Site Photos - South Capitol Street

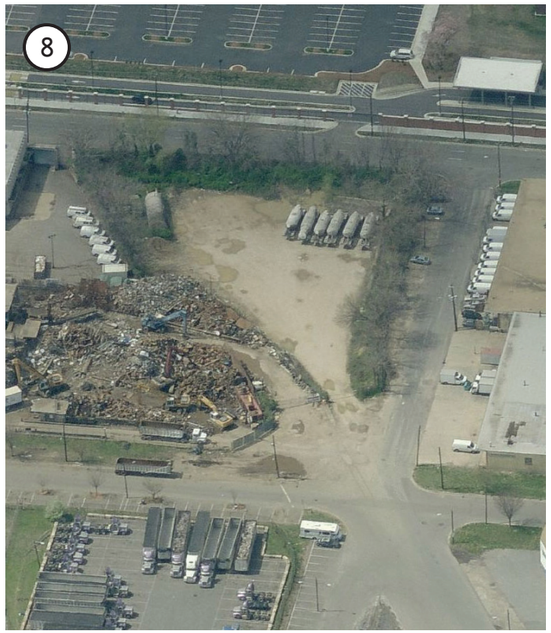


Image 3-9 U.S. Reservation 243

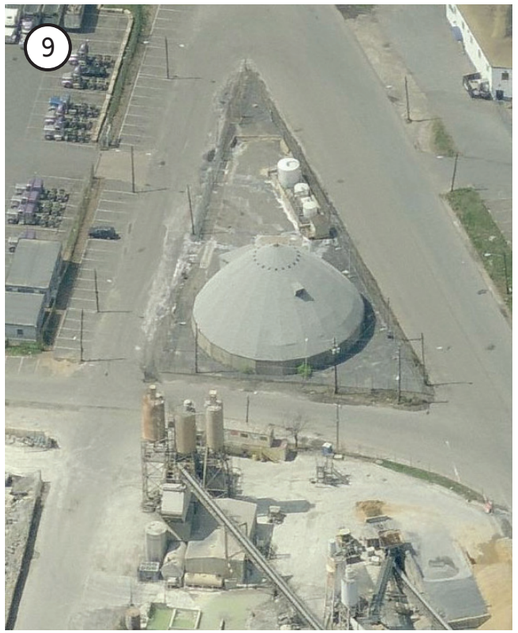


Image 3-10 U.S. Reservation 244

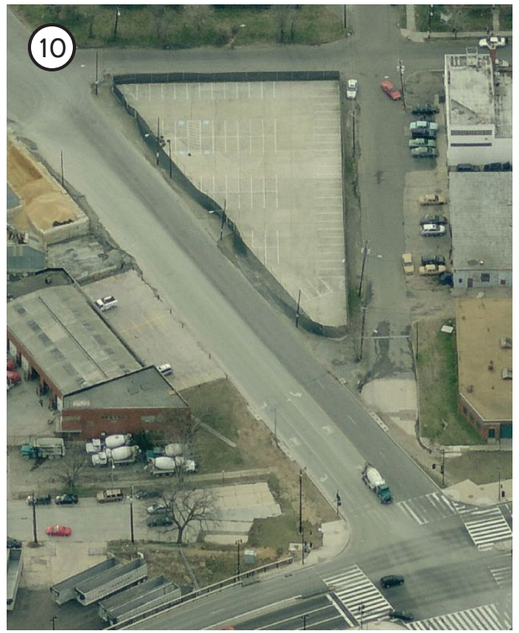


Image 3-11 U.S. Reservation 245

Image 3-12 Q Street looking west

Image 3-13 R Street looking southwest

3.5.4 Site Photos - South Capitol Street - Adjacent Land Use

Image 3-14 Nationals' Stadium and gravel lot (future site of Florida Rock Development)

Image 3-15 U.S. Reservation 245

Image 3-16 U.S. Reservation 245

3.5.5 Site Photos - Frederick Douglass Memorial Bridge

Image 3-17 Existing Frederick Douglass Bridge viewed from Potomac Avenue SE

Image 3-18 Existing Frederick Douglass Memorial Bridge at night

Site Photos - Frederick Douglass Memorial Bridge

Image 3-19 Existing Frederick Douglass Memorial Bridge viewed from South Capitol Street ramp

Image 3-20 Existing Frederick Douglass Memorial Bridge viewed from Anacostia Drive ramp

Site Photos - Frederick Douglass Memorial Bridge

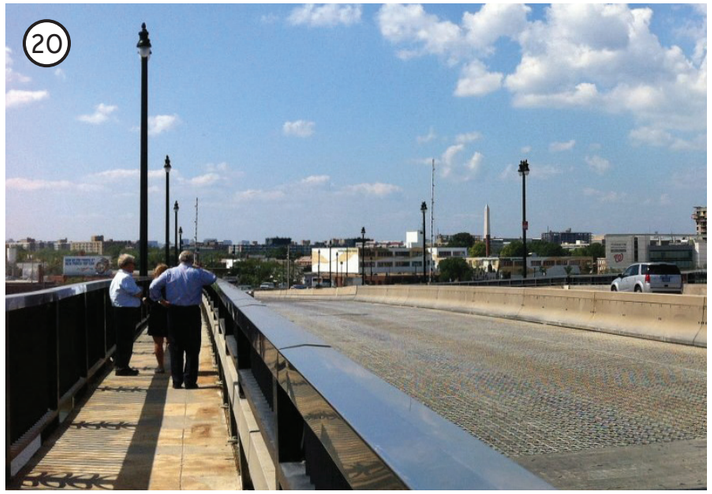
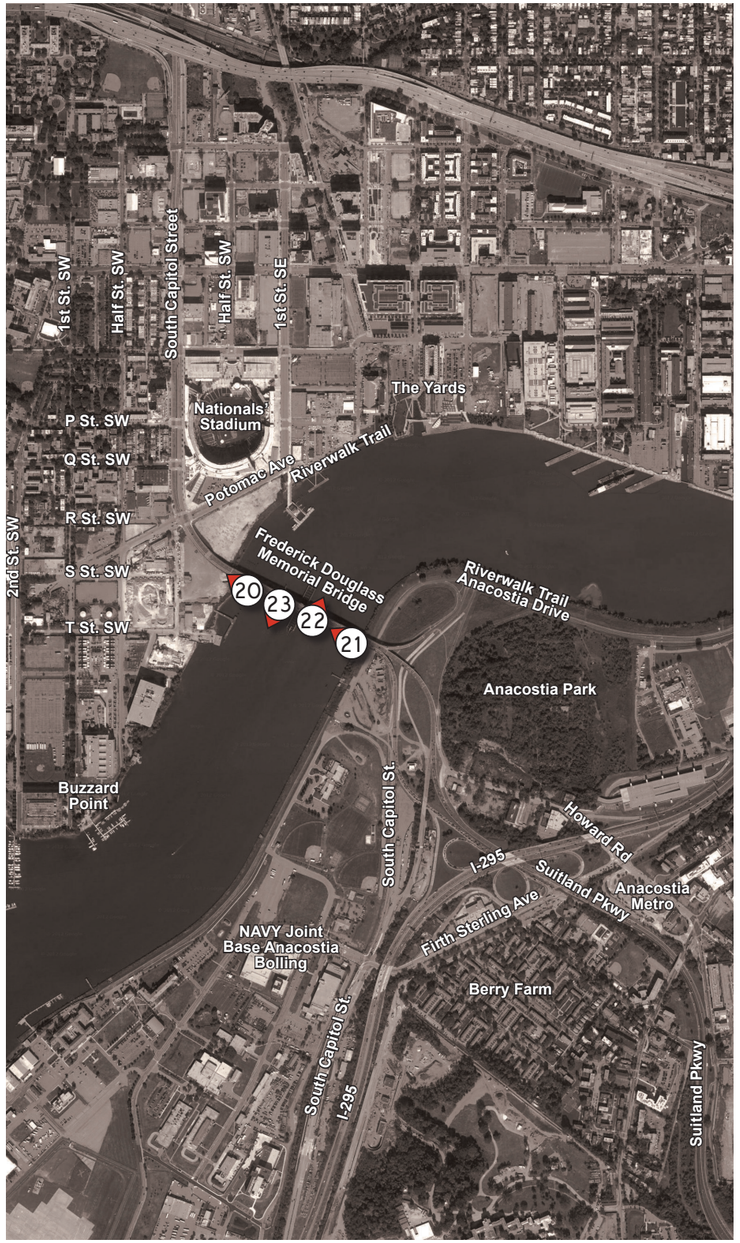


Image 3-21 Existing Frederick Douglass Memorial Bridge sidewalk

Image 3-22 Existing Frederick Douglass Memorial Bridge roadway

Image 3-23 Upstream view of the Anacostia from the Frederick Douglass Memorial Bridge

Image 3-24 Downstream view of the Anacostia from the Frederick Douglass Memorial Bridge



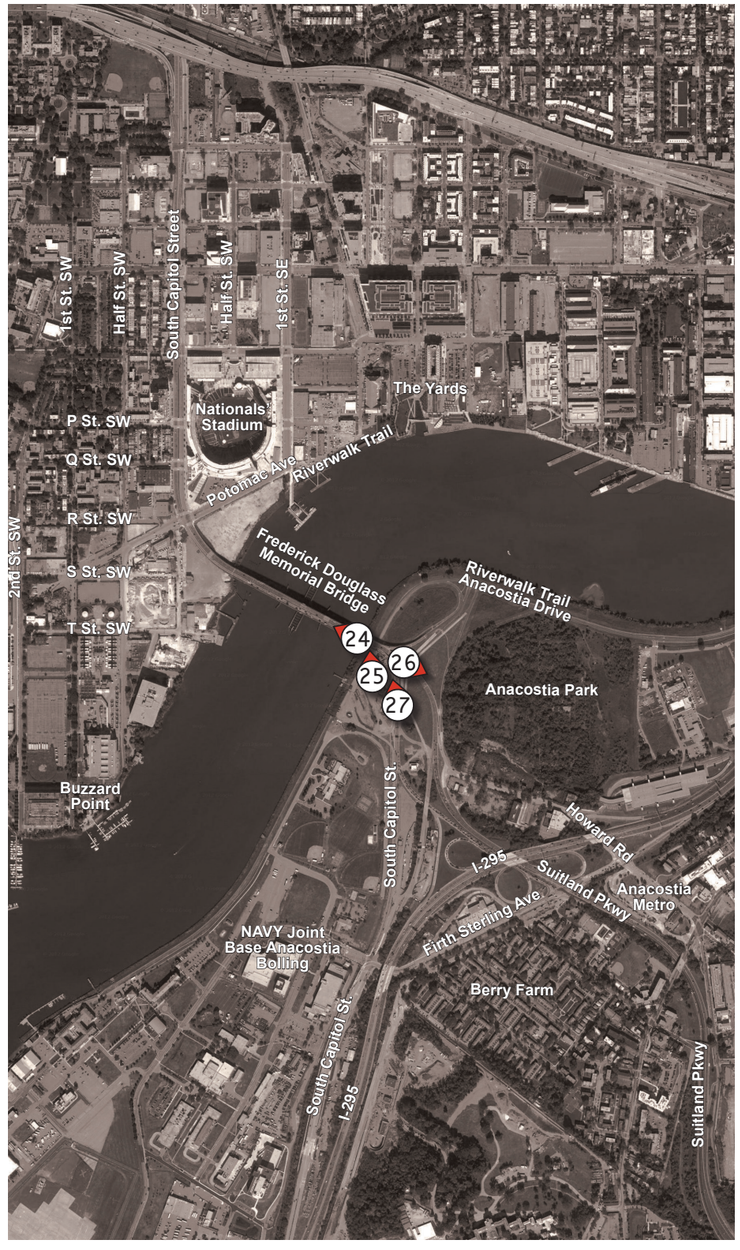
Site Photos - Frederick Douglass Memorial Bridge

