



## Executive Director's Recommendation

Commission Meeting: May 5, 2016

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<b>PROJECT</b> <b>Arlington Memorial Bridge Rehabilitation</b> Southwest Washington, DC	<b>NCPC FILE NUMBER</b> 7547
<b>SUBMITTED BY</b> United States Department of the Interior National Park Service	<b>NCPC MAP FILE NUMBER</b> 75.00.01(48.00)43884
<b>REVIEW AUTHORITY</b> Federal Projects in the District per 40 U.S.C. § 8722(b)(1) and (d)	<b>APPLICANT'S REQUEST</b> Approval of comments on concept design
	<b>PROPOSED ACTION</b> Approve comments as requested
	<b>ACTION ITEM TYPE</b> Presentation

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### PROJECT SUMMARY

The National Park Service (Department of the Interior) has submitted plans for the rehabilitation of the Arlington Memorial Bridge for concept review. The bridge was designed by the architectural firm McKim, Mead, and White, and opened in 1932. The project includes the rehabilitation or replacement of the steel bascule span; repairs to the deteriorated portions of the abutments, piers, and concrete arch approach spans; replacement of the concrete bridge deck; resurfacing of the travel lanes; replacement of the concrete sidewalks and refitting of granite curbs; repairs to granite bridge railings; repairs to lamp posts; repairs to access panels; installation of an improved drainage system; and other minor nonstructural bridge improvements.

The Federal Highway Administration (FHWA) regularly inspects the bridge in accordance with generally recognized structural engineering guidelines and standards. These detailed structural inspections and studies have identified corroded steel and deteriorated concrete. The most critical elements needing repair are the concrete arch approach spans and the steel bascule (drawbridge) span. Therefore, the project is needed to address the ongoing corrosion of steel structural members of the bascule span, deterioration of the concrete on the bridge's approach spans, and deterioration of the sidewalks and wearing surface.

### KEY INFORMATION

- The Arlington Memorial Bridge spans the Potomac River, and provides a connection between the Lincoln Memorial on the east and Arlington National Cemetery on the west. The bridge was designed to create a physical and symbolic connection between the North and South, and provides a link in the chain of monuments and memorials that begins with the US Capitol and extends to Arlington National Cemetery.

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- The bridge was designed in a neoclassical style by lead architect William Mitchell Kendall, as a part of the architectural firm of McKim, Mead and White. It consists of ten reinforced concrete spans and a double-leaf bascule (draw) span at the center. Counterweights were used to pivot each leaf upwards on trusses supported by an axle, or trunnion.
  - The bridge was the first of its kind to have all the operable elements of the bascule span concealed under the bridge and within the span's abutments. It was also among the longest, heaviest and fastest draw spans in the world.
  - The bascule span was operable between 1932 and 1961, and would allow access for large ships traveling upstream to the Georgetown waterfront. In 1962, the Army Corps of Engineers determined that the draw bridge need not open for vessels, and it has not operated since the 1960s.
  - The bridge was listed in the National Register of Historic Places in 1980 for its architectural characteristics and innovative engineering.
  - The bridge is administered and maintained by the George Washington Memorial Parkway, a unit of the National Park Service (NPS).
  - FHWA has performed scheduled routine inspections of the bridge, including underwater examinations of the bridge piers, since 1978.
  - According to NPS and FHWA, the most recent bridge inspection was performed in 2015, and determined that the "existing structure steel trusses in the bascule span were found to be deteriorating much more rapidly than expected."
  - NPS, at the recommendation of FHWA, has posted load limits on the bridge which will remain in effect until the rehabilitation project is completed. Further restrictions or limitations, including closures, may be necessary in the future.
  - NPS has prepared an Environmental Assessment (EA), and the Commission is a cooperating agency for compliance with the National Environmental Policy Act (NEPA).
  - NPS released the EA on April 13, 2016 for public comment. The EA evaluates a no action and four action alternatives (Alternatives 1A, 1B, 2 and 3). Alternative 1B is the NPS-preferred alternative.
  - The US Commission of Fine Arts (CFA) reviewed the Arlington Memorial Bridge rehabilitation project on April 21, 2016, and approved the concept plans for Alternative 1B.

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## RECOMMENDATION

The Commission:

**Notes** that Arlington Memorial Bridge is the work of the architectural firm McKim, Mead, and White, and the McMillan Commission identified a memorial bridge in the location as part of the Plan of 1901. The bridge opened in 1932 and was listed in the National Register of Historic Places in 1980.

**Notes** that the bascule spans have deteriorated, and corrective measures are necessary to keep the bridge open to the public.

**Supports** the National Park Service's efforts to rehabilitate the bridge as a commemorative work, important regional transportation connection and significant gateway to the nation's capital.

**Notes** that several alternatives were considered, but dismissed from further analysis in the EA. These included replacing the bascule span with a new concrete arch span, providing a temporary bridge during construction, replacing the entire bridge, and replacing the bascule span with a new identical span of riveted steel.

Provides the following comments on the action alternatives:

**Does not support** Alternative 1A (Replace Bascule Span with Precast Concrete Box Girders) because its material and design approach is not sympathetic to the existing bridge. The new bascule span would replace the existing steel arch with a straight concrete span.

**Notes** that Alternative 2 (Replace Bascule Span with New Span Comprised of Welded Steel Truss Construction) would visually replicate the existing bridge, however, it would also replicate some of the existing design flaws and maintenance challenges faced by the current bridge.

**Notes** that Alternative 3 (Rehabilitate the Existing Bascule Span in Place) would preserve elements of the existing bridge, however, the continued challenge of maintaining and repairing the existing span design may lead to more substantial operational issues over time.

**Supports** Alternative 1B (Replace Bascule Span with Variable Depth Girders) as the preferred alternative for the Arlington Bridge Rehabilitation, as it best balances historic preservation goals with constructability, maintenance and cost.

**Supports** methods that eliminate or minimize the need for full bridge closures for vehicular, pedestrian and bicycle traffic during construction.

**Encourages** continued coordination with local and regional agencies to address potential impacts to mobility during the period of construction.

