LONG BRIDGE PROJECT
SOUTH PACKAGE

DESIGN-BUILD
REQUEST FOR QUALIFICATIONS

RFQ No.: 1-001-23-0002

LONG BRIDGE PROJECT
Connecting North and South Through our Nation's Capital

DATE: June 30, 2023

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1. INTRODUCTION

The Virginia Passenger Rail Authority ("VPRA") is issuing this Request for Qualifications ("RFQ") to obtain Statements of Qualification ("SOQs") from firms interested in serving as the Design-Builder under a Design-Build Agreement ("DBA") for the South Package of the Long Bridge project. The procurement process for the Project will consist of two steps: (1) a RFQ step to identify a Shortlist of qualified firms; and (2) a Request for Proposals ("RFP") step during which the Shortlisted firms will each be invited to submit a Proposal to serve as the Design-Builder. The overall process will identify the firm with the best qualifications, approach, and price to design and construct the Project.

In the first step of this procurement process, interested firms will submit SOQs detailing the firm's relevant project experience, Key Personnel, and summary approach to the Project and quality management. In the second step of the process, firms named to the Shortlist will be invited to submit Proposals containing a detailed approach to the Work, risk management, quality management, Disadvantaged Business Enterprise ("DBE") utilization, and lump-sum price to design and construct the Project.

SOQs must meet all requirements established by this RFQ. Requirements of this RFQ generally will use the words "shall", "will", or "must" (or equivalent terms) to identify a required item that must be submitted with the SOQ. Failure to meet a RFQ requirement may render a SOQ non-responsive, while the extent to which a Respondent meets or exceeds evaluation criteria will be rated by the Evaluation Team and be reflective of the Evaluation Team's scoring (in its sole discretion) of SOQs.

Unless otherwise defined herein, capitalized terms shall have the meanings set forth in Appendix 1.

1.1. Project Information

1.1.1. Long Bridge Project Overview

The Long Bridge corridor is a vital link connecting the local, regional, and national transportation networks, and the project is critical to ensuring that the Long Bridge corridor can meet future rail needs. Current service along the corridor does not provide sufficient capacity and redundancy to meet projected future demand for railroad services in the region. The overall Long Bridge project will add capacity to a busy rail travel corridor through construction of a modern rail bridge from Washington, D.C. into Virginia.

The corridor is a 1.8-mile railroad corridor between Rosslyn interlocking in Arlington, Virginia and L'Enfant Interlocking near 10th Street SW in the District of Columbia. The primary component of the Long Bridge project is a new two-track bridge upstream of the existing Long Bridge. The existing bridge will be retained to create a four-track crossing. The Long Bridge project additionally consists of environmental mitigation measures including a new bike-pedestrian shared use path across the George Washington Memorial Parkway and the Potomac River.

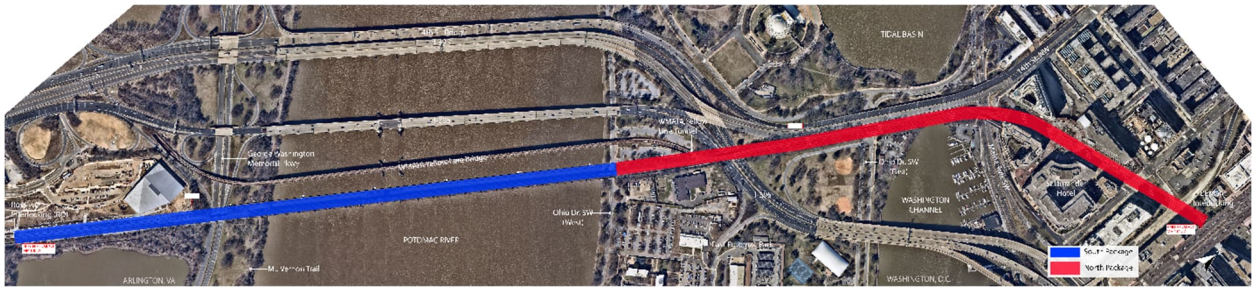
The Long Bridge project will allow for the separation of passenger and freight traffic while maintaining interoperability of passenger and freight rail for all four tracks. The existing eastern pair of tracks will be used primarily for CSX Transportation, Inc. ("CSXT") freight rail, while the western pair of tracks will be used primarily for passenger rail, including the National Railroad Passenger Corporation ("Amtrak") and Virginia Railway Express ("VRE").

At the southern end of the project in Virginia, a new two-track railroad bridge will be constructed over the George Washington Memorial Parkway, Mount Vernon Trail, Potomac River, and Ohio Drive SW (West) to the west of the existing Long Bridge. The project will continue through East Potomac Park, crossing over the portal to the Washington Metropolitan Area Transit Authority ("WMATA") Yellow Line tunnel and I-395 with a new two-track bridge, while retaining the existing I-395 rail bridge. After crossing I-395, the project will continue with four-track bridges, replacing the existing two-track bridges at Ohio Drive SW (East), the Washington Channel, and Maine Avenue SW.

The four tracks will continue underneath the Maryland Avenue SW overbuild, travel along the existing corridor underneath 12th Street SW and the 12th Street Expressway and tie into the four tracks proposed at L'Enfant Interlocking under a separate project led by VRE. Construction will occur within the Potomac River and Washington Channel. The project scope will require the installation of signal/communication systems (led by CSXT), as well as potential early works packages for utility relocations, and soil improvements.

The overall Long Bridge project consists of two primary construction packages, referred to as the North Package and South Package. The Project that is the subject of this RFQ is the South Package shown in blue in the graphic below (the North Package is shown in red).

Figure 1-1: Program Map



1.1.2. South Package Project Description and Scope

The South Package includes work from the Rosslyn Interlocking in Arlington, Virginia to the northern abutment of the New Long Bridge on the north side of Ohio Drive SW (West) in East Potomac Park in Washington, D.C. As part of this package, a new two-track railroad bridge and a bicycle/pedestrian bridge will be constructed over the George Washington Memorial Parkway, Mount Vernon Trail, Potomac River, and Ohio Drive SW (West) to the west of the existing Long Bridge.

The existing CSXT owned George Washington Memorial Parkway ("GWMP") Rail Bridge and 1904 Long Bridge, modified in 1942, over the Potomac River and Ohio Drive SW (West), known as the Long Bridge, will be retained. The Potomac River Undergrade Bridge will be constructed adjacent to the existing GWMP bridge and Long Bridge to accommodate two additional tracks as part of the overall Long Bridge Project Corridor Improvements. The proposed Potomac River Undergrade Bridge will combine all crossings into one continuous structure from the GWMP to Ohio Drive SW (West) in East Potomac Park. These improvements are intended to minimize impacts to the GWMP and the existing tracks, provide improved horizontal clearance between railroad centers, and provide a structure to meet a minimum design life of 100 years.

The Project limits include:

(a) Northern terminus: North side of Ohio Drive SW (West) in East Potomac Park; and

(b) Southern terminus: South end of Rosslyn Interlocking (RO) (the interlocking is not included in this package).

The South Package will consist of the following major scope items:

(a) Early and enabling work (i.e., demolition, sitework, utility relocations, etc.);

(b) Construction of railroad embankment fills;

(c) New non-CSXT-owned trackwork;

(d) CSXT Track and Signals (to be performed by CSXT);

(e) New two track rail bridge over the GWMP and the Potomac River (From GWMP, across the Potomac and landing in East Potomac Park past Ohio Drive SW (West));

(f) New bicycle-pedestrian bridge over the GWMP and the Potomac River (From Long Bridge Park, across GWMP, Potomac River and Landing in East Potomac Park at Ohio Drive SW (West);

(g) Connections at Long Bridge Aquatic Center, Mount Vernon Trail, and Ohio Drive SW (West);

(h) New Retaining Walls at GW Parkway and associated embankments;

(i) Fender System within the Potomac River Navigational Channel;

(j) Landscaping – Protection and Restoration;

(k) Erosion and sediment control;

(l) Maintenance of Traffic for Roadway and Waterway;

(m) Roadway work;

(n) Right-of-Way coordination;

(o) Coordination with regulatory agencies, and property owners;

(p) Securing of applicable permits;

(q) Public and stakeholder outreach; and

(r) Coordination with adjacent projects and owners.

VPRA is delivering the Project in partnership with CSXT, Amtrak, VRE, District Department of Transportation (“DDOT”), National Park Service (“NPS”), and other local agencies with jurisdiction over the Project area. VPRA and the Design-Builder will work closely with these agencies to coordinate the Work and ensure that design and construction conform to applicable specifications and requirements. DDOT, CSXT, and Amtrak will participate in the design review process and will

have approval authority over design packages that impact certain portions of the Project.[1] Other agencies may also participate and have approval authority over certain aspects of the Design.

Key project development principles include:

(a) All mainline tracks will be designed to meet or exceed the existing speeds through the project area;

(b) Both new and existing mainline tracks will be designed for resiliency, redundancy, interoperability, and connectivity between all passenger and freight service;

(c) Utilization of ongoing and previously completed studies, concept development, and rail improvement designs in the Corridor to the extent feasible and practicable;

(d) Recommended bridge type for the Potomac River Undergrade Bridge Crossing to consist of the following:

   a. Simply supported through plate girder spans ranging in length from approximately 75 feet 1.5 inches to 139 feet 3 inches; and

   b. Two railroad tracks;

      i. 15-foot minimum distance between the centerline of the track;

      ii. Ballasted deck construction; and

      iii. Cast in place piers and abutments founded on deep foundations; and

(e) The following design items are anticipated to require design waivers:

      i. Design maximum of 12 inches of future ballast; and

      ii. Design meeting a minimum of Cooper E-80 loading.

Additional information about the Project is provided in Exhibit B.

1.1.3. Additional Project Information

The South Package work will require attention to the following:

(a) Portions of the work will require permits from entities such DDOT, District Department of Buildings ("DOB"), District Department of Energy and Environment, US Army Corps of Engineers, US Coast Guard, and Federal Aviation Administration, among others.

(b) There are numerous utilities throughout the corridor that will need to be relocated to accommodate the bridge structures.

(c) There are 27 spans (26 piers) for both the Potomac River Rail Bridge and Potomac River Bike-Ped Bridge, with 22 of the 26 piers in the Potomac River. There is the potential for 188 drilled shafts with a range of diameters between five and eight feet. Considering the in-water work restrictions and contract completion date, there is the potential to require

[1] As part of VPRA's delivery of the Project, VPRA is obligated to provide certain indemnifications to CSXT and Amtrak that will be passed-through to the Design-Builder. These indemnification obligations are attached as Exhibit A and are non-negotiable.

more than four drilled shaft rigs working simultaneously, which does not include any additional drill rigs that may be required for the other bridges north of the Potomac River.

(d) The project is located approximately 0.75 mile north of Reagan National Airport and is directly in the flight path of Runway 1/19. As such, during normal airport operations, there are restrictions on how high a crane or pile may extend in the air. Based on early coordination efforts with FAA, it is VPRA's understanding that equipment may not extend beyond 80 feet on the south side of the river during airport operational hours (5AM to 12AM). VPRA additionally anticipates restrictions on the north side of the river.

(e) Based on early coordination with DOB, it is anticipated that there will be noise restrictions imposed on the Project of no more than 80db at the property line of the sensitive receptor and pile driving only allowed between 7AM to 7PM Monday through Saturday.

(f) The depth of the Potomac River varies along the alignment. The width of the river is approximately 2300 feet at the Project location. The water reaches a depth of approximately 10 feet below mean low water (MLW) within 100 feet from the Virginia shore. The river depth remains 10 to 22 feet below MLW until about 1200 feet from the Virginia shore, reaching a maximum of about 26 feet below MLW in the navigational channel. Further north depths are shallower, reaching a minimum of 5.5 feet below MLW about 600 feet from the District of Columbia shore, mostly providing at least 6-10 feet below MLW from 900 to 100 feet from the District of Columbia shore.

1.1.4. Environmental Status

In 2011, DDOT received a High-Speed Intercity Passenger Rail grant from Federal Railroad Administration ("FRA") to complete a two-phase feasibility and planning study of the rehabilitation or replacement of Long Bridge. In 2016, FRA awarded DDOT a Transportation Investment Generating Economic Recovery grant for Phase III of the Long Bridge Project, which includes the NEPA process. The grant funded the development of the Environmental Impact Statement, Section 4(f) Evaluation, and Record of Decision ("ROD"), including conceptual and preliminary engineering to support the analysis of alternatives, analysis of environmental impacts, and identification of a Preferred Alternative on November 29, 2018.

In September 2019, the Draft Environmental Impact Statement ("DEIS") was finalized. The DEIS considered a No Action Alternative, Action Alternative A (the ultimate Preferred Alternative), and Action Alternative B. The Project received a Final Environmental Impact Statement ("FEIS") and ROD from the FRA on August 12, 2020 which can be found at https://vapassengerrailauthority.org/transforming-rail-in-virginia/long-bridge/#doc-library.