Image 3-25 Existing Frederick Douglass Memorial Bridge

Image 3-26 Levee along the south bank of the Anacostia

Image 3-27 Arched stone abutment wall

Image 3-28 Ashlar pattern stone retaining wall on South Capital Street



3.5.6 Site Photos - Anacostia - Adjacent Land Use

Image 3-29 Anacostia Park north of existing Frederick Douglass Memorial Bridge

Image 3-30 Navy JBAB North Entrance

Image 3-31 Navy Fuel Pier

Site Photos - Anacostia - Adjacent Land Use

Image 3-32 Frederick Douglass Memorial Bridge sidewalk

Image 3-33 Existing South Capitol Street trail

Image 3-34 Existing bike signage

Image 3-35 Anacostia Riverwalk trail

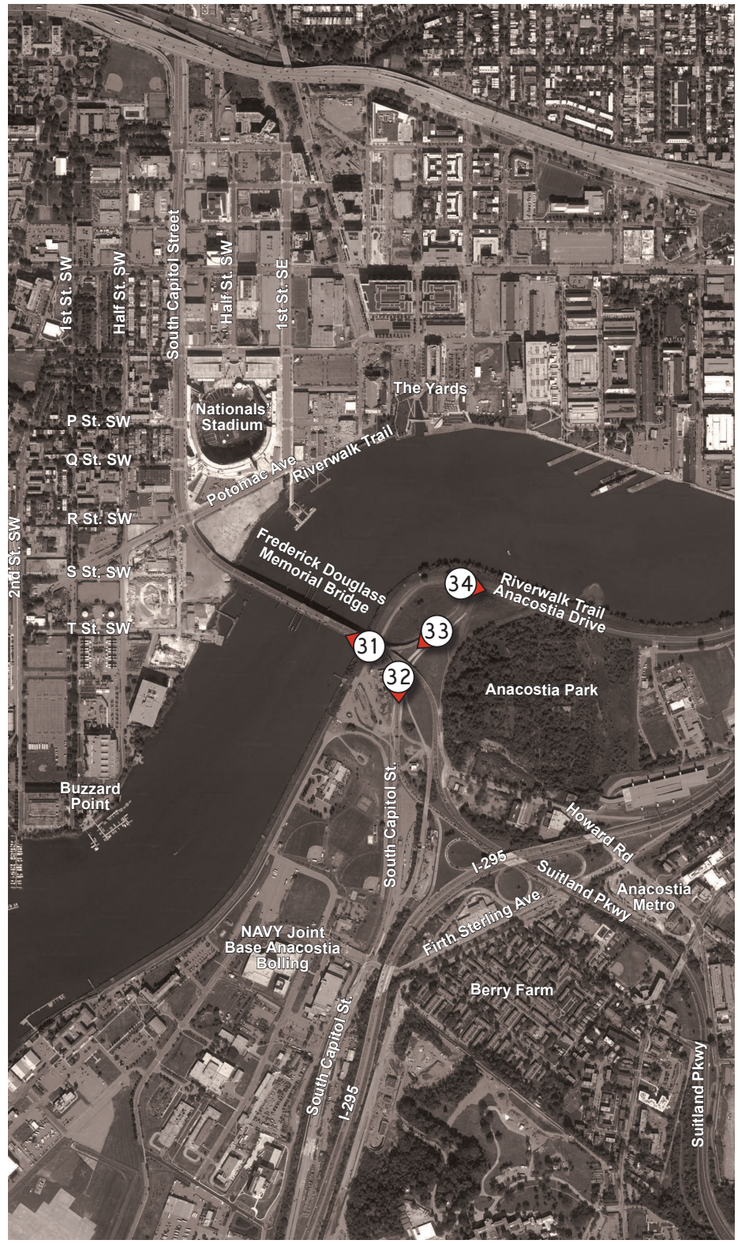


Image 3-35 Anacostia Riverwalk trail

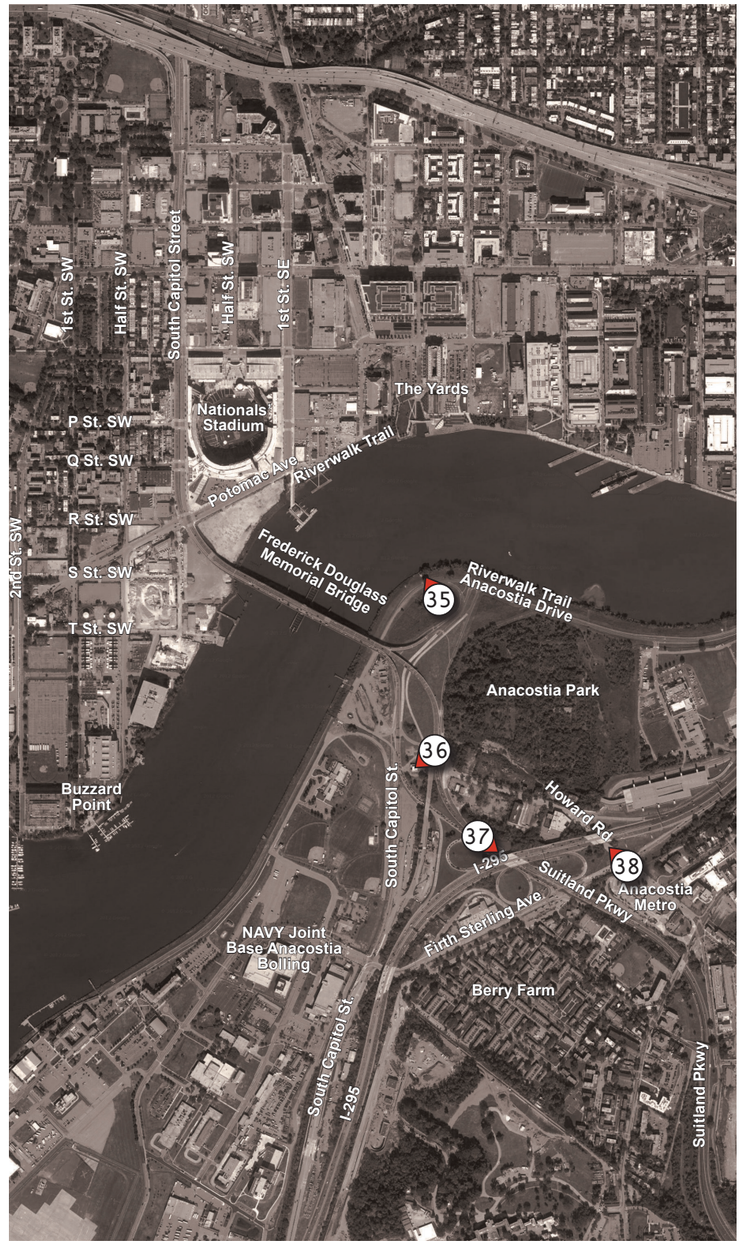
3.5.7 Site Photos - Anacostia/Suitland Parkway - Adjacent Land Use

Image 3-36 Anacostia Pump House

Image 3-37 Poplar Point Pumping Station

Image 3-38 I-295 overpass at Suitland Parkway

Image 3-39 I-295 overpass at Howard Road



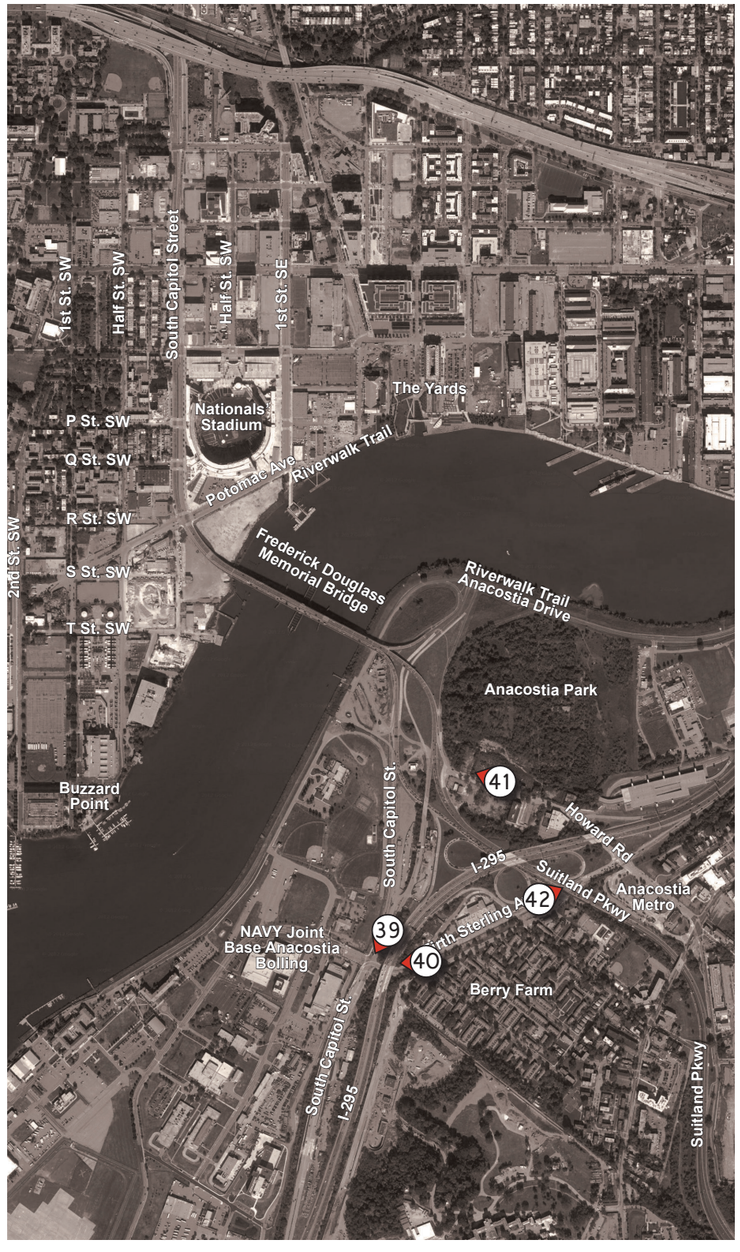
3.5.8 Site Photos - Suitland Parkway - Adjacent Land Uses

Image 3-40 South Capitol Street - Firth Sterling Avenue intersection at JBAB main gate

Image 3-41 I-295 overpass at Firth Sterling Avenue

Image 3-42 Howard Road north of I-295

Image 3-43 Firth Sterling Avenue - Suitland Parkway



3.5.9 Site Photos - Suitland Parkway

Image 3-44 I-295 overpass at Suitland Parkway

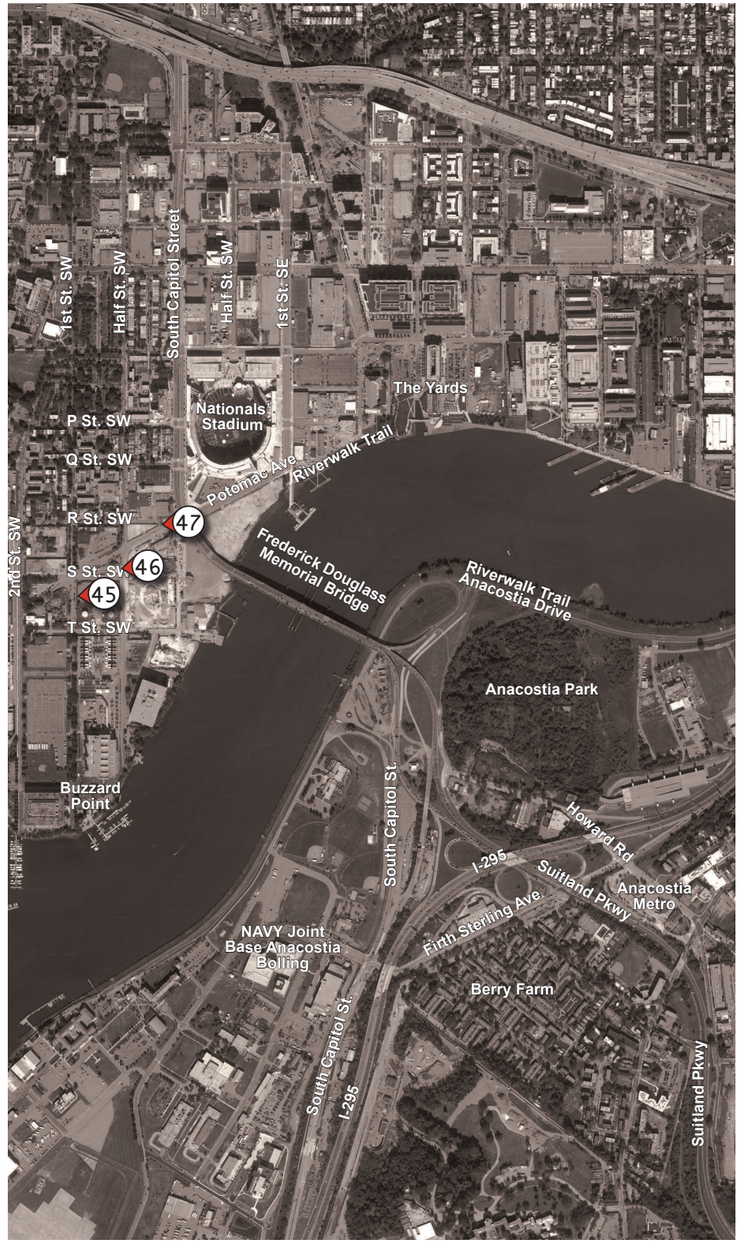
Image 3-45 I-295 overpass at Suitland Parkway

3.5.10 Site Photos - Reservations 243, 244 and 245

Image 3-46 U.S. Reservation 243

Image 3-47 U.S. Reservation 244

Image 3-48 U.S. Reservation 245



3.6 History

3.6.1 DC Planning

L'Enfant Plan 1791 (Figure 2-1)
The plan for Washington, D.C. was designed by the French artist and engineer, Major Pierre Charles L'Enfant. Modeled after the great cities of Europe, L'Enfant's baroque style plan consisted of diagonal avenues radiating symbolically from the Capitol Building (not the President's residence, which would have been the case in Europe), which was placed at the grandest, and highest spot within the designated city limits. The entire plan was designed to symbolize the equality of all citizens. The Mall was intended to be accessible from all points - a "public walk" for the people. Despite his utilization of topography to provide prominence to places of federal importance, a system of avenues was overlaid on an urban grid that essentially ignored the natural topography, thereby emphasizing a hierarchy on a man-made organization strategy over nature. Importantly, L'Enfant envisioned 15 public spaces created by the intersections of the diagonal avenues - one for each of the 15 states that were, at that point, part of the Union.