**Requests** that NPS evaluate short-term and long-term opportunities to improve pedestrian and bicycle connections to and from the west end of the bridge, including around Memorial Circle and to and from the Mount Vernon Trail.

**Requests** the following information be submitted at the time of preliminary review to better evaluate the proposal:

- Detailed project plans, sections and elevations of the bascule span, to understand the elements of the design and their relationship to any character-defining features, either retained or removed;
- Additional renderings and perspectives from several locations indicating the visibility of the bascule span elements, including upstream from the Kennedy Center River Terrace, downstream from the George Washington Memorial Parkway, and at a location approaching the bascule span at the river level;
- Plans for pedestrian and bicycle access and alternative routes during the construction period; and
- The location and configuration of specific construction staging areas, including screening measures, to minimize impacts on views and circulation between the Lincoln Memorial and Arlington National Cemetery.

## PROJECT REVIEW TIMELINE

<b>Previous actions</b>	– None
<b>Remaining actions</b> (anticipated)	– Preliminary Review – Final Review

## PROJECT ANALYSIS

### Executive Summary

The National Park Service is proposing the rehabilitation project to restore the structural integrity of the Arlington Memorial Bridge while protecting and preserving its memorial character and significant design elements. NPS, in cooperation with FHWA, is evaluating the proposed rehabilitation through an Environmental Assessment (EA), which has identified four action alternatives, along with a no action alternative. Staff has analyzed the alternatives considering principles related to historic preservation, transportation and visitor experience, and therefore recommends the Commission **support Alternative 1B (Replace Bascule Span with Variable Depth Girders) as the preferred alternative for the Arlington Bridge Rehabilitation, as it best balances historic preservation goals with constructability, maintenance and cost.**

### Analysis

Comprehensive repairs are necessary to ensure the functionality of Arlington Memorial Bridge as a major Potomac River crossing and entry to the monumental core. Staff recommends the Commission **note that the bascule spans have deteriorated, and corrective measures are necessary to keep the bridge open to the public.** Further, staff recommends the Commission **support the National Park Service's efforts to rehabilitate the bridge as a commemorative**

**work, important regional transportation connection and significant gateway to the nation's capital.**

The project must balance a number of issues, including historic preservation, transportation, and visitor experience. Staff has analyzed the action alternatives based upon these planning considerations. A description of each alternative, along with an evaluation of potential impacts, is described below. Staff further requests the **Commission note that several alternatives were considered, but dismissed from further analysis in the EA. These included replacing the bascule span with a new concrete arch span, providing a temporary bridge during construction, replacing the entire bridge, and replacing the bascule span with a new identical span of riveted steel.** These alternatives were dismissed for a number of reasons, including unnecessary impacts to historic or environmental resources; excessive cost; use of outdated construction methods and materials; and complexity that significantly increased construction time.

#### *Historic Preservation & Design*

The project aims to address goals related to historic preservation, while considering the constructability, maintenance and cost of any rehabilitation. Given the importance of the bridge as a historic structure and commemorative work, staff requests the **Commission note that Arlington Memorial Bridge is the work of the architectural firm McKim, Mead, and White, and the McMillan Commission identified a memorial bridge in the location as part of the Plan of 1901. The bridge opened in 1932 and was listed in the National Register of Historic Places in 1980.**

All alternatives include repairs to the deteriorated portions of the abutments, piers, and concrete arch approach spans; replacement of the concrete bridge deck; resurfacing of the travel lanes; replacement of the concrete sidewalks and refitting of granite curbs; repairs to granite bridge railings; repairs to lamp posts; repairs to access panels; installation of an improved drainage system; and other minor nonstructural bridge improvements. The action alternatives therefore primarily differ in the rehabilitation or replacement of the steel bascule span. The proposed design and impacts related to historic preservation are described for each alternative below, with a focus on the bascule span:

- *No-Action Alternative*
  - Design: No major rehabilitation would be implemented and the bridge would continue to deteriorate.
  - Impact: Emergency repairs would be necessary over time to address continuing deterioration. Major repairs would ultimately be necessary, and could significantly impact character-defining features of the bridge through degradation or complete loss.

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- *Alternative 1A – Replace Bascule Span with New Span Comprised of Precast Concrete Box Girders*
    - Design: The existing bascule span would be replaced with a new fixed span comprised of straight, precast concrete girders. The sides of the new span would include a truss design that is visually similar to the existing bascule span, and the existing steel façade would be removed, refurbished and replaced.
    - Impact: The underside of the replacement span would not replicate the form or construction of the existing bridge. The straight, concrete span would be substantially different from the existing arched steel span. From a distance, the bascule would not look substantially different from existing conditions. However, views from under the bridge would be altered. This design would also require less effort to maintain due to the more limited number of structural elements and joints as compared to Alternatives 2 and 3.
  
  - *Alternative 1B – Replace Bascule Span with New Span Comprised of Variable Depth Steel Girders*
    - Design: The existing bascule span would be replaced with a new fixed span comprised of variable depth (arched) steel girders. The sides of the new span would include a truss design that is visually similar to the existing bascule span, and the existing steel façade would be removed, refurbished and replaced.
    - Impact: The underside of the replacement span would replicate the general arched form of the existing bridge. As such, from a distance, the bascule would not look substantially different from existing conditions. However, views from under the bridge would be altered. This design would also require less effort to maintain due to the more limited number of structural elements and joints as compared to Alternatives 2 and 3.
  
  - *Alternative 2 – Replace Bascule Span with New Span Comprised of Welded Steel Truss Construction*
    - Design: The existing bascule span would be replaced with a new fixed span comprised of welded steel trusses that would visually replicate the existing bridge. The existing steel façade would be removed, refurbished and replaced.
    - Impact: The underside of the replacement span would visually replicate the existing span. Views of the bascule would not look substantially difference from existing conditions. This primarily construction method would be welding, instead of riveting, as with the existing bridge. Riveting has been identified as an outdated, cost-prohibitive method not employed today. This design would also replicate some of the existing maintenance challenges due to the large number of structural elements and joints.
  
