F. of Kentucky; Georgia Convention

240-foot level: Tuscarora Tribe No. 5 of the I.O.R.M., Washington, D.C.; Kings County, New York; James Buchanan (From Braddock's Field); the American Medical Association; the Association of the Oldest Inhabitants of the District of Columbia; the Nation of Wales (inscription in Gaelic); the General Assembly of the Presbyterian Church; the United American Mechanics of Pennsylvania

250-foot level: the Citizens of Stockton, California; the Ladies of Lowell, Massachusetts; Citizens of the United States residing in Foo Chow Foo, China; the Fire Department of Philadelphia; the Engine and Hose Companies of Philadelphia; the Engine, Hose, and Hook-and-Ladder Companies of Pennsylvania; Teachers of the Buffalo Public Schools; the Proprietors of the Cincinnati Commercial; the Thalian Association of Wilmington, North Carolina; the Young Men's Mercantile Library Association of Cincinnati

260-foot level: the Sunday School Children of the Methodist Episcopal Church of the City of New York; the Sabbath School Children of the Methodist Episcopal Church of Philadelphia; the Sons of New England in Canada; the Washington Erina Guard, Newark, New Jersey; the Fire Department of the City of New York; the Cincinnati Fire Company; Pupils of the Public Schools of Baltimore, Maryland

270-foot level: the Continental Guard of New Orleans, Louisiana; the Alexandrian Library in Egypt; the Jefferson Society of the University of Virginia; R. Norris and Son Locomotive Works, Philadelphia; the Ladies of Manchester, New Hampshire; the Cleosophic Society, Nassau Hall, New Jersey

280-foot level: the City of Honesdale, Pennsylvania; the First Regiment of Light Infantry, Massachusetts Voluntary Militia, Boston; the Citizens of Alexandria, Virginia; Two Disciples of Daguerre; the Dramatic Profession of America; the Hibernian Society of Baltimore; Jefferson Medical College of Philadelphia; Western Military Institute, Drennon, Kentucky

290-foot level: the State of Colorado; the State of Oklahoma; the State of Texas

300-foot level: the State of South Dakota

310-foot level: the State of Washington; the People of Okinawa Prefecture, Japan

320-foot level: the State of Arizona

330-foot level: the State of New Mexico; Thomas Crawford (Top of Statue on Capitol)

340-foot level: the Vatican, Italy (inscription in Latin)

350-foot level: the State of North Dakota

360-foot level: Grace Brothers, Ltd. (Hawaii Uamawkeea Okaina Ikapono);

380-foot level: the City of Carthage

400-foot level: the State of Idaho

450-foot level: the State of Alaska

4.6.9 490-FOOT LEVEL

The 490-foot level is the elevator re-entry level for the Washington Monument, providing elevator access to departing visitors. This level contains interpretive displays about the history of the monument as well as a small souvenir shop in which visitors can browse while waiting for their ride to ground level. The 490-foot level is also the departure point for frequent National Park Service led "walk-down tours" that enable visitors to descend the monument by stair and view the interior of the monument shaft. The 490-foot level was completely renovated during the monument restoration project of 1997-2000, and only the white marble masonry and painted Phoenix columns remain intact from the original monument construction period (see figure 4.43). All other finishes date to the renovation.

The marble masonry walls of the 490-foot level are completely encased in a protective glass framework set in metal "T"s, which are supported on 1½-inch-square metal tubes. This framework is painted off-white and wraps around the masonry ribs of the pyramidion, providing recesses for interpretive displays in the two center bays of each elevation. Pictorial and text displays are laminated to the glass framework between ribs, and they are backlit by strip fluorescent light fixtures located behind base moldings and above the ceiling. Underneath each display panel, a narrow metal air vent can be seen in the floor. Two of the displays, at the north and east elevations, are enhanced by glass cases containing artifacts (see figure 4.44). These cases sit on tubular-steel bases that project from the glass framework on steel supports.

The floor of the 490-foot level is an epoxy terrazzo in two shades of gray set in a checkerboard pattern of 28-inch squares. The ceiling has a baked on paint finish with recessed panels and coffers holding dropped incandescent light fixtures with frosted globes. These materials are in stark contrast to the four wrought-iron Phoenix columns, which surround the elevator enclosure.

In the northwest corner of the 490-foot level, a small souvenir shop provides books, postcards, and other keepsakes to monument visitors. The shop is characterized by full-height laminated display racks and bookshelves supported on a tubular-steel structure. The shop has a sliding metal-mesh security door that locks at the ceiling. Adjacent to the shop is a small retail counter with a cash register.

In the northeast and southeast corners of the 490-foot level, two stairs lead to the 500-foot level observation platform. These stairs have brushed-stainless-steel handrails with metal-mesh panels below. The stairs are framed with steel structural members and covered with

epoxy terrazzo in a dark gray. In the center of each stairwell, a large ventilation duct penetrates the floor and continues up to the 500-foot level.

4.6.10 500-FOOT LEVEL

The 500-foot level is the observation level of the Washington Monument, providing visitors with panoramic views of the Washington, D.C., skyline. It is the elevator exit point for visitors and contains an electrical closet in the southwest corner, a communications enclosure in the northwest corner, stairs down to the 490-foot level in the northeast and southeast corners, and ladder access to the elevator equipment platform at the 518-foot level. The 500-foot level was completely renovated during the monument restoration project of 1997–2000, and only the white marble masonry remains intact from the original monument construction period (see figures 4.45 and 4.46). All other finishes date to the renovation.

The marble ribs supporting the monument pyramidion at the 500-foot level are completely encased in a protective glass framework identical to that found on the 490-foot level (see figure 4.47). Over 11 feet high, this framework opens up around the eight bulletproof glass windows while providing a mounting surface for labeled photographic views of objects seen through these windows. Individual photo panels are fixed to the glass framework above each window with four round metal fasteners, and they sit 3 inches in front of the framework. Above each of the photographic panels, red aircraft-warning lights can be seen (see figure 4.48). These lights are more fully described in the Washington Monument Exterior section above.

Currently, one window opening on each of the four elevations is blocked by a plywood enclosure. These enclosures are approximately 7 feet tall and constructed of 2-by-4 wood framing held away from the glass framework by spacers. The enclosures have plywood doors with hasp locks and apparently enclose security monitoring equipment for the capital. At each remaining window opening, a set of booster steps can be seen (see figure 4.49). These steps face the windows and have two treads and risers of stainless steel embossed with a tread pattern. The steps have rubber nosings and a single metal handrail on metal supports at the top.

The floor of the 500-foot level is an epoxy terrazzo in two shades of gray set in a checkerboard pattern of 28-inch squares. This pattern is inset with a central compass design of deep-rose terrazzo embellished with aluminum directional letters at the cardinal points. The ceiling is open to the marble pyramidion interior above (see figure 4.50).

In the northeast and southeast corners of the 500-foot level, terrazzo stairs lead down the 490-foot (elevator re-boarding) level (see figure 4.46). A large round air duct in the center of these stairwells rises to approximately 12 feet above the 500-foot level floor. The marble masonry in these stairwells is not encased in glass, providing monument visitors with their only chance to appreciate the tactile qualities of the historic pyramidion stone. The northwest and southwest corners of the 500-foot level are enclosed in metal-mesh partitions and house electrical and communications equipment for the monument.

4.6.11 ELEVATOR EQUIPMENT PLATFORM

The elevator equipment platform is located on top of the monument elevator shaft at the 518-foot level. This platform is accessed through a galvanized panel door on an angle-iron framework that is reached by a two-piece ladder rising from the observation platform floor. The elevator equipment platform is completely enclosed in galvanized sheet metal, including the pyramidal roof, and it houses the elevator hoist, elevator motion control panels, and a variety of other elevator electrical and mechanical equipment. In the middle of each platform wall, the center ribs of the monument pyramidion are visible. These ribs project through the platform enclosure and are wrapped with sheet copper (see figure 4.51). Lighting for the platform is provided by two 1-foot by 4-foot fluorescent light fixtures with metal guards, and all interior surfaces of the enclosure are covered with an assortment of conduit, exposed wiring, and fasteners.

4.7 INTERIM SECURITY BUILDING – INTERIOR

The interior of the interim security building was completed in 2001, and all of the original materials remain in place. This temporary addition is divided into two rooms by a single metal-framed partition wall running north to south. The larger room is located at the east end of the addition directly behind the main entrance door. It functions as a security screening area and contains a metal detector, an x-ray machine for visitors' personal belongings, and two stations for security screening personnel. The smaller west room serves as a guard station and is constantly manned by at least one member of the United States Park Police.

The interior wall surfaces of the security addition are finished with gypsum wallboard painted off-white with a black vinyl base. The ceiling is composed of 2-foot-square white acoustic tile, and lighting is provided by four 2-foot by 4-foot recessed fluorescent light fixtures. There are also two 2-foot-square air vents recessed in the ceiling of the rooms. The flooring of the addition is comprised of two materials, the first of which was installed in 1975. Granite pavers laid in a splayed pattern emanate from the east portal of the Washington Monument, and these make up the majority of the addition flooring. The second flooring material is exposed aggregate concrete, which is simply a continuation of the monument plaza paving surrounding the addition. All doors in the addition are metal set in hollow metal frames. They have lever-type knobs and closers of brushed stainless steel. The two doors in the partition wall between the two rooms have a single narrow vertical light on the latch side of the door. The doors are constantly propped open and serve as entry and exit points for monument visitors traveling through the security checkpoint.

The east room of the security addition is subdivided on the south side to create a narrow passageway for exiting visitors. This division is formed with a half-wall of gypsum wallboard approximately 4 feet tall that stretches west from the east exterior wall to a point midway through the east room. The wall is topped by a single-pane window in a stainless-steel frame. The half-wall continues west to the partition wall, but it continues in glass, making the full height of the exit passageway visible to security personnel. Also in the east room are two 5-inch by 5-inch columns that continue through the acoustic-tile

ceiling to the roof structure above. Finally, the west wall of the east room supports a large electrical panel and a security system keypad.

The west room of the security addition contains moveable furniture and storage for security personnel. It is equipped with motion detectors, and conduit can be seen snaking from the ceiling through the west doors into the monument (see figure 4.52). The west wall of this room is the east exterior marble wall of the Washington Monument. The wall has a large central opening that is 8 feet tall and approximately 5 feet-8 inches wide spanned by a steel lintel. The original 1854 opening was 16 feet tall, but this dimension was decreased in 1885 when the decorative marble door surround was removed.⁵² The existing opening is covered by a pair of decorative metal gates painted off-white with a hasp and padlock assembly. These bronze gates, installed in 1932,⁵³ cover solid marble double doors dating from 1885 that are approximately 4 inches thick and fixed in the open position (see figure 4.53).

ENDNOTES

Abbreviations:

- E 484 Letters Received, Entry 484; Records of the Joint Commission for Completion of the Washington Monument.
- E 495 Letters Sent, Entry 495; Records of the Engineer in Charge, 1876–1892; Records of the Joint Commission for Completion of the Washington Monument, 1876–1892.
- E 512 Contracts, Entry 512; Records of the Engineer In Charge, 1876–1892; Records of the Joint Commission for the Completion of the Washington Monument, 1876–1892.
- GPO Government Printing Office, Washington, D.C.
- NAB National Archives Building, Washington, D.C.
- NPS-NCR National Park Service – National Capital Region
- RG 42 Records of the Office of Public Buildings and Public Parks of the National Capital, Record Group 42
- RG 79 Records of the National Park Service, Record Group 79
- SPNEA Society for the Preservation of New England Antiquities

¹ “Washington Monument, Plans and Sections Showing Progress of the Work,” 1 December 1880; [Architectural Drawing] File 74-8-1, Sheet No. 1; NCP 807; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.

² Quinn-Evans Architects, “Bunker 1 Plan and Details,” July 1997; [Architectural Drawing] File 807_41019A, Sheet 8 of 81; Technical Information Center, Denver Service Center, National Park Service.

³ “Cross Section of the National Washington Monument, Its Bench Mark and Foundation,” 1898; [Architectural Drawing] File 74-15-23; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.

⁴ “Cross Section of the National Washington Monument, It’s Bench Mark and Foundation,” 1898.

⁵ Kluckhuhn, Cobb & McDavid Co., "Lighting Vault Plan and Sections," Revised 4 July 1958; [Architectural Drawing] File 807_84289, Sheet 12 of 15; NPS-NCR Collection.

⁶ "Washington Monument, Plans and Sections Showing Progress of the Work," 1 December 1880.

⁷ Lt. Col. Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to W. W. Corcoran, Chairman Joint Commission for Construction of Washington Monument, 27 July 1878; v. 4, p. 6; E 495; RG 42; NAB.

⁸ Casey to Corcoran, 27 July 1878.

⁹ "Washington Monument, Plan and Section of Concrete Sub Foundation," 1 December 1879; [Architectural Drawing] File 807_80022, Sheet No. 1; Technical Information Center, Denver Service Center, National Park Service.

¹⁰ Henry O. Avery, "The Washington Monument," *The American Architect and Building News*, 13 December 1884; vol. XVI, no. 468, p.282.

¹¹ Casey to Corcoran, 27 July 1878.

¹² "Washington Monument, Plan and Section of Concrete Sub Foundation," 1 December 1879; "Plan and Section of Buttress," 1 December 1879; [Architectural Drawing] File 807_80023, Sheet No. 2; Technical Information Center, Denver Service Center, National Park Service.

¹³ "Washington Monument, Plan of Masonry at Ref. 150^{ft}," n.d., [Architectural Drawing] File 74-2-203; NCP 807; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.

¹⁴ [Unknown] to Col. Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, 30 June 1883; Letters Received, Entry 492; Records of the Engineer in Charge, 1876-1892; Records of the Joint Commission for the Completion of the Washington Monument, 1876-1892; RG 42; NAB.

¹⁵ Lt. Col. Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and T. T. Fowler and Co., "Articles of Agreement," 7 October 1878; E 512; RG 42; NAB.

¹⁶ Mark Brewer, "Marble Joinery in the Washington Monument," n.d.; NPS-NCR Collection.

¹⁷ "Exterior Conditions," December 1997; [Architectural Drawing] File 807_41026, Sheet 3 of 8; Technical Information Center, Denver Service Center, National Park Service.

¹⁸ "Survey of Condition of Stones in Washington Monument," October 1934; [Architectural Drawing] File 74-2-212; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.

¹⁹ "Masonry Repair Details," December 1997; [Architectural Drawing] File 807_41026, Sheet 6 of 8; Technical Information Center, Denver Service Center, National Park Service.

²⁰ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Brig. Gen. H. G. Wright, Chief of Engineers, U.S.A., Chairman of Building Committee, Joint Commission for Completion of the Washington Monument, 19 January 1884; E 484; RG 42; NAB.

²¹ Casey to Wright, 19 January 1884.

²² Bernard R. Green, Civil Engineer, "Notes on Project for a Marble Pyramidion for the Washington Monument, represented in four sheets of drawings on file in the Engineer Office," 4 August 1884; Folder 21, Box 41; Casey Family Papers; SPNEA.

²³ "Course K (Roof)," n.d.; [Architectural Drawing] File 74-3-22-9; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.

²⁴ National Capital Parks. "Bicentennial Specifications, Interior Structural and Mechanical Improvements," 30 July 1974; NPS-NCR Collection.

²⁵ "Miscellaneous Details," December 1997; [Architectural Drawing] File 807_41026, Sheet 7 of 8; Technical Information Center, Denver Service Center, National Park Service.

²⁶ Kluckhuhn, Cobb & McDavid Co., "Obstruction and Pyramidion Lighting and Plan," Revised 4 July 1958; [Architectural Drawing] File 807_84289, Sheet 13A of 15; NPS-NCR Collection.

²⁷ Steber Manufacturing Co., "PAR-64 Lampholder with Auxiliary Red Lens," 1 May 1957; [Architectural Drawing] File 807_84298; Technical Information Center, Denver Service Center, National Park Service.

²⁸ "Exterior Conditions," December 1997.

²⁹ "Crowning the Monument," *The Evening Star*, 6 December 1884, n.p.

³⁰ Col. Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of December 1884," 3 January 1885; E 484; RG 42; NAB.

³¹ E. H. Dix, Jr., "Aluminum Cap Piece on Washington Monument," *Metal Progress*, December 1934, n.p.

³² U.S. Department of the Interior, Geological Survey, "Building Stones of our Nation's Capital," <http://pubs.usgs.gov/gip/stones/>, accessed 14 August 2003.

³³ Women In Mining, "About Minerals, A Tour of Historical Rocks in DC," <http://www.womeninmining.org/WashingtonDctour.htm>, accessed 8 September 2003.

³⁴ U.S. Department of the Interior, Geological Survey, "Building Stones of our Nation's Capital."

³⁵ Maryland Geological Survey, "A Geologic Walking Tour of Building Stones of Downtown Baltimore, Maryland," <http://www.mgs.md.gov/esic/features/walking/stp6.html>, accessed 8 September 2003.

³⁶ Mark Brewer, "We the Undersigned Stonecutters Have the Honor to Present to You....," n.d., NPS-NCR Collection.

³⁷ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of November 1879," 2 December 1879; v. 1, p. 352; E 495; RG 42; NAB.

³⁸ "Alterations to Guard's Room," Revised 17 December 1931; [Architectural Drawing] File 807_84090, Sheet 3 of 3; NPS-NCR Collection; Quinn-Evans Architects, "Bunker 1 Plan and Details," July 1997.

³⁹ "Architectural Floor Plan." Revised 4 July 1958; [Architectural Drawing] File 807_84289, Sheet 4 of 15; NPS-NCR Collection.

⁴⁰ Quinn-Evans Architects, "Bunker 1 Plan and Details." July 1997.

⁴¹ Quinn-Evans Architects, "Bunker 1 Plan and Details," July 1997.

⁴² Quinn-Evans Architects, "Bunker 1 Plan and Details," July 1997.

⁴³ Quinn-Evans Architects, "Bunker 1 Plan and Details," July 1997.

⁴⁴ Quinn-Evans Architects, "Bunker 1 Plan and Details," July 1997.

⁴⁵ "Alterations to Guard's Room," Revised 17 December 1931.

⁴⁶ Quinn-Evans Architects, "Bunker 1 Plan and Details," July 1997.

⁴⁷ Hilleary-Miller, June 1974; [Architectural Drawing] File 807_41001A, Sheet 35 of 55; NPS-NCR Collection.

⁴⁸ U.S. Congress. Senate, *Annual Report of the Joint Commission for Completion of the Washington Monument*, 49th Congress, 1st session, 1885, Doc. 6, 2.

⁴⁹ Skylight Studios Inc., "Transom Panel." 25 September 1993; [Architectural Drawing] File 807_1400, Sheet 1 of 5; Technical Information Center, Denver Service Center. National Park Service.

⁵⁰ F. D. Owen. "Plans. Small Additional Waiting Room, Washington Monument," 1913; [Architectural Drawing] File 74-20-18; NCP 807; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.

⁵¹ Mike G. Rose, Park Ranger, Mall Operations, "Washington Monument Memorial Stones," 22 July 1997; NPS-NCR Collection; Judy Jacob, "Washington Monument: Survey of Commemorative Stones," 20 May 2003; NPS-NCR Collection. Before-restoration and after-restoration photographs taken in conjunction with the 2000 restoration project are located in the Building Conservation Branch, Northeast Cultural Resources Center of the National Park Service, in Lowell, Mass.

⁵² U.S. Congress, Senate, *Annual Report of the Joint Commission for Completion of the Washington Monument*, 49th Congress, 1st session, 1885, Doc. 6, 2.

⁵³ Office of Public Buildings and Public Parks of the National Capital, *Annual Report of Director of Public Buildings and Public Parks of the National Capital*, Washington, D.C.: GPO, 1932.

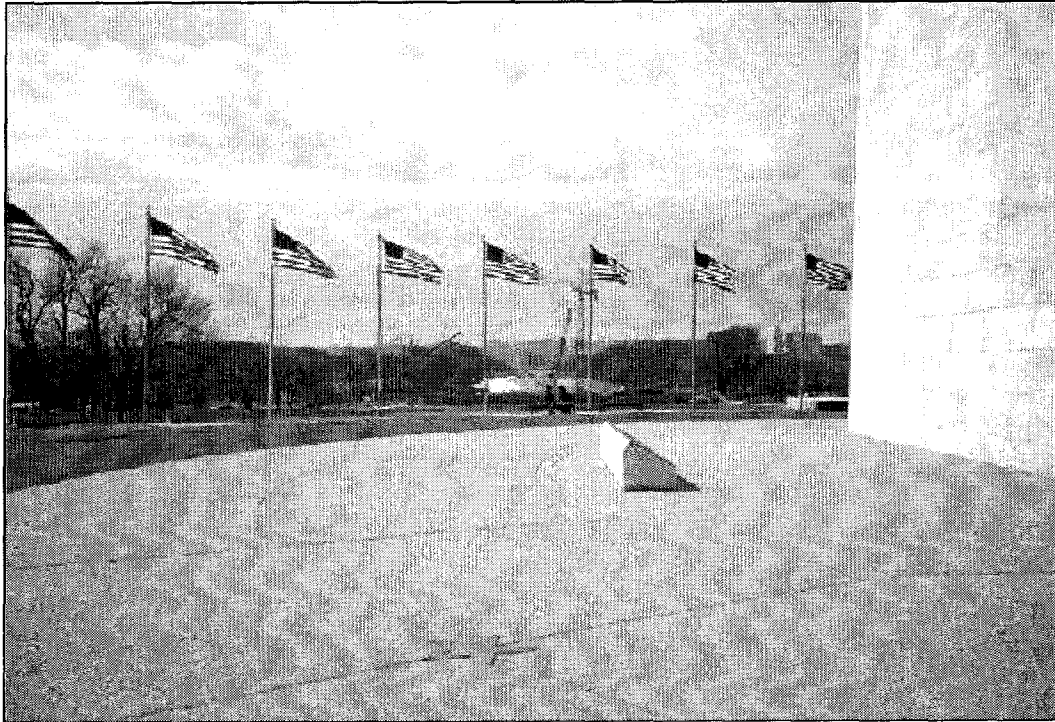
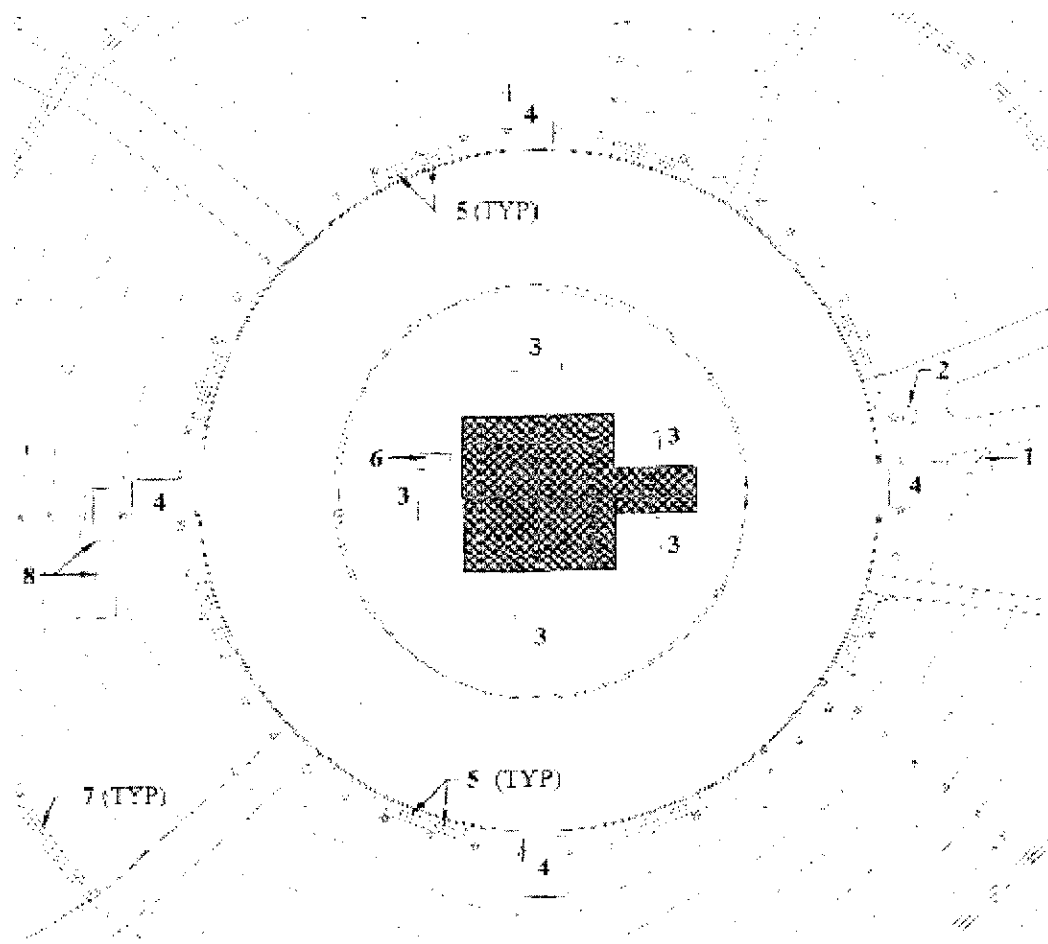


Figure 4.1: Monument Plaza, view to the west, with inset granite star in foreground.



FEATURES KEY:

- 1 DRINKING FOUNTAIN
- 2 COMMEMORATIVE PLAQUE
- 3 FLOOD LIGHT FIXTURE
- 4 FLOOD LIGHT VALVE
- 5 BENCH
- 6 STAIR DOWN TO BUNKER 1
- 7 TRAFFIC BARRIER
- 8 EQUIPMENT VAULT

* represents a

LEGEND:

- [Hatched Box] BUILDING
- [Dashed Line] CONTOUR
- [Triangle] DRINKING FOUNTAIN
- [V-shape] FENCE POST
- [Star] FLAG POLE
- [Circle with X] STAIRS
- [Dotted Line] SIDEWALK
- [Square with X] TRASH RECEPTACLE

Drawing 1, Washington Monument Site Plan.



Figure 4.2: Washington Monument site plan.

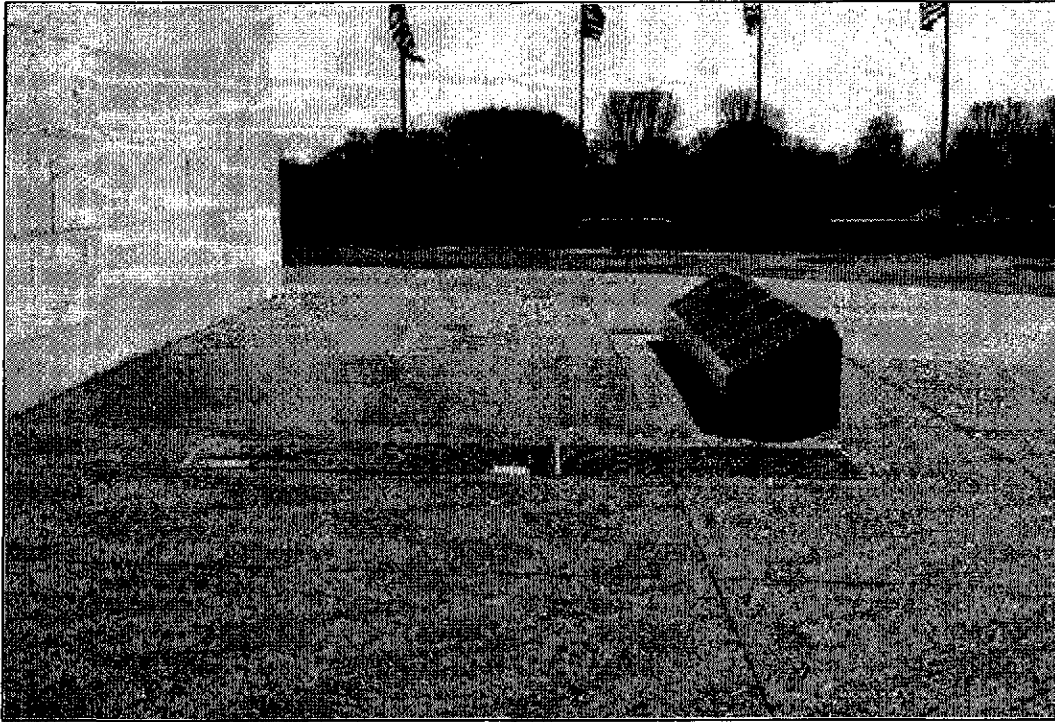


Figure 4.3: Monument Plaza, view to the south, with long metal grate in foreground over access to below-grade mechanical space.



Figure 4.4: Monument Plaza, geodetic control mark access cover at corner of monument.



Figure 4.5: Floodlight vault, view to the west.

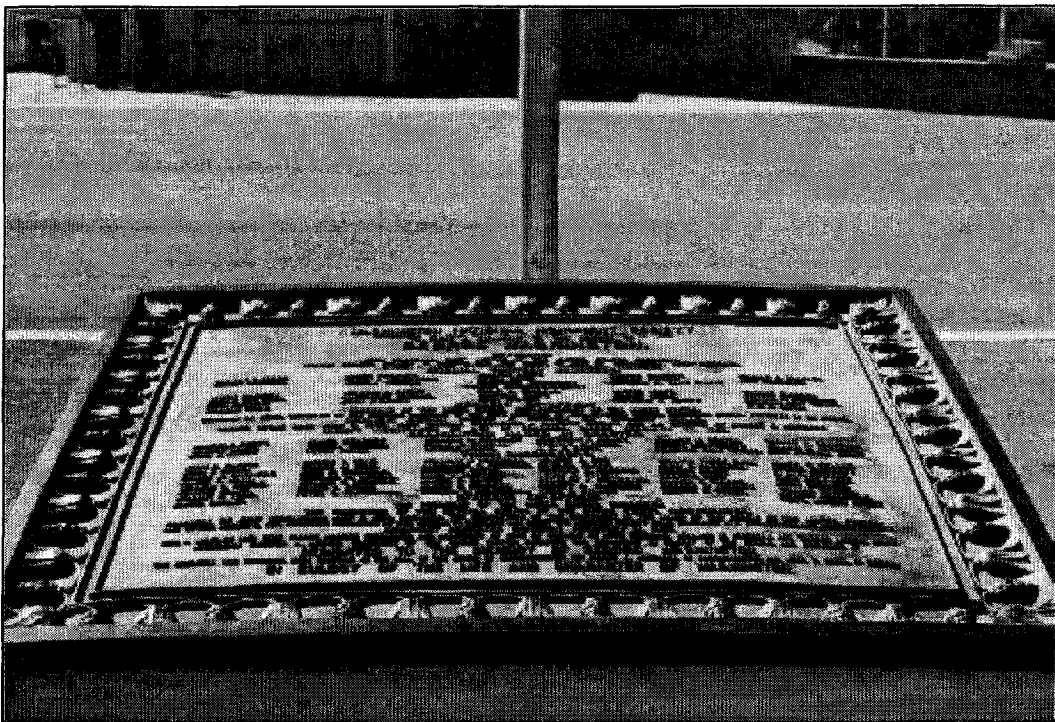


Figure 4.6: Washington Monument Society Plaque, view to the west.

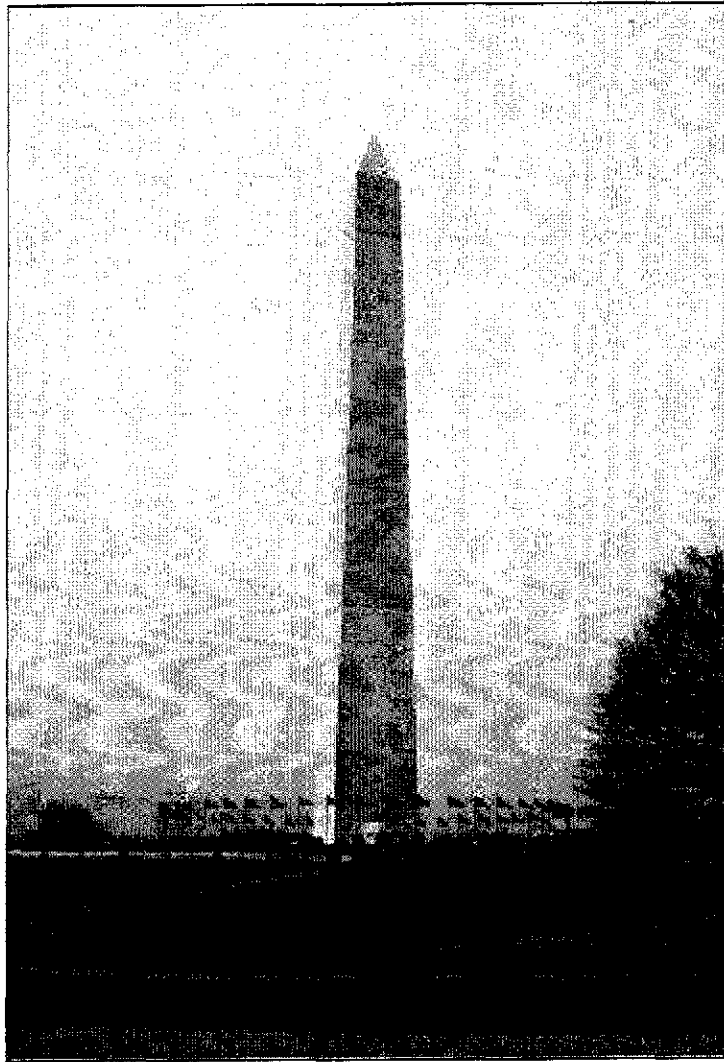


Figure 4.7: Washington Monument, view to the northwest.



Figure 4.8: Historic construction photograph showing the original stepped blue gneiss foundation of the Washington Monument. ("Foundation of Washington Monument, from the south," August 14, 1879, Prints and Photographs Division, LC-USZ62-30613, Library of Congress, Washington, D.C.)

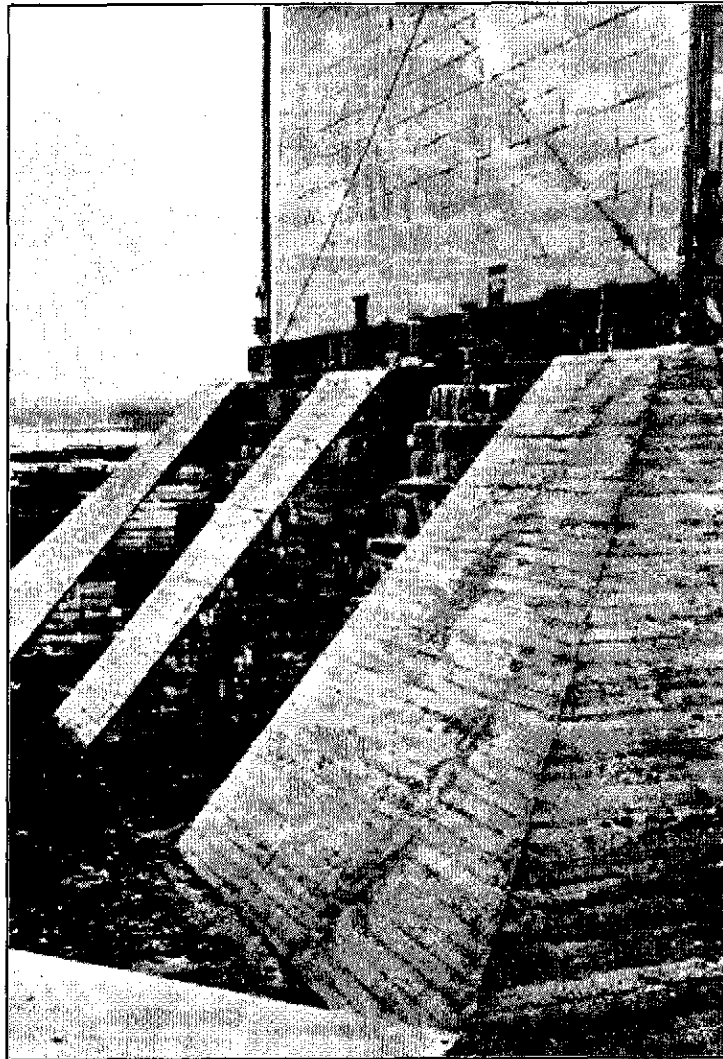


Figure 4.9: January 20, 1880, photograph showing the concrete buttressing of the original Washington Monument foundation. ("Buttressing of Foundation, Washington Monument, from the southeast," Prints and Photographs Division, LC-USZ62-30612, Library of Congress, Washington, D.C.)

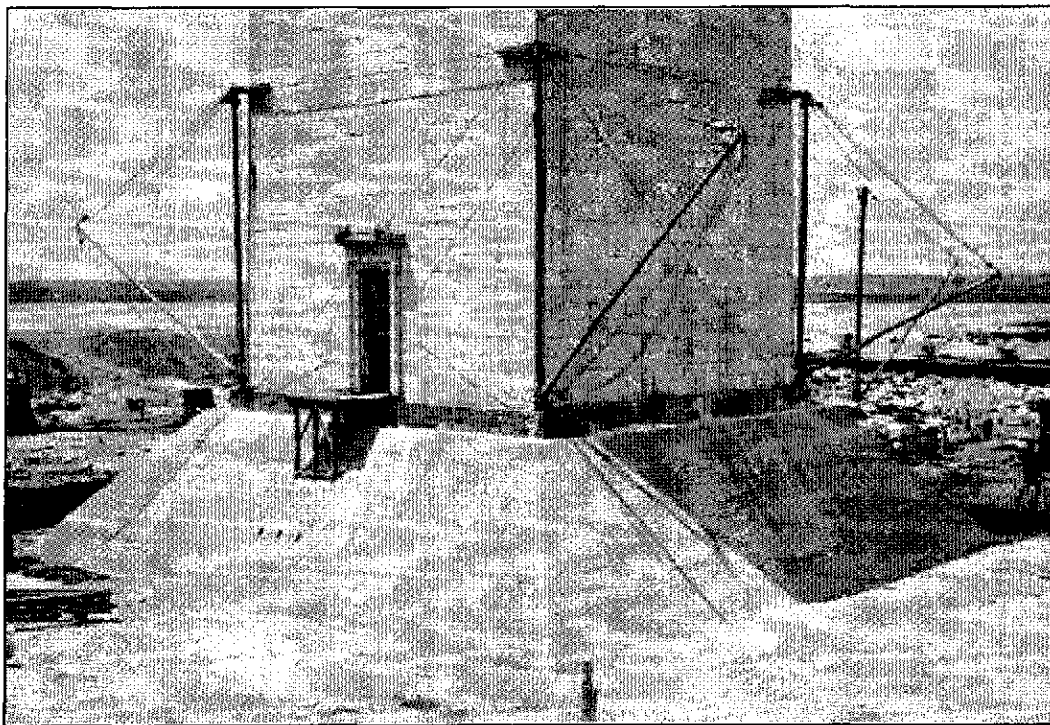


Figure 4.10: May 1880 photograph showing the completed enlargement and strengthening of the original Washington Monument foundation ("Washington Monument, Strengthening Foundation Completed May 28, 1880," Prints and Photographs Division, LC-USZ62-15294, Library of Congress, Washington, D.C.)

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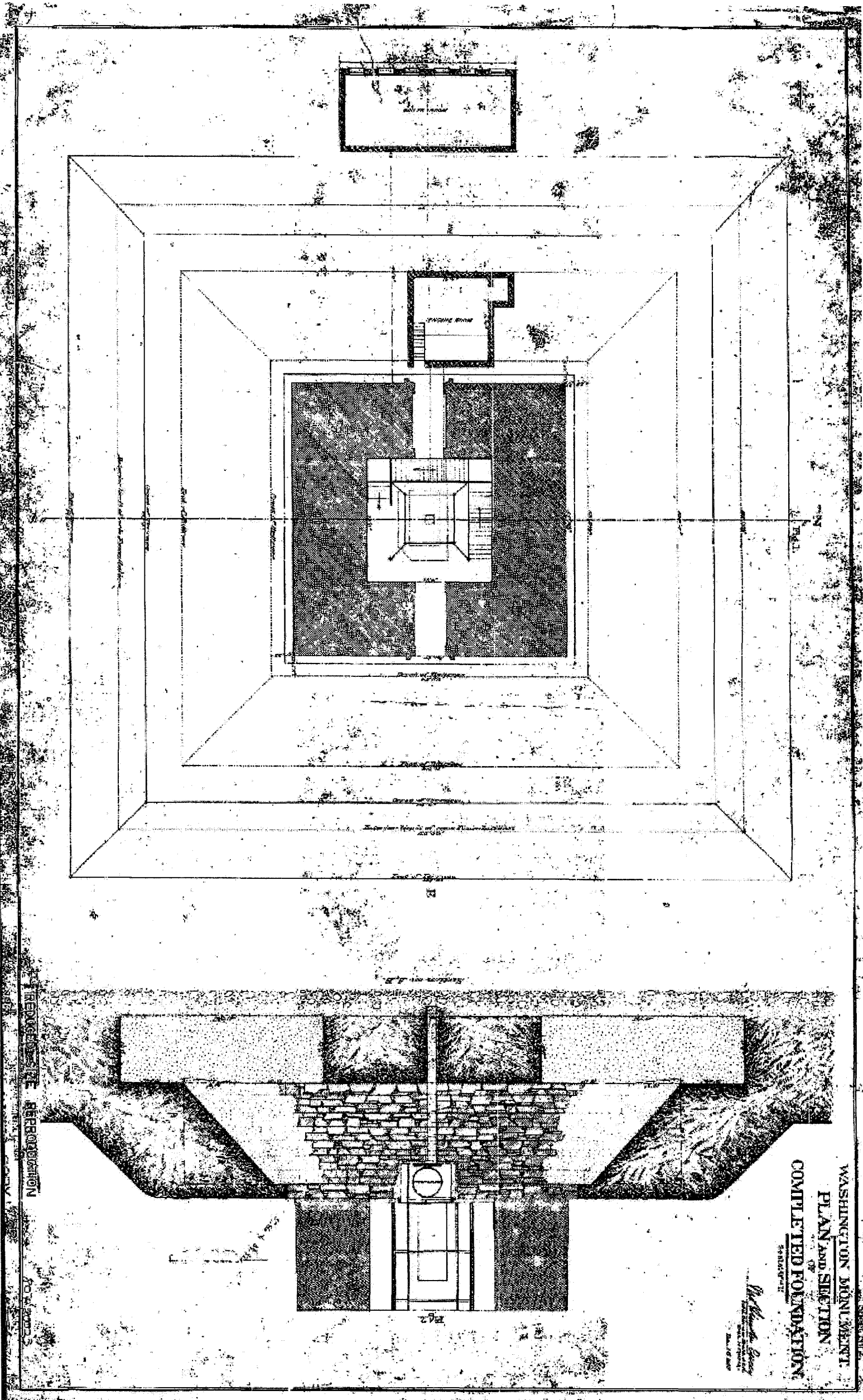


Figure 4.11: Completed foundation drawing showing original stone foundation, concrete buttressing and underpinning, and grading of the knoll. (Thos. Lincoln Casey, Washington Monument, Plan and Section of Completed Foundation, Sheet No. 2, December 1, 1880, NCP 807_80025.



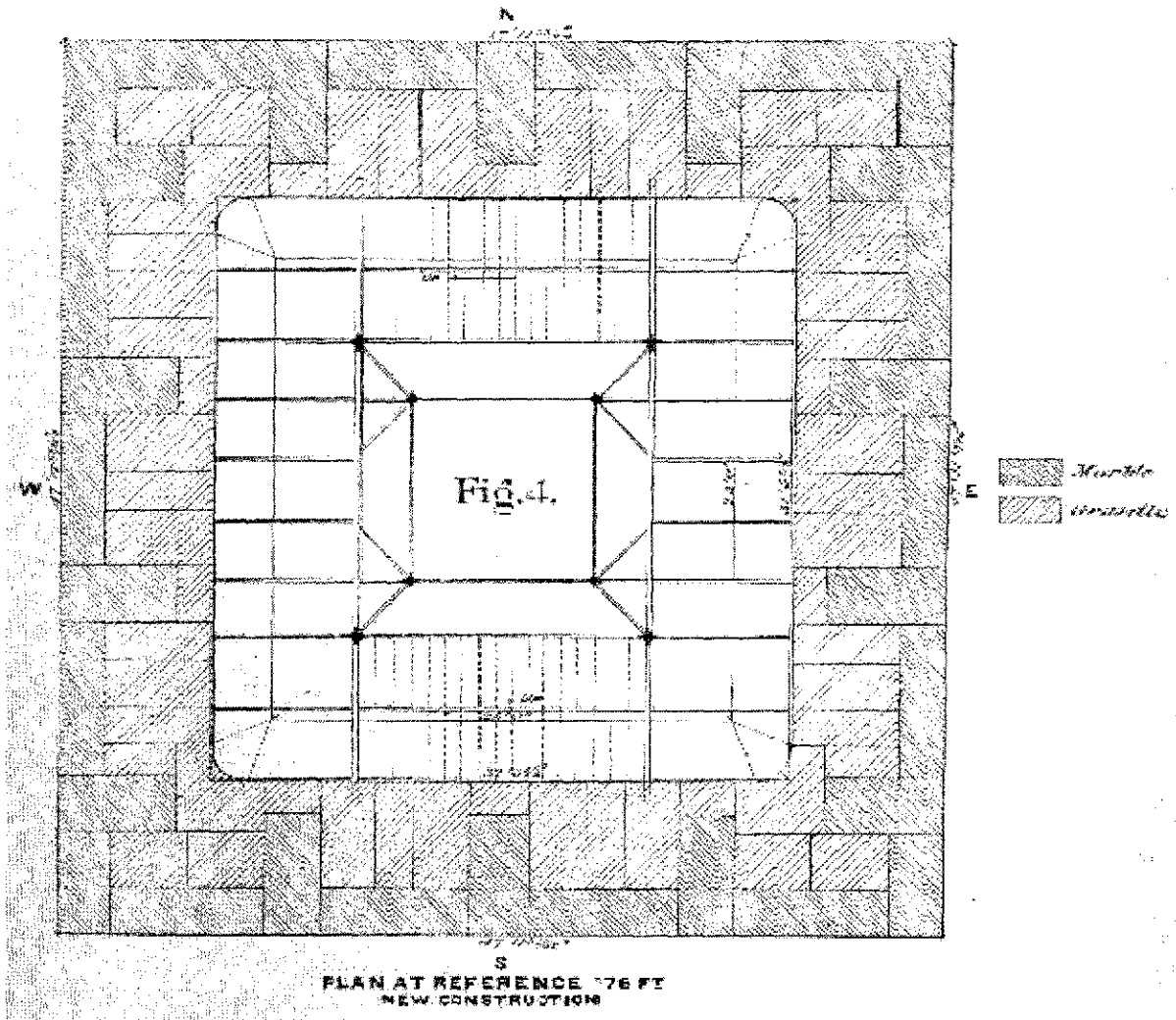


Figure 4.12: Plan at Reference 176 feet ("Washington Monument, Plans and Sections Showing Progress of the Work," 1 December 1880; [Architectural Drawing] File 74-8-1, Sheet No. 1; NCP 807; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)

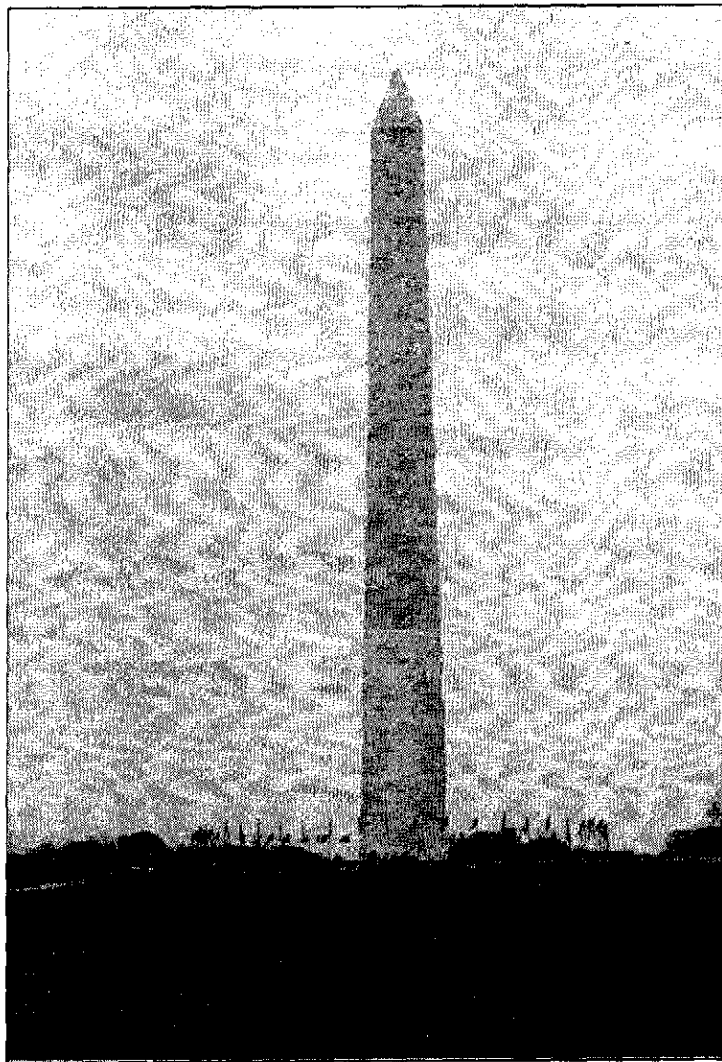


Figure 4.13: Washington Monument, view to the east, with marble color change at the 150-foot level.