Although the District of Columbia still adheres closely to L'Enfant's vision, unchecked urbanization has caused divergences from the plan throughout the city's history. Similar to cities across the nation, the necessary infrastructure associated with the railroads caused a significant deviation from the original organizational strategy of the city. While the railway fostered the district's wealth and prosperity, its sprawling development pattern fragmented many parts of the city, most notably the National Mall. By 1901, the Senate recognized the need to redevelop the Mall and commissioned the most notable architects and landscape architects in the united states, including Daniel Burnham and Frederick Law Olmsted, to design an updated plan for Washington, D.C., known as the McMillan Plan.

McMillan Plan 1901 (Figure 2-2)
The members of the McMillan Commission had mostly gained world renown from their work at the 1893 World's Columbian Exhibition in Chicago. The commission was heavily influential in the City Beautiful movement, and this visionary ideology would permeate throughout their plan. Despite the tremendous accomplishments of its members, they immediately recognized the genius and foresight of Pierre L'Enfant, and utilized L'Enfant's plan to frame their own. The commission refined L'Enfant's grand vision, while addressing issues of urbanization unique to the period. In total, the plans called for: re-landscaping the ceremonial core, consisting of the Capitol Grounds and Mall, including new extensions west and south of the Washington Monument; consolidating city railways and alleviating at-grade crossings; clearing "slums"; designing a coordinated municipal office complex in the triangle formed by Pennsylvanian Avenue, 15th Street and the Mall, and establishing a comprehensive recreation and park system that would utilize and preserve the ring of Civil War fortifications around the city.

The longevity of the L'Enfant and McMillan plans has been aided by the Commission of Fine Arts (CFA), which was established in 1910. The CFA continues to act as a consultant on the design of all public buildings, bridges, parks, and other artistic endeavors in the district.

The project Area of Potential Effect (APE) includes portions of the street system that was laid out by L'Enfant in his original plan for the City of Washington. South Capitol Street was one of the principal axes which led directly to the U.S. Capitol. Four of the diagonal avenues that L'Enfant conceptualized run through, or near, the APE. These diagonal streets are Delaware Avenue SW, New Jersey Avenue SE, Potomac Avenue, and Water Street SW. Most of the other north-south numbered and east-west lettered streets were also part of his original organization. All of the aforementioned streets and avenues are cataloged and chronicled in the Draft National Historic Landmark (NHL) nomination titled The Plan of the City of Washington. The Plan of the City of Washington was determined to be significant under Criterion A in the area of community planning and under Criterion C in the area of architecture. The nomination form evaluates the eligibility of each individual corridor in terms of whether it constitutes a contributing element to the NHL. Some of the documented corridors have either been modified too extensively, or do not follow the original intent or plans of either L'Enfant or the McMillan Commission. These corridors are therefore considered to be non-contributing elements. Despite the fact that South Capitol Street *has* been altered, it is considered to be a contributing element for its entire length from Independence Avenue to S Street. Although the full linear integrity of most of the east-west streets within the APE has been severed, the NHL nomination took their separations into account, mentioning that they are "discontinuous" (Draft NHL Nomination, 31). It was determined that these streets were all contributing elements, specifically, Potomac Avenue and all of the alphabetically named east-west corridors between I Street and T Street in both the Southeast and Southwest quadrants of the District of Columbia (Draft NHL Nomination: 31).

Figure 3-6 L'Enfant Plan

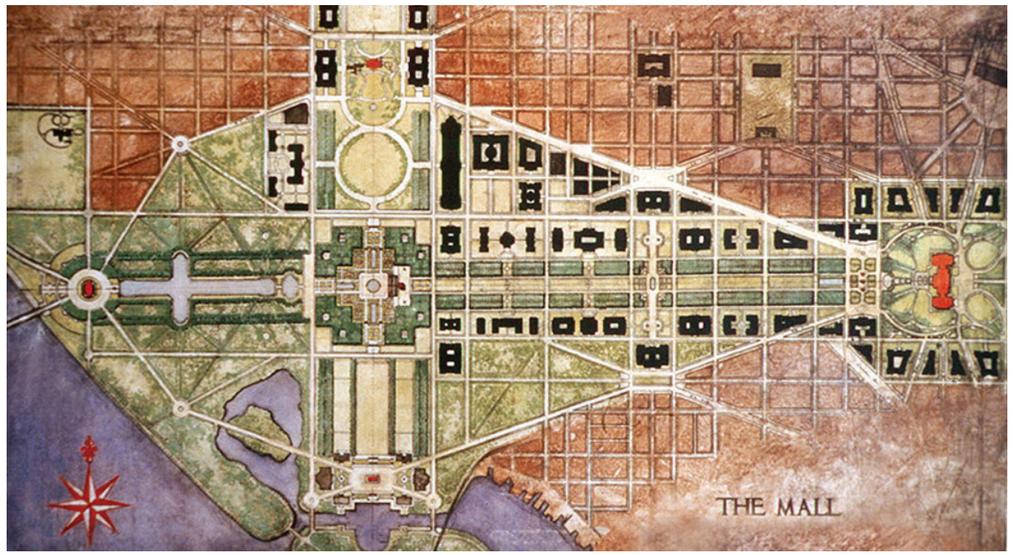


Figure 3-7 McMillan Plan

Extending the Legacy: Planning America's Capital for the 21st Century
Produced by NCPC, the "Legacy" Plan began with the goal of preserving the Monumental Core in Washington D.C. from encroaching development in the form of monuments and museums. The plan quickly evolved into a new vision for the District as a whole, taking jobs, housing and transit systems into account. The result was a comprehensive plan - not only for the Mall, but for all adjacent communities. The plan utilizes the Capitol building as the City's new center, and extends the monumental core to the east and south. Five main themes form the basis for the Legacy Plan:

- Building on the historic L'Enfant and McMillan plans, which are the foundation of modern Washington;
- Unifying the city and the Monumental Core, with the Capitol at the center;
- Using new memorials, museums and other public buildings to stimulate economic development;
- Integrating the Potomac and Anacostia rivers into the city's public life and protecting the Mall and the adjacent historic landscape from future building; and
- Developing a comprehensive, flexible and convenient transportation system that eliminates barriers and improves movement within the city.

Image 3-49 Rendering of South Capitol Street (From "Extending the Legacy: Planning America's Capital for the 21st Century", National Capitol Planning Commission)

3.6.2 Frederick Douglass

Frederick Douglass (born Frederick Augustus Washington Bailey) was born into slavery in Talbot County, Maryland, in approximately 1888. After the death of his owner, he was given to the Auld family, who were located in Baltimore, MD. Sophia Auld, his master's wife, defied the law and taught Douglass how to read. Once discovered, she was banned from providing these lessons to Douglass, however, he continued to pursue his studies on his own. Douglass's desire for knowledge was prodigious, and through his readings he gained a sense of self-confidence and respect that later allowed him to refuse a beating from his last master, who never touched him again.

Douglass attempted to escape slavery twice before finally succeeding with the help of Anna Murray, a free black from Maryland. He landed in New York, where he and Anna were married, and chose the name "Douglass" as their new surname. They settled in New Bedford, Massachusetts, where he met William Lloyd Garrison, an abolitionist, who would become his friend and mentor.

Douglass, with Garrison's encouragement, started giving speeches about his experiences as a slave, and eventually wrote his autobiography. The prominence of these activities made him very visible, and he was forced to depart to Europe in 1845 to evade being recaptured. While in Europe, he continued giving speeches about the institution of American Slavery, and developed a following among sympathetic groups in England and Ireland. Eventually, these groups helped raise the funds to purchase Douglass's freedom, and in 1848 he returned to the United States as a free man. Once home, he became a newspaperman, and produced several abolitionist newspapers: the North Star, Frederick Douglass Weekly, Frederick Douglass' Paper, Douglass' Monthly and New National Era.

Later in life, he became the President of the Freedmen's Savings Bank, served as an ambassador to the Dominican Republic, and was appointed the minister-resident and consul-general to the Republic of Haiti.

In 1872, he was the first African American nominated for U.S. Vice President, on the Equal Rights Party ticket (which was done without his knowledge), with Victoria Woodhull –a woman– as the presidential nominee.

Anna Douglass died in 1882, and in 1884, Douglass married Helen Pitts, a white woman, and avid suffragist. The two remained married until Douglass's death in 1895.

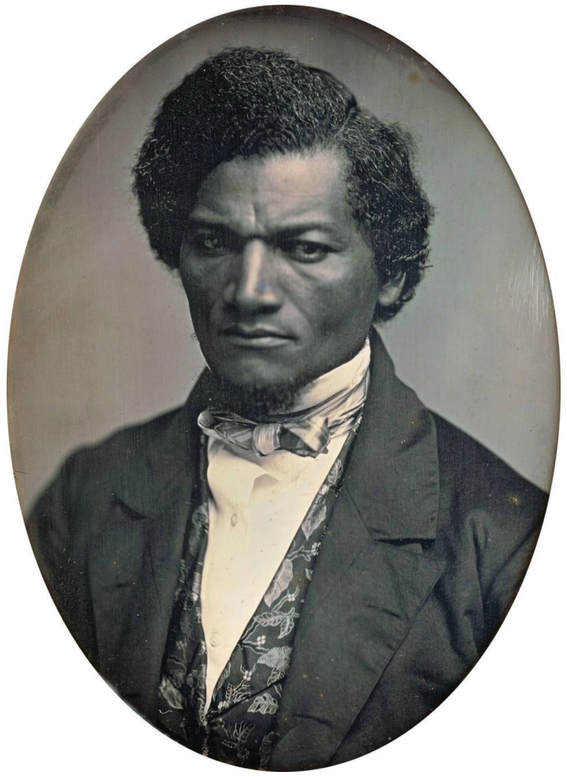


Image 3-50 Frederick Douglass (1852)

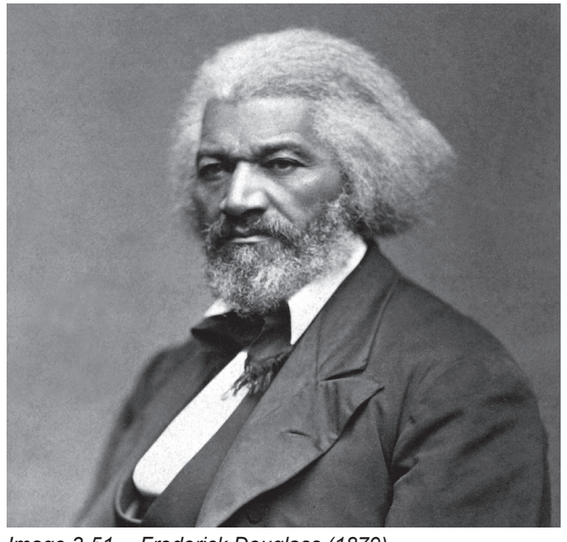


Image 3-51 Frederick Douglass (1879)

Racial Equality

Douglass became a highly sought-after speaker on the topics of emancipation and civil rights. His oratory skills and ability to reason were extremely profound, and his words come across with intense power.

Douglass was not the most radical of those calling for the emancipation and equal treatment of the slaves. Of all of the abolitionists, William Lloyd Garrison's views on slavery and women were considered to be some of the most extreme, and in many ways Garrison's views surpassed Douglass's own. Garrison's belief that the U.S. Constitution was "a covenant with death, an agreement with hell," eventually caused a rift between the two friends, as Douglass did not believe that the document was inherently racist. He believed that "construed *only* in the light of its letter" and "[i]nterpreted as it ought to be interpreted, the Constitution is a glorious liberty document."