  - *Alternative 3 – Rehabilitate the Existing Bascule Span in Place*
    - Design: The existing bascule span would be repaired in place, with steel members replaced as appropriate due to their deterioration. Elements that are replaced would be bolted in place, rather than riveted, and the existing steel façade on the span would be removed, refurbished and replaced.

- Impact: The underside of the replacement span would visually replicate the existing span. Views of the bascule would not look substantially different from existing conditions. Staff notes that the 2015 inspection revealed that approximately 20 to 25 percent of the existing steel was no longer usable and that at the current rate of deterioration, more would likely be unusable by the time the rehabilitation commences in 2018. In addition, given the number of steel members and the existing assembly, many areas may not be accessed for cleaning, and may continue to corrode, leading to future ongoing maintenance and repair challenges.

All the alternatives have particular implications regarding historic preservation, while considering long term maintenance and cost. Alternative 1A introduces a new straight-span form to the bascule which would deviate most significantly from the existing design. In addition, the central span is currently differentiated from the remaining concrete spans in its steel design. As such, staff recommends the **Commission not support Alternative 1A because its material and design approach is not sympathetic to the existing bridge. The new bascule span would replace the existing steel arch with a straight concrete span.**

Alternative 2 recreates the visual design of the bascule span but utilizes a new construction method – welding instead of riveting. Further, the proposed design would replicate many of the maintenance challenges faced by the current bridge. In particular, the large number of steel members require additional time and cost to inspect and paint. Therefore, staff recommends the **Commission note that Alternative 2 (Replace Bascule Span with New Span Comprised of Welded Steel Truss Construction) would visually replicate the existing bridge, however, it would also replicate some of the existing design flaws and maintenance challenges faced by the current bridge.**

Alternative 3 would maintain the form and many of the elements of the existing bridge. However, the continuing deterioration of the existing steel may necessitate more substantial repairs and the further loss of historic fabric. Many of the elements of the structure that are not accessible for repair or maintenance would continue to decline. In addition, any replacement of steel or connections would require bolting in lieu of riveting, further altering the design of the bridge. As such, staff recommends the **Commission note that Alternative 3 (Rehabilitate the Existing Bascule Span in Place) would preserve elements of the existing bridge, however, the continued challenge of maintaining and repairing the existing span design may lead to more substantial operational issues over time.**

The NPS-preferred Alternative 1B reflects the original bascule design in its form and the use of steel, without attempting to recreate the historic design. The girder shape echoes the original arch of the bascule, while outboard trusses would reflect the current span design. Further, the variable depth girders would require less effort to maintain due to the reduced number of structural elements and joints as compared to Alternatives 2 and 3. Therefore, staff recommends the **Commission supports Alternative 1B (Replace Bascule Span with Variable Depth Girders) as the preferred alternative for the Arlington Bridge Rehabilitation, as it best balances historic preservation goals with constructability, maintenance and cost.**

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*Transportation*

Arlington Memorial Bridge is an important component of the local and regional transportation network. As part of the National Highway System, it carries more than 68,000 vehicles each day, in addition to thousands of bicyclists and pedestrians. The bridge is only one of five that connect Virginia with the District of the Columbia, and is identified as a vital route in the Washington, DC evacuation plan. Therefore, both short- and long-term changes to the bridge's function are likely to have impacts on access and mobility. As part of the project, the number and configuration of travel lanes and sidewalks is not proposed to change after rehabilitation. Therefore, impacts to transportation have been primarily evaluated for the construction period. The EA evaluated four alternatives, in addition to the no action alternative, as described below:

- No Action Alternative
  - Design: No major rehabilitation would occur and the bridge would continue to deteriorate.
  - Impact: As the bridge continued to deteriorate, additional use restrictions would likely be necessary, in addition to emergency repairs. Intermittent closures of traffic lanes and sidewalks would be necessary and would result in adverse impacts to transportation and mobility.
  
- Alternative 1A
  - Design: The bridge would undergo a major rehabilitation lasting approximately 560 days, or 1.5 years. Closures would be necessary for the period, and would be dependent on the construction method selected. Two construction methods are possible with this alternative. Under Construction Method (A), full closures of the bridge would be necessary for approximately 70 days. Closures would impact all modes of travel. Under Construction Method (B), no full closures would be necessary, but traffic would be limited to three lanes and one sidewalk.
  - Impact: During construction, the diversion of traffic would have impacts on traffic volumes on surrounding bridges, including the Theodore Memorial Bridge, Key Bridge and 14<sup>th</sup> Street Bridge. Construction Method (A) would require full closures and the bridge would not be accessible to vehicles, pedestrians or bicyclists. Construction Method (B) would allow some use of the bridge by all modes for the duration of construction. After completion of the rehabilitation, the Arlington Memorial Bridge would return to its full use, with beneficial impacts to mobility.
  
- Alternative 1B
  - Design: The bridge would undergo a major rehabilitation lasting approximately 560 days, or 1.5 years. Closures would be necessary for the period, and would be dependent on the construction method selected. Two construction methods are possible with this alternative. Under Construction Method (A), full closures of the bridge would be necessary for approximately 70 days. Closures would impact all modes of travel. Under Construction Method (B), no full closures would be necessary, but traffic would be limited to three lanes and one sidewalk.

- Impact: The impacts during construction and following completion of the rehabilitation would be similar to those described for Alternative 1A. Construction Method (A) would require full closures and the bridge would not be accessible to vehicles, pedestrians or bicyclists. Construction Method (B) would allow some use of the bridge by all modes for the duration of construction.
- Alternative 2
  - Design: The bridge would undergo a major rehabilitation lasting approximately 560 days, or 1.5 years. Full closures would be necessary for 80 days, while three lanes and one sidewalk would be open for approximately 480 days.
  - Impact: The impacts during construction and following completion of the rehabilitation would be similar to those described for Alternative 1A.
- Alternative 3
  - Design: The bridge would undergo a major rehabilitation lasting approximately 600 days, or 1.6 years. Full closures would be necessary for 30 non-consecutive days, while three lanes and one sidewalk would be open for approximately 570 days.
  - Impact: The impacts during construction and following completion of the rehabilitation would be similar to those described for Alternative 1A.