1.1.5. Role of VPRA

In the context of the Project, VPRA is responsible for:

(a) Providing the Conceptual Design;

(b) The appropriate environmental clearances and mitigation based on the Conceptual Design, except for those obligations specifically assigned to the Design-Builder;

(c) Overall program administration;

(d) Project financing;

(e) Preparation of the RFQ and RFP, evaluation of SOQs and Proposals, determination of

the Shortlist and selection of Design-Builder;

(f) Contract procurement and administration;

(g) Design Independent Quality Assurance and Construction Quality Acceptance;

(h) Geotechnical data included in the RFP, subject to the conditions specified in the Design-Build Agreement;

(i) Land acquisition for rights-of-way, permanent easements, and temporary construction easements necessary for the Conceptual Design, except for those obligations specifically assigned to the Design-Builder;

(j) Acceptance of work and payment for work;

(k) Initial utility coordination efforts; and

(l) Preliminary utility information identified in the RFP, subject to the conditions specified in the Design-Build Agreement.

At VPRA's sole discretion, it may use its consultants in fulfilling the responsibilities noted in this Section 1.1.5.

1.1.6. Design-Builder Responsibilities

The Design-Builder will be responsible for:

(a) All work necessary to design and construct the Project;

(b) Certain public information roles to alert the public of traffic and construction;

(c) Coordination with Project stakeholders, other contractors, and utility owners;

(d) Design Quality Control and Quality Assurance (by the Independent Design Quality Manager ("IDQM"));

(e) Construction Quality Control;

(f) Environmental mitigation efforts assigned to the Design-Builder;

(g) Environmental permitting efforts assigned to the Design-Builder;

(h) Obtaining governmental approvals for the Project;

(i) Maintenance and protection of traffic;

(j) Maintaining access to adjacent facilities;

(k) Project safety and security;

(l) Preliminary and final engineering;

(m) Geotechnical investigations;

(n) ITS design and integration;

(o) Preparation of permitted design exceptions;

(p) Management and remediation of hazardous materials;

(q) Drainage and erosion control;

(r) Construction waste disposal;

(s) Obtaining and maintaining required clearances, licenses, and permits;

(t) Assistance in obtaining additional ROW or temporary construction easements desired for Design-Builder's convenience;

(u) Obtaining temporary work areas for Design-Builder's convenience;

(v) Material acquisition, permits, and transportation;

(w) Utility coordination and relocation, and protection of existing facilities;

(x) Compliance with the utility agreements;

(y) Site clearance and demolition; and

(z) Such other responsibilities to be stated in the Contract Documents.

1.2. Project Goals

VPRA's goals for the Project are:

(a) Substantial completion of Construction Work on or before December 2030;

(b) Maximizing the innovation potential of contractor involvement in the design-build method;

(c) Managing costs and completing the Project within budget;

(d) Safe construction, including ensuring worker safety and the safety of the traveling public;

(e) Efficient construction in a congested area and in consideration of limited space to stage on either side of the Potomac, height restrictions on construction operations, and other limitations due to the proximity to Reagan National Airport;

(f) Compliance with environmental mitigation measures for construction over the Potomac River;

(g) Maximizing community engagement and the use of DBE firms;

(h) Minimizing the impacts of construction to the public, stakeholders, CSXT, VRE, Amtrak, Authorities Having Jurisdiction ("AHJs"), and government agencies, including construction noise and disruptions;

(i) Innovation around building plan and construction methods that are in compliance with commitments made to AHJs; and

(j) enhancement of access to rail services in the Commonwealth by creating an efficient gateway between Washington, D.C. and the Commonwealth.

1.3. Single Point of Contact

VPRA's single point of contact ("Point of Contact") for matters relating to this procurement shall be:

John Kostyniuk, Director of Procurement
919 E. Main Street, Suite 2400
Richmond, VA 23219
(804) 339-2604
procurement@vpra.virginia.gov

All communications regarding the procurement shall be directed to the Point of Contact. Only written communications received from the Point of Contact may be relied on throughout this procurement, subject to any limitations under the DBA regarding reliance on certain materials provided. VPRA is not responsible for oral communications or other communications that occur outside the communications protocol established by this RFQ.

1.4. Rules of Contact

As of the date of issuance of this RFQ, no Respondent shall contact any employee or representative of VPRA concerning this RFQ or the Project, including members of VPRA's Board of Directors, except for the Point of Contact as specifically permitted in this RFQ. This prohibition does not apply to discussions with VPRA not related to this RFQ or the Project.

The following entities are considered "representatives" of VPRA during this procurement and may not be contacted by any means whatsoever concerning this RFQ or the Project:

(a) WSP USA Inc.;
(b) Vanase Hangen Brustlin, Inc.;
(c) Kimley-Horn and Associates, Inc.;
(d) Rummel, Klepper, and Kahl, LLP;
(e) Modjeski & Masters, Inc.;
(f) Michael Baker International;
(g) Gannett Fleming, Inc.;
(h) Mott MacDonald, Inc.;
(i) Hardesty & Hanover, LLC; and
(j) Jacobs Solutions, Inc.

In addition, Respondents are prohibited from contact with the following stakeholders concerning this RFQ or the Project:

(a) CSXT;
(b) Amtrak;
(c) VRE;
(d) DDOT;
(e) NPS;
(f) Utility owners;
(g) Other governmental agencies with jurisdiction;
(h) Adjacent landowners; and
(i) Business owners in the vicinity of the Project.

Further, no Respondent, or any constituent entity or personnel thereof may communicate with another Respondent or members thereof with regards to this RFQ or the Project. However, notwithstanding the foregoing, Respondents may communicate with Subcontractors that have been identified as part of multiple Respondents (where membership on multiple Respondents is not prohibited under the terms of this RFQ), provided that Respondents establish a protocol to ensure that the prospective Subcontractor will not impermissibly share information between Respondents or otherwise allow for collusion or the appearance thereof.

These rules of contact shall apply until the earliest of the following:

(a) amendment to the rules of contact by VPRA, or superseding of these rules in the RFP;

(b) the execution of the DBA and the expiration of any applicable protest period or resolution of any protest then pending; or

(c) notification by VPRA of cancellation of the procurement.

Any communication prohibited by these rules may be grounds for a firm's disqualification from further participation in the procurement. VPRA may disqualify any Person for violation of these rules in its sole discretion.

1.5. Conflict of Interest

VPRA's procurement of the Project is governed by VPRA's Organizational Conflict of Interest Policy, available at: https://vapassengerrailauthority.org/wp-content/uploads/2022/09/VPRA-Organizational-Confict-of-Interest-Policy_Executed-FINAL_Effective-08_24_2022_V1.pdf. Prior to submission of a SOQ, a Respondent may request that VPRA determine whether a specific conflict of interest exists by following the process in VPRA's Organizational Conflict of Interest Policy.

Respondents are required to provide information concerning potential organizational conflicts of interest in their SOQs. Respondents must state how their interests, or those of their Principal Participants, Affiliates, chief executives, directors, Key Personnel, or any proposed consultant, contractor or Subcontractor may result, or could be viewed as, an organizational conflict of interest. The information shall be submitted on Form E.

VPRA will review the information submitted and make a written determination of whether the Respondent's interests create an actual or apparent organizational conflict of interest. VPRA may award the DBA to a Respondent where an organizational conflict of interest is determined to exist, provided that VPRA determines that the conflict can be avoided, neutralized, or mitigated.

If, after award of the DBA, an organizational conflict of interest is discovered, the Design-Builder must make an immediate and full written disclosure to VPRA, including a description of the action taken to avoid, neutralize or mitigate the conflict. If it is determined that the Design-Builder was aware, or should have been aware, of an organizational conflict of interest prior to award of the DBA and did not disclose the conflict to VPRA, VPRA may terminate the contract for default and/or exercise any other remedies available.

If the Proposer selected to be design-builder for the North Package (or a constituent entity of the selected design-builder) intends to pursue work on the South Package, whether individually, as part of a joint venture, as a subcontractor, or otherwise, that Proposer must evaluate any real or apparent conflict of interest that could arise as a result of the engagement, and where appropriate,

seek a conflict of interest determination from VPRA in accordance with the Organizational Conflict of Interest Policy. Any significant potential organizational conflict of interest that cannot be effectively neutralized or mitigated, will result in that Proposer (or a constituent entity) being deemed ineligible from participating in the South Package procurement.

1.5.1. Ineligible Firms

VPRA and other interested entities retained the following Persons to assist in the preparation of technical specifications, Project scope of work, or consultation in the development of the qualifications and evaluation criteria for the SOQs and Proposals:

(a) WSP USA Inc.;
(b) Vanasse Hangen Brustlin, Inc.;
(c) Kimley-Horn and Associates, Inc.;
(d) Rummel, Klepper, and Kahl, LLP;
(e) Modjeski & Masters, Inc.;
(f) Michael Baker International;
(g) Gannett Fleming, Inc.;
(h) Mott MacDonald, Inc.;
(i) Hardesty & Hanover, LLC; and
(j) Jacobs Solutions, Inc.

These Persons are not eligible to participate in this procurement on any Respondent team in any capacity. VPRA made this determination in accordance with its Organizational Conflict of Interest Policy. If any firm listed above desires to appeal this determination of its ineligibility, such appeal must be made accordance with the procedures set forth in Section 2.6 of the Organizational Conflict of Interest Policy.

In VPRA's discretion, exceptions may be granted on the grounds provided in the Organizational Conflict of Interest Policy. VPRA's reconsideration determination will be in writing.

1.6. Legal Authority

VPRA is conducting this procurement in accordance with the Procurement Rules adopted by VPRA pursuant to Va. Code § 33.2-299.1 and intends to execute the DBA pursuant to its powers granted under Va. Code § 33.2-292. This procurement is not subject to the Virginia Public Procurement Act (Va. Code § 2.2-4300 *et seq*.) or any of its companion acts (e.g., Chapter 43.1 of Title 2 of the Code of Virginia, "Construction Management and Design-Build Contracting").

1.7. Federal Funding and Requirements

VPRA anticipates receiving financial assistance from the U.S. Department of Transportation ("DOT") in the form of grant(s) and/or cooperative agreement(s) through a DOT Component, including the Federal Transit Administration ("FTA") and the Federal Railroad Administration ("FRA"). Accordingly, this procurement and the DBA shall be subject to all requirements associated with DOT federal financial assistance provided by a DOT Component. Additional details concerning federal requirements will be specified in the RFP and DBA documents.

1.8. Disadvantaged Business Enterprises

In accordance with 49 C.F.R. Part 26, VPRA seeks to maximize opportunities for the participation of DBE firms on the Project. To facilitate the use of DBE firms, the RFP will require Proposers to, among other things, submit a DBE Utilization Plan (Form PD 51B), which plan will be scored as part of the evaluation criteria. No DBE contract goal will apply to this solicitation; however, VPRA's draft Triennial Goal Methodology (FFY 2024-2026) designates an overall goal of 7.05% DBE participation on FTA-assisted contracts.

To qualify as a DBE for the Work, a firm must be certified as such by the Department of Small Business and Supplier Diversity ("DSBSD") or the Metropolitan Washington Airports Authority ("MWAA") at the time a Proposal submits its Proposal. A list of certified DBE firms is maintained on the DSBSD website (www.sbsd.virginia.gov) under the DBE/SWAM Certification Directory link.

VPRA is in the process of obtaining FTA approval of its DBE Program Plan and related items. The DBA will be subject to the DBE Program Plan once approved by the FTA.

1.9. Respondent Composition

Principal Participants, the Lead Designer, IDQM firms, and Key Personnel identified in the SOQ may not be removed, replaced, or added without written approval from VPRA. If Respondent requests to change a Principal Participant, the Lead Designer, IDQM, or Key Personnel after notification of the Shortlist, and VPRA approves the change, VPRA will re-assess and re-score the qualifications of the Respondent and determine whether the substitution affects eligibility to be named to the Shortlist. If VPRA determines that the approved, amended organization remains qualified to be named to the Shortlist, VPRA's re-assessed SOQ score for the Respondent organization will be the score carried forward to the RFP phase. If VPRA determines that the new Respondent organization is not qualified for the Shortlist, VPRA may remove the Respondent from the Shortlist.

A written request from a Respondent to change Respondent's organization must document the proposed change, identify good cause for the change, and demonstrate that the change will be equal to or better than the Principal Participant, Lead Designer, IDQM, or Key Personnel submitted in the SOQ. Requests to change Respondent's organization must also be accompanied by all forms required to be submitted by the RFQ with the new organization's information.

Additionally, VPRA may disqualify a Respondent if any of its Principal Participants or Lead Designer belongs to more than one Respondent organization, or if any Affiliate of Respondent or any of its Principal Participants or Lead Designer is a member of another Respondent organization.