In 1862, Douglass conferred with Abraham Lincoln on the status of enlisted black soldiers, and their desire for wages and protections equal to those afforded to white soldiers. He also (perhaps more essentially) spoke to Lincoln about allowing African Americans to have the vote. He left the meeting with the understanding that Lincoln's hesitation to free the slaves was solely about the maintenance of the union–a hesitation that had led several more radical abolitionists to denounce him. True to their conversation, Lincoln's Emancipation Proclamation specifically stated "that such persons of suitable condition, will be received into the armed service of the United States to garrison forts, positions, stations, and other places, and to man vessels of all sorts in said service." However, the proclamation only abolished slavery in states that had seceded from the Union (allowing any slave-holding states that had stayed in the Union to proceed as status quo). Abolitionists reacted with jubilation–but also hesitation, disappointed that he hadn't chosen to emancipate all enslaved people. Douglass's response was: "For my own part, I took the proclamation, first and last, for a little more than it purported, and saw in its spirit a life and power far beyond its letter. Its meaning to me was the entire abolition of slavery, wherever the evil could be reached by the Federal arm, and I saw that its moral power would extend much further. It was, in my estimation, an immense gain to have the war for the Union committed to the extinction of slavery, even from a military necessity. It is not a bad thing to have individuals or nations do right, though they do so from selfish motives."

Frederick Douglass - Quotes on Racial Equality

"The American people have this to learn: that where justice is denied, where poverty is enforced, where ignorance prevails, and where any one class is made to feel that society is an organized conspiracy to oppress, rob, and degrade them, neither person nor property is safe."

"It is said that we are ignorant; admit it. But if we know enough to be hung, we know enough to vote. If the Negro knows enough to pay taxes to support government, he knows enough to vote; taxation and representation should go together. If he knows enough to shoulder a musket and fight for the flag for the government, he knows enough to vote .... What I ask for the Negro is not benevolence, not pity, not sympathy, but simply justice."

"It is not light that we need, but fire; it is not the gentle shower, but thunder. We need the storm, the whirlwind, and the earthquake."

"No man can put a chain about the ankle of his fellow man without at last finding the other end fastened about his own neck."

"What, to the American slave, is your Fourth of July?

I answer: a day that reveals to him, more than all other days in the year, the gross injustice and cruelty to which he is the constant victim. To him, your celebration is a sham; your boasted liberty, an unholy license; your national greatness, swelling vanity; your sounds of rejoicing are empty and heartless; your denunciation of tyrants, brass-fronted impudence; your shouts of liberty and equality, hollow mockery; your prayers and hymns, your sermons and thanksgivings, with all your religious parade and solemnity, are, to Him, mere bombast, fraud, deception, impiety, and hypocrisy–a thin veil to cover up crimes which would disgrace a nation of savages. There is not a nation on the earth guilty of practices more shocking and bloody than are the people of the United States at this very hour."

Gender Equality

In addition to his work towards achieving racial equality, Frederick Douglass also worked towards achieving suffrage, and the rights of women. In 1848, Douglass was the only black, and one of the few male attendees of the first Woman's Rights Convention at Seneca Falls. He saw a direct connection between the two causes - both were struggles for a group of people to achieve equal rights, and the ability to govern over his or her own person. At the Convention, it was Douglass's speech that convinced some of the hesitant attendees to vote for Elizabeth Cady Stanton's resolution demanding women's suffrage, and sign the "Declaration of Sentiments," a document fashioned after the Declaration of Independence.

The Fourteenth and particularly the Fifteenth Amendments to the US Constitution caused a rift between Douglass and the suffragist movement. Douglass and other abolitionists saw the 15th Amendment as "the Negro's Hour," and campaigned for its ratification. However, the inclusion of the word "male" in the Fourteenth Amendment, which guaranteed citizenship and equal protection under the laws, and then the exclusion of "gender" or "sex" under the 15th amendment, which granted citizens the right to vote and prohibited the denial of voting privileges due to certain characteristics (race, color and previous condition of servitude), meant that women were left behind, and the struggle for women's suffrage would have to continue.

The evolution of Douglass's thinking later in life placed even greater importance on women's rights than his efforts to end slavery. In 1888 in an address to the New England Woman Suffrage Association, he stated: "My special mission… was the emancipation and enfranchisement of the negro. Mine was a great cause. Yours is a much greater cause, since it comprehends the liberation and elevation of one half of the whole human family."

Frederick Douglass - Quotes on Gender Equality

"When I ran away from slavery, it was for myself; when I advocated emancipation, it was for my people; but when I stood up for the rights of women, self was out of the question, and I found a little nobility in the act."

"[T]his woman suffrage movement is but a continuance of the old anti-slavery movement…. The fundamental proposition of the woman suffrage movement is scarcely less simple than that of the anti-slavery movement. It assumes that woman is herself. That she belongs to herself."

"[A] woman should have every honorable motive to exertion which is enjoyed by man, to the full extent of her capacities and endowments. The case is too plain for argument. Nature has given woman the same powers, and subjected her to the same earth, breathes the same air, subsists on the same food, physical, moral, mental and spiritual. She has, therefore, an equal right with man, in all efforts to obtain and maintain a perfect existence."

"In respect to political rights, we hold woman to be justly entitled to all we claim for man. We go farther, and express our conviction that all political rights which it is expedient for man to exercise, it is equally so for women. All that distinguishes man as an intelligent and accountable being, is equally true of woman; and if that government is only just which governs by the free consent of the governed, there can be no reason in the world for denying to woman the exercise of the elective franchise, or a hand in making and administering the laws of the land. Our doctrine is, that "Right is of no sex."

"When a great truth once gets abroad in the world, no power on earth can imprison it, or prescribe its limits, or suppress it. It is bound to go on till it becomes the thought of the world. Such a truth is woman's right to equal liberty with man. She was born with it. It was hers before she comprehended it. It is inscribed upon all the powers and faculties of her soul, and no custom, law or usage can ever destroy it. Now that it has got fairly fixed in the minds of the few, it is bound to become fixed in the minds of the many, and be supported at last by a great cloud of witnesses, which no man can number and no power can withstand."

Local History

Frederick Douglass moved to Washington, D.C. in 1872, after his house in Rochester NY burned. In 1877, he purchased a property just south of the Anacostia River, and he and Anna named it Cedar Hill (Image 3-52). During this time, aside from his international appointments and national speeches and activities, Douglas served as the U.S. Marshall for the District of Columbia, the District's Registrar of Deeds, and as a Trustee for Howard University.

Image 3-52 Cedar Hill, located in Anacostia,Washington, D.C.

Image 3-52

3.6.3 Pump Houses

There are two pump houses located within the project limits that are owned and operated by D.C. Water and Sewer Authority (WASA).

The first is a small brick building located on the south bank of the Anacostia River (Image 3-53) that serves as an ancillary station to the larger O Street Pumping Facility. As a roofed, but open-air pavilion, it's main purpose was to provide shelter for the control wheels for the pump valves. Built between 1903 and 1908, both buildings are faced with brick with ornate stone decoration.

The second of these pump houses, Poplar Point Pumping Station (Image 3-54) is located in a narrow strip of land between the northbound and southbound lanes of Suitland Parkway. Poplar Point Pump Station is a two-story, flat-roofed structure constructed circa 1915 of concrete and pebbled-stucco in the Art Deco style. It was found eligible for the NRHP in 2006 as part of a Multiple Resource Area along with the O Street Station and the Anacostia Shoreline Pump Station. It is eligible for the NRHP for its distinctive architecture and engineering. Its historic boundary is the building footprint plus a 20-foot buffer.

Image 3-53 Anacostia Pump House

Image 3-54 Poplar Point Pumping Station

3.6.4 Suitland Parkway

Suitland Parkway (Image 3-55) was placed on the National Register of Historic Places (NRHP) in 1995. Its landscape style is similar to the "Emerald Necklace" and the "Franklin Park Zoo" entry in Boston. The parkway was designed by the Public Road Administration and the NPS. The designers were T.C. Jeffers (architect), Jay Downer (engineer), and Gilmore D. Clarke (landscape architect).

Suitland Parkway extends from the east end of the Frederick Douglass Memorial Bridge on the Anacostia River to the northern entrance of Andrews Air Force Base (AFB) in Maryland. The parkway links Andrews AFB (the primary arrival point for the President, U.S. government officials, and visiting foreign dignitaries) directly to the U.S. Capitol, White House, and other federal office buildings, via the South Capitol Street corridor. According to the 1984 NRHP nomination, the parkway consists of 9.18 miles of road, with 2.8 miles of this total within the bounds of the District of Columbia, and the remaining 6.38 miles within the State of Maryland.

The most notable part of the project is the integration of the roadway with the undulating terrain and naturalistic plantings. The large median between the divided highway was planted with a mixture of large shade trees and small flowering trees. All of the structures built along the roadway were finished in stone including bridges, and low walls.

The parkway corridor encompasses 587.79 acres within the boundaries of its right-of-way. It generally follows an east/southeast alignment and passes through Suitland, Maryland, hence the parkway's name. Suitland Parkway within the District of Columbia is under the jurisdiction of DDOT. The NCPC transferred the jurisdiction of the roadway "for parkway purposes" in December 1972 from the NPS to the District of Columbia. Suitland Parkway was listed in the NRHP in June 1995 as part of the "Parkways of the National Capitol Region Multiple Property submission (1913–1965)."

Its period of significance is 1942–1944, marking the commencement of property acquisition through the completion of construction and opening for service of the entire length of the parkway. It is categorized as a district with 38 culverts (most of them stone-lined), 39 drop inlets, seven stone-faced and stone-trimmed bridges (including the Martin Luther King, Jr. Bridge), and the parkway road all being contributing elements. The two circa 1963 I-295 bridges are considered non-contributing elements.

Suitland Parkway was determined eligible for its significance for transportation and landscape architecture. Since Suitland Parkway's listing in the NRHP, some alterations have occurred to the parkway, but it still maintains its integrity. The historic boundary for Suitland Parkway begins approximately 1,300 feet east of the Anacostia River, is centered on the parkway road, and extends for a width of approximately 1,200 feet. It does not include the Frederick Douglass Memorial Bridge or its approaches.

Image 3-55 Suitland Parkway

Image 3-56 Martin Luther King Jr. Overpass Over Suitland Parkway

3.6.5 Frederick Douglass Memorial Bridge

The existing Frederick Douglass Memorial Bridge was built in 1949 and was the first bridge to span the Anacostia River at this location in Southeast DC. The main river bridge is 1,305'-6" in length and consists of a three span continuous unit on the west side, a symmetrical swing span over the navigational channel, and a three span continuous unit on the east side. The current flanking spans and swing span are non-redundant structures; each cross section consists of two main girders. The existing bridge is also considered fracture critical.

The bridge has been rehabilitated over recent years as an interim solution to address the immediate structural deficiencies. In 2007, DDOT completed two construction projects within the project area: the Frederick Douglass Memorial Bridge Rehabilitation and the South Capitol Street Near-Term Improvements. The 2007 Frederick Douglass Memorial Bridge Rehabilitation project included structural repairs, deck repairs, new joint assemblies, a new drainage system, painting, and new light fixtures. The project also included removal of several spans of the existing bridge structure, lowering of a portion of the existing structure, construction of a mechanically stabilized earth-retaining wall starting at Potomac Avenue, and reconstruction of South Capitol Street as an at-grade roadway from Potomac Avenue to N Street.

Additional structural repairs to the bridge were made in 2010. The South Capitol Street Near-Term Improvements project included reconstruction of 1st Street SE (from I Street SE to Potomac Avenue SE), Potomac Avenue (from 1st Street SE to Half Street SE), N Street SE (from 1st Street SE to South Capitol Street), and I Street SE (from New Jersey Avenue SE to South Capitol Street). The reconstruction and street widening included streetscape, streetlight, and traffic signal improvements. In addition, this project included construction of several minor pedestrian improvements, such as crosswalk striping and ramp installations in compliance with the Americans with Disabilities Act requirements, throughout Wards 6 and 8. The South Capitol Street Near-Term Improvements project was completed in 2008.

