District Department of Transportation

William Howard Taft Bridge

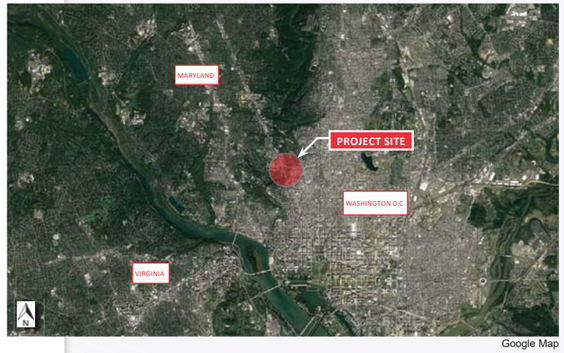
Pedestrian Railing Improvement Concept Design

Presented to: Historic Preservation Review Board, August, 2023

View from Rock Creek Park trail

View from Rock Creek Park

TABLE OF CONTENTS



VICINITY MAP

Google Map

LOCATION MAP

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Sanborn Map Image, April 15, 2015

DC Government Office of the Chief Medical Examiner data showed 26 bridge related suicides from January 1, 2010 to June 1, 2022. 50% (13 fatalities) were from the Taft Bridge.

The William Howard Taft Bridge is in the District of Columbia and carries Connecticut Avenue NW over Rock Creek Park. It was constructed in 1907 and was one of the first and largest unreinforced concrete bridges in the world. The bridge was identified in the DC Inventory as a Landmark in 1964 and was listed in the National Register of Historic Places in 2003.

Sadly, since 2010 there have been 26 suicides in the District, and 13 of the suicides have involved the Taft Bridge. The bridge has recently become the focus of the District's behavioral health department as the low height of the existing pedestrian railings has become associated with the high number of suicides off the structure. Behavioral health experts agree that this concern may be reduced, and lives saved, if suicide deterrent features are installed Additionally, improving the barrier condition will increase safety for all bridge users including vehicles, bicyclists, and pedestrians.

The significance of the bridge's historic nature coupled with the critical safety need creates a challenge that requires a carefully balanced approach to meet the community's needs. Finding the ideal solution will require a detailed understanding of the bridge, its surroundings, and the partner agencies, so that the unsafe condition is considerably improved while preserving the bridge's historic past.

There are three primary and interconnected goals for this project:

- **Develop a suicide deterrent barrier system (SDB) for the bridge that reduces the potential of suicide attempts.**
- **Minimize the impact to the existing historic bridge fabric and surrounding viewsheds.**
- **Provide a deterrent barrier that is compatible to the bridge aesthetics.**

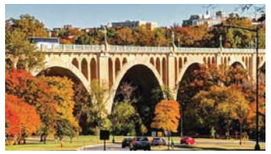
Options provided within this document include features that will deter persons from climbing a protective barrier on either side of the bridge. Such deterrent features include: increasing the bridge railing height, minimizing finger clearances to prevent potential barrier hand holds, and minimizing horizontal element projection to prevent potential barrier foot holds. Materials evaluated included: metal picket fencing, glass systems, ClearVu fencing, and netting systems.

Overall History

The William Howard Taft Bridge (originally known as the Connecticut Avenue Bridge) was constructed between 1897 and 1907, and widened in 1995. The existing bridge is 1,331 feet long and has a bridge out-to-out deck width of 64'-8". The bridge was designed by George S. Morison (Engineer) and Edward Pearce Casey (Architect). It is considered one of the largest unreinforced concrete bridges in the world (1). The bridge spans over the Rock Creek Park in Northwest, Washington D.C. and carries Connecticut Avenue. The original cost was $864,000, making it commonly known as the first million-dollar bridge in Washington, D.C. (2)

In 1931, the bridge was renamed for William Howard Taft, the 27th President of the United States and 10th Chief Justice of the Supreme Court. Local history indicates that he was a frequent pedestrian on the bridge.

From 1993 to 1995 a comprehensive bridge rehabilitation occurred involving the replacement and widening of the bridge deck from 59'-0" to 64'-8", and rehabilitation of the concrete piers . Existing lanterns and pilasters were removed and reinstalled. Existing railings were removed and replaced. A precast concrete element was added at the bottom of the railing to increase the railing height.



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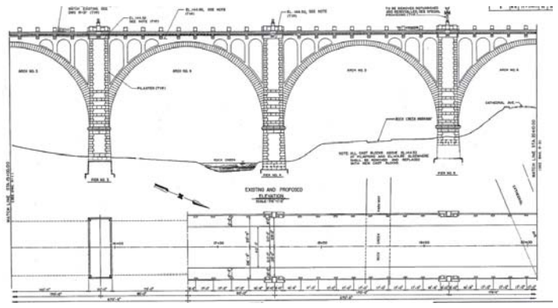
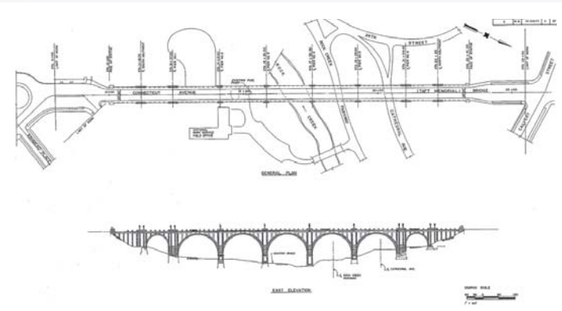


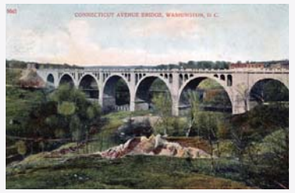
Partial plan and elevation

1995 Rehab of Connecticut Ave Bridge (Taft Memorial Bridge)



Existing overall plan and elevation

1906 Record Drawings



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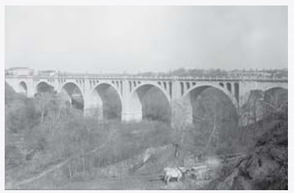
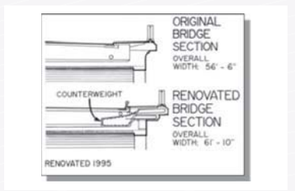
Bridge before 1995 rehabiliation - DDOT Historic Collections



Library of Congress Collection



Library of Congress Collection

SIGNIFICANCE

The construction of the William Howard Taft Bridge marked a key turning point in opening the extension of Connecticut Avenue and making vast stretches of upper Northwest Washington D.C. more easily accessible and thus more desirable as residential areas. The bridge rises 136 feet from the floor of Rock Creek Park and extends 1,341 feet across the valley. The bridge is supported by seven arches; the five large ones are 150 feet across, and the two smaller ones measure 82 feet. (3)

The bridge, when initially constructed (around 1907), had a curb-to-curb width of 39 ft and a 6'-0" pedestrian walkway on both the east and west side of the bridge travel lanes. This also included a metal railing system, concrete pilasters and architectural bridge lighting.

In 1995, the DC Department of Transportation rehabilitated the bridge. This rehabilitation included replacing the 39'-0" wide bridge deck (curb-to-curb) with a new, 40'-0" wide bridge deck (curb-to-curb), and new 7'-4" wide sidewalks on both sides of the bridge.