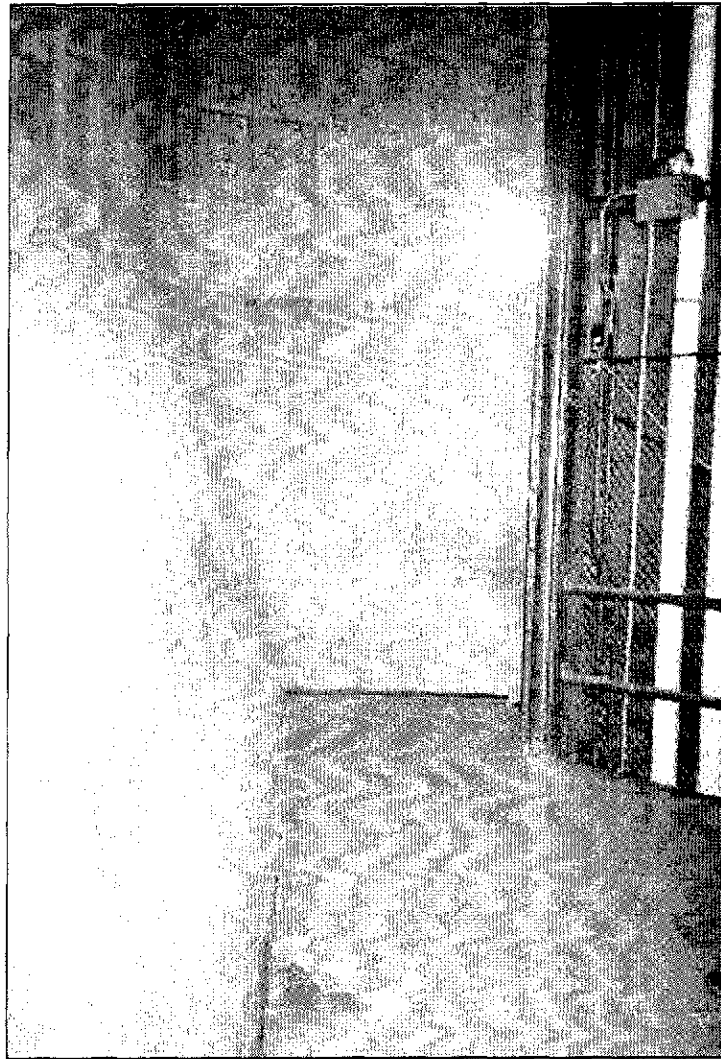


Figure 4.14: Washington Monument interior at the 150-foot level showing the taper of the shaft wall surface.



Figure 4.15: Washington Monument interior at the 450-foot level. Marble headers and granite stretchers appear from the 218-foot level to the 460-foot level.

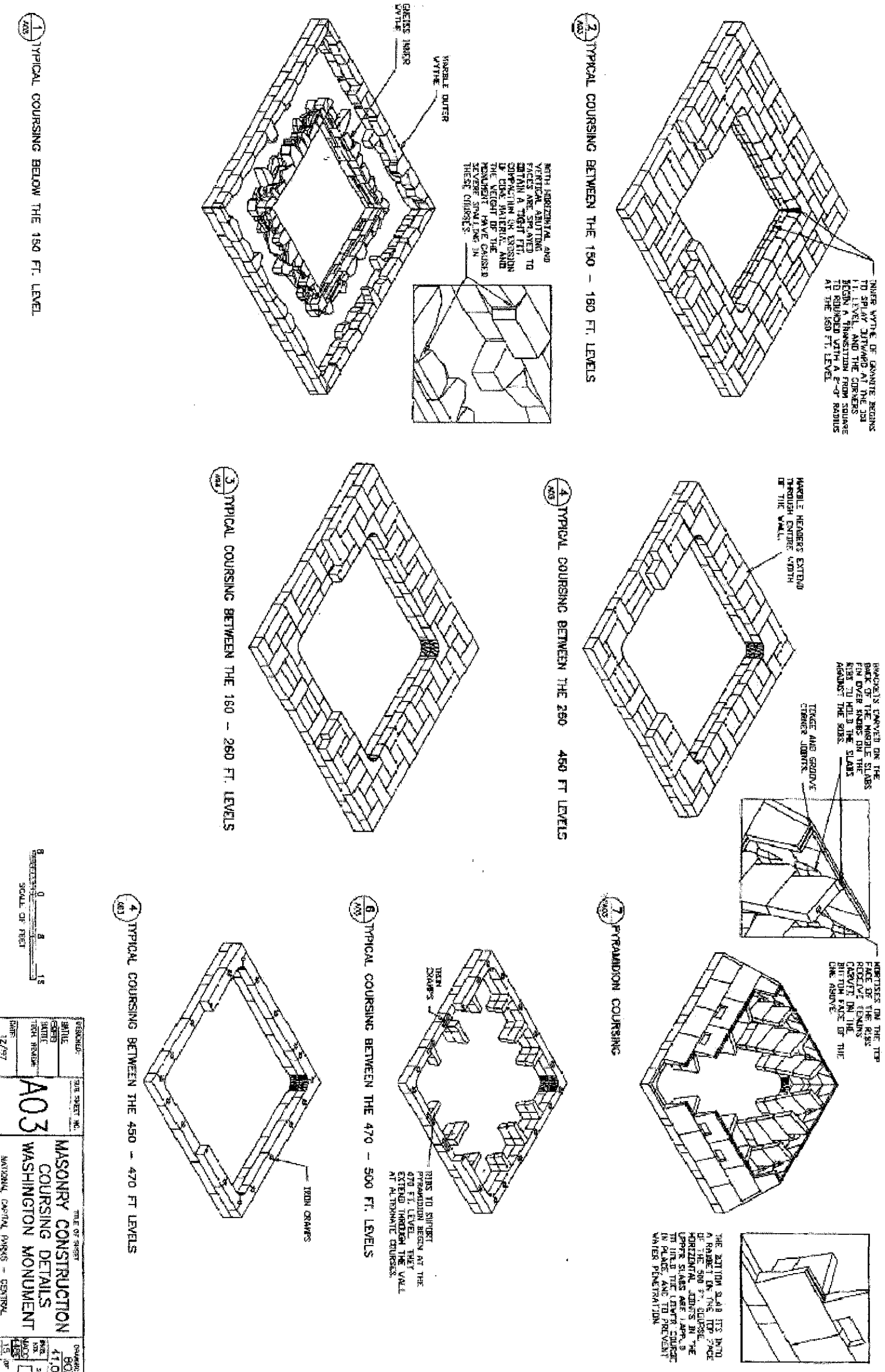


Figure 4.16: Monument stone coursing diagrams. (National Capital Parks - Central, Masonry Construction Coursing Details, Washington Monument, December 1997, NCP 807_41026 p. 5.)

REVISIONS:	SITE SHEET NO.	DATE OF SHEET
DATE	NO.	BY
12/97	A03	11/02
MASONRY CONSTRUCTION COURSING DETAILS WASHINGTON MONUMENT		
NATIONAL CAPITAL PARKS - CENTRAL		
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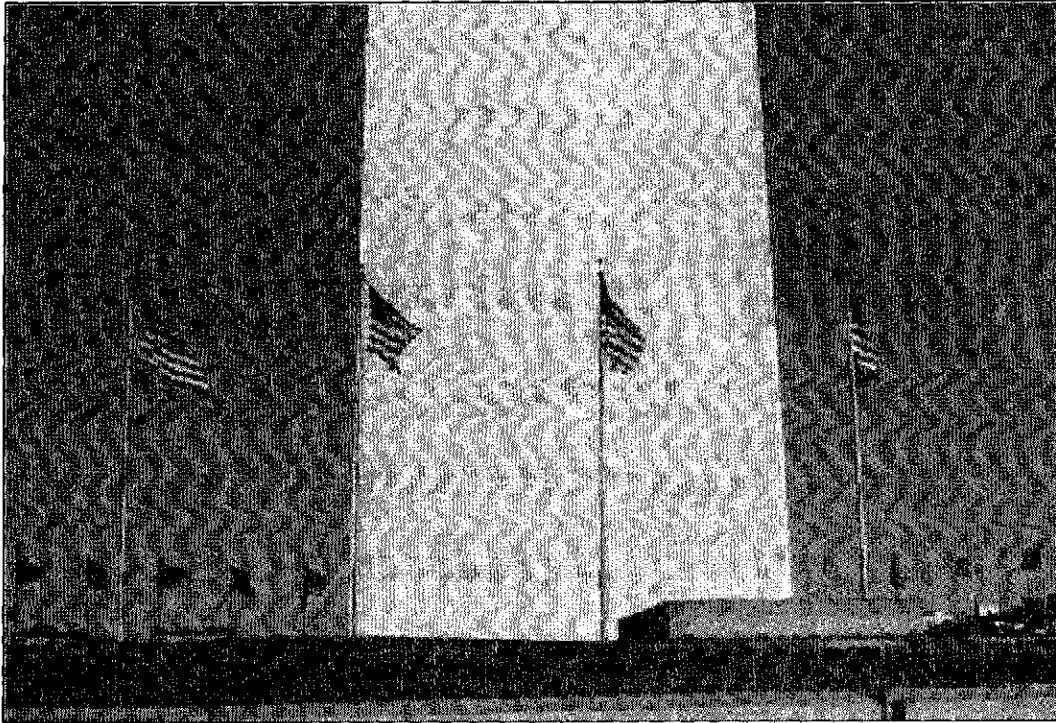


Figure 4.17: Washington Monument, view to the east. Note the bright-white stone dutchman repairs at the corners of the monument.



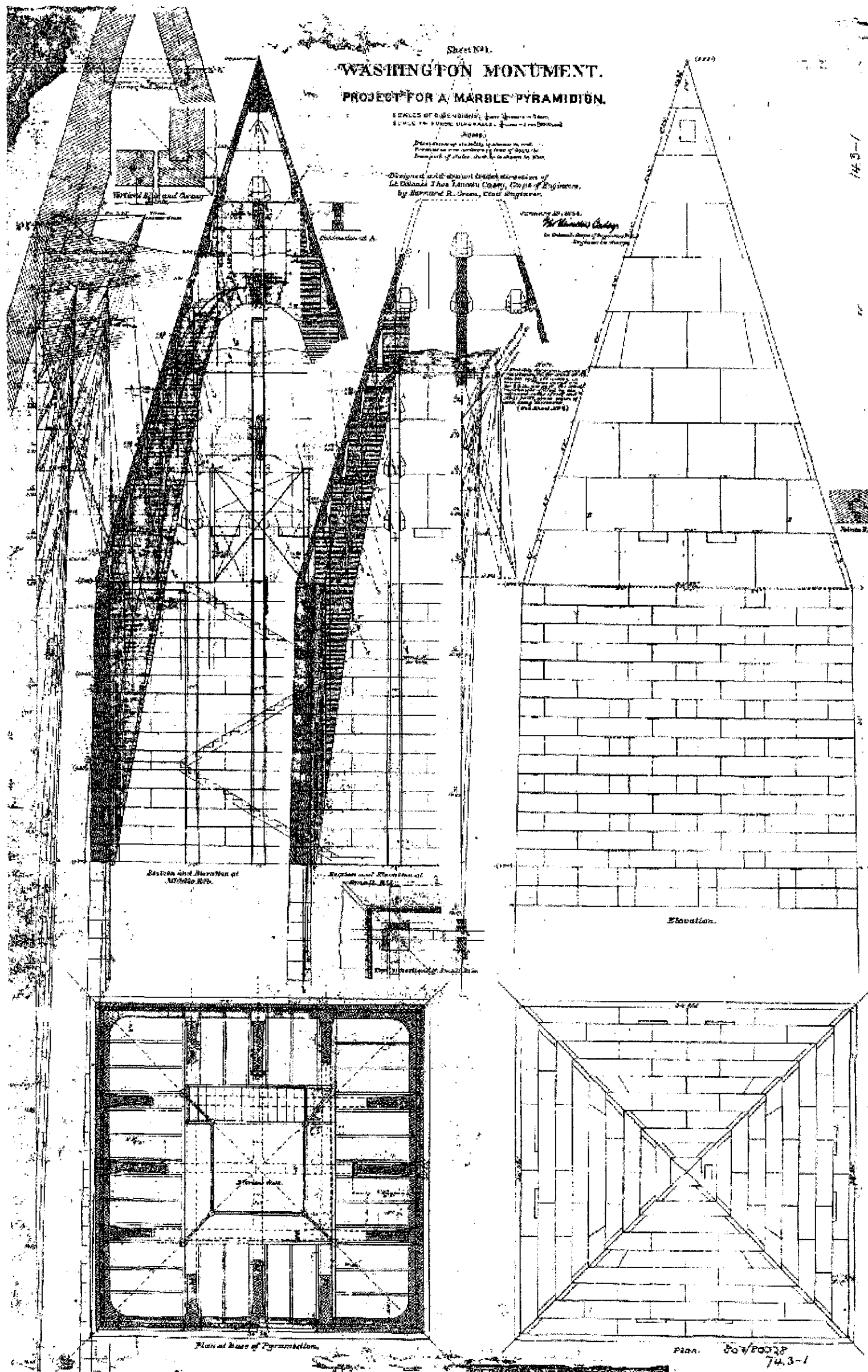
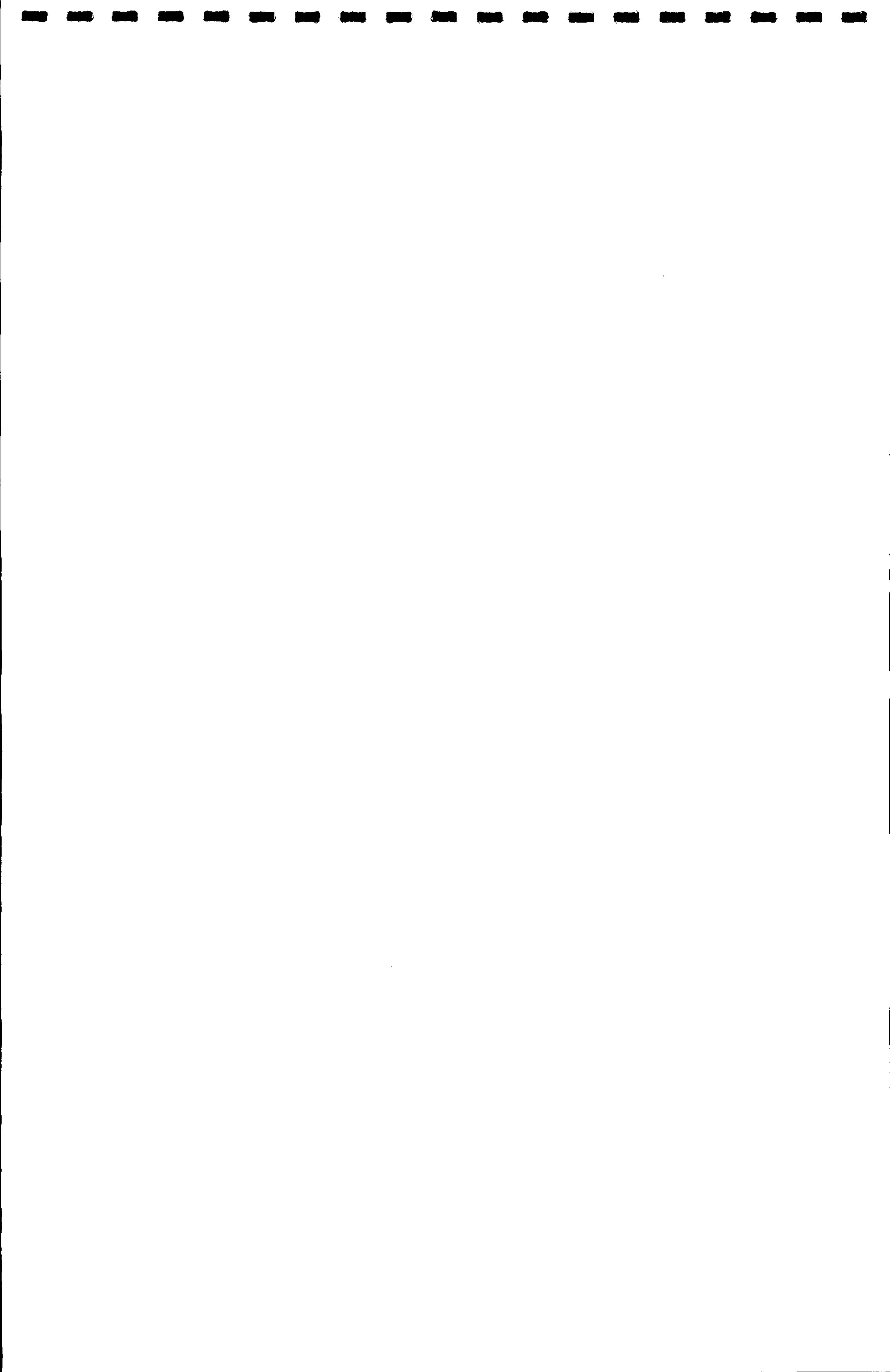


Figure 4.18: Pyramidion design development drawing showing ribs, stone brackets, and joints. (Thos. Lincoln Casey, Washington Monument, Project for a Marble Pyramidion, Sheet No. 1, January 19, 1884, NCP 807_80028



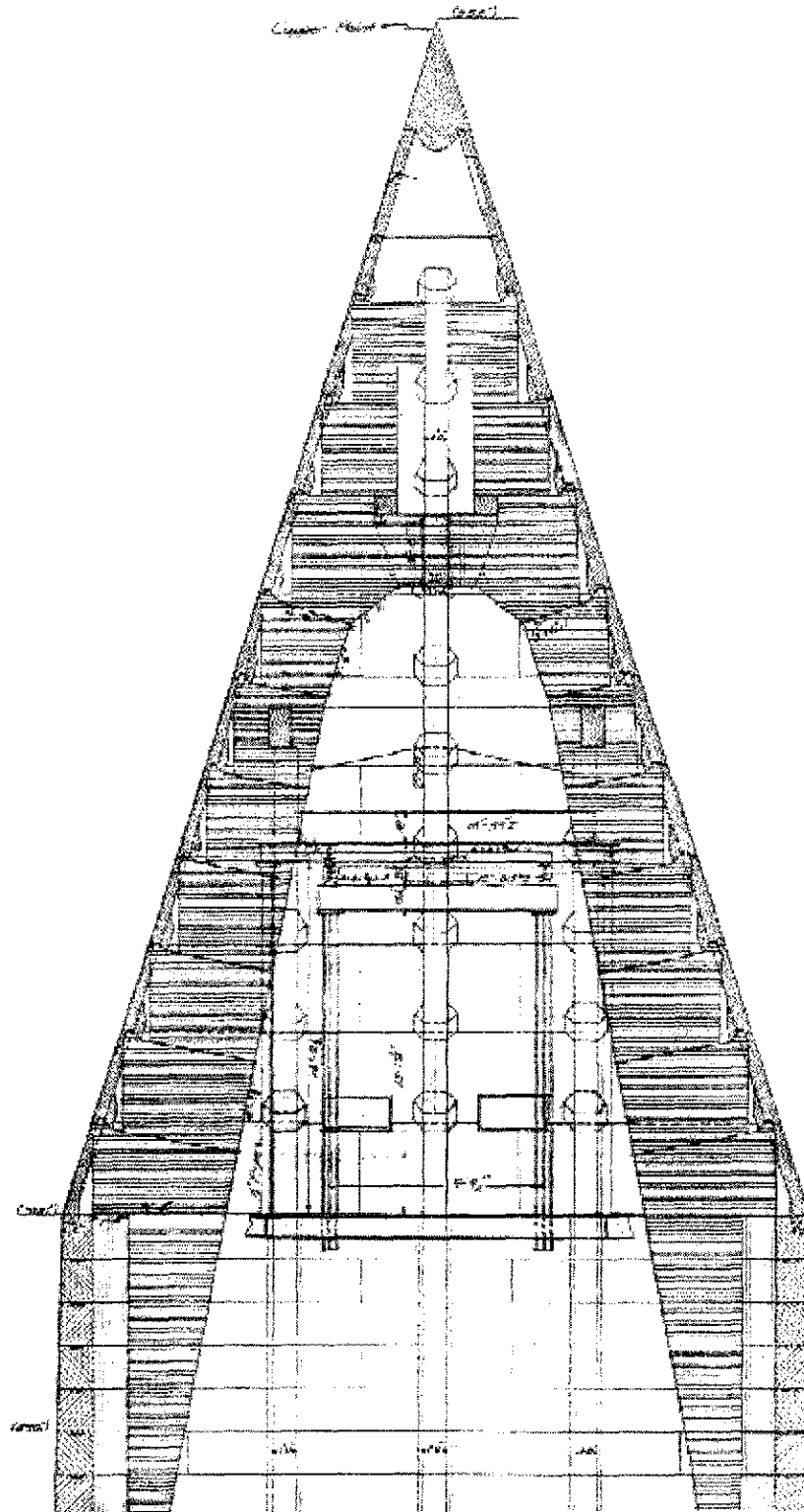


Figure 4.19: Detail of Pyramidion. (Earl G. Marsh, "Washington Monument Pit, Pyramidion, & Foundation Existing Conditions," 19 March 1925; [Architectural Drawing] File 74-13-24, Sheet No. 1; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.)

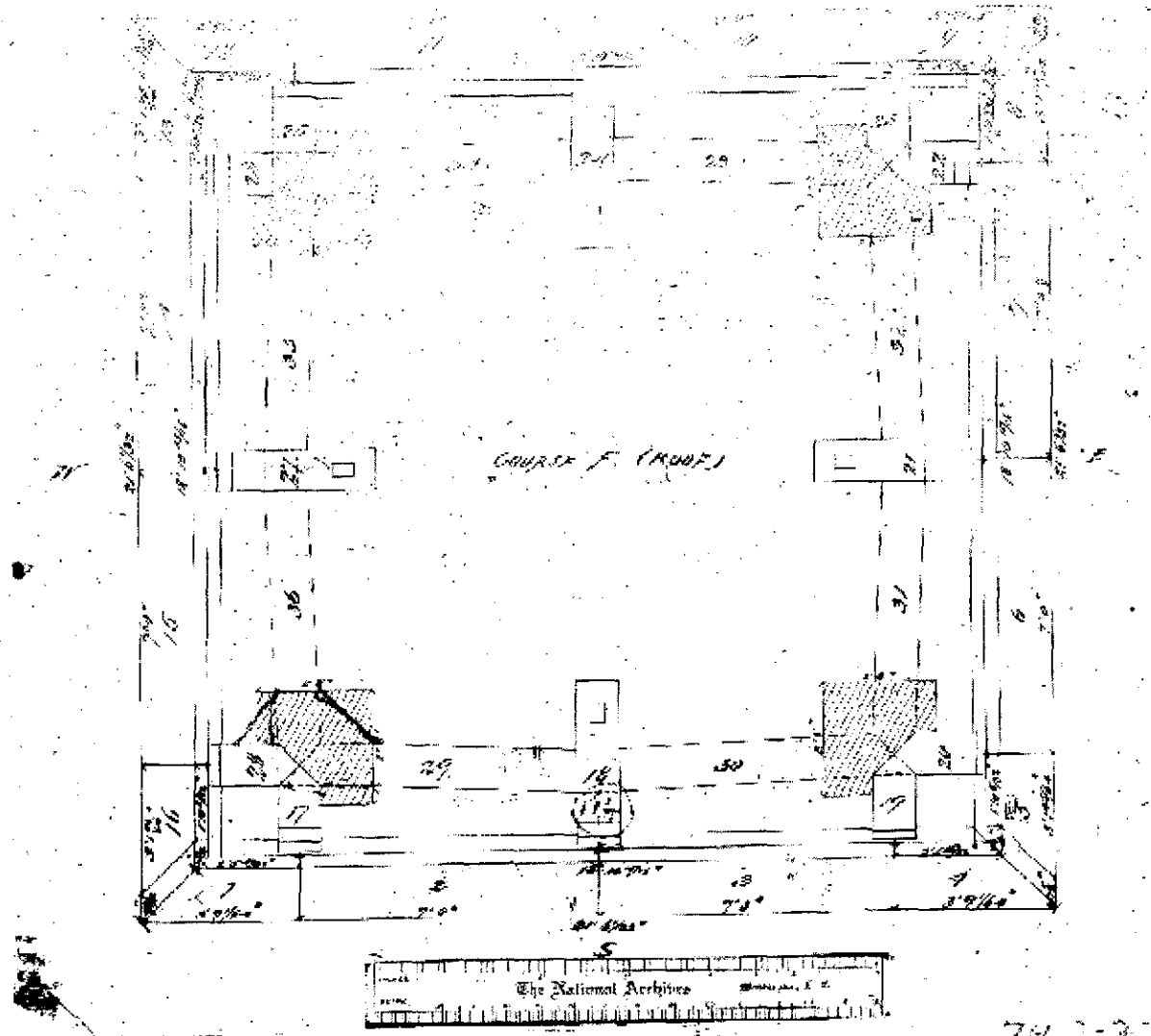


Figure 4.20: Sixth pyramidion stone course showing vertical corner support blocks and beam ties between the corner and center ribs (Course F (Roof) [NARA RG 79, file 74.3-22-6, Cartographic and Architectural Records LICON, Special Media Archive Division, College Park, Md.]

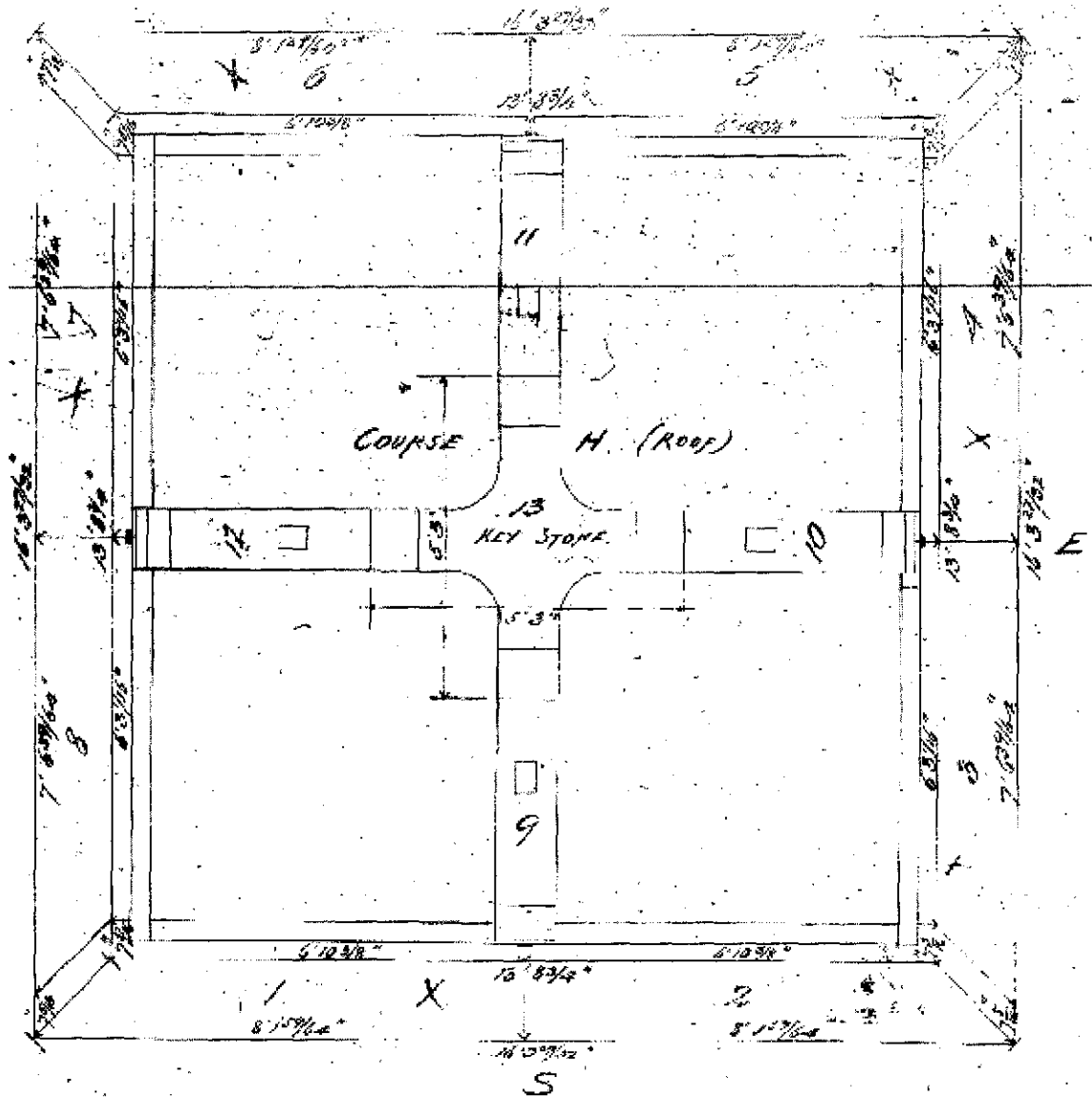


Figure 4.21: Seventh pyramidion stone course showing cruciform keystone connecting the center ribs. (Course H (Roof) [NARA RG 79, file 74.3-22-7, Cartographic and Architectural Records LICON, Special Media Archive Division, College Park, Md.]

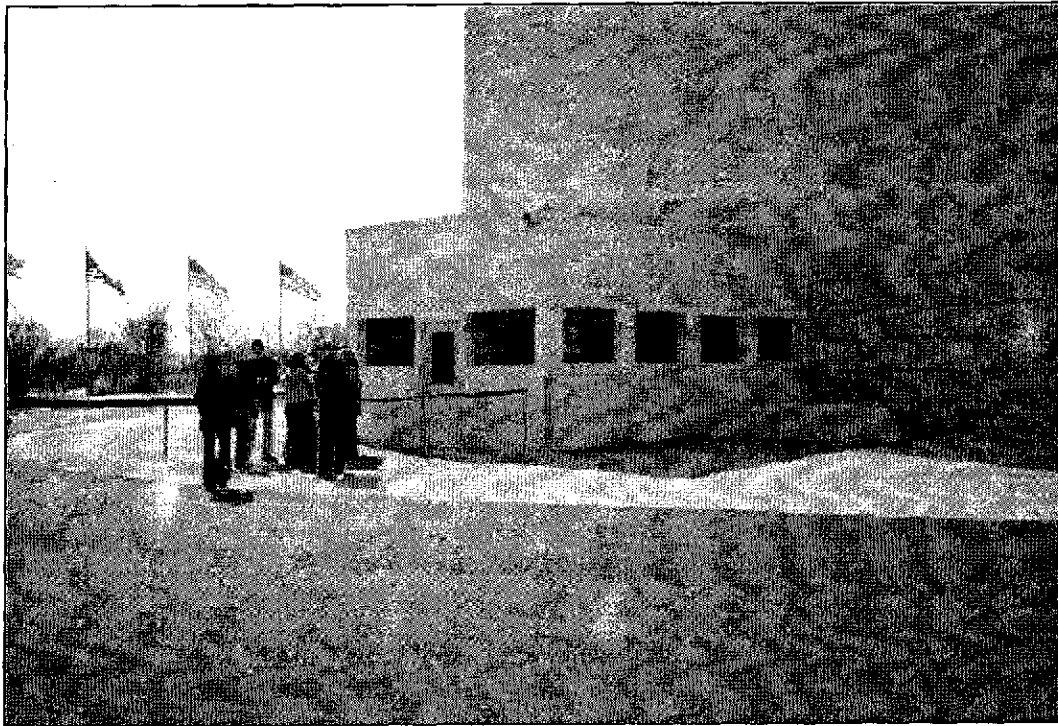


Figure 4.22: Interim security building, north and east elevations, view to the southwest.

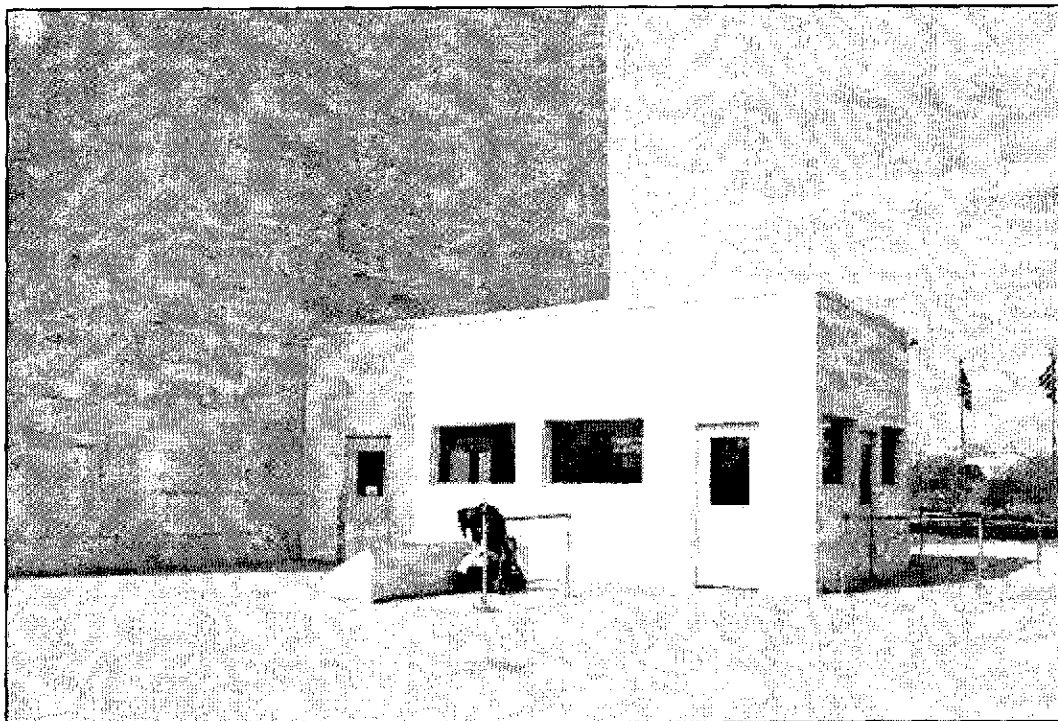


Figure 4.23: Interim security building, south elevation, view to the northwest.

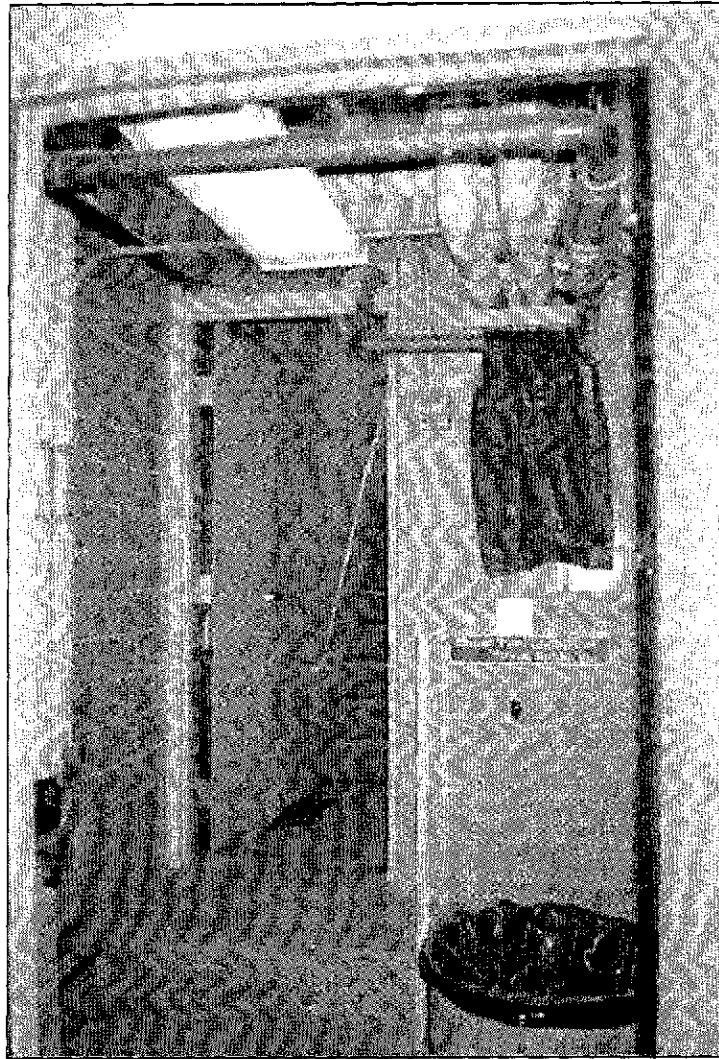


Figure 4.24: Below-grade mechanical area, vestibule, view to the east, with stair to grade in background.



Figure 4.25: Below-grade mechanical area, rest room, view to the west.

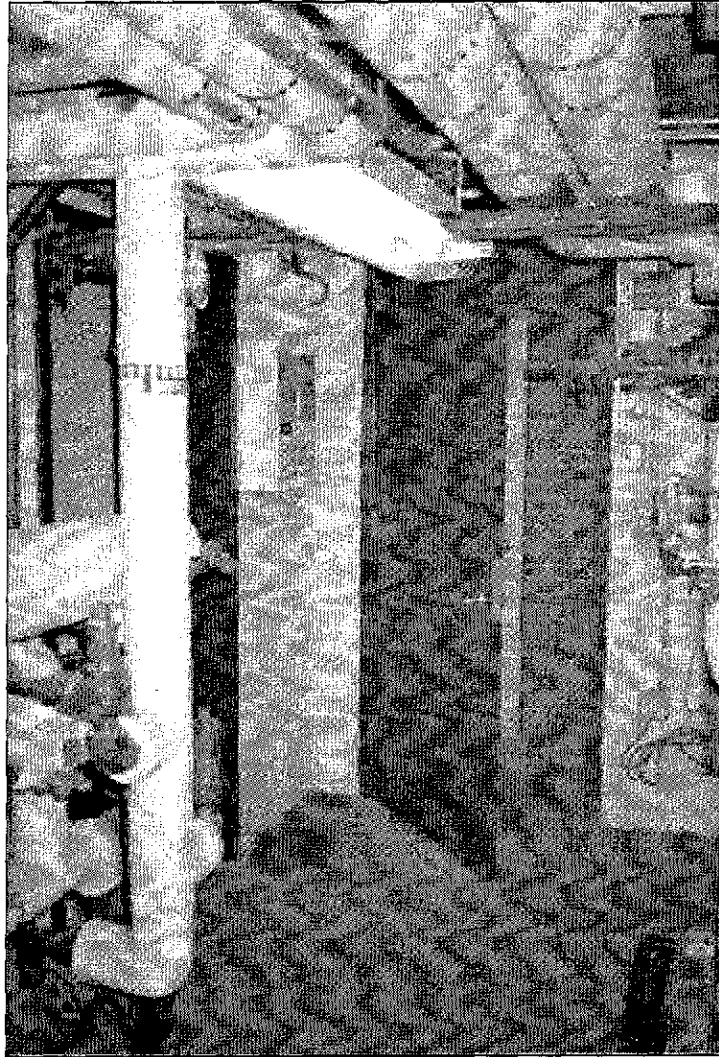


Figure 4.26: Below-grade mechanical area, mechanical room, view to the north, with doorway to electrical room in background on left and stair to grade beyond door on right.

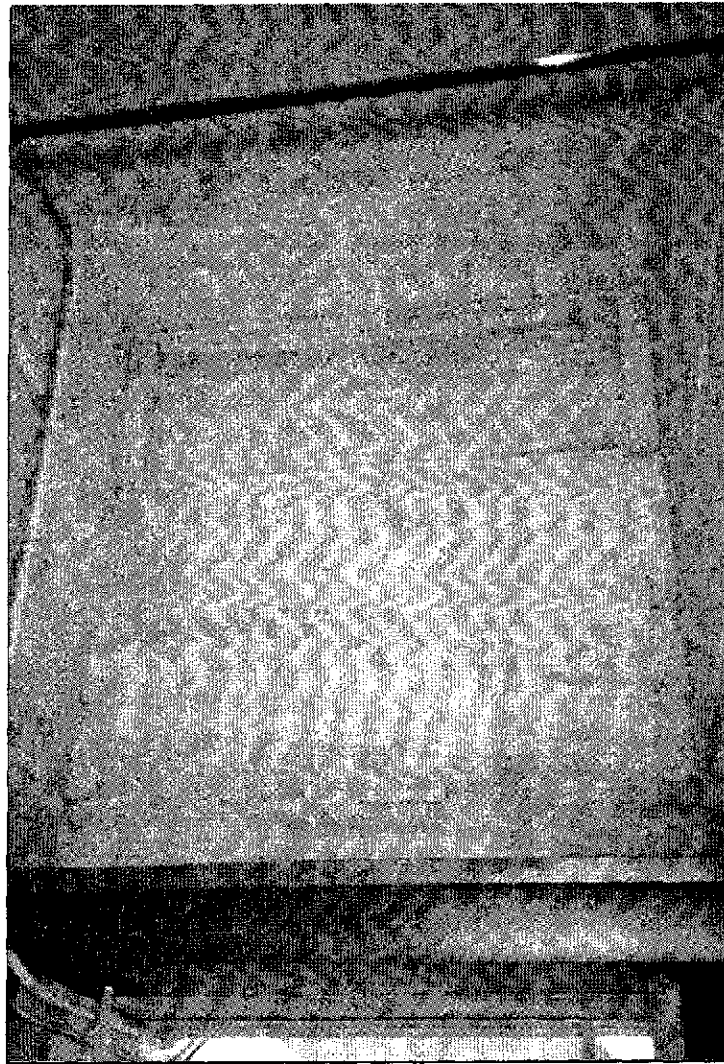


Figure 4.27: East portal, view to the east, showing the bronze cornice, attachment ghosts, and remains of original east entry door.



Figure4.28: East elevator lobby, view to the east, showing the glass transom to the east portal and the surface-mounted conduit penetration. Also note the rough-finished stone courses above the door surround.



Figure 4.29: East elevator lobby, view to the east, showing the south door surround with historic graffiti.



Figure 4.30: East elevator lobby, view to the west, showing the elevator doors, bronze transom panel, and limestone door surround.

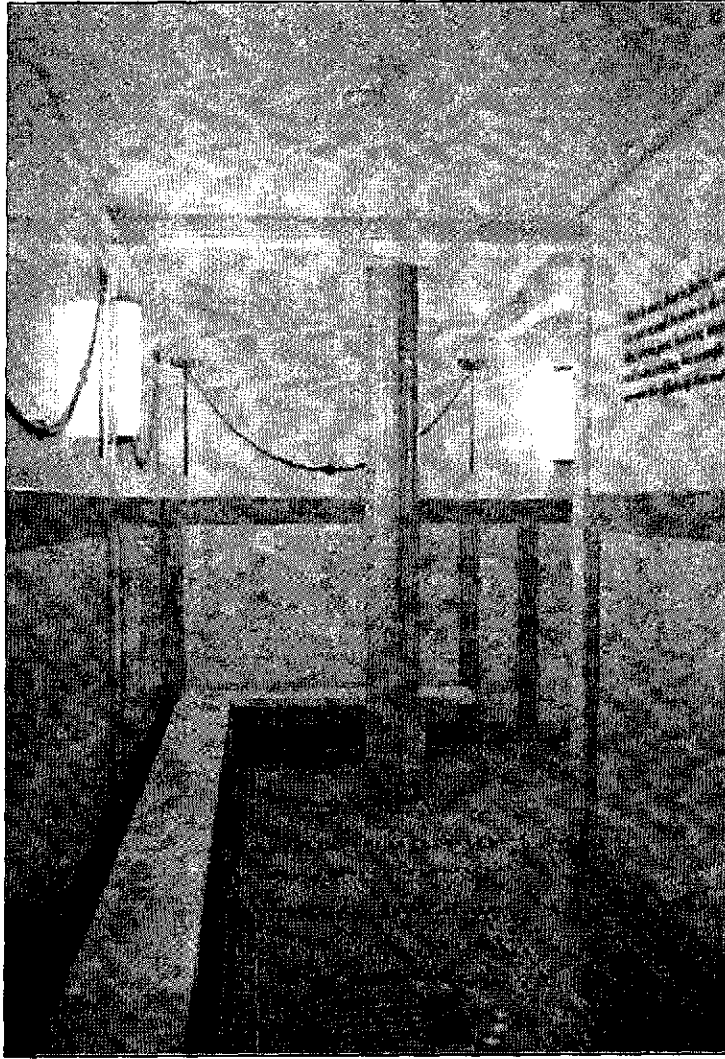


Figure 4.31: South corridor, view to the west.



Figure 4.32: South corridor, east end showing terrazzo floor repair.



Figure 4.33: West chamber, view to the west.

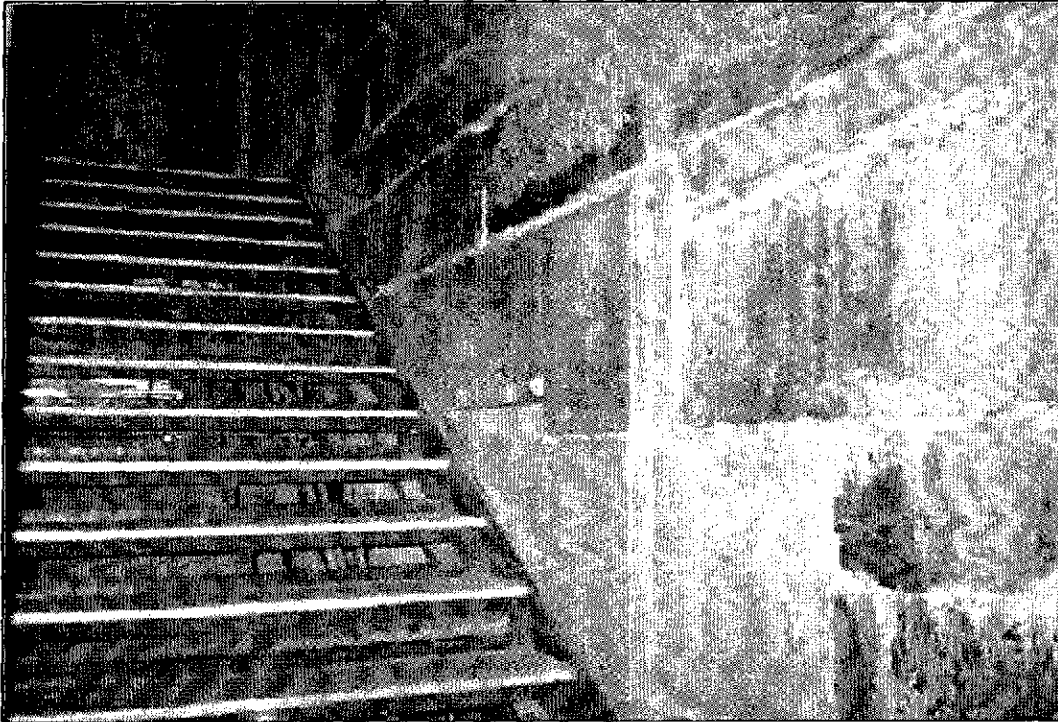


Figure 4.34: Stair to 20-foot level, view to the southwest, with remains of original west entrance to the monument in the masonry above the stringer.

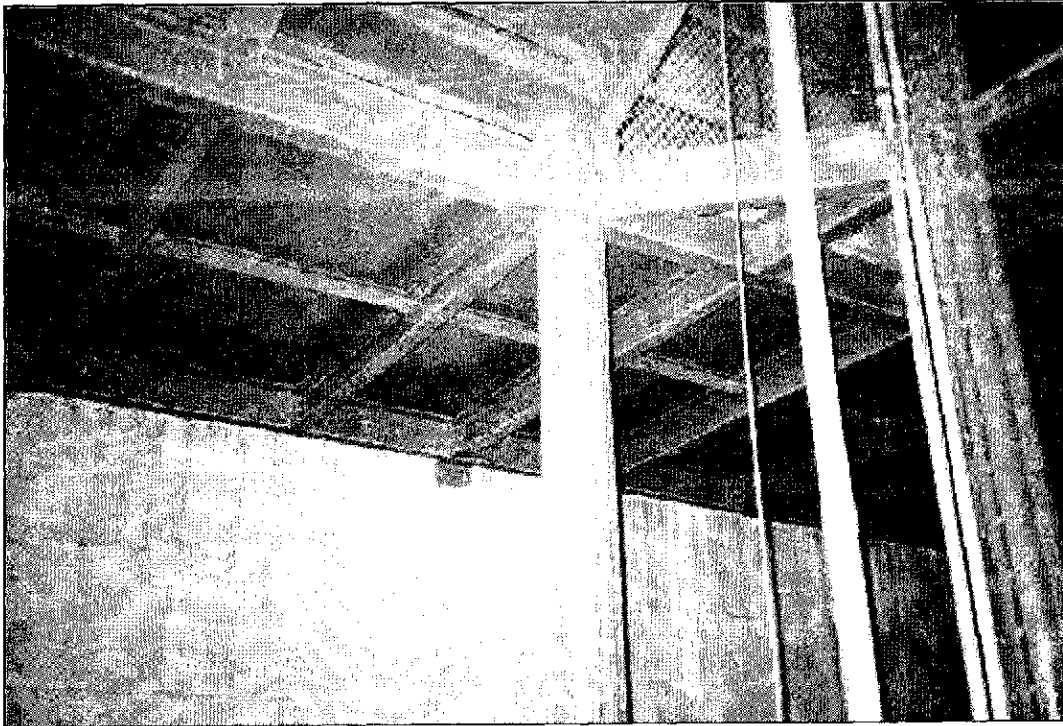


Figure 4.35: Underside of typical landing platform showing framing and column connections.