However, replacement of the bridge is necessary to address long-term structural needs and safety issues. According to the latest DDOT Bridge Inspection Report (2012), the bridge is currently in need of additional repairs and has a Sufficiency Rating of 45.2%. The bridge has been posted to restrict truck traffic to the center lane of the westbound

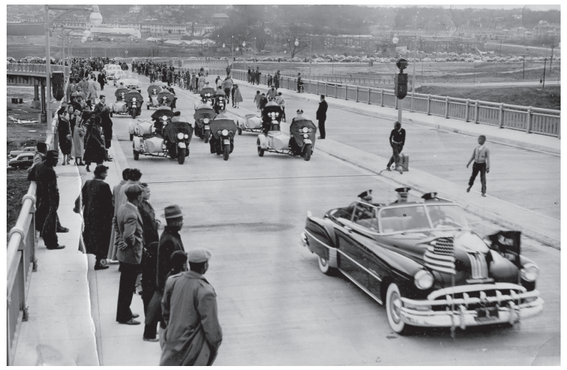


Image 3-57 Procession Marking The Opening Of The Frederick Douglass Memorial Bridge, Ca. 1950

Image 3-58 Steel Corrosion On The Existing Frederick Douglass Memorial Bridge

Image 3-59 Sidewalk Spall With Exposed Reinforcing Steel

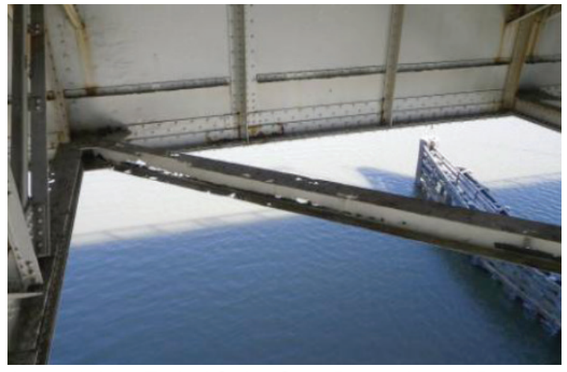


Image 3-60 Typical Swing Span Bottom Lateral Brace With Severe Deterioration

Image 3-61 East Sidewalk Joint At Pier J

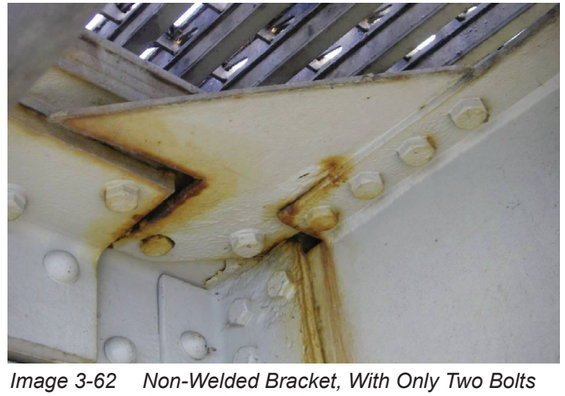


Image 3-62 Non-Welded Bracket, With Only Two Bolts Connecting The Tie Plate

Image 3-63 West Sidewalk Joint At Pier F

roadway and to the left lane of the eastbound roadway. However, trucks that merge onto the bridge from the southeast must travel in the right lane for an extended distance until they can safely merge to the center lane. Severe deterioration of the swing span bottom laterals, as shown in Image 3-59, is of particular concern when the bridge is opening to allow a vessel to pass due to the reduced lateral support to the compression flanges of the main beams.

In addition to the existing bridge's structural issues, it is primarily a vehicular crossing. The existing narrow sidewalks and missing connections on either side of the river discourage pedestrians and bicyclists from utilizing the facilities. More importantly, its utilitarian freeway design inhibits its participation in the urban planning improvements on both sides of the river that are part of the overall South Capitol Street Project goals.

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4.0 Analysis

Given the prominence of this project, it is important the designs that are implemented help contribute to, and reinforce the geometry of the District as a whole. It is also important that the proposed strategies be contributing factors in the rebirth of this corridor. To this end, it is important to understand how similar spaces have functioned within the District, and which factors have contributed to successful bridges and roundabouts in other locations as well. An exploration of other similar bridges and roundabouts generated some general rules for this design effort.

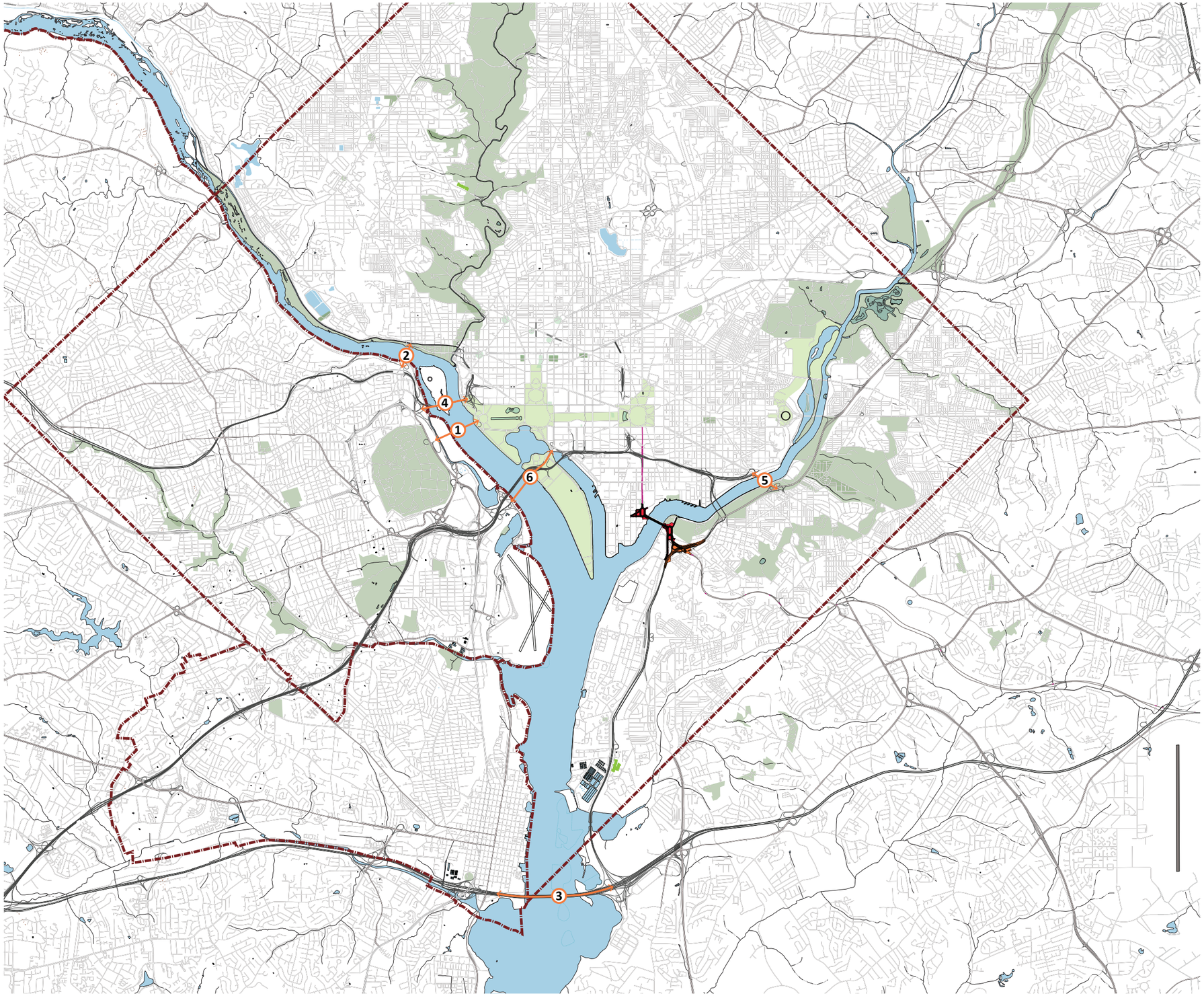
4.1 Bridge Precedents

The visually memorable Washington bridges have two things in common:

- A sense of classical repose based on careful proportioning of the spans, girders and piers and an overall symmetry in their sites.
- An arched line, achieved either because they are actual arches or through the use of haunched girders. The deeper the haunch the more effective visually this line is.

It is also clear that views through the bridge are much affected by the spacing of the piers and their size. The more attractive of the bridges have longer spaces between the piers and relatively slender pier shapes.

Finally, the more memorable bridges have thoughtfully designed details for decorative features on the bridge, railings and light poles, with careful attention paid to spacing and coordination of the various elements.



LEGEND

- Precedent Bridges
  1. Arlington Memorial Bridge
  2. Francis Scott Key Bridge
  3. Woodrow Wilson Bridge
  4. Theodore Roosevelt Bridge
  5. John Phillips Sousa Bridge
  6. WMATA and Amtrak Bridge
- Washington D.C. City Limits
- Project Area
- Segment 1
- Segment 2

N

0 500 1000 2000 Feet

Figure 4-1 Vicinity Location Plan

Figure 4-1 Vicinity Location Plan

4.1.1 Arlington Memorial Bridge - Washington, D.C.

Length	**2,000’**
Lanes	**6**
Ped/Bike Facilities	**Shared-Use**
Details	

- Historic bridge with green spaces at both ends
- Arlington Cemetery on the west bank and Lincoln Memorial on the east bank
- Minimal ped/bike usage due to heavy vehicular traffic and low connectivity

Image 4-1 Birds’ Eye of Arlington Memorial Bridge

Image 4-2 Aerial of Arlington Memorial Bridge

Image 4-3 View Across Bridge Toward Arlington Memorial Cemetery

Image 4-4 Bridge Arches

4.1.2 Francis Scott Key Bridge - Washington, D.C.

Length	**1,800'**
Lanes	**6**
Ped/Bike Facilities	**Shared-Use**

Details

- Washington's oldest surviving bridge across the Potomac River
- Neo-Classical design mimics roman aqueducts
- Historically, it was a multimodal bridge. Trolley lines removed in 1955.
- Pedestrian and bike facilities are relatively narrow

Image 4-5 Francais Scott Key Bridge

Image 4-6 Francais Scott Key Bridge Arches

4.1.3 Woodrow Wilson Bridge - Maryland and Virginia

Length	**5,900’**
Lanes	**12**
Ped/Bike Facilities	**Upstream Side**
Details	

- Interstate drawbridge carries I-95 and I-495
- Features dramatic cantilevered piers
- Includes 2 HOV lanes
- Owned Jointly by Maryland and Virginia

Image 4-7 Woodrow Wilson Bridge

Image 4-8 View from Beneath Woodrow Wilson Bridge

Image 4-9 Woodrow Wilson Bridge Pier Profile

4.1.4 Theodore Roosevelt Bridge - Washington, D.C.

Length	**3,200’**
Lanes	**6**
Ped/Bike Facilities	**Shared Use Path**

Details

- Steel and stone construction resembles the existing Frederick Douglass Memorial Bridge
- Very narrow pedestrian/bicycle facilities
- Washington DC’s most criticized Potomac River crossing as a result of its original planning and aesthetic quality

Image 4-10 Theodore Roosevelt Bridge

4.1.5 John Philips Sousa Bridge - Washington, D.C.

Length	**1,400’**
Lanes	**6**
Ped/Bike Facilities	**Shared-Use**
Details	

- Steel and stone construction resembles the existing Frederick Douglass Memorial Bridge
- Very narrow pedestrian/bicycle facilities

Image 4-11 John Philip Sousa Bridge Arch

Image 4-12 John Philip Sousa Bridge Piers

Image 4-13 John Philip Sousa Bridge

4.1.6 WMATA and Amtrak Bridges - Washington, D.C.

Length	**1,400’**
Lanes	**2-Way Rail on Both Bridges**
Ped/Bike Facilities	**None**

Details

- Utilitarian bridges that lack significant aesthetic appeal
- Accommodate trains and light rail (METRO)

Image 4-14 WMATA Bridge

Image 4-15 Amtrak Bridge

4.2 Bridge Options

4.2.1 Initial Bridge Alternates

The Bridge Alignment Study, completed in 2007, provided preliminary guidance on the orientation of the proposed Frederick Douglass Memorial Bridge. This study was completed as a complementary document to the Draft Environmental Impact Statement (EIS). The study presented four different bridge ideas to the public

Alternate 1: Cable Stayed Swing Bridge

Alternate 2: Stayed Bascule Bridge?

Alternate 3: Arched Bascule Bridge

Alternate 4: Retractile Bridge

The study used an evaluation matrix to assess each prospective bridge on a scale from 1-10. The criteria considered were the following:

- Context
- Anacostia Waterfront Initiative Vision
- User Experience
- Initial Cost/Constructibility
- Operational Reliability
- Maintenance/Life Cycle Costs
- Roadway Geometry

A Washington Post public poll of the four bridge alternates recommended the Cable Stayed Swing bridge and the Arched Bascule bridge being the preferred options. The Cable Stayed Swing Bridge received the highest rating (6.6) followed by the Arched Bascule Bridge (6.25). Ultimately, despite the slight edge of the Cable Stayed Swing Bridge, the Arched Bascule Bridge was chosen as the preferred alternative in the Final Environmental Impact Statement (FEIS), completed in March of 2011.