Staff analysis finds that Alternatives 1A and 1B allow for a construction method which avoids a full closure of the bridge. Three travel lanes would be available to vehicular traffic and one sidewalk would be accessible to pedestrians and bicyclist for the duration of construction. In addition, these alternatives would allow the bridge to function as an emergency route if necessary.

Alternatives 2 and 3 require full bridge closures for periods of time. Given the importance of the bridge as a transportation connection, alternatives which avoid the need for full closure seem most appropriate. Therefore, staff recommends the **Commission support methods that eliminate or minimize the need for full bridge closures for vehicular, pedestrian and bicycle use during construction.** Further, given the potential impacts of full and partial closures on the transportation network, staff recommends the **Commission encourages continued coordination with local and regional agencies to address potential impacts to mobility during the period of construction.**

Staff notes that NPS has initiated a separate study of the Memorial Circle area of the George Washington Memorial Parkway. The purpose of the planning effort is to increase overall visitor safety, maintain the memorial character of the area, and improve mobility for vehicles, pedestrians, and bicycles. The period during and following construction may provide an opportunity to address some of the connections and potential conflicts between pedestrians, bicyclists and vehicles as they approach or exit the bridge. As such, staff recommends the **Commission request NPS evaluate short-term and long-term opportunities to improve pedestrian and bicycle connections to and from the west end of the bridge, including around Memorial Circle and to and from the Mount Vernon Trail.**

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*Visitor Experience*

As noted previously, the Arlington Memorial Bridge is a major gateway to the national capital, and an important link in the chain of monuments and memorials which stretch from the US Capitol Building to Arlington National Cemetery. A visitor's experience of the bridge is therefore related to physical access, views and commemoration. As a result, staff recommends the **Commission request the following information be submitted at the time of preliminary review to fully evaluate the proposal:**

- **Detailed project plans, sections and elevations of the bascule span, to better understand the elements of the design and their relationship to any character-defining features, either retained or removed;**
- **Additional renderings and perspectives from several locations indicating the visibility of the bascule span elements, including upstream from the Kennedy Center downstream from the George Washington Memorial Parkway, and at a location approaching the bascule span at the river level;**
- **Plans for pedestrian and bicycle access and alternative routes during the construction period; and**
- **The final location and use of construction staging areas, including screening measures, to minimize impacts on views between the Lincoln Memorial and Arlington National Cemetery.**

## **CONFORMANCE TO EXISTING PLANS, POLICIES AND RELATED GUIDANCE**

### **Comprehensive Plan for the National Capital**

The rehabilitation of the Arlington Memorial Bridge is generally consistent with the *Federal Elements of the Comprehensive Plan*. The project meets basic goals of the Plan, and in particular those policies related to Urban Design, Transportation and Visitors & Commemoration. Overall, the project is necessary to preserve and protect a vital historic resource and transportation infrastructure, and the NPS-preferred alternative appears to appropriately balance effects on historic resources with impacts to transportation and urban design, while considering short- and long-term costs.

### **National Historic Preservation Act**

In compliance with the National Historic Preservation Act (NHPA), NPS initiated consultation with the Advisory Council on Historic Preservation, the District of Columbia State Historic Preservation Office (DC SHPO) and the Virginia Department of Historic Resources on November 26, 2012. Through consultation, NPS identified an area of potential effects (APE) and the historic properties located in the APE. As noted previously, the bridge is listed in the National Register of Historic Places. NPS held consulting parties meetings on September 26, 2013 and April 20, 2016.

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NPS will coordinate the findings of EA with the DC and Virginia State Historic Preservation Offices through the preparation of an Assessment of Effects. Given its approval authority over the project, NCPC also has an independent responsibility to satisfy the regulations implementing Section 106 of the NHPA.

### **National Environmental Policy Act**

NPS is the lead federal agency responsible for compliance with the National Environmental Policy Act. NCPC is a cooperating agency. On April 9, 2013, NPS announced the start of the public scoping period for the preparation of an EA. Two public open houses were held in April 2013, one in Washington, DC and Arlington, VA, respectively. Comments received through the scoping period focused on suggestions for multi-modal transportation improvements, lighting, boat access and preservation of the bridge's historic features. In addition, a public review of the preliminary alternatives was held between October 30, 2013 and December 2, 2013, with an additional open house on November 12, 2013. The EA was released for a public review period on April 13, 2016, and comments will be accepted through May 16, 2016. Topic areas evaluated in the EA include water quality, riverine systems, wildlife, cultural resources, historic resources, visitor use and experience, transportation and navigation.

## **CONSULTATION**

### **Coordinating Committee**

The Coordinating Committee reviewed the proposal at its April 13, 2016 meeting. The Committee forwarded the proposal to the Commission with the statement that it has been coordinated with all participating agencies. The participating agencies were: NCPC; the District of Columbia Office of Planning; the District of Columbia State Historic Preservation Office, the District Department of Transportation; the General Services Administration; the National Park Service and the Washington Metropolitan Area Transit Authority. The State Historic Preservation Office noted the project is subject to further consultation under Section 106 and the development of a Memorandum of Agreement. The District Department of Transportation noted that it would continue working with the applicants on the rehabilitation project.

### **US Commission of Fine Arts**

The CFA reviewed the proposal at their April 21, 2016 meeting, and approved the concept plans for Alternative 1B.

## ONLINE REFERENCE

The following supporting documents for this project are available online:

- Submission Package
- Project Summary
- Environmental Assessment –  
<http://parkplanning.nps.gov/document.cfm?parkID=186&projectID=37120&documentID=72107>

Prepared by Matthew J. Flis  
04/28/2016

## POWERPOINT (ATTACHED)

**NCPC File #7547:**

# **Arlington Memorial Bridge Rehabilitation**

**Southwest, Washington, DC**

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**Submitted by the National Park Service**

**Concept Review**

**May 5, 2016**

**Commission meeting date:** May 5, 2016

**NCPC review authority:** Approval – Federal project in the District of Columbia

**Applicant request:** Approval of Comments on Concept Design

**Delegated / consent / open / executive session:** Open

**NCPC Review Officer:** M. Flis

**NCPC File number:** 7547

**Project summary:**

The National Park Service (Department of the Interior) has submitted plans for the rehabilitation of the Arlington Memorial Bridge for concept review. The bridge was designed by the architectural firm McKim, Mead, and White, and opened in 1932. The bridge's draw span closed to operation in 1961.