Figure 4.36: Stair to 260-foot level, with marble headers and granite stretchers in background.



Figure 4.37: Structural rib at 480-foot level.

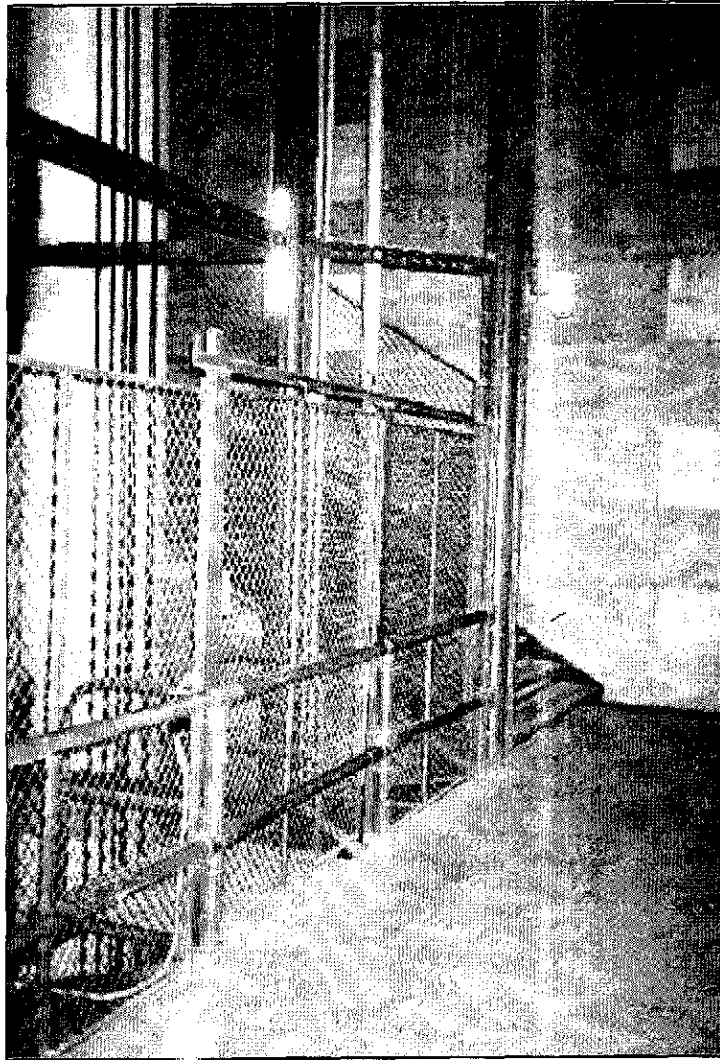


Figure 4.38: Landing at 220-foot level, with emergency platform beyond center sliding-screen-panel section.

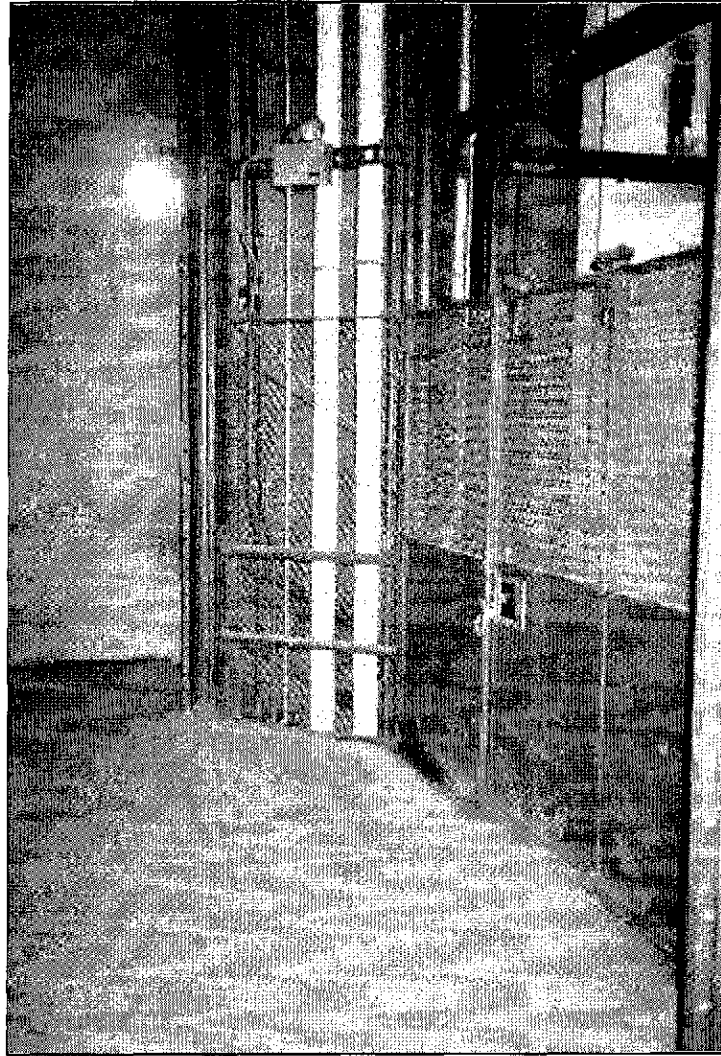


Figure 4.39: Landing at 150-foot level, with extended platform and center sliding-screen panel. Note the lower half of screen panels at this landing are replaced by solid-metal panels.



Figure 4.40: Landing at 140-foot level, with glazed viewing panels for elevator passengers.



Figure 4.41: No-vandalism signs were added in 1904 to every other landing.

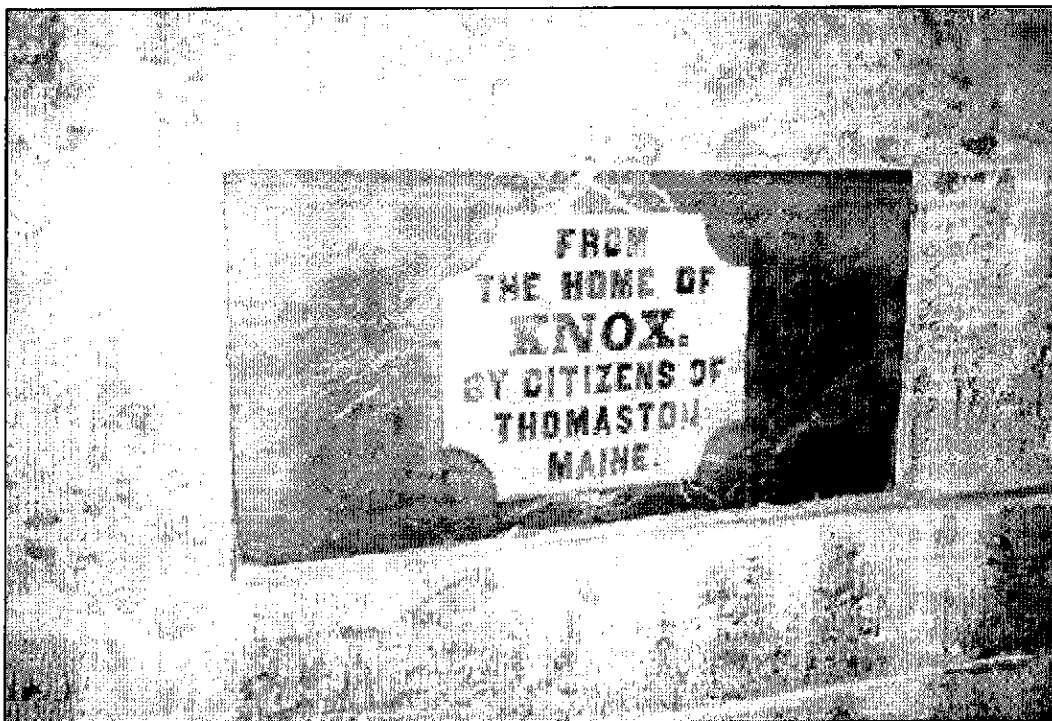


Figure 4.42: Memorial stone at 110-foot level is typical of size and shape of majority of memorial stones.



Figure 4.43: Elevator re-boarding level (490-foot level), with glass-encased masonry and corner stair to observation level (500-foot level) in background.



Figure 4.44: Informational display at elevator re-boarding level (490-foot level), with replica aluminum pyramidion tip.

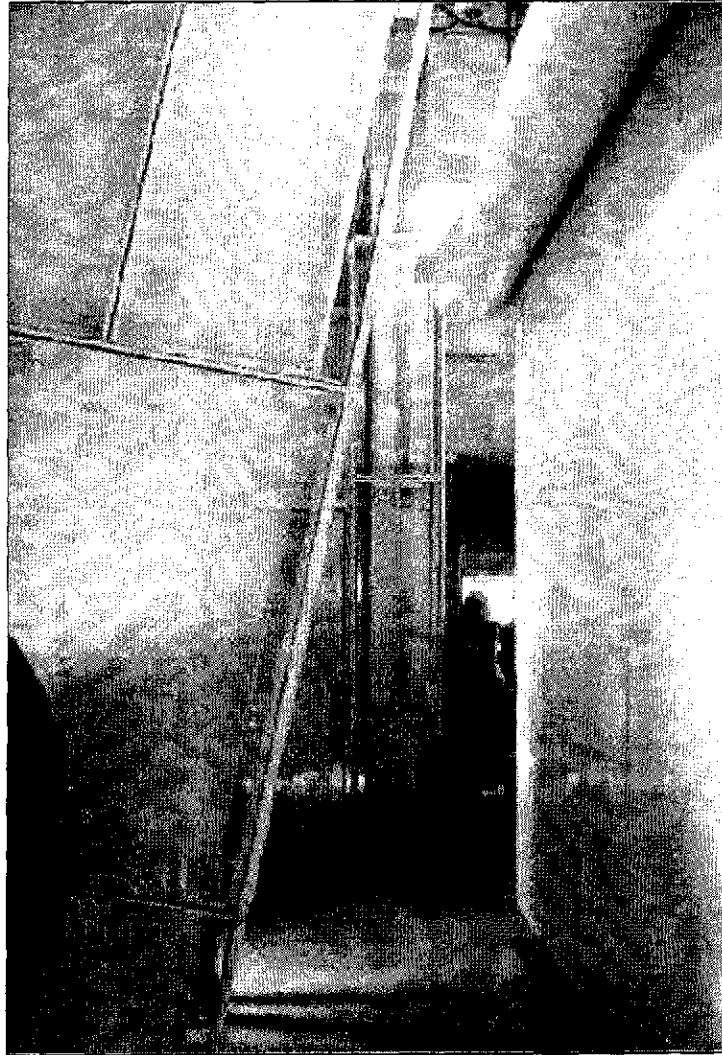


Figure 4.45: Observation level (500-foot level), with glass-encased masonry, glass elevator shaft, and observation window in background. Also note metal-mesh closet door in corner.

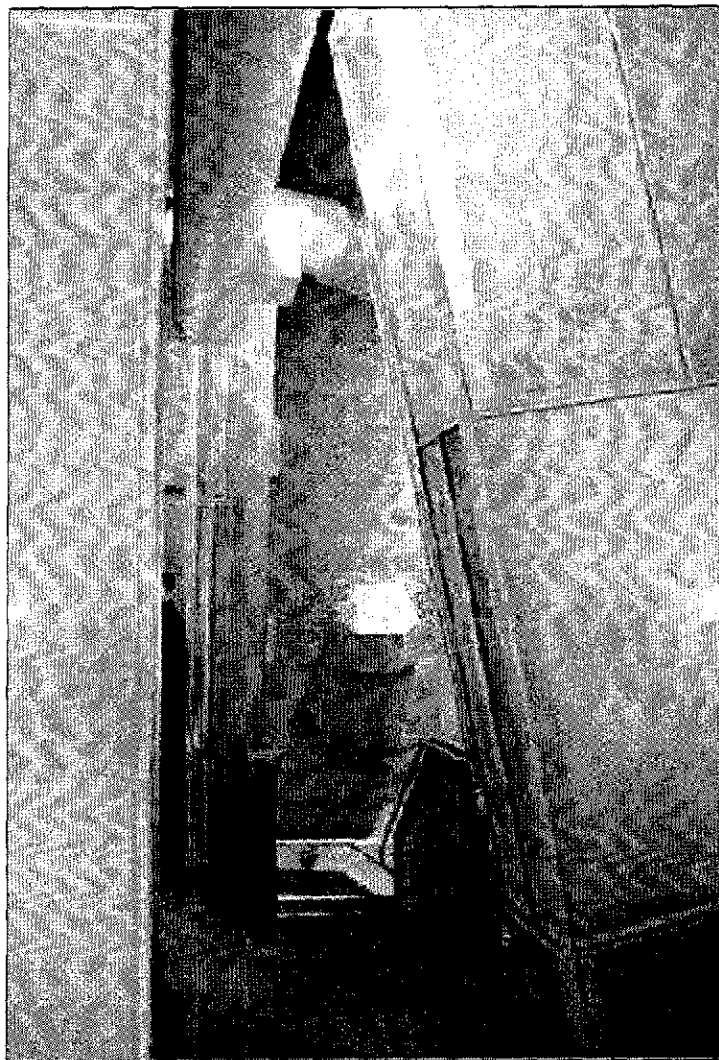


Figure 4.46: Observation level (500-foot level), with glass-encased masonry and stair to elevator re-boarding level (490-foot level) in background. Note carved marble bracket on pyramidion stone in stairwell.

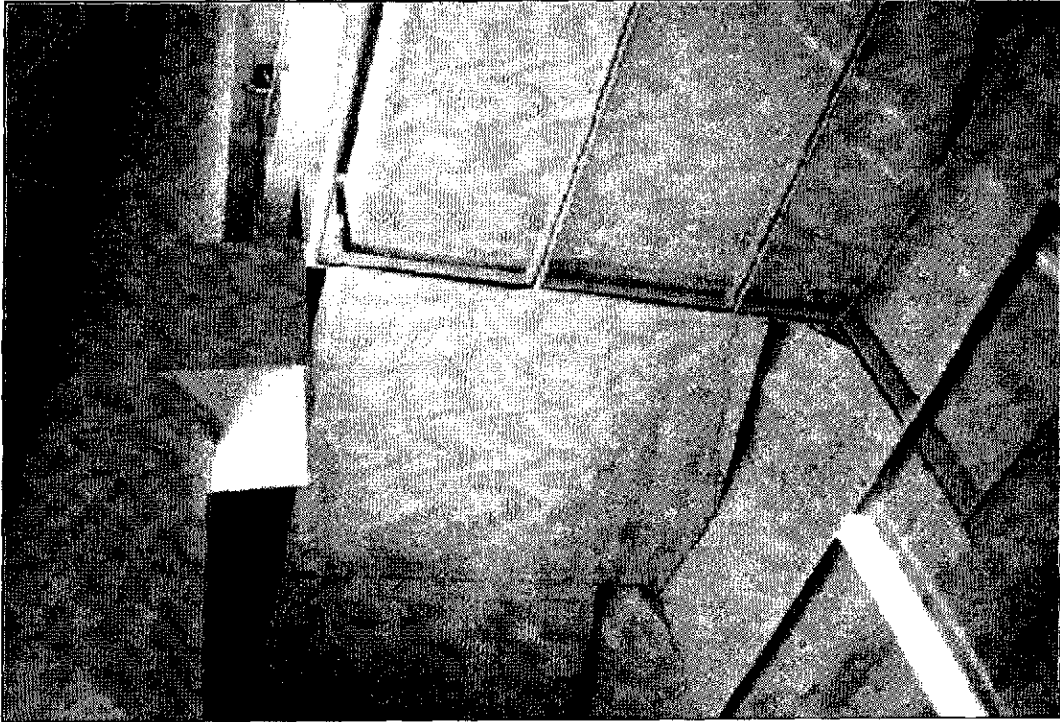


Figure 4.47: Observation level (500-foot level), with glass-encased marble rib holding carved marble brackets of pyramidion stones.

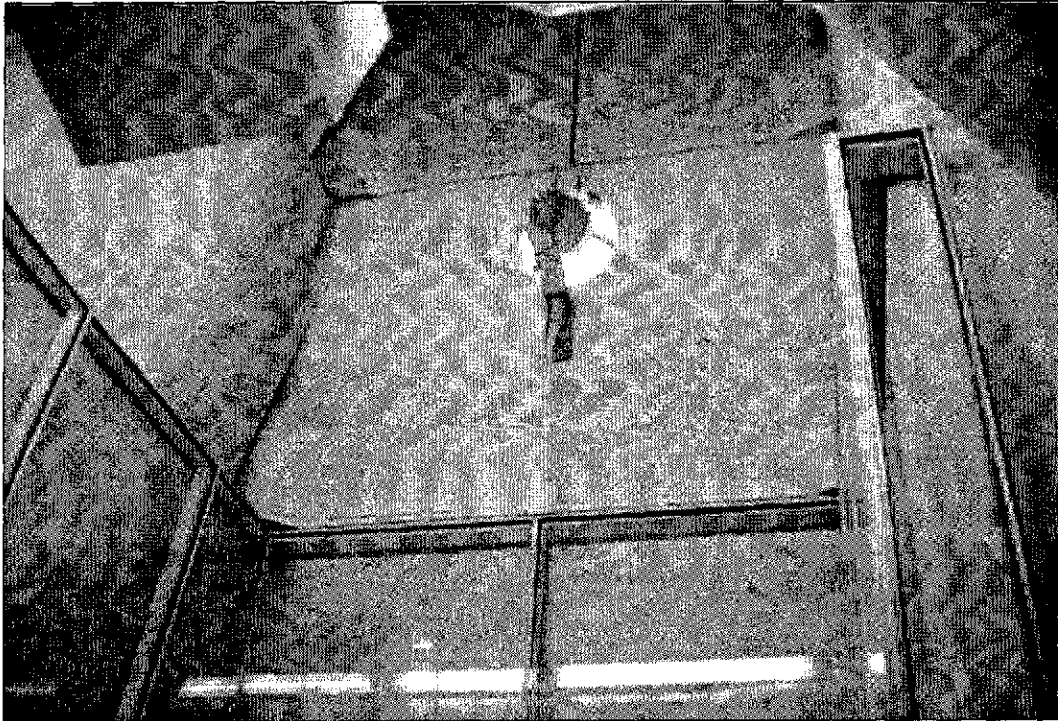


Figure 4.48: Observation level (500-foot level), with interior view of aircraft-warning light.

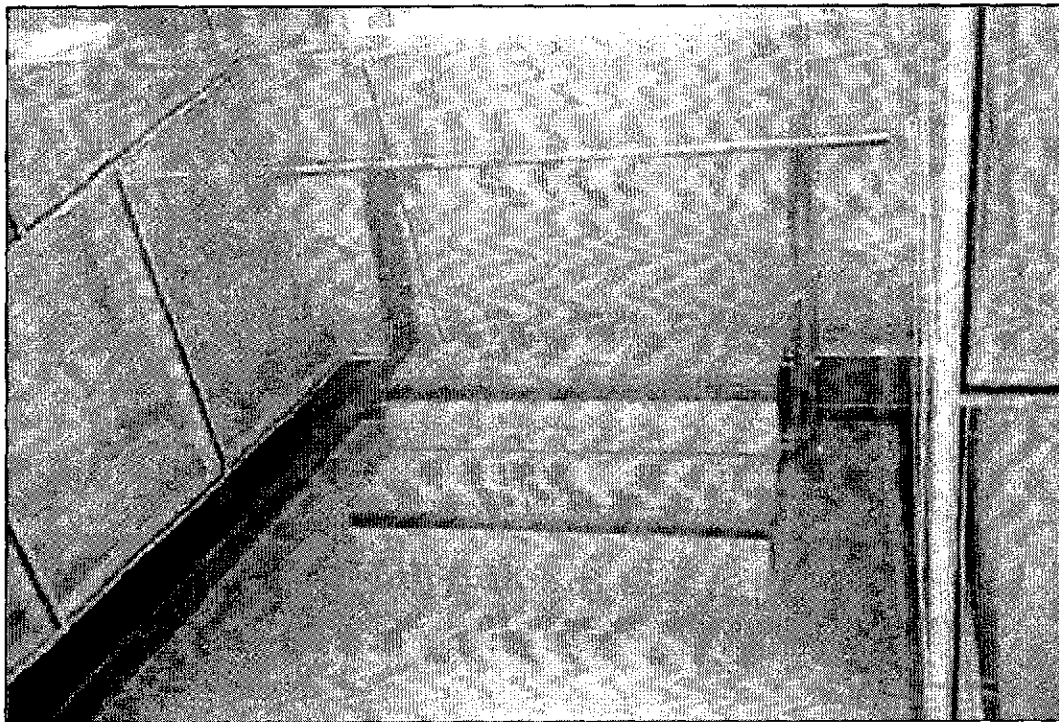


Figure 4.49: Observation level (500-foot level), with metal steps at observation window.



Figure 4.50: Pyramidion interior, view to top, with carved marble brackets sitting on rib. Note stones with brackets were not finished smooth on the interior.

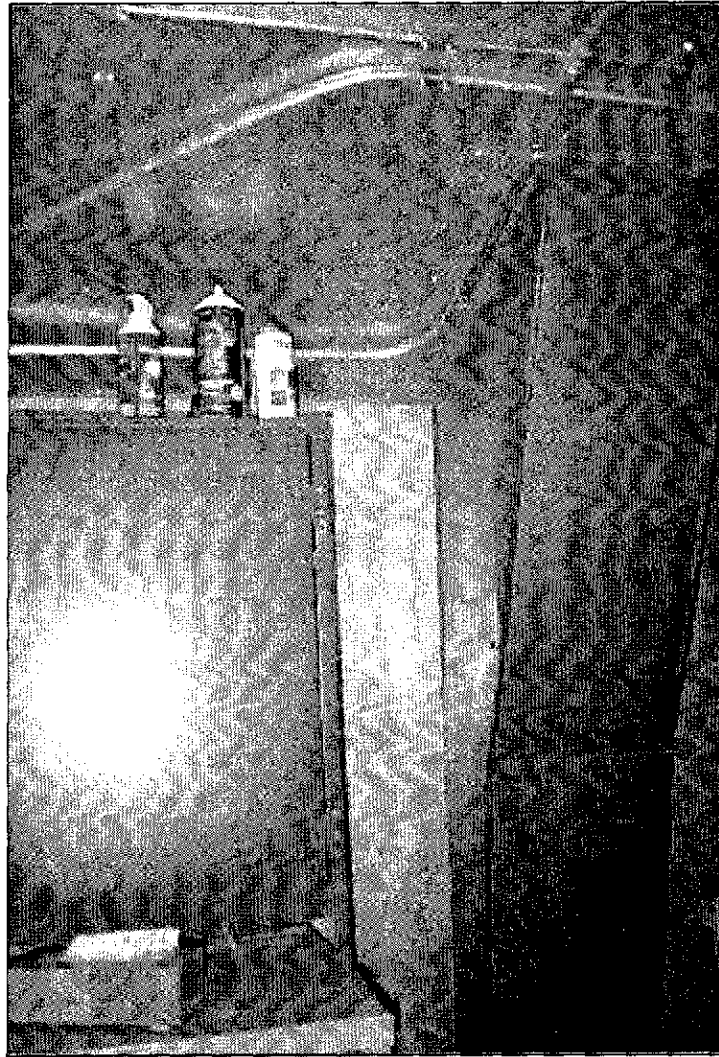


Figure 4.51: Elevator equipment platform, interior at 518-foot level, with rib encased in copper panels.

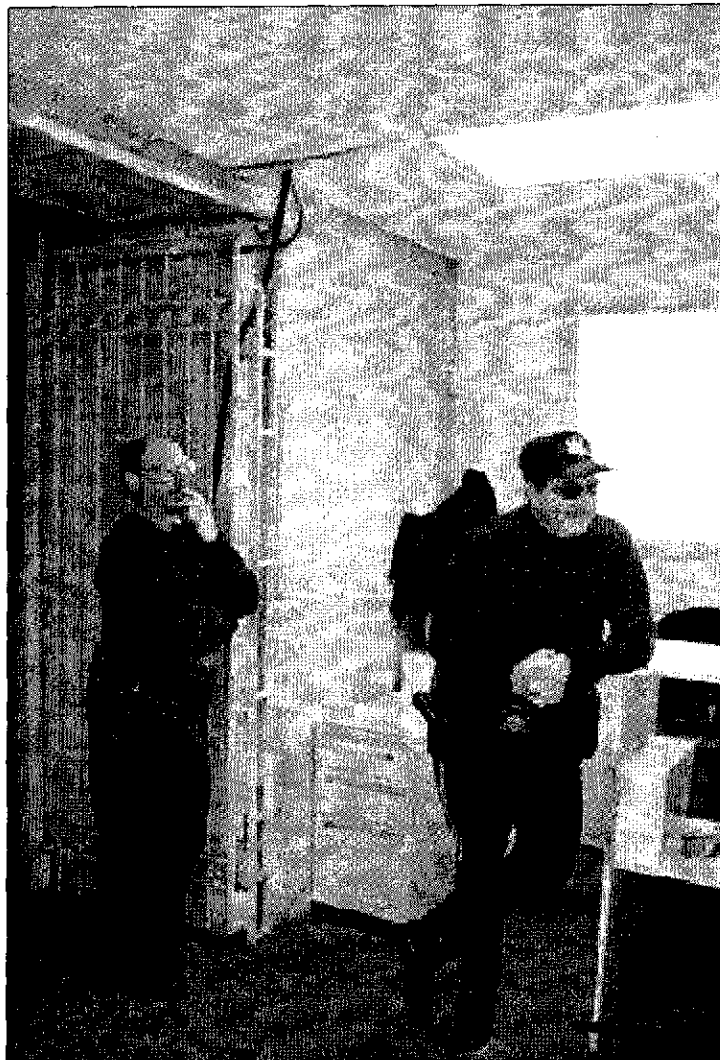


Figure 4.52: Interim security building, west room, view to the north.



Figure 4.53: Interim security building, west room. view to the west showing the marble door and metal gate connection.

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Part I - Developmental History

CHAPTER FIVE
CONDITION ASSESSMENT



CHAPTER FIVE

CONDITION ASSESSMENT

5.1 GENERAL CONDITION

The Washington Monument is a National Register-listed property for the period of significance 1848–1889 in the areas of architecture, engineering, landscape architecture, and commemoration.¹ Building elements dating to this period will be considered significant; all others will be deemed non-contributing. The Washington Monument, its attached interim security building, and the surrounding hardscape features of the monument site are all currently in good condition. The historic exterior masonry of the monument, its historic and modern interior finishes, and the interim security building only require maintenance-level repairs to ensure their continued preservation. Maintenance-level repairs are also required for site features such as exterior lighting, paving, and flagpoles.

The exterior masonry of the Washington Monument is in good condition, with minor deterioration from weathering and building settlement evident at joint lines and masonry corners. Long vertical cracks above the 150-foot level currently appear to be monitored for movement. This monitoring should continue, and structural investigations should be undertaken to ensure the longevity of the masonry. The interior structural masonry and iron stair structure are in good condition, exhibiting minor deterioration from age, wear, and maintenance work. Finishes at the entry level, the elevator re-entry (490-foot) level, the observation (500-foot) level, and the elevator mechanical platform are in excellent condition. The elevator system is currently in good working order. The only area of active deterioration is located in the below-grade mechanical area known as Bunker 1, which is located to the west of the monument below the plaza level. The concrete ceiling of Bunker 1 is exhibiting signs of active deterioration and should be investigated to determine appropriate repair methods.

5.2 METHODOLOGY

The condition assessment of the Washington Monument was produced from information gathered during on-site visual inspections, primarily on the interior of the existing structure. Assessments of the memorial stones and the elevator system were not included within the scope of work for this report, and their condition will only be summarized from information in specialized reports, where applicable. Exterior conditions are summarized from conditions visible at ground level and from available construction documents dating from the 1997–2000 restoration project. Because as-built documentation from this restoration was not available from the National Park Service, specific materials, methods, and quantities are not detailed. Also, it was not possible to interview National Park Service staff directly involved with the recent restoration work; therefore, no interviews were undertaken. Destructive testing and material analyses were not included in the scope of work for this report, nor were electrical and mechanical investigations. No information was available from structural investigations currently

underway by other parties. Conditions were noted and color photographs were taken to document existing conditions.

5.3 SITE

The exposed aggregate concrete and asphalt plaza surrounding the Washington Monument is currently in good condition. Only small areas of staining and heavy soiling were noted, and these can easily be removed by cleaning. The sealant joint between the plaza and the monument base is beginning to crack in isolated areas and should be monitored for progressive deterioration and water infiltration. As these sealant joints reach the end of their service life, they should be replaced before entering moisture causes damage to the interior of the masonry structure. The cast-iron and plastic benches around the monument plaza are also in good condition, as are all concrete and metal floodlight housings. Exposed aggregate concrete paths leading to the west of the plaza are currently in good condition. They are uniform in color and texture and show no signs of serious deterioration. Asphalt paths to the east of the monument, however, are seriously deteriorated with cracking, spalling, and previous patches evident. The edges of these paths are actively eroding, which could create a tripping hazard. These asphalt pathways do not date from the period of significance for the Washington Monument, and it is recommended that they be replaced or resurfaced in their entirety to correct their appearance and prevent areas of erosion from becoming tripping hazards. The flagpoles surrounding the monument plaza are currently in good condition, with soiling evident on the poles, particularly around their midpoints. Several of the poles have small dents between ground level and approximately 3 feet above grade or dents in their ball ornaments. The poles should be cleaned and dented members replaced. The bronze commemorative plaque to the east of the monument is in good condition, with some darkening of the bronze due to weathering. If desired, the bronze may be cleaned. This should be accomplished by stripping the existing coatings with solvent or anionic cleaners, then cleaning the bronze with a gentle abrasive such as fine pumice and/or a buffing pad, and finally recoating the plaque with lacquer and cold wax. Bronze cleaning should only be completed by a specialist in metals conservation. The mown turf surrounding the monument is very thin due to foot and vehicular traffic and erosion, particularly adjacent to plaza/sidewalk intersections. Affected areas may need to be reseeded, possibly with the inclusion of a low groundcover bordering pathway intersections to reduce foot and vehicular traffic across these areas.

5.4 WASHINGTON MONUMENT – EXTERIOR

The general condition of the exterior masonry of the Washington Monument is very good, with only maintenance-level repairs required to ensure its preservation. The exterior was completely restored during the 1997–2000 restoration project, and most of the repairs seem to be weathering well. Small areas of deterioration, though, are beginning to appear on all four façades of the monument. Beginning just above the 150-foot level near the center of all four elevations, a large vertical crack is visible. Approximately 40 feet in length, these cracks follow joint lines in some instances, while splitting through stone for most of their height. There are currently two bands in place around these crack locations at the 190-foot level and the 204-foot level (see figure 5.1). These bands hold some type of monitoring equipment, but it is not known if the devices are crack monitors or who is collecting the data they generate.

At the four corners of the monument, several bright-white dutchmen dating to the 1997-2000 restoration have been installed, particularly in the lower 60 feet of the monument (see figure 5.2).² Corner stones that have not been replaced show significant areas of spalling and erosion at their horizontal joints. This deterioration is generally a result of vertical stress on the individual stones due to the immense weight of the upper portion of the monument shaft and the techniques used during construction, including particularly narrow masonry joints. As historic corner stones continue to erode over time through weathering and structural stresses, they may need to be replaced before complete failure occurs. Marble dutchmen the full width and height of the existing corner stones should be installed where required with an effort made to match the historic marble in color and texture. The existing dutchmen are considerably brighter than the historic masonry. If an exact match to the historic marble is unavailable, a match to the existing dutchmen should be acquired. Every effort should be made to prevent introduction of yet a third marble color on the lower portion of the obelisk. A few marble dutchmen have also been installed in the field of the monument elevations, most of which are significantly smaller than a typical stone or are not the height of a full course (see figure 5.3). These repairs are currently in good condition.

Many of the stones in the lower portion of the monument shaft (below 150-foot level) have significant spalling and delamination at horizontal joints. Most of these areas have recently been patched with a cementitious patching material. Some very small areas of material loss were not patched, however, and these areas show up as dark spots in the marble surface from shadows cast into the recesses (see figure 5.4). The patching material used in the 1997-2000 restoration project is typically in good condition. Several areas of patches have significantly higher water retention characteristics than the surrounding masonry or adjacent patches. This gives the wet patch material a mottled appearance until it is completely dry (see figure 5.5). In areas where moisture is slow to evaporate, typically near ground level, the patch material and repointing mortar are sustaining biological growth. This gives a dark green or black cast to these areas and can be quite unsightly (see figure 5.6). Regular inspections of patch and repointing materials near ground level should occur to detect biological growth, and any biological growth found should be immediately removed. At least one patch on the north elevation near ground level has completely failed (see figure 5.7). From the discoloration of the exposed stone, it appears that biological growth was present behind the patch before it failed. This brings into serious question the adhesion of other patches and the compatibility of the patch mix used. Any failed patches should be immediately repaired to prevent water infiltration into the masonry structure and to give the monument a uniform appearance.

The three types of marble used in the construction of the Washington Monument have a range of color between white and dove gray. All of the marbles are composed primarily of the carbonates calcite and dolomite with color variation imparted by mineral inclusions, including the silicates phlogopite (brown mica), muscovite (white mica), quartz, and tremolite, and the sulfide pyrite. Natural inclusions containing iron, such as pyrite, can discolor the stone after exposure to the elements and cause streaking and color variation on the face of the marble. In the monument, red streaking is particularly evident on the marble surface near ground level (see figure 5.8). This may be caused by "very small amounts of iron incorporated in the crystal lattice of calcite or dolomite. Such iron may have been primary (i.e., in the crystal lattice from the beginning) or

secondary (i.e., produced by the alteration of other iron-bearing minerals during episodes of metamorphism hundreds of millions of years ago).”³ Another explanation for the red streaking visible from ground level could be the possible use of Potomac River sand in the mortar mix utilized during the original construction period or one of the early exterior restoration projects. Potomac River sand is known to contain minute specks of limonite (FeO-OH) and/or hematite (Fe₂O₃).⁴ In either case, an acidic weathering environment, which is a naturally low pH from moisture in the air and precipitation containing dissolved carbon dioxide producing carbonic acid, is sufficient to mobilize the iron and cause red streaking. Microscopic analyses should be completed to determine if there is iron present in either the dimensional stone or in the aggregate of one of the mortar mixes used in the monument.

Many of the original stones in the monument also exhibit original tooling marks, seen as bright-white bands around the perimeter of each stone. The presence of these marks indicates the incredible durability of the marble used during construction. Other exterior elements of the Washington Monument, including windows and aircraft-warning lights, are in excellent condition. New sealant was installed in windows and lenses during the 1997–2000 restoration project, ensuring that these elements are watertight.

5.5 INTERIM SECURITY BUILDING – EXTERIOR

The exterior of the interim security building is in excellent condition, with only maintenance-level repairs required to ensure its preservation. On all three elevations of the building, there is a band of soiling along the bottom three feet caused by splashing rain. It is particularly heavy on the east elevation around the main entry. This soiling can easily be removed by cleaning. On the north elevation, below the two PVC downspout outlets, small areas of biological growth are thriving on the finish system surface (see figure 5.9). Also found were a few spots of chewing gum, particularly on the north elevation. All of these areas should be cleaned, and the downspouts regularly inspected to prevent water ponding on the security building roof. The windows and doors of the building are currently in good condition, with minor paint loss evident on the doors due to heavy use. As painted surfaces continue to lose their coating, they should be repainted both to protect them and to provide a uniform appearance.

5.6 WASHINGTON MONUMENT – INTERIOR

The interior of the Washington Monument is in good condition. The structural stone masonry on the interior exhibits small-scale deterioration but is in good condition overall. The decorative memorial stones have recently been comprehensively treated, ensuring their preservation. The interior iron stair structure is also in good condition with some deterioration and should be preserved through cyclical maintenance. The public spaces at entry level, elevator re-entry (490-foot) level, and observation (500-foot) level are in excellent condition. Above the observation (500-foot) level, the elevator mechanical platform is currently in good condition.

5.6.1 STRUCTURAL STONE MASONRY

The granite, marble, and gneiss masonry on the interior of the Washington Monument are in good condition despite showing signs of small-scale deterioration. No specific treatment is

At the four corners of the monument, several bright-white dutchmen dating to the 1934 restoration have been installed, particularly in the lower 60 feet of the monument (see figure 5.3).² Corner stones that have not been replaced show significant areas of spalling and erosion at their horizontal joints. This deterioration is generally a result of vertical stress on the individual stones due to the immense weight of the upper portion of the monument shaft and the techniques used during construction, including particularly narrow masonry joints. As historic corner stones continue to erode over time through weathering and structural stresses, they may need to be replaced before complete failure occurs. Marble dutchmen the full width and height of the existing corner stones should be installed where required with an effort made to match the historic marble in color and texture. The existing dutchmen are considerably brighter than the historic masonry. If an exact match to the historic marble is unavailable, a match to the existing dutchmen should be acquired. Every effort should be made to prevent introduction of yet a third marble color on the lower portion of the obelisk. A few marble dutchmen have also been installed in the field of the monument elevations, most of which are significantly smaller than a typical stone or are not the height of a full course (see figure 5.3). These repairs are currently in good condition.

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5.6.1 STRUCTURAL STONE MASONRY

The granite, marble, and gneiss masonry on the interior of the Washington Monument are in good condition despite showing signs of small-scale deterioration. No specific treatment is

recommended at this time. Continued monitoring of conditions and maintenance on the interior will ensure that any rapid acceleration in deterioration will quickly be recognized and treated.

Typical conditions of masonry on the interior of the central shaft include cracking through marble and gneiss masonry, spalling and loss, open joints, efflorescence, rust staining, and case hardening and discoloration of gneiss. Cracks through the marble masonry were noted in the upper portions of the shaft at the 450- and 470-foot levels, while cracking through the gneiss was noted in the lower levels at the 150- and 160-foot levels where the foundation widens (see figure 5.10). The age and activity of these cracks are not known. It is not clear exactly what stresses caused these cracks. At the upper levels, the cracks tend to be limited to one stone and may indicate a weakness in the individual unit. At the lower levels, the cracks travel through masonry units, indicating a structural stress. Cracks in the gneiss have been highlighted with chalk and appear to be monitored in some manner. It is recommended that cracks, particularly those traveling through masonry units, be monitored with a crack monitor to ascertain the crack activity over an annual cycle.

Further evidence of structural stresses can be seen in areas of spalled masonry at the curved interior corners of the shaft just above the stair landings. Spalling was noted in corners at the 340-foot level and at the 430- through 480-foot levels (see figure 5.11). Movement in the upper portion of the shaft would cause stress at the corners, particularly where restricted by the stair landings. The spalling is not causing large-scale masonry loss. However, the current extent of spalling should be documented in order to monitor the rate of deterioration in these areas. The only other instance of deterioration causing loss was noted at ribs located at the 480-foot level (see figure 5.12). Loss in these areas appears to have occurred some time ago and does not indicate active deterioration.

Open joints were noted on the interior, particularly at the masonry between the 480- and 490-foot levels as well as at the 460-foot level (see figure 5.13). It is recommended that open, cracked, or otherwise failed joints be repointed as part of a regular maintenance cycle.

Efflorescence was noted accumulating at masonry joints from the 150- to 410-foot levels. The presence of efflorescence indicates that water is moving through the masonry joints and is evaporating on the interior, leaving behind dissolved salts on the interior of the shaft (see figure 5.14). While efflorescence was found on all elevations, it was more often noted on the east and northwest interior elevations.⁵ The efflorescence is not severe and does not indicate an unacceptable level of moisture movement within the masonry.

Rust staining and bleaching of the stones was noted throughout the interior of the Washington Monument in the form of rust-colored or white streaks forming under stairs and landings (see figures 5.15 and 5.16). The rust staining and bleaching may be related to cleaning of the terrazzo stair landings. Water used when cleaning the terrazzo stair may have contributed to the rusting of the iron stair structure. During cyclical maintenance, the rust would be washed down onto the stones below. Cleaners containing bleaching agents were also rinsed down onto the stones below, causing the white streaks. The stairs at the Washington Monument are no longer open to the general public, though controlled numbers are taken down the stairs on a regular basis. This

has decreased the amount of dirt accumulating in the stairs, which should no longer require industrial cleaning methods. It is recommended that cleaning methods used on the terrazzo floors employ a minimal amount of water, possibly through the use of a wet vacuum. Bleaching compounds should be strictly controlled and used only where absolutely necessary.

The gneiss below the 150-foot level exhibits yellow discoloration and black crusts (see figure 5.17). Both the discoloration and black crusts may be normal weathering patterns for the gneiss. The gneiss in this area was exposed to the elements for 23 years from 1854–1877. It is possible that this exposure caused different weathering patterns than those seen on the other interior masonry. This condition is not causing any further deterioration of the gneiss masonry.

5.6.2 MEMORIAL STONES

The memorial stones inserted into the structural masonry on the interior of the monument shaft were comprehensively treated in 2000. National Park Service staff performed these treatments. The conditions of all of the stones were most recently noted in a NPS Ranger Book dated July 22, 1997.⁶ As part of the restoration in 2000, the stones were further documented and photographs were taken before and after treatment.⁷ However, the exact treatments carried out on each of the stones are not documented.

5.6.3 INTERIOR IRON STAIR STRUCTURE

With only a few areas of deterioration, the iron stair structure, including Phoenix columns, stair landings, stairs, and wire-mesh grilles, is in good condition. The terrazzo flooring at the stair landings is generally in good condition despite general staining from standing water and dirt (see figure 5.18). At the 310-foot level, the thin terrazzo has cracked from impact, creating small areas of loss (see figure 5.19). The terrazzo should be repaired in this area to halt further loss. The angle iron at the stair-landing edges is rusting in many places. The angle iron should be wire brushed and painted as part of the same maintenance cycle for the iron stair structure. The failure of caulking was noted at the underside of the stair landing at the 250-foot level. This was the only place where this condition was noted.

5.6.4 ELEVATOR SYSTEM

The current elevator system was upgraded in 1997. There are no reported problems or deficiencies in the current system.

5.6.5 ENTRY-LEVEL AREA

The entry level is in excellent condition with only minor deterioration from wear and tear. Paint is beginning to fail at the Phoenix columns located in the south corridor, and the ceiling has minor cracking and paint failure at the column-penetration locations. The terrazzo is heavily worn at the southeast corner of the elevator lobby and has been repaired in several places (see figure 5.20). The marble wainscot has yellowed from oils in a horizontal band located at the head level of seated visitors. The discoloration can be removed by stripping and reapplying the protective wax coating in this area.

5.6.6 ELEVATOR RE-ENTRY (490-FOOT) LEVEL

At the elevator re-entry (490-foot) level, the finishes and exhibits date to the 1997–2000-era restoration and are in good condition. Dust, coins, and paper scraps have begun to collect behind the glass panels and are becoming unsightly. The areas behind the glass panels should be cleaned. The paint is beginning to fail at the sealed glass joints. A security concern at the 490-foot level is the inactive alarm at the entrance door to the central iron stairs. This alarm should be activated to ensure that no visitors enter the stairs unless accompanied by a National Park Service ranger.

5.6.7 OBSERVATION (500-FOOT) LEVEL AND ELEVATOR MECHANICAL PLATFORM

At the observation (500-foot) level and the elevator mechanical platform, the finishes date to the 1997–2000 renovation and are in excellent condition. The glass panels on the west side of the 500-foot level show streaking from either water infiltration or significant water condensation from the masonry above. Streaking may also be caused by poor cleaning methods. The elevator platform finishes, metal housing, and equipment are in good condition. The current elevator equipment appears to include a retrofit casing from the 1925-era Otis elevator.

5.7 INTERIM SECURITY BUILDING – INTERIOR

The utilitarian interior of the interim security building is in good condition. The finishes show only general deterioration from heavy use. General cleaning and cyclical painting of this area will preserve the spaces and give them a uniform appearance.

5.8 BUNKER 1 – INTERIOR

The below-grade mechanical area, or Bunker 1, is in fair condition. The rest room and electrical room are in good condition with only minor deterioration of finishes. However, portions of the concrete ceiling at the entrance and in the mechanical room are actively deteriorating. Rust stains and accretions of efflorescence indicate significant water movement through the concrete and its rusting reinforcing bar. The condition of the ceiling in both locations should be investigated to determine its structural stability and appropriate repair methods.

The concrete steps at the entrance are spalled, cracked, and delaminating, particularly near the top of the entrance. Stalactites of efflorescence have formed at the concrete covering the western end of the entrance area, indicating considerable water movement through the masonry. Rust staining on the concrete in this area indicates that concrete reinforcing bar is actively corroding. The ceiling structure in this area should be investigated and appropriate repair methods undertaken in order to halt ongoing deterioration. The cement plaster on the brick masonry at the entrance steps is cracked with large areas of loss. Efflorescence is forming at the cracks. In some areas, large accretions of efflorescence have accumulated (see figure 5.21). It is recommended that the deteriorated cement plaster be completely removed. The source of water infiltration, whether from the open grate above or from the surrounding earth, should be investigated prior to replacing the plaster. Appropriate remedial measures should be taken, including installation of flashing, new drainage, and/or below-grade waterproofing, as deemed necessary.

The rest room and vestibule in the northwest corner of Bunker 1 are in good condition. The pink-glazed tile walls and the red-tile floor are in good condition with minor cracking and small areas of loss patched with a gray cementitious patch material. The bathroom fixtures are in good working order.

The equipment and finishes in the electrical room are in good condition. The salmon paint from the 1997–2000 renovations is peeling at the ceiling over chilled water pipes, duct, and air handler unit (see figure 5.22). Damage may be caused by water infiltration through the roof above or from leaks in the pipes and equipment from below. This condition should be carefully monitored to ensure that water leaks do not damage the equipment in this room.

The mechanical room is in fair condition; however, conditions should be investigated and monitored in order to ensure that deterioration is repaired before the equipment or structure is damaged. The lintel and frame at the louver located in the wall between the entrance and the mechanical room is actively rusting, probably from water infiltration through the grates over the entrance area (see figure 5.23). The rusting louver should be cleaned with a wire brush and painted with a rust-inhibiting paint or the entire unit should be replaced to prevent displacement of the masonry. A crack in the ceiling at the center of the western side of the room was dripping water at the time of site survey. Stalactites were forming at the ceiling and the water was dropping onto insulated pipes below, causing damage and discoloration of the insulation material (see figure 5.24). The floor in this area was also wet. Some of this water may be coming from the steam-condenser transfer pump, which is also located in this area. The discoloration may be coming from corroding reinforcing bars in the concrete ceiling above. This condition should be thoroughly investigated to ensure that no long-term damage is being caused to the ceiling structure. In the southwest corner, the masonry and tile have been disrupted by movement caused by settling or installation of equipment (see figure 5.25). The steam tunnel at the south side of the mechanical equipment room is a continuous source of water in this area and contained standing water at the time of site survey.

ENDNOTES

¹ Donald C. Pfanz, "Washington Monument," National Register of Historic Places Inventory, Documentation of Existing National Register Property, 2 December 1980.

² John L. Nagle, United States Department of the Interior, National Park Service, Eastern Division, Branch of Engineering, Washington, Memorandum, 21 January 1935; Correspondence, Entry 432, Records of the Secretary, 1833–1951; Records of the National Monument Society, 1833–1951; Records of the Joint Commission for the Completion of the Washington Monument, 1876–1892; National Archive Building, Washington, D.C.

³ James P. Reger, Ph.D., Environmental Geology & Mineral Resources, Maryland Geological Survey, electronic mail to authors, 27 May 2003.

⁴ James P. Reger, Ph.D., Environmental Geology & Mineral Resources, Maryland Geological Survey, electronic mail to authors, 19 June 2003.

⁵ Efflorescence was noted in the following areas on the interior of the Washington Monument shaft: 410-foot level on east, 390-foot level on east, 320-foot level on northwest, 280-foot level on west, 230-foot level on east, 200-foot level on northwest, 160-foot level on south and northwest, and 150-foot level on east.

⁶ Mike G. Rose, Park Ranger, Mall Operations, "Washington Monument Memorial Stones," 22 July 1997; NPS-NCR Collection.