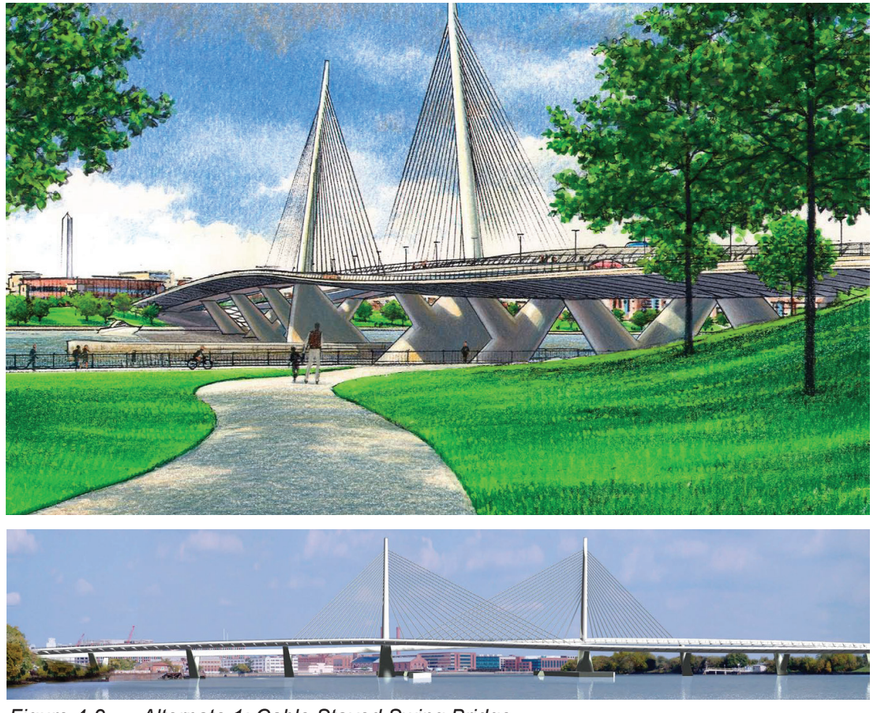


Figure 4-2 Alternate 1: Cable Stayed Swing Bridge

Figure 4-3 Alternate 2: Stayed Bascule Bridge

Figure 4-4 Alternate 3: Arched Bascule Bridge

Figure 4-5 Alternate 4: Retractile Bridge

4.2.2 Preliminary Engineering

The preferred alternative from the FEIS, the Arched Bascule Bridge, was further developed as part of additional structural type studies done as part of the preliminary engineering phase, starting in 2012. All of these new alternatives were based on the original EIS alignment, and were 1,700' long. The types considered were:

- Alternate 1 - 8 span parallel flange steel plate girders
- Alternate 2 - 8 span haunched steel plate girders
- Alternate 3 - 6 span haunched steel tub girders
- Alternate 4 – 5 span haunched segmental concrete box girder
- Alternate 5 – 5 Span arched segmental concrete box girder

An evaluation matrix was established with the following major categories, along with the weights for each used in the evaluation:

- Measures of Cost – 40%
- FEIS Measures – 40%
- Technical Measures – 20 %

The measures of cost included engineering and construction and long term maintenance, as well as the length of the construction schedule. The FEIS measures account for the relative variance each alternative would result in, relative to the FEIS preferred alternative. Subcategories included aesthetics, variance from specific FEIS requirements, number of river piers and minimum vertical clearance. Technical factors included the relative degree of risk involved in the design, construction and operation of each alternative.

After an initial review it was determined that Alternates 1 and 2 would not meet the aesthetic requirements of the FEIS, and they therefore were not considered further. Based on these results Alternates 3, 4 and 5 were retained for further study.

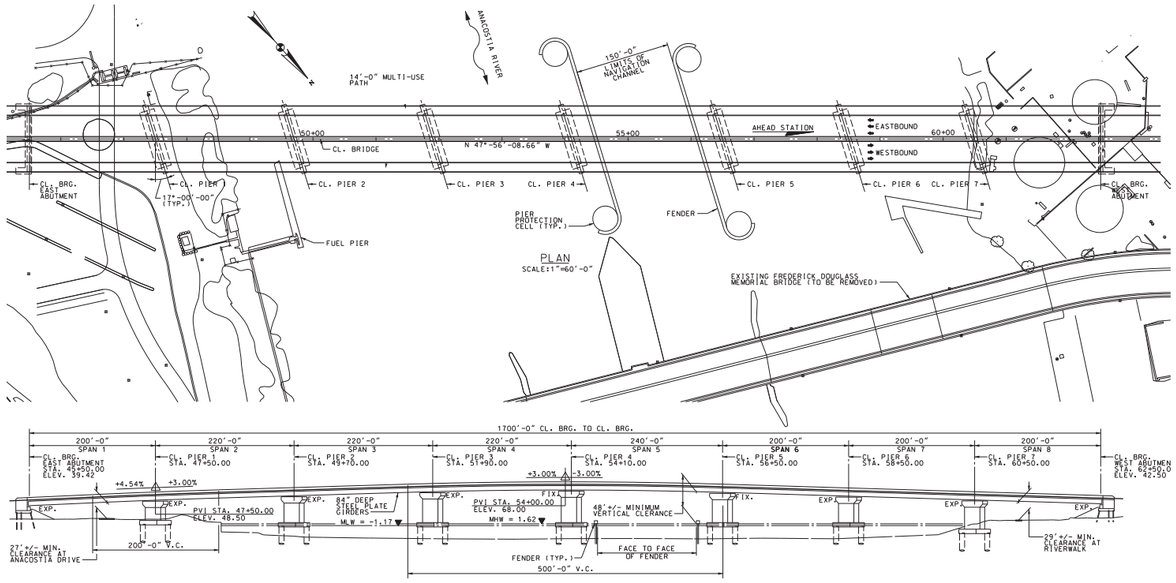


Figure 4-6 Bridge Alternative 1 - Plan and Elevation

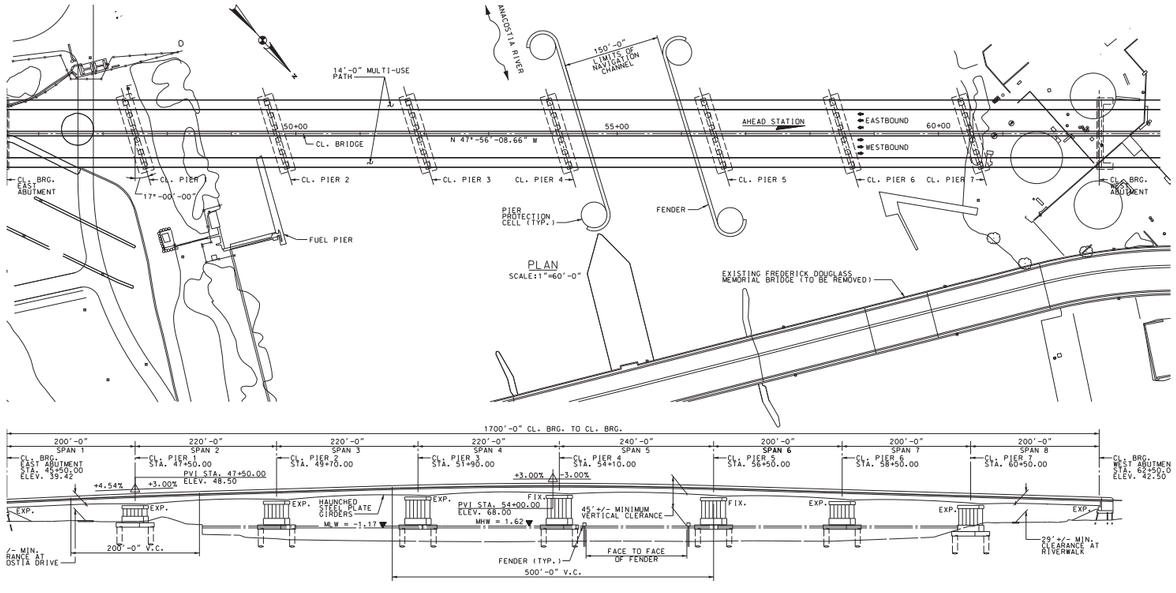


Figure 4-7 Bridge Alternative 2 - Plan and Elevation

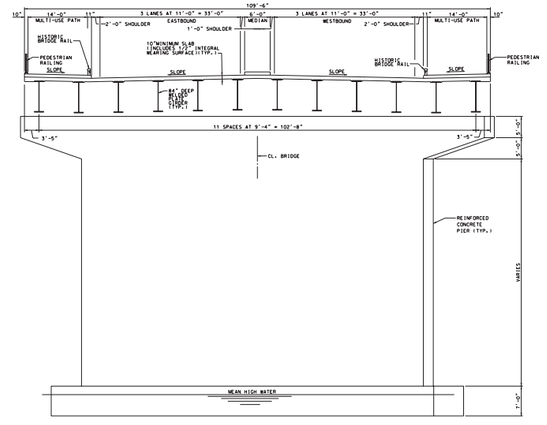


Figure 4-8 Bridge Alternative 1 - Section

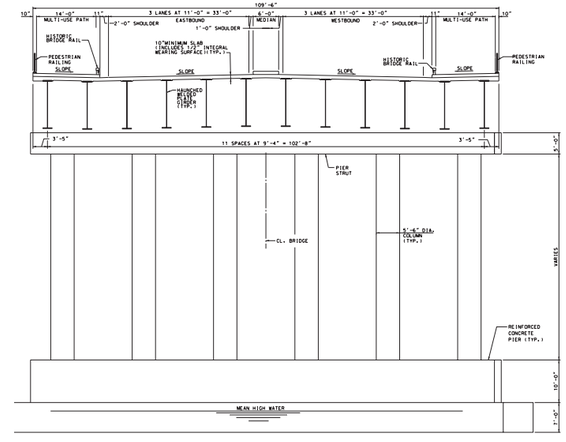


Figure 4-9 Bridge Alternative 2 - Section

Without describing all of the evaluation considerations in the matrix, it is worth mentioning two points regarding Alternate 5:

- This alternate placed a significantly larger load on the foundations. Given the extremely poor geotechnical conditions at the site, this had implications for both construction cost, time of construction and construction risk; and
- The lower portions of the arches would essentially block views through the bridge for drivers approaching the bridge and users of the riverfront walkways and promenades.

4.2.3 Selected Alternative

The selected alternative, which was further developed as part of this current effort, was the Fixed Bridge Alternate 4, the Slender Haunched Concrete Box Girder.