NOTABLE ELEMENTS

Perry Lions

The bridge originally had four lions, 2 at each end of the bridge sculpted by R. Hinton Perry out of precast concrete. These lions were restored in 1965. Continued degradation caused these lions to later be removed, and new concrete lions were cast by Reinaldo Lopez-Carrizo and installed in 2000.

Baristow Eagle Lamp posts

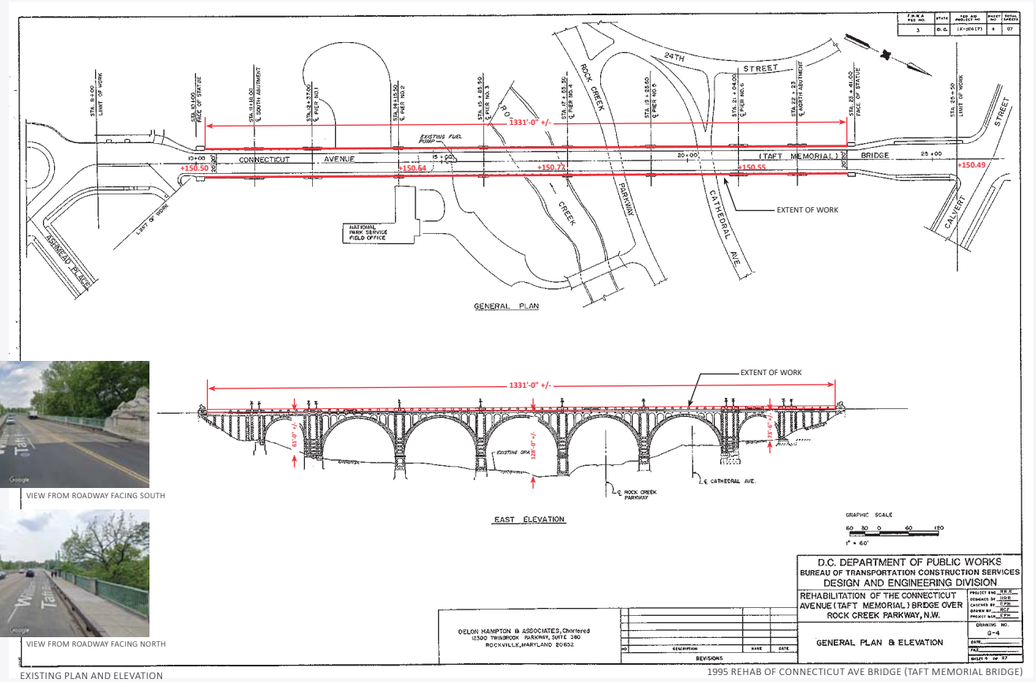
There are 24 lamp posts spaced along both sides of the bridge. These were sculpted by Ernest Baristow in 1906. Each lamp post is about 15 feet in height above the concrete pilasters and was made of painted iron. There are two globes hanging at the horizontal crossbar from either side of the post. There is a painted eagle with wings spread at the top of the post. These lamp posts are mounted to concrete pilasters. Pilaster configuration varies between a two-lamp post configuration that occurs at the first two pilasters towards the ends of the bridge and a single lamp-post configuration that occurs at all other locations.

Metal Railings

The existing metal railings span 17'-0" feet from center-to-center of concrete pilasters. These railings were removed and replaced during the 1995 bridge rehabilitation project. The detailing of the rehabilitation project matches the original plans except that a 4" additional precast concrete toe railing was added at the bottom to increase the overall railing height to 4'-0". Railings are constructed with painted 1-1/8" x 1-1/8" steel bar pickets, a 1" x 3" metal bottom rail and a 1" x 2" top rail. The cast iron top-rail matches the original design.

Bridge Chronology

- **1897-1907** Original Bridge Construction
- **1965** Perry Lion Restoration Project
- **1993-1995** Major Bridge rehabilitation
  - Bridge deck replaced and widened
- **2000** New Concrete Lions cast for bridge ends



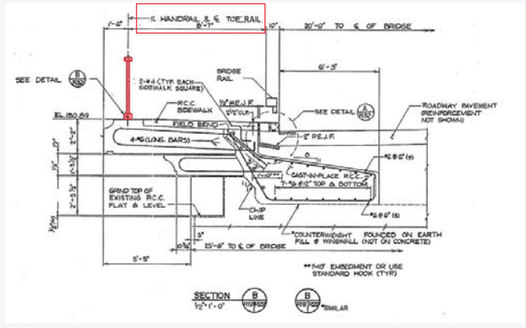
VIEW FROM ROADWAY FACING SOUTH

VIEW FROM ROADWAY FACING NORTH

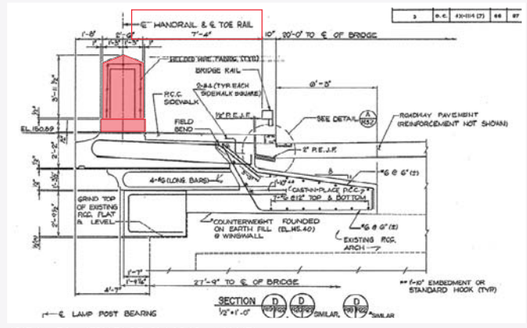
EXISTING PLAN AND ELEVATION

1995 REHAB OF CONNECTICUT AVE BRIDGE (TAFT MEMORIAL BRIDGE)

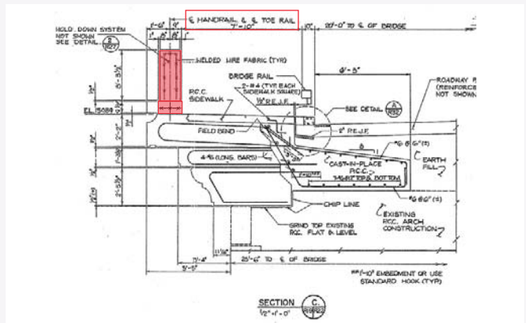
1995 REHAB DRAWINGS OF CONNECTICUT AVE BRIDGE (TAFT MEMORIAL BRIDGE)



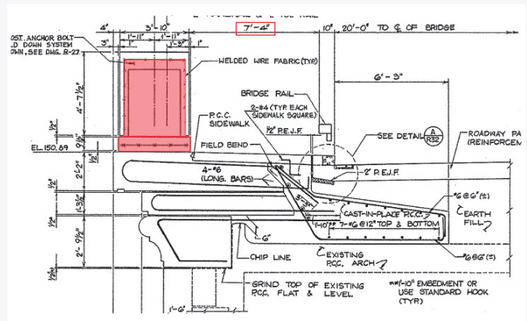
SECTION AT RAILING



SECTION AT PILASTERS TO EITHER SIDE OF LAMPPOSTS



SECTION AT TYPICAL PILASTERS



SECTION AT LANTERN PILASTERS

Google Image

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1995 REHAB OF CONNECTICUT AVE (TAFT MEMORIAL BRIDGE)