⁷ Judy Jacob, "Washington Monument: Survey of Commemorative Stones," 20 May 2003; NPS-NCR Collection. Before-restoration and after-restoration photographs taken in conjunction with the project are located in the Building Conservation Branch, Northeast Cultural Resources Center of the National Park Service, in Lowell, Mass.

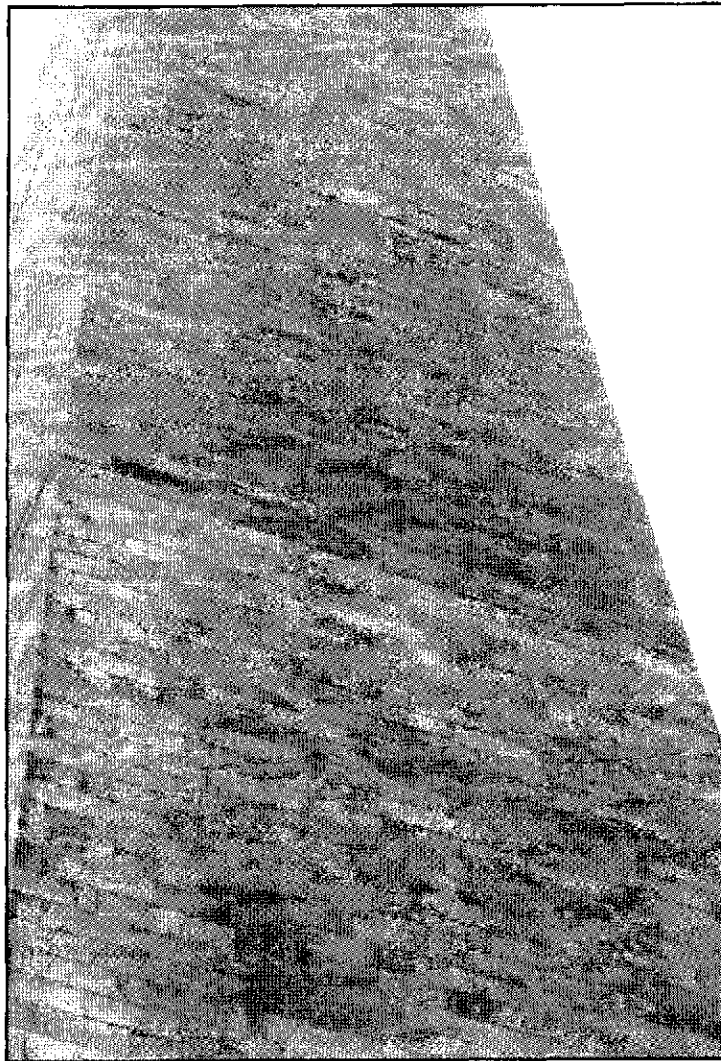


Figure 5.1: West elevation with significant vertical cracking in center of wall. The cracking begins just above the 150-foot level and continues approximately 40 feet. The cracking follows joint lines in some instances and goes directly through stone in others. This condition is typical for all four elevations of the monument. Note crack monitors strapped to façade.

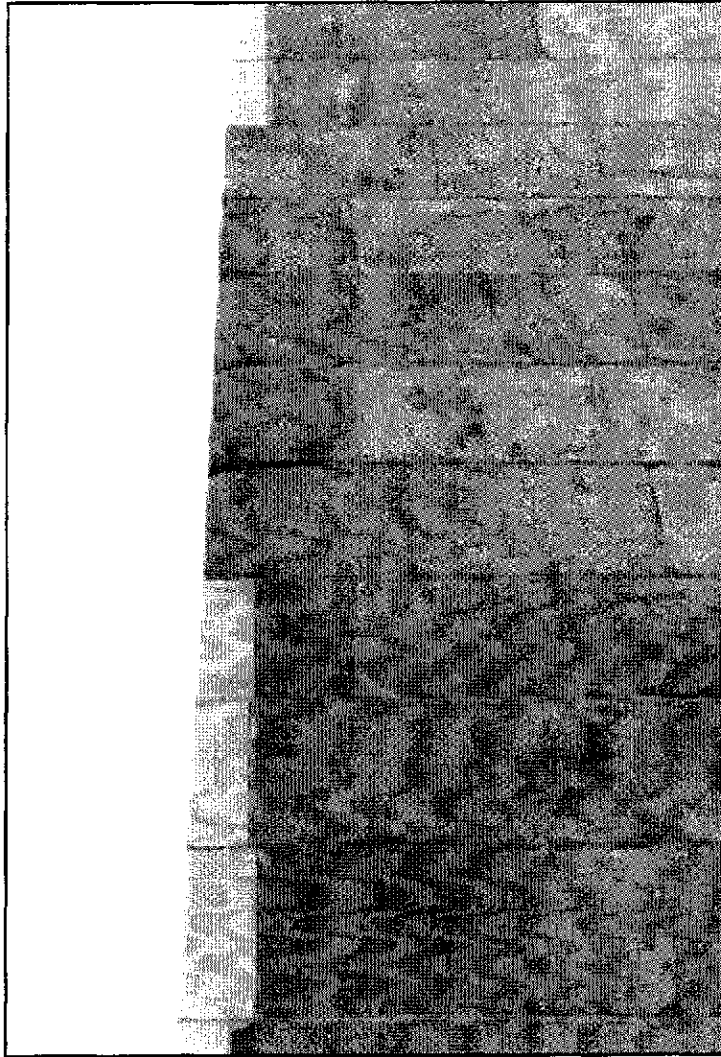


Figure 5.2: Northwest corner with dutchmen repairs showing bright white. Corner stones that have not been repaired show significant spalling and erosion at horizontal joint lines.

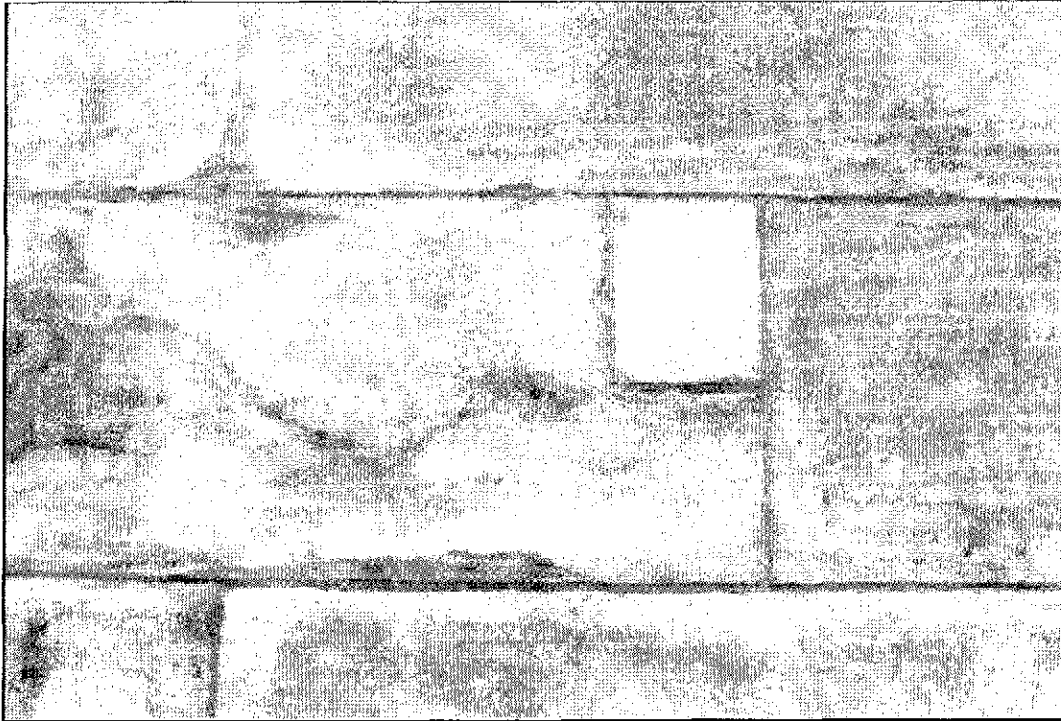


Figure 5.3: West elevation with particularly obvious dutchman repair and nearby patch material. This dutchman should have been full-course height (2 feet) to better blend with its surroundings.

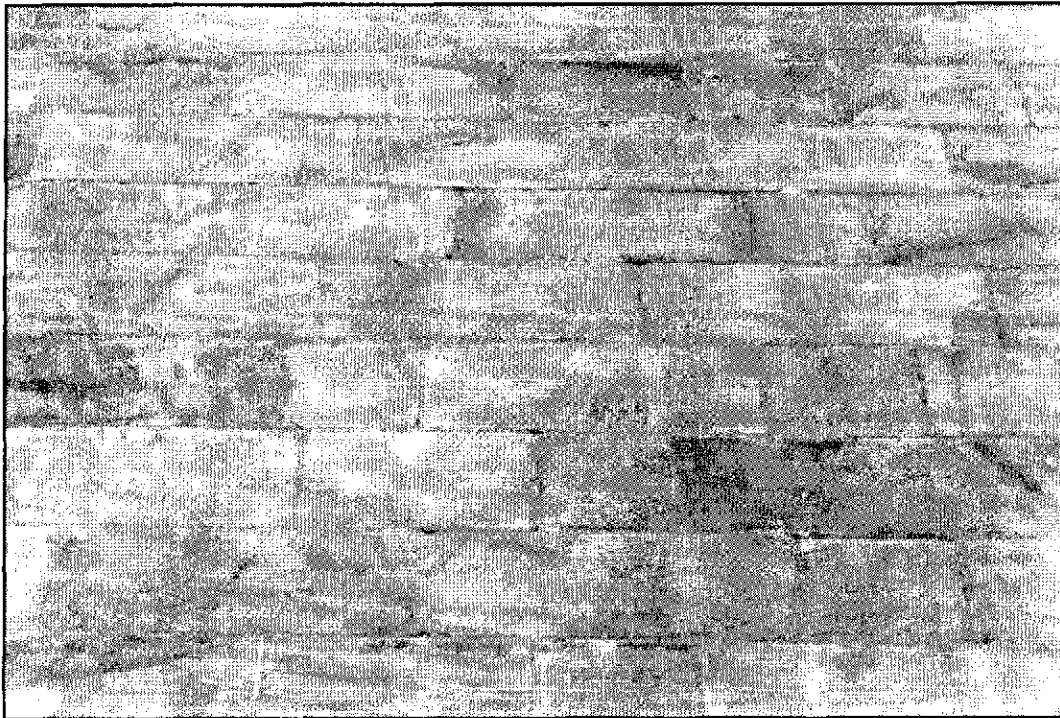


Figure 5.4: North elevation. Dark areas indicate small spall locations that have not been repaired.



Figure 5.5: West elevation patches near ground level. The patch material absorbs and evaporates water at a rate that is very inconsistent. Dark areas of the patch are still damp hours after the last rainfall, which gives the patch a mottled appearance.

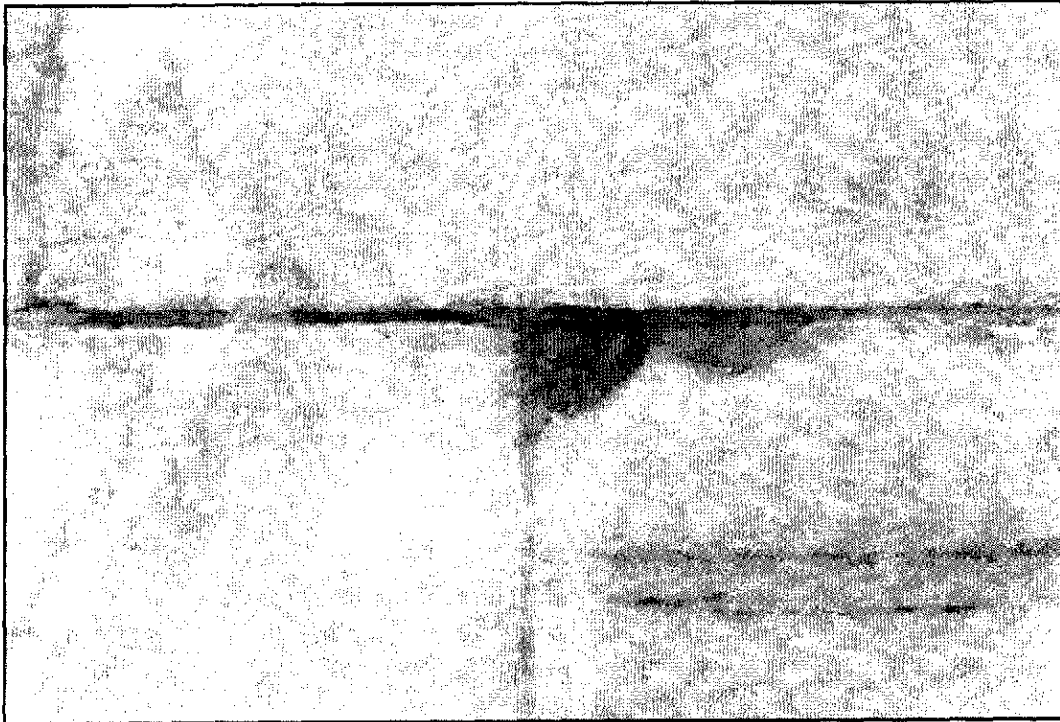


Figure 5.6: North elevation patch and pointing material. The patch and pointing materials in this area have retained water long enough to support biological growth, causing discoloration.



Figure 5.7: North elevation near ground level with failed patch. It appears that moisture behind the patch was supporting biological growth before the patch completely failed.



Figure 5.8: West elevation with original tool marks evident around perimeter of stones. There are also areas of red or pink staining indicating locations of inclusions in the marble.

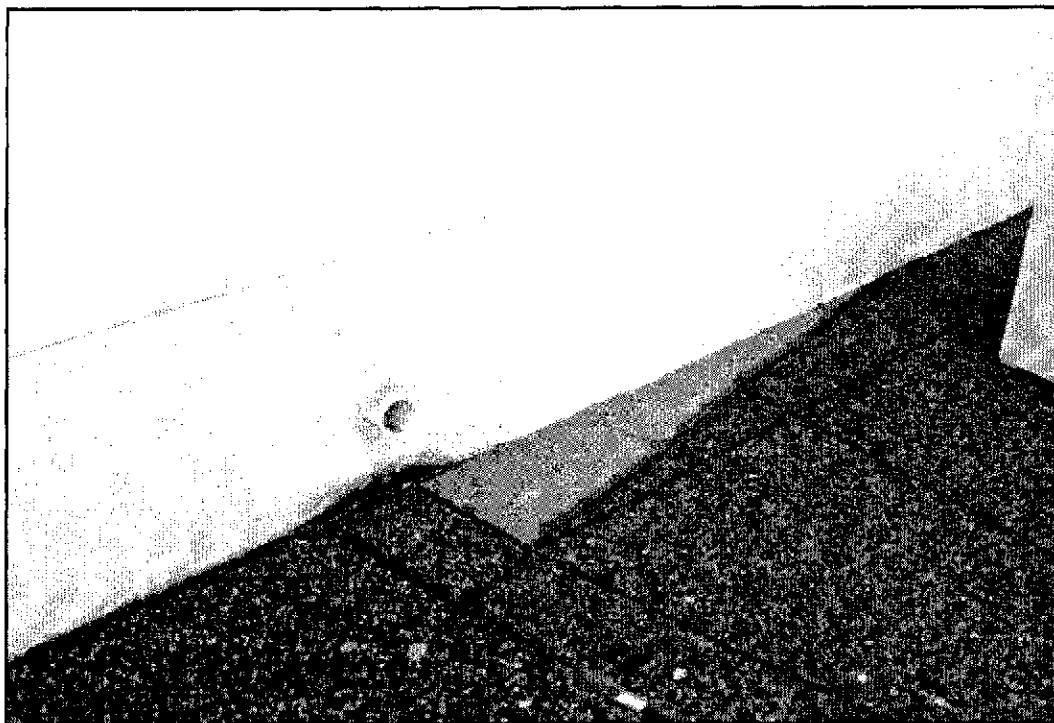


Figure 5.9: Interim security addition north elevation with internal downspout outlet. The water splashing up from this outlet has caused biological growth to thrive at the base of the addition wall.

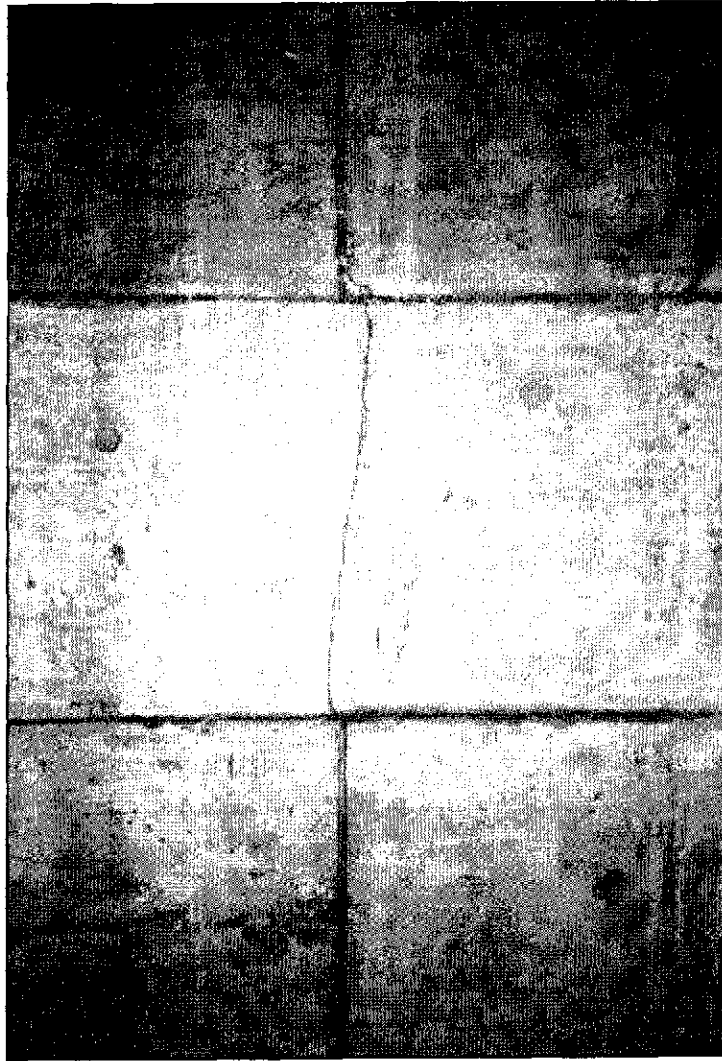


Figure 5.10: Washington Monument, interior, central shaft, cracking at masonry above 420-foot level.



Figure 5.11: Washington Monument, interior, central shaft, delamination at corner stones.



Figure 5.12: Washington Monument, interior, central shaft, spall on pier at 480-foot level.



Figure 5.13: Washington Monument, interior, central shaft, open joints at 490-foot level stairs.

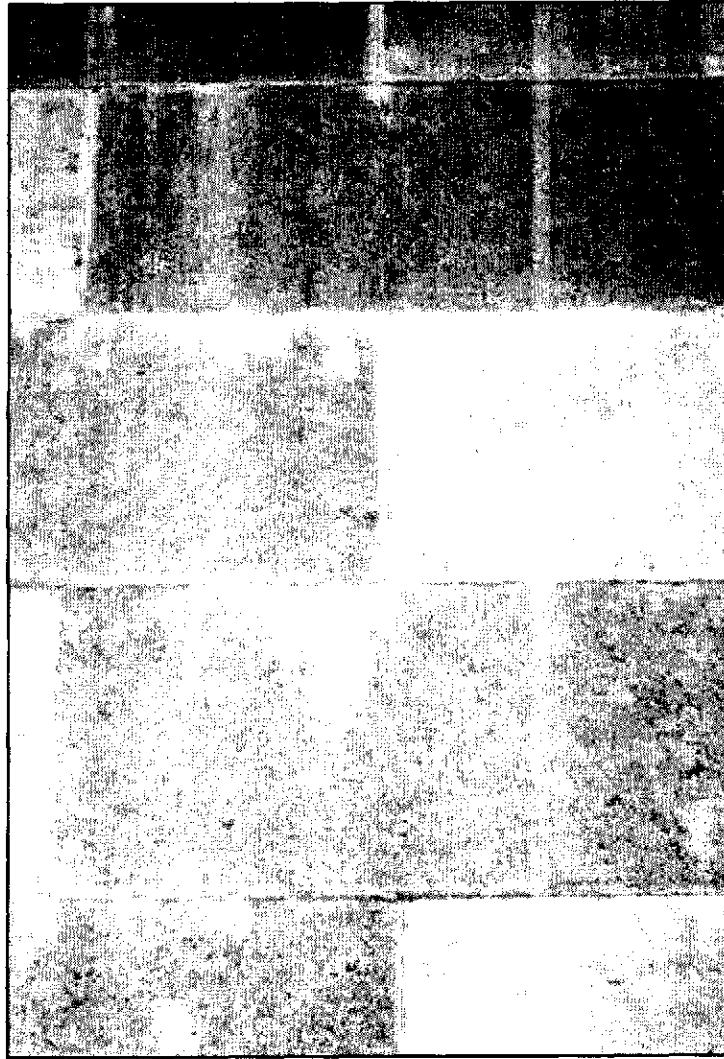


Figure 5.14: Washington Monument, interior, central shaft, efflorescence.

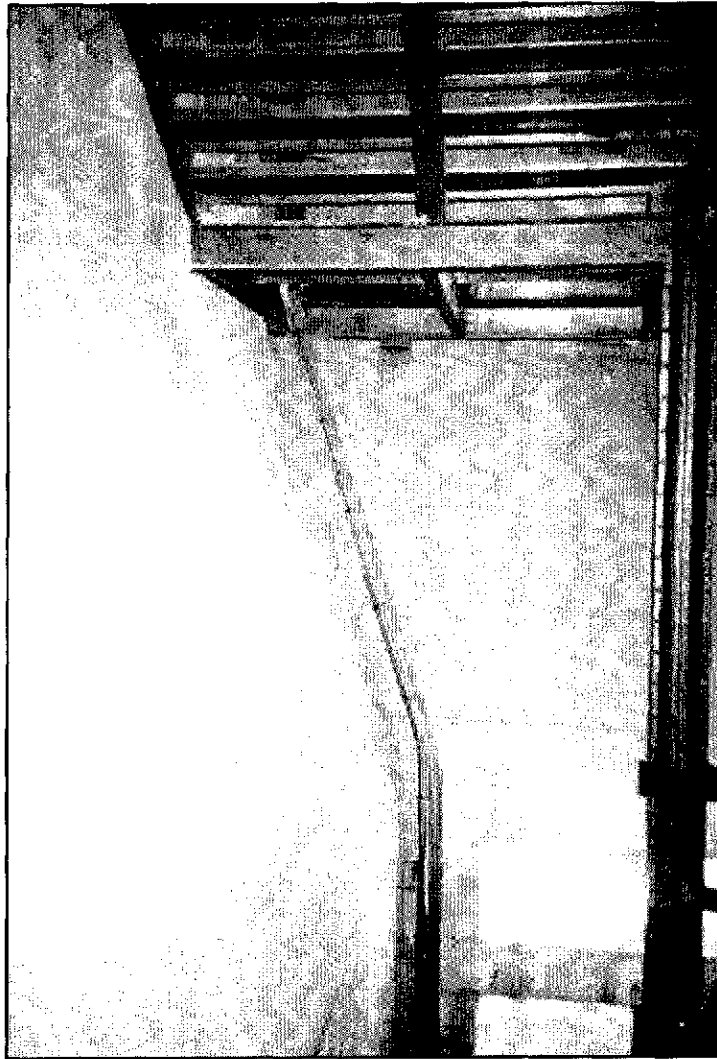


Figure 5.15: Washington Monument, interior, central shaft, bleaching under stairs.

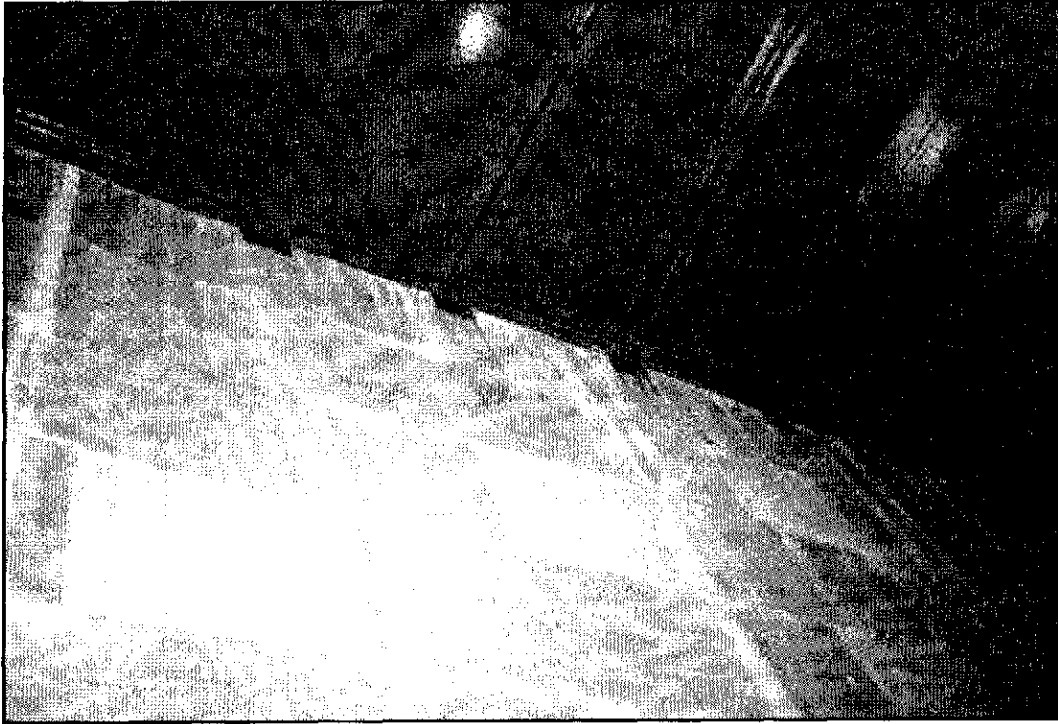


Figure 5.16: Washington Monument. interior, central shaft, rust staining at underside of stair landing.



Figure 5.17: Washington Monument, interior, central shaft, discoloration of gneiss at 15-foot level.

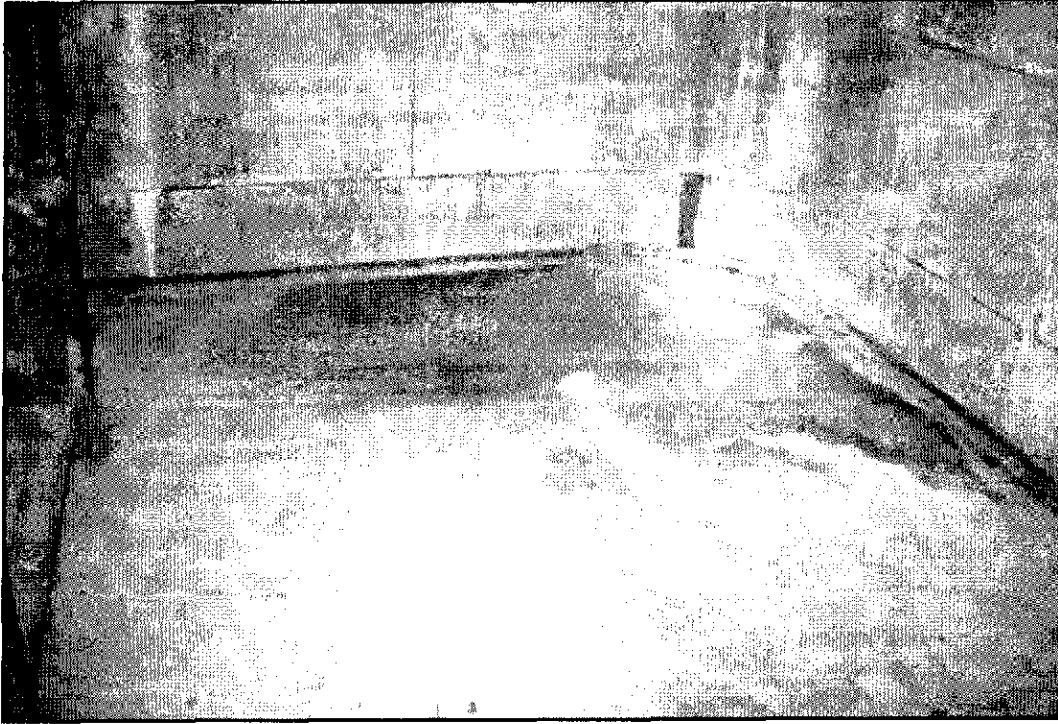


Figure 5.18: Washington Monument, interior, central shaft, 470-foot level, rusting angle iron, stained terrazzo, efflorescence, and water infiltration.



Figure 5.19: Washington Monument, interior, central shaft and stairwell, loss in terrazzo floor at 310-foot level.



Figure 5.20: Washington Monument, south corridor, west terrazzo panel.

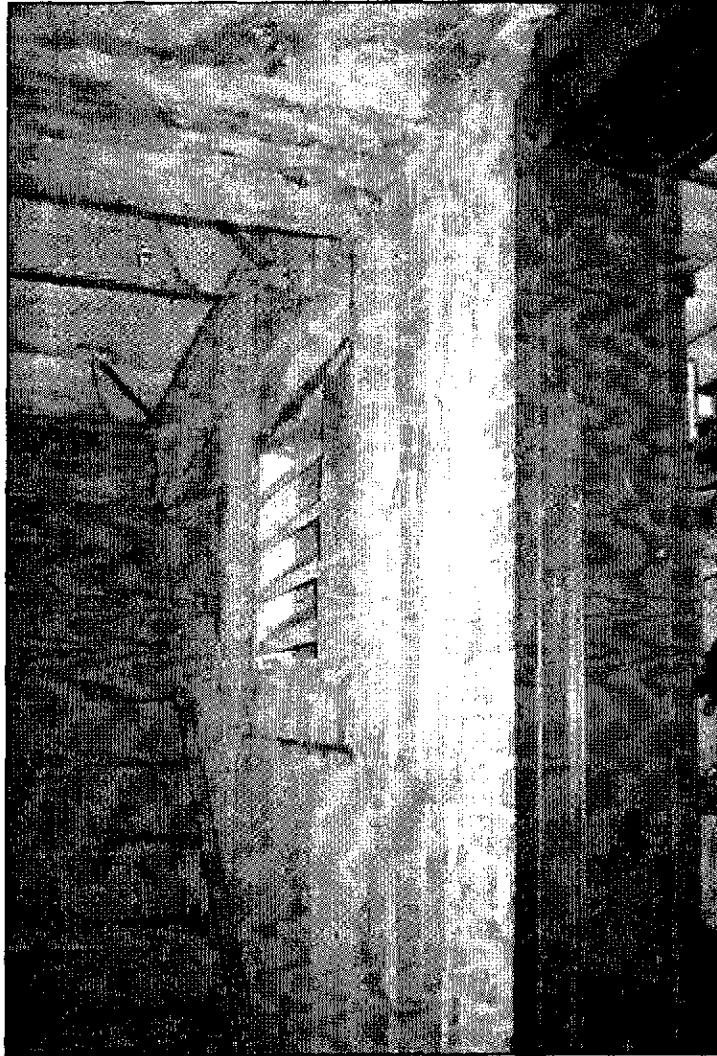


Figure 5.21: Washington Monument, Bunker 1, interior, entrance area, looking east at south wall.

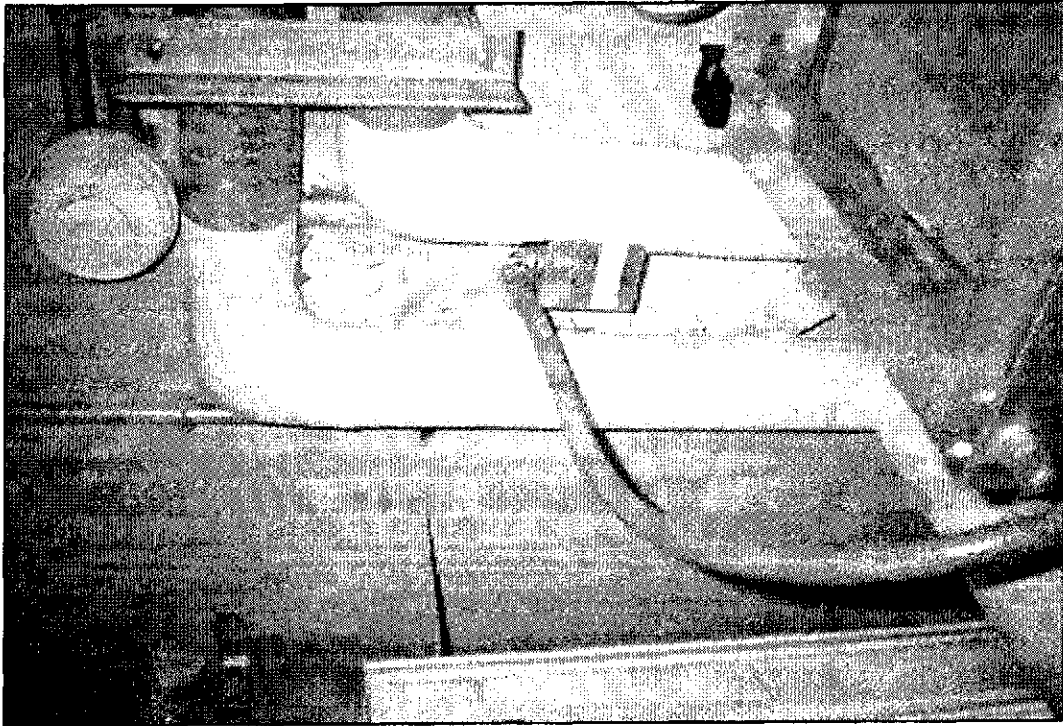


Figure 5.22: Washington Monument, Bunker 1, interior, electrical room, peeling paint at east end of ceiling.



Figure 5.23: Washington Monument, Bunker 1, interior, mechanical room, north wall, rusting louver.

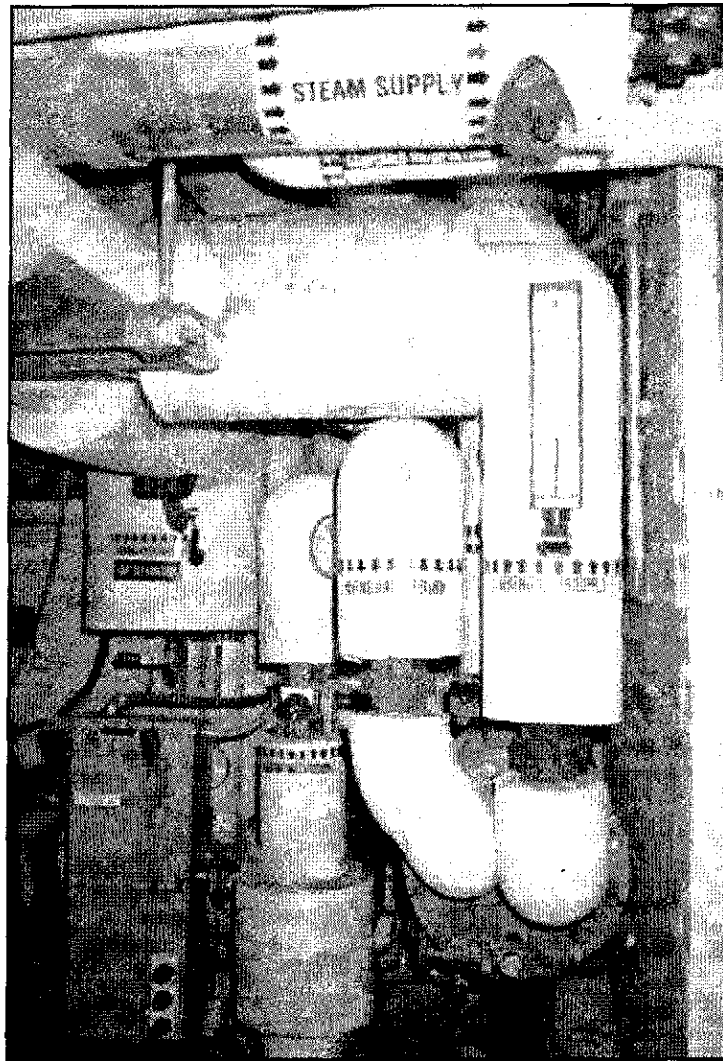


Figure 5.24: Washington Monument, Bunker 1, interior, mechanical room, staining at pipe casing under crack at west central ceiling.

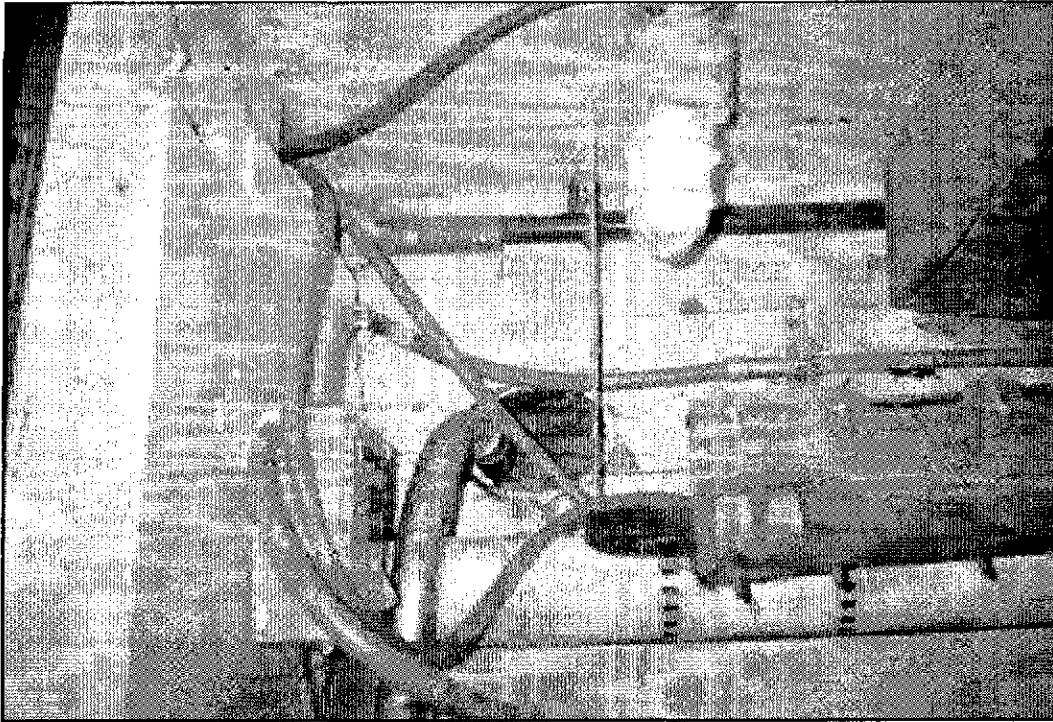


Figure 5.25: Washington Monument, Bunker 1, interior, mechanical room, southwest corner, movement in masonry.



Part I – Developmental History

CHAPTER SIX
EVALUATION OF INTEGRITY



CHAPTER SIX

EVALUATION OF INTEGRITY

The Washington Monument is listed on the National Register of Historic Places as significant in the areas of architecture, engineering, landscape architecture, and commemoration for the period 1848–1889.¹ It is proposed that the period of significance should be extended to 1848–1913 to include the installation of significant interior finishes. The monument's significance to civil engineering is underscored by its designation as a National Historic Civil Engineering Landmark. It is also proposed that the monument is significant for historic events and associations as a symbol of America for the period 1865–2003.

The most prominent character-defining feature of the Washington Monument is the uninterrupted rise of the marble obelisk from the grass-covered knoll. The interior of the monument is characterized by the same verticality, with an entry area at ground level and observation and elevator re-entry areas in the pyramidion, which are separated by 490 feet of the monument shaft. The interior of the shaft is accessed by a central iron stair structure, composed of Phoenix columns, stair landings, and steps, winding around the central open elevator shaft. Walls of structural marble, granite, and gneiss masonry dominate the interiors of both the shaft and the areas in the pyramidion. In the shaft interior, the masonry pattern is interrupted periodically by memorial stones of varied size, material, and style. At the entry level, the interior finishes of plaster, marble, and terrazzo conceal much of the masonry and provide a more human-scaled waiting area.

The exterior of the Washington Monument has excellent integrity; the 1889 appearance of the monument has been altered only by the installation of aircraft-warning lights in the pyramidion and the construction of the interim security building at the east entrance. The integrity of the interior of the monument is good; though few finishes remain from the National Register period of significance in the entry- and observation-level areas, the central shaft retains significant materials and features dating to 1848-1889.

The Washington Monument continues to be the central focus for the planning axes connecting the White House, Capitol Building, and Lincoln and Jefferson Memorials. The monument serves its historical function as a memorial to George Washington and a cultural attraction. The structure still conveys the aesthetics and engineering prowess of a specific period of time. However, the monument has transcended its materials and construction to become a timeless symbol of America.

6.1 CHARACTER-DEFINING FEATURES

Dominating the Washington, D.C., skyline, the Washington Monument is primarily defined by the uninterrupted rise of the marble obelisk, tapering slightly towards its pyramidion apex. Smooth-finished blocks of marble of ashlar masonry create the tapering planes of the unadorned obelisk. The simple geometric form of the monument provides a canvas for the daily changes in light reflected off the marble masonry. At the 150-foot level, the color of the marble masonry changes slightly, marking the pause in construction of the monument shaft during 1854–1880.

On the interior, the Washington Monument is characterized by the vertical arrangement of spaces with the entry area on the ground floor, the observation and elevator re-entry levels on the 500- and 490-foot levels, separated by 490 feet of the monument shaft. The ground floor has a square floor plan wrapped around the central elevator shaft with halls leading off to the east and west. The north portion of the ground floor is currently partitioned off as a mechanical room. The walls of the mechanical room are the exposed gneiss of the monument foundation courses and the floors are paved with the diamond-patterned stone flooring dating to 1886. The remaining ground-floor area is open to the public with finishes dating primarily to the 1904, 1913, and 1992 renovations. At the 500-foot observation area, the square floor plan encircles the central elevator shaft. The observation area is open to the top of the pyramidion and is dominated by the heavy masonry and ribs of its structure. The finishes at the observation area all date to the 2000 renovation work. The 490-foot elevator re-entry level was created in 1958 to improve traffic flow for visitors to the 500-foot observation level. All finishes at this level date to the 2000 renovation.

The interior of the monument shaft is characterized by the walls of structural marble, granite, and gneiss masonry and the central iron stair structure that winds around the open elevator shaft. The change in masonry on the shaft interior documents the pause in construction at the 150-foot level as well as alteration in the monument's masonry-bearing structure. Above the 150-foot level, the solid granite interior walls change to checkerboard granite and marble and then to solid marble as the walls thin towards the pyramidion. Memorial stones are set within the interior shaft masonry at stair landings.² The memorial stones date from the beginning of construction through the recent past and are composed of varied stone materials in a wide range of styles. The stair structure is composed of Phoenix columns, stair landings at every 10 feet, steps, cross bracing, and wire-mesh grilles covering the elevator shaft. Though modified throughout its history, the central stair structure retains its essential form and materials.

6.2 LOCATION AND SETTING

The Washington Monument has excellent integrity of location and setting. The monument is sited in its original location near the cross axes of the White House and Capitol Building. Poor soil quality required that the monument be sited 370 feet east of the White House axis and 123 feet south of the Capitol axis. The monument remains prominently located at the top of a grassy knoll above a broad swath of lawn. Survey Lodge and Monument Lodge, ancillary structures constructed to power the monument's elevator and provide waiting areas for visitors, remain on the grounds in their original locations. The grounds immediately surrounding the monument have changed in use, circulation patterns, and landscaping. These changes have not diminished

the preeminence of the monument within the landscape. Though the knoll and surrounding grounds have been altered throughout its history, the Washington Monument remains a central focus of the Washington Mall area, dominating views and drawing tourists to its base.

6.3 FORM, DESIGN, AND MATERIALS

The exterior of the Washington Monument retains excellent integrity of form, design, and materials. The form of the obelisk as completed in 1885 remains almost completely unaltered. In 1958, eight aircraft-warning lights were installed in the pyramidion.³ Though having limited impact during the day, the red warning lights have necessarily altered the appearance of the monument at night for safety reasons. The form of the monument has been recently altered by the construction of an interim security building in 2001, currently sited at the base of the east elevation. The interim security building is a temporary structure constructed to address security issues until a permanent solution is achieved. These alterations have not diminished the imposing presence of the marble obelisk, nor have they detracted from its overall form and design.

The exterior marble masonry of the Washington Monument has excellent integrity. Though a small amount of historical material has been lost from deterioration, the vast majority of the marble masonry from 1848–1889 remains. The exterior masonry of the monument has had four major maintenance campaigns in 1934, 1964, 1974–76, and 1997–2000. This work involved repointing, cleaning, installing cementitious patches, repairing cracks, and replacing deteriorated masonry with marble dutchman repairs. Much of the repair and replacement of masonry has occurred near the base of the monument. Most noticeably, the corner stones from the ground to the 60-foot level have been replaced with marble of a whiter color than the original. The maintenance campaigns have ensured the overall health of the exterior masonry and have not involved removal of significant amounts of historical masonry.

The integrity of form, design, and materials on the interior of the Washington Monument is good, though significant alterations have taken place at the entry level and at the 500-foot observation level. The electrical and mechanical systems have been continually upgraded throughout the history of the monument. While the form and design of the monument interior have not been significantly altered, many of the historical finishes dating to the period of significance 1848–1889 have been lost in the entry level and at the 500-foot observation level.

The vertical form of the monument has been retained, with an entry area on the ground-floor level and observation and elevator re-entry areas in the pyramidion separated by 490 feet of the monument shaft, which is accessed by the central iron stair structure. Minor alterations to the floor plan occurred at the ground-level entry area. The original square floor plan circling the central elevator shaft on the ground floor with halls leading off to the east and west was partitioned in 1904, dividing the mechanical room and stairway on the north from the rest of the ground floor.⁴ A major alteration to the interior floor plan was the construction of an additional floor at the 490-foot level in 1958 in order to improve traffic flow at the 500-foot observation level. Starting in 1958, visitors to the monument would take the elevator to the 500-foot observation level, descend by one of two new stairwells, and re-enter the elevator at the 490-foot level.⁵ The addition of the 490-foot elevator re-entry area did not compromise the overall form and design of the monument but did improve its function as a tourist facility.

Renovations to the interior of the monument have covered or removed the historical finishes in the ground-level entry area and the 500-foot observation level; in contrast, changes to the central iron stair structure have minimally affected the historical materials. At the ground-level entry area, the terrazzo floor and marble wainscot date to the 1904 and 1913 renovations.⁶ The remainder of the current finishes date to the 1992 renovation. In the mechanical room on the north, the 1886–1903 appearance of the ground-floor entry area is retained. The exposed gneiss foundation forms the walls, and the floor is paved with stone dating to 1886.⁷

At the 500-foot observation level, the character of the area has been retained, though the finishes all date to the 1997–2000 renovation. The observation area is dominated by the sloping walls of the pyramidion, characterized by the massive marble stones notched into the pyramidion ribs. It is in the observation area that the impressive engineering of the structure is most evident on the interior. Two observation windows remain on each of the four sides of the observation area. The center of the observation area houses the elevator shaft and elevator equipment. As part of the 1997–2000 renovation, all new finishes were installed in the observation area, including new floors, elevator housing, and glass panels to cover the interior monument masonry at visitor level. All of the finishes at the 490-foot elevator re-entry level were also replaced in 1997–2000.⁸ The interior of the monument shaft has seen fewer changes to the historical materials. The shaft interior is characterized by the iron stair structure winding around the open, central elevator shaft between the masonry walls of the monument shaft. The central iron stair structure, composed of Phoenix columns, steps, stair landings at every 10 feet, handrails, and wire-mesh grilles, remains relatively unaltered from the completion of the monument in 1889. Additional reinforcing iron tie-rods were added to stiffen the structure in 1898–1901.⁹ Wire screening and guardrails were installed around the central elevator shaft in 1929.¹⁰ Emergency exit platforms were added to each stair landing in 1938.¹¹ Numbers were installed in the floor of each landing indicating the height above ground level in 1974–76.¹² As part of the 1997–2000 elevator upgrade, new lighting and glass screens have been set up at selected stair landings where the elevator slows on descent, allowing passengers a glimpse of the memorial stones in these locations. These alterations have improved interpretation and visitor safety, but have minimally impacted the integrity of the monument shaft interior.

The masonry in the shaft interior has remained untouched, with the exception of the installation of memorial stones. Memorial stones have been inserted in the interior shaft of the Washington Monument from the beginning of its construction up to the present time. The size, style, and material of each stone are unique. The memorial stones were recently restored during the 1997–2000 restoration project.