1.10. Licensing Requirements

Prior to execution of the DBA, all Persons participating in this procurement and/or the DBA must obtain all licenses and permits and take all necessary steps to conduct business in the Commonwealth consistent with the laws of the Commonwealth. Respondents are advised that the Project may involve the multi-jurisdictional practice of professional services (the Commonwealth and the District of Columbia). It is incumbent upon each Respondent to investigate all applicable licensure requirements and possess such qualifications as may be required for the performance of the Work. Failure to comply with applicable law with regard to any

registration or licensure requirements, whether business, individual, or professional in nature may result in VPRA declining to execute the DBA, in the sole and reasonable discretion of VPRA.

Respondents shall be required to have all required licenses at the time of execution of the DBA and will be required to submit evidence that Key Personnel and other specified individuals have all required licenses as a pre-condition to execution of the DBA.

1.11. Quality Management

Quality is a key priority for the Project. For the Design, VPRA anticipates that quality management will be performed by having the Design-Builder perform Quality Control and Quality Assurance (through the IDQM), while VPRA will perform Independent Quality Assurance ("IQA"). For the Construction Work, the Design-Builder will perform Quality Control and VPRA will perform Quality Acceptance.

1.12. Safety, Job Quality, and Workforce Assurance

Respondents shall consider the use of a South Package-specific workforce agreement if such agreement results in a safer, more efficient delivery of the South Package. Such agreement would be between the successful Design-Builder and one or more labor organizations, and would provide the following: (i) a guaranteed supply of qualified labor, (ii) a prohibition against strikes and lockouts (and similar labor disruptions), (iii) uniform procedures for resolving project-related disputes, and (iv) provisions governing worker safety. Any such agreement must conform to all applicable laws[2] and regulations; it may neither require nor prohibit workers to be union members or to pay union dues in order to work on the Project.

2. PROCUREMENT PROCESS

2.1. Procurement Schedule

Below is VPRA's planned schedule for this procurement. VPRA reserves the right to amend these dates in its sole discretion.

Activity	Timeline
Request for Letters of Interest Issued	November 16, 2022
Letters of Interest Received	December 30, 2022
Release of RFQ	June 30, 2023
Industry Day	10:00 – 11:30am, July 24, 2023
First Request for Clarifications Due	July 28, 2023
Last Day to Request One-on-One Meeting	August 17, 2023
One-on-One Meeting	August 31, 2023
Second Request for Clarifications Due	September 29, 2023
SOQ Due Date	November 30, 2023
Shortlist Announced	January 2024
Release of RFP	February 2024
ATCs Due	March 2024

[2] Project-specific agreements are permitted under District of Columbia law. With respect to Virginia law, among other laws, any such agreement must comply with Article 3 of Chapter 4 of Title 40.1 of the Code of Virginia (Denial or Abridgement of Right to Work) – colloquially called Virginia's "right to work statute."

ATC Decisions	May 2024
Proposals Due	July 2024
Announcement of Preferred Proposer	August 2024
Contract Execution	October 2024
Start of Construction	April 2025
Substantial Completion of Construction	December 2030 (or earlier)

2.2. Design-Build Process

This procurement will consist of two steps: (1) a RFQ process that identifies a Shortlist of Respondents determined by VPRA to be most qualified to complete the Project; and (2) a RFP process in which the Shortlist submits Proposals identifying such information as their approach to the Project and plan to manage the Project, among other information. Additional details of each step are identified below.

2.2.1. RFQ Phase

The RFQ phase will identify a Shortlist of Respondents determined to be most qualified to complete the Project in accordance with VPRA's goals. SOQs submitted in response to this RFQ will first be reviewed for compliance with the pass/fail requirements. SOQs receiving a "pass" on all pass/fail requirements will then be reviewed based on qualitative evaluation criteria. The Shortlist of firms that will be invited to submit Proposals will be determined based on evaluation of the qualitative criteria set forth herein. This RFQ sets out what is required during the RFQ phase of the procurement (see Section 4 for SOQ submittal requirements).

2.2.2. RFP Phase

The RFP will provide further specific instructions on submission requirements, the evaluation criteria, and the objectives and requirements for evaluation. Evaluation factors for the RFP are anticipated to include, but not be limited to:

(a) Pass/Fail;

(b) Technical approach;

(c) Quality management approach;

(d) Project management approach; and

(e) The lump-sum price to complete the Work.

Information to be submitted in the Proposals may include, but not be limited to:

(a) Documents demonstrating ability to enter the Design-Build Agreement with VPRA;

(b) Proposal Bond set at 5% of the Contract Price;

(c) Technical approach, including concepts for rail and bridge construction, structures, geotechnical investigation and design, maintenance of traffic, mass grading earthwork, drainage (temporary and permanent), utility coordination and relocations, compliance with local AHJ requirements, compliance with CSXT and Amtrak standards, obtaining and compliance with required permits, techniques proposed to accelerate critical work activities, avoidance of rework, and future maintenance;

(d) Preliminary baseline critical path schedule depicting key activities to achieve timely completion of the Project;

(e) Approach to quality management, including the identification of key processes and individuals to ensure that Design-Builder completes a quality Project;

(f) Project management approach, including organizational structure, coordination between design and construction, constructability review, delegation of authority, schedule and budget controls, partnering, claims avoidance and mitigation, and document control;

(g) Specified design documents and conceptual diagrams and sketches; and

(h) Price Proposal.

The RFP process will include the opportunity for Proposers to submit Alternative Technical Concepts ("ATCs") that allows Proposers to submit innovative design and construction concepts to VPRA. Permitted ATCs will consist of proposed changes to the Technical Provisions that a Proposer contends will enhance the Project and/or reduce the costs or time to complete the Project. Additional details of the ATC process will be included in the RFP.

VPRA will score Proposals using a best value methodology, which accounts for a balance of technical and price factors. While price is an important factor in the RFP phase of the procurement, Proposers' technical approach, management approach, and quality will also be significant factors in determining the success of the Project.

The relative weights of technical and price in the best value proposal score will be specified in the RFP.

2.2.3. Self-Performance

The Principal Participants (other than the Lead Designer, if the Lead Designer is a Principal Participant) are required to self-perform no less than 30% of the value of Construction Work.

2.3. RFQ Process

2.3.1. RFQ Questions

Respondents may submit questions to VPRA pertaining to the RFQ. Questions must be submitted via e-mail to the Point of Contact by the deadline in the Procurement Schedule. All questions must contain the following information, to the extent applicable, and shall be on Form M, which Respondents shall submit in Microsoft Word format:

(a) RFQ Section Number or Form Number; and

(b) Question.

Respondents submitting a question that contains proprietary or other confidential information may identify the question as confidential by submitting Form N with the question(s). VPRA will review questions marked confidential and if it concurs that the question contains confidential information, will not make the question or response public. If VPRA disagrees that the question contains confidential information, VPRA will notify the Respondent submitting the question and provide the option to withdraw the question, amend the question, or allow the question to remain submitted without confidentiality protection.

Except for questions containing proprietary or confidential information, VPRA will post all questions received and VPRA's responses on the VPRA Website.

2.3.2. RFQ One-on-One Meetings

VPRA will offer the opportunity to conduct One-on-One Meetings with each Respondent on the date set forth in the Procurement Schedule to discuss issues and clarifications regarding the Project and the Project-related documents or communications provided by VPRA or the Respondent, including RFQ Questions submitted by the subject Respondent in accordance with Section 2.3.1.

Each One-on-One will be held at a time and location as determined by VPRA. One-on-One(s) may be conducted in-person, virtually or a hybrid of the two. One-on-One meetings are not mandatory; however, VPRA encourages interested firms to participate. Interested Respondents must request a One-on-One meeting by the deadline stated in the procurement schedule. Requests shall be made to the Point of Contact. VPRA shall notify each interested Respondent in writing of the scheduled time, place, date, and duration of the One-on-One meeting.

Respondents will choose the topics for discussion and prepare a meeting agenda, which must be submitted to the Point of Contact a minimum of five (5) business days in advance of the scheduled meeting. Meeting agendas must include the topics, schedule, appropriate RFQ Question references, and an attendee list to allow VPRA to identify the appropriate decision-makers and support personnel to participate in the One-on-One.

The One-on-One discussion is intended to enable the Respondent to ask questions concerning the procurement and to allow VPRA to provide feedback on those questions prior to the Respondent submitting their SOQ. VPRA's verbal feedback, comments, voiced concerns, and answered questions concerning the Respondent's approach to the project shall be non-binding.

The One-on-One shall be one (1) hour in length, and the Respondent can decide how to allocate the time of the One-on-One. This should be identified in the submitted agenda.

2.3.2.1. One-on-One Rules

The One-on-Ones are subject to the following rules:

(a) The One-on-One is intended to provide Respondents with a better understanding of the Project and the Project-related documents or communications provided by VPRA.

(b) VPRA may raise its own questions and issues for discussion at One-on-Ones.

(c) During a One-on-One, Respondents may ask questions, and VPRA may provide responses; provided, however, that any responses provided by VPRA during such One-on-One may not be relied upon by the Respondent. Nothing stated at any One-on-One will modify this procurement unless incorporated through an Addendum.

(d) VPRA, except as provided in this RFQ, will not discuss with any Respondent any information submitted by any other Respondent.

(e) VPRA reserves the right to limit the subject matter of a One-on-One as it deems appropriate.

(f) Respondents shall not seek to obtain commitments from VPRA in a One-on-One or otherwise seek to obtain an unfair competitive advantage over any other Respondent.

(g) No aspect of any One-on-One is intended to provide any Respondent with access to information that is not similarly available to other Respondents. Material information about the Project or procurement that VPRA reveals or discusses in response to questions raised in a One-on-One may, except as provided in this RFQ, be revealed to the other Respondents by VPRA, in its sole discretion, if VPRA believes such disclosure is necessary in the interest of maintaining a fair procurement process or complying with any applicable law.

(h) No part of the evaluation of Proposals will be based on the conduct or discussions that occur during a One-on-One.

(i) Information shared in One-on-One meetings is not confidential. VPRA may issue an addendum to the RFQ or otherwise adjust the procurement process based on information discussed during the One-on-One meetings.

2.3.3. RFQ Addenda

VPRA may amend the RFQ from time to time in its sole discretion. Any such amendments shall be incorporated into the RFQ through an addendum that will be published on the VPRA Website. Upon submission of a SOQ, Respondents will be required to affirm receipt of all issued addenda using Form A.

2.3.4. VPRA Requests for Clarification

It is the responsibility of the Respondent to provide accurate and complete information to VPRA. If information is not complete, the Respondent will be notified and will not be allowed to participate further in the procurement of this Project until all information required is provided.

VPRA may waive technical irregularities in the form of the SOQ that do not alter the quality or quantity of the services or the management, design, and construction offered. VPRA may, at its sole discretion, request clarifications and/or supplemental information from Respondents during the SOQ evaluation and Shortlisting process.

All requests and responses shall be issued in writing by e-mail from VPRA's Point of Contact. Responses shall be limited to answering the specific information requested by VPRA.

2.4. Respondent Responsible for All Costs

Except for the stipend provided in Section 3 and subject to the terms thereof, Respondents shall be responsible for all costs associated with participation in this procurement process, including but not limited to the preparation of SOQs and Proposals, submission of questions, participation in public forums or other meetings established pursuant to the procurement process, and any other efforts or costs arising from or related to this procurement.

3. Proposal Stipend

VPRA has decided that the payment of a Stipend to Proposers that submit responsive Proposals but are not selected as the Design-Builder, under certain conditions, is a proper part of this procurement. The amount of the stipend is anticipated to be **One Million Five Hundred Thousand and no/100 ($1,500,000.00) Dollars**. The Stipend may be adjusted if VPRA adds

one or more additional optional scope items or requires additional efforts associated with them in the RFP.

As a condition precedent to payment of any Stipend, each Stipend-Eligible Proposer must execute the Stipend Agreement and provide any additional required information not later than the Proposal Due Date. Any Stipend-Eligible Proposer that fails to execute the Stipend Agreement and provide any additional required information by the Proposal Due Date will forfeit all rights to receive a Stipend.

No Proposer will be eligible for payment of any Stipend amount if the Proposer has filed a protest of the procurement process, award, or cancellation of the procurement. In addition, as a condition of accepting payment of any Stipend amount, the Proposer shall agree to not file any protest of the procurement process, award, or cancellation of the procurement after accepting payment of the Stipend.

In consideration for paying the Stipend and executing the Stipend Agreement, VPRA may use any ideas or information contained in the Proposal, including ATCs if submitted, in connection with the Project or in connection with a subsequent project without any obligation to pay any additional compensation to any Proposer that accepts the Stipend.

If, for any reason, VPRA suspends or cancels the procurement process for this Project prior to the Due Date for Proposals, VPRA, in its sole discretion, may elect to pay Stipends, or any part thereof, that VPRA deems, in its sole discretion, appropriate under the circumstances or to pay no Stipend at all.