Railing details

1995 REHAB OF CONNECTICUT AVE (TAFT MEMORIAL BRIDGE)

Image of Perry Lion

Baristow eagle lamp post

Rehab of Connecticut Ave
(Taft Memorial Bridge)

Google Image

NHPA Section 106 Process

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires federal agencies to consider the effects on historic properties of projects they carry out, assist, fund, permit, license, or approve throughout the country. If a federal or federally assisted project has the potential to affect historic properties, a Section 106 review will take place. (https://www.achp.gov/protecting-historic-properties/section-106-process/introduction-section-106)

1. Initiate NHPA Consultation and identify other consulting parties for stakeholder engagement
2. Define the Area of Potential Effects (APE) and identify other historic properties within the APE
3. Initiate field work early in the process to identify key cultural resources and character-defining elements
4. Review of cultural resources will include:
   - Previously identified archeological sites in the APE
   - National Register historic districts and individual sites in and abutting the APE
   - Zoning overlay districts and applicable design guidelines
5. Assess effects of the proposed project to the Taft Bridge and any other identified historic resources
6. Consult to resolve adverse effects
7. Complete preliminary environmental review for the following:
   - Threatened & endangered species
   - Soils data
   - Floodplain
   - Wetlands/waters of the US
   - Forest/trees
   - Hazardous materials
   - Environmental justice/ community impacts
   - Cultural resources
   - Air & noise
   - Parks

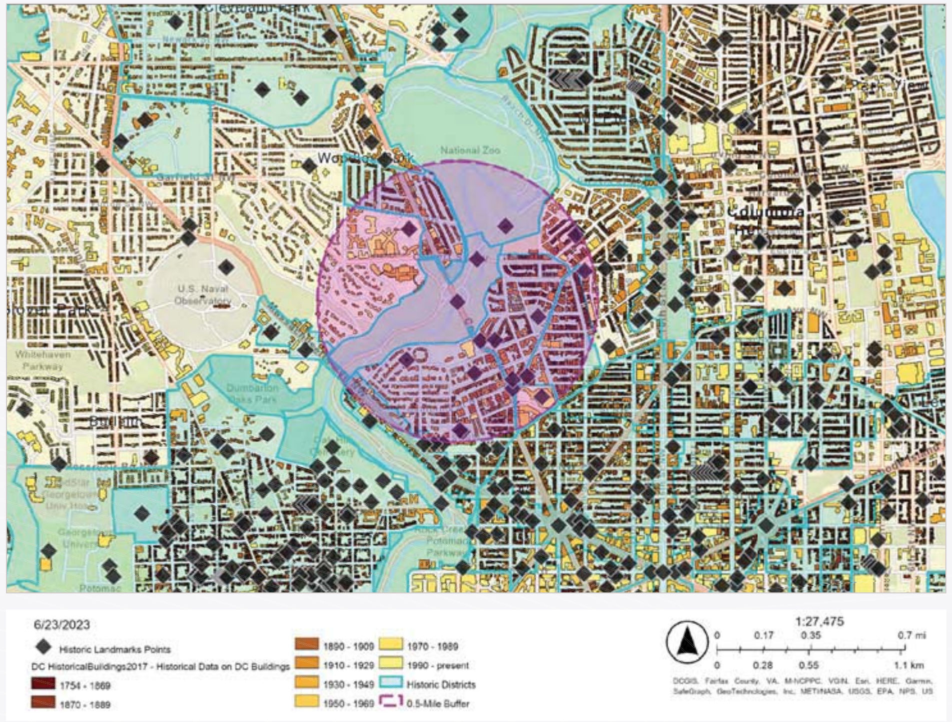

Image from DC GIS illustrating viewsheds from the bridge

View of Rock Creek Park from bridge deck (WSP image)

View of Taft Bridge from Duke Ellington Bridge


1


2


3


4

CAPTION LIST

1. Empire State Building, New York
2. Bridge in Madrid, Spain
3. Bridge in Madrid, Spain
4. Brooklyn Bridge, New York
5. Pedestrian bridge, Switzerland
6. Golden Gate Bridge, San Francisco
7. Bridge netting
8. Pedestrian bridge, Switzerland
9. Duke Ellington Bridge, Washington DC
10. Key Bridge, Washington DC
11. 9th Street bridge, Washington DC
12. Monroe Street bridge, Washington DC

SOURCE

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Hammerglass image
Golden Gate Physical Suicide Deterrent Study
Google image
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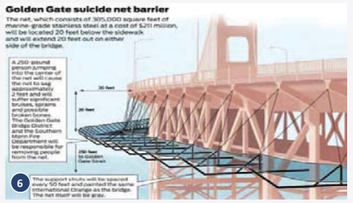

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A few other bridges and railings were investigated as precedents for suicide deterrent barriers. These included glass panel systems at the Empire State Building, existing glazing railings at bridges in Spain and Switzerland, horizontal netting systems at the Golden Gate Bridge, vertical netting barriers and curved metal systems. Local precedents include: metal railing systems at the Duke Ellington Bridge, curved railing system at the Key Bridge, railing and outrigger system at the 9th Street Bridge in Northeast D.C., and curved ClearVu fencing system at the Monroe Street Bridge in Northeast D.C.