6.4 FEELING AND ASSOCIATION

The importance of the Washington Monument as a memorial to George Washington, a civil engineering landmark, and a national symbol persists to the present day. It continues to serve as a memorial to the first president of the United States and a destination for tourists visiting Washington, D.C. The number of visitors to the Washington Monument, 323,560 in 2002, attests to its continuing significance.¹³

The Washington Monument is an outstanding example of the aesthetics and engineering skill for the period of its 1848–1889 construction. The exterior appearance of the monument has changed little since its completion, presenting the desired aesthetics of Robert Mills’s design as completed by Thomas Lincoln Casey under the guidance of ambassador George Marsh and the Joint Commission for the Completion of the Washington Monument. The monument is also a testament to the engineering skill of Thomas Lincoln Casey and the Army Corps of Engineers. From the concrete buttresses of the foundation to the Phoenix columns of the central iron stair structure and the masonry of the pyramidion, the monument provides physical evidence of the ingenuity of these nineteenth-century engineers in constructing what remains the tallest freestanding, load-bearing, masonry structure in the world.

The Washington Monument has also achieved iconic status as a symbol of the nation. During its period of construction, 1848–1889, spanning the years before and after the Civil War, the monument became a symbol of unification, as expressed in many of the memorial stones dating to this period. The monument has continued to be a gathering point for patriotic events, protests, and presidential addresses. As a national symbol and rallying point, the monument has achieved significance beyond the importance of its materials and construction.

ENDNOTES

Abbreviations:

RG 79 Records of the National Park Service, Record Group 79

¹ Donald C. Pfanz, “Washington Monument” National Register of Historic Places Inventory, Documentation of Existing National Register Property, 2 December 1980.

² “Washington Monument Memorial Stones,” National Capitol Parks-Central, National Park Service, 22 July 1997.

³ “Obstruction and Pyramidion Lighting and Plan, Floodlighting and Electric Service, Washington Monument, US Reservation 2.” Revised to as built conditions 4 July 1958; [Architectural Drawing] File 44.289-13; NCP 807/84289; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.

⁴ “Floor Plan of Waiting Room Washington Monument, Measurements for Marble Wainscoting,” Approved 20 October 1904; [Architectural Drawing] File 74.2-7; NCP 807/80044; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.

⁵ Kluckhuhn, Cobb, & McDavid Engineering Consultants. “The Washington Monument” (Axonometric view of 490’ and 500’ Levels), 1958; [Architectural Drawing] File 74.14-61-1; NCP 807/80060 1 of 2; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.

⁶ “Floor Plan of Waiting Room Washington Monument, Measurements for Marble Wainscoting,” Approved 20 October 1904; [Architectural Drawing] File 74.2-7; NCP 807/80044; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md; “Plans Small Additional Waiting Room, Washington Monument,” Approved 8 May 1913; [Architectural Drawing] File

74.20-18; NCP 807; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.

⁷ "Contract Sheet No. 1, Washington Monument, Details of Floor Covering," January 1886; [Architectural Drawing] File 74.11-2; NCP 807; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, MD.

⁸ "Sheet No. A2 Sup, 490' Level Interior Elevations, Interior Renovations Washington Monument," 24 January 2000, Technical Information Center, Denver Service Center, National Park Service; "Sheet No. A3 Sup, 500' Level North & East Interior Elevations, Interior Renovations Washington Monument," 24 January 2000, Technical Information Center, Denver Service Center, National Park Service; "Sheet No. A6, 490' and 500' Level Floor Patterns, Interior Renovations Washington Monument," 24 January 2000, Technical Information Center, Denver Service Center, National Park Service; "Sheet No. A7, 490' Level Reflected Ceiling Plan & Details, Interior Renovations Washington Monument," 24 January 2000, Technical Information Center, Denver Service Center, National Park Service.

⁹ Theodore A. Bingham, "Appendix DDD: Annual Report upon the Improvement and Care of the Public Buildings and Grounds, and Care and Maintenance of the Washington Monument in the District of Columbia" in *Annual Report to the Chief of Engineers for 1901*, Washington, D.C.: Government Printing Office, 1901.

¹⁰ "Washington Monument Protective Screen," January 1929; [Architectural Drawing] File 74.4-44; NCP 807/80036; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.

¹¹ Aaron V. Wunsch, Washington Monument, HABS No. D.C.-428 (Washington, D.C.: Department of the Interior, National Park Service, Historic American Buildings Survey, 1994), 6.

¹² "General Notes Section and Details," 7 January 1974; [Architectural Drawing] NCP 807/41001A 2 of 55; RG 79; Cartographic and Architectural Records LICON, Special Media Archives Division, National Archives at College Park, College Park, Md.

¹³ See National Park Service, Washington Monument, Park Facts website <http://www.nps.gov/wamo/pphtml/facts.html>, accessed 19 August 2003.

Part II

CHAPTER SEVEN
TREATMENT AND USE

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CHAPTER SEVEN

TREATMENT AND USE

7.1 ULTIMATE TREATMENT AND USE

The approved ultimate treatment of the Washington Monument is preservation for its continued use as a memorial and cultural tourist attraction. The preservation of the monument and improvement of visitor facilities are called for in the National Park Service (NPS) Revised Development Concept Plan (DCP), approved by the National Capital Planning Commission (NCPC) in January 2003. The Revised DCP incorporates planning elements from the 1993 DCP such as improvements to the Washington Monument grounds, provision for an underground visitor facility accessed through the Monument Lodge, and a redesign of the monument plaza. In addition to these planning goals, the Revised DCP includes the construction of an addition to the Monument Lodge, a skylight over the underground visitor facility, an underground passage from the new underground facility to the monument, and construction of low retaining wall vehicle barriers and pedestrian pathways around the monument.¹ The purpose of the proposed work is to improve security, visitor flow, and accessibility, while retaining recreational areas, preserving the quality of the cultural landscape, and, listed as the highest priority, preserving the Washington Monument. Approval for the Revised DCP was based on a "Finding of No Significant Impact"² for the proposed action as assessed in the "Washington Monument Permanent Security Improvements Environmental Assessment."³

This section of the Historic Structure Report will deal specifically with the impact of the ultimate treatment on the historic structure and its immediate site. The landscape issues are addressed in the companion Cultural Landscape Report. Further discussion of the rehabilitation and addition to Monument Lodge is included in the Monument Lodge Historic Structure Report. This section will address the issues raised concerning the redesign of the monument plaza and the construction of a new underground passage and entrance to the Washington Monument.

The current plan for the redesign of the monument plaza involves repaving the plaza with concentric circles of granite in two colors, installing curved white-granite benches at the outer circumference of the plaza, and retaining the existing fifty flagpoles and flags. Final site development plans for the plaza redesign were approved by the NCPC in June 2003.⁴

Designs for the underground passage and entrance to the Washington Monument are not currently available for review. Studies performed for the Environmental Assessment, later corroborated by peer reviewers, concluded that construction of the underground passage and entrance would not destabilize the monument if handled correctly.⁵ Plans for the underground passage are currently under reconsideration. Should plans for the proposed underground passage proceed, NPS would continue to consult with signatories and concurring parties, as part of a

Programmatic Agreement, in order to ensure that excavation and construction through the foundation would be conducted without harm to the monument's integrity. The Programmatic Agreement formalizes the process for review of the proposed work in compliance with Section 106 of the National Historic Preservation Act.⁶

7.2 REQUIREMENTS FOR TREATMENT

The purpose of the NPS, as stated in the NPS Organic Act of 1916,⁷ and clarified under the NPS General Authorities Act of 1970, as amended in 1978,⁸ is the conservation of park resources and values and the provision for the enjoyment of these resources by current and future generations of Americans. Where use of these resources, either by the NPS or the public, conflicts with the goal of resource conservation, the overriding goal is the preservation of the resource.⁹ As a federal agency, the NPS must conform to various laws,¹⁰ executive orders,¹¹ and guidelines,¹² aimed at integrating the preservation of cultural resources into ongoing agency programs and policies. Further, Section 110 of the National Historic Preservation Act (NHPA) requires the NPS, as a federal agency, to take into account the effects of their actions on properties listed or eligible for listing in the National Register of Historic Places. Adverse effects to cultural resources must be mitigated according to Section 106 of NHPA. Within the NPS, "NPS-28: Cultural Resource Management Guideline" elaborates on the laws, policies, and standards applying to cultural resources and offers guidance on their implementation.¹³ Regarding the specific proposed undertaking involved in the implementation of the Washington Monument permanent security improvements, a Programmatic Agreement is in place, which sets forth the process by which the NPS will meet the requirements of Section 106 of NHPA.¹⁴

The Secretary of the Interior's "Standards for Preservation and Guidelines for Preserving Historic Buildings" states that preservation is recommended "when the property's distinctive materials, features, and spaces are essentially intact and thus convey the historic significance without extensive repair or replacement." The 8 criteria for the preservation of historical properties emphasize the retention of historical use where possible and retention of distinctive materials, features, spaces, and spatial relationships. The historical structure will be recognized as a physical record; therefore, repairs will be made with compatible but identifiable non-historical materials, and significant historical changes will be retained. Repairs will involve limited replacement in kind and chemical and physical treatments will use the gentlest means possible. Archeological resources will be protected and preserved in place.¹⁵ The NPS document "Management Policies 2001" clarifies when preservation should be implemented within the NPS: a historical structure will be preserved in its present condition if "that condition allows for satisfactory protection, maintenance, use and interpretation."¹⁶

Within the Washington Monument Grounds administrative unit of NPS, alterations to existing structures and construction of new facilities requires approval of the NCPC and the Commission of Fine Arts (CFA).¹⁷ NCPC planning and design decisions are based on the Federal Element of the Comprehensive Plan for the National Capital. An important component of the Comprehensive Plan concerning the Washington Monument Grounds is the Parks, Open Space, and Natural Features Element, which states that "the Mall should be considered complete, and any improvements necessary in this area should be limited in scope and sensitively designed to reinforce the integrity of the Mall complex."¹⁸ NCPC is a signatory of the Programmatic

Agreement prepared for the Section 106 review of the proposed work at the Washington Monument. The CFA has not been involved in recent design submittals for the proposed work.

The design and construction of new facilities and additions to historical structures are subject to nationally recognized codes and standards.¹⁹ The *International Building Code* contains standards for the design and installation of building systems. Special considerations for existing structures are detailed in chapter 34.²⁰ Fire-safety regulations to prevent fires, explosions, and to ensure proper evacuation in case of emergency are standardized under the National Fire Protection Association (NFPA) codes and standards. Fire-safety codes dealing with construction are detailed in NFPA 5000 Building Construction and Safety Code. NFPA 101 Life Safety Code deals specifically with features that will minimize danger from fires, smoke, fumes, or panic during evacuation. NFPA 909 Code for the Protection of Cultural Resources provides guidance on integrating fire-safety codes with cultural properties without impairing their historical integrity. Additional recommendations for identifying and dealing with fire hazards in historical buildings are contained in NFPA 914 Code for Protection of Historic Structures. Specific NPS requirements are outlined in "Director's Order #58 and Reference Manual 58: Structural Fires." The NPS must comply with the Occupational Safety and Hazard Administration (OSHA) standards when dealing with the abatement of hazardous materials while maintaining, altering, or constructing new or existing structures.²¹ OSHA Standard 1910 deals with general industry standards; section 1001 of OSHA Standard 1910 specifically addresses asbestos hazards. OSHA Standard 1960 focuses specifically on occupational safety and health programs for federal employees. General construction standards are contained in OSHA Standard 1926. Further guidance for the application of OSHA standards to NPS facilities is contained in "Director's Order #50B and Reference Manual 50B Occupational Safety and Health Program."

Design considerations regarding accessibility are also standardized. The NPS must provide for the accessibility for persons with disabilities in all buildings and facilities "to the greatest extent possible, in compliance with all applicable laws, regulations and standards."²² In accordance with previous legislation,²³ the NPS must comply with both the Uniform Federal Accessibility Standards (UFAS)²⁴ and Americans with Disabilities Act of 1990 and its implementing ADA Accessibility Guideline (ADAAG).²⁵ Where the standards of the UFAS and ADAAG differ, the more stringent requirements apply.²⁶ NPS "Director's Order #42: Accessibility for Visitors with Disabilities" outlines how accessibility standards apply to NPS properties.

NPS is also required to adhere to energy-efficiency standards for new construction or rehabilitation work as stated in the Energy Policy Act of 1992²⁷ and applicable executive orders.²⁸ The NPS "Management Policies 2001" declares that any facility work "whether it be a new building, a renovation, or an adaptive re-use of an existing facility" must include improvements in energy efficiency in both the building envelope and mechanical systems using alternative energy and energy-efficient systems. Where appropriate, construction within the parks must also employ sustainable materials and construction practice.²⁹

7.3 ALTERNATIVES FOR TREATMENT

The ultimate treatment of the Washington Monument is preservation of the structure in its current condition. In the "Washington Monument Permanent Security Improvements

Environmental Assessment," the NPS has assessed alternatives to achieve the most appropriate and effective security improvements in order to ensure the preservation of the Washington Monument and improve security for the monument and its visitors. The Environmental Assessment presented two action alternatives A and B with a third no-action alternative. The two action alternatives A and B will be reviewed here. Alternative A involves the currently proposed underground passage and entrance and is the preferred alternative. Based on the scope of proposed work, Alternative A will be discussed as the rehabilitation of the Washington Monument. Alternative B includes new above-ground facilities and an above-ground security fence providing a passage from the screening areas to the monument. Since Alternative B involves no alteration to the monument, it will be discussed as the preservation of the Washington Monument. The no-action alternate will not be discussed, as it does not address the NPS objectives of improving security, visitor access, and visitor facilities.

7.3.1 REHABILITATION OF WASHINGTON MONUMENT

Alternative A of the Environmental Assessment is the preferred alternative including site improvements, monument plaza redesign, and construction of an underground visitor facility with an underground passage and entrance to the Washington Monument. The impact of the redesign of the Monument Plaza and the construction of a new underground passage and entrance to the Washington Monument has been assessed as having no significant impact, which fulfills the requirements of the National Environmental Protection Act (NEPA).³⁰ Under the Revised Development Concept Plan, the proposed action of Alternative A, including the redesign of the monument plaza and construction of a new underground passage and entrance to the monument, was officially incorporated in NPS planning policy. NCPC has found the design concept consistent with the Comprehensive Plan of the Nation's Capital. Further approval for the plan is contingent on full compliance with Section 106 of NHPA as outlined in the Programmatic Agreement, including completion of this Historic Structure Report, as well as continued consultation on the design and engineering of the new underground passage and entrance.³¹

In Alternative A, the monument plaza is to be redesigned with granite paving and benches. Though the form of the plaza and the ring of flags are deemed as contributing features, the materials of the current plaza are non-contributing and can be replaced. The proposed design would improve the appearance of the plaza and would provide additional seating for visitors.

The proposed scope of work involves the rehabilitation of the Washington Monument; rehabilitation allows more aggressive repairs, alterations, and additions to historical structures while preserving significant historical features and materials. Under the proposed plan, the new entrance would significantly alter the visitor's experience of the monument. Rather than approaching the monument along the upward slope of the knoll, with a constant view of the ever-increasing height of the structure, visitors would approach the structure from underground, losing this aspect of the monument. The visitor would also bypass the historical interior finishes in the ground-floor lobby dating to 1904 and 1913.

The currently proposed underground passage and entrance to the Washington Monument Grounds involve substantial and irreversible alterations to the Washington Monument structure. The proposed work would not involve any additions or accretions to the exterior of the

monument and would restore the exterior to its appearance prior to the construction of the interim security building. However, the new entrance would be constructed through the existing foundation, involving significant removal and alteration of historical fabric. The strengthening of the original 1848 stepped gneiss foundation is an important part of the engineering history of the Washington Monument. Completed during 1878–1880, the concrete underpinning of the earlier foundation remains as a document of the engineering skill of the U.S. Army Corps of Engineers and Thomas Lincoln Casey as well as the early use of Portland cement. The main concern regarding the construction of an underground passage and entrance to the monument has, understandably, been the stability of the structure. However, the impact on the historical foundation should also be considered. A significant amount of the original gneiss foundation would necessarily have to be removed, and possibly portions of the 1878–1880 concrete foundation, as well. The alteration would be irreversible, causing a permanent change in the monument's structure.

7.3.2 PRESERVATION OF WASHINGTON MONUMENT

Alternative B provides for the preservation of the monument. Under Alternative B, new above-grade facilities would be constructed near the existing Sylvan Theater to the southeast of the monument. The two proposed buildings would provide ticketing, screening, educational and interpretive facilities, and other visitor services. After screening, visitors would be escorted by law-enforcement personnel through an above-ground, double-fenced security pathway to the east entrance of the monument.

Under Alternative B, the monument plaza would be redesigned as a grass area with a low granite wall at its perimeter. This treatment was found to have adverse impacts on visitor access to the monument. However, as noted by the National Trust for Historic Preservation, the plaza could also be paved with granite and ameliorated with benches as proposed in Alternative A.³²

Alternative B was found to have negative visual impacts on the Washington Monument Grounds, altering the swath of open grass at the base of the monument with the proposed new security fence. This alternative would, however, preserve the monument in its current condition and would be easily reversible in the future. There would be no significant alteration in the historical foundation. The historical visitor experience of entering the monument from the east would be retained. Further, the visitor facilities as proposed would be accessible to visitors without going through security screening. Currently, the concept of above-ground visitor facilities at the Washington Monument Grounds is not under consideration.

7.3.3 RECOMMENDATIONS

Although Alternative B has less impact on the historical fabric, Alternative A preserves the character, appearance, and use of the monument and grounds. Alternative A also fulfills the NPS project objectives of improving security, visitor flow, and accessibility, while retaining recreational areas, and preserving the quality of the cultural landscape. As proposed, Alternative A is an appropriate treatment with the following recommendations:

- The implementation of the design must ensure that no structural damage will occur to the Washington Monument over the long term.

- The design must minimize the removal of historical fabric.
- Prior to removal of historical fabric, the current historical structure and material to be disturbed must be documented. Any information that would contribute to the understanding of historical construction methods and materials should also be documented. Historical materials should be analyzed to gain information on their original components.
- Any historical material that is removed should be reused and interpreted within the new construction, possibly within the proposed concourse or new visitor facility.
- The design should be implemented by structural engineers and architects with *significant* experience in rehabilitating historic structures.

ENDNOTES

Abbreviations:

CFR	Code of Federal Regulations
FR	Federal Register
NCPC	National Capital Planning Commission
USC	United States Code

¹ National Capital Planning Commission, "Washington Monument Grounds Revised Development Concept Plan and Preliminary Site and Building Plans for Visitor and Security Improvements," 9 January 2003, NCPC Files Nos. 1303 and 6152.

² National Capital Planning Commission, "Decision Notice and Finding of No Significant Impact, Washington Monument Permanent Security Improvements Environmental Assessment," July 2002.

³ National Park Service, U.S. Department of the Interior, "Washington Monument Permanent Security Improvements Environmental Assessment," April 2002.

⁴ National Capital Planning Commission, "Washington Monument Grounds Final Site Development Plans for Visitor and Security Improvements – Landscape Plan," 5 June 2003 (NCPC Files Nos. 1303 and 6152), 3.

⁵ National Capital Planning Commission, "Washington Monument Grounds Revised Development Concept Plan and Preliminary Site and Building Plans for Visitor and Security Improvements," 9 January 2003 (NCPC Files Nos. 1303 and 6152), 21–22.

⁶ "Programmatic Agreement Among the National Park Service, National Capital Planning Commission, District of Columbia State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding Implementation of Permanent Security Improvements to the Washington Monument and its Grounds," 7 May 2002.

⁷ 16 USC 1-4; August 25, 1916, ch. 408, 39 Stat. 535.

⁸ 16 USC 1a-1 et seq.; PL 91-383, 94-458, 95-250.

⁹ U.S. Department of the Interior, National Park Service, "Management Policies 2001" (December 2000), 60.

¹⁰ Antiquities Act of 1906 (16 USC 431-433; June 8, 1906, ch. 3060, 34 Stat. 225); Historic Sites, Buildings and Antiquities Act (16 USC 461-467; August 21, 1935, ch. 593, 49 Stat. 666); National Environmental Policy Act of 1969 (NEPA) (42 USC 4321-4370d; PL 91-190); National Historic Preservation Act (NHPA) (16 USC 470-470x-6; PL 89-665, 96-515).

¹¹ Executive Order 11593, May 13, 1971, 36 FR 8921 (Protection and Enhancement of the Cultural Environment); Executive Order 13287, March 5, 2003 (Preserve America).

¹² Standards and Guidelines for Federal Agency Historic Preservation Programs Pursuant to the National Historic Preservation Act (63 FR 20497-508).

¹³ U.S. Department of the Interior, National Park Service, "NPS-28: Cultural Resource Management Guideline," August 2002.

¹⁴ "Programmatic Agreement Among the National Park Service, National Capital Planning Commission, District of Columbia State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding Implementation of Permanent Security Improvements to the Washington Monument and its Grounds," 7 May 2002.

¹⁵ Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR 68).

¹⁶ U.S. Department of the Interior, National Park Service, "Management Policies 2001" (December 2000), 59.

¹⁷ National Capital Planning Act of 1952 (40 USC 71).

¹⁸ Parks, Open Space, and Natural Features Element, Comprehensive Plan for the National Capital (1 February 2001), 19.

¹⁹ Public Buildings, Compliance with Nationally Recognized Codes (40 USC 619).

²⁰ *International Building Code*, International Code Council, 2000.

²¹ Occupational Safety and Hazard Administration Standards, 29 CFR 1910.

²² U.S. Department of the Interior, National Park Service, "Management Policies 2001" (December 2000), 102.

²³ Architectural Barriers Act of 1968 (42 USC 4151-4157; PL 90-480); Section 504 of the Rehabilitation Act of 1973 (29 USC 701-797b; PL 93-112, 105-220).

²⁴ Uniform Federal Accessibility Standards (UFAS) (41 CFR 19.6; 49 FR 31528).

²⁵ Americans with Disabilities Act of 1990 (ADA) (42 USC 12101-12213; PL 101-336).

²⁶ U.S. Department of the Interior, National Park Service, "NPS-28: Cultural Resource Management Guideline" (August 2002), Chapter 4-A-2.

²⁷ Energy Policy Act of 1992 (42 USC 13201-13556; PL 102-486).

²⁸ Executive Order 13123, 3 June 1999, 64 FR 30851 (Greening the Government Through Effective Energy Management).

²⁹ U.S. Department of the Interior, National Park Service, "Management Policies 2001" (December 2000), 102.

³⁰ National Capital Planning Commission, "Decision Notice and Finding of No Significant Impact, Washington Monument Permanent Security Improvements Environmental Assessment," July 2002; National Capital Planning Commission. "Washington Monument Grounds Revised Development Concept Plan and Preliminary Site and Building Plans for Visitor and Security Improvements," 9 January 2003 (NCPC Files Nos. 1303 and 6152), 16.

³¹ National Capital Planning Commission, "Washington Monument Grounds Revised Preliminary Site and Building Plans for Visitor and Security Improvements – Lodge Addition," May 1, 2003 (NCPC Files Nos. 1303 and 6152), 7-8.

³² Elizabeth S. Merritt, Deputy General Counsel, National Trust for Historic Preservation, to Arnold Goldstein, Superintendent, National Park Service, National Capital Region, 21 June 2002.

APPENDIX A
SCOPE OF WORK



APPENDIX A

SCOPE OF WORK

INTRODUCTION

The purpose of this Historic Structure Report (HSR) is to inform the analysis and evaluation of the proposed visitor facility and security design improvements, to document and assess the historic significance and integrity of the buildings, and to help guide future management of the facilities. The HSR was commissioned in conjunction with a companion Cultural Landscape Report (CLR) for the Washington Monument Grounds. Together the HSR and CLR will provide a guide for the treatment and management of the Washington Monument, Monument Lodge, Survey Lodge, and Monument Grounds. The HSR scope of work includes the architectural and historical evaluation of the designated structures. Civil, structural, mechanical, plumbing, and electrical analysis of the Washington Monument, the Monument Lodge, and the Survey Lodge are not included in the scope of work.

HISTORIC STRUCTURE REPORTS

The National Park Service provides guidelines for the preparation of Historic Structure Reports in *Director's Order Number 28: Cultural Resource Management Guidelines* as follows¹:

The Historic Structure Report (HSR) is the primary guide to treatment and use of a historic structure and may also be used in managing a prehistoric structure. A separate HSR should be prepared for every major structure managed as a cultural resource. Groups of similar structures or ensembles of small, simple structures may be addressed in a single report. In no case should restoration, reconstruction, or extensive rehabilitation of any structure be undertaken without an approved HSR, Parts 1 and 2.

An HSR includes the following:

- *Management Summary*: This is a concise account of research done to produce the HSR, major research findings, major issues identified in the task directive, and recommendations for treatment and use. Administrative data on the structure and related studies are included.
- *Part 1, Developmental History*: This is a scholarly report documenting the evolution of a historic structure, its current condition, and the causes of its deterioration. It is based on documentary research and physical examination. The scope of documentary research may extend beyond the physical development of the structure if needed to clarify the significance of the resource or to refine contextual associations; however, major historical investigation of contextual themes or background information should be conducted as part of a historic resource study.

- *Part 2, Treatment and Use:* This presents and evaluates alternative uses and treatments for a historic structure. Emphasis is on preserving extant historic material and resolving conflicts that might result from a structure's "ultimate treatment." Part 2 concludes by recommending a treatment and use responding to objectives identified by park management. In most cases, design work does not go beyond schematics.
- *Part 3, Record of Treatment:* This is a compilation of information documenting actual treatment. It includes accounting data, photographs, sketches, and narratives outlining the course of work, conditions encountered, and materials used.

All aspects of a historic structure and its immediate grounds should be addressed in an HSR. Potential overlaps with other cultural resource types and natural resource issues should be identified, and applicable studies and reports should be called for or referenced. An HSR and analogous reports (e.g., a cultural landscape report) may be combined to address multiple resource types at a single property or area.

SCOPE OF WORK

This report constitutes Parts I, Developmental History, and Part II, Treatment and Use, of a HSR for the Washington Monument and Associated Structures. This HSR has been prepared in accordance with the Scope of Work presented in the Request for Proposal provided by the NPS and Grunley Walsh as follows²:

The products will be written Historic Structure Reports on the Washington Monument, Washington Monument Lodge, and the Survey Lodge. The focus of the HSR effort will be to develop historical background, determine the building developmental history and use, update existing conditions documents and in one instance will lead directly to schematic design for adaptive reuse of the Monument Lodge as opposed to a more academically focused, research-type HSR). The document should also clearly define the elements that give these properties their architectural character, define primary and secondary spaces, and convey their significance. This information should be the basis upon which to carefully evaluate any alterations that are proposed.

Each report shall be professionally produced following the National Park Service's Management of Cultural Resource Director's Order Number 28 (DO-28) and its technical supplements. DO-28 is available at <http://www.nps.gov/refdesk/DOrders/DOrder28.html>. All reports shall consist of sections, parts, narratives, graphics, and appendix as outlined below. The level of research for this report will be "thorough." This is one of three levels of investigation—exhaustive, thorough, and limited, as defined by DO-28. The final reports shall include, but not be limited to:

- A. Cover Page:
- B. Table of Contents:
- C. Executive Summary:
 - Research done to produce the HSR.

- Major research findings.
 - Major issues identified in the task directive.
 - Recommendations for treatment or use.
- D. Administrative Data:
- Names, numbers (park structure numbers and LCS #3s), and location data used to refer to the historic structure.
 - The proposed treatment of the structure including the source document.
 - Related studies.
 - Cultural resource data including date listed in the National Register and National landmark status data.
 - Recommendations for documentation, cataloging, and storage of materials generated by the HSR.
- E. Part 1: Developmental History:
- Historical Background and Context: This section briefly describes the people and events associated with the structure. The section should establish a recommended period or periods of significance if this has not been done in the National Register nomination, historic resource study (HRS), or legislation.
 - Chronology of Development and Use: Physical construction, modification, and use of the structure is summarized in this section. The text should be based on historical documentation with corroboration from first-hand observation and materials analysis.
 - Physical Description: This section contains a description and analysis of all features, materials, and spaces according to age, significance, and condition. Describe and document all alterations to the structure. Discuss character-defining features, and primary and secondary spaces. Copies of inspection reports should be included in the appendix but summarized in the body of the chapter. The text should also discuss causes of deterioration. For the Washington Monument, the interior description will reference prior reports prepared by the NPS for description of the memorial stones.
 - Condition Assessment:
 - a) General: This is a conclusive narrative stating the overall physical condition and recommendations for work critical to preservation of the existing building.
 - b) Graphic Data:
 1. Site Plan: Scaled plan indicating boundaries of the building and locations of all related hardscape features. Historic American Building Survey (HABS) and current survey drawings may be reproduced and used.

2. Architectural Drawings: Include historic scaled plans for each building including foundation plans, floor plans, roof plans, as available.
 3. Photographic Copies: Organized photographic records showing overalls and details of exterior elevations, interior spaces, and significant elements of the building.
- c) Methodologies: Narrative descriptions of methodologies used for inspections, fabric investigation, material analyses and testing, and recording of existing conditions for the property.
 - d) Condition Assessment Data: This includes information pertaining to deficiencies in physical conditions of features and materials identified through inspections and evaluations. It also includes information pertaining to deficiencies in design, specifically how architectural components interrelate, potentially resulting in building-component failure. Special attention is given to issues regarding integrity and stability, accessibility, life safety, fire protection.
 - e) Evaluation of Integrity: This section is a statement of historical and/or architectural significance, which discusses how well the building is still able to convey a sense of its history and/or architectural design. This needs to be evaluated in order to make preservation treatment decisions based on the building's historical and architectural importance.

F. Part 2: Treatment and Use

- Ultimate Treatment and Use: This narrative discusses and analyzes the ultimate treatment and use of the structures as defined in park planning documents. If they have not been defined, this section may recommend an ultimate treatment and use. If analysis of the structure suggests that a planned treatment or use would adversely affect it, the text may present an alternative approach. Recommended treatment in general is to preserve the extant historic materials and features, but not to arbitrarily restore missing features unless they are highly characteristic and needing treatment for other reasons such as severe deterioration. Any proposed rehabilitation associated with new uses would have to be carefully considered, so that the existing character-defining features of the site and building are maintained.
- Requirements for Treatment: In concise terms, this text outlines applicable laws, regulations, and functional requirements. Specific attention should be given to issues of life safety, fire protection, energy conservation, abatement of hazardous materials, and handicapped accessibility.
- Alternatives for Treatment: This section presents and evaluates alternative approaches to realization of the ultimate treatment. Alternatives are presented in both text and graphic form. Analysis addresses the adequacy of each solution in terms of impact on historic materials, effect on historic character, compliance with NPS policy, and other management objectives. The section concludes with

elaboration on the recommended course of action and specific recommendations for preservation treatments.

- **Technical Data:** This portion of the report contains copies of field reports, material data sheets, field notes, correspondence, accounting spread sheets, and contract summaries.

G. **Appendices**

The appendices include relevant information that is not included in the text. Appendix shall include, but not be limited to:

- Bibliography
- Drawings
- Photographs

ENDNOTES

¹ NPS Director's Order Number 28: *Cultural Resource Management Guidelines* (June 11, 1998), Chapter 8, 4.

² NPS, Task Order #25, Modification 3, NPS Contract # 1443cx3059980901, *Scope of Services for Historic Structures Report—Washington Monument and Associated Structures* (February 14, 2003), 1–4.

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APPENDIX B

ANNOTATED CHRONOLOGY

PRE-1832 (UNBUILT MEMORIALS TO GEORGE WASHINGTON)

- 1783 Maj. Pierre Charles L'Enfant proposed that Congress erect an equestrian statue of George Washington.¹
- 8/7/1783 In gratitude for his service during the Revolutionary War, the Continental Congress recommended erecting an equestrian statue of George Washington "at the place where the residence of Congress shall be established." This statue was to be bronze, with Washington in Roman dress, truncheon in his right hand, and a laurel wreath on his head, the statue on a marble pedestal illustrated with the principal events of the war commanded by Washington: evacuation of Boston, capture of Hessians at Trenton, battle of Princeton, action of Monmouth, and surrender of York. The United States minister to Versailles was to superintend the work, "by the best artist in Europe."²
- 12/24/1799 After Washington's death, John Marshall, then a representative from Virginia, introduced a resolution calling for the construction of a marble monument within the Capitol to serve as Washington's mausoleum. Martha Washington consented to the removal of her husband's remains from Mount Vernon to the Capitol, but Congress did not approve the resolution.³
- 5/8/1800 Representative Henry Lee of Virginia proposed building the equestrian statue approved by Congress in 1783 in front of the Capitol. Representative Robert Goodloe Harper of South Carolina altered this proposal so as to authorize building of a Benjamin Latrobe-approved mausoleum in the form of a 19-step pyramid with a 100-foot square base. The estimated \$62,500 cost of this structure caused debate among members of Congress who preferred a less-expensive alternative. The House passed the bill, but the Senate took no action.⁴
- 2/16/1801 The unresolved issue of whether to build a monument or mausoleum for Washington was again brought before the House, but nothing was resolved.⁵
- 1819 The Senate raised the issue of a memorial to Washington and adopted a resolution to build an equestrian statue of Washington on the Capitol grounds, but the House failed to pass the bill.⁶
- 1/1824 Representative James Buchanan of Pennsylvania again brought the question of a monument to Washington before the House, which took no action.⁷

1832 The issue of a monument or mausoleum to George Washington was yet unresolved during the centennial celebration of his birth. In commemoration of this event, Congress did authorize John Vanderlyn to copy Gilbert Stuart's portrait of Washington for the Hall of Representatives and commissioned Horatio Greenough to sculpt a statue of Washington based upon the bust by Houdon. Greenough's statue depicted Washington seated and dressed in a Roman toga. This statue was completed in 1841 and displayed in the rotunda of the Capitol, but it was not well received by the general public.⁸

1833-1854 (PLANNING AND INITIAL CONSTRUCTION PHASE)

EXTERIOR

- 9/26/1833 The Washington National Monument Society was founded by Chief Justice John Marshall, who served as the first president of society; George Watterston, Librarian of Congress; and James Madison, who became president of the Society after Marshall's death in 1835.⁹
- 1835 The Washington National Monument Society appointed bonded agents to collect funds from the general public for construction of a monument to George Washington. In order provide an opportunity for all Americans to contribute to the monument, individual donations were initially limited to \$1 per person per year. Senators, Representatives, and other public figures nominated the agents to the task. These agents received a 10% commission on all funds that they collected. As the rate of fund-raising slowed, this commission was raised to 15% to provide further incentive to the collection agents.¹⁰
- 8/1836 By this date, the Washington National Monument Society had raised \$28,000 for building the monument. In order to maintain public and Congressional interest and support of the project, the Society advertised for designs for a monument to Washington, with an estimated cost of not less than \$1,000,000. Several designs were submitted, including one by Robert Mills. The Society felt that none of the designs were "coextensive with the Nation" and did not select a design at this time.¹¹
- 1837 The Panic of 1837 and the \$1 limit on donations dramatically slowed contributions to the Washington National Monument Society.¹²
- 1839 After Congress had cast doubts upon the Society for its slow pace of fund raising, the Society issued a new appeal, raised the collection agents' commission to 20%, and provided donors of more than \$1 with a lithograph of the monument. This appeal "did not meet the expectations of the Society."¹³

5/25/1844 A bill introduced into the House would have provided for construction of a monument to George Washington by the Washington National Monument Society on Reservation No. 2 between the Washington Canal, and B, 7th and 12th streets. The bill recommended a temple form monument that would be paid for using public funds raised through the sale of lots in Washington, D.C. and the funds raised by the Washington National Monument Society. As with previous proposals, this bill was not approved by Congress.¹⁴

4/1845 The Design Committee of the Washington National Monument Society selected a design for the monument by Robert Mills. This design was formally adopted by the Society on November 18, 1845.¹⁵ This design was for a 600-foot tall obelisk with a nearly flat top, surrounded by a colonnaded rotunda 200-feet in diameter and 100-feet tall. Thirty 12-foot diameter columns formed a 'National Pantheon' with statues of 30 prominent Revolutionary War heroes and signers of the Declaration of Independence inside. The obelisk was crowned with a statue of Washington in a chariot. Visitors would enter through two 15-foot tall, 6-foot wide entrances on the east and west elevations. Each entrance had a heavy pediment and entablature with a winged ball and asp over each door. The size and scale of these entrances was in keeping with the massive pantheon planned by Mills. Visitors would travel to the observatory at the top of the monument by a 'railway.'¹⁶ This building was estimated to cost \$200,000 to complete, with \$50,000 of that to complete the shaft.¹⁷

Mills' description of his design for the Washington Monument:

. . . to be erected at the seat of the general government of the United States of America, in honor of "the father of his country," and the worthy compatriots of the revolution. This design embraces the idea of a grand circular colonnaded building, 250 feet in diameter and 100 feet high, from which springs an obelisk shaft 70 feet at the base and 500 feet high, making a total elevation of 600 feet. The vast rotunda, forming the grand base of the Monument, is surrounded by 30 columns of massive proportions, being 12 feet in diameter and 45 feet high, elevated upon a lofty base or stylobate of 20 feet elevation and 300 feet square, surmounted by an entablature 20 feet high and crowned by a massive balustrade 15 feet in height . . . A tetrastyle portico (four columns in front) in triple rows of the same proportions and order with the columns of the colonnade, distinguished the entrance to the Monument and serves as a pedestal for the triumphal car and statue of the illustrious chief. . . Over each columns, in the great frieze of the entablature around the entire building, are sculptured escutcheons (coats of arms of each State in the Union) . . . The statues surrounding the rotunda outside, under the colonnade, are all elevated upon pedestals, and will be those of the glorious signers of the Declaration of Independence. Ascending the portico outside to the terrace level, a lofty vomitoria (doorway) 30 feet high leads into the cella (rotundo gallery), 50 feet wide, 500 feet in circumference, and 60 feet high, with a colossal pillar in the center 70 feet in diameter, around which the gallery sweeps. This

pillar forms the foundation of the obelisk column above . . . This spacious gallery and rotunda, [may] be denominated the "National Pantheon," . . . In the center of the grand terrace . . . rises the lofty obelisk shaft of the Monument, 50 feet square at the base, and 500 feet high, diminishing as it rises to its apex, where it is 40 feet square; at the foot of this shaft and on each face project four massive zocles 25 feet high, surmounted by fascial columns with their symbols of authority. These zocle faces are embellished with inscriptions, which are continued around the entire base of the shaft . . . On each face of the shaft above this is sculptured the four leading events in General Washington's eventful career, in basso relievo, and above this the shaft is perfectly plain to within 50 feet of its summit, where a simple star is placed, emblematic of the glory which the name of Washington has attained . . . In the center of the Monument is placed the tomb of Washington.¹⁸

- 1846 The Washington National Monument Society began a new fund-raising campaign, again using the bonded-agent system. Mrs. James Madison, Mrs. John Quincy Adams, and Mrs. Alexander Hamilton also formed a ladies aid society. They held fairs and social functions to raise money. Special appeals for donations were also made to consuls abroad and the Navy.¹⁹ All of these attempts were less than successful.
- Spring 1848 The Building Committee of the Washington National Monument Society had temporary wooden buildings built on the work site, including stonecutters sheds, stone storage buildings, a watchman's house, lapidarium, and latrines. The committee also had rigs for lifting stones built at the wharf on the Potomac and at the building site.²⁰
- 4/11/1848 Due to funding shortfalls, the Washington National Monument Society directed Mills to modify his original design for the monument, to initially build only the 500-foot tall obelisk, with a 55-foot square base and 35-foot square apex. The construction of a pantheon, terrace, or landscape would be addressed after the obelisk was completed.²¹
- June 1848 Began building the monument foundation of rough, untooled blue gneiss.²²
- 7/4/1848 The cornerstone of the Washington Monument was laid with great ceremony. The 24,500-pound white marble block was donated by Thomas Symington, from the Beaver Dam Quarry near Baltimore. This was the same quarry that supplied the marble for the monument exterior. President James K. Polk led a parade that included the Cabinet, Congress, military units, fire companies, and bands to the site. House Speaker Robert C. Winthrop gave a 2-hour oration. A zinc case within the cornerstone was filled with mementoes, including copies of the Declaration of Independence, Constitution, coins, and newspapers. Grandmaster Benjamin B. French, Grand Lodge of Free and Accepted Masons of the District of Columbia, formally laid the cornerstone, while wearing the same Masonic apron and sash

that Washington had worn when he laid the Capitol cornerstone September 18, 1793.²³

In his oration at the cornerstone-laying ceremony, Robert C. Winthrop, Speaker of the House, said "Let the column which we are about to construct be at once a pledge and an emblem of perpetual union! Let the foundations be laid, let the superstructure be built up on and cemented, let each stone be raised and riveted in a spirit of national brotherhood!"²⁴

1848–1854 Phase I construction of the Washington Monument was directed by Superintendent of Construction William Daugherty and Foreman David Hepburn, who oversaw construction of the foundation. The bluestone gneiss for the foundation and interior walls was supplied by William Early, Washington, D.C., and marble by Thomas Symington, Baltimore, Md. In 1848, only 14 stonemasons, 2 stonecutters, 4 carpenters and 1 rigger worked on the site. By December 1849, there were 57 men working on the site.²⁵

The marble used in the Monument was dressed and polished by hand. In other locations, such as New York City, stone dressing was largely mechanized. Superintendent of Construction William Dougherty unsuccessfully attempted to convince the Building Committee of the Washington National Monument Society to save money by machine-dressing the stones.²⁶

1840s–1850s Annual assemblies with speeches by distinguished orators were held at the base of the Washington Monument on the 4th of July.²⁷

3/6/1854 The anti-Catholic Know-Nothing party seized and destroyed a memorial stone from the Temple of Concord in Rome, donated to the Society by the Pope.²⁸

Fall 1854 At the end of the buildings season, the Washington Monument stood 152 feet tall, and the Washington National Monument Society had exhausted their funds.²⁹

INTERIOR

1849 Alabama, as an expression of support for the project, donated a marble block quarried in the site for use in construction of the Washington Monument. The Society then allowed other states and territories to donate stones and later permitted Indian tribes, societies, professional organizations, labor unions, businesses, individuals and foreign countries to also donate stones. Some stones contributed to the monument made no references to George Washington. By 1854, 92 memorial stones had been built into the interior walls. This included a stone from each state and two territories. Stones awaiting insertion in the interior walls were stored in a lapidarium on the monument grounds.³⁰

SITE

1/31/1848 Congress authorized the Washington National Monument Society to build their monument to George Washington on public grounds or a reservation within Washington, D.C.³¹

There is little information in the records of the Washington National Monument Society discussing the specific placement of the Washington Monument within Reservation 3. The Washington Monument was not built at the intersection of the north-south axis from the White House and the east-west axis from the Capitol but instead was built about 370 feet east and 123 feet south of this cross-axis.³² Some scholars believe that soil tests conducted at the intersection of this cross-axis found marshy soil that was too swampy and unstable to support the weight of the monument, and so the monument was built on a nearby knoll of firmer soil.³³ Others note the presence of the Jefferson Pier Marker, or Meridian Stone, at the intersection of the cross-axis when the monument site was selected, thus preventing the building of the Washington Monument at the cross-axis. Thomas Jefferson placed this 3 to 4-foot tall marker at the cross-axis in 1804. It remained standing until 1874 when it was removed as part of improvements made to the monument grounds.³⁴ Others cite the fact that at the time of construction, the mall was narrower than today, due to the presence of the Potomac River and Washington Canal, and was not centered about the east-west axis from the Capitol. On the north side of the mall, the north-south location of the Washington Monument is close to the north-south center of the mall at the time construction began on the monument. The cross-axis was also near the edge of the Potomac, and extensive filling would have been necessary to accommodate the large pantheon base of the monument had it been built at the cross-axis.³⁵

4/12/1848 President Polk transfers the selected site to the Washington National Monument Society. The President of the U.S. and the Society chose a 37-acre site, Reservation 3, that included the location proposed by L'Enfant for an equestrian statue of George Washington and the intersection of the north-south axis through the President's House and the east-west axis through the Capitol.³⁶

June 1848 Architect Robert Mills, the Building Committee of the Washington Monument Society, and expert architects and engineers inspected the building site before construction to determine site suitability. In the center of the planned monument foundation location a well was dug close to the foundation location, Mills found compact soil and good conditions. A well dug in the center of the planned foundation location to a depth of 20 feet below the bottom of the foundation showed the same favorable conditions. This well was then walled to provide water for the workmen and for construction needs.³⁷

1855 – 1875: PAUSE IN CONSTRUCTION

EXTERIOR

- 2/22/1855 Members of the Know-Nothing party held an illegal officer and board of managers election where by they elected only members of the Know-Nothing to these positions. This created two separate Washington National Monument Societies. The Know-Nothing-based society later seized control of the Washington Monument grounds from the original Society. This hostile take-over along with the destruction of the Pope stone tarnished the image of the Washington National Monument Society.³⁸
- 2/22/1855 Congress appropriated \$200,000 to continue construction of the Washington Monument, but rescinded the money after learning of the February 22, 1855 hostile take-over of the Washington National Monument Society by the Know-Nothing political party.³⁹
- 1855 - 1858 While in control of the monument, the Know-Nothings added 2 rows, or 4 feet, of masonry to the monument shaft. This stone was later found to be of poor workmanship and quality (much of it was waste stone from the previous construction) and removed. In 1858, after failing to raise much money for construction, the Know-Nothings returned the records to the original society. The lack of funds and the unfavorable political and social climate due to the pending Civil War precluded further fund-raising and construction.⁴⁰
- “That truncated shaft, with its untidy surroundings, looked only like an insult to the memory of Washington. It symbolized nothing but an ungrateful country, not destined – as, God be thanked, it still was – to growth and grandeur and imperishable glory, but doomed to premature decay, to discord, strife, and ultimate disunion.”⁴¹
- 2/22/1859 In order to protect the Washington National Monument Society from another action like the Know-Nothing incident, and to provide legality to their mission, Congress incorporated the Society “for the purpose of completing the erection now in progress of a great National Monument to the memory of Washington at the seat of the Federal Government.”⁴²
- 2/22/1866 At first meeting of the Washington National Monument Society after the Civil War, President Andrew Johnson spoke: “Let us restore the Union, and let us proceed with the Monument as its symbol until it shall contain the pledge of all the States of the Union.”⁴³
- Pre-1873 Growing excitement over the approaching centennial caused increased interest in completing the Monument. Speeches in favor of completing the Monument were made in Congress. Newspaper editorials promoted completion of the Monument

as a way to celebrate the centennial. The Washington National Monument Society again submitted a request to Congress for public funding to resume construction.⁴⁴

- Spring 1873 A House Select Committee was appointed on January 27, 1873 to study the viability of completing the Washington Monument in time for centennial celebrations. It determined that Congressional action and funding to complete the monument was appropriate. The Select Committee agreed with the Washington National Monument Society that the Mills-designed pantheon did not need to be constructed at this time and could be added at a later date, and that "this rich and massive shaft, though simple and plain, would be a noble monument, worthy of the sublime character which it is designed to testify." The Select Committee had asked the advice of Corps of Engineers on the safety of the Monument's foundations. First Lt. William Louis Marshall conducted a "hasty and superficial inspection of the monument and its foundation course," and concurred with an 1859 report by Lt. Joseph Ives that the foundations were stable and of adequate size.⁴⁵ The soundness of the foundations continued to be a concern.⁴⁶
- 4/20/1874 First Lt. Marshall conducted a more thorough investigation of the Washington Monument and spent three months investigating the foundations and conferring with experts. He then submitted a second report on the Monument's foundations to the House Select Committee, repeating his earlier conclusion, that the foundations were secure. Marshall did recommend minimizing the load on the foundations by reducing the height of the monument to 400 feet, using brick for the walls above 250 feet, and roofing the monument with cast-iron plates.⁴⁷
- 5/1/1874 The Select Committee recommended completing the Washington Monument using federal funds. As the original deed to the Washington National Monument Society was a deed of trust, and the Society itself admitted that it could not meet the obligations of that deed, the deed of trust could be legally revoked, and the Federal government could legally assume the work of completing the monument. The monument was intended to be completed by July 4, 1876.⁴⁸
- 8/1874 The Corps of Engineers submitted First Lt. Marshall's second report for review by the Corps Board of Engineers for Fortifications. After reviewing Marshall's report this board "could not . . . with the information before us, recommend [that] any additional pressure should be thrown on the site of the Washington Monument." Once the Select Committee received this appraisal, Army Chief of Engineers, Andrew A. Humphrey, recommended that the Select Committee do extensive borings around the shaft to determine the sub-stratum stability. Humphrey also suggested considering another design, one that would place less pressure on the existing foundation.⁴⁹
- 11/1874 "At present the Monument is a reflection upon the whole country. It seems as if the admiration and respect felt by our people for the founder of our Republic had

met with a great check, and that the gratitude for his eminent services had completely died out. The appearance of this half-finished pile of marble seems to mark us as a fickle people, anxious one day to do honor to the greatest character in our history, the next quite indifferent whether his memory is honored or not."⁵⁰