4. SOQ SUBMISSION INSTRUCTIONS

4.1. SOQ Deadline and Instructions

SOQs must be submitted to VPRA on or before **November 30, 2023 at 2:00 p.m. Eastern Time**. VPRA will not accept a late SOQ for any reason. Respondents shall submit their SOQ by e-mail to proposals@vpra.virginia.gov. VPRA will respond with a confirmation of receipt. All SOQs shall be submitted in searchable (i.e., not scanned) portable document format (.pdf). The file name for the overall SOQ shall be: [Respondent Name/LB SP SOQ/Date]. The file name for the financial statements shall be: [Respondent Name/LB SP SOQ Financial Statements/Date].

VPRA's e-mail system can receive file sizes up to 150 MB. If a Respondent must submit multiple e-mails to accommodate file size limitations, the transmission e-mail shall state the number of e-mails that Respondent will send to complete the SOQ package. Additionally, each file shall state, after the information required by the paragraph above, the file number out of the total number submitted (i.e., 1 of 2, 2 of 3, etc.).

Respondents may submit financial statements and confidential or proprietary information using a password-protected file. If Respondent sends information in a password-protected file, Respondent must state as such in the transmission e-mail. Respondent shall send the password in a separate e-mail. Respondents may not password protect their entire SOQ and may only do so for financial statements or other information identified on Form N.

4.2. SOQ Format

Each Respondent shall organize its SOQ as stated in Section 5. The information that must be contained in each Tab, in addition to the page limit (if any) for each Tab or portion thereof, is further described in Section 5. Note that the financial statements shall not be submitted in Tab 2 with the other financial information, but shall instead be submitted in a separate .pdf file.

Text shall be in English in a standard font, a minimum of 11 points, single-spaced, except that graphics, including the organizational chart, may be no smaller than 10-point font. Pages shall be 8 ½-inch x 11-inch, with lettered/numbered dividers between each Tab. Graphic presentations may be submitted on 11-inch x 17-inch pages. Respondents shall be limited to a total of 2 (two) 11-inch by 17-inch pages for the entirety of the SOQ, each of which shall count as a single page. Pages must be numbered consecutively and include the Tab number in which the page is included (i.e., 1-1, 1-2; 2-1, 2-2, etc.).

The SOQ shall contain a table of contents before Tab 1. The table of contents shall include links to each tab that allow the user to toggle to each tab by clicking the link. The .pdf containing the financial statements does not require a table of contents.

4.3. Additional Requirements

SOQs shall be signed by an authorized representative of the Respondent. If the Respondent is a Joint Venture, partnership, or other form of consortium, the SOQ must be signed by authorized representatives of each Principal Participant. Signatures shall be applied using a program that applies electronic signatures.

All information requested must be submitted. Failure to submit all information requested may result in VPRA requiring prompt submission of missing information and/or giving a lowered evaluation of the SOQ. SOQs that are substantially incomplete or lack key information may be rejected as non-responsive by VPRA at its sole discretion.

5. CONTENTS OF STATEMENT OF QUALIFICATIONS

The SOQ shall be organized as shown in the table below. The information required under each tab is described in further detail in this Section 5. Within each tab, the materials submitted shall be in the order stated in this table.

Tab Number	Content	Required Submissions/ Page Limits
1	Section 5.1: Cover Letter	• Cover letter (2 Pages) • Form A (Acknowledgement and Receipt of RFQ, Addenda, and Responses to Questions)
2	Section 5.2: Legal, Financial, Safety, and DBE information	• Form B (Respondent's Organization Information) • Organizational agreement or material terms • Form C (Legal and Disputes History) • Form D (Principal Participant and Lead Designer Certification) • Form E: (Conflict of Interest Disclosure) • Surety Letter • Material change disclosure • Form F (Safety Questionnaire) plus required documents • Form G (Record of DBE Performance)
3	Section 5.3: Executive Summary	• 2 Pages
4	Section 5.4: Respondent Experience	• Form H (Project Experience Description) (2 pages each) • Narrative (2 pages)
5	Section 5.5: Key Personnel and Organization	• Form I (Key Personnel) • Key Personnel resumes (2 pages each) • Form J (Subcontractor Information) • Subcontractor description (1 page) • Organizational Chart and description (2 pages)
6	Section 5.6: Quality Management	• Narrative (3 pages)
7	Section 5.7: Understanding of Project and Design-Build; Consideration of Project-Specific Workforce Agreement	• Narrative (4 pages)
8	Additional Forms	• Form K (Affidavit of Non-Collusion) • Form L (Lobbying Certificate) • Form N (Proprietary / Confidential Information Designation), if needed
Separate .pdf	Section 5.2: Financial	• Financial statements

5.1. Cover Letter and Form A

Respondent shall provide a cover letter stating its desire to be considered for the Project and stating the official names and roles of all Principal Participants, the Lead Designer (if not a Principal Participant), and IDQM firm(s). Respondents shall be comprised only of teams or organizations that are capable of designing and constructing the Project in its entirety. Individual firms or potential Subcontractors that are not capable of performing the entirety of the Work shall not be eligible to submit a SOQ.

In the cover letter, the Respondent shall identify a single point of contact for the Respondent (the "Designated Contact") and the e-mail address, physical address, and telephone number where questions may be directed. The letter shall be signed by authorized representatives of the Respondent's organization. If the Respondent is a Joint Venture, partnership, or other consortium, the letter shall be signed by authorized representatives of each member.

In addition, Respondent shall submit Form A.

5.2. Legal, Financial, Safety, and DBE Information

5.2.1. Legal Information

5.2.1.1. Legal Structure

Submit the following information:

(a) Using Form B, identify Respondent's legal name, legal structure, and relevant state(s) of organization. Provide the legal structure and state of organization for each Principal Participant, the Lead Designer (if not a Principal Participant), and IDQM firm(s), and the % of equity interest of each Principal Participant.

(b) If Respondent is a Joint Venture, partnership, or other consortium, provide a copy of the agreement between the constituent entities. If such agreement has not yet been executed, provide a copy of the anticipated key terms of the agreement. The agreement or the key terms must include, at a minimum, the percentages of ownership of each constituent entity, roles of the various entities, a stated commitment to execute an agreement prior to submission of a Proposal, and the provisions concerning joint and several liability stated in part (c) below.

(c) If the Respondent is a Joint Venture, partnership, or other consortium, each constituent entity of the Respondent must agree to be jointly and severally liable for the Respondent's obligations with respect to the Project.

5.2.1.2. Legal/Disputes History

Submit the following information:

(a) Submit Form C for the Respondent, Principal Participants, Lead Designer, and IDQM as applicable, in accordance with the instructions on the form.

(b) Provide Form D for each Principal Participant and the Lead Designer (if not a Principal Participant).

(c) Using Form E, provide the conflict of interest disclosure discussed in Section 1.6. If there is no conflict of interest, affirmatively state as such on Form E.

5.2.2. Financial Information

Submit the following information:

(a) Financial Statements

Financial statements for the Principal Participant(s) (and the Guarantor if applicable under Section 5.2.2(e)) for the three most recently completed fiscal years. Financial Statements must include:

(i) Opinion Letter (Auditor's Report);
(ii) Balance Sheet;
(iii) Income Statement;
(iv) Statement of Changes in Cash Flow; and
(v) Footnotes.

In addition, financial statements must meet the following requirements:

GAAP or IFRS Compliant

Financial statements must be prepared in accordance with U.S. Generally Accepted Accounting Principles ("U.S. GAAP") or International Financial Reporting Standards ("IFRS"). If financial statements are prepared in accordance with principles other than U.S. GAAP or IFRS, a letter must be provided from a certified public accountant identifying and discussing the areas of the financial statements that would be affected by a conversion to U.S. GAAP or IFRS. A restatement of the financial information in accordance with U.S. GAAP or IFRS is not required.

U.S. Dollars

Financial statements shall be provided in U.S. dollars, if available. If financial statements are not available in U.S. dollars, the Respondent must include summaries of the income statements, statements of cash flow, and balance sheets for the applicable time periods converted to U.S. dollars, within one month of the SOQ due date, by a certified public accountant.

Audited

Financial statements must be audited by an independent party qualified to render audit opinions (e.g., a certified public accountant). If audited financials are not available for an entity, the Respondent shall include unaudited financial statements for such entity, certified as true, correct, and accurate by the chief executive officer, chief financial officer, or treasurer (or by such equivalent position or role) of the entity.

English

Financial statement information must be prepared in English. If audited financial statements are prepared in a language other than English, translations of all financial statement information must be provided with the original financial statement information.

SEC Filings

If the Respondent or any other entity for whom financial information is submitted in the SOQ files reports with the Securities and Exchange Commission, then such financial statements shall be

provided by including the entity's most recent Form 10-K. For all subsequent quarters, provide a copy of any report filed on Form 10-Q or Form 8-K that has been filed since the latest filed 10-K.

(b) Bonding Capacity and Eligibility

Provide a letter from a surety or insurance company stating that the Respondent is capable of obtaining Performance and Payment Bonds in the amount of $700,000,000, each in the forms attached hereto as Exhibit C and that the surety or insurance company will issue the required bonds in such amount for this Project. The surety or insurance company submitting such letter must be rated AA-/Aa3 by two nationally recognized rating agencies or at least A-VII by A.M. Best and Company, be listed on Treasury Department Circular 570, and be on the list of companies approved by the Commonwealth. The letter should recognize the Respondent's backlog and work-in-progress in relation to its bonding capacity. Letters indicating "unlimited" bonding/security capability are not acceptable.

(c) Material Changes in Financial Condition

Respondent shall provide information regarding any material changes in financial condition for each Principal Participant, and, if applicable, each Guarantor for the past three fiscal years and anticipated for the next fiscal year. For the avoidance of doubt, if any of the foregoing entities is a Joint Venture, partnership, or other consortium, Respondent shall provide this information for all members. If no material change has occurred and none is pending, each of these entities shall provide a letter from their respective chief executive officer, chief financial officer, or treasurer (or equivalent position or role) so certifying.

In instances where a material change has occurred, or is anticipated, the affected entity shall provide a statement describing each material change in detail, the likelihood that the factors underlying the change will continue during the period of performance of the Project, and the projected full extent of the changes likely to be experienced in the periods ahead. Estimates of the impact on revenues, expenses, and the change in equity shall be provided separately for each material change certified by the chief executive officer, chief financial officer, or treasurer (or equivalent position or role). References to the notes in the financial statements are not sufficient to address the requirement to discuss the impact of material changes.

Where a material change will have a negative financial impact, the affected entity shall additionally provide a discussion of measures that it will undertake to insulate the Project from such negative material changes, and those currently in progress or reasonably anticipated in the future. If the financial statements indicate that expenses and losses exceed income in each of the three completed fiscal years (even if there has not been a material change), the affected entity shall provide a discussion of measures that will be undertaken to make the entity profitable in the future and an estimate of when the entity will be profitable.

Set forth at Appendix 2 is a representative list of events intended to provide examples of a material change in financial condition. This list is intended to be indicative only and is not exhaustive.

At the sole discretion of VPRA, any failure to disclose a prior or pending material change may result in disqualification from further participation in the selection process.

(d) Guarantor

VPRA may in its discretion specify that an acceptable Guarantor is required as a condition of shortlisting and award of the DBA. If VPRA requires a Guarantor, VPRA will require Respondent

to provide the Guarantor's financial statements for the preceding three (3) years by a time specified in VPRA's notice to a Respondent that a Guarantor is required.

If a Guarantor is required, Respondent must comply with all other requirements in the RFQ for the submission of financial information. VPRA reserves the right to review a proposed Guarantor's financial capacity and reject the proposed Guarantor if there is a material risk that it would be unable to fulfill its obligations.

5.2.3. Safety Record

Submit Form F, Safety Questionnaire, for each Principal Participant, in addition to the documentation specified in Form F. If the Lead Designer is a Principal Participant, the Lead Designer is not required to submit Form F.

5.2.4. DBE Participation Record

Submit Form G, Record of DBE Performance, for each Principal Participant reflecting the record of DBE participation in their contracts for the past three (3) years. If the Lead Designer is a Principal Participant, the Lead Designer is not required to submit Form G.

5.3. Executive Summary

Respondent shall submit an executive summary that provides an overview of the information presented in the SOQ. The purpose of the executive summary is to familiarize reviewers with the content of the SOQ in plain language and to provide an introduction to the SOQ.