WILLIAM H TAFT MEMORIAL BRIDGE - SUICIDE DETERRENT BARRIERS DESIGN CRITERIA

GROUP	REFERENCE	DATE	TYPE OF OPTION	BARRIER HEIGHT	NETTING LENGTH	NETTING DEPTH	CLEARANCE	FOOTHOLD	HANDHOLD	INWARD PROJECTION	COMMENTS
EXISTING	WILLIAM H TAFT BRIDGE, WASHINGTON, DC	1909	EXISTING RAILING	4.5'	-	-	3.5"	YES	-	-	EXISTING RAILING 4.5' IN HEIGHT, NO DETERRENCE YET
	DUKE ELLINGTON BRIDGE, WASHINGTON, DC	1986	VERTICAL BARRIER	6.0'	-	-	3.5"	YES	-	YES	6.0' FENCING ATTACHED OUTBOARD OF EXISTING FENCE, 8.0' ABOVE DECK
GOV THOMAS JOHNSON BRIDGE	MDOT GOVERNOR THOMAS JOHNSON BRIDGE EVALUATION OF SUICIDE DETERRENT SYSTEMS	2022	PHYSICAL BARRIER BEHIND EXISTING CONCRETE PARAPET	10'-8" MIN	-	-	NONE INDICATED	YES 10"	NOT INDICATED	YES	NEEDS TO BE LARGER TO FACILITATE STANDING ON PARAPET
	MDOT GOVERNOR THOMAS JOHNSON BRIDGE EVALUATION OF SUICIDE DETERRENT SYSTEMS	2022	PHYSICAL BARRIER ON TOP OF EXISTING CONCRETE PARAPET	8'-10" MIN	-	-	NONE INDICATED	NONE	NOT INDICATED	NO	
	MDOT GOVERNOR THOMAS JOHNSON BRIDGE EVALUATION OF SUICIDE DETERRENT SYSTEMS	2022	NETTING NEAR ROADWAY	-	13" MIN	SMALL	NONE INDICATED	YES 10"	NOT INDICATED	-	NETTING NEAR PARAPET REQUIRES MORE HORIZONTAL PROTECTION
	MDOT GOVERNOR THOMAS JOHNSON BRIDGE EVALUATION OF SUICIDE DETERRENT SYSTEMS	2022	NETTING BELOW ROADWAY	-	13" MIN	LARGE	NONE INDICATED	-	NOT INDICATED	-	NETTING BELOW PARAPET HAS MORE DEPTH BUT LESS HORIZONTAL PROTECTION
	MDOT GOVERNOR THOMAS JOHNSON BRIDGE EVALUATION OF SUICIDE DETERRENT SYSTEMS	2022	HYBRID PHYSICAL BARRIER/NETTING	VARIES	VARIES	VARIES	NONE INDICATED	-	NOT INDICATED	YES	
GOLDEN GATE BRIDGE	GOLDEN GATE PHYSICAL SUICIDE DETERRENT SYSTEM PROJECT	2008	VERTICAL BARRIER TO OUTISDE RAILING (1A)	8.0'	-	-	NONE INDICATED	-	NOT INDICATED	-	
	GOLDEN GATE PHYSICAL SUICIDE DETERRENT SYSTEM PROJECT	2008	HORIZONTAL BARRIER TO OUTISDE RAILING (1B)	12.0'	-		5.375"	-	NOT INDICATED	YES	8'-0" ABOVE 4'-0" GUARDRAIL WITH HORIZONTAL CABLES 1'-0" WINGLET AT TOP
	GOLDEN GATE PHYSICAL SUICIDE DETERRENT SYSTEM PROJECT	2008	REPLACE OUTSIDE HANDRAIL WITH VERTICAL BARRIER (2A)	12.0'	-	-	4.5"	-	-	-	VERTICAL STEEL RODS
	GOLDEN GATE PHYSICAL SUICIDE DETERRENT SYSTEM PROJECT	2008	REPLACE OUTSIDE HANDRAIL WITH HORIZONTAL BARRIER (2B)	10.0'	-	-	4.4"	-	-	YES	HORIZONTAL CABLES 1'-0" WINGLET AT TOP
	GOLDEN GATE PHYSICAL SUICIDE DETERRENT SYSTEM PROJECT	2008	ADD NET SYSTEM THAT EXTENDS HORIZONTALLY (3)	-	20.0'	20.0'	NONE INDICATED	-	-	-	NETTING 20' FROM BRIDGE, EXTENDS 5' ABOVE BOTTOM CHORD OF BRIDGE. PTD METAL MESH
FLORIDA SKYWAY BRIDGE	FLORIDA SUNSHINE SKYWAY BRIDGE	2019	VERTICAL TRANSPARENT PANEL BARRIER	-	-	-	-	-	-	-	NOT PURSUED DUE TO WEIGHT AND UV DAMAGE
	FLORIDA SUNSHINE SKYWAY BRIDGE	2019	WIRE NET FENDING OPTION	7.5'	-	-	-	CHAMPER AT TOP	-	-	OUTBOARD OPTIONS EXTENDING FROM OUTSIDE OF EXISTING TRAFFIC RAILING
	FLORIDA SUNSHINE SKYWAY BRIDGE	2019	EXTERIOR HORIZONTAL NETTING OPTION	-	13.0'	13.0'	-	-	-	-	HORIZONTAL NETTING BELOW BRIDGE. SPECIAL SNOOPER TRUCK REQUIRED.
NATIONAL SURVEY SWITZERLAND	COMPARING SUICIDE PREVENTION MEASURES: NATIONAL SURVEY IN SWITZERLAND	2017	VERTICAL BARRIER	4.90'	-	-	-	-	-	-	1.5 M HEIGHT 68% REDUCTION
	COMPARING SUICIDE PREVENTION MEASURES: NATIONAL SURVEY IN SWITZERLAND	2017	VERTICAL BARRIER	9.0'	-	-	-	-	-	-	2.75 M HEIGHT 68% REDUCTION
	COMPARING SUICIDE PREVENTION MEASURES: NATIONAL SURVEY IN SWITZERLAND	2017	VERTICAL BARRIER	10.8'	-	-	-	-	-	-	3.3 M HEIGHT 69% REDUCTION
	COMPARING SUICIDE PREVENTION MEASURES: NATIONAL SURVEY IN SWITZERLAND	2017	SAFETY NET	-	-	-	-	-	-	-	SAFETY NETTING LED TO 77.1% REDUCTION
CORNELL	PREVENTING SUICIDE BY JUMPING FROM BRIDGES OWNED BY CITY OF ITHACA AND BY CORNELL UNIVERSITY	2010	RECOMMENDATIONS	8.2' OR 2.5 M	-	-	< 0.49" OR 150 MM	NONE	NONE	YES	PREDOMINANTLY SMOOTH VERTICAL MEMBERS, AND DAUNTING VISIBLE DETERRENT

Design Criteria involved looking at several reference projects. These included the existing features at the William Howard Taft Bridge and its sister, the Duke Ellington Bridge. Literature included:

- Maryland Department of Transportation Governor Thomas Johnson Bridge Evaluation of Suicide Deterrent Systems, 2022
- Golden Gate Physical Suicide Deterrent System Project, 2008
- Florida Sunshine Skyway Bridge, 2019
- Comparing Suicide Prevention Measures; National Survey of Switzerland, 2017
- Preventing Suicide by Jumping from Bridges owned by the City of Ithaca and by Cornell University, 2010

The suicide deterrent features from the studies were located in the following positions: inboard of the existing railing system, in the same plane as the existing railing system (by removing existing railings and replacing with new taller railings), and outboard of the existing railing system. Likewise, material was mostly either metal or glass for vertical barriers, and metal for netting systems..

- Metal vertical barriers ranged from 7'-0" to 12'-0" in height above the existing bridge deck.
- Netting systems extended 13'-0" to 20'-0" horizontally from the bridge deck in both horizontal projection and depth.
- Glass vertical barriers ranged from 7'-6" to 8'-0" in height from the bridge deck.
- Horizontal clearance between vertical pickets ranged from 3 ½" to 5".
- Potential footholds were either chamfered to prevent foot placement or were non-existent.
- Potential handholds were eliminated by raising elements above 8'-0" or reducing projections to less than 1".
- Inward angled or horizontal projection of barrier top elements of approximately 1'-0" in height tended to reduce overall height by 1'-0".

The Cornell study summary indicated that the best deterrent systems were predominantly smooth vertical elements with a daunting visual deterrent.

The Duke Ellington Bridge presented an interesting solution that was attached outboard of the existing railing system. Although successful in reducing suicides, the height of the railing system was approximately 5'-0" above the top of the existing railing and not difficult to scale.

The William Howard Taft Bridge has the added challenge of an existing railing system that is identical to the original railing as well as aesthetic viewsheds from Rock Creek Park. The stakeholders indicated a desire of maintaining the existing railing and the existing viewsheds.

From discussion with stakeholders, it was determined that the design criteria should include the following:

- Vertical barriers (either metal or glass) should extend 8'-0" in height from the bridge deck.
- Horizontal netting systems should extend 13'-0" in both horizontal projection and depth.
- Spacing of pickets should be 4" or less.
- Potential handholds and footholds should be eliminated.