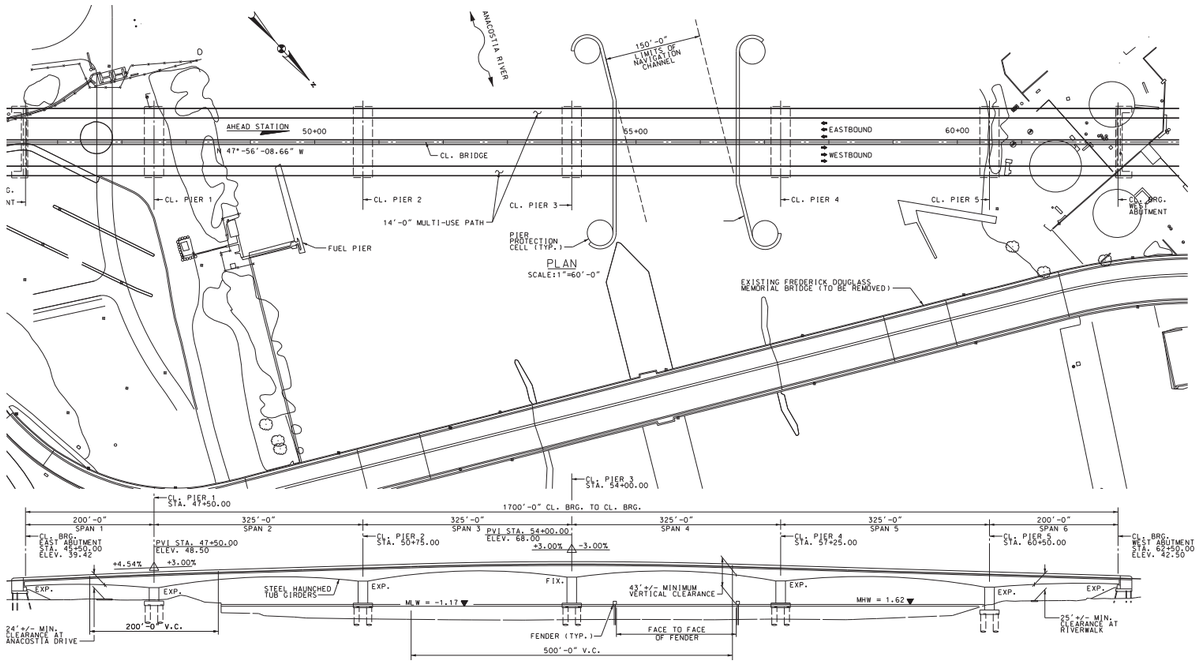


Figure 4-10 Bridge Alternative 3 - Plan and Elevation

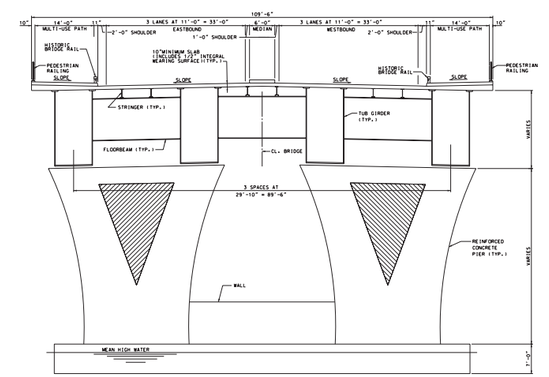


Figure 4-11 Bridge Alternative 3 - Section

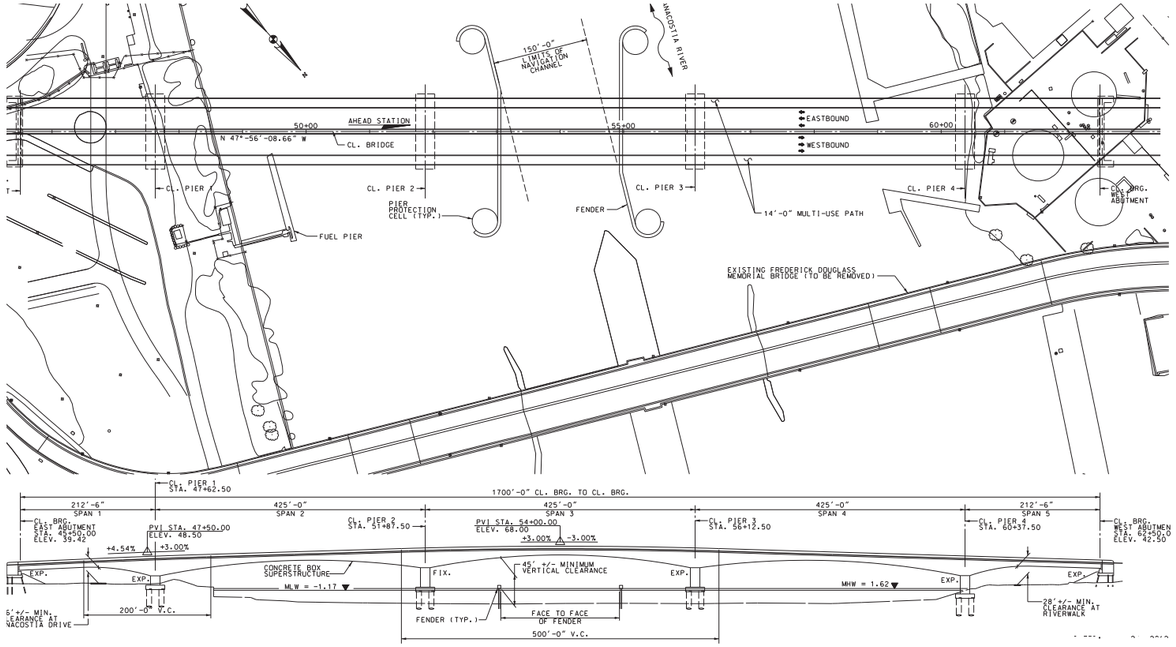


Figure 4-12 Bridge Alternative 4 - Plan and Elevation

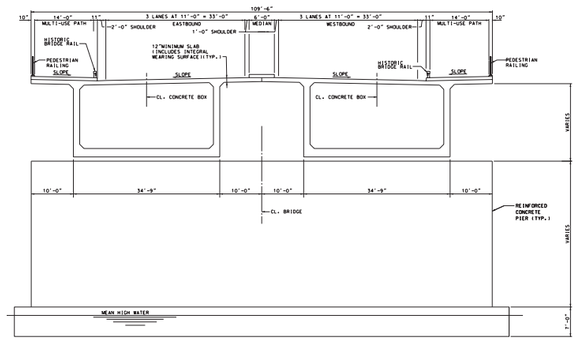


Figure 4-13 Bridge Alternative 4 - Section

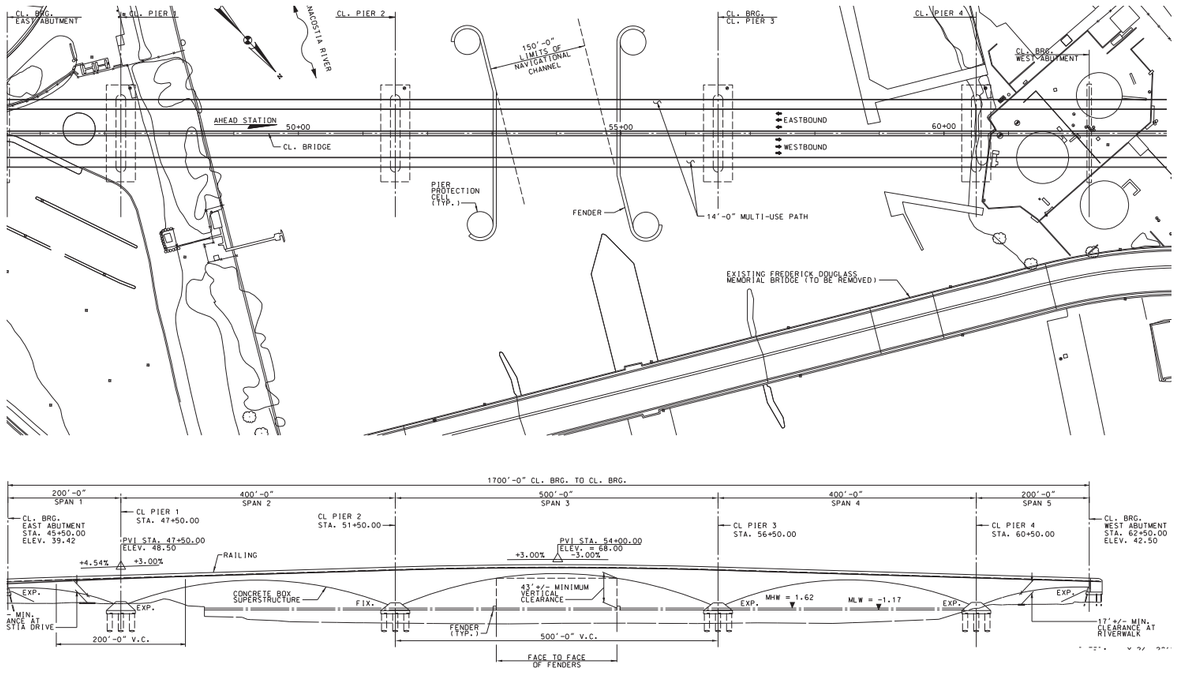


Figure 4-14 Bridge Alternative 5 - Plan and Elevation

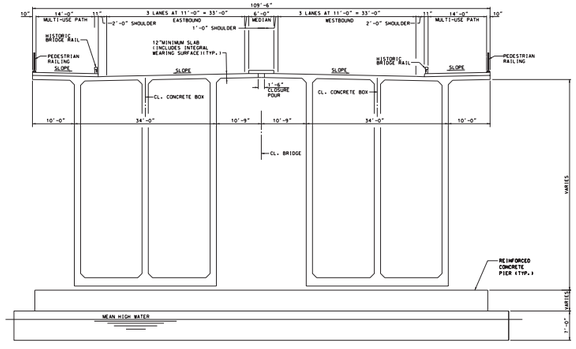


Figure 4-15 Bridge Alternative 5 - Section

4.2.4 Refinement of Box Girder Options

Further analysis was undertaken on the retained alternative, the Concrete Box Girder. The effort revolved around the following goals and objectives:

- Achieve the classical repose of previous Washington bridges but in a contemporary idiom suiting its surroundings;
- Restore, maintain and enhance views to and through the bridge for users of the riverside promenades and trails;

The selected alternative was the Seven Span Slender Haunched Concrete Box Girder (Figure 4-17) based on the following criteria:

- Capital Cost
- Maintenance Cost
- Aesthetics
- Degree of Departure from FEIS

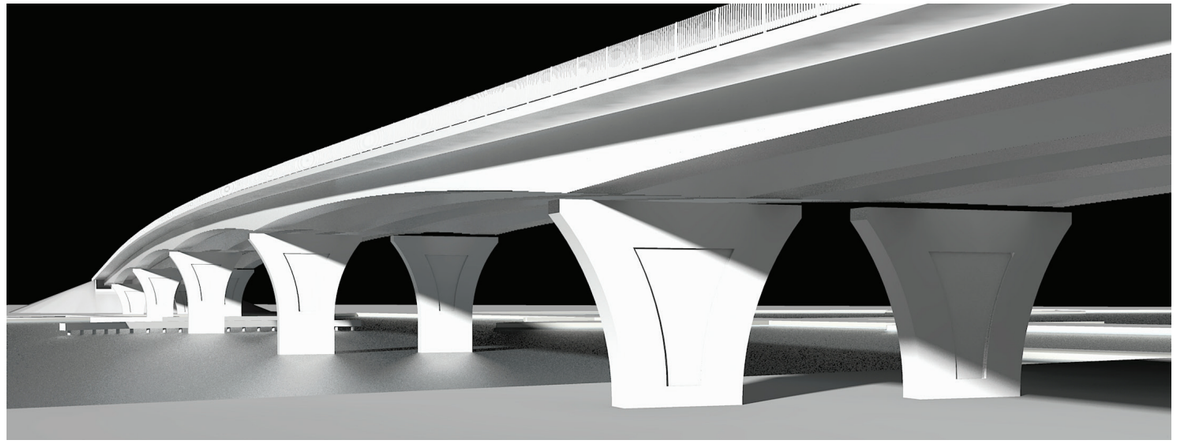


Figure 4-16 Steel Tube Girder

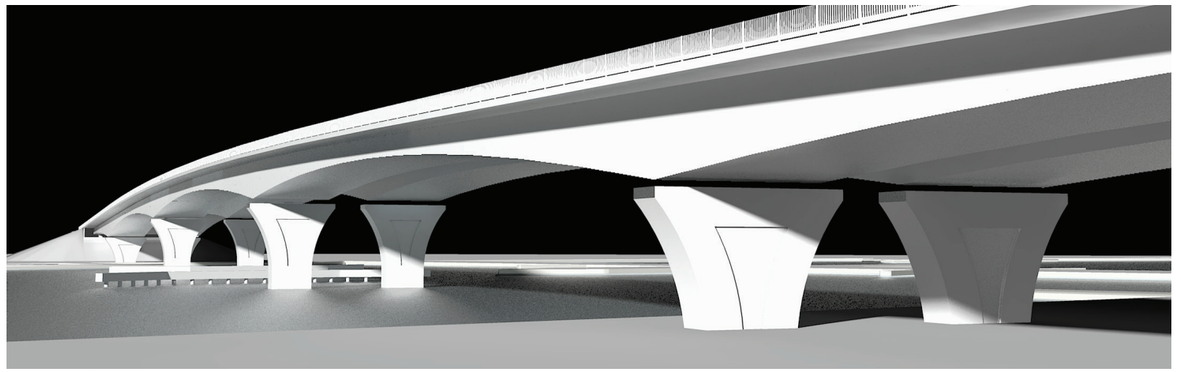


Figure 4-17 Haunched Concrete Box Girder

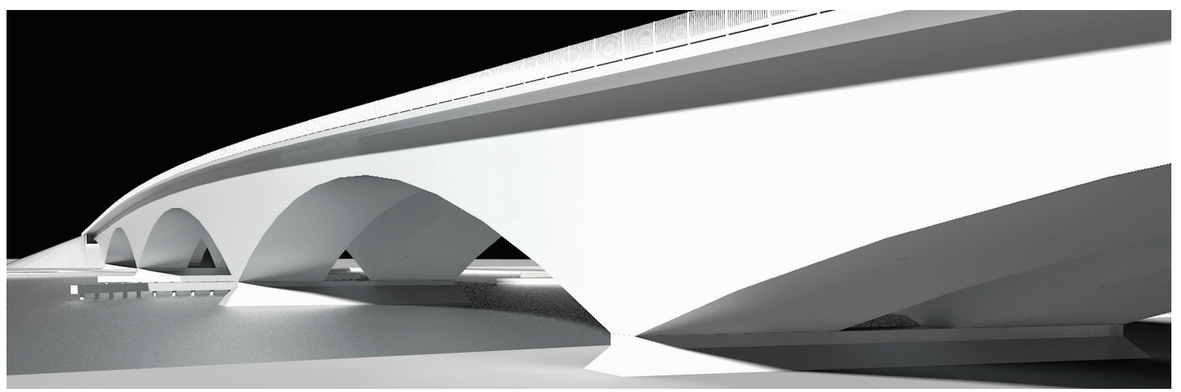


Figure 4-18 Deep Haunched Concrete Box Girder

4.2.5 Refinement of Selected Type

Alignment, Profile Grades, and Vertical Curve

At this point studies of the alignment changed the location of the bridge to run parallel to and 30 feet from the existing bridge. This shortened the total length of the bridge by about 100 feet and made possible reconsideration of the span lengths.

Given the goal to "Achieve the classical repose of previous Washington bridges" it is important for the bridge to have a sense of symmetry about the center of the river and a smoothly flowing geometry. The existing bridge has a pronounced hump which is unattractive to viewers and makes the bridge seem steeper to both drivers and bicyclists/ pedestrians. A study of these issues resulted in the finding that the problems could be addressed with the profile grade and vertical curve shown in Figure 4-18.