5.4. Experience of Respondent

Respondent shall identify projects performed by the Principal Participants, the Lead Designer (if not a Principal Participant), and IDQM firms demonstrating that they have the experience, knowledge, and capability to execute the Project successfully. Respondents should identify other projects with a similar scope of work, risks, constraints and third-party considerations. Respondents should also demonstrate their experience on similar projects using the design-build delivery method. Respondents shall provide the following information to demonstrate its experience:

(a) Using Form H, Project Experience Description, provide at least two (2) projects, but no more than three (3) projects, for each (i) Principal Participant and (ii) the Lead Designer (if not a Principal Participant). Additionally, for each IDQM firm identified, provide two (2) representative projects. All project descriptions should highlight experience in the last ten (10) years relevant to the Project, with a focus on projects that have similar scopes of work, similar risks, and demonstrate experience comparable to that needed for the Project. Additionally, the projects submitted must comply with the following:

(i) for the projects submitted for the Principal Participants, the projects must have reached final acceptance as defined by the requirements of the submitted projects, except that for each Principal Participant, Respondent may identify no more than one (1) project that has not reached final acceptance provided that at least 50% of the value of the construction work has been completed, and

(ii) for the projects submitted for the Lead Designer and IDQM, design on the project must be complete such that all final design plans have been submitted and accepted by owner and all design packages have been released for construction.

A project may be considered complete even if the Lead Designer continues to perform ancillary design services, such as responding to requests for information, preparing notices of design change, and similar services.

(b) Provide a narrative explaining how Respondent's project experience identified in Section 5.4(a) qualifies it to perform the work on the Project, with an emphasis on how Respondent's experience equips it to collaborate with VPRA. Explain how Respondent's project experience will help it address the Project's risks and challenges and to complete the Project on time or early. Discuss whether the members of Respondent's organization have previously worked together and how this experience will benefit the Project.

5.5. Key Personnel and Organization

5.5.1. Key Personnel

Respondent shall identify Key Personnel with the qualifications and experience to create a collaborative environment that maximizes use of the design-build delivery method. Respondent shall submit Form I containing the identity of individuals proposed to fill the Key Personnel positions identified in the table below. Additionally, Respondent shall submit a resume for each Key Personnel. Each resume shall highlight the following information:

(a) Proposed role on Project and experience in area of responsibility;

(b) History of employment;

(c) Experience on projects with a scope similar as the Project;

(d) Work on the Projects identified in response to Section 5.4;

(e) Years of experience; and

(f) Education and registrations.

Respondents may not substitute identified Key Personnel without VPRA's written consent. If a Respondent requests substitution of a Key Personnel position at any time prior to execution of the DBA, Respondent shall submit a request in writing. Such request must identify a substitute. VPRA may re-assess the qualifications of the Respondent and determine whether the substitution affects eligibility to be named to the Shortlist and submit a Proposal. Substitutions of Key Personnel after execution of the DBA will be subject to the terms therein, and in certain circumstances may be subject to the assessment of liquidated damages.

Key Personnel	Requirements and Preferred Qualifications	Time Commitment
Project Manager	The Project Manager will manage the overall Project for the Design-Builder. This person will be the main point of communication for the Design-Builder and VPRA's primary point of contact. The Project Manager will be responsible to ensure adequate personnel and other resources are made available for the Project, will handle contractual matters, and will be responsible for quality and timeliness of the team performance.	100%

	Preferred Qualifications: • 20 years managing similar projects • Design-Build experience	
Design Manager	The Design Manager is responsible for coordinating all aspects of the Design, including coordinating between the design disciplines. The Design Manager will be responsible for ensuring that the overall Project Design is completed in accordance with the Contract Documents. The Design Manager must be an employee of the Lead Designer and must be a registered Professional Engineer in the Commonwealth and Washington, D.C. Preferred Qualifications: • 20 years managing or performing design for similar projects • Design-Build experience	100% until final RFC by VPRA of last set of plans; thereafter as needed to resolve design matters
Construction Manager	The Construction Manager is responsible for coordinating and overseeing all aspects of Construction Work. Preferred Qualifications: • 20 years managing construction of similar projects • CMAA Certification • Design-Build experience	100%
Quality Manager	The Quality Manager will be in charge of the Design-Builder's quality program. The Quality Manager will oversee that the Project is built in conformance with the approved Quality Plan and the Contract Documents. The Quality Manager will be the primary liaison with VPRA's Quality Acceptance program. The Quality Manager must work for the Design-Builder under the direct supervision of an executive officer above the level of and under a line of authority independent of the Project Manager. The individual must have the ability to stop design or construction at any time and in the individual's sole discretion.	100%

	Preferred Qualifications: • 20 years of quality management experience for similar projects • Licensed Professional Engineer • Design-Build experience	
Independent Design Quality Manager Director	The Independent Design Quality Manager Director ("IDQMD") shall be an employee of one of the IDQM firm(s) identified as part of Respondent's organization. The IDQMD shall perform reviews of Design-Builder's Design for conformance to the Contract Documents, environmental commitments, permit conditions, and conformance with the Design Quality Plan. The IDQMD shall review each design submittal prior to submission to VPRA for conformance to the Technical Provisions. The IDQMD shall oversee and supervise the reconciliation and resolution of comments between the IDQM and Design-Builder. After review of the Design and resolution of comments, the IDQMD shall cause the RFC plans to be signed and stamped by a qualified member of the IDQM before submission to VPRA. The stamp shall attest that, under the supervision of the IDQMD, the RFC plans have been reviewed and inspected, conform to the Contract Documents and the Design Quality Plan, and represent good industry practice. The IDQMD must be a registered Professional Engineer in the Commonwealth and Washington, D.C. Preferred Qualifications: • Twenty (20) years of experience in the analysis and design of rail systems and bridge structures. Emphasize experience with rail design, bridges, retaining structures, drainage structures, and projects of similar size and type of work. • Design-Build experience	100% until final RFC by VPRA of last set of plans; thereafter as needed to resolve design matters
Structures Design Manager	The Structures Design Manager ("SDM") will be in charge of all structural design work on the Project and ensuring that the structural design is prepared in conformance with the	100% until final RFC by VPRA of last set of plans; thereafter as

	Contract Documents. THE SDM will be responsible for design of all structures on the Project. The SDM must be a registered Professional Engineer in the Commonwealth and Washington, D.C. Preferred Qualifications: • 20 years of demonstrated experience in bridge engineering, design and analysis, including projects of similar size, type of work, and complexity as the Project. • Design-Build experience	needed to resolve design matters
Geotechnical Design Manager	The Geotechnical Design Manager ("GDM") will be in charge of all geotechnical design work on the Project and ensuring that the geotechnical design is prepared in conformance with the Contract Documents. The GDM will be responsible for geotechnical design of the retaining walls, foundations, cut and fill slopes, embankment materials and construction, geotechnical instrumentation, and pavement subgrade and structure. The GDM must be a registered Professional Engineer in the Commonwealth and Washington, D.C. Preferred Qualifications: • 20 years of experience including planning and overseeing subsurface exploration programs for bridge structures and roadways, including projects of similar size, type of work, and complexity as this Project. • Design-Build experience	100% until final RFC by VPRA of last set of plans; thereafter as needed to resolve design matters
Environmental Compliance Manager	The Environmental Compliance Manager is responsible for ensuring that all Work complies with all environmental laws and environmental requirements specific to the Project. The Environmental Compliance Manager may review designs to ensure compliance with environmental requirements, and will oversee construction	100%

	operations to ensure compliance with environmental requirements. Preferred Qualification: • 10 years of overseeing environmental compliance for similar projects	
Third-Party Coordinator	The Third-Party Coordinator is responsible for engaging with third-parties and stakeholders as needed to manage construction and other Project operations. This Person will meet with third-parties to understand and manage concerns, establish schedules, and serve as point person for the Design-Builder. Additionally, this Person will communicate progress with third-parties and manage the resolution of conflicts. Preferred Qualifications: • 10 years of experience with third-party coordination for similar projects • Alternative delivery experience or delivery methods with early contractor involvement, including, for example, progressive design-build, CM/GC, and design-build	100%
Public Information Coordinator	The Public Information Coordinator is responsible for coordinating and managing information provided to stakeholders and the public. The Public Information Coordinator will engage with the public, obtain feedback, and provide such information to the Design-Builder and VPRA. Further, the Public Information Coordinator will work with VPRA to ensure that information about the Project is consistent and accurate. Additionally, the Public Information Coordinator will act as the Design-Builder's liaison to the public and with stakeholders. Preferred Qualifications: • 10 years of experience with public information management for similar projects • Alternative delivery experience or delivery methods with early contractor involvement, including, for example, progressive design-build, CM/GC, and design-build	

Safety Manager	The Safety Manager shall oversee and be responsible for safety on the Project site. The Safety Manager shall be responsible for preparation of Design-Builder's Safety Management Plan and may assist with constructability review to verify that construction can be performed safely. Additionally, the Safety Manager shall ensure that all Work is performed safely and in compliance with the Contract Documents and Design-Builder's Safety Management Plan. The Safety Manager must be on site during all major construction operations. Preferred Qualifications: • 15 years of managing safety for similar types of construction work, with an emphasis on rail construction and construction in a dense, urban environment	100%
Additional Value Personnel* (see note below)		

*Additional Value Personnel: Respondent may name up to two (2) other individuals that the Respondent considers as key to the success of the Project. Their resumes shall describe their anticipated role, relevant experience, registration(s), education, and other elements of qualification applicable to this Project, as well as how much time they will dedicate to the Project.

5.5.2. Independent Design Quality Manager

Respondents shall identify the IDQM firm(s) in their SOQ. The IDQM firm(s) shall be retained by the Design-Builder but have no contractual relationship with the Lead Designer or be a Subcontractor at any tier under the Lead Designer.

The IDQM will provide independent design reviews and certification that the submitted designs comply with the Contract Documents, the Design-Builder's Quality Plan, and represent good industry practice. The IDQM's review shall be in addition to the Design-Builder's internal Quality Control and assurance procedures and shall not replace the Design-Builder's Quality Control responsibilities. The IDQM firm signing and certifying compliance of designs with the Contract Documents must hold the same professional licensure and applicable certifications as those required for the Lead Designer. Prior to submission of a design package to VPRA, Design-Builder shall obtain signed certification from the IDQM. Respondents may identify multiple firms to serve

in the IDQM role if Respondent believes that specialized expertise in different technical disciplines will benefit the Project.

5.5.3. Organization

Provide the following information about Respondent's organization:

(a) Using Form J, except for the Lead Designer and IDQM, identify Subcontractors the Respondent plans to use for the Work.

(b) Submit a summary describing the Subcontractors identified in Form J.

(c) Provide an organizational chart identifying Key Personnel and participating firms responsible for major functions to be performed in designing, constructing, and providing quality management services for the Respondent's organization. All Key Personnel, Principal Participants, the Lead Designer (if not a Principal Participant), IDQM firms, and known Subcontractors must be identified on the chart. Provide a brief description of the significant functional relationships among these firms.

5.6. Quality Management

Respondent shall demonstrate its approach to ensure that the design and construction work is prepared and performed with a focus on quality. Respondent shall provide a narrative of its approach to quality management and how Respondent intends to interact with VPRA's Design IQA and Construction Quality Acceptance programs. Respondent shall address Quality Control for both design and construction and specify the key processes it will employ in its Quality Plan, including the role to be played by the IDQM firm(s) for design Quality Assurance. Respondent shall discuss such issues as the use of independent checks, stop work authority, resolution of nonconformance reports, and other critical quality issues. Respondent shall identify past successes with its approach to quality management, as well as key lessons learned from its experience.

Note that the RFP will require Proposers to submit an in-depth discussion of quality management and a draft Quality Plan.

5.7. Understanding of Project and Design-Build; Consideration of Project-Specific Workforce Agreement

5.7.1. Respondent shall demonstrate its preliminary understanding of the Project, key risks and challenges, and how it will use the design-build delivery method to improve the Project and mitigate risk. Respondent shall describe the following:

(a) Respondent's understanding of the Project, VPRA's goals, and Respondent's preliminary approach to completing the Project on time and within budget;

(b) Respondent's approach to using the design-build delivery method to introduce design and construction innovation, expedite project completion, and mitigate risk;

(c) Respondent's approach to ATCs;

(d) Respondent's approach to coordinating with and receiving Design approval from VPRA's partners, including CSXT and Amtrak;

(e) How Respondent's identified experience demonstrates its ability to use the design-build method to benefit the Project;

(f) Preliminary major risks and challenges associated with the Project and how the Respondent would plan to mitigate those risks and overcome those challenges, including how Respondent would use the design-build method to mitigate risk;

(g) Respondent's understanding of the Project's significant technical challenges, approach to their resolution, and how Respondent's experience demonstrates its capability to achieve such resolution; and

(h) Respondent's approach to maintenance of marine and land traffic and to utility coordination for the Project, and how Respondent's experience with these critical issues will contribute to their successful implementation.

5.7.2. Respondent shall demonstrate that it has meaningfully considered the use of a Project-specific workforce agreement containing the following: (i) a guaranteed supply of qualified labor, (ii) a prohibition against strikes and lockouts (and similar labor disruptions), (iii) uniform procedures for resolving Project-related disputes, and (iv) provisions governing worker safety. In the interest of clarity, at this RFQ stage, Respondent need only document the plenary efforts it has made to evaluate the potential viability of a Project-specific workforce agreement (i.e., there is no requirement that a Respondent commit to a Project-specific workforce agreement).