INTERIOR

5/1/1874 First Lt. W. L. Marshall, in his report to the House Select Committee, proposed that the interior of the Washington Monument have a circular stair with niches in the interior walls for the memorial stones.⁵¹

SITE

3/20/1855 An inventory of property belonging to the Washington National Monument Society listed the following buildings on the Washington Monument grounds: 1 dwelling house for day watchman, 1 office or reception room for visitors, 1 engine house and 1 saw shed, 1 stone cutters shop and shed, 2 stone block sheds, 1 carpenters shop, 1 smiths shop, 1 cement house, 1 feed house 1 stable, 55 contribution blocks from different states and associations.⁵²

1860 The Washington National Monument Society spent \$3,514.32 to construct new buildings on Monument grounds, repair others, and reorganize the plant.⁵³

25/7/1861 The Washington National Monument Society was notified of Lt. Bickworth's (U.S. Army) Presidential order "to use the Monument Grounds for Cattle belonging to the Government."⁵⁴ During the Civil War, the grounds were known as the Beef Depot, the Cattle Meadow, and the Washington National Monument Cattle Yard. Initially, 45 head of cattle were housed in an enclosure around the monument. One of the former construction outbuildings was used to store hay. As the war progressed, the area expanded to include extensive horse stables, quarters and a mess for officers and men and a civilian bunk house. These buildings were often "surrounded by offal rotting two or three feet deep."⁵⁵

Post-1865 The Washington Monument grounds were known as "Murderer's Row," a place where prison escapees, deserters and other undesirables from the war gathered.⁵⁶

1867 Control of Federal lands within Washington, D.C. was transferred to the Army Corps of Engineers and its newly created Office of Public Buildings and Grounds (OPB&G). This was done in part to try to control and repair the damage done to public lands during the Civil War.⁵⁷

5/1/1874 Lieutenant W. L. Marshall, in his report to the Select Committee on the soundness of the monument, proposed sitting the monument on a terrace.⁵⁸

1876–1888 (COMPLETION OF THE WASHINGTON MONUMENT)

EXTERIOR

- 7/5/1876 Senator John Sherman (Ohio) introduced legislation providing appropriations to complete the Washington Monument. This resolution passed unanimously both houses of Congress and became law on August 2, 1876.⁵⁹ Public funding was contingent on the transfer of monument ownership from the Washington National Monument Society to the federal government. The Washington National Monument Society would be able to continue to raise funds and act as an advisor in building and maintaining the monument. Two million dollars was appropriated, to be divided into four annual installments. This bill also established a Joint Commission, comprised of the President, Supervising Architect of the Treasury, Architect of the Capitol, Chief Engineer of the U.S. Army and First Vice President of the Washington National Monument Society, to oversee completion of the monument. This Commission spent two years discussing how to complete the Washington Monument, including use of the as-completed monument as the base for a new design.⁶⁰
- 6/15/1877 The Board of U.S. Army Engineers reported to the Joint Commission on the stability of the Washington Monument foundation. This report found that the existing foundation was too narrow and shallow to support the weight of the completed monument and believed that excavating under the existing foundation in order to add a new one would be hazardous.⁶¹
- 11/8/1877 The Joint Commission reported to Congress that expert engineers believe “it must be assumed that the foundation is insufficient to sustain the weight of the completed structure.”⁶²
- 1878-1888 Phase II of Washington Monument construction under Chief Engineer Lieutenant Colonel Thomas Lincoln Casey, U.S. Army Corps of Engineers; Assistant Engineers George W. Davis (Captain 14th U.S. Infantry, Bernard Richardson Green (Civil Engineer, U.S. Corps of Engineers); Master Mechanic P. H. McLaughlin; Overseer B. F. Navarre; Memorial Stone Installation: Dennis O’Leary, Washington, D.C.; Aluminum: Apex by William Frishmuth, Philadelphia, Pa.; Bluestone gneiss T. T. Fowler (location unknown); Boiler House William Bradley, Washington, D.C.; Electric Lighting System U.S. Electric Light Company, Washington, D.C.; Elevator: Otis Brothers and Co., N.Y., N.Y.; Granite (in order of quantity supplied): Davis Tillson, Rockland, Maine, Cape Anne Granite Co., Boston, Mass., Bodwell Granite Co., Rockland, Maine, William S. White, Rockland, Maine; Gravel and sand by R. M. Miller and Son (location unknown); Iron Work, Wrought and Cast (in order of expenditure) Sneed and Company Iron Works, Louisville, K.Y., Phoenix Iron Company, Phoenixville, Pa., J. B. and J. M. Cornell, N.Y., N.Y., H. H. Ramsay and Son, Baltimore, Md.; Lightning rods by Ledig and Herrlein and Sons, Philadelphia,

Pa.; Lumber by Willett and Libby (location unknown); Marble (in order of amount supplied): Hugh Sisson, Baltimore, Md., John A. Briggs, Sheffield, Mass.; Memorial stones from multiple sources; miscellaneous materials from Riordan and Driscoll, Washington, D.C.; Portland Cement by J. B. White and Brothers, N.Y., N.Y.⁶³

“How cheering and how inspiring the reflection, how grand and glorious the fact, that no sooner were our unhappy contentions at an end-no sooner were Union and Liberty, one and inseparable, once more and, as we trust and believe, forever reasserted and reassured-than this monument to Washington gave signs of fresh life, began to attract new interest and new effort, and soon was seen rising again slowly but steadily toward the skies-stone after stone, course upon course, piled up in peace.”⁶⁴

- 6/14/1878 Congress authorized the Joint Commission to spend \$36,000 to strengthen the existing foundations, if the Joint Commission deemed it advisable.⁶⁵
- 6/27/1878 Sculptor Larkin Mead suggests that he provide sculptures showing four scenes from the life of George Washington and other sculptural adornment to be included in the finished monument.⁶⁶
- 7/1/1878 Thomas Lincoln Casey was appointed by Joint Commission as engineer-in-charge of the monument. Casey was authorized (with prior authority from the Commission) to hire, build temporary buildings, and prepare a project for strengthening the foundations to support a 525-foot tall shaft. Casey was to prepare monthly reports for the Commission. Captain George W. Davis was appointed to assist him with day-to-day operations.⁶⁷
- 7/27/1878 Thomas Lincoln Casey proposed for strengthening the foundations: “The shaft of the monument currently stands 156 feet 4-1/8-inches tall with facing stones that have “a large crystal, white marble facing and a blue stone rubble backing.” The “foundation is of rubble masonry of blue gneiss, laid in pure lime mortar.” There was a 2-foot by 2-foot well hole, without water, in the center of the foundation that did not go below the bottom of the foundation. “To carry the monument to the required height of 525 feet, it is proposed to construct it of masonry to a height of 500 feet and to crown the shaft with a pyramidal roof of iron, which shall be twenty-five feet in height. This roof can be covered with hammered glass, over some portions, to give light to the well of the monument.” For the new portion of the shaft, the facing stone would be white marble of headers and stretchers, with the headers extending through the wall and the marble backed by rubble blue gneiss up to 172 feet. Above 172 feet, the walls would be only marble. For the foundation, the existing foundation would be underpinned and its surface bearing surface expanded. The underpinning would be to the level of water below the present foundation. The existing well would be used to access the

area under the present foundation. Underpinning is to extend 18 feet under the outer edge of the foundation and 5 feet under the outer edge of the shaft. "To lock the old foundation with the new and distribute the pressure more uniformly over the new mass, three large buttresses, one on each side of the structure – twelve in all – are carried from the upper surface of the new foundation up and under the outer portions of the shaft . . . The construction of the foundation proposed will require great care and skill on the part of the workmen. To undermine a structure weighing nearly 32000 tons, and to replace to a considerable extent with masonry the earth upon which it stands, is evidently a delicate operation." To ensure safety, the underpinning was to be done by introducing the new masonry in thin vertical layers, each less than 4 feet wide, installed in tunnels of the same dimension dug under the foundation. The new foundation layers were to be of Portland cement concrete, except possibly for masonry wedged into the short distance under the old foundation and above the new masonry. This strengthening was estimated to cost \$99,102.85.⁶⁸

- 7/1878 Excavation began at the corners of the foundation to gather subsoil data before expanding the foundations. All rotten and damaged materials were removed from the top of the shaft for the safety of the workers. New doors were installed on the monument to prevent unauthorized entry. New blocks, falls and supports were installed to allow access to the top of the shaft. A benchmark was cut into the top of each corner of the foundation at the top of the fourth step (counting from the lowest step).⁶⁹
- 9/1878 Lt. Col. Thomas Lincoln Casey's assistant engineer visited Baltimore's extensive tunneling operations to expand their water supply. He learned that some of these men would be available to oversee the excavations to underpin the Washington Monument.⁷⁰
- 10/1/1878 The Joint Commission and the Building Commission discussed final design of the Washington Monument. Public opinion opposed the deletion of Mills' original pantheon from the new construction plans. Several architects submitted their own ideas for completing the monument. The Washington National Monument Society accepted William Wetmore Story's design.⁷¹
- 10/24/1878 J.B. White and Bros. (Manufacturer's of Portland, Roman, and Keene's Cements, Swanscombe, England) was contracted to deliver 2,500 barrels of Portland cement to the Washington Monument site.⁷²
- 10/1878 The Joint Commission approved Casey's plan for strengthening the foundation. On the monument grounds, workers began repairing the dilapidated old buildings and erecting stone houses for tools and materials, and mechanics' shops. The new buildings included a 28-foot by 60-foot carpenters shop, a 24-foot by 100-foot stone house and a nearly completed 24-foot by 37-foot smith's shop. The well in

the center of the existing monument foundation was cleaned out. A road was built to the monument from 14th Street to accommodate the heavily loaded teams carrying materials to the site. Two steam-powered concrete mixers were built. Two granite blocks in concrete foundations were set up to use as bench marks (no indication of location of these bench marks).⁷³

- 11/1878 The four derricks for hauling materials were almost ready to be erected. The two engines and boilers were completed and ready to power the hoist and cement mixers. The blacksmith shop with three forges was set up and fitted with tools. A scaffold was set up on top of the monument. It supported derrick for hoisting stones to the top of the wall and removing damaged older stones. The broken stone, pebbles and sand to be used in the concrete were delivered.⁷⁴
- 12/1878 T. T. Fowler and Co., Washington, D.C. was contracted to provide for 300 yards of bluestone gneiss.⁷⁵
- 12/1878 The Joint Commission established a Building Committee composed of three members of the Joint Commission to manage all matters relating to construction. Casey provided his monthly progress and status reports, monthly estimates of funds needed, etc. to the Building Committee.
- 12/1878 Most of the month was spent preparing the machinery and collecting materials for foundation work. The four derricks at the corners of the foundation were put in place (their tops were secured to the shaft with iron bands). Also set up were the two concrete mixers and steam engines.⁷⁶
- 1/1879 Work continued setting up machinery and collecting materials for work on the foundation.⁷⁷
- 2/9/1879 George Marsh, American ambassador to Rome, provided the proportions of Egyptian obelisks: the shaft height is 10 times the width of the base and top of the shaft is β to $\frac{3}{4}$ the width of the base. These pyramidions have as their base the summit of the shaft with no break (except for an angle). The height of the pyramidion is equal to width of one side of the base of the shaft. There should be no statue at the top of the pyramidion or windows in the pyramidion. If there must be a "peephole," Marsh recommended that it be the same size and shape as one of the stones and fitted with a shutter the color of the stone.⁷⁸
- 3/1879 Excavations on the east and west faces of the monument to the bottom of the existing foundation were finished on March 9 and then work began to excavate for the foundation underpinning. These excavations removed all earth above the water level within a rectangle 126.5 feet on each side, except for a 44-foot square directly below the center of the monument. This removed earth was replaced with Portland Cement so that the old foundation would bear on new concrete. So as to

keep the bearing surface from being considerably diminished, Casey directed that the earth be removed in narrow sections and that these cuts be filled immediately with concrete. These cuts were to be 4 feet wide, 41 feet-3 inches long and extended to the water level (approximately 20 feet below the ground surface). These cuts on each face were numbered 1 through 18, starting at the right. To reduce the supporting area of the foundation by only 1/44th, it was proposed to work on only two cuts on opposite faces at the same time. Heavy timbers and jack screws were to be used to hold back the surrounding earth, removing the jacks as the concrete was added, but leaving the timbers in place. These timbers were buried in place and would be removed when the adjoining cuts were made. When the space between the old and new work was too small for workers to swing their cast-iron rammers, gunny sacks filled with concrete were wedged into the space with a heavy timber battering ram. Before installing these sacks, iron pipes were to be laid below the old foundation and used to pump in grout to fill the crevices between the sacks. Some settlement occurred as the cutting and filling progresses. To determine the amount of settlement, the south benchmark was used as the standard and is compared to the height of each corner at the top of the third step from the bottom. The movement stopped and slowed when the concrete filling was completed for the two trenches, showing that the movement of the monument could be controlled. The broken stone provided under contract with J. McLaughlin was used for concrete.⁷⁹

- 3/1879 The excavations to uncover the north and south sides of the old foundation were completed. A plumb bob was suspended in the southwest corner of the well of the shaft to measure movement from the top of the monument. Continued excavating and filling with concrete the cuts for the underpinning of the foundation.⁸⁰
- 4/25/1879 George Marsh, Ambassador to Rome, commented on Casey's revised design for the Washington Monument. The proportions of this Washington Monument design were almost in line with the proportions of ancient Egyptian obelisks, except for two points: the batter (the Washington Monument's is more rapid than any obelisk studied by Marsh) and the pyramidion. Marsh noted that while the proportions of the shaft sometimes differed in construction, the properties of pyramidions were very regular. Thus the height of the Washington Monument pyramidion should be not less than 50 feet or at least taller than the side of its base or "the summit will have a truncated shape quite out of harmony with the soaring character of the structure." Marsh inferred (with pleasure) that the "sort of temple-like excrescence from the base – a highly objectionable feature – is abandoned." There was no consensus as to what the base of Egyptian obelisks originally looked like.⁸¹
- 5/1879 Laborers excavated and filled 12 cuts for the underpinning. As excavation continued, the earlier concrete sections had been exposed and 8 out of 12 of these had small cracks, either at the edge of the old foundation or within 5 feet-3 inches

of the edge of the old foundation. These cracks were vertical, beginning at the bottom of the block and continuing for 18 inches to 10 feet-6 inches. Three of these cracks were ¼" wide, and the others were smaller.⁸²

- 6/3/1879 Thomas Lincoln Casey planned for installing the stair and elevator frame, which consisted of four Phoenix columns supporting the stair and four Phoenix columns supporting the elevator: "In passing the west face the stair case will cut across the west doorway about 2 feet below the top of the north jamb, but sufficiently above the floor not to interfere with ingress to the monument by this door, should it be desired to preserve this opening in the shaft." Four Phoenix columns supported the stair and four support the elevator. "It is recommended that some 6 feet of the top of the monument be removed and this wall reset, giving to it, the diminished thickness, which the new project for the shaft requires. This recommendation is based upon the fact that the mortar in the masonry of the top portion of the structure seems to be quite disintegrated – under the action of the frost and weather."⁸³
- 1879 Thomas Lincoln Casey proposed modifying Mills' original plan to complete the monument. Casey had originally specified backing the marble facing with blue stone gneiss, but as that would be expensive (especially to lay the stone), he proposed using regular dimension granite in place of the blue stone gneiss. The granite would arrive at the site rough cut and be cut on site.⁸⁴
- 6/27/1879 Congress increased the original \$36,000 appropriation granted June 14, 1878 for strengthening the foundations by \$64,000.⁸⁵
- 6/1879 Due to a delay in the delivery of the Portland Cement because of a longshoreman strike, not much work strengthening the foundation was completed; instead workers built swinging platforms at the top corners of the monument shaft.⁸⁶
- 7/17/1879 The Joint Commission, based on Thomas Lincoln Casey's recommendation, resolved to use coursed granite instead of random bluestone for backing the monument's marble exterior wall.⁸⁷
- 7/1879 Contracts were made with J. B. White and Bros. for 6,300 ± bbls of Portland cement; with Andrew Gleason for 3,700 cubic yards of broken stone; John Miller for 2700 cubic yards of pebbles; John B. Lord for 1,700 cubic yards of sand; Phoenix Iron Co., Trenton, N.J. for the iron frame and interior stair up to 250 feet; Bodwell Granite for 15,000 cubic feet of rough dimension granite. Bids for marble were opened, but no contract was awarded.⁸⁸
- 8/20/1879 Casey planned for transporting stone to the top of the monument. Dimension stone would be rolled onto the elevator platform at the bottom of the shaft; hoisted to the level of masonry being set, rolled onto the temporary platforms set up on

the east and west faces, picked up and set in position by a horizontal derrick boom. The maximum elevator load was 6 tons, and the two hoisting ropes each needed to be capable of carrying this load independently. Casey requested proposals from Otis Bros, Stokes and Parish, Philadelphia; Crane Bros. Manufacturing Col, Chicago; Cumberland Dugan and Co. for H. A. Ramsey and Co.; Tufts Elevator Works, Boston; and H. J. Reedy, Cincinnati.⁸⁹

- 8/25/1879 John R. Riggs was contracted to provide 12,500 ± cubic feet of rough marble.⁹⁰
- 8/1879 Work continued excavating and filling for the underpinning of the old foundation. Work on the monument this month focused on the areas below the corners of the old foundation. Based on a review of the underpinning so far, Thomas Lincoln Casey concluded "subsidence at the corners is in large part local, unaccompanied by a corresponding movement of the shaft." New bids for marble were opened, and assistant engineer Capt. Davis inspected the quarries to ascertain their ability to supply the marble.⁹¹
- 9/1879 All but one section of the concrete underpinning on each side of the foundation was complete. Excavation began to build the center buttresses on all four faces by carving 15 feet back from the extreme edge of the lowest step of the foundation into the rubble masonry of the old foundation. The faces of this excavation were left as rough as possible, and the mortar between the blue stone was removed to form recesses for the concrete to expand into. The stone cutters shed was completed.⁹²
- 10/15/1879 The horizontal slab beneath the old foundation was completed, except for cut #10 in the center of all four sides. This cut had been left open "for the purposes of driving tunnels entirely through the bed of the foundations in order to introduce cross walls or a leg of masonry under the center of the old foundation." Thomas Lincoln Casey then changed his initial recommendation to build these cross walls and recommended keeping the vertical column of earth at the center of the foundation intact. The #10 cuts were to be filled in the same manner as all the other cuts. The center buttresses of the north, south, and west sides were nearly completed. Casey revised his buttress design because he believed that the initially planned buttresses were too small and that the buttressing should be expanded to be continuous around the shaft.⁹³
- 10/21/1879 The Building Committee of the Joint Commission for Completion of the Washington Monument resolved that the cross walls initially planned for under the center of the monument be eliminated and a continuous, (12 separate sections were initially designed), buttress be built around the old foundation.⁹⁴
- 10/1879 The north, south and west buttresses were excavated into the original blue stone foundations and were built up with Portland Cement. Excavation was made into

the bluestone foundation for the elevator winding drum. This drum was 18 feet square and 8 feet deep. The four elevator columns rested on the concrete floor of the bottom of this pit. The four #10 cuts that remained open were filled in, completing the 126-foot 6-inch square and 13-foot-6-inch deep slab under the old foundation. Because construction of the continuous buttress would obscure the points at the foundation corners used as leveling spots, it was proposed to transfer these spots to the marble at the base of the monument.⁹⁵

- 11/1879 The winding drum pit was completed with walls of cast-in-place cement, made of the same mixture as the buttresses. The central buttress of the western elevation was widened to provide a seat for the elevator engine. Boilers were set upon the concrete slab under the old foundation. The reference levels were moved from their former locations (third step from the bottom of the old foundation) to new location on the lowest course of marble on the shaft. The offices of the engineer-in-charge in the Old Executive Office Building were connected by telephone to the monument.⁹⁶
- 12/4/1879 By December 1, John R. Briggs, of Sheffield, Mass, had not delivered any of the contracted marble specified in his August 15, 1879 contract and so Casey annulled the contract.⁹⁷
- 12/1879 Work continued on installing the I-beams and channel bars in the north and south faces of the elevator drum pit to support the stair platforms. A channel was made through the west doorway "for the reception of the driving shaft from the engine." Excavation of the old rock foundation to allow for construction of continuous buttresses was finished. A flat and temporary roof was installed over the top of the shaft to protect the exposed masonry and workmen, who would soon begin building the stairway and hoisting machine, from the weather.⁹⁸
- 1/1880 Installation of the iron beams and channel bars in the elevator pit was completed on January 13. The first iron columns supporting the stair and elevator were installed and reached a height of 40 feet by the end of the month. Cleaning of the rectangular well at the center of the monument foundation was begun so that the lightning rods could be installed. This well was 23-feet 2-inches deep with 2 feet of water at the bottom. Four copper rods were thrust into the water and mud at the bottom of the well. The copper rods were then screwed into the Phoenix columns' cast-iron pillow blocks, and the well was filled with sand.⁹⁹
- 3/1880 Excavation continued for the continuous buttress, focusing on the northeast corner.¹⁰⁰
- 1880 Increased mechanization in cutting and quarrying technology, as well as improved funding, since the initial phase of construction, allowed the use of larger, more

regular blocks. This helped construction progress more rapidly than during the first construction phase.¹⁰¹

- 4/19/1880 Thomas Lincoln Casey submitted his final design for the Washington Monument to Winthrop, secretary of the Society. The Joint Commission had approved Casey's earlier design. This redesign was done in consultation with George Perkins Walsh, American ambassador to Italy, who had studied Egyptian obelisks in Rome and provided Casey with the proportions of Egyptian obelisks. Casey's newest design was for a 550-foot tall unadorned obelisk, with a marble exterior with granite backing and topped with a steeply-pitched 50-foot tall pyramidion of iron and glass. This design was 45 feet shorter than Mills' original design but had a much steeper pyramidion. The Washington National Monument Society approved Casey's design, and Congress followed suit.¹⁰²
- 4/26/1880 The Washington National Monument Society made a presentation to Congress. "It has been objected in some quarters that the ancient obelisks were all monolithic – massive single stones, cut whole from the quarry; but our country has been proud to give examples of both political and material structures which owe their strength to union; and this Monument to Washington will not be the less significant or stately from embodying the idea of our national motto, '*E pluribus unum.*'"¹⁰³
- 4/1880 Work continued on building the continuous buttresses around the foundation. The steam boiler for the elevator was set in place. All the ironwork needed to build the interior frame to a height of 250 feet had been delivered to the site.¹⁰⁴
- 5/7/1880 Casey recommended demolishing the top three courses of masonry at the top of the shaft (bringing the height of the shaft down to 150 feet) for the following reasons: at 150 feet it "shall secure a sounder masonry and shall find the mortar less disintegrated from the effects of the frost . . . shall secure a rect. figure to begin upon less distorted from a square than the edges of the courses above this level;" and "shall begin the sloping of the inside walls at the bottom of a flight of stairs and so secure a uniform increase of dimensions of the stairway rising from the 150 foot platform to the 160 foot platform at which level the new dimensions of the well will be commenced . . . It is understood that the top courses of the monument were put up from the refuse pieces about the yard and the number of headers for the marble in these courses is altogether too small for a work of this character."¹⁰⁵
- 5/1880 The strengthening of the foundation was finished on May 28. Also began laying dry stone walls around the engine and boiler. The stone cutting shed was cleared out, and stone cutters began working June 1. Hoisting ropes were received from Mr. Roebling, and installation of the hoisting machinery was almost complete.¹⁰⁶

- 6/25/1880 John R. Briggs wrote Thomas Lincoln Casey, explaining that the delay in his shipping marble to the monument, per his contract, was due to labor problems. He assured Casey that these problems were resolved and that he intended to submit a proposal for the most recent request for bids for marble.¹⁰⁷
- 6/1880 Stone cutting began on June 1 with 38 stone cutters employed by the end of the month. The elevating machinery was mostly in place by the end of the month. A contract had been awarded to build additional stone cutting sheds.¹⁰⁸
- 7/9/1880 Contracted with Hugh Sisson for 40,000 cubic feet of marble.¹⁰⁹
- 7/12/1880 Contracted with Davis Tillen, of Rockland, Me., for 40,000 cubic feet of rough granite.¹¹⁰
- 7/15-8/2/1880 The top three courses of stone, primarily those added during the Know-Nothing period, were removed due to disintegration of mortar and displacement of the stones. New work on the shaft began at 150 feet.¹¹¹
- 7/1880 On July 19 workers began removing the top three courses of masonry from the shaft; this was mostly finished by July 30 when preparations began to receive the new masonry. An average of 40 marble and granite cutters were employed during the month.¹¹²
- 8/7/1880 A second 'cornerstone' was set at the 150-foot level, marking the resumption of construction of the shaft.¹¹³
- 8/1880 Workers finished removing the top three courses of old masonry from the top of the monument. All loose material (mortar, lime, and small stones) was removed from the top course, and these recesses were filled with Portland cement concrete. The supply of rough marble was insufficient for more than two courses to be laid (this was due to the failure of John R. Riggs to deliver material according to contract), and work on the top of the shaft was temporarily suspended. The first marble under the Hugh Sisson contract arrived August 26. By the end of August, 62 marble and granite cutters were employed. A safety net was attached to the top of the monument.¹¹⁴
- 9/1880 Workers continued laying stone at the top of the monument. The safety net saved the life of one workman who was jerked off the top of the monument by a guy rope. By the end of the month 115 stone cutters were employed.¹¹⁵
- 10/1880 Workers continued laying stone at the top of the monument. The slowing of marble shipments caused 60 marble cutters to be furloughed, while 59 granite cutters continued working.¹¹⁶

- 11/1880 Workers continued building the shaft and completed the first 'shift' of iron framework. The 'shift' consisted of raising the safety net to the top of the masonry, hoisting to the top of the wall all Phoenix columns and other ironwork (including the stairway) to be added; taking down the derrick arms; fastening the car near the top of the shaft and removing the hoisting ropes; dismantling all overhead iron framing used with the overhead wheels of the elevator; building an additional 20 feet of Phoenix columns and interior structure; raising the scaffolding; lengthening the bell wire, water pipe, and speaking tube; sweeping down the platform; and then beginning to lay the new courses of masonry.¹¹⁷ The swinging scaffolds for pointing were finished, and six courses of the new masonry were pointed. The marble supply continued to be slow in arriving.¹¹⁸
- 12/1880 Twenty-six feet of masonry were added to shaft in the 1880 season. Due to the weather there was no masonry construction during the winter. Preparations for adding 30 feet to each side of the earthen terrace began by extending the retaining wall around the boiler house. Granite cutting continued, but marble cutting was suspended until a sufficient supply was received.¹¹⁹
- 1/1881 Granite cutting was stopped on January 31.¹²⁰
- 2/1881 Marble cutting was resumed on February 14.¹²¹
- 3/22/1881 The marble cutters requested an 8-hour work day due to the slow arrival of marble and the very laborious of cutting it. The building committee of the Joint Commission granted this request 28 March 1881.¹²²
- 3/1881 The marble cutters stopped work March 21 due to exhaustion of the marble supply.¹²³
- 5/31/1881 The granite cutters request a raise in their per foot wages.¹²⁴
- 5/1881 On May 17, Casey contracted with Hugh Sisson, Baltimore for 3,600 cubic feet of marble, and on May 18 with the Cape Ann Granite Co., Mass. Workers began laying granite on April 30, and began preparations to make another 'shift.' The expansion of the earthen terrace was 2/3 done by the end of May.¹²⁵
- 6/1881 Workers completed the 'shift' to level 210.¹²⁶
- 7/2/1881 An advertisement was placed for cast-and wrought-iron work for the monument. This work included wrought-iron segmental (Phoenix) columns, I-beams, channel irons, angle irons, bar irons, elevator guides and cast-iron elevator safety ratchets. The Phoenix Iron Co. of Trenton, N.J. was awarded this contract on August 2, 1881.¹²⁷

- 9/1881 Continued construction of the masonry walls was delayed for most of the month while workers awaited shipment of the iron work from the Phoenix Iron Company.¹²⁸
- 9/25/1881 Work on the Washington Monument stopped and the monument was draped in black bunting at the death of President Garfield.¹²⁹
- 10/1881 During this month, no additional work was done on the masonry walls, since the delivery of the Phoenix columns was delayed. Work resumed on October 25 after a partial shipment of the iron work arrived.¹³⁰
- 11/1881 The interior iron frame was extended from reference 240 feet to reference 260 feet. Thomas Lincoln Casey noted that the rapidity of construction of the shaft depends upon the availability of materials, especially marble.¹³¹
- 12/1881 Work on the shaft continued until December 9 when the 250th course was reached. Workers then began pointing the masonry laid in December. All work on the shaft stopped for the winter at the end of December.¹³²
- 1881 Seventy-four feet of stone had been added to the monument shaft during the 1881 building season, bringing the total height of the monument to 250 feet.¹³³
- 1/1882 Stone cutters continued dressing marble and granite. The safety net and hoisting apparatus were repaired.¹³⁴
- 4/24/1882 An advertisement was made for additional wrought- and cast-iron work.¹³⁵
- 4/1882 The overhauled safety net was reinstalled, and two new hoisting ropes (made by John Roebling's Sons) were put into place. The side slopes and top of the earthen embankment was graded and sown with rye and grass seed "to secure a grassy turf that would protect the slopes from being washed and gullied by rain water and also to cover the earth as to keep down the dust which in dry weather is blown into the Engine rooms and cause damage to the machinery."¹³⁶
- 5/11/1882 J. B. and J. M. Cornell, of New York, N.Y. for wrought-and cast- iron work for Washington Monument, with all items to be delivered by August 15, 1882. This contract included the 15th and 16th sections with the 31st platform and all connections used below reference 310 feet: 100 feet of interior framework.¹³⁷
- 5/19/1882 Hugh Sisson, of Baltimore was constructed, for 39,000 cubic feet of white marble "of the same kind and quality as the sample submitted by the said Hugh Sisson July 1st 1880"¹³⁸

- 5/22/1882 The Bodwell Granite Co., was constructed for 23,000 cubic feet of rough dimension granite "of the same kind and quality as the sample submitted by the said Bodwell Granite Co. with their proposal of July 25, 1879"¹³⁹
- 5/1882 Workers resumed laying stone in the shaft at 250 feet on May 1 and reached 270 feet by the end of the month.¹⁴⁰
- 8/1882 The granite cutters were furloughed during this month due to a lack of material.¹⁴¹
- 9/1882 The average number of stone cutters at work dressing stones was 100.¹⁴²
- 12/1882 Freezing weather halted work laying masonry for the winter on December 19.¹⁴³
- 1882 Ninety feet of stone were added to the monument shaft during the 1882 building season to bring the monument to a height of 340 feet.¹⁴⁴
- 1/1883 The granite cutters continued working, while the marble cutters worked only half time due to lack of supplies.¹⁴⁵
- 2/1883 The only work done on the monument during the month was stone cutting, repairing the safety net, and building a model of the top of the obelisk.¹⁴⁶
- 4/3/1883 Contracted with William J. White, of Knox Co., Rockland, Me. Was constructed, for 10,000 cubic feet of dimension granite from Hurricane Island, Me. for the Washington Monument. Delivery was to begin on May 1, 1883 and be completed by July 1, 1883.¹⁴⁷
- 4/18/1883 The Lee Marble Co., N.Y., N.Y., was constructed for 42,000 cubic feet of marble for the Washington Monument. Delivery was to begin April 20, 1883 and continue at a rate of 200 blocks per month until the contract was fulfilled.¹⁴⁸
- 4/19/1883 The Phoenix Iron Co., was constructed for wrought- and cast-iron work: the 20th and 21st sections, including the 41st platform and all other necessary work below reference 410 feet.¹⁴⁹
- 4/22/1883 A memoranda was prepared that listed the sizes of iron truss rods for the ribs of the pyramidion. This memoranda seems to be written as part of the design of an earlier scheme for building the pyramidion. No iron was used in constructing the present pyramidion.¹⁵⁰
- 5/1883 On May 7 preparatory work to resume construction began. This included the overhaul of the safety net, machinery, etc. Masons began laying stone May 14.¹⁵¹

- 6/1883 The shift to 360 was completed. Fifty blocks of marble from the Lee Marble Co. were delivered to the grounds and inspected. Only 12 of these blocks were deemed acceptable, and the stone cutters cut only 3.¹⁵²
- 7/2/1883 The contract with Lee Marble Co. was annulled by the president of Lee Marble Co. and with the sanction of the Building Committee.¹⁵³
- 7/20/1883 Contract for 42,000 cubic feet of white marble was awarded to Hugh Sisson. Delivery of the stone was to begin August 6, 1883 and continue at a rate of 200 blocks per month until the contract was fulfilled.¹⁵⁴
- 8/1883 Workers continued cutting marble and granite with an average of 53 marble cutters and 32 granite cutters, as well as an average of 27 other laborers on site.¹⁵⁵
- 9/1883 Work this month focused almost exclusively on cutting stone. Workers were trying to assemble enough building stock so the laying of stone could continue.¹⁵⁶
- 10/1883 Workers resumed setting stone at reference 370 feet. Within 18 working days workers had laid an additional 20 feet of masonry.¹⁵⁷
- 11/1833 Masonry laying was suspended November 24 because the supply of cut stone was almost exhausted and there was not enough cut stone to justify laying more stone before the onset of winter. All of the granite needed to finish the shaft (the last course of granite is at 452 feet) was cut, and the granite cutters were dismissed.¹⁵⁸
- 1883 This building season saw 70 feet of stone added to the monument shaft reaching a height of 410 feet. Early in this building season, the marble supply from Hugh Sisson, of Baltimore, Md., had been exhausted. A contract for marble was made with the Lee Marble Co., but they were unable to fulfill the contract because the marble they provided had many cracks and flaws and was a different color (yellow-white, rather than the blue-white of the existing marble of the monument). The company was also not able to provide sufficient quantity. Another contract for marble was made with Hugh Sisson on July 20, 1883.¹⁵⁹
- 1/19/1884 Thomas Lincoln Casey submitted a revised design for the pyramidion to the Building Committee. Casey and his assistant, Bernard Richardson Green, a civilian civil engineer, developed these revisions. This modified design used only marble to construct the pyramidion, rather than Casey's earlier proposal for an iron and glass pyramidion. This would reduce the possibility of discoloring the shaft by the use of differing materials. Criteria for the pyramidion put forth by Casey, "the roof of this obelisk must be as light in weight, as is consistent with stability, under the action of forces arising from the most violent gales of this latitude and this lack of weight is demanded by the thinness of the side walls of the shaft - which are not able to stand the outward thrust of a massive masonry

roof; and also by the necessity of keeping the total weight of the structure resting on the "bed of foundation" as small in amount as possible. The material of the roof must be such as will not stain or discolor the marble of the shaft below it – by drippings from its surfaces, or will not through combinations of materials expanding differently, create unequal strains and in this way cause cracks in the roof covering or its supports. These conditions would seem to forbid the use of a metal frame for the roof or for taking up its thrust as was suggested in the project of July 27, 1878, to be covered with slabs of glass or of marble or metal. The roof built entirely of the same marble as the walls should be covered with large slabs in order to have as few joints in the masonry as practicable and so a minimum amount of leakage through the roof covering. In the project submitted the roof covering is held up by the intervention of arched ribs of masonry which spring from points of the wall surface 30 feet below the top of the shaft. There are three of these ribs on each face bounded securely with the masonry of the walls. . . . the stones of the ribs above the top of the shaft . . . are so arranged that the weight of each course of roof covering except the first – shall be borne largely by the ribs and in a small measure only by the course of slabs below. The roof covering of marble . . . the joints between the slabs will be arranged so as to lock the slabs together and to be as water tight as possible. Any devices in the way of grooves, tongues, or other arrangements for making the joints tight will be [se]nted to, if practicable. The masonry of the last 30 feet in height of the shaft as well as that of the ribs will be strengthened by cutting mortises and tenons on the builds and beds of the several courses. Through the top stone a copper rod is passed the upper end of which will be silvered and the lower end connected by copper rods with the upper ends of the four elevator columns. The lower ends of these columns are already connected to copper rods that pass into the water in the well through the center of the foundation. . . . two openings near the base of each face of the roof will also be made for ventilation and observation or repairs. All of the openings above-mentioned are to be closed with marble slabs hung in bronze frames; the slabs to open inwards."¹⁶⁰

- 2/11/1884 The Joint Commission approved Thomas Lincoln Casey's report that presented two schemes for building the pyramidion: one for a metal-covered roof; the other, preferred option, for a solely marble pyramidion.
- 3/25/1884 An advertisement and specifications for wrought- and cast-iron work were published: Phoenix columns, channel bar, I-beam, 4-inch pipe, ratchets, guides and chains.¹⁶¹
- 4/21/1884 A contract for wrought- and cast-iron work was awarded to H. A. Ramsay and Son, Baltimore, Md. These items were to be delivered to the site by July 1, 1884.¹⁶²
- 4/1884 Construction of the shaft resumed April 14 with the shift to level 440 feet.¹⁶³

- 5/1884 Laying the masonry of the shaft continued as workers began making preparations for building the roof of the monument.¹⁶⁴
- 7/1884 Workers began laying course 472 feet on July 9. At 472 feet the pyramidion ribs "commence to corbel out from the shaft."¹⁶⁵
- 8/4/1884 Bernard R. Green's notes on the marble pyramidion for the Washington Monument included these conditions of the design: "1. Appearance. The exterior surface to present permanently, under all conditions of weather, wet or dry, a tone of color uniform with that of the shaft of the obelisk, - as in a monolith. 2. Minimum of weight. Reducing the weight to a practical minimum for the benefit of the foundation of the monument and to lessen the cost of material and handling. 3. Stability and Durability. Resisting for centuries of time the destructive agencies of weather as manifested in wind and rain, ice, corrosion and expansion and contraction of materials. First requirement is met by using nothing but the same kind of material as that composing the surface of the shaft, - namely white marble from the Beaver Dam quarries, - and avoiding entirely the use of metal, excepting bits of sheet lead as usual in bed joints of heavy masonry, and some light galvanized iron wind-ties in the interior. The second requirement is met by reducing the thickness of the inclined walls and arches to a minimum; and the third by the manner of supporting weights and the interlocking, overlapping, open and closed joints, and again avoiding the use of metal. Joints in Arch Ribs (see sheet No. 3) All joints of voussoirs and other supporting stones should be cut perfectly true, full and fine, - not exceeding 3/32 inch, - and filled with stiff, rich Portland cement mortar, small pieces of sheet lead to be used near the corners in the usual way in setting. The shoulder joints, supporting covering stones, should be very accurately and smoothly cut and care taken that the stone is sound especially at the shoulder. The notch-joints between the covering and arch stones must be as closely fitted as possible and filled at the sides or cheeks with type metal, the back of the joint to be close and "dry" containing at the top a little lead lightly calked in to keep water out. Joints of Covering Stones (see sheet No. 3) Of these stones all except the lower course and a few at the hips are borne entirely by the shoulders of the respective voussoirs or similar supporting stones. It is therefore highly important that their weight should never be transferred from higher to lower bearing points by the cumulative lifting of a vertical expansion exceeding that of the arch ribs, and that horizontal expansions should cause neither lateral stresses in the arch ribs nor dislocations of the covering slabs, even in a long period of time. Heel or hook joint The part of each bed, therefore, which rests upon the shoulder of the arch stone, supporting the entire weight or half weight, as the case may be, should be cut and fitted very accurately and so as to admit a bedding of about 3/32-inch sheet lead instead of mortar. the level of the stone should be adjusted in setting by inserting very thin additional sheets of lead of suitable size whenever the m[aul] fails to force the stone down to place. This is more likely to occur in stones supported only in the middle. Horizontal joints Of

the three places, **a**, **b**, **c**, composing the horizontal joint, only **b** is to come in contact with the adjacent stone. On the other two planes the joint should remain open nearly 1/8 inch to prevent the stones from lifting each other by expansion and throwing more weight upon some of the heels and shoulders than they are calculated to support. No mortar or other hard filling is intended to be put into these joints excepting the whole of the horizontal joint between courses **A**, and **B**, of the whole of those above course **L**, and parts of certain joints near the hips, all as indicated by brown lines in the "exterior elevation," sheet No. 3. Where joints are thus filled it should be in the usual way with a bed of strong mortar, as the stone is set, and afterwards pointed. The joint between courses **A** and **B**, however, should not be filled until after the stones of course **B** have been permanently set upon their proper bearings, – the shoulders of the arch stones. The joint may then be forced full of stiff mortar and pointed inside and outside. Upright joints Excepting the tongue-and-groove hip joints these also should be kept open or "dry" and free from large accumulations of dust. The stones should be set as close together as possible – stone to stone – so as to admit the least possible quantities of water, ice or dust. To make them essentially water tight the form given in full size sheet No. 3 is favorable while it is also not very expensive to make nor in serious danger of being split off by frost. The hip joints may be filled in with mortar and pointed although their form is very favorable for exclusion of water which would drain down the angle of the tongue and outward at the bed joint. Thus to secure independence of support and permanence of position in the covering stones, under varying conditions of temperature, most of the joints are to be left and to be maintained open (emphasis in original) or "dry." It is not expected nor presumed to be necessary that they should be absolutely and permanently water tight. The interior construction and probably use of the building do not demand it. But a few drops of water can work through the covering if carefully constructed in the way proposed. Lightly calking in yarn of oakum or cotton into small joints as may be found to leak objectionally will exclude the water effectually without defeating the object of open joints. All joints (emphasis in original) in the covering are purposely made as close, or as nearly stone to stone, as it is possible to cut and build the work, and, as in planes **a** and **c** of the horizontal joints, to allow slight motions vertically without thrust. Truss Rods To ensure stability of the arches under action of winds that might exceed fifty-five pounds pressure per square foot and even reach one hundred pounds, the truss rods shown in the drawings are inserted. They are unnecessary for winds of less pressure than fifty-five pounds per square foot. When put in place they should be screwed up evenly by pairs (emphasis in original) on each rib so as to give permanent and equal initial tension on both sides of the rib. Stability of Arches. Sheets Nos 1, 2, and 3 give graphical constructions of curves of pressure or thrust in which each curve is assured to pass through the keystone as shown and also a point in the weakest joint 1/6 its width from the intrados of the arch. The latter point is found by trial and always occurs in the lowest joint of the arch. All the curves by this method were therefore assured to be horizontal at

the crown. The weight, wind forces, and points of application used are shown in the drawings. In sheet No. 4 curves of pressure for the middle rib only are drawn after the method for a fixed parabolic rib given in [Greene's] "Trusses and Arches" Part III, and are therefore based on no assumptions of pointes traversed. They pertain only to the arch proper or that which is above and rests upon the corbels at the 500-ft. level, - base of pyramidion. An approximate parabolic is assumed as the center line of the rib. Using the notation and formulæ given in Prof. Greene's book the following tables and values are obtained for use in plotting the curves as shown in the drawing. (tables of calculations follow) . . . Care and Preservation of the Pyramidion. To preserve the pyramidion intact by guard against dislocation of parts or fractures, great or small, due to the effects of weather, all that need be done is to examine both its exterior and interior as often as experience may dictate, - probably once every five years, - and restore the condition of the joints where necessary to that above described for erection. This would consist mainly in thoroughly clearing out all joints intended to be kept open and filling and pointing those intended to be filled. If too long neglected the exterior parts of the joints may become clogged with dust from the air, washed into them by rain water, and not only but the stones practically in contact but produce veiled streaks down the faces of the masonry. This contingency however may be very remote as the amount of dust lifted by winds to such a height as this structure will stand may be very small. Especial care will need to be taken to prevent the soiling of the exterior faces of the white marble around the portholes by careless visitors.¹⁶⁶

- 8/1884 On August 9 course 500 was completed, 4 years and 20 days from when the first stone was laid at 152 feet. Course 500 was the top of the shaft and served as the base for the pyramidion. In preparation to build the pyramidion, the derricks were dismantled, and a horizontal boom derrick installed in their place. The top of the monument was lit with two locomotive head lights, one placed on the Treasury Building and the other on the Smithsonian building. These lights were provided by Brush Swan Electric Co. and they allowed the workers to work into the evening installing the deck at 500 feet that supported the horizontal boom, platform, etc. in a single day.¹⁶⁷
- 9/1884 Installation of the centering for the marble ribs and laying stones began in the pyramidion. The pyramidion stones progressed slowly, and this slowed progress on the pyramidion. To counteract this, the marble cutting force was increased to 86.¹⁶⁸
- 10/29/1884 Casey sent William Frishmuth a wooden model of the lightning rod terminals to be used in casting them in copper or brass. Casey also requested a small pyramid of aluminum (as proposed by Frishmuth) for capping the pyramidion.¹⁶⁹

- 10/1884 Workers continued laying the pyramidion stones. The exterior scaffolding was completed.¹⁷⁰
- 11/2/1884 William Frishmuth cast a perfect pyramidion out of South Carolina corundum [aluminum ore] for the monument.¹⁷¹
- 11/25/1884 The aluminum pyramidion for the Washington Monument was put on display at Tiffany's in New York. Frishmuth requested that the terminal be displayed for an extended period, but Casey wanted the terminal delivered as promised.¹⁷²
- 11/1884 Workers continued setting the pyramidion stones. On November 27 and 28, the remaining 9 pyramidion stones were hoisted to the top of the shaft. Cutting of the pyramidion stones had been completed on November 21.¹⁷³
- 12/3/1884 Courses L & M, consisting of 8 stones, were completed, and the capstone hoisted to the top of the monument, to be installed once the aluminum tip was ready.¹⁷⁴
- 12/6/1884 The engraving of the aluminum point was completed, and at 2:17 p.m. the capstone and aluminum point were set into place. The pyramidion was completed with the setting of the capstone in place.¹⁷⁵ When the setting of the capstone was announced, a 21-gun salute was given and the national colors were displayed at the head of the rigging.¹⁷⁶
- 12/10/1884 An advertisement and specifications for the bronze frames and iron cranes for marble shutters for the openings in the pyramidion were published. These consisted of 3 pairs of 3 feet wide by 18 inches high shutters and one pair of 3 feet wide 24 inches high shutters. The angle-shaped frames for holding the marble "will be cast in one piece, of statuary bronze that will not corrode by any exposure to the weather so as to stain the stone." The swivel bolt and flanged piece across the back were also to be of bronze. The crane and double bracket to be of cast iron. The shield protecting the shutters when open was to be of iron plate. All iron is to be galvanized. A strip of "pure rubber gum packing" was to be countersunk into the bronze frame. A bronze padlock and bolt, and an extra pair of cam latches for the shutter over the 9th opening in the top of the pyramidion were to be provided. The marble for the shutters was to be provided by the U.S.¹⁷⁷
- 12/23/1884 The contract for the bronze frames and iron work for marble pyramidion shutters was awarded to Stokes and Parrish. The frames were due January 15 1885.¹⁷⁸
- 12/30/1884 F. M. Draney agreed "to remove all granite and marble from the south side of the Monument to the place named by Capt. Davis []low the road on river front." This work was to be completed by February 20 1885.¹⁷⁹

12/1884 Began preparing the window openings for the installation of the shutters. The old blacksmith shop and small engine house were removed from the grounds. By December 10 the scaffolding around the pyramidion had been removed.¹⁸⁰