The proposed Arlington Memorial Bridge project includes the rehabilitation or replacement of the steel bascule space; repairs to the deteriorated portions of the abutments, piers, and concrete arch approach spans; replacement of the concrete bridge deck; resurfacing of the travel lanes; replacement of the concrete sidewalks and refitting of granite curbs; repairs to granite bridge railings; repairs to lamp posts; repairs to access panels; installation of an improved drainage system; and other minor nonstructural bridge improvements.

The Federal Highway Administration regularly inspects the bridge in accordance with generally recognized structural engineering guidelines and standards. These detailed structural inspections and studies have identified significant amounts of corroded steel and deteriorated concrete. The most critical elements needing repair are the concrete arch approach spans and the steel bascule (drawbridge) span. Therefore, the project is needed to address the ongoing corrosion of steel structural members of the bascule span, deterioration of the concrete on the bridge's approach spans, and deterioration of the sidewalks and wearing surface.





View from Lincoln Memorial



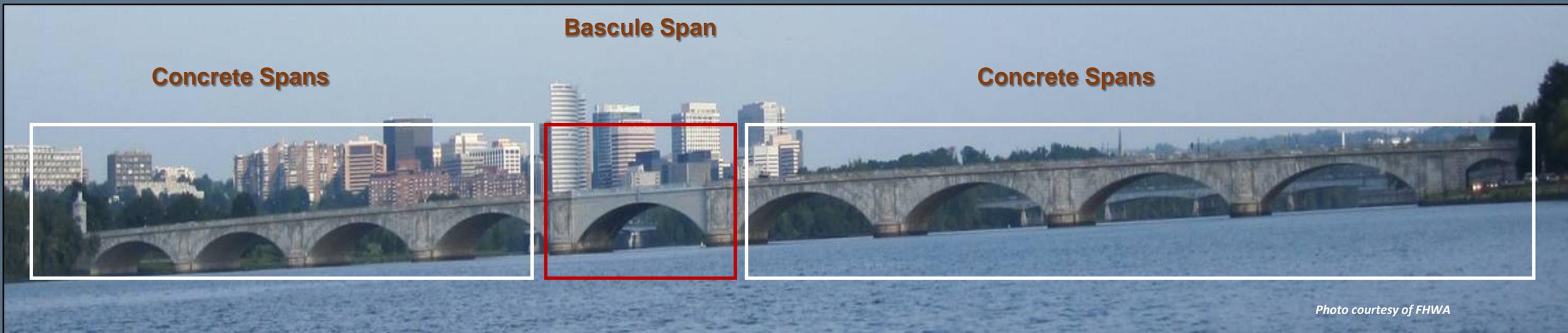
View from Potomac River

## Several important roles:

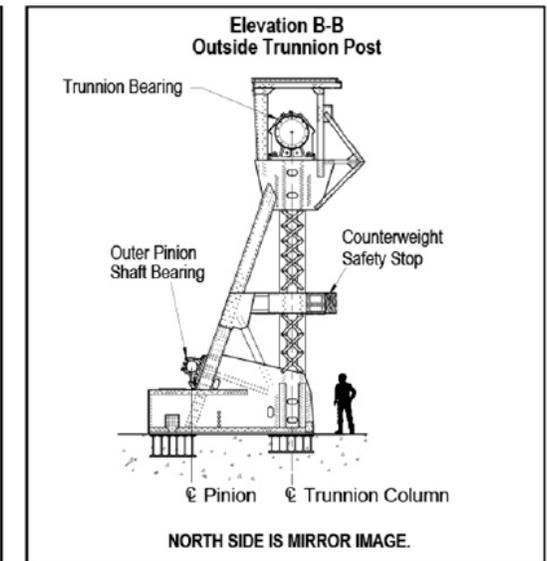
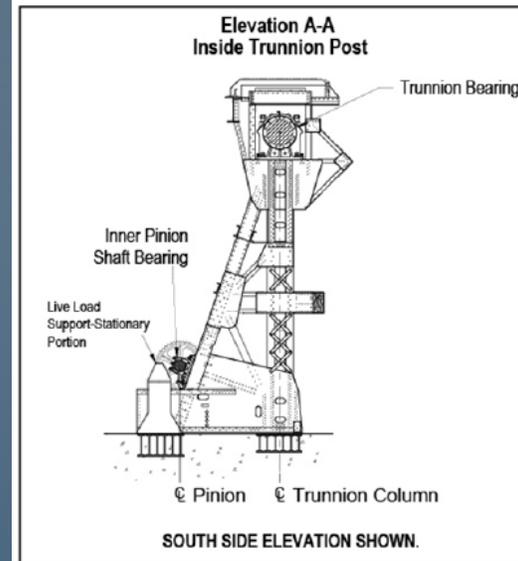
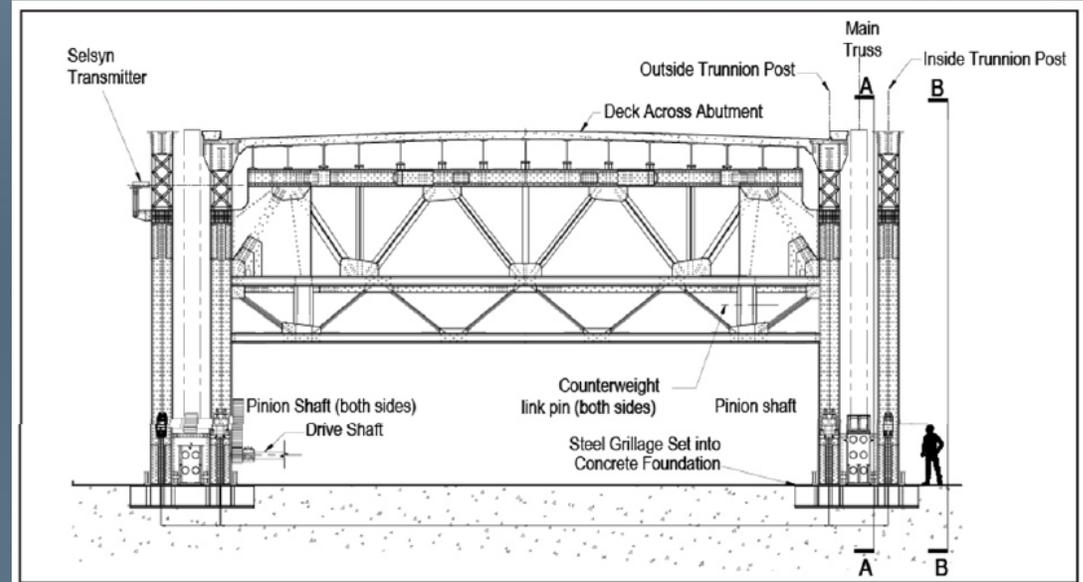
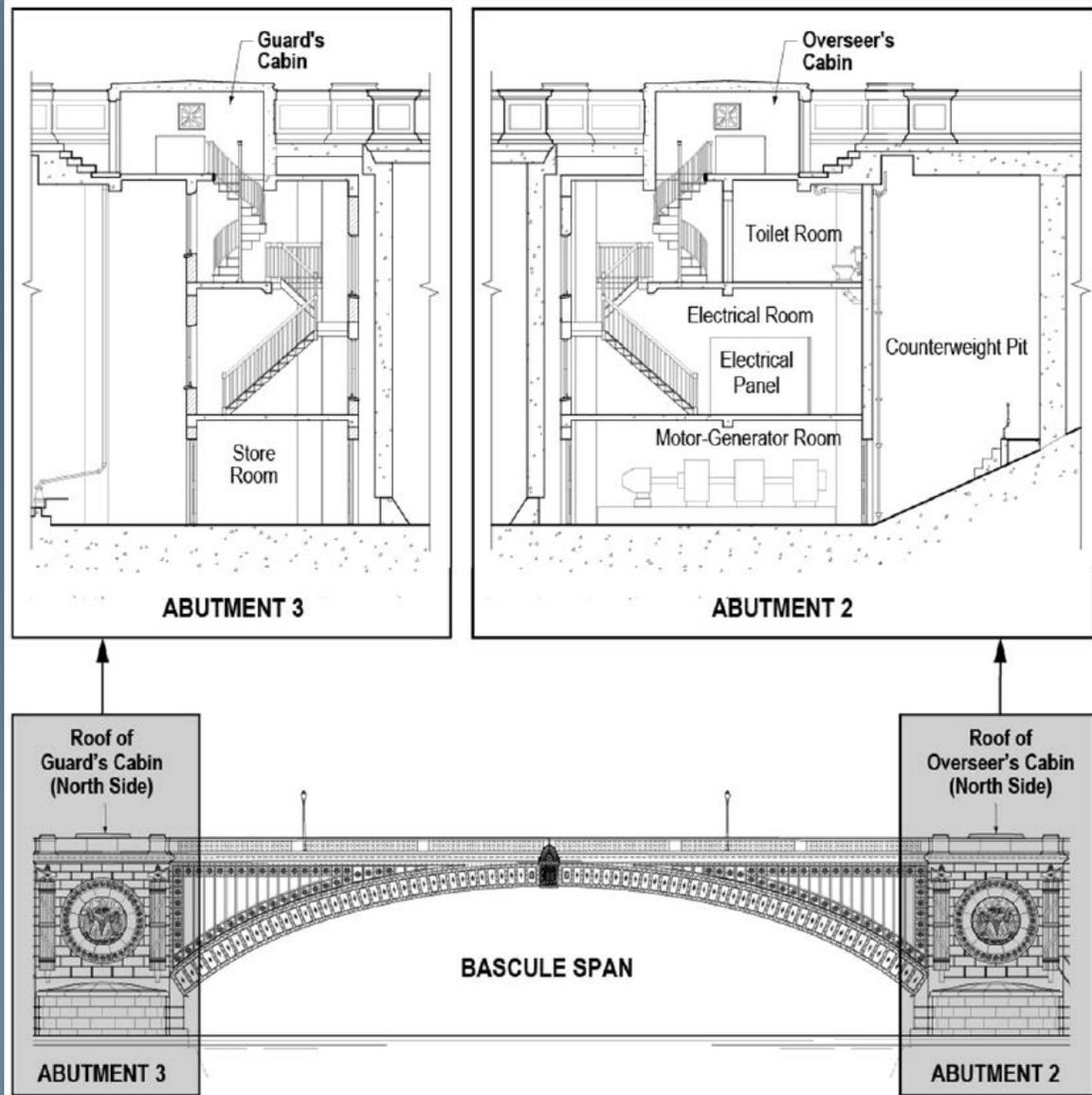
- It serves as a significant vehicle, bicycle, and pedestrian route for commuters, visitors and dignitaries on a daily basis;