5.8. Additional Forms

Respondent shall provide the following:

(a) Affidavit of Non-Collusion (Form K);

(b) Lobbying Certificate (Form L); and

(c) Form N: Proprietary/Confidential Information Designation (if applicable).

6. EVALUATION CRITERIA

This Section 6 describes the evaluation criteria for the RFQ phase of the procurement.

6.1. SOQ Evaluation

SOQs will be evaluated in two steps:

(a) Pass/Fail Review; and

(b) Qualitative Review.

VPRA will first conduct a Pass/Fail review of all SOQs received. SOQs that receive a "Pass" for all categories of the Pass/Fail criteria will proceed to the qualitative review and be scored. SOQs that receive a "Fail" in any category of the Pass/Fail criteria will be removed from further consideration. VPRA will notify Respondents whose SOQ receive a "Fail."

6.1.1. Pass/Fail Review

The pass/fail review consists of the following:

(a) **Responsiveness**: The SOQ complies with the following:

(i) the SOQ conforms to the RFQ instructions regarding organization and format and Respondent has submitted all required information;
(ii) the Respondent's qualifications and other information provided are responsive to the requirements set forth in the RFQ; and
(iii) the SOQ does not contain any material misrepresentations.

In performing the responsiveness review, the Evaluation Team reserves the right to waive minor informalities, irregularities, and apparent clerical mistakes that are unrelated to the substantive content of the SOQ. In accordance with Section 2.3.4., the Evaluation Team may also require Respondents to clarify responses within their SOQ and/or address any informational deficiencies within their SOQ. A failure to provide the clarification and/or information requested by the Evaluation Team may result in a SOQ being deemed non-responsive and designated as a "Fail."

(b) **Legal**: The SOQ complies with and meets or exceeds the minimum requirements listed in Section 5.2.1 and there are no identified issues presenting a material risk that the Respondent is unable to complete the Work.

(c) **Financial Capacity**: The SOQ complies with and meets or exceeds the minimum requirements listed in Section 5.2.2 and there are no identified issues presenting a material risk that the Respondent is unable to complete the Work.

(d) **Safety**: Respondent possesses a comprehensive safety program, performs regular safety training for employees, and, through its responses on Form F, demonstrates a commitment to a safety culture within the organization as evidenced by its processes, procedures, and outcomes. In addition, there are no identified issues presenting a material risk that the Respondent would not be able to perform the Work safely and with due regard for the health and safety of its employees, VPRA, and the general public.

(e) **DBE Participation**: The Respondent demonstrates a history of successful compliance with DBE requirements and does not present a material risk of non-compliance with the DBE requirements for the Project.

6.1.2. Qualitative Review

SOQs will be evaluated and scored as follows:

Category	Total Points Possible
Experience of Respondent	35
Key Personnel and Organization	35
Quality Management	15
Understanding of Project and Design-Build	15
Total	**100**

Respondents are advised that a Respondent's "Experience of Respondent" and "Key Personnel and Organization" qualifications scores will be carried forward to the RFP step and considered as part of the Proposal scoring of shortlisted Proposers. Respondent organizations that receive written approval from VPRA to change compositions will have their qualifications re-evaluated as stated in Section 1.9.

VPRA will conduct the SOQ evaluations based on the following criteria:

Category	Evaluation Criteria
Experience of Respondent	The extent to which the Respondent's organization shows that it has successfully performed similar prior work, including on design-build projects, that demonstrates its qualifications and ability to design and build the Project, including but not limited to the information provided in Tabs 2, 3, 4, and 5. This includes the Respondent's prior successes at developing innovative design and construction concepts, using ATCs to improve outcomes, on-time completion of complex projects, delivering quality design and construction work, meeting owner project goals, minimizing disruption to adjacent communities and projects, and coordinating with utility owners and other third-parties.
Key Personnel and Organization	The extent to which Respondent's Key Personnel and organization have the background and experience to be successful at delivering a quality Project that meets VPRA's goals, as demonstrated by the prior successes of the Key Personnel and Respondent's organization.
Quality Management	The extent to which Respondent demonstrates a thorough commitment to quality, evidenced by the presence of a robust quality control process that incorporates production staff, contains procedures to identify and correct nonconforming work, vests quality staff with sufficient authority to stop work, uses the IDQM to make the design review process as efficient as possible, and will interact with VPRA's design IQA and construction Quality Acceptance program in a manner that facilitates cooperation and improves the overall quality of the Work.
Understanding of Project and Design-Build; Consideration of Project-Specific Workforce Agreement	The extent to which Respondent demonstrates an approach that: maximizes the value of the design-build delivery method, understands key risks and mitigation strategies, addresses technical challenges, proposes a logical and innovative methodology for the Project's delivery, understands VPRA's Project goals, and exhibits that its prior work provides the experience for a successful Project outcome. The extent to which Respondent has meaningfully considered the use of a Project-specific agreement containing the following: (i) a guaranteed

	supply of qualified labor, (ii) a prohibition against strikes and lockouts (and similar labor disruptions), (iii) uniform procedures for resolving Project-related disputes, and (iv) provisions governing worker safety.

6.1.3. Evaluation Methodology

The Evaluation Team will evaluate each of the four categories in Section 6.1.2 using the following adjectival ratings: Exceptional, Good, Acceptable, Weak, and Unacceptable. The Evaluation Team may differentiate within each adjectival rating by adding a plus (+) or minus (–) to the rating, except that (Exceptional +) and (Weak –) shall not be available ratings. To rank the SOQs, the Evaluation Team will reach a consensus adjectival rating for each of the four categories. The consensus adjectival ratings will be converted to the numerical scale identified in Section 5.1.2 to assign a score to each SOQ. In developing a consensus score, the Evaluation Team is at liberty to consider all information contained within a Respondent's SOQ. Where deemed relevant to any of the evaluation criteria, information that is considered as part of the pass/fail review under Section 6.1.1. may, in the sole discretion of the Evaluation Team, be carried forward and considered when assigning a consensus score as part of the qualitative review under Section 6.1.2.

The adjectival ratings will be assigned on the following basis:

Adjectival Rating	Rating Description
Exceptional	The SOQ offers universally better than acceptable quality and the greatest likelihood of successful results for the Work. There are essentially no weaknesses or deficiencies requiring correction.
Good	The SOQ offers generally better than acceptable quality and a high likelihood of successful results for the Work. Deficiencies and/or weaknesses in the SOQ are minor and correctable.
Acceptable	The SOQ offers an acceptable level of quality and a reasonable likelihood of successful results for the Work. Deficiencies and/or weaknesses in the SOQ are generally correctable with minor to some significant changes.
Weak	The SOQ minimally complies with stated criteria and offers a low likelihood of successful results for the Work. The SOQ includes deficiencies and/or weaknesses that are not correctable without significant changes.
Unacceptable	The SOQ does not meet the stated criteria and has significant weaknesses, deficiencies, and/or unacceptable quality. Essential information is not provided or is conflicting and/or unproductive. Deficiencies and weaknesses are so major and/or extensive that a major revision to the SOQ would be necessary to meet the objectives of the Project.

A Respondent that receives a consensus adjectival rating of "Unacceptable" in any of the categories identified in Section 6.1.2 may, in VPRA's sole discretion, be eliminated from further consideration.

6.2. Shortlisting

Respondents shall be ranked from highest to lowest in order of their SOQ scores. VPRA intends to name no more than three (3) Respondents to the Shortlist in order to ensure adequate competition. Upon shortlisting by the Evaluation Team, only those Respondents named to the Shortlist shall remain eligible for participation in the RFP step. Neither the overall scoring nor the ranking of the Respondents on the Shortlist will be disclosed to Respondents until the procurement process is complete and a DBA is executed.

6.3. Debriefings

All Respondents submitting SOQs will be notified in writing of the Shortlist. Respondents not named to the Shortlist may request a debriefing. If requested, debriefings shall be provided at the earliest feasible time after announcement of the Shortlist, subject to applicable law. The debriefing shall be conducted by VPRA's Point of Contact or designee, who may be accompanied by other VPRA officials familiar with the rationale for the selection decision.

Debriefings shall:

(a) be limited to discussion of the unsuccessful Respondent's SOQ and will not include specific discussion of a competing SOQ;

(b) be factual and consistent with the evaluation of the unsuccessful Respondent's SOQ; and

(c) provide information on areas in which the unsuccessful Respondent's SOQ had weaknesses or deficiencies.

Debriefing will not include discussion or dissemination of the identities, thoughts, or notes of individual members of the Evaluation Team, but may include a summary of the rationale for the selection decision.

7. PROCUREMENT DECISION APPEALS

Any Respondent who desires to file a procurement decision appeal (other than matters involving organizational conflicts of interest) must do so in accordance with sections 7.3, 7.4, and 7.5 of the Procurement Rules. Procurement decision appeals will be administered in accordance with the Procurement Rules.

8. VIRGINIA FREEDOM OF INFORMATION ACT

All SOQs submitted to VPRA become the property of VPRA and are subject to the disclosure requirements of the Virginia Freedom of Information Act (VFOIA) (Va. Code § 2.2-3700 *et seq*.). Respondents are advised to familiarize themselves with the provisions of VFOIA to ensure that documents identified as confidential will not be subject to disclosure under VFOIA. In no event shall the Commonwealth or VPRA be liable to a Respondent for the disclosure of all or a portion of a SOQ submitted pursuant to this request.

If a Respondent has special concerns about information that it desires to make available to VPRA (including information submitted in a SOQ), but that it believes constitutes a

trade secret, proprietary information, or other confidential information exempted from disclosure, such Respondent should specifically and conspicuously designate that information as such in its SOQ and state in writing why protection of that information is needed in accordance with Form N (Proprietary/Confidential Information Identification), and submit Form N in Tab 8 of the SOQ.

Blanket designations that do not identify the specific information are not acceptable and may be cause for VPRA to treat the entire SOQ as public information. Nothing contained in this provision shall modify or amend requirements and obligations imposed on VPRA by applicable law, and the applicable law(s) shall control in the event of a conflict between the procedures described above and any applicable law(s).

In the event VPRA receives a request for public disclosure of all or any portion of a SOQ identified as confidential, VPRA will attempt to notify the Respondent of the request, providing an opportunity for such Respondent to assert, in writing, claimed exemptions under the VFOIA or other Commonwealth law. VPRA will come to its own determination whether the requested materials are exempt from disclosure.

9. RESERVED RIGHTS

In connection with this procurement, VPRA reserves to itself all rights (which rights shall be exercised by VPRA in its sole discretion) available to it under applicable law, including without limitation, the following, with or without cause and with or without notice:

(a) The right to cancel, withdraw, postpone, or extend this RFQ in whole or in part at any time prior to the execution by VPRA of the DBA, without incurring any obligations or liabilities;

(b) The right to issue a new RFQ or RFP;

(c) The right to reject any and all submittals, responses, and SOQs received at any time;

(d) The right to modify all dates set or projected in this RFQ;

(e) The right to suspend and terminate the procurement process for the Project, at any time;

(f) The right to waive or permit corrections to data submitted with any response to this RFQ until such time as VPRA declares in writing that a particular stage or phase of its review of the responses to this RFQ has been completed and closed;

(g) The right to issue addenda, supplements, and modifications to this RFQ;

(h) The right to permit submittal of addenda and supplements to data previously provided with any response to this RFQ until such time as VPRA declares in writing that a particular stage or phase of its review of the responses to this RFQ has been completed and closed;

(i) The right to hold meetings and conduct discussions and correspondence with one or more of the Respondents responding to this RFQ to seek an improved understanding of the responses to this RFQ;

(j) The right to seek or obtain data from any source that has the potential to improve the understanding and evaluation of the responses to the RFQ, including the right to seek clarifications from Respondents;

(k) The right to permit Respondents to add or delete firms and/or Key Personnel until such time as VPRA declares in writing that a particular stage or phase of its review has been completed and closed;

(l) The right to add or delete Respondent responsibilities from the information contained in this RFQ;

(m) The right to waive deficiencies, informalities, and irregularities in a SOQ, accept and review a non-conforming SOQ or seek clarifications or supplements to a SOQ;

(n) The right to disqualify any Respondent that changes its submittal without VPRA approval;

(o) The right to change the method of award at any time prior to submission of the Proposals; and

(p) The right to respond to all, some, or none of the inquiries, questions and/or request for clarifications received relative to the RFQ.

10. COMPLIANCE WITH LAW IN VIRGINIA

Failure to comply with the law with regard to those legal requirements in Virginia (whether federal or state) regarding the Respondent's ability to lawfully offer and perform any services proposed or related to the Project may be cause for rejection of a Respondent's SOQ, in the sole and reasonable discretion of VPRA, and in that event a Respondent's SOQ submittal may be returned without any consideration for selection of contract award.