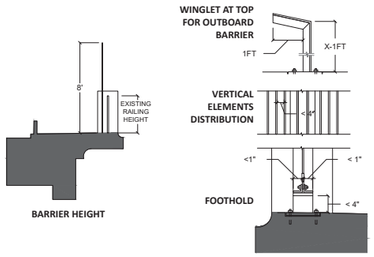
Suicide Deterrent Barrier System (SDB)

BARRIER HEIGHT
- Ideal Height (8', looking for input)
- Height reduction (curved top/angled inward)

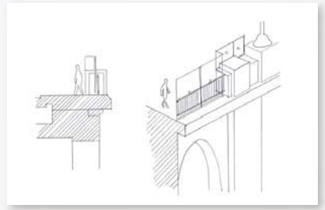
HANDHOLDS
- Maximize finger clearance to prevent handholds

FOOTHOLDS
- Minimize horizontal element projection

MATERIALS
- Metal picket fencing, ClearVu, glass, netting

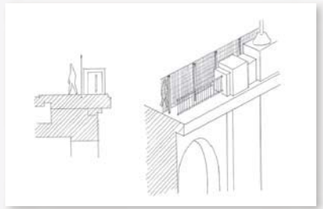


Option 1 - Cantilevered glazing panels

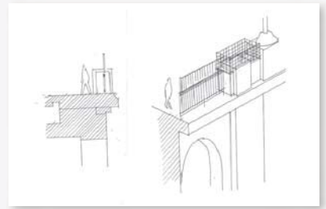


Option 1A - Cantilevered glazing panels

Option 3 - Glass panel with posts and glass attached to pilasters



Option 4 - ClearVu metal panel

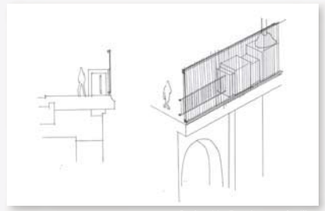


Option 5 - New railing secured to existing railing

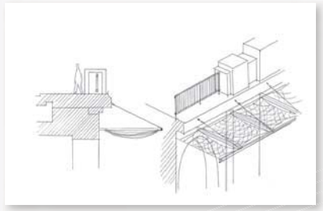
Option 7 - Replace with metal railing

Option 8 - Replace with glazing panel

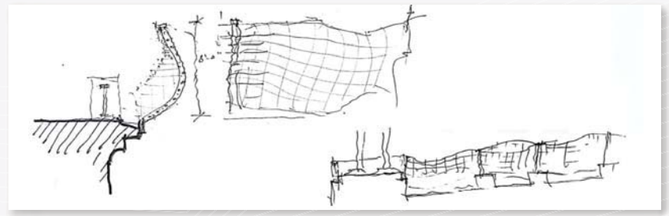
Option 10 - Replace railing & raise pilasters



Option 11 - Exterior metal railing



Option 13 - Horizontal netting



Option 14 - Vertical netting

These options were divided into barrier systems inboard of the existing railing system (Options 1-4), barriers in the same plane as the existing railing system (Options 5-10), barriers outboard of the existing railing system (Options 11-12), and other barrier options including netting systems (Options 13-15).

Through discussion with the stakeholders, a weighted score was assigned to each option with respect to safety, physical deterrence, visual impacts, structural implications, maintenance and probable cost. Safety, physical deterrence and visual impacts were weighted heaviest at 2.0, maintenance and cost at 1.5 and structural implications at 1.0.

- Inboard options tended to score highest as they were the simplest to construct and shortest in height with limited to no impact to existing historic fabric.
- Outboard options tended to score lower as they involved higher vertical elements to achieve the 8'-0" of vertical height above the existing railing as a deterrence to climbing.
- Netting options scored poorly as there were concerns for visual appearance from Rock Creek Park, and concern with maintenance.
- Vertical barrier options in the plane of the existing railing, although providing the greatest pedestrian space also scored poorly as modification or removal of the existing railing was deemed by the stakeholders as detrimental to the existing historic fabric.

From the aforementioned design criteria and evaluations – three options were selected to pursue for concept submission:

- 8'-0" tall glass panel option secured to vertical metal posts inboard of existing railing
- 8'-0" tall metal Clear-Vu fencing secured to vertical metal posts inboard of existing railing
- 8'-0" tall metal panel frame with stainless steel wiring inboard of existing railing

CONCEPT 1

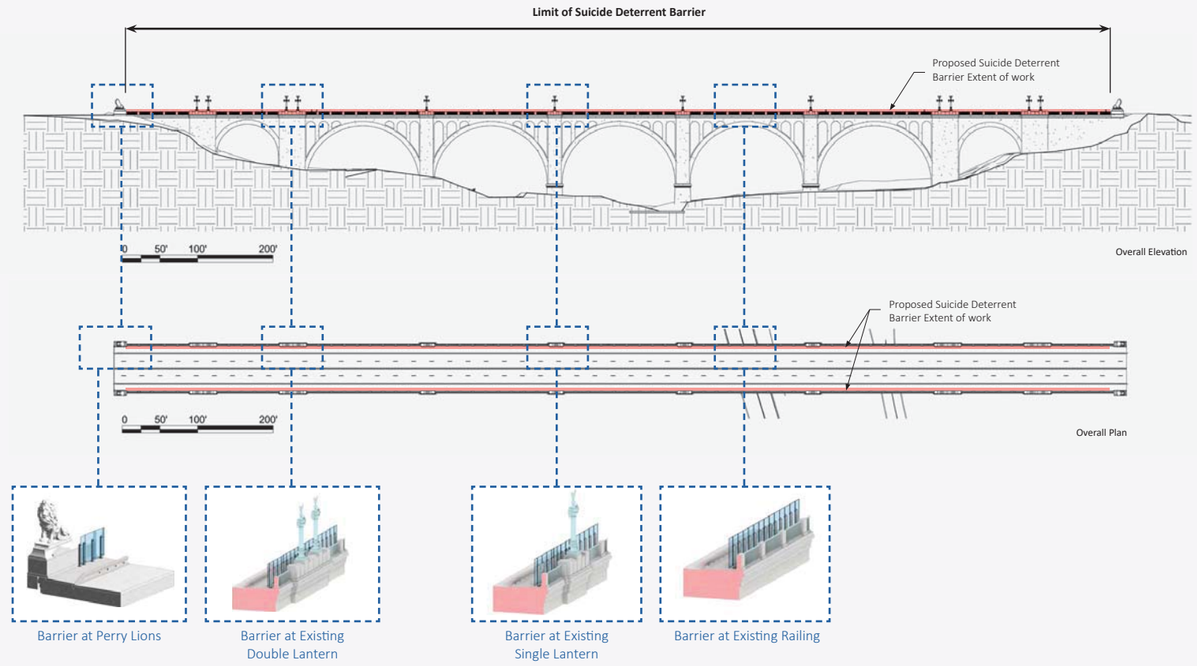
WSP rendering

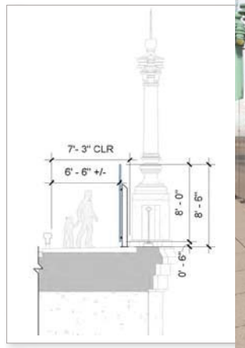
CONCEPT 2

WSP rendering

CONCEPT 3

WSP rendering





Section at existing railing

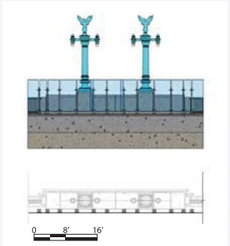
Rendering of glazing panels in same plane