1884 "The pyramidion is built entirely of marble, and its covering slabs are but seven inches in thickness. Each of these slabs rests upon projections on the marble ribs. These ribs are twelve in number, three upon each side of the well, and spring from the interior face of the walls at the level 470. they are then carried upward, until the ribs nearest the angles of the shaft meet in the hips of the pyramidion, while those in the center of each face are connected still higher up by voussoir stones, forming two arches intersecting each other at right angles. The thrust of a corner rib is transmitted to its opposite, by the use of horizontal stones between their upper extremities. The weight of the pyramidion is 300 tones. Work upon the materials and machinery needed in the construction of the pyramidion was commenced in June, 1884, the contractor delivered the last stone for this part of the structure October 29, 1884, and the cutters dressed the last stone November 21, 1884. . . . The fitting of marble slabs as shutters to the nine openings in the walls of the pyramidion, is all that is needed to complete this part of the structure, and this work will be accomplished in a few weeks." This source states that the monument was 152 feet tall when work stopped in 1854 and was 156 4 1/8" tall by 1856, when work stopped again. Work needed to finish the monument and its surroundings included: 1) interior stairs and platforms – to be of inflammable material and as thin and light in weight as possible 2) dynamo of about 2000 candle power set up in the engine-house to power incandescent lights to light the interior 3) the engine house must be enlarged by about 6.5 feet to the south to allow space for the dynamo and its engine. A low galvanized iron double roof with louvered and glass sides is to be erected over the engine house. Engine house to be entered through covered passage under the terrace (similar to the one planned for the exclusive use of visitors on the east side) 4) the presentation blocks – 101 of them at this time– "it is probably that some are not suitable for introduction in the walls." Those that are 'suitable' will need to be reduced in thickness and inserted into niches cut into the walls 5) backing of the first 150 feet of interior walls should be plastered with Portland cement mortar to keep water of condensation from catching in the joints of the roughly constructed walls 6) need to install floor of cast-iron plates over the drum and shaft pits on the floor of the Monument. 7) the two doorways into the monument should be closed and entrances to the floor of the shaft will be made in short passages below the terrace, with a flight of stairs leading to the closed doorways. "This closing of the doors will present the structure to the eye and mind as an obelisk pure and simple, and will undoubtedly add to the dignity and impressiveness of the structure. 8) propose two methods of treating the terrace at the foot of the shaft: "erect a retaining wall of the most rare and beautiful marbles around the terrace, which wall is to be surmounted with a marble balustrade and ornamented with bronzes and mosaics. At the center of each face is to be a set of broad, double stairs,

extending from the general level of the site to the esplanade, which is to be paved in marble tiles of approved patterns, the whole work to be designed in all its details by the first artists and architects. The other method of finish proposed is to fill earth about the present terrace and joining with it, and to extend this filling so far from the Monument as to fade the slopes of the embankment gradually into the surrounding surfaces, and this to be done with so much skill as to give to the mound an appearance as far from artificial as possible. This mound is then to be planted with trees, and shrubs, paths are to be laid out, a pavement to be put around the foot of the Monument, and far enough from it to prevent the storm-waters from washing out the filling; and a keeper's lodge is also to be built near the work to accommodate the watchmen and visitors." 9) elevator machinery can be kept and the current platform turned into a passenger car by adding "proper seats, linings, and cabinet-work" 10) "boiler-house and smoke-stack of the boiler for the elevator and dynamo engines should be located in the western part of the Monument lot, and the steam to the engines, and the exhaust steam from them, should be led from and to the boiler by pipes laid in an underground passage. A new boiler-house, stack and 80 horse-power boiler are needed." 11) during construction, it was noted that the two north corners of the Monument were the first to settle when any motion took place in the structure. This is believed to be due to the "proximity of the pond just north of the terrace, in the south margin of which are numerous springs. . . . In the interest of increased stability of the Monument and for the better arrangement of the terrace slopes and grades, it is recommended that the pond just north of the obelisk be filled to the level of its banks." Estimated cost for the earthen terrace landscape: 166,800; estimated cost for the marble wall: 612,300.¹⁸¹

- 1/1885 The trimming of the marble around the window openings to receive the shutters was completed on January 20. Installation of the iron and marble shutters began on January 29. Lighting rods were connected by January 9. By January 24, all scaffolding, the safety net, and planking had been removed from the Monument exterior.¹⁸²
- 2/21/1885 The dedication of the Washington Monument followed this order of proceedings: the festivities began at 11am at the base of the monument and were presided over by Sen. John Sherman, chairman of the Joint Commission. Music followed, then prayer, then remarks by William W. Corcoran (the 1st vice president of the Washington National Monument Society), then the Masonic ceremonies, then remarks by Thomas Lincoln Casey delivering the monument to the President, then an oration written by Robert C. Winthrop, who had also spoken at the cornerstone ceremony, followed by Chester Arthur's dedication of the monument "to the immortal name and memory of George Washington," which was followed by more music and a procession to the Capitol via President's Square to 17th St., up 17th St. to Pennsylvania Avenue, along Pennsylvania Avenue to the Capitol, where the procession was reviewed by the President.¹⁸³ Later that evening, there

was a display of fireworks at the monument that included displays of national emblem rockets of red, white and blue, a representation of Niagara Falls, representations of agricultural and mechanical emblems, a representation of Washington resigning his commission to Congress, and as a finale, a representation of figures, the central one of which was Washington on horseback, flanked by Liberty and Columbus.¹⁸⁴

Thomas Lincoln Casey spoke at the dedication ceremony: "the resources of modern engineering science have supplied means for the completion of the grandest monumental column ever erected in any age of the world."¹⁸⁵

"America is certainly at liberty to present new models in art as well as in government, or to improve upon old ones; and, as I ventured to suggest some years ago, our monument to Washington will be all the more significant and symbolic in embodying, as it does, the idea of our cherished national motto, E pluribus unum. That compact, consolidated structure, with its countless blocks, inside and outside, held firmly in position by their own weight and pressure, will ever be an instructive type of the national strength and grandeur which can only be secured by the union of 'many in one'."¹⁸⁶

- 5/28/1885 An advertisement and specifications for the dressed marble for the doorways of the Washington Monument were prepared. This work required 23 pieces of "alum marble to match the marble now in the structure."¹⁸⁷
- 6/15/1885 Hugh Sisson was contracted to provide "23 pieces of "alum" marble for the doors and doorways."¹⁸⁸
- 6/1885 Lightning struck the monument on June 5 as work was beginning to connect the lightning rods. No one was injured, but one stone in the pyramidion was cracked. A study by electrical experts recommended placing additional lightning points on the pyramidion.¹⁸⁹
- 7/1885 On July 16 scaffolding was set up to begin the preparatory work of dressing off the original door surround before closing up the western entrance and reducing the eastern entrance.¹⁹⁰
- 8/7/1885 A contract was awarded to Ledig and Herrlein of Philadelphia "for furnishing and delivering gold plated copper rods, screws and copper rods, etc. for the Washington Monument."¹⁹¹
- 8/1885 Cutting of the projecting heads and jambs of the east and west entrances and insertion of the presentation blocks continued. All but one of the presentation blocks had been to size and all depressions in the interior wall were ready to receive the blocks.¹⁹²

- 9/1885 Cutting off the projections around the east and west doorways and insertion of the 53 presented stones continued.¹⁹³
- 10/1885 Dressing of the jambs and architraves of the east and west doorways, was finished the western entrance was completely filled in. On October 17 began installing the additional lightning rods using a new scaffolding built around the pyramidion. The lightning rods were installed by the end of the month.¹⁹⁴
- 1885 Lightning conductors were added to the pyramidion; electric lights were installed on the interior; the boiler house was relocated from the Washington Monument to the new boiler house; 9 openings (8 windows and a small door to access the exterior) in the pyramidion were fitted with marble shutters; and the projecting jambs, entablature, and pediments of the two original entrances were dressed down. Casey felt they were remnants from the original Mills design for a massive temple around the shaft and no longer fit the design as a simple obelisk. The western entrance was closed up, and the eastern entrance was reduced to 8 feet tall and fitted with marble doors.¹⁹⁵
- 3/15/1886 Halliday & Wilson, Washington, D.C. was constructed in, build a tunnel connecting the Boiler House, now the Survey Lodge, and the Engine House, now the below-grade mechanical room.¹⁹⁶
- 4/1886 On April 1, Halliday and Wilson began excavation for the pipe tunnel. By the end of month the tunnel was completed as far as the terrace. Preliminary work (i.e. concreting the floor the tunnel) extended 630 feet from the Monument.¹⁹⁷
- 6/1886 The contractor laying the pipe tunnel completed all brickwork on the tunnel and began the iron work. The boiler house was completed on June 30. Preparations began for a topographic survey of the grounds.¹⁹⁸
- 7/1886 The engine house was nearly completed.¹⁹⁹
- 8/1886 The engine house was completed. Old tools, machines, and refuse building materials were collected to be auctioned. The topographic survey began in preparation of the earth filling around the terrace.²⁰⁰
- 9/1886 Otis Bros. overhauled the elevator engine and machinery in the drum pit and at the top of the monument. The topographic survey of the grounds was completed.²⁰¹
- 10/1886 Mr. Lyons finished setting the boilers and had almost finished setting the steam pipe in the tunnel. On October 21 the old tools, refuse materials, etc. were auctioned.²⁰²

- 12/1/1887 Thomas Lincoln Casey asked to be relieved of his duties as Engineer in Charge of the Washington Monument. April 3, 1888, Lt. Col. John M. Wilson, C.E., was appointed engineer in charge of construction of the monument.²⁰³
- 12/1886 The steam pipes connecting the Boiler House and Engine House were completed. The topographic drawing of the monument grounds was finished.²⁰⁴
- 3/1887 An average of 125 visitors a day climbed the monument.²⁰⁵
- 1888 Total cost for construction of the monument, after the interior was complete, came to \$1,187,710. The Washington National Monument Society had raised approximately one-quarter of the cost.²⁰⁶
- 10/9/1888 The Washington Monument opened to the public. The Joint Commission for Completion of the Washington Monument was disbanded.²⁰⁷
- 10/2/1888 Congress passed legislation appointing the War Department custodian of the Washington Monument. The Corps of Engineers, through its Officer in Charge of Public Buildings and Grounds, oversees the monument.²⁰⁸
- 1877 - 1896 Thomas Lincoln Casey and Bernard R. Green were major builders of post-Civil War Washington. Soon after Casey was appointed head of the Office of Buildings and Grounds in 1877, he hired Green, whom he had worked with on fortifications along the Maine coast during the Civil War. Casey and Green worked on (besides the Washington Monument) the north wing of the State, War and Navy Building (their wing, despite its elaborate interior, cost 1/3 less than the earlier east wing built under Babcock), and the Library of Congress (Casey began overseeing this project in 1888 and he died in 1896, one year before the library was finished).²⁰⁹

INTERIOR

- 7/1878 The Washington National Monument Society had received 189 memorial stones, 92 of which were installed in the interior walls before construction halted. In preparing to restart construction, Thomas Lincoln Casey had 8 of these removed. Casey did not add any memorial stones to the interior during construction of the monument, but added them once the structure was completed.²¹⁰
- 2/1880 Contractors began installation of the staircase and elevator frames within the monument. This work this work was done entirely by contractors.²¹¹
- 3/1880 Contractors had built the stair and elevator frame to a height of 180 feet.²¹²
- 3/17/1880 The Phoenix Iron Co. built the interior iron frame and interior stair to a height of 180 feet.²¹³

- 4/1-7/12/1880 Otis Brothers & Co. installed a steam elevator for hoisting stones to top of shaft. This elevator was steam powered, with the engine and boiler located in temporary buildings west of the monument.²¹⁴ By the end of April they had installed elevator guides up to a height of 160 feet on the interior structure.²¹⁵ They finished installing the hoisting machinery on July 12.²¹⁶
- 7/1880 Installation of the flooring over the drum pit and shaft was completed. The railroad track from the east door to within reach of the sweep boom derrick that hoisted stone to the top of the terrace was finished. On July 19 began removing the top three courses of masonry from the shaft, this was mostly finished by July 30 when preparations began to receive the new masonry. An average of 40 marble and granite cutters were employed during the month.²¹⁷
- 3/1885 Work continued on the electrical plant, especially re-running of the wires. The marble shutters were almost completed.²¹⁸
- 4/8/1885 Thomas Lincoln Casey recommended insertion of only 56 presentation blocks, those from states, foreign countries, cities, towns and several societies, into the interior. Insertion of the remaining stones would be considered after these 56 were in place. Casey investigated entering the monument via a subterranean passage and found that this method would require removal of much of the foundation. Casey believed that this could be injurious to the foundation and instead recommended "that the west door way be closed by a thin wall matching the bond and marble of the exterior facing and flush with it, and the east approach be treated in the same manner, leaving the lower 8 feet for a doorway to be closed by two marble leaves for doors, the exterior surface of the doors to be flush with the face of the wall and lined in uniformity with the bond."²¹⁹
- 5/6/1885 Contracted with The Snead Co. Iron Works, Louisville, for wrought-iron and cast-iron work on the monument.²²⁰
- 5/1885 Work continued in preparing to insert the presentation stones.²²¹
- 6/10/1885 An advertisement and specifications were published for inserting 53 presented stones into the interior walls of the Washington Monument.²²²
- 6/30/1885 Dennis O'Leary was contracted "for fitting and securing 53 presented stones in the interior walls of the Washington Monument."²²³
- 7/1885 Began inserting the presented blocks into the interior of the monument on July 7.²²⁴
- 12/1885 Finished enclosing the east doorway. The contractor began inserting some of the interior stair's iron platforms and steps.²²⁵

- 1885 On January 14, 1885 an advertisement was published for electrical lighting of the monument interior, on January 24, bids from The Edison Co. for Insulated Lighting, U. S. Electric Lighting Co. and, Brush Swann Electric Co. were opened. On January 27 the contract was awarded to U. S. Electric Lighting Co., the low bidder, this work was to be completed by February 25. On March 6, the U.S. Electric Lighting Co. was notified by letter of their failure to implement the contract, and their contract was continued. On April 5, the U.S. Electric Lighting Co. notified the Corps of Engineers that the lights were installed and ready for use; on July 2, the contract with U.S. Electric Lighting Co. was annulled. It appears that the lights failed an inspection; on October 8, the electric lighting plant was finished and accepted. The earlier problems had been corrected by the U.S. Electric Lighting Co.²²⁶
- 1/1886 The only work done on the Washington Monument during this month was the continuation of the contractor's installation of the interior iron stair.²²⁷
- 2/1886 Good progress was made on the interior stair with all the treads, platforms, and coverings in place. Installation of the hand rails was underway.²²⁸
- 3/1886 The contractor had installed the interior stair platforms, treads, and hand rails. The only stair work remaining was to finish the screens on each platform.²²⁹
- 3/15/1886 Halliday & Wilson, Washington, D.C. was constructed, to lay the floor of interior of monument.²³⁰
- 4/30/1886 Snead & Co., Ironworks, of Louisville, Ky., completed the installation of permanent iron treads, platforms, hand rails and screens in place of the temporary wooden components.²³¹
- 6/26/1886 Otis Bros., New York, N.Y. was constructed, to convert the material hoist into a passenger elevator. Thomas Lincoln Casey wanted to embellish the elevator with seats and soft wall linings. The upgraded elevator was completed on December 20, 1886, and it took 10-12 minutes to ascend the monument.²³²
- 7/26/1886 Otis Bros. was contracted to "alter and make all the required changes in the elevator engine and safety appliance of car and engine" as well as making steam connections with the elevator and fitting up the elevator car.²³³
- 7/1886 The floor of the monument, including the iron plate coverings for the drum pit and shaft trench, was finished.²³⁴
- 10/1886 Otis Bros. continued work on overhauling the elevator systems.²³⁵
- 11/1886 Otis Bros. finished overhauling the elevator.²³⁶

1/1887 The electric lighting system was overhauled. Burns and Son was contracted to insert 11 additional presented stones, including stones from states and private organizations.²³⁷

2/1887 Burns and Son completed insertion of the 11 presented stones.²³⁸

SITE

1/19/1877 The Washington National Monument Society transferred ownership of the Washington Monument to the U.S. Government.²³⁹

1/28/1879 By this date, all materials, tools and machinery were on site for starting construction of Washington Monument. The upper courses of stone on the obelisk were stabilized, and buildings for construction operations were built: carpenters and rigging shop (28 x 60 x 12 feet), cement storehouse (24 x 100 x 10 feet), blacksmith's shop (24 x 37 x 12 feet, with three forges) and frame for 36 x 73 x 16 foot stone cutting shed was prepared to be erected when needed. Six wooden platforms for receiving and storing concrete for the foundations were also built. Five boom derricks with necessary blocks and tackle were built around and on top of the Washington Monument.²⁴⁰

6/1880 Work continued on building the dry stone walls on the west side of the boiler and engine houses. Each of these 'houses' had brick walls and a wooden roof. The floor of the engine house was Portland cement and that of the boiler house was brick set on end. The engine formerly driving the southeast cement mixer was moved to the east side of the monument to power the two derricks used to hoist stone upon the earthen terrace around the foundation. A 20-foot by 6-foot by 10-foot high dry stone wall was built at the foot of the earthen terrace opposite the east door of the monument to support the rail track over the terrace that leads to the east doorway. Railroad track was also laid through the stone cutting shed. On June 7 workers began filling and embanking about the foundation with earth excavated from under and around the old foundation. This embankment was finished on June 30. Four new forges for tool sharpeners were added to the blacksmith shop. Drains were laid from the boiler house and from the latrine.²⁴¹

6/7-7/10/1880 A steep earthen embankment (30 feet wide and 17 feet above ground level) was completed to provide a terrace around the Washington Monument.²⁴²

7/1880 The railroad track from the east door to within reach of the sweep boom derrick that hoisted stone to the top of the terrace was finished.²⁴³

8/1880 Hugh Sisson, the current marble contractor, arranged with the Baltimore and Potomac Railroad to lay a branch track from their line on Maryland Ave. to the monument lot via 14th St. This new track was approved by the District

Commissioners and the Engineer in Charge of OPB&G. Each of the three stone cutting sheds had a light rail line extending to the end of the Baltimore and Potomac track, approximately 600 feet south of the monument. Stones were brought into the sheds via horse-drawn carts.²⁴⁴

- 10/15/1880 By this date, an additional 380 feet of stone cutting sheds had been built. To facilitate handling the large stone blocks, 2,632 feet of additional railroad track were laid down, with accompanying additional railroad cars and turntables. These tracks ran from the Baltimore and Potomac tracks on Maryland Ave. to the monument grounds. Nine new blacksmith forges and five derricks were built.²⁴⁵
- 12/13/1880 Thomas Lincoln Casey proposed extending the earthen terrace around the base of the foundation by about 30 feet in width on all sides and recommended doing this work in the winter season as no work was being done then at the top of the shaft. This expansion was to load the earth just beyond the foundation. This expansion would require approximately 11,900 cubic yards of fill and would require the extension of the stone walls around the engine and boiler houses.²⁴⁶
- 1/22-7/9/1881 The embankment around the Washington Monument base was expanded to 175 x 220 feet. A retaining wall was built around the boiler house due to this expansion of the terrace. Thomas Lincoln Casey directed that refuse gneiss, approximately 1,500 cubic yards removed from the original foundation added to the enlarged embankment. This refuse stone formed a layer 2.5' thick (on average) over the area to be covered by the enlarged terrace.²⁴⁷ The train tracks, which previously ran to the base of the structure, were raised on a trestle so that blocks could be taken directly to the east door of the monument and then hoisted up.²⁴⁸
- 1/1881 Work continued to expand the earthen terrace by extending the north and south retaining walls around the boiler house by 4 feet.²⁴⁹
- 2/1881 Contractor Andrew Gleason finished extending the granite retaining walls around the boiler house. Refuse Potomac blue stone that had been removed from the old foundations as they were being expanded was included in the fill used to expand the terrace to add additional weight to support the foundations.²⁵⁰
- 3/1881 The work to expand the earthen terrace was slowed by rain.²⁵¹
- 6/1881 Despite the rain, the north and west sides of expanded terrace were completed.²⁵²
- 1882 In response to the large flood of 1881 that extended almost to the White House and the Capitol, the Corps of Engineers began dredging the Potomac Channel and filling in Potomac Flats.²⁵³

- 3/1882 The Joint Commission for Completion of the Washington Monument asked Thomas Lincoln Casey to study the possibility of building a terrace around the base of the Washington Monument with retaining walls, tiled esplanades, double stairs, and artist Larkin Mead's bas reliefs depicting events in the life of George Washington. Casey responded with a plan for a terrace supported with a masonry wall topped by a stone balustrade. Access to the top of the terrace was provided via four sets of double stairs. The bas reliefs were to be on the terrace walls between the stairs. The terrace would conceal the elevator's steam engine and its accompanying boiler. A gallery running under the terrace would lead to an entrance under the existing east door. Both existing doors would be covered with thin marble walls. Many Congressmen objected to Casey's plan, not only on aesthetic grounds, but also for its increased cost. Casey then responded with an expansion of the existing terrace, gradually sloping the terrace to blend in with the surrounding landscape. Casey suggested planting trees and shrubs around the mound and laying out stone or concrete paths throughout the grounds. Casey put the cost at this more natural landscape at \$166,800; the more elaborate terrace plan at an estimated \$612,300. The Joint Commission approved the second (less expensive) alternative.²⁵⁴
- 1/19/1885 An advertisement and specifications for a pavilion and receiving stand for the dedication of the monument were prepared. The main pavilion was to be 181 feet long and 77 feet wide, located at the southeast corner of the terrace, and have a capacity of 1540 and include a speakers' stand. The reviewing stand was to be built opposite the east, or main, entrance to the Capitol Building.²⁵⁵
- 1/1885 The derricks and railroad tracks were removed from the grounds.²⁵⁶
- 5/1885 Work continued removing the shops from the grounds.²⁵⁷
- 3/15/1886 Halliday & Wilson, Washington, D.C. was contracted, to lay the floor on the interior of the monument and build a tunnel connecting the Boiler House, now the Survey Lodge, and the Engine House, now the below-grade mechanical room. The Engine House was enlarged and sited so that its roof would not project above the terrace around the Washington Monument.²⁵⁸
- 11/15/1886 An advertisement and specifications for the earth filling around the base of the Washington Monument was published.²⁵⁹
- 1886-1887 Grading and filling around the monument prevented work on the principal lawns.²⁶⁰
- 3/19/1887 Thomas H. Lyons, Baltimore, Md., was contracted to "deposit around the base of the Monument and in the pond [Babcock Lake] just north of it some 250,000 cubic yards of filing, the work to be completed by or before January 1, 1889."²⁶¹

- 5/1887 Thomas Lyons began depositing earth around the monument terrace and into the lake north of the monument. The bench mark on the south side of the monument was surrounded with a cone of brickwork to protect it during the earth work. The old boiler house walls were partly thrown down and covered by the earth fill.²⁶²
- 6/3/1887 The Schillinger Artificial Stone Company, of Washington, D.C. to lay an apron 10-feet wide around the base of the shaft to prevent washing out of the earth by storm waters. Work was finished by November 26, 1887.²⁶³
- 12/15/1888 The embankment around the Washington Monument was completed by Thomas Lyons.²⁶⁴

1889 – PRESENT (MAINTENANCE, UPGRADES AND RESTORATION)

EXTERIOR

- 12/18/1890 Replacement of the old copper roof, “that has blown off from the roof of the engine house at the Washington monument,” was approved. Thomas Pinnix, Washington, D.C. did this work, for a cost not to exceed \$132, with the work to be done as soon as possible.²⁶⁵
- Winter 1894 As part of the inauguration events, four flags were flown from the top of the Washington Monument. This entailed closing the monument to the public to allow installation of the flags.²⁶⁶
- 12/1902 Storm doors were added to the monument entrance.²⁶⁷
- 1/1903 The old doorway into the Washington Monument was replaced with panels, partitions and door “obtained at the Garden” (does not specify where the ‘garden’ is) and all woodwork at the main entrance was given two coats of white paint.²⁶⁸
- 1924 Gutters were placed over the pyramidion windows.²⁶⁹
- 3/8/1931 Red aircraft warning lights were hung in one observation window on each side of the monument. Pilots found these lights difficult to see and instead suggested that the entire monument be floodlit.²⁷⁰
- 4 – 5/1931 Two configurations of floodlights and search lights illuminating the exterior of the monument for the safety of aviators were tested.²⁷¹
- 11/11/1931 As part of the Armistice Day celebrations, the new floodlights illuminating the monument were turned on for the first time.²⁷²
- 1932 Bronze gates replaced the marble doors in the east entrance.²⁷³

6/1935-1/1936 Contract I-IP-1848 "for the cleaning and repairing of the Washington Monument" was completed by Alexander Howie, Inc. Work began in June/July 1934 and was completed on January 15, 1935. During this contract, "all of the horizontal joints and all of the vertical joints in the lower 150 feet of the Monument where [sic] channeled out to a depth of 1-1/8 inches, and then pointed up with lime and cement pointing mortar." It was hoped that this work would reduce the spalling of stones caused by "the hard contact of the stones as originally laid in this portion of the Monument." In the process of repointing, workers found many spalls that had yet to be dislodged and repaired them. A large spall near the 100-foot level was repaired with a Dutchman. "Above the 150-foot level practically all of the horizontal joints were found to be in excellent condition; but the pointing mortar had fallen from many of the vertical joints. In some of these vertical joints, growing moss was found . . . After removal of all loose and defective pointing mortar, the joints were repointed with lime and cement mortar. A number of stones above the 150-foot level were found to be slightly cracked, and these cracks were likewise channeled out and then pointed to prevent water from entering." "Above the 500-foot level, that is on the pyramidion, all of the joints, both vertical and horizontal, were caulked with a plastic pointing compound." "The lightning protection installation on the pyramidion was repaired by replacing a number of defective points, the resoldering of some joints in the conductor system, and the tightening of the fastenings holding the rods, etc. to the masonry. Also, the points at the very apex of the Monument were lengthened so as to extend above the apex of the aluminum block." "The damaged block in the pyramidion, at the northeast corner and in the second course from the top, which had been cracked and loosened for some time, was removed and the cavity cleaned of all fallen mortar, splinters of stone. The block was then reset and refastened snugly. The crack was caulked up." "The entire surface of the Monument from the apex to the base was cleaned of all dirt adhering to the surface by means of water and scrubbing brushes. The water was softened to remove the iron content . . . The scrubbing was done energetically with stiff brushes and all grime adhering to the masonry was removed. As the result of this cleaning, it was found that the stones, especially from the 150-foot level upwards, were of rather variegated colors. The variegations in color seemed to be due partly to the color of the blocks themselves. Many of these blocks have rather large dark streaks over varying portions of the areas of their faces. When the grime was removed, these varieties in color become more apparent from the ground; but as dust begins to accumulate, they will become more and more indistinct." "A number of holes were drilled through the interior face of the marble below the 150-foot level and these were filled to refusal by cement grout introduced under air pressure. As stated above, the amount of grout which could be introduced was considerably less than the amount which was expected." "As a result of the above described operations, the Monument is now weather-proof and water-proof, perhaps for the first time since it was built. Although several hard rains have occurred since the pointing work was finished, there are no indications that water

was entering the Monument through the masonry. The Monument is also clean in so far as it can be made by the removal of matter adhering to its surface." "It will be found, however, that the general appearance of the Monument as viewed from a point immediately at the base has not been materially changed, especially with respect to the larger spalls which have fallen off in the past. The cleaning of the surface will, of course, help some, and the channeled joints lend a somewhat more regular appearance. Those results are all that it is possible to accomplish, except by the removal of the entire exterior surface of the lower 150 feet to a thickness of about 6 inches, and the replacing of the removed surface by new marble." This new work (re-facing the monument) was estimated to cost \$363,000. The total cost for the cleaning was \$87,802. Dismantling of the scaffolding began on January 16, 1935, and by January 21, 1935, the scaffolding had been removed to the 400-foot level.²⁷⁴ A study of the stones of the Washington Monument conducted in October 1934 in preparation for this repair work found that from courses 0 to 76, inclusive, 164 stones needed replacement, 370 stones required cut and pointing, and 22 needed the installation of dutchmen. From courses 77 to 262, inclusive, only two stones needed replacing, 106 cut and pointed, and 13 required dutchmen. One Hundred Eighty-One stones on the west elevation needed repair of some kind, 115 stones on the south elevation, 198 stones on the east, and 183 stones on the north elevation. For the lower elevation, much of the repair work focused on the corner stones.²⁷⁵

- 2/22/1935 The Washington National Monument Society adopted a resolution advocating resurfacing of the monument by "cutting the face of the marble back about six inches and replacing it with new stone." The Society felt "that the resurfacing should be done with granite, selected to harmonize with the marble of the upper portion, because of the greater durability of granite."²⁷⁶
- 1958 Eight blinking red aircraft-warning lights were installed in the pyramidion, one above each window. These lights were installed at the 516-foot level in holes cut through the stone structure of the pyramidion.²⁷⁷
- 6/1964 The Taylor Co. of Iowa began cleaning the Washington Monument.²⁷⁸
- 10/1/1964 Cleaning and repairing the Washington Monument exterior was to be finished.²⁷⁹
- 1964 The Washington Monument exterior was cleaned using exterior rigging, rather than scaffolding, as in the 1934 cleaning and repair operation. The walkway and entrance to the monument from the plaza were covered with a wooden enclosure to protect visitors from water and debris. The exterior marble was cleaned using high-pressure water. Exterior masonry joints were cut out, cleaned and repointed. Small exterior cracks were patched with epoxy resin. Large cracks were treated as expansion joints and filled with non-staining two-component synthetic rubber sealant. Small spalls and those above the 150-foot level were patched with epoxy

resin mixed with washed ground marble. All other spalls were repaired by installing marble dutchmen. Expansion joints were cut every ten courses beginning four courses from the base as part of the repointing. The exterior marble was waterproofed with a water emulsion silicone.²⁸⁰

- 1974 – 1976 The lightning rod points were restored as part of renovations at Washington Monument in anticipation of the bicentennial.²⁸¹
- 1996 The Washington Monument Restoration Project; It Stands for All, was to include: enveloping the entire monument in scaffolding, pointing 64,000 linear feet of exterior joints, pointing 39,000 linear feet of interior joints, sealing 500 linear feet of exterior/interior stone cracks, repairing 1,000 square feet of chipped/patched stone, cleaning 59,000 square feet of interior wall surface, preserving/restoring 193 interior commemorative stones, and sealing eight observation windows and eight aircraft warning lights. This portion of the project was funded in part by a \$1 million donation from Target (out of \$5 million estimated cost). Funds were also provided by Kodak, 3M, General Electric, Visa, Proctor and Gamble, and Discovery Communications. The National Park Service was to make other improvements, including: replacing the elevator, upgrading HVAC systems, enhancing exterior lighting, and improving visitor access to the site.²⁸²
- 1998-2000 Phase II of the Washington Monument Renovation, exterior work, began on July 5, 1998. This included construction of a Michael Graves-designed aluminum scaffolding covered with blue-gray mesh in horizontal and vertical stripes, lit from within at night by 800+ lights, and enclosure of the base of the monument within a 12-foot high wooden fence.²⁸³ Other work included cleaning the entire exterior, repointing all joints, repairing the lightning protections system, reglazing the eight windows on the observation level, recaulking the red aircraft lights in the pyramidion, sealing cracks and patching stones as needed, and installing dutchmen where needed. This exterior work was estimated to cost 6 million. Private corporations funded most of the project, and Congress appropriated \$1 million. Phase II was expected to end May 2000.²⁸⁴
- Fall 2001 An interim security addition was built at the base of the western elevation of the Washington Monument. This small temporary shed housed metal detectors and X-rays to screen monument visitors and their belongings.²⁸⁵
- 2/2002 The Washington Monument reopened for visitors, almost a year later than planned, due to problems installing the new elevator cab. It had been closed to the public December 4, 2000.²⁸⁶
- INTERIOR
- 1889 Thirty-One additional memorial stones were inserted into interior walls.²⁸⁷

- 1889 – 1890 The west alcove of the ground level of the Washington Monument, the former western entrance corridor, was converted into a store room by enclosing it with a wooden partition. An oil stove added to heat the upper floors.²⁸⁸
- 1890 A storm door and steam heat were installed on the ground level of the Washington Monument.²⁸⁹
- 1892 – 1897 The interior iron structure of the monument was repainted. The elevator drum pit was painted with red lead, and the interior of the shaft with white zinc.²⁹⁰
- 1/18/1893 Enclosure of the southeast corner of the top floor of the Washington Monument was approved “to protect the floormen from extreme cold when no visitors are at the top.” This was to accomplished with a thin board partition and a wooden floor. The Public Gardener, George H. Brown, was to do the work.²⁹¹
- 1894 – 1895 The boiler house, engine room, and elevator car were connected by telephone.²⁹²
- 1896 – 1897 The copper roof of engine house was blown off in a storm and was replaced and painted.²⁹³
- 1897 – 1898 Plans were made to replace the inefficient steam engine for the elevator with an electric dynamo (to be housed in a small addition to the Boiler House, now the Survey Lodge). This conversion would lighten the elevator and provide an independent power source for lighting the Washington Monument and Executive Mansion grounds, even the Executive Mansion itself.²⁹⁴
- 1898 The tie rods connecting the interior structure of Phoenix columns began to fail and were reinforced.²⁹⁵
- 1898 – 1898 The iron work from the Washington Monument floor to the 20-foot landing, including doors, door frames, windows, was painted. A permanent phone connection was made between the top of the monument and the engine room, boiler house, and elevator cage (with the earlier telephone connection, if elevator was at bottom the top of monument had no telephone contact).²⁹⁶
- 1899 – 1900 The roof of the engine room was repaired and repainted. The engine room handrail, doors, window sash, casing and steam pipe coverings were painted, and the walls of engine room were whitewashed. New telephones replaced the older ones in the elevator car, engine room, boiler house and Lodge House.²⁹⁷
- 6/6/1900 Congress appropriated \$26,500 to replace the steam elevator with an electric-powered elevator.²⁹⁸

- 6/1900-7/1901 On June 22, 1900, there was a call for bids to install the electric elevator and motor at the Washington Monument and generating unit in the boiler house. Bids were opened on July 14, 1900. These initial bids were too high. A new call for bids was issued on September 22, 1900, and opened on October 22, 1900. This round the generating unit bids remained too high. The lowest bid for the elevator and motor was from Marine Engine and Machine Co., Harrison N.J., and a contract entered with them on November 21, 1900. A satisfactory bid for the generating unit was received from Crocker-Wheeler Co., Ampere, N.J. on November 12, 1900; they issued a contract on December 18, 1900. The monument was closed to visitors January 10, 1901 to allow removal of the old steam elevator. The Monument re-opened to visitors using the stairs on January 21, 1901 but closed again January 25, 1901 to allow for installation of the new electric elevator. The monument re-opened to visitors climbing the stairs June 1, 1901, but the new elevator did not begin public operation until July 29, 1901. The new electric elevator made the trip to the top of the monument in 5 minutes (rather than the 10-12 minutes the steam elevator took).²⁹⁹
- 1900 – 1901 stiffening of the tie-rods on the interior of the Washington Monument structure was furnished. In the “motor room,” formerly the engine room, of the Washington Monument, a new floor was laid, the woodwork painted, and a new hopper and flush tank were installed. The walls and ceiling of boiler room were whitewashed. Wood- and iron-work at the top of the monument and from the 140-foot level to the bottom of monument was painted. Electric lights below the 290-foot level were upgraded from 70-volt lamps to 110-volt lamps.³⁰⁰
- 1901 – 1902 The 70-volt lamps between the 290-foot and 500-foot levels were replaced with 110-volt lamps. The ironwork (columns, tie-rods, stair sides, hand rails, etc.) between the 140-foot and 500-foot levels was painted. In the motor room ceiling, walls, window frames, door and door frames were painted. The motor room floor was cleaned and given a coat of hard oil, two coats of wood filler, and a top coat of floor wax. Two electric lamps and an oil stove were installed in the motor room. The eight windows and wire work around the elevator were repainted.³⁰¹
- 1902 – 1903 A coal strike limited the coal supply needed to power the monument elevator and lights and so the elevator only operated a few days a week in October, November, and December 1902. The elevator resumed usual operation on January 15, 1903. In the motor room of the Washington Monument, the interior and exterior woodwork, roof, iron railing, and brickwork were all painted. The floor of the motor room was given two coats of floor stain and then varnished. The motor room engine and motor paint work was painted and varnished. The waiting room walls and ceiling were patched and painted; all its woodwork was given a coat of hard oil. A proposal was made to create a reception room in the lower level, south of the elevator shaft, for visitors waiting to use the elevator.³⁰²

- 1903 – 1904 Thirty cast-iron signs warning visitors against vandalism were placed on every landing. Eight additional electric lights were installed in the visitors' waiting area at bottom of the monument. In the motor room, four clothes lockers and new shelving for stoves were installed, and the doors and windows were weather-stripped.³⁰³
- 7/1903 New cast-iron steps with brass hand rails were installed at the entrance to the elevator, replacing earlier wooden steps.³⁰⁴
- 11/1903 The store room on the lower floor of monument was cleaned, and cocoa matting placed on the floor to provide a temporary winter waiting room for visitors to the monument.³⁰⁵
- 5/1904 To provide increased lightning protection to the machinery in the drum pit and the bottom floor of the monument, a ½" copper cable was connected to the iron column in the southwest corner of the drum pit and grounded to a water pipe in the motor room.³⁰⁶
- 10/1904 Iron gates were installed at the monument entrance to replace an earlier wooden gate.³⁰⁷
- 12/1904 The National Mosaic Company began installation of marble wainscoting and a mosaic floor in the waiting room on the ground floor of the monument.³⁰⁸
- 1904-1905 On October 3, 1904 proposals were sought for constructing a waiting and reception room on the lower floor of the monument. The room was framed with steel I-beams and had concrete walls and ceiling. The plaster ceiling had a plaster of Paris cove molding around the edge of the ceiling and the false beams. The floor was terrazzo, decorated with mosaics of the Union Jack and quotes from Lighthorse Harry Lee's elegy to George Washington. The walls were adamant plaster with a marble wainscot. The two entrances had glass and wood doors. The room was fitted with electric lights, steam heat and four oak settees for those waiting to use the elevator.³⁰⁹
- The floorman's room on the top landing was cleaned, painted and had an electric heater installed. The ironwork in the stairway and the support columns were repaired, as were the large entrance doors. The copper roof, iron railing, window frame and exterior brick walls of motor room were painted. The interior of the motor room was cleaned and painted. Steam heat from the waiting room was piped-in to heat the motor room. The elevator was shut down on November 30, 1904 to install new hoisting and counterweight cables for the elevator. The old cables ones were showing "pronounced signs of wear."³¹⁰

- 1/1905 The waiting room walls and ceiling were plastered and marble wainscoting refitted to the walls.³¹¹
- 4/1905 New shutters were installed on the windows at the top of the monument "to better the ventilation and keep out the rain."³¹²
- 7/1905 Four new "oak setters" (sic) were installed in the waiting room. Revolving doors installed at the monument entry.³¹³
- 10/10/1905 Joseph Owings, who was painting the interior iron work, fell 250 feet from a scaffold and died.³¹⁴
- 1905 - 1906 The monument's interior ironwork (columns, angle irons, tie-rods, stairways and landings) was painted with two coats of white paint. The woodwork in the entrance and waiting room was painted. The motor room floor and adjoining toilet was painted.³¹⁵
- 1906 - 1907 Repairs made to the motor room included replacing the damaged wooden wainscoting, painting the roof and all woodwork, and replacing the rotten wooden floor with cement. The waiting room woodwork, ironwork at entrance to elevator car, and windows at the top of the monument were painted.³¹⁶
- 1908 - 1909 In the motor room the wooden wall sheathing was replaced with glazed tile. A vertical 4-foot tall concrete wall was built against the sloping east wall of the motor room, making a 3.5-foot wide shelf. This sloping wall was also the Washington Monument foundation. The exterior 'areaways' around the motor room were paved with cement.³¹⁷
- 1909 - 1910 Repairs to the motor room included repairing the doors, windows and frames and painting all of the woodwork with two coats of lead and oil paint and two coats of enamel paint.³¹⁸
- 1910 - 1911 In the motor room the areaway walls, stair landing, and interior walls were plastered with cement mortar.³¹⁹
- 1911 - 1912 The iron and wood work at the top, the bottom, and up to 230-foot level of the Washington Monument was painted with two coats of paint. From 230 feet and above, iron and wood work given one coat of paint. Eight new painted sash were made for the windows at the top of the monument.³²⁰
- 1913 The visitor space on the ground floor of the Washington Monument was expanded into the west chamber (the former portal for the closed west entry). The west chamber was given marble wainscoting, mosaic flooring, and plaster walls,

- ceiling and cove molding, similar to that installed in the remainder of the lobby in 1904.³²¹
- 1916 – 1917 The motor room walls and ceiling were cleaned and painted.³²²
- 1918 – 1919 The waiting room, south corridor, west elevator, lobby, and west chamber of the ground floor of the Washington Monument were painted. Between April and June 1919, the interior ironwork of Monument was painted. Due to an influenza epidemic and to allow installation of new elevator cables, the monument closed to visitors between October 15 and November 30, 1918.³²³
- 7 – 8/1921 The elevator was closed to repair the hoisting machinery.³²⁴
- 1922 – 1923 The Washington Monument was rewired to provide electric power, light and heat. The elevator was closed for repairs May 1 – 15, 1923.³²⁵
- 1923 – 1924 Telephones for public and official use were installed in the monument waiting room.³²⁶
- 3/24/1925 Congress approved a \$30,000 appropriation to be used “for extraordinary repairs and replacement of the elevator and machinery” in the Washington Monument.³²⁷
- 1925 – 1926 Due to its pending replacement and poor condition, the elevator was out of service for much of fiscal year 1926. The new elevator opened to the public on June 17, 1926. This new elevator cost \$30,000 and was the third elevator installed in the monument.³²⁸ Otis Elevator installed the new 6,000-pound overhead gearless elevator. The elevator machine room, 519 feet level, was added at this time. This elevator made the trip in 70 seconds, rather than 5 minutes for the first electric elevator.³²⁹
- 11/1927 After two suicides (on November 20, 1926 and November 22, 1926), an additional guard was posted at the top of the monument. Additional planned safety measures included installation of bars over the windows, wire grating on the upper landing, and a third guardrail around the elevator shaft.³³⁰
- 1929 A wire-protected grille was installed around the elevator shaft to prevent falls.³³¹ A “textile” floor was installed on the observation landing.³³²
- 1932 The door and panel work at the monument entrance were replaced. The motor room was remodeled.³³³
- 1938 Metal platforms, serving as emergency exits, were added in the elevator shaft every 10 feet to correspond to the stair landings.³³⁴

1940 The heating system was renovated, converting it to steam heat. This system remained in operation at least through 1994.³³⁵

11/18/1942 Picture maps were installed above the two west windows. Maps were also prepared for installation over the other windows of the observation level.³³⁶ These identified major buildings, parks, and water bodies visible from the monument.³³⁷

1957 – 1958 One of the Mission 66 improvements for the Washington Monument was the installation of a new elevator cab within the existing frame and the revision of visitor circulation patterns. Visitors had previously entered the monument and elevator from the east on the ground level and at the 500 foot level had entered and exited from the east side. This circulation pattern caused congestion and blocking of the east windows. To make visitor circulation more orderly, it was proposed that visitors enter the monument on the east, pass left around the elevator through the waiting room, then enter the elevator on the west. They would then exit the elevator on the east at the 500-foot level on the east, circle the observation deck to the right and descend to the 490-foot level by either existing stair in northeast or new stair in southeast corner, to a new elevator entry platform on the west, where they would board the elevator for the descent. These changes were estimated to potentially increase visitor capacity by 50%. The new elevator was estimated to cost \$125,000. Work began on the elevator renovations November 17, 1958 with the closure of the monument and finished an for the inaugural run on February 22, 1959.³³⁸ The Otis Elevator Co. undertook these renovations to the monument elevator, re-using many elements of the 1926 elevator, including the hoist machine (with its original micro drive removed), car platform, car sling, and car safety device. The elevator doors were widened from 3 feet to 4 feet to allow for quicker passenger entry and exit. The elevator ride was accompanied by a 60-second recorded lecture. The speed of the elevator was increased from 450 feet per minute to 500 feet per minute.³³⁹

Another Mission 66 improvement to the monument was the enlargement of the equipment room to provide office space for guards and laborers. A space approximately 16 feet x 18 feet was excavated adjacent to the equipment room (which had formerly housed both equipment and offices). After this expansion, the equipment room housed only equipment, and the offices and lockers were located in the newly excavated space.³⁴⁰

Other Mission 66 improvements proposed for the monument included installation of Lucite “bubble-type” windows within stainless steel frames in the eight observation windows to prevent the dropping or throwing of objects from the windows (and damaging people or cars below); renovation of the entrance level of the monument by re-opening the western entrance to the monument to facilitate visitor handling (visitors would enter by west door and exit by east door); and

renovation of the walls and floor of the waiting room and elevator compartment.³⁴¹ Another improvement was the creation of a square stone-paved pedestrian plaza lined with seats and flags at the base of the monument. These additional improvements, scheduled for completion in 1961, were never completed.³⁴²

- 8/1959 Workers enlarging the Washington Monument elevator discovered a 200-pound marble stone, 17.5 x 19 x 14.5 inches, in a corner of a stairwell. The stone was inscribed "Carthage - David Porter Heap, M. D. - July 4, 1855" with a carved horse and palm tree. Park officials and historians had no idea how the stone arrived at this location or how long it had been there. A memorial stone from Carthage was listed as being installed on the interior walls of the Monument, but was not.³⁴³
- 1959 Installation of a dehumidifier ended a long-standing interior condensation problem.³⁴⁴
- 1972 Revolving doors were installed at the western end of the entrance corridor.³⁴⁵
- 1974-1976 Major renovations, estimated to cost between \$850,000 and \$950,000, were made to the Washington Monument in preparation for bicentennial celebrations. These renovations included repairing the stairs, floors and structure and installing a new air temperature control system. The entrance passage and east lobby received granite flooring, graded to replace the step into the lobby and improve access, and standard doors to replace the revolving doors. The entrance corridor's wall and ceiling paneling were replaced with marble paneling and a drop ceiling. The ornamental plaster ceiling in the west and south lobbies was replaced. The 490 foot level received a new drop ceiling. The 500 foot level received new flooring, Plexiglas encasing the stone ribs, and glass doors on the elevator equipment and guard rooms. The pyramidion windows were covered with bullet-proof glass, and the stone shutters were removed. Santmyer Decorating Company, Inc. of Fairfax, Va., received the contract for these improvements.³⁴⁶
- 1987 The interior ventilation and temperature control systems were upgraded.³⁴⁷
- 4/1991 The renovation of the entry level lobby proposed by Notter Finegold + Alexander Inc., Architects and Preservation Planners, would reopen the interior of the east portal to its full height and, replace the existing glass and aluminum doors between the east portal and the east elevator lobby with frameless glass doors and a glass transom, extending to the full height of the entry space. The plan would extend the east portal and the west chamber to their full original heights and re-exposing the dressed marble walls currently behind later fabric. The west chamber was to be fitted with bronze copy of Houdon's statue of Washington. The new

bronze elevator would be a scaled down version of Robert Mills's original Egyptoid monument entrance surrounds.³⁴⁸

1992 – 1994 The interior at the ground and 10 foot levels was restored, with some structural modifications below the 20 foot level. The utilities were upgraded, and the cab interior was renovated.³⁴⁹

6/2/1997 Contract for Phase I of the Washington Monument Renovation included fabrication and installation of new mechanical and electrical equipment, new and repaired elevator equipment, new elevator car finishes, new fire protection devices, new underground steam, electrical, mechanical, and communications lines, abatement of hazardous materials, and minor related architectural work. The monument was closed to allow completion of this work from October 1, 1997 through March 31, 1998.³⁵⁰ The HVAC system was replaced in part because it was "lousy" and let heat build up to 120 or 130 degrees inside which caused the monument to be closed due to excessive interior heat and which contributed to the deterioration of the mortar.³⁵¹ This phase of renovation was estimated to cost 1.6 million.³⁵²

SITE

1888 – 1889 A 10-foot wide granolithic pavement was laid around Washington Monument's base. The paving was soon extended to cover a circular area with a 70-foot radius, and was surrounded by an 8-inch granolithic curb and granolithic outside gutter. This was to be surrounded by a gravel roadway 50 feet wide, with 30 feet wide roadways and 9-foot wide paths leading to various entrances to the park. Work was to begin by May 13, 1889 and be completed by June 20, 1889.³⁵³

12/1889 The Jefferson Pier was rebuilt on its existing foundations. The lower 20 inches of the foundation were all that remained of the 1804 stone pier. Its superstructure had been removed during 1872 road construction. The new pier was built of poured concrete topped with an inscribed granite block.³⁵⁴

1898 A 13-foot-6-inch tall concrete obelisk, serving as a benchmark for the Washington Monument, was built in a manhole 150 feet south of the monument. This obelisk was 5 feet square at the bottom and tapered to a point at the top. The benchmark was installed by the Coast and Geodetic Survey for the purpose of calculating settlement of the Washington Monument.³⁵⁵

1896 – 1897 The grading of the Washington Monument grounds was completed.³⁵⁶

1901 Senator James McMillan of Michigan chose Daniel H. Burnham, Charles F. McKim, Frederick Law Olmsted Jr. and Augustus St. Gaudens as the Senate Park Commission and charged them with redesigning Washington, D.C.³⁵⁷

1/15/1902 The McMillan Plan, submitted to Congress by the Senate Committee on District of Columbia, called for relandscaping and redesigning the ceremonial core, the Capitol Grounds and Mall, by extending the cross-axes of the Capitol and White House west and south of the Washington Monument; consolidating city railways and alleviating grade crossings; removing Mall railroad crossings and station to a Union Station; clearing slums; building a coordinated municipal office complex in the triangle formed by Pennsylvania Avenue, 15th Street and the Mall; and creating a comprehensive recreation and park system to preserve the ring of Civil War fortifications around the city.³⁵⁸

The McMillan plan marked a shift from the meandering paths and picturesque garden movement promoted by Downing to the formal and symmetrical paths favored by the Neoclassical style. This was illustrated by the McMillan Plan's conversion of the Mall from a segmented pleasure garden with winding paths, uneven topography interspersed with asymmetrically placed fountains and flower beds, into a flat open greensward lined with evenly spaced elms framing vistas from the Capitol to the Washington Monument.³⁵⁹

For the Monument Grounds, the McMillan Plan called for the "gem of the Mall system;" Monument Garden; a formal sunken garden west of the monument, accessed by a grand staircase. This sunken garden included bosquets, reflecting pools, fountains and sculpture. The garden would reinforce the north-south axis between the White House and the proposed memorial south of the Tidal Basin.³⁶⁰