11. ETHICS IN PUBLIC CONTRACTING

By submitting their SOQs and Proposals, Respondents certify that their submissions are made without collusion or fraud and that they have not offered or received any kickbacks or inducements from any other Respondent, supplier, manufacturer or subcontractor in connection with their submissions, and that they have not conferred on any public employee having official responsibility for this procurement transaction any payment, loan, subscription, advance, deposit of money, services or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value was exchanged.

12. REPRESENTATIONS

Respondent hereby represents and warrants that (1) as of the date hereof, and on and as of the date of the provision of goods or services contemplated herein, the Respondent (or where applicable, its Principal Participants) is duly organized, validly existing and in good standing under the laws of its jurisdiction of organization; and (2) the Respondent has the full right, power and authority and has taken all necessary action under the laws of its jurisdiction of organization to authorize it to execute and deliver the DBA, to consummate the transactions contemplated hereby and in the DBA and to perform its obligations thereunder. Respondent hereby agrees to furnish to VPRA any and all certificates of governmental authorities and/or officers or directors of Respondent (or where applicable, its Principal Participants) that VPRA may reasonably require in order to confirm the due authorization and execution of the SOQ, Proposal, and the DBA and Respondent's right, title, and authority to perform its obligations thereunder.

13. NO ASSUMPTION OF LIABILITY

VPRA assumes no obligations, responsibilities, and liabilities, fiscal or otherwise, to reimburse all or part of the costs incurred or alleged to have been incurred by parties

considering a response to and/or responding to this RFQ. All of such costs shall be borne solely by each Respondent and its team members. In no event shall VPRA be bound by, or liable for, any obligations with respect to the RFQ until such time (if at all) a contract, in form and substance satisfactory to VPRA, has been executed and authorized by VPRA and, then, only to the extent set forth therein.

14. APPLICABLE COST PRINCIPLES; ACCOUNTING REQUIREMENTS

The DBA will be performed and audited in accordance with 2 C.F.R. Part 200, Uniform Administrative Requirements, Cost Principles and Audit Requirements for Federal Awards, which provisions were adopted by DOT at 2 C.F.R. Part 1201 and are incorporated herein by reference. To be eligible for reimbursement, Respondent's costs must comply with cost principles set forth in 2 C.F.R. Part 200. All Respondents submitting SOQs and Proposals must have internal control systems in place that meet federal requirements for accounting. These systems must comply with requirements of 2 C.F.R. Part 200 and be sufficient to exclude unallowable cost items from Project invoicing to VPRA.

Where applicable, certain costs and reimbursement under the DBA must also comply with 48 C.F.R. Part 31 ("FAR Part 31"). All Respondents submitting SOQs and Proposals must have internal control systems in place that meet federal requirements for accounting. These systems must comply with requirements of FAR Part 31 and be sufficient to exclude unallowable cost items from Project invoicing to VPRA.

EXHIBIT A: Railroad Operator Indemnification

I. INDEMNIFICATION DUTIES

A. CSXT. Design-Builder shall indemnify, defend, and hold harmless CSXT Indemnitees to the same extent to which VPRA is entitled to indemnity and defense under Section [●] of the Design-Build Agreement.

B. Amtrak. [Subject to applicable law, including Va. Code § 11-4.1], Design-Builder shall indemnify and defend Amtrak for all losses or claims arising from the acts or omissions of Design-Builder in performing the Design-Build Agreement, whether or not Design-Builder is negligent and irrespective of any negligence or fault of Amtrak, *provided that,* Design-Builder's indemnity and duty to defend shall not extend to Amtrak-Assumed Individuals and/or Amtrak-Assumed Property.

II. DEFINITIONS

"**Affiliate**" means, when used to indicate a relationship with a specified Person, Person that: (a) directly or indirectly, through one or more intermediaries has a 10% or more voting or economic interest in such specified Person or (b) controls, is controlled by or is under common control with such specified Person, and a Person is deemed to be controlled by another Person, if controlled in any manner whatsoever that results in control in fact by that other Person (or that other Person and any Person or Persons with whom that other Person is acting jointly or in concert), whether directly or indirectly and whether through share ownership, a trust, a contract, or otherwise.

"**Amtrak-Assumed Individuals**" means:

(i) an employee of Amtrak;
(ii) any person who is on an Amtrak train other than a Commonwealth-Introduced Individual;
(iii) any person other than a Commonwealth-Introduced Individual at or adjacent to a passenger station located on the rail lines used for Amtrak service who is at such passenger station for the purpose of boarding or detraining from an Amtrak train, meeting an Amtrak train, purchasing a ticket for an Amtrak train, making a reservation for an Amtrak train, or obtaining information about Amtrak service or conducting business with Amtrak (including a vendor from whom Amtrak receives compensation);
(iv) any person at or adjacent to a passenger station who is providing local transportation to or accompanying a person described in (iii) above; and
(v) any person injured or killed by the collision of a vehicle or person with an Amtrak train on or adjacent to the rail lines on which Amtrak operates, including the collision of a derailed Amtrak train or any part thereof beyond the Commonwealth's railroad right-of-way.

"**Amtrak-Assumed Property**" means:

(i) the property of any Amtrak-Assumed Individual;
(ii) any locomotive, passenger car, or any other property or equipment owned by, leased to, used by or otherwise in control, custody, or possession of Amtrak (except that

Amtrak's dispatching of trains, which trains are not otherwise in control, custody, or possession of Amtrak, by itself shall not be deemed to place such trains into Amtrak's control, custody, or possession); and

(iii) property of parties other than Amtrak and VPRA, to which damage is caused by fuel oil which is demonstrated to have spilled from an Amtrak engine and for fuel oil which is demonstrated to have spilled by Amtrak's employees, agents, or contractors (but excluding CSXT) while fueling an Amtrak train.

"**Commonwealth-Introduced Individual**" means any employee, invitee, or agent of the Commonwealth or the Commonwealth's contractor in the course of his employment or agency, except when such employee, invitee, or agent is a fare-paying passenger of Amtrak.

"**CSXT Indemnitees**" means CSXT, any Affiliate of CSXT, and any of the officers, directors, shareholders, employees, agents, successors, or assigns of such entities.

III. INCLUSION IN SUBCONTRACTS

Design-Builder agrees to have the foregoing terms flow down to each subconsultant agreement and lower tier subcontract issued under the Design-Build Agreement, modified only to identify the subconsultant or subcontractor that will be subject to the provisions.

EXHIBIT B: PROJECT INFORMATION

In addition to the information contained herein, certain supplemental project information will be made available to Respondents upon execution of VPRA's Non-Disclosure and Confidentiality Agreement (NDA). For further information or to request a copy of the NDA, please contact: procurement@vpra.virginia.gov.

VPRA reserves the right to deny access to the Exhibit B supplement to any party who, in its sole discretion, is determined not to have a legitimate business purpose for the information.

VIRGINIA PASSENGER RAIL AUTHORITY

Basis of Design Report

Draft – February 2023

Table of Contents

Appendices

1 Introduction

The Long Bridge Project (The Project) consists of improvements to the Long Bridge and related railroad infrastructure located between the Rosslyn (RO) Interlocking near Long Bridge Park in Arlington, Virginia and the L'Enfant (LE) Interlocking near 10th Street SW in Washington, DC (see Figure 1-1). The existing Long Bridge is currently owned and operated by CSX Transportation (CSXT), a Class I freight railroad, which also operates the Long Bridge Corridor (Corridor). In addition to CSXT freight, the Corridor is utilized by Amtrak and the Virginia Railway Express (VRE). The Virginia Passenger Rail Authority (VPRA) has agreed to purchase infrastructure and approximately half of the right-of-way in the Corridor from CSXT and currently has a permanent easement on the property until the title transfers.

As part of the project, the evaluation of improvements along the 1.8-mile Corridor to increase the current two-track capacity to four-tracks was completed at the conclusion of the National Environmental Policy Act (NEPA) process. The land and infrastructure transaction between VPRA and CSXT along with the build out of the four-track corridor will allow for the separation of passenger and freight traffic while maintaining interoperability for all four tracks. The proposed improvements along the Corridor include, but are not limited to, the following:

- Adding two new tracks adjacent to the existing two-track alignment;
- Adding a new two-track bridge upstream of the existing Long Bridge for a four-track crossing;
- Retaining the existing two-track Long Bridge over the Potomac River;
- Corridor-wide upgrades to track, signal, and interlockings;
- New and replacement bridges along the Corridor to achieve four-track capacity;
- New retaining walls along the Corridor to minimize impacts and facilitate phasing;
- New crashwalls and modifications to reinforce bridge piers and other structures;
- New Pedestrian Bridge crossing Maine Avenue SW; and
- New Bicycle-Pedestrian (Bike-Ped) Bridge crossing of the Potomac River and George Washington Memorial Parkway (GWMP) upstream of the new two-track rail bridge.

This Basis of Design (BOD) Report was prepared to document supporting technical criteria utilized in the development of the Project's Engineering plans, considering the various stakeholders within the Project limits. Those stakeholders included CSXT, Amtrak, VRE, and VPRA.

The BOD is applicable only to areas where new construction or major reconfiguration is anticipated to occur. Areas that do not require track structure replacement, including areas where existing tracks are maintained, are exempt from the design criteria as well as the approvals and design exception process in *Chapter 10* of this document. It is anticipated that portions of the existing track may need to be modified or upgraded for improved rail geometrics as well as to be included in modifications to the signal system.

During the previous Project phase, the Environmental Impact Statement (EIS) phase, the BOD was closely coordinated and developed with input from the major project stakeholders, including the District Department of Transportation (DDOT); Federal Railroad Administration (FRA); VPRA; CSXT; Amtrak; and VRE. The Project Sponsor for preliminary and final design, construction, future infrastructure, and corridor ownership is VPRA. Maintenance responsibilities are described in *Exhibit M – Joint Operating and Maintenance Agreement of the Virginia*

Department of Rail and Public Transportation (DRPT) CSXT Comprehensive Rail Agreement. Further discussions between CSXT and VPRA will determine maintenance responsibilities for shared structures. CSXT and VPRA have agreed that all rail improvements will be conceptually designed consistent with CSXT design standards; FRA standards; and as described in the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering.

This BOD has expanded upon the EIS BOD. It is considered a living document that will be updated throughout the Preliminary Engineering phase based upon additional input and decisions made in project development. The primary goal of this version of the BOD is to provide sufficient technical criteria to complete Preliminary Engineering (PE) design of the Preferred Alternative. Preliminary Engineering (PE) typically includes 30 percent design and engineering. Engineering disciplines that will progress further than 30 percent design in this PE phase are described in the respective discipline sections.

1.1 Engineering Limits

The Engineering Limits extend approximately 1.8 miles within the RF&P Subdivision (previously the Richmond, Fredericksburg and Potomac Railroad) of the CSXT Central Zone (see Error! Reference source not found.). The Engineering Limits extend approximately from L'Enfant (LE) Interlocking near milepost (MP) CPF 111.5 in the District of Columbia (District) to beyond the Rosslyn (RO) Interlocking at MP CPF 109.76 in Arlington, Virginia. The Engineering Limits northern terminus adjoins the proposed station capacity improvements to the VRE L'Enfant Station; and the Engineering Limits southern terminus in Arlington adjoins the northern limits of VPRA's Alexandria Fourth Track project.

The Study Area is surrounded by diverse land uses between the District and Arlington County, Virginia, including local and national parks, residential mixed use, and commercial development. These land uses constrain the operational considerations. In general, the Project intent is to create a four-track corridor by increasing the number of tracks as recommended by the capacity modeling over the Potomac River and into the District. Operational speeds will be maintained within the narrow railroad Corridor. The Engineering Limits include multiple transportation structures. Capacity increases will impact the configuration of three existing undergrade bridges and one existing overgrade viaduct within the Corridor:

- CSXT bridge over Ohio Drive SW (East) (DDOT Br # 512);
- CSXT bridge over Washington Channel (DDOT Br #513);
- CSXT bridge over Maine Avenue SW (DDOT Br # 514); and
- Republic Properties Maryland Avenue SW viaduct over CSXT (Unknown).

The following existing undergrade bridges will not require reconfiguration and are anticipated to remain in place:

- CSXT bridge over GWMP (Unknown);
- CSXT Long Bridge over Potomac River, Mount Vernon Trail, and Ohio Drive SW (West) (DDOT Br #510); and
- CSXT bridge over Interstate 395 (I-395) (DDOT Br # 1135).

FIGURE 1-1. LONG BRIDGE PROJECT LIMITS.