- It is part of the National Highway System, carrying more than 68,000 vehicles each day, in addition to thousands of bicyclists and pedestrians; and
- The Memorial Bridge is a vital route identified in the Washington, DC emergency evacuation plan.
- It is one of only five bridges connecting Virginia and the District of Columbia across the Potomac River;
- Symbolic entrance to the Capital and the National Mall; link in series of monuments and civic structures starting with the United States Capitol and extending to Arlington Memorial Cemetery
- Listed on the National Historic Register – example of neoclassical urban design, sculpture, engineering and design



- A bridge in this location was first proposed in the 1830s
- McMillan Commission ultimately developed the Senate Park Commission Plan of 1901 and included a memorial bridge in the location that the Arlington Memorial Bridge was ultimately constructed
- Architects McKim, Mead & White were selected in early 1923
- Bridge completed in 1932
- Symbolically links North and South in its alignment between the Lincoln Memorial and Arlington House, the Robert E. Lee Memorial
- Placed on the National Register of Historic Places in 1980



- Bridge is 2,163 feet long and 94 feet wide;
- Consists of ten reinforced concrete arch approach spans and a double leaf bascule span at the bridge's center. Eight of the 10 approach spans convey the Potomac River under the bridge; and
- Two smaller concrete arches span the GWMP and Ohio Drive, SW at each end of the bridge.