Rendering of glazing panels at single lantern

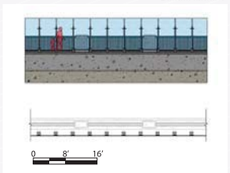
Rendering of glazing panels at double lantern

Rendering of view from Rock Creek Park

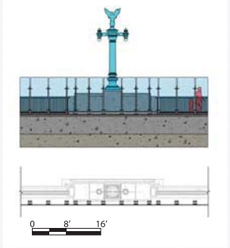
Rendering of view from Rock Creek Park



Double lantern



Existing railing and pilaster



Single lantern

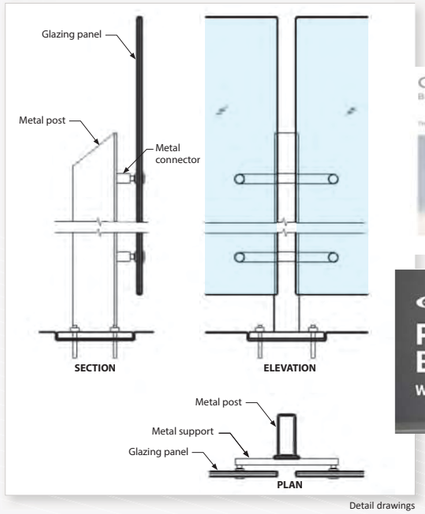
Concept Option 1 *(Preferred Concept)*

Concept Option 1 is a glass panel system, measuring 8'-0" in height with point supports attached to regularly spaced vertical posts. Panels will likely be laminated glazing with a type of bird film and anti-graffiti coating application. Panels are intended to be removable for maintenance access to the existing railing system. A 6" space from the deck to the underside of the glazing allows for easy removal of leaf clutter and debris that may accumulate behind the panel.

The system is designed as a monolithic element with posts mounted inboard of the existing concrete lantern pilasters and glazing extending in horizontal plane in front of all existing lanterns and railings.

A variant to Option 1 illustrates the same scheme with a jogged approach around the wider pilasters at lantern location thereby affording additional sidewalk width at the typical (narrower) pilasters.

Detail rendering



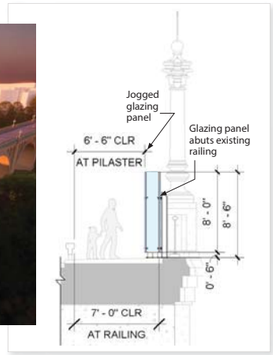
Detail drawings

Examples of glazing film

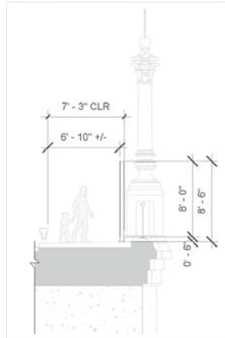
Rendering of glazing panel mounted at railing

Rendering of glazing panel system jogs around pilasters

Rendering at sunset



Section at existing railing



Section at existing railing

Rendering of metal panel system in same plane

Rendering of ClearVu panel system at single lantern

Rendering of panel system at double lantern

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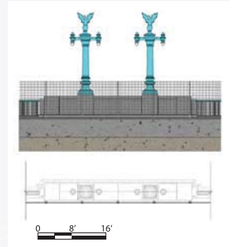
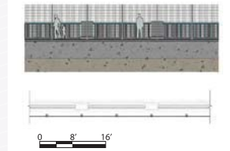
Rendering of view from Rock Creek Park

Rendering of view from Rock Creek Park

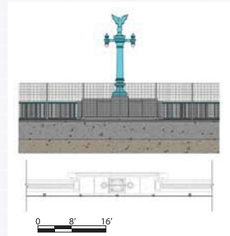
Rendering of view from Rock Creek Park



Double lantern



Existing railing and pilaster



Single lantern

Concept Option 2

Concept Option 2 is a ClearVu metal railing system that is 8'-0" in height attached to regularly spaced vertical posts. The barrier is constructed of a welded wire mesh that can be matched in color with the existing railings and lanterns. The railing system would be a vertical mesh that precludes handholds and footholds. Similar to Option 1, the system would have a gap at the base to allow for removal of leaf debris and cleaning.

This option is a single monolithic element in the same plane along the length of the bridge. Therefore, the ClearVu system is secured close to the face of the pilasters and somewhat removed from the typical pilasters and railings. A variant of Option 2 illustrates a ClearVu system that jogs around the pilasters and keeps the vertical barrier close to the interior face of the existing railing system.

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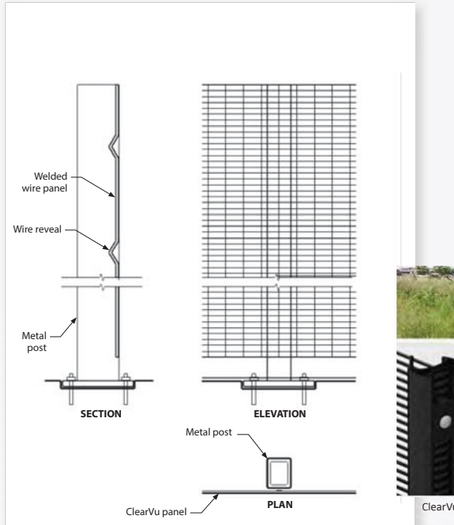
Detail rendering



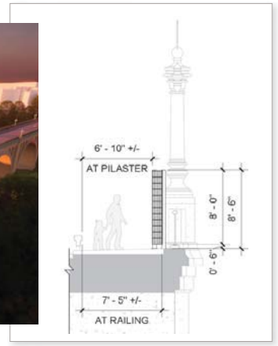
Detail drawings

ClearVu detail image

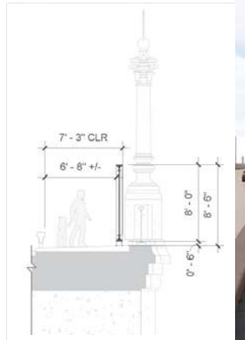
Rendering of ClearVu mounted at railing

Rendering of ClearVu system jogs around pilasters

Rendering at sunset



Section at existing railing



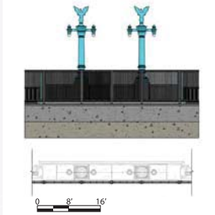
Section at existing railing

Rendering of metal panel system in same plane

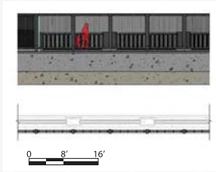
Rendering of panel system at single lantern