Cross Section Refinements

DDOT's desire to provide a bike lane separated from the pedestrian walkway resulted in the addition of a 4 feet wide raised median to separate the bike lane from the roadway on both sides of the bridge, resulting in a total 8 feet added to the cross section.

While the selected alternative is not the deepest box girder considered, it is still relatively massive for a 21st century bridge. The team also believed it necessary to reduce the actual and apparent mass of the box girder. Different overhang lengths were considered resulting in a determination that a 12 foot overhang could be accommodated within the normal capabilities of the concrete box girder. The resulting overhang will create a shadow line that minimizes the apparent depth of the box girder.

To meet the same goal as well as minimize the size and visual mass of the piers the team also considered various slopes to the box Girder webs. A slope of 2.6 vertical to 1 horizontal seemed to best meet the aesthetic goals while still accommodating structural requirements for pier and bottom flange width.

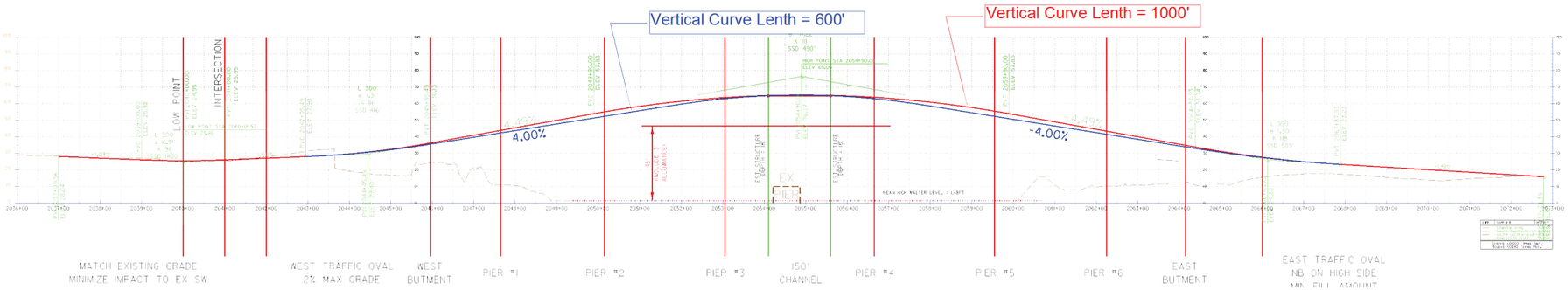


Figure 4-19 Profile Refinement

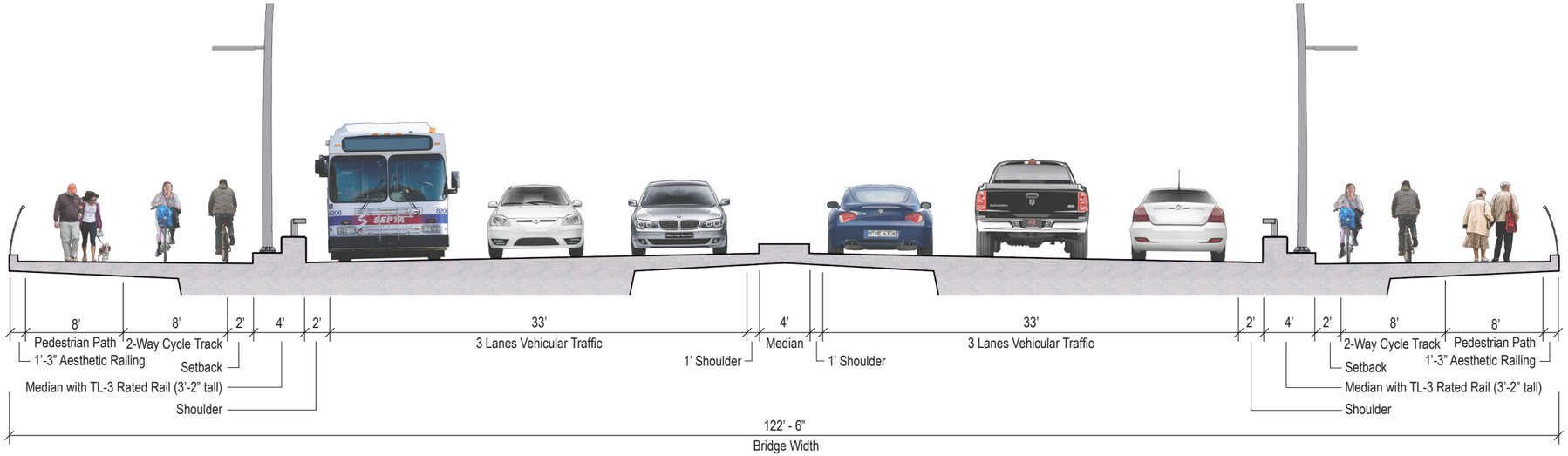


Figure 4-20 Final Cross Section

Span Proportions
The proposed bridge design is proportioned to provide a modern interpretation of the successful District of Columbia bridges. Span length is an important consideration when looking at a side by side comparison. Figure 4-21 presents a comparative study of the span length of selected District bridges.

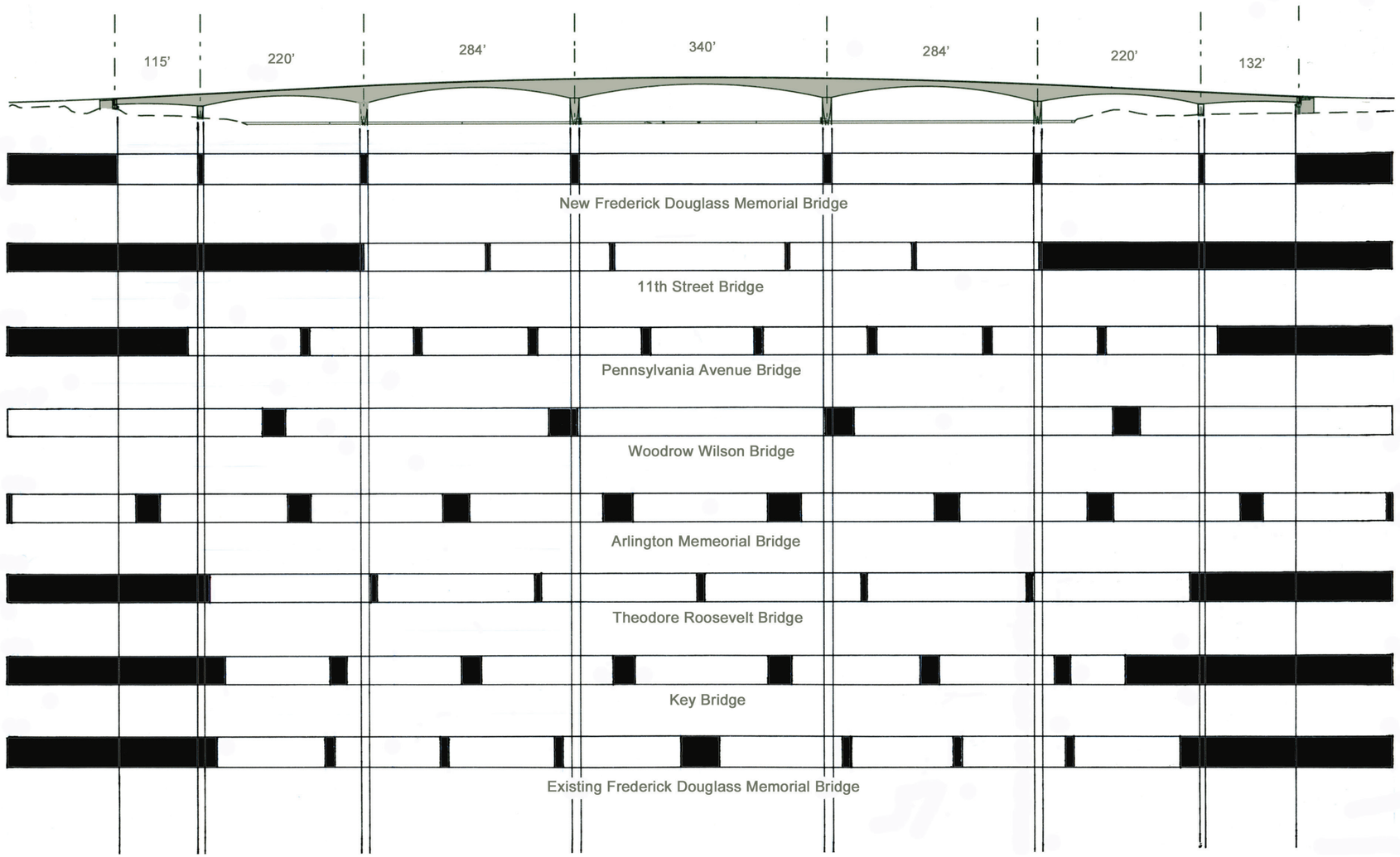


Figure 4-21 Span Proportions

Figure 4-21 Span Proportions

Haunch Depths

The goals to “Achieve the classical repose of previous Washington bridges”, to “Maintain and enhance views from the bridge to the distant monuments and the nearby landmarks” and to “Restore, maintain and enhance views to and through the bridge for users of the riverside promenades and trails” have the potential to be contradictory. The archetypal Washington bridge is an arch bridge, but, as shown with FEIS alternative, a conventional arch bridge blocks important views through the bridge. The team sought to maximize the “archiness” of the design while maintaining the important views. The key dimension was the ratio of the haunch depth at the piers to the height of the profile grade at the piers. After considering several options as shown in Figures 4-21 to 4-26, the team decided on on a ratio of approximately 45% for this proportion. This placed the deepest part of the haunches just above the eye lines of viewers standing on the riverside walks and trails.

Figure 4-22 1:1 Haunch Depth-Pier Height Ratio

Figure 4-23 1:1 Haunch Depth-Pier Height Ratio Close-Up

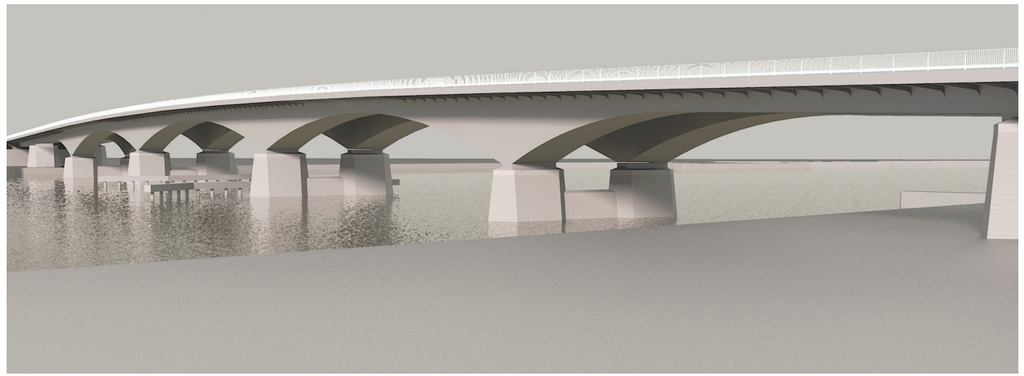


Figure 4-24 2:1 Haunch Depth-Pier Height Ratio

Figure 4-25 2:1 Haunch Depth-Pier Height Ratio Close-Up

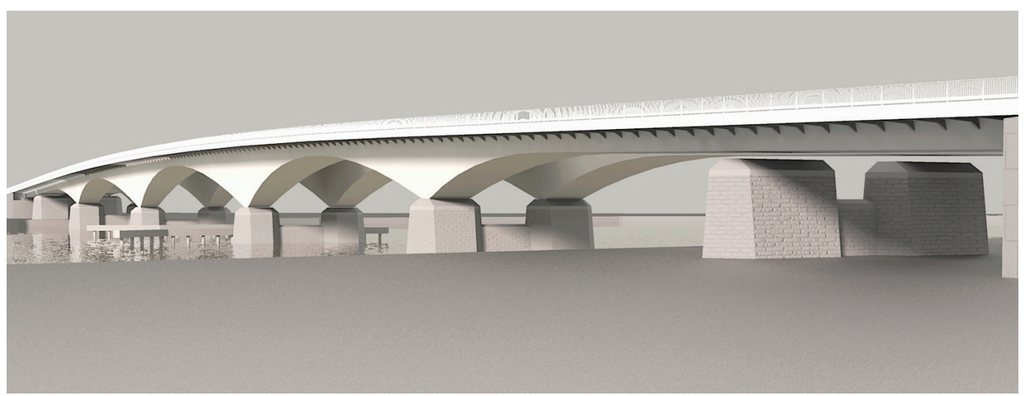


Figure 4-26 3:1 Haunch Depth-Pier Height Ratio

Figure 4-27 3:1 Haunch Depth-Pier Height Ratio Close-Up