2/23/1920 The first George Washington birthday celebration was held at the Washington Monument. This was the first time that a ring of American flags was flown around base of the Washington Monument. Forty-eight flags, one for each state, were flown on temporary wooden flag poles around the circular drive at Washington Monument's base. Flags flown at base of monument to mark Washington's birthday every year until 1958 (except for 1924 when there was no formal birthday celebration at the Monument and 1929 when snow prevented their display).³⁶¹

1925 The monument was lit by search lights installed on the Powhatan Hotel at the intersection of Pennsylvania Ave. and 18th St.³⁶²

1929 Search lights were installed on the roof of the Navy Building to illuminate the top of the monument for the safety of airplanes.³⁶³

1/15/1928 House Resolution 128 was introduced to carry out the McMillan Plan. This bill provided \$30,000 to prepare plans for the Monument Grounds.³⁶⁴

- 4/19/1930 The Independent Offices Act, 1931, authorized “study for the improvement of the grounds at the base of the Washington Monument” and was approved by Congress.³⁶⁵
- 5/1930 An Advisory Committee was organized to guide the preparation of plans for the Monument Grounds. This committee consisted of F. L. Olmstead, Jr., Wm. A. Delano, L. Vipond Davies (civil engineer and foundation expert), Lazarus White (civil engineer and underpinning expert), Maj. D. H. Gillette (Corps of Engineers), and John L. Nagle (designing engineer).³⁶⁶
- 12/1930 An initial series of seven test borings to bedrock was made in a ring around the driveway surrounding the Washington Monument base to determine the sub-soil conditions around the monument. The “result of the core borings made it manifest that this plan [McMillan Plan for Monument Garden] would seriously endanger the stability of the Monument.”³⁶⁷ Two possible solutions to allow construction of Monument Garden were developed: underpinning the Washington Monument to bedrock (estimated to cost \$600,000); dismantling the monument and rebuilding it on a new foundation that extended to bedrock (estimated to cost \$1,000,000). The Advisory Committee recommended abandoning the Monument Garden plan proposed in the McMillan Plan.³⁶⁸
- 1931-1932 The monument base was encircled with 84 new benches around the inner curb. These benches were placed several feet away from the shaft to protect tourists from falling chips of stone loosened from the monument walls by weather.³⁶⁹
- Spring 1931 Two new plans for the monument grounds were developed by the architect members of the advisory committee (Olmsted and Delano). A formal, or balustrade plan, primarily developed by Delano, and an informal plan primarily developed by Olmsted and Hubbard.³⁷⁰
- 3/8/1931 Red aircraft warning lights were hung in one observation window on each side of the monument. These lights were difficult for pilots to see and pilots instead suggested that the entire monument be floodlit.³⁷¹
- 4 – 5/1931 Two configurations of floodlights and search lights were tested to illuminate the exterior of the monument for the safety of aviators.³⁷²
- 4/1931 Prompted by the development of Balustrade and Informal plans that impacted a larger area of the monument grounds than the McMillan Plan, a second series of 8 test borings was conducted further away from the monument base than the initial 7 tests.³⁷³
- 5/20/1931 Engineer members of the Advisory Committee, while considering the results of both sets of test borings, reviewed the Balustrade and Informal schemes. The

Balustrade and Informal plans called for much less change to ground west of the Monument than the Monument Garden plan of the McMillan plan, but still called for considerable additional loading east of the monument. The engineers found that both the Balustrade and the Informal schemes were hazardous to stability of the Washington Monument and recommended revisions to both plans. They also recommended only minimum changes west of the monument.³⁷⁴

- 6/1931 Revised Balustrade and Informal plans were reviewed by the engineers of the Advisory Committee. They found that the Balustrade plan, with its massive masonry and heavy fill from the Monument to 14th Street, "can not be safely carried out with out underpinning the shaft."³⁷⁵ They determined that the Informal Plan could be carried out without endangering the safety to the Monument if modified to carry 15th Street under a circular road on the north and south sides and putting it into a subway adjacent to 14th Street.³⁷⁶
- 6/27/1931 The Balustrade Plan was reviewed by the consulting engineers H. G. Balcom and Daniel E. Moran. Balcom felt that the Balustrade Plan had too small a margin of safety, while Moran felt that it was safe to construct as planned.³⁷⁷
- Fall 1931 A new system of monument floodlights was installed. It was comprised of 20 floodlighting units, in batteries of 5, were installed near the curbing on the sidewalk surrounding the monument, with one battery facing each side of the Monument. These lights were first turned on November 11, 1931 as part of Armistice Day celebrations.³⁷⁸
- 10/8/1931 Plans for a new curb around the monument base were completed.³⁷⁹
- 12/7/1931 A revised plan for curbs, pavement, fencing, seating, and changes to the guard room as part of a floodlighting project was completed.³⁸⁰
- 1/19/1932 Delano explained the Balustrade Plan to the Advisory Committee: the "Washington Monument should hold the place of honor in the development of the two great vistas which L'Enfant laid down as backbones of the plan for the city of Washington." Delano desired a formal treatment of the monument grounds. The Balustrade Plan was estimated to cost \$4,100,000 to complete.³⁸¹
- 10/9/1932 Olmstead and Hubbard explained the Informal Plan to the advisory committee: the Washington Monument should be visible looking from the east and west and also through "numerous enframed view points within the grounds" by pedestrians and automobiles. There should be four roads on the mall: 2 outer roads carrying 2-way traffic and 2 inner roads carrying 1-way pleasure traffic. 14th and 15th Streets should be placed in underpasses. Cuts and fills on the grounds should be reduced to a minimum. "Circulation of automobile pleasure traffic be provided around the Monument at sufficient distance from it, that views of the Monument

be presented to this traffic and that traffic be separated entirely throughout its circuit from any business traffic.” Additional parking, screened from view of the monument, was needed. The “possibility of wheeled access to the Monument should be provided for use on special occasions, but we (Olmsted and Delano) believe that on ordinary occasions wheel traffic should be kept away from the immediate vicinity of the Monument.” The monument would crown monument hill, enframed with masses of trees on the left and right – the trees’ variation from absolute formality was seen an advantage. The estimated cost of the Informal plan was \$3,400,000.³⁸²

11/18/1932 The Balustrade and Informal Plans were submitted to a joint meeting of the National Capital Planning Commission (NCPC) and Commission of Fine Arts (CFA). The NCPC determined that “no thoroughly satisfactory solution has as yet been found which safeguards both the stability and the aesthetic possibilities of this important Monument; and that the commission favors such delay as may be necessary for further study of this subject.” The CFA advised “it is essential that the integrity of the Washington Monument shall be guaranteed by carrying the foundations of the Monument itself to solid bedrock.”³⁸³

1933 The Director of Public Buildings and Public Parks, Washington, D.C., Ulysses S. Grant, III, assessed the plans for improving the Washington Monument Grounds: there are three basic requirements for the new Washington Monument setting: engineering, traffic and aesthetic. The McMillan plan didn’t meet current engineering or traffic needs; Delano and Olmsted both exceeded engineering limitations; the aesthetics of all three plans were not agreed on by all. “Not able to recommend at this time any solution to the problem that entirely satisfies the views of all the authorities involved. A general decision that no new construction work should ever be undertaken within the Monument Lot would solve the problem from an engineering standpoint but would leave an aesthetic situation as to which authoritative opinion seems to be united, namely, that the Monument Grounds in their present state are incongruous with the Mall development to the east and Lincoln Memorial Grounds to the west. The fact that traffic can not flow undisturbed through the Monument Grounds from the existing streets makes of this central feature of the city which Washington founded an irritating obstacle and emphasizes its lack of relationship to the other elements of the central area of the National Capital.”³⁸⁴ The road layout and approximate plantings of the Informal Plan can be implemented without the accompanying grading. The report (and U.S. Grant III) recommended construction of adjusted elements of the Informal Plan (those that avoid large expense and avoid endangering the stability of the Monument) be constructed year-by-year as the individual features became necessary or desirable. Also Grant “recommend at this time against the adoption of any general formal or other plan that will materially change the characteristics of the setting of the Monument as planned and intended by its builders.”³⁸⁵

- 6/10/1933 The Office of Public Buildings and Public Parks of the National Capital was reorganized as part of the Department of Interior.³⁸⁶
- 9/1937 Plan for improvement of the monument floodlighting was completed.³⁸⁷
- 9/7/1940 Specifications were prepared for installing concrete curbing along the outer edge from 15th St. to Monument Circle and repaving of this roadway.³⁸⁸
- 12/22/1942 A Joint Resolution permitted flags to be displayed at night around the Washington Monument "upon special occasions when it is desired to produce a patriotic effect."³⁸⁹
- 1/8/1957 A plan was made for the construction and arrangement of flagpoles around the monument.³⁹⁰
- 2/1957 NPS contacted twenty flagpole manufacturers to find suitable permanent, non-corrosive metal, and wind-resistant replacement poles for the temporary wooden flag poles used until then.³⁹¹
- 5/6/1957 A plan for the development of Monument plaza was completed.³⁹²
- 6/26/1957 A contract to provide 50 permanent flagpoles was awarded to the American Flagpole Equipment Co., New York, N.Y. The on-site work was to be done by Young and Crary, Inc., of Washington, D.C. The Potomac Electric Power Co. would relocate nine street lamps from around the monument's circular drive to make room for the new flagpoles. Fifty flagpole bases were installed, but initially only 48 poles were installed, with the 2 remaining flagpoles to be added once Alaska and Hawaii joined the Union. The installation of the bases was completed in January 1958.³⁹³
- 1957-1958 As part of Mission 66 improvements, new floodlights were installed at the monument. The chosen scheme mounted the lights in four concrete vaults located at the outside edge of the curb facing the sides of the monument. An inner bank of lights was located in four smaller concrete vaults 19 feet from the shaft and illuminated the lower 60 feet of the monument. The pyramidion was lit from eight searchlights mounted on four 15-foot high pedestals installed 568 feet from the corners of the monument. The lights were first turned on February 22, 1958 to mark Washington's birthday. This new floodlighting system was 14 times more powerful than the previous system.³⁹⁴
- 1958 Eight blinking red aircraft-warning lights were installed in the pyramidion, one above each window. These lights were installed at the 516-foot level in holes cut through the stone structure of the pyramidion.³⁹⁵

- 2/22/1958 Forty-eight American flags were flown from the newly installed aluminum flag poles. From this day on, flags were flown daily, raised and lowered without ceremony. The Commission of Fine Arts never approved the permanent flag display. They felt that the display "was a misuse of the flag, and that the poles and flapping banners detracted from the appearance and solidity at the base of the Monument." The Commission would have preferred only two flags positioned at the door to the Monument.³⁹⁶
- 9/1958 Several benches were installed as an outer ring to the circle of benches around the base of the Monument to provide seating for visitors to the Monument not planning to ascend the structure.³⁹⁷
- 1/19/1959 The National Capital Parks planned a new pedestrian plaza around the Washington Monument base, which might involve re-opening the closed west entrance to the Monument. The current circular drive was planned to become a squared-off stone-paved walkway lined with seats and flags. This plan was approved by NCPC and was awaiting review by the CFA. It was expected to be completed by 1961, but was never constructed.³⁹⁸
- 7/4/1959 A 49th flag and pole were installed for the new state of Alaska.³⁹⁹
- 7/4/1960 A 50th flag and pole were installed for the new state of Hawaii.⁴⁰⁰
- 1960 Cars were prohibited from Washington and Adams Drives flanking the Mall. Cars were still allowed on Madison and Jefferson Drives.⁴⁰¹
- 2/22/1960 Cars were no longer allowed to park around the Washington Monument. The plaza and former road were to be converted into a stone-paved walkway in 1961. Parking spaces for Washington Monument visitors were reserved in the existing parking lot at 16th St. and Constitution Ave.⁴⁰²
- 3/1963 Projected improvements to the grounds included the removal of the path surrounding the monument and another to the west, and the replacement of the vehicular road from 15th St. to the base with a pedestrian path 12-feet wide.⁴⁰³
- 4/1963 New benches with concrete sides and wooden slat seats and backs were installed in a circle around the base of the monument, replacing the benches installed in 1932.⁴⁰⁴
- 7/1963 Work began to replace the roadway between 15th St. and the Washington Monument with a pedestrian pathway.⁴⁰⁵
- 11/1963 New covered-top trashcans and wood-slatted receptacles with buff-colored metal liners replaced some of the wire baskets on the Washington Monument Grounds.

Paul Rudolph described the wire baskets in a January issue of *Architectural Forum* as “cheap wire waste-paper baskets” which contribute to the “pile of junk” which Rudolph said surrounded the monument.⁴⁰⁶

- 6/10/1964 During the exterior renovations, a frame covering protected visitors to the Monument from falling debris.⁴⁰⁷
- 1966 Skidmore, Owings, and Merrill completed their 1966 Mall Development Plan. The plan was developed according to the basic principles of the Mall “as a magnificent setting for the primary government buildings – the Capitol and the White House – its potential for widespread use and enjoyment, and its significance as a tourist destination.” The plan sought to diminish the negative impact of automobiles on these public parks. The Mall was envisioned as a ‘historic heartland’ to be developed for pleasure and relaxation.”⁴⁰⁸ For the monument grounds, this plan proposed depressing 14th St. over a 3,000-car parking garage, building a Washington Monument Overlook, and a Washington Monument Visitor Center. Funding for this plan was exhausted before reaching the Washington Monument Grounds.⁴⁰⁹
- Early 1970 A flag retreat ceremony was instituted at the Washington Monument.⁴¹⁰
- 7/4/1971 Presidential Proclamation 4064 declared that flags surrounding the Monument was to fly 24 hours a day.⁴¹¹
- 1973 A plan for lighting the flags at the base of the Monument was completed.⁴¹²
- 9/20/1973 The Washington Monument Visitor Facility Comprehensive Design Program and Engineering Feasibility Program was prepared. This engineering report examined the possibility constructing an underground visitor’s structure on the monument grounds. Recommendations included building a one-story underground visitor facility. This facility would be symmetrical around the entire Monument, but not overlapping its foundations, entered through a recessed stair adjacent to the Monument and connecting to the monument through a ramped tunnel leading to a new below-grade elevator landing. Visitors would enter the monument through this visitor facility and exit the monument through its existing east entrance. Proposed work inside the monument included remodeling the 490-foot and 500-foot levels, replacing existing elevator cab with one that could provide views into the shaft; removing, redesigning, and replacing the existing monument plaza, including the lights and flagpoles.⁴¹³
- 4/1974 An interim development plan for the Washington Monument Grounds for the Bicentennial proposed no alterations to the three historic structures or their immediate surroundings.⁴¹⁴

- 2/1977 Lights at monuments and prominent landmarks throughout the capital, including the White House, Washington Monument, Lincoln Memorial, and Jefferson Memorial, were turned off at night to conserve energy costs. The Capitol dome remained lit at night.⁴¹⁵
- 9/1981 The 1981 Development Concept Plan and Alternatives for Washington Monument included these objectives for the Monument Plaza: "to convert the monument plaza to a dignified and comfortable place, to highlight the feeling of arrival at the monument, and to support the reception function," by partially enclosing the monument plaza with two berms with breaks where the walks meet the berms; providing an area of terraced seating, to hold two groups of 30 people to north and south of monument, planting two rows of deciduous trees adjacent to the fixed seating areas north and south of the Monument, and moving the flagpoles to the outer berm.⁴¹⁶
- 5/11/1984 It was proposed to light the Washington Monument flag display at night with below-grade stem-mounted aluminum floodlights. One Hundred Forty-Two fixtures were to be installed; three for each flag except in those beside the light vaults, which would need only two fixtures.⁴¹⁷
- 1986 Plans for changes to Washington Monument grounds included a new visitor facility. This facility would include a kitchen, outdoor dining area, toilets, souvenir shop and information station and would be located near the intersection of 15th St. and Madison Drive. The Monument Plaza was redesigned with a perimeter earth berm approximately 2 – 3 feet high with a sloping grass surface for informal seating and viewing the Monument. Four approaches to the plaza would break through the berm into a plaza consisting of seating and a ring of trees. The NCPC disapproved the preliminary building plan because the berm and trees were not consistent with the historical simplicity of the Monument base. NCPC also disapproved of the new visitor's center plan. The Advisory Council on Historic Preservation also disapproved of this project.⁴¹⁸
- 4/1989 The 1989 revisions to the 1981 Development Concept Plan for the Washington Monument grounds included the construction of a visitor services facility near the Sylvan Theatre (built into Monument hill to minimize visual impact), and the redesign of Monument Plaza with "a grass surface to emphasize the simplicity of the obelisk rising directly from its grassy knoll. At the crest of the knoll a new exposed aggregate walkway will encircle the monument interconnecting the four paved approaches. The inside edge of the walkway will be defined by a low, seat-height white granite retaining wall the top of which will be level with the base of the Monument." The NCPC, CFA, and the Advisory Council approved the 1989 Development Concept Plan.⁴¹⁹

- 1993 Proposed modifications to the approved 1989 Development Concept Plan for the Washington Monument Grounds included replacing the perimeter walk at base of the monument with two branched walkways running north/northeast and south/southeast (to meet ADA requirements); developing an underground visitor queuing and interpretation center (entered through the adaptively reused Monument Lodge).⁴²⁰ These revisions also included building walks from the existing monument plaza to the Friendship Garden, to the corner of Constitution Ave. and 17th St., to the north-south axis at Independence Ave., and to the Ranger Station (Survey Lodge). Also planned were changes to the existing monument plaza surfacing, lighting, benches and flags. A seat wall and turf would surround the monument, new light vaults would be built outside of the east-west and north-south axes, and the flagpoles would be relocated.⁴²¹
- 8/1998 A ring of concrete Jersey barriers were installed around the base of the Monument as an anti-terrorism measure after the bombings of the U.S. embassies in Kenya and Tanzania.⁴²²
- 2/1999 A temporary steel structure with a blue canopy was built to serve as an interactive visitor's center during the renovation of the Washington Monument. Designed by Discovery Communications, Inc., this structure housed four exhibits and provided a simulated ride to the top of the monument, while the monument was closed to visitors. It was dismantled in September 2000.⁴²³
- Fall/2001 A call for proposals to design and construct a vehicle barrier system around the monument and a visitor facility connected to the Monument was issued. The proposals were due December 19, 2001. The installation of a permanent security barrier around the Washington Monument became a Department of Interior priority after the events of September 11, 2001.⁴²⁴
- 12/2001 The NPS chose Olin Partnership's design for a 20,000 square foot underground visitors center entered through the Monument Lodge. The vehicle barrier system consisted of two 12-foot wide sunken walkways looping around the Monument.⁴²⁵
- 2/7/2002 The NCPC granted conceptual approval for permanent visitor and security improvements to the Washington Monument and its grounds. Many of these improvements were part of the 1993 Development Concept Plan (DCP) for the Washington Monument and its grounds. The modifications to the DCP are due to security concerns not anticipated when the 1993 DCP were developed. The proposed modifications to the 1993 DCP included reconfiguring the walkways around the monument as "partial ovals extending east and west from the plaza. These partially sunken walkways will incorporate low seating walls that replace the seating walls as shown in the DCP around the edge of the plaza. These walls will serve as barriers that establish the perimeter required to protect the monument from vehicles. They will be screened in some areas by low berms located opposite

the walls. The underground visitor facility will include a security area to provide the required screening of all visitors entering the monument. Once screened, it is essential that these visitors do not come into contact with unscreened visitors. To ensure their separation, while also ensuring the unrestricted movement of pedestrians throughout the grounds, a tunnel is proposed to connect the underground visitors facility to the monument. Visitors will enter the monument one floor below the existing elevator lobby. The proposed design calls for visitors to exit through the existing monument doors on the plaza (surface level). Other elements of the 1993 DCP will be achieved with little or no modification. The plaza itself will be flush and closer in design to the historic plaza. The flagpoles will be retained."⁴²⁶

- 2/21/2002 CFA approved the "design concept" for Security Improvements at the Washington Monument, including replacement of the Jersey barriers, and construction of an underground visitors center with tunnel entry into Monument.⁴²⁷
- 2/28/2002 The Historic Preservation Review Board for the District of Columbia approved a "design concept" for Security Improvements at the Washington Monument: to include replacing Jersey barriers, and underground visitors center with tunnel entry into Monument.⁴²⁸
- 4/2002 The NPS released an Environmental Assessment Report that supported the construction of the underground visitor facility and underground concourse. The Commission of Fine Arts and the National Capital Planning Commission endorsed the concept.⁴²⁹
- 7/2002 The NPS released its *Decision Notice and Finding of No Significant Impact, (FONSI) Washington Monument Permanent Security Improvements Environmental Assessment* that finds preferred Alternative A "does not constitute a major Federal action significantly affecting the quality of the human environment."⁴³⁰ "Due to the high visibility and importance of the Washington Monument, increased national security concerns, and the prominence of the Monument and its setting, the NPS proposes permanent improvements to the current temporary security systems at the Washington Monument and its Grounds and related revisions to the 1993 Development Concept Plan. These improvements would include the construction of a permanent visitor screening facility to replace the interim facility located adjacent to the Monument, and the installation of a permanent vehicle barrier system to replace the temporary concrete jersey barrier system. The program also includes enhancement of the visitor experience as well as general improvements to the Monument Grounds. The existing concrete jersey barriers and the interim visitor security facility obstruct important vistas to and from the Monument and its Grounds, intrude on the setting of this important national icon, and disrupt pedestrian circulation

patterns. In addition, the current system requires heavy personnel staffing by the U.S. Park Police. The pathways and facilities on the Monument Grounds also require updating. Walks and paths to the base of the Monument need to be made more accessible for persons with physical disabilities. Concession facilities on the site are [sic] inappropriately situated and restroom facilities are inadequate. In addition, conditions currently do not allow the provision of educational and interpretive programs and visitor services to meet NPS standards. Finally, while waiting to obtain tickets or to ascend the Monument, visitors to the monument are completely exposed to the weather."⁴³¹ In November 2001, NPS issued its *Program Requirements for the Washington Monument Permanent Security Improvements* for "design and construction of a new permanent visitor screening facility and vehicle barrier systems, enhancement of the visitor [sic] experience and general improvements to the Monument Grounds include[ing]: improvement of security; enhancement of the visitor experience; provision of outdoor recreational opportunities; rehabilitation of the cultural landscape; improvement of accessibility; preservation of the Monument structure; rehabilitation of the Monument Lodge; and completion of the 1993 Development Concept Plan for the Washington Monument Grounds"⁴³² Three alternatives were considered. Alternative A was the below-grade alternative with an underground screening facility and passage into the monument. It included a landscaped vehicle barrier system of walled terraces and walkways, removal above-ground visitor queuing area and temporary visitor screening facility, removal existing ticket distribution kiosk on the west side of 15th Street at Madison Drive; removing unsympathetic addition to Monument Lodge; rehabilitation of Monument Lodge and construction of compatible new addition to serve as portal to new underground visitor screening facility (underground facility to include ticketing/lobby area, security queuing and screening area, educational and interpretive area and other visitor services); installing skylight to allow light into the screening facility and preserve visual connection to the Monument; underground passageway sloping gently upward to new elevator lobby one floor beneath the existing lobby; replacing jersey vehicle barriers with 24 to 30-inch tall walled terraces; constructing a berm, 450 feet west of Monument, to visually screen the wall from the west; subtle regrading of Monument's grassy mound to a more uniform topography and provide easier pedestrian flow and universally accessible walkways; replacing existing concrete at plaza with high-quality paving materials and benches; removing 16th Street parking lot and completion of German-American Friendship Garden; adding trees along the primary streets and other locations on edges of Grounds; preservation and interpretation of the Jefferson Pier; preservation of exiting recreational fields. Alternative B was the above-grade alternative with a visitor screening facility (two buildings containing ticketing, security queuing and screening, educational and interpretive displays and other visitors services) clustered in a less visible and less used part of the grounds near the Sylvan Theatre; removing above-ground visitor queuing area and temporary visitor screening facility, removing existing ticketing kiosk on

west side of 15th Street at Madison Drive; constructing above-ground, double-fenced security pathway through which law enforcement personnel would escort groups of screened visitors to a double-locked door at the entrance to the Monument; replacing existing jersey barriers with a vehicular barrier system of bollards along the 1.25-mile perimeter of the Monument Grounds; rehabilitation of Monument Lodge, including removal of unsympathetic addition; improvements to Monument Grounds including replacement of asphalt paving on the plaza with grass and a low granite wall, removing 16th Street parking lot and completion of German-American Friendship Garden). Alternative C was the No Action Alternative.⁴³³

- 12/16/2002 The NCPC issues a FONSI regarding the revised development concept plan.⁴³⁴
- 1/9/2003 NCPC approved the Revised Development Concept Plan (an update of the 1993 DCP for the Washington Monument and Grounds) and reaffirmed its approval of the concept of the underground Visitor Facility and Concourse to the Monument, approves preliminary site and building plans for the landscape plan, retaining walls, and paths and monument plaza, and approved the concept of an addition to the west façade of Monument Lodge “of a size sufficient to meet the National Park Service’s needs without overwhelming the lodge and suggest that NPS provide two or more alternative designs.”⁴³⁵ Since NCPC concept approval of the addition to Monument Lodge in April 2002, the NPS had determined a need to have screening take place above ground, necessitating a larger addition than previously approved by the NCPC. The NCPC appears to have approved the Revised Development Concept Plan for the Washington Monument Grounds. Exception were the addition to Monument Lodge, the skylight illuminating the below-grade visitor facility, the below-grade visitor facility, and the underground passage into the monument. NCPC also approves portions of Preliminary Site and Building Plans for Visitor and Security Improvements, including the landscape plan (the retaining walls and path serving as vehicle barriers) and redesign of Monument Plaza. The exceptions from approval were due to proposal revisions submitted. The proposal was “significantly different than the concept approved by the Commission in April 2002, and because it does not meet the request of the Commission for a compatible lodge addition that “is not visually larger than the existing lodge”.”⁴³⁶ The Revised Development Concept Plan includes same general development concepts of 1993 Development Concept Plan with the addition of: redesigned pathway system with low retaining walls serving as a vehicle barrier system; skylight over the visitors facility; and an underground passage to a new below-grade monument entrance.⁴³⁷
- 1/2003 Elements of the Revised Development Concept Plan included: 30-inch reinforced concrete retaining walls/vehicle barriers clad with rough split granite and topped with a 2-foot wide granite cap. The base of the wall would extend about 20 inches to provide a curb or footrest. The walls would be at the base of the Monument

knoll, approximately 400 feet from the monument. The walls would be built at an accessible grade to direct pedestrians in gentle arcs up the Monument knoll. Operable bollards along the paths would provide access to the monument to service and emergency vehicles. The retaining walls would be screened from view on the west by a newly created slight rise in the landscape, on the east partially by the Monument Lodge. This would be visible on the north and south. The existing paths to the monument from the east do not meet accessibility standards. As part of the landscape changes, some of the irregularities of the knoll would be smoothed out. The Jefferson pier and its general surroundings would not be disturbed.⁴³⁸ The Revised Development Concept Plan also included repaving of the monument plaza with granite and retention of the fifty flags at the outer perimeter of the plaza. Curved backless marble benches would be installed at the outer circumference. The east site of the plaza would have an exit hatch to an emergency stair from the new below-ground passageway.⁴³⁹

ENDNOTES

Abbreviations:

- E 484 Letters Received, Entry 484; Records of the Joint Commission for Completion of the Washington Monument.
- E 495 Letters Sent, Entry 495; Records of the Engineer in Charge, 1876 – 1892; Records of the Joint Commission for Completion of the Washington Monument, 1876 – 1892.
- E 512 Contracts, Entry 512; Records of the Engineer In Charge, 1876-1892; Records of the Joint Commission for the Completion of the Washington Monument, 1876-1892.
- NAB National Archives Building, Washington, D.C.
- OPB&PP Office of Public Buildings and Public Parks
- RG 42 Records of the Office of Public Buildings and Public Parks of the National Capital, Record Group 42.

¹ Donald C. Phanz, "Washington Monument," *National Register – Documentation of Existing National Register Property* (Washington, D.C.: Department of the Interior, National Park Service, 1980) item 8, p. 1.

² U.S. Congress, House, *Report of the Select Committee on the Washington National Monument*. 43d Cong., 1st sess., 1874. H. Rept. 485, 1.

³ Louis Torres, *To the Immortal Name and Memory of George Washington" The United States Corps of Engineers and the Construction of the Washington Monument* (Washington, D.C.: GPO, 1984) 3.

⁴ Torres, *Corps of Engineers*, 3-5.

⁵ Torres, *Corps of Engineers*, 5.

⁶ Torres, *Corps of Engineers*, 5.

⁷ Torres, *Corps of Engineers*, 5.

⁸ Torres, *Corps of Engineers*, 6.

⁹ Frederick L. Harvey, *History of the Washington National Monument and the Washington National Monument Society* (Washington, D.C.: GPO: 1903) 21-22.

¹⁰ Harvey, *Washington National Monument Society*, 25.

¹¹ Quoted in Pamela Scott, "Robert Mills and American Monuments," in *Robert Mills, Architect*, ed. John M. Bryan (Washington, D.C.: American Institute of Architects Press, 1989), 158.

¹² George J. Olszewski, *A History of the Washington Monument 1844 – 1968*. (Washington, D.C.: Department of Interior, National Park Service, Office of History and Historic Architecture, Eastern Service Center, 1971) 4.

¹³ Harvey, *Washington National Monument Society*, 33-35.

¹⁴ Harvey, *Washington National Monument Society*, 33-37.

¹⁵ Scott, "American Monuments," 158.

¹⁶ Olszewski, *Washington Monument 1844 – 1968*, 3-4.

¹⁷ There is evidence for at least three designs for a Washington Monument in Mills' 1836-1840 journal (Scott, "American Monuments," 158).

¹⁸ Harvey, *Washington National Monument Society*, 26-28.

¹⁹ Harvey, *Washington National Monument Society*, 39-40.

²⁰ Torres, *Corps of Engineers*, 16-17.

²¹ Robert Mills, 11 April 1848; Graphic Works Folder 4, Thomas Lincoln Casey Papers, Society for the Preservation of New England Antiquities (SPNEA).

²² Aaron V. Wunsch, *Washington Monument, HABS No. DC-428* (Washington, D.C.: Department of the Interior, National Park Service, Historic American Buildings Survey, 1994) 2, 10.

²³ Olszewski, *Washington Monument 1844 – 1968*, 4-5, 7-8.

²⁴ Quoted in Harvey, *Washington National Monument Society*, 130.

²⁵ Torres, *Corps of Engineers*, 18.

²⁶ Torres, *Corps of Engineers*, 17.

²⁷ Harvey, *Washington National Monument Society*, 238.

²⁸ Wunsch, *Washington Monument*, 8.

²⁹ Phanz, "Washington Monument," item 8, p. 1.

³⁰ Torres, *Corps of Engineers*, 21-22.

³¹ House, *Select Committee*, 1874, 2-3.

³² Torres, *Corps of Engineers*, 15.

³³ Olszewski, *Washington Monument 1844-1968*, 4.

³⁴ Silvio A. Bedini, *The Jefferson Stone* (Frederick, Md.: Professional Surveyors Publishing Co., 1999), 34.

³⁵ Pamela Scott, "'This Vast Empire': The Iconography of the Mall, 1791-1991," in *The Mall in Washington, 1791-1991*, 2nd ed., ed. Richard Longstreth, (Washington, D.C.: National Gallery of Art, 2002), 52.

³⁶ Harvey, *Washington National Monument Society*, 42.

³⁷ Harvey, *Washington National Monument Society*, 47.

³⁸ Torres, *Corps of Engineers*, 26-27.

³⁹ Harvey, *Washington National Monument Society*, 55-56.

⁴⁰ Torres, *Corps of Engineers*, 26-27.

⁴¹ speech of Hon. Robert C. Winthrop, at dedication of Washington Monument, 21 February 1885, quoted in Harvey, *Washington National Monument Society*, 239.

⁴² Harvey, *Washington National Monument Society*, 65.

⁴³ Harvey, *Washington National Monument Society*, 74.

⁴⁴ Torres, *Corps of Engineers*, 32.

⁴⁵ In 1859, the Society asked Secretary of War to assign an engineer to examine the foundation – Ives (Corps of Engineers) was appointed and found no signs of settling or insecurity in the foundation – he noted some chipped marble blocks in the lower courses and believed these to be the result of joints being laid too close together, but there was no for concern regarding the stability of the foundations. (Torres, *Corps of Engineers*, 28).

⁴⁶ Torres, *Corps of Engineers*, 32-33.

⁴⁷ House, *Select Committee*. 1874, 4-6

⁴⁸ House, *Select Committee*, 1874, 7-8.

⁴⁹ Torres, *Corps of Engineers*, 36-37.

⁵⁰ David D. Porter, Admiral, to Washington National Monument Society, 19 November 1874, quoted in Harvey, *Washington National Monument Society*, 83.

⁵¹ House, *Select Committee*, 1874, 4-6.

⁵² "Inventory of Property Belonging to the W. N. Monument Society as reported by those in possession March 20, 1855;" Correspondence, Entry 432; Records of the Secretary, 1833-1951; Records of the Washington National Monument Society, 1833-1951; RG 42; NAB.

⁵³ Harvey, *Washington National Monument Society*, 172.

⁵⁴ Bickworth, Lt., to Washington National Monument Society, 7 May 1861; Records Relating to the Design and Construction of the Monument, Monument Grounds, and Offices of the Society, Entry 436; Records of the Secretary, 1833-1951; Records of the Washington National Monument Society, 1833-1951; RG 42; NAB.

⁵⁵ "The Cattle Meadow near Washington" *Frank Leslie's Illustrated News* (1 February 1862).

⁵⁶ Elizabeth J. Barthold, *The National Mall and Monument Grounds (Reservation Numbers 2, 3, 3A, 3B, 4, 5, 6, 6A)*; HABS No. DC-687 (Washington, D.C.: Department of the Interior, National Park Service, Historic American Buildings Survey, 1993).

⁵⁷ Elizabeth J. Barthold, *L'Enfant-McMillan Plan of Washington, DC - HABS No. DC-668*, edited by Sara Amy Leach (Washington, D.C.: Department of the Interior, National Park Service, Historic American Buildings Survey, 1993).

⁵⁸ House, *Select Committee*, 1874, 4-6.

⁵⁹ U.S. Public Law No. 129, 45th Congress, 1st Session, 2 August 1876.

⁶⁰ Torres, *Corps of Engineers*, 37.

⁶¹ Olszewski, *Washington Monument 1844-1968*, 18-19.

⁶² Torres, *Corps of Engineers*, 42.

⁶³ Wunsch, *Washington Monument*, 2-3.

⁶⁴ speech of Hon. Robert C. Winthrop, at dedication of Washington Monument, 2/21/1885, quoted in Harvey, *Washington National Monument Society*, 239-240.

⁶⁵ Olszewski, *Washington Monument 1844-1968*, 19.

⁶⁶ Larkin Mead to Washington National Monument Society, 27 June 1878; Letters Received, Entry 428; Records of the Washington National Monument Society, 1833-1951; RG 42, NAB.

⁶⁷ William W. Corcoran, Chairman, Joint Commission, to Lt. Col. Thomas Lincoln Casey, 1 July 1878, v. 4, p. 5; E 495; RG 42; NAB.

⁶⁸ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to W. W. Corcoran, Chairman of Joint Commission, 27 July 1878, v. 4, p. 6; E 495; RG 42; NAB.

⁶⁹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument. "Report of Operations Upon Completion of the Washington Monument for the Month of July 1878." 2 August 1878; E 495; RG 42; NAB.

⁷⁰ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument. "Report of Operations Upon Completion of the Washington Monument for the Month of September 1878." October 1878; v. 1, p. 46; E 495; RG 42; NAB.

⁷¹ Wunsch, *Washington Monument*, 9. The Washington National Monument Society had approved Story's design, but the Building Committee of the Joint Commission asked Casey's opinion on the practicality of the design, Casey said that Story's design (contrary to previous statements) would require the removal of 41.5 feet of the existing monument to add in windows and that if the design were carried out without underpinning the foundation, the building would fail, and even if Casey underpinned the foundation as approved by the Joint Commission, the total weight of the structure would be too much. (Torres, *Corps of Engineers*, 54).

⁷² J.B. White and Bros. to Lieut. Col. Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, 24 October 1878; Letters Received, Entry 492; Records of the Engineer in Charge, 1876 - 1892; Records of the Joint Commission for the Completion of the Washington Monument, 1876 - 1892; RG 42; NAB.

⁷³ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument. "Report of Operations Upon Completion of the Washington Monument for the Month of October 1878." November 1878; E 484; RG 42; NAB.

⁷⁴ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument. "Report of Operations Upon Completion of the Washington Monument for the Month of November 1878." December 1878; v. 1, p. 119; E 495; RG 42; NAB.

⁷⁵ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and T.T. Fowler and Co. "Articles of Agreement." December 1878; E 512; RG 432; NAB.

⁷⁶ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of December 1878," 10 January 1879; E 484; RG 42; NAB.

⁷⁷ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of January 1879," 14 February 1879; v. 1; E 495; RG 42; NAB.

⁷⁸ George P. Marsh to Sen. George F. Edmunds. 29 April 1879; printed in U.S. Congress. House. *Memorial of the Committee of the National Monument Association, Relative to the Completion of the Washington Monument*. 46th Cong., 3d sess., 1880, Mis. Doc. 37.

⁷⁹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of February 1879," 3 March 1879; v. 1; E 495; RG 42; NAB.

⁸⁰ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of March 1879," 3 April 1879; v. 1; E 495; RG 42; NAB.

⁸¹ George P. Marsh to Senator Geoff Edmunds, 24 April 1879; E 484; RG 42; NAB.

⁸² Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of May 1879," June 1879; v. 1; E 495; RG 42; NAB.

⁸³ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Chairman, Joint Commission for Completion of the Washington Monument; 3 June 1879; v. 1, p. 195; E 495; EG 42; NAB.

⁸⁴ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Brig. Gen. H.G. Wright, Chief of Engineers, chairman, Building Committee of Joint Commission for Completion of the Washington Monument; 1879; v. 1, p. 219; E 495; RG 42; NAB.

⁸⁵ Torres, *Corps of Engineers*, 54.

⁸⁶ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument. "Report of Operations Upon Completion of the Washington Monument for the Month of June 1879," July 1879; v. 1, p. 216; E 495; RG 42; NAB.

⁸⁷ Joint Commission for the Completion of the Washington Monument, 17 July 1879; Proceedings, Entry 482; Records of the Joint Commission for the Completion of the Washington Monument, 1876 – 1892; RG 42; NAB.

⁸⁸ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of July 1879," 5 August 1879; v. 1, p. 254; E 495; RG 42; NAB.

⁸⁹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Otis Bros. Co., 20 August 1879; v. 1, p. 273; E 495; RG 42; NAB.

⁹⁰ Thomas Lincoln Casey and John R. Riggs, "Articles of Agreement." 25 August 1879; E 484; RG 42; NAB.

⁹¹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of August 1879," 3 September 1879; v. 1, p. 294; E 495; RG 42; NAB.

⁹² Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of September 1879," 4 October 1879; v. 1, p. 315; E 495; RG 42; NAB.

⁹³ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Brig. Gen. H. G. Wright, Chairman of the Building Committee, Joint Commission for Completion of the Washington Monument, 15 October 1879; E 484; RG 42; NAB.

⁹⁴ Joint Commission for the Completion of the Washington Monument, 21 October 1879; Proceedings, Entry 482; Records of the Joint Commission for the Completion of the Washington Monument, 1876 – 1892; RG 42; NAB.

⁹⁵ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of October 1879," 5 November 1879; v. 1, p. 340; E 495; RG 42; NAB.

⁹⁶ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of November 1879," 2 December 1879; v. 1, p. 352; E 495; RG 42; NAB.

⁹⁷ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Brig. Gen. H. G. Wright, Chairman, Building Committee, Joint Commission for Completion of the Washington Monument, 4 December 1879; E 484; RG 42; NAB.

⁹⁸ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of December 1879," January 1880; v. 2, p. 9, E 495; RG 42; NAB.

⁹⁹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of January 1880," February 1880; v. 2, p. 20, E 495; RG 42; NAB.

¹⁰⁰ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of March 1880," April 1880; v. 2, p. 49, E 495; RG 42; NAB.

¹⁰¹ Wunsch, *Washington Monument*, 9.

¹⁰² Torres, *Corps of Engineers*, 56-57.

¹⁰³ Harvey, *Washington National Monument Society*, 97.

¹⁰⁴ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of April 1880," May 1880; v. 2, p. 70, E 495; RG 42; NAB.

¹⁰⁵ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to General H. G. Wright, Chairman, Building Committee, of Joint Commission for Completion of the *Washington Monument*, 7 May 1880; E 484; RG 42; NAB.

¹⁰⁶ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of May 1880," June 1880; v. 2, p. 95, E 495; RG 42; NAB.

¹⁰⁷ John R. Briggs to Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, 25 June 1880; Letters Received, Entry 492; Records of the Engineer in Charge, 1876 - 1892; Records of the Joint Commission for the Completion of the Washington Monument, 1876 - 1892; RG 42; NAB.

¹⁰⁸ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of June 1880," July 1880; E 484; RG 42; NAB.

¹⁰⁹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and Hugh Sisson, "Articles of Agreement," 9 July 1880. E 512; RG 42; NAB.

¹¹⁰ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and Davis Tillen, "Articles of Agreement," 12 July 1880; E 512; RG 42; NAB.

¹¹¹ U.S. Congress, Senate, *Annual Report of the Joint Commission for the Completion of the Washington Monument*. 46th Cong., 3d sess., 1880. Mis. Doc. 9, 2-4.

¹¹² Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of July 1880," August 1880; v. 2, p. 169, E 495; RG 42; NAB.

¹¹³ Olszewski, *Washington Monument 1844-1968*, 29.

¹¹⁴ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of August 1880," September 1880; v. 2, p. 196, E 495; RG 42; NAB.

¹¹⁵ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of September 1880," 8 October 1880; v. 2, p. 226, E 495; RG 42; NAB.

¹¹⁶ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of October 1880," 4 November 1880; v. 2, p. 238, E 495; RG 42; NAB.

¹¹⁷ Senate, *Annual Report*, 1880, 2-4.

¹¹⁸ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of November 1880," 2 December 1880; v. 2; E 495; RG 42; NAB.

¹¹⁹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of December 1880," 5 January 1881; E 484; RG 42; NAB.

¹²⁰ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of January 1881," 4 February 1881; E 484; RG 42; NAB.

¹²¹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of February 1881," 7 March 1881; E 484; RG 42; NAB.

¹²² Marble cutters to Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, 21 March 1881; Letters Received, Entry 492; Records of the Engineer in Charge, 1876 - 1892; Records of the Joint Commission for the Completion of the Washington Monument, 1876 - 1892; RG 42; NAB.

¹²³ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of March 1881," 4 April 1881; E 484; RG 42; NAB.

¹²⁴ Granite cutters to Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, 31 May 1881; Letters Received, Entry 492; Records of the Engineer in Charge, 1876 – 1892; Records of the Joint Commission for the Completion of the Washington Monument, 1876 – 1892; RG 42; NAB.

¹²⁵ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of May 1881," 2 June 1881; E 484; RG 42; NAB.

¹²⁶ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of June 1881," July 1881; E 484; RG 42; NAB.

¹²⁷ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, "Advertisement and Specifications for Cast and Wrought Iron Work," 2 July 1881; Proposals to Prospective Bidders, Entry 516; Records of the Joint Commission for the Completion of the Washington Monument, 1876 – 1892; RG 42; NAB

¹²⁸ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of September 1881," 6 October 1881; E 484; RG 42; NAB.

¹²⁹ *Washington Post*, 25 September 1881.

¹³⁰ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of October 1881," 4 November 1881; E 484; RG 42; NAB.

¹³¹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of November 1881," 2 December 1881; E 484; RG 42; NAB.

¹³² Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of December 1881," 4 January 1882; E 484; RG 42; NAB.

¹³³ U.S. Congress, Senate, *Annual Report of Joint Commission for the Completion of the Washington Monument*. 47th Cong., 1st sess., 1881, Mis. Doc. No. 19, 1-2.

¹³⁴ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of January 1882," 4 February 1882; E 484; RG 42; NAB.

¹³⁵ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, "Advertisement and Specifications for Wrought and Cast Iron Work," 24 April 1882; Proposals to Prospective Bidders, Entry 516; Records of the Joint Commission for the Completion of the Washington Monument, 1876 – 1892; RG 42; NAB.

¹³⁶ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of April 1882," 4 May 1882; vol. 5, p. 163; E 495; RG 42; NAB.

¹³⁷ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and J. B. and J. M. Cornell, "Articles of Agreement," 11 May 1882; E 512; RG 42; NAB.

¹³⁸ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and Hugh Sisson, "Articles of Agreement," 19 May 1882; E 512; RG 42; NAB.

¹³⁹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and Bodwell Granite Co., "Articles of Agreement," 22 May 1882; E 512; RG 42; NAB.

¹⁴⁰ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of May 1882," 3 June 1882; vol. 3, p. 81; E 495; RG 42; NAB.

¹⁴¹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of August 1882," 5 September 1882. v. 3; E 495; RG 42; NAB.

¹⁴² Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of September 1882," 5 October 1882. v. 3, p. 81; E 495; RG 42; NAB.

¹⁴³ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of December 1882," 3 January 1883; E 484; RG 42; NAB.

¹⁴⁴ U.S. Congress, Senate, *Annual Report of the Joint Commission for the Completion of the Washington Monument*. 1882. Doc. 13, 2

¹⁴⁵ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of January 1883," February 1883. v. 3, p. 163; E 495; RG 42; NAB.

¹⁴⁶ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of February 1883," 3 March 1883. E 484; RG 42; NAB.

¹⁴⁷ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and William J. White, "Articles of Agreement," 3 April 1883; E 512; RG 42; NAB.

¹⁴⁸ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and Lee Marble Co., "Articles of Agreement," 18 April 1883; E 512; RG 42; NAB.

¹⁴⁹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and Phoenix Iron Company, "Articles of Agreement," 19 April 1883; E 512; RG 42; NAB.

¹⁵⁰ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, Memorandum. 22 April 1883; Box 40, Folder 27, Casey Family Papers, Society for Preservation of New England Antiquities (SPNEA), Boston, Mass.

¹⁵¹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of May 1883," 1 June 1883; E 484; RG 42; NAB.

¹⁵² Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Building Committee, Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of June 1883," 3 July 1883; E 484; RG 42; NAB.

¹⁵³ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Building Committee, Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of July 1883," 1 August 1883; E 484; RG 42; NAB.

¹⁵⁴ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and Hugh Sisson, "Articles of Agreement," 20 July 1883; E 512; RG 42; NAB.

¹⁵⁵ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of August 1883," 3 September 1883, v. 3, p. 256; E 495; RG 42; NAB.

¹⁵⁶ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Building Committee, Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of September 1883," 2 October 1883; E 484; G 42; NAB.

¹⁵⁷ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Building Committee, Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of October 1883," 3 November 1883; E 484; RG 42; NAB.

¹⁵⁸ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Building Committee, Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of November 1883," 3 December 1883; E 484; RG 42; NAB.

¹⁵⁹ U.S. Congress, Senate, *Annual Report of the Joint Commission for the Completion of the Washington Monument*, 48th Cong., 1st sess., 1883. Mis. Doc. 22, 2.

¹⁶⁰ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Brig. Genl. H. G. Wright, Chief of Engineers, U.S.A., Chairman of Building Committee, Joint Commission for Completion of the Washington Monument, 19 January 1884; E 484; RG 42; NAB.

¹⁶¹ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, "Advertisement and Specifications for Wrought and Cast Iron Work," 25 March 1884; Proposals to Prospective Bidders, Entry 516; Records of the Joint Commission for the Completion of the Washington Monument, 1876 - 1892; RG 42; NAB.

¹⁶² Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, and H. A. Ramsay and Son, "Articles of Agreement," 21 April 1884; E 512; RG 42; NAB.

¹⁶³ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of April 1884," 3 May 1884, v. 3, p. 346; E 495; RG 42; NAB.

¹⁶⁴ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Building Committee, Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of May 1884," 4 June 1884; E 484; RG 42; NAB.

¹⁶⁵ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Building Committee, Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of July 1884," August 1884; E 484; RG 42; NAB.

¹⁶⁶ Bernard R. Green, Civil Engineer, "Notes on Project for a Marble Pyramidion for the Washington Monument, represented in four sheets of drawings on file in the Engineer Office," 4 August 1884; Folder 21, Box 41; Casey Family Papers; SPNEA..

¹⁶⁷ Thomas Lincoln Casey, Engineer in Charge of the Washington Monument, to Building Committee, Joint Commission for Completion of the Washington Monument, "Report of Operations Upon Completion of the Washington Monument for the Month of August 1884," 4 September 1884; E 484; RG 42; NAB.

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NAB	National Archives Building, Washington, D.C.
RG 42	Records of the Office of Public Buildings and Public Parks of the National Capital, Record Group 42

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1969

[Photograph] Picketing file 154633, Washingtoniana Division, Martin Luther King, Jr. Memorial Library, Washington, D.C.

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1998

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