Rendering of view from Rock Creek Park

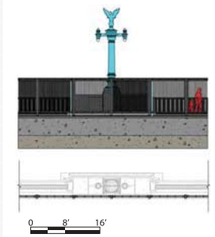
Rendering of view from Rock Creek Park



Double lantern



Existing railing and pilaster



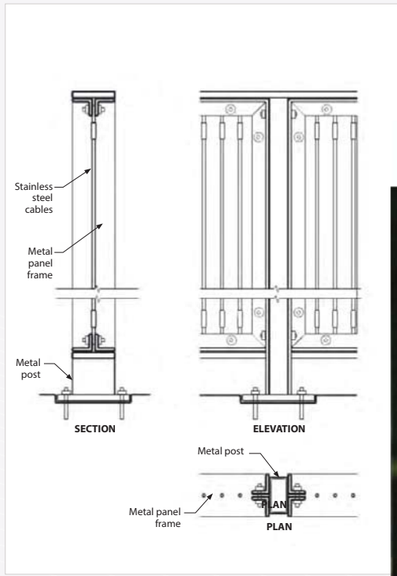
Single lantern

Concept Option 3

Concept Option 3 is a prefabricated metal panel system that is 8'-0" in height. The metal panel system incorporates vertically tensioned stainless-steel wires spaced at 3" intervals. The entire panel would be bolted to vertical steel posts. The system allows for the removal of panels for maintenance access. Post spacing would be similar to that for the Clear-Vu panel system. A gap at the bottom of the panel is provided to allow for easy removal of leaves and debris. Similar to the Clear-Vu system, the vertical stainless-steel wires introduce a modern component that delineates the system from the existing railing system. It is also likely that the color of the system would deviate from the existing railing system. Similar to the Clear-Vu panel system there a translucency to the barrier system except for the vertical support posts and frame.

The option incorporates a system that is a monolithic element that spans in the same plane down the length of the bridge. Vertical posts at the pilasters set the plane for the frame system inboard of the existing railing system. A variant of Option 3 allows for this system to jog around the pilasters and for the panel system to be closer to the existing railing system.

Detail rendering



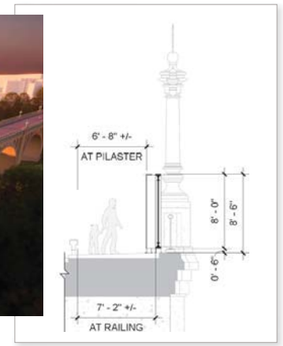
Detail drawings

Stainless steel material

Rendering of metal panel system jogs around pilasters

Rendering of metal panel mounted at railing

Rendering at sunset



Section at existing railing

10.0 REFERENCES AND COST ESTIMATE

- (1) Streets of Washington.com, John DeFerrari, The Million Dollar Bridge November 30, 2009
- (2) Ibid.
- (3) Ibid.
- Maryland Department of Transportation Governor Thomas Johnson Bridge Evaluation of Suicide Deterrent Systems, 2022
- Golden Gate Physical Suicide Deterrent System Project, 2008
- Florida Sunshine Skyway Bridge, 2019
- Comparing Suicide Prevention Measures; National Survey of Switzerland, 2017
- Preventing Suicide by Jumping from Bridges owned by the City of Ithaca and by Cornell University, 2010