- The bridge has sidewalks on each side measuring 14 feet each
- The roadway and sidewalks are illuminated at night by 40 electric street lamps, four on each river span and two on each roadway span.
- Roadway measures 60 feet from curb to curb, providing six 10-foot-wide vehicle travel lanes
- Carries more than 68,000 vehicles each day



- Repair of Bridge Piers, Foundations, and Bearings
- Repair of Concrete Arch Spans
- Restore and reinstall metal fascia
- Replacement of Bridge Deck and Expansion Joints
- Replacement of Sidewalks and Repair of Curbs
- Repair of Non-Structural Elements such as balustrades
- Stone will be repointed and cleaned; replaced if required





# Alternative 1A – Replace Bascule Span with Concrete Beams



# Alternative 1B – Replace Bascule Span with Variable Depth Girders

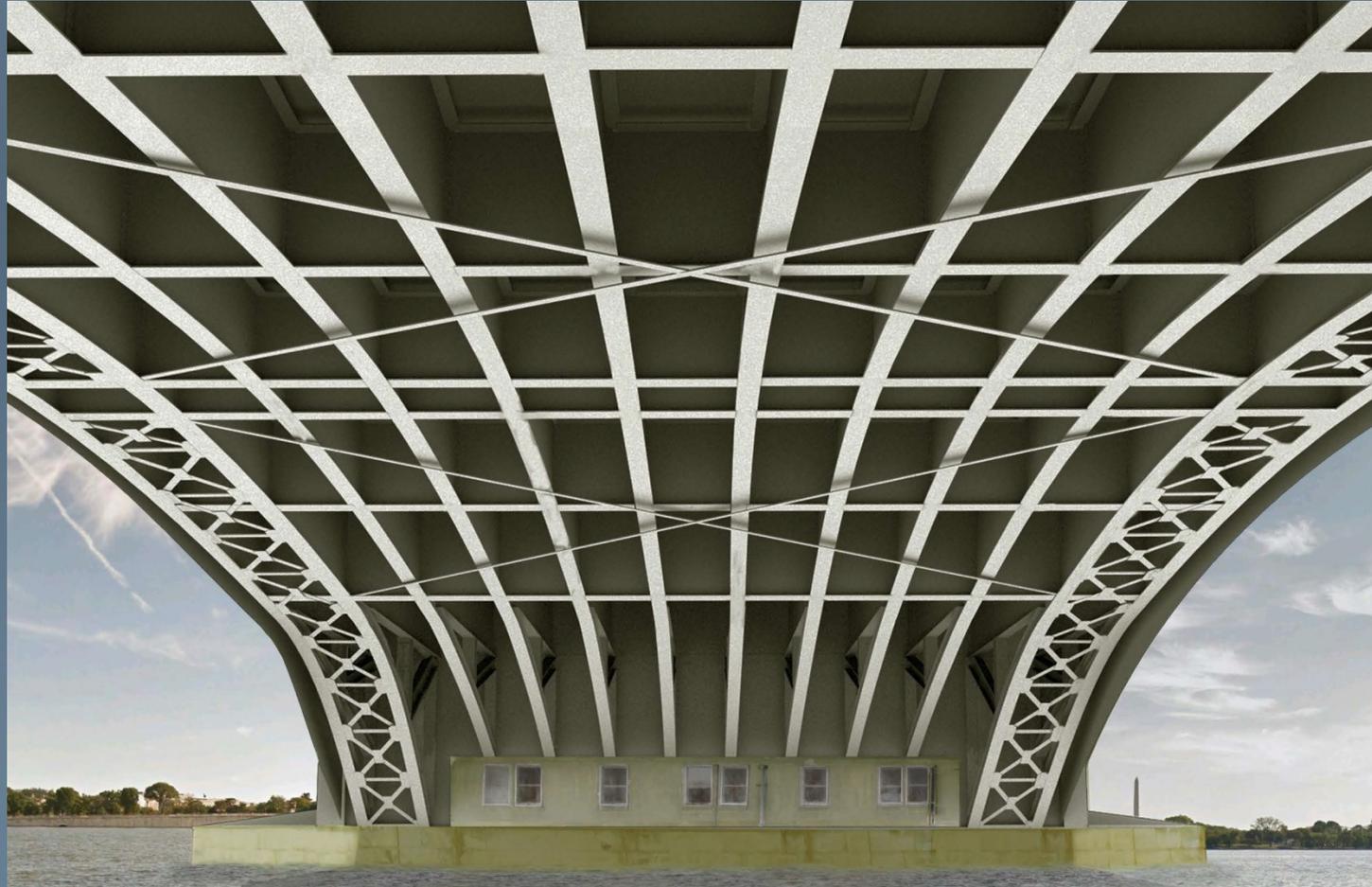


## Alternative 2 – Replace Bascule Span with Fixed Steel Truss



## Alternative 3 – Rehabilitate Existing Bascule Span





- **1A – Replace Bascule Span with Concrete Beams**
  - Substantially different visually; different material
  - Allows for partial or full bridge closures
  
- **1B – Replace Bascule Span with Variable Depth Girders (Preferred)**
  - Some visual similarity to existing bridge
  - Simpler maintenance (fewer elements)
  - Lower construction and maintenance costs than #3
  - Allows for partial or full bridge closures
  - Trunnion posts/counterweight removed
  
- **2 – Replace Bascule Span with Fixed Steel Truss**
  - Visually similar to existing bridge
  - Numerous small elements create same maintenance challenges as current bridge
  - Requires full closure
  
- **3 – Rehabilitate Existing Bascule Span (Previously Preferred)**
  - Would visual recreate existing design
  - Requires full closure
  - Higher construction and maintenance costs than #1B
  - Trunnion post repaired, but full replacement possible