CONCEPT 1

$3.9 MILLION +/-

CONCEPT 2

$1.2 MILLION +/-

CONCEPT 3

$2.5 MILLION +/-

EVALUATION CHART

WILLIAM H TAFT MEMORIAL BRIDGE - SUICIDE DETERRENT BARRIERS														EVALUATIONS														
			MATERIALS								ANALYSIS		SAFETY (1 POOR - 3 GOOD)		PHYSCAL DETERRENCE (1 POOR - 3 GOOD)	VISUAL IMPACTS (1 POOR (high Visual Impact) - 3 GOOD (Low Visual Impact))					STRUCTURAL (1 POOR - 3 GOOD)		MAINTENANCE (1 POOR (Higher Maintenance) 3 GOOD (Lower Maintenance))				COST (1 POOR (Higher Cost) - 3 GOOD (Lower Cost))		SUM
SUBSET	NUMBER	CONCEPT OPTIONS	GLAZING	METAL	STONE	COMPOSITE	ACRYLIC	CAST-IRON	CHAIN LINK	OTHER	ADVANTAGES	DISADVANTAGES	SAFETY RISK TO EMERGENCY PERSONNEL	SAFETY RISK TO GENERAL PUBLIC	REDUCES POTENTIAL FOR JUMPING	VISUAL IMPACT TO ROADWAY	VISUAL IMPACT FROM ROCK CREEK PARK	VISUAL IMPACT <1 MILE	IMPACTS TO HISTORIC CHARACTER OF BRIDGE	CONTROVERSIAL SOLUTION	WIND LOADING FACTORS	WEIGHT LOADING FACTORS	COST TO MAINTAIN DETERRENT FEATURES	COST FOR ROUTINE BRIDGE MAINTENANCE	EASE OF CLEANING	OVERALL COST	TOTAL (HIGHER VALUE BETTER)	
		Relative Weight →											2	2	2	2	2	2	2	2	1	1	1.5	1.5	1.5	1.5		
NONE	0	MAINTAIN EXISTING BRIDGE WITH NO MODIFICATIONS	NO	NO	NO	NO	NO	NO	NO	NO	NONE	PROJECT SCOPE NOT SATISFIED. OPTION IS A NON-STARTER	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
INBOARD OF EXISTING RAILING	1	MAINTAIN EXISTING RAILING, NEW GLASS/ACRYLIC 7'-6" CANTILEVERED GLASS PANEL IN FRONT OF EXISTING RAILING AND PILASTERS	YES	NO	NO	NO	NO	NO	NO	NO	1. NO IMPACT TO EXISTING RAILINGS, 2. 7'-6" HEIGHT 3. LIMITED VISUAL IMPACT	1. REDUCES PEDESTRIAN WALKWAY SOME, 2. POTENTIAL FOR DAMAGE TO GLAZING, 3. POTENTIAL FOR GRAFFITTI	3	3	3	2	2	3	2	3	1	1	3	3	3	1	59	
	1a	MAINTAIN EXISTING RAILING, NEW GLASS/ACRYLIC 7'-6" CANTILEVERED GLASS PANEL IN FRONT OF EXISTING RAILING AND ON TOP OF PILASTERS	YES	NO	NO	NO	NO	NO	NO	NO	1. NO IMPACT TO EXISTING RAILINGS, 2. 7'-6" HEIGHT 3. LIMITED VISUAL IMPACT	1. REDUCES PEDESTRIAN WALKWAY SOME, 2. POTENTIAL FOR DAMAGE TO GLAZING, 3. POTENTIAL FOR GRAFFITTI	3	2	3	2	2	3	2	3	1	1	3	3	3	1	57	
	2	MAINTAIN EXISTING RAILING, NEW GLASS/ACRYLIC 7'-6" CANTILEVERED GLASS PANEL IN FRONT OF EXISTING RAILING AND AROUND PILASTERS	YES	NO	NO	NO	NO	NO	NO	NO	1. NO IMPACT TO EXISTING RAILINGS, 2. 7'-6" HEIGHT 3. LIMITED VISUAL IMPACT	1. POTENTIAL FOR DAMAGE TO GLAZING, 2. POTENTIAL FOR GRAFFITTI	3	3	3	2	2	3	2	3	1	1	3	3	3	1	59	
	3	MAINTAIN EXISTING RAILING, NEW GLASS/ACRYLIC 7'-6"GLASS PANEL WITH POSTS. SPAN BETWEEN SECTIONS WITH METAL PANEL OR GLASS	YES	NO	NO	NO	NO	NO	NO	NO	1. NO IMPACT TO EXISTING RAILINGS, 2. 7'-6" HEIGHT 3. LIMITED VISUAL IMPACT	1. POTENTIAL FOR DAMAGE TO GLAZING, 2. POTENTIAL FOR GRAFFITTI	3	3	3	2	2	3	2	3	1	1	3	3	3	1	59	
	4	MAINTAIN EXISTING RAILING, NEW METAL RAILING INBOARD OF RAILINGS AND PILASTERS (CLEAR-VU OPTION)	NO	YES	NO	NO	NO	NO	NO	NO	1. SOME IMPACT TO EXISTING RAILINGS 2. 8'-6" HEIGHT	1. MORE VISUAL IMPACT FROM ROADWAY	3	3	3	2	3	3	2	2	3	2	2	3	2	3	62	
MODIFY EXISTING RAILINGS AT EXISTING PLANE	5	MAINTAIN EXISTING RAILING, ADD NEW METAL RAILINGS ON TOP OF EXISTING RAILING	NO	YES	NO	NO	NO	YES	NO	NO	1. NO IMPACT TO PEDESTRIAN ZONE	1. IMPACT TO EXISTING RAILINGS. 2. CHANGE IN VISUAL APPEARANCE.	2	2	2	1	1	2	1	2	3	2	2	3	2	3	46	
	6	MAINTAIN EXISTING RAILING, ADD NEW GLASS RAILING ON TOP OF EXISTING RAILING	YES	NO	NO	NO	NO	NO	NO	NO	1. NO IMPACT TO PEDESTRIAN ZONE	1. IMPACT TO EXISTING RAILINGS. 2. CHANGE IN VISUAL APPEARANCE.	2	2	2	2	2	3	2	2	2	2	3	3	3	2	54.5	
	7	REPLACE EXISTING METAL RAILING WITH TALLER RAILING AT 8'-0" SPAN BETWEEN PILASTERS WITH RAILING OR METAL PANEL	NO	YES	NO	NO	NO	YES	NO	NO	1. MAINTAINS SIMILAR ARCHITECTURAL VOCABULARY WITH VERTICALITY	1. REMOVES EXISTING BUILDING FABRIC. 2. LOSES CHARACTER OF ORIGINAL	3	3	3	1	2	2	2	2	3	2	2	3	2	3	56	
	8	REPLACE EXISTING METAL RAILING WITH GLASS PANELS, WRAP PANELS AT FRONT OF PILASTERS.	YES	NO	NO	NO	NO	NO	NO	NO	1. NO IMPACT TO PEDESTRIAN ZONE	1. REMOVES EXISTING BUILDING FABRIC. 2. LOSES CHARACTER OF ORIGINAL	3	3	3	2	2	2	1	1	1	2	3	3	3	1	52	
	9	REPLACE EXISTING METAL RAILING WITH NEW RAILING AT 8'- 0" SPAN BETWEEN SECTIONS WITH METAL PANEL	NO	YES	NO	NO	NO	NO	NO	NO	1. MAINTAINS SIMILAR ARCHITECTURAL 2. NO IMPACT TO PEDESTRIAN ZONE	1. REMOVES EXISTING BUILDING FABRIC. 2. LOSES CHARACTER OF ORIGINAL	3	3	3	2	2	2	1	1	3	2	2	3	2	3	54	
	10	REMOVE AND REPLACE RAILINGS WITH NEW METAL RAILINGS. INCREASE HEIGHT OF PILASTERS WITH CONCRETE OR GLASS.	NO	YES	YES	NO	NO	NO	NO	NO	1. MAINTAINS SIMILAR ARCHITECTURAL 2. NO IMPACT TO PEDESTRIAN ZONE	1. LOSS OF HISTORIC RAILING ELEMENTS 2. CHANGES BRIDGE CHARACTER	3	3	3	1	1	2	1	1	3	2	2	3	2	1	47	
MODIFY EXISTING RAILINGS OUTBOARD	11	MAINTAIN EXISTING RAILING, NEW METAL RAILING OUTBOARD OF RAILINGS AND PILASTERS	NO	YES	NO	NO	NO	NO	NO	NO	1. NO IMPACT TO EXISTING RAILING IF SECURED OUTBOARD, 2. NO IMPACT TO PED WALKWAY.	1. POTENTIAL NEGATIVE VISUAL IMPACT 2. CHANGES BRIDGE CHARACTER	2	3	3	1	1	1	1	1	3	1	2	1	2	3	42	
	12	MAINTAIN EXISTING RAILING, NEW GLASS/ACRYLIC RAILING OUTBOARD OF RAILINGS AND PILASTERS	YES	YES	NO	NO	NO	NO	NO	NO	1. NO IMPACT TO EXISTING RAILING IF SECURED OUTBOARD, 2. NO IMPACT TO PEDESTRIAN WALKWAY.	1. POTENTIAL NEGATIVE VISUAL IMPACT, 2. RAILING TO BE HIGHER 3. RAILING +/- 12'-0" 4. OPTION TO BE CANTILEVERED	2	3	3	1	1	1	1	1	3	1	1	1	3	1	39	
OTHER OPTIONS	13	NETTING SYSTEM EXTENDING HORIZONTALLY FROM BRIDGE 13'-0"	NO	YES	NO	NO	NO	NO	NO	YES	1.NO IMPACT TO EXISTING RAILINGS OR ROADWAY VIEWS.	1. MAINTENANCE COSTS 2. VISUAL IMPACT FROM GROUND, 3. OPPORTUNITY FOR CLIMBING	1	1	1	3	1	1	1	1	3	3	1	1	3	1	35	
	14	NETTING/METAL PANEL SYSTEM MOUNTED OUTBOARD OF BRIDGE	NO	YES	NO	NO	NO	NO	NO	YES	1. OUTBOARD SOLUTION THAT IS AWAY FROM EXISTING RAILING ONLY NEEDS TO BE 8'-0"	1. VISUAL IMPACTS ROADWAY AND GROUND, 2. MAINTENANCE COSTS, 3. VISUAL IMPACTS FROM GROUND	2	3	3	1	1	1	1	1	3	3	1	1	3	3	44	
	15	ENCLOSURE OPTION	YES	YES	NO	NO	NO	NO	NO	YES	1.NO IMPACT TO PEDESTRIAN WALKWAY	1.VISUAL IMPACT ROADWAY AND GROUND. 2. MAINTENANCE COSTS	2	2	3	1	1	1	1	1	3	3	2	1	3	1	40.5	

GOVERNMENT OF THE
DISTRICT OF COLUMBIA
MURIEL BOWSER, MAYOR

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