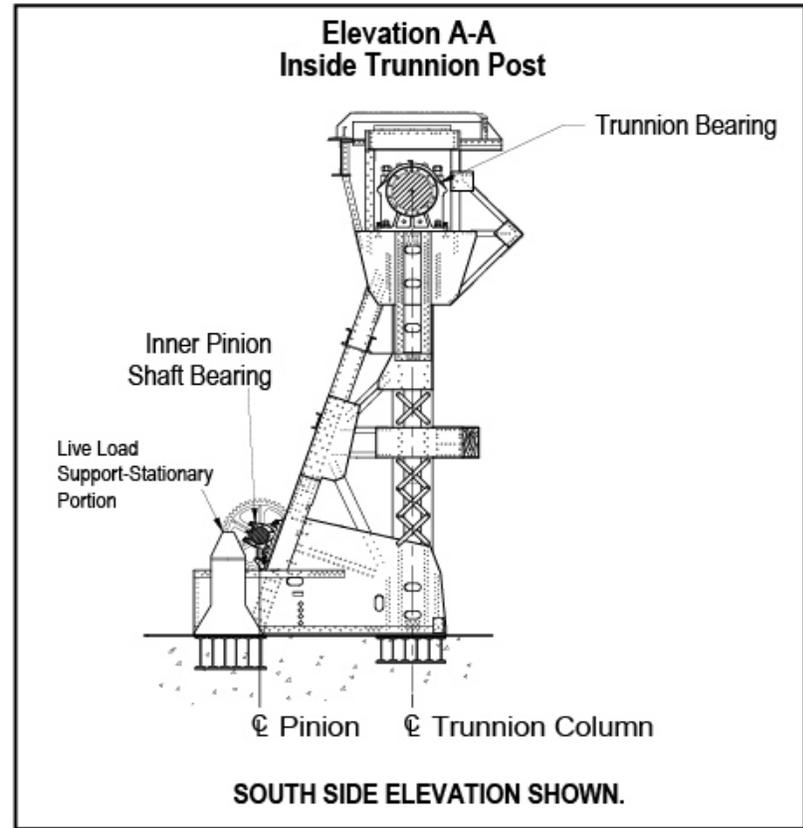
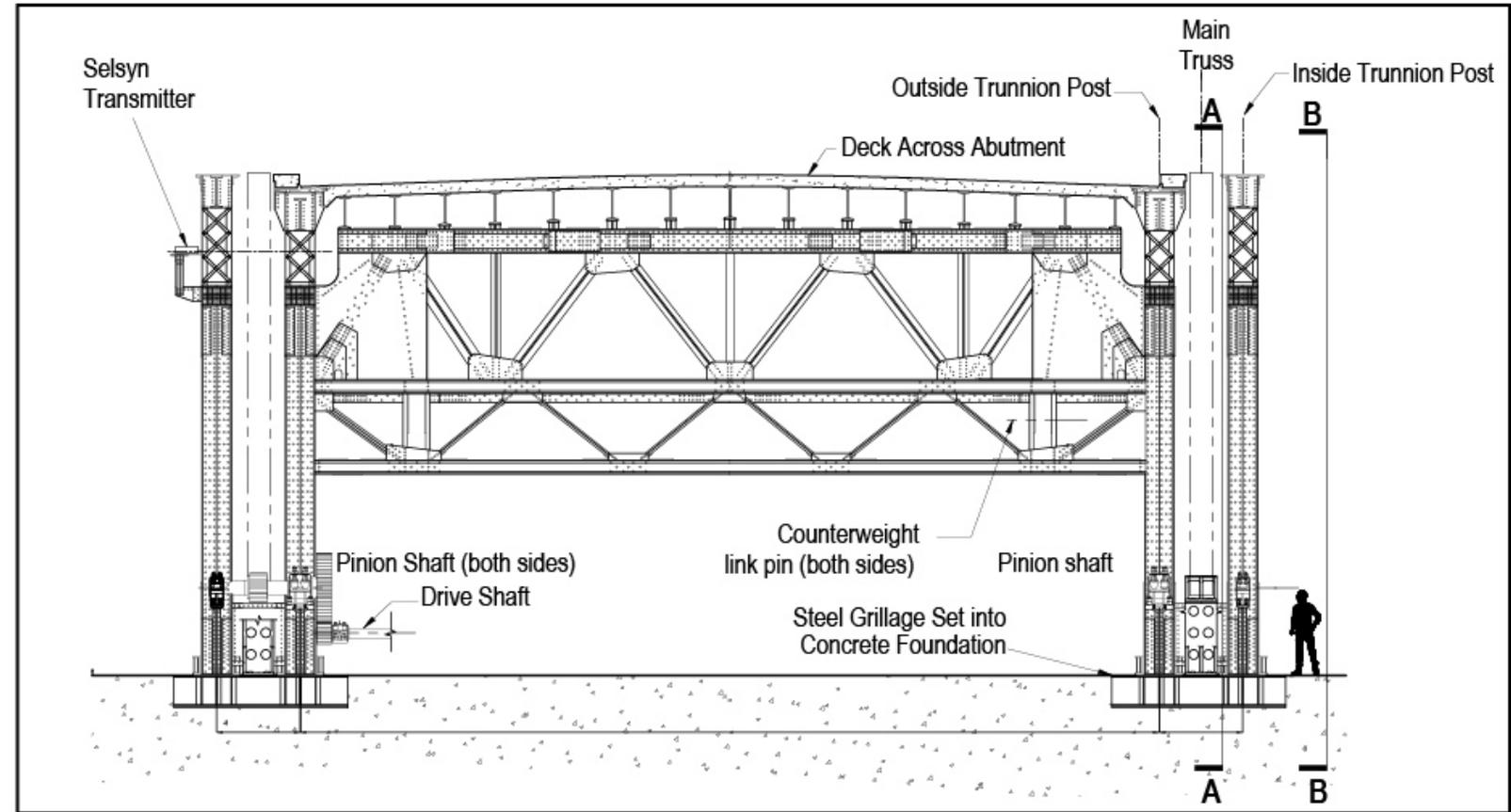
## Character Defining Features Retained in Alternative 1B

Guard and Overseer Cabins, Store Room, Operators Room, Mechanical Room



## Character Defining Features Removed

Steel Trusses, Bascule leaves, Counterweights, Trunnion Posts, Drive Shafts



Source: NPS



Existing Bascule Span



NPS Preferred Alternative