Additional work includes the following new structures or alterations to existing:

- A new undergrade bridge over GWMP, the Potomac River, and Ohio Drive SW (West) (MP 110.24);
- A new undergrade bridge over the Washington Metropolitan Area Transit Authority (WMATA) Yellow Line Tunnel and I-395 (MP 110.91);
- A new undergrade bridge over Ohio Drive SW (East) (MP 111.14);
- A new undergrade bridge over Washington Channel (MP 111.21);
- A rehabilitated undergrade bridge over Maine Avenue SW (MP 111.29);
- A new bike-ped bridge over GWMP and the Potomac River;
- A new pedestrian bridge over Maine Avenue SW that connects the Salamander Hotel and the SW Riverfront;
- New signal bridges will be incorporated along the Corridor;
- New crashwalls and modifications to reinforce bridge piers and other structures; and
- New retaining walls will be constructed throughout the Corridor to limit property impacts.

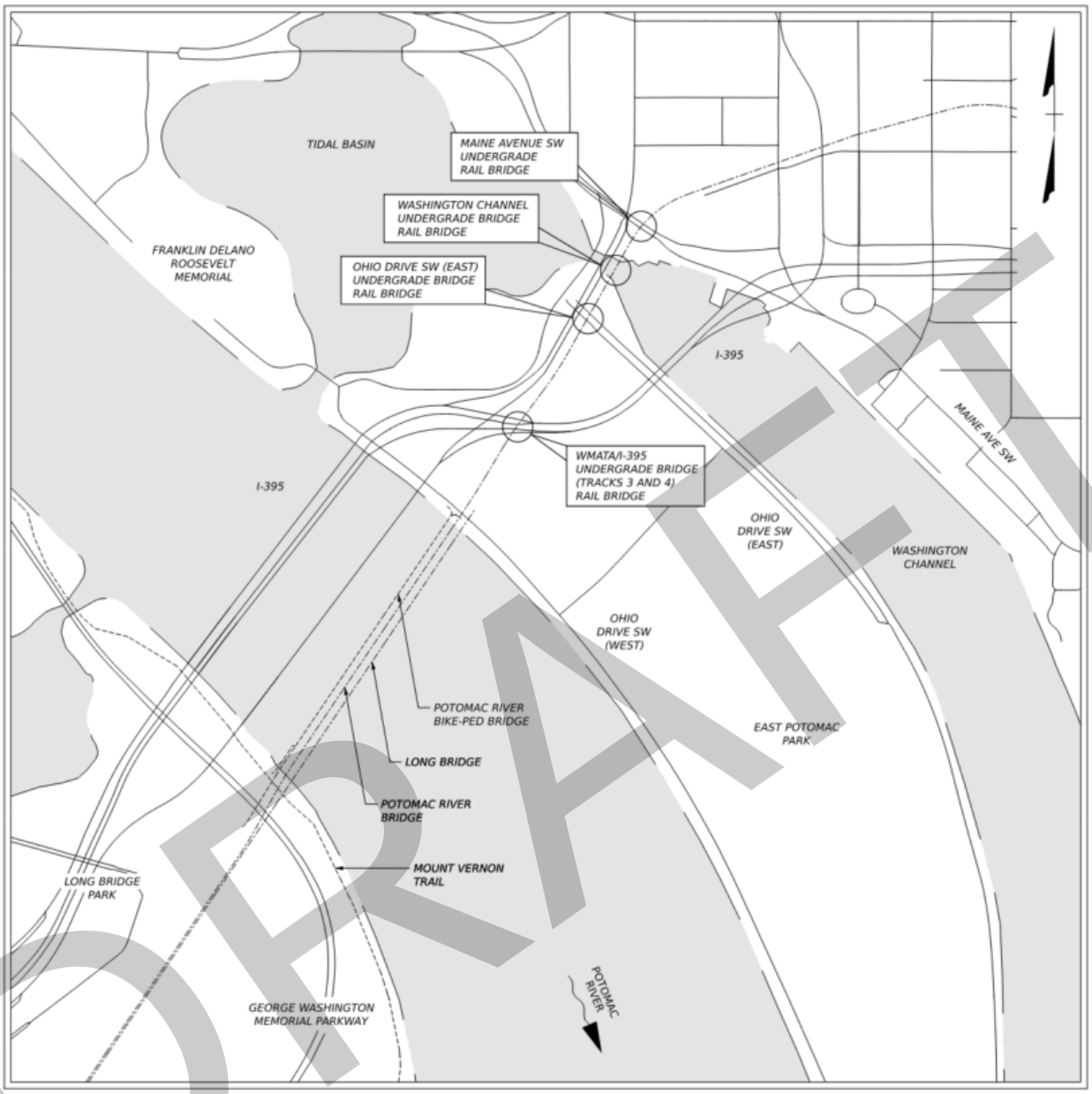


FIGURE 1-2. BRIDGE LOCATIONS.

1.2 Project Approach

The BOD Report documents the design standards applied to the preliminary engineering design. Additional criteria, definitions, and specifications are expected to be added during the development of the preliminary design and final design. These modifications shall be approved through a technical process based on sound engineering judgment, practice, and economics. A general review process is described in *Chapter 10, Approvals and Design Exceptions*.

Key Project development principles reflected in the BOD include the following:

- All mainline tracks will be designed to meet or exceed the existing speeds through the project area.
- Preliminary design is not to preclude future electrification along the passenger tracks. Future catenary structures can be installed by widening the substructure units of the bridge or on the embankments on the approaches.
- Both new and existing mainline tracks will be designed for resiliency, redundancy, interoperability, and connectivity between all passenger and freight service.
- Utilization of ongoing and previously completed studies, concept development, and rail improvement designs in the Corridor to the extent feasible and practicable.

1.3 Planning Considerations

1.3.1 OPERATIONAL CAPACITY

The Project objective is to provide additional long-term railroad capacity and to improve the reliability of railroad service through the Long Bridge Corridor. Capacity increases are needed to meet projected demand for passenger and freight rail services of stakeholders; improve operational flexibility and resiliency; and provide redundancy for this critical link in the local, regional, and national railroad network. To increase capacity, the two-track Corridor is to be updated to four-tracks through the project area. Capacity improvements were focused on obtaining one or more of the following objectives:

- Improved travel time;
- Increase and/or improve reliability and resiliency;
- Provide flexibility to recover during periods of higher demand and service delays, including track maintenance(resiliency);
- Increase in frequency of service;
- Increase in length of train/consistency; and
- Additional infrastructure to support improvements listed above.

1.3.2 PERMITTING OVERVIEW

The Long Bridge Project traverses through various historic areas, the viewshed of the Monumental Core of the District, private and federal properties, and environmentally sensitive areas. The evaluation of these features under NEPA is complete and included the following considerations:

- Stakeholder, cooperating agencies, participating agencies, and public input on the various alternatives;
- Focus on minimizing impacts to adjacent private and federal properties;
- Focus on minimizing environmental impacts;
- Influences on visual viewshed, noise mitigation, and aesthetic improvements;
- Improvements to railroad operational benefits and safety;
- Constructability of the proposed improvements; and
- Compatibility of proposed improvements with regional planning efforts.

Additionally, construction related permits, geotechnical permits, and other permits are required to construct the project and will be pursued during the Preliminary Design phase through

construction. *Appendix B* includes a list of all identified Permits and current status as of the date of this document.

1.4 Utilization of Standards

The design will include the use of applicable agency standard drawings, materials, and specifications for applicable improvements within the Authority Having Jurisdiction (AHJ). The utilization of standard practices and materials promotes understanding of the intended improvements with the benefit of expediting the design and construction. All new construction must conform to current and applicable AHJ standards or criteria, as detailed within specific design sections within this document. In the situation of multiple relevant standards, the more restrictive criteria will have precedence, unless otherwise specified and/or agreed upon.

Design Criteria and utilization of Standards may vary in accordance with the agency who will own and maintain the structure. Ownership and maintenance responsibilities for joint structures will be determined during the design phase of the project.

This basis of design will use Customary U.S. Units such as feet/inches, pounds/kips, degrees Fahrenheit (°F), etc. Horizontal datum references North American Datum of 1983/2011 (NAD83(2011)) and vertical datum references North American Vertical Datum of 1988 (NAVD88).

2 Railroad

Railroad geometric design is to be developed to provide safe, economical, and efficient freight and passenger service along the rail Corridor. The geometric design configurations must be developed to mutually maintain the operation and rolling stock stability for both freight and passenger operations.

The design criteria within the Basis of Design (BOD) reflects a combination of accepted and recommended engineering practices utilized by CSX Transportation (CSXT), Amtrak and Virginia Railway Express (VRE), as well as those contained in the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering (MRE).

2.1 Safety

Safety of freight and passenger operations, freight and passenger employees, and the public above, under, and adjacent to the railroad Corridor represents the critical priority of the design. Railroad safety promotion and regulation is governed by the Federal Railroad Administration's (FRA) Office of Railroad Safety, which includes FRA Track Safety Standards – 49 CFR Part 213. As the operator of the railroad Corridor, CSXT reserves the right to review and approve proposed railroad improvements.

The Project will maintain the existing posted speeds for freight and passenger trains along the existing railroad Corridor. If speeds are proposed to be increased by the Project due to improved geometry, FRA regulations require preparation of a system safety plan.

2.2 References

The design parameters for the Environmental Impact Statement (EIS) phase originated with the engineering and operating standards of CSXT. The following additional agency criteria were reviewed for more restrictive criteria or general compliance:

- AREMA Manual for Railway Engineering, 2022 Edition
- Amtrak Standards
- Applicable FRA safety requirements
- Federal laws
- District of Columbia general laws
- Commonwealth of Virginia general laws

For preliminary and final design documents, the latest edition of the code, regulation, standard, and specification applicable to the Project in effect on the day of engineering Notice-to-Proceed (NTP) is applicable to the Project design. Revisions to code, regulation, standard and specification made during engineering design are to be presented to the District Department of Transportation (DDOT), CSXT, or the Authority Having Jurisdiction (AHJ) and approved prior to incorporating revisions.

This BOD is based on industry standards, governmental regulations, AREMA recommended practices, and railroad standards. The following publications and documents are current references for Preliminary Engineering:

- CSXT Engineering and Operating Standards (in effect as of September 15, 2016)
- CSXT Design and Construction Standard Specifications – Pipeline Occupancies (Rev. June 5, 2018)
- CSXT Design and Construction Standard Specifications Vol. 1 (March 1, 2021)
- CSXT Design & Construction Standard Specifications – Wireline Occupancies
- AREMA Manual for Railway Engineering, 2021 Edition
- FRA Track and Rail and Infrastructure Integrity Compliance Manual (in effect as of January 2017)
- FRA Railroad Corridor Transportation Plans Guidelines (July 2005)
- District of Columbia Municipal Regulations (DCMR), Chapter 24-31. OCCUPATIONAL SAFETY: RAILROAD CLEARANCES, Title 24. PUBLIC SPACE AND SAFETY.
- U.S. Code of Federal Regulations (CFR)
- Absolute maximum/minimum values for any track design element will comply with 49 CFR 213 for the applicable class of track. (On CSXT-owned and maintained track, CSXT will not allow any proposed track design element that does not comply with FRA class of track standards.)
- Strategic Rail Corridor Network (STRACNET) and Defense Connector Lines (December 1998) - http://www.tea.army.mil/DODProg/RND/default.htm

2.3 Design Life

The design life for the new railroad related features and facilities are:

- Embankment: 100 years minimum
- Ballast and subballast: 35 years minimum
- Track structure (rail, ties, and fasteners): 35 years minimum

It is anticipated that facilities will require regular maintenance and some degree of component repairs and replacement over the course of the design life. Additional decisions made on the preferred materials, fabrication, and installation of infrastructure will be made during the Final Design stage based upon AHJ requirements.

Temporary facilities used to accommodate construction of permanent systems are to be designed for a period up to five years. Examples include temporary tracks and facilities during construction.

2.4 Design Speeds

The Corridor design speed is intended to maintain and improve the existing freight and passenger speeds reflective of constraints due to the existing topographic and environmental features. New alignments will meet or exceed FRA Class 3 track design speeds. See *Section* 2.9 for additional design speed information at track turnouts and crossovers along the Corridor.

Horizontal curves are to be designed to the highest speeds possible for mixed traffic based on the design criteria, train performance models, and local conditions. Design speeds are to be established by optimizing the horizontal curve (reducing the degree of curvature).

2.5 Horizontal Geometry

Mainline horizontal track alignments are to be stationed along the centerlines of the existing CSXT alignment. Engineering stationing (ES) increases from south to north. Station equations are to be used to correlate Project ES with CSXT Valuation Maps stationing, CSXT mileposts, and any identifiable bridges and relevant topographic or structural features referenced on the Valuation Maps.

Track horizontal curvature and superelevation will be designed to maximize speed for mixed traffic considering both CSXT and AREMA standards.

All mainline tracks within proximity of the existing Right-of-Way (ROW) are to be designed in accordance with the existing AHJ railroad speeds. Engineering alternatives include meeting or matching the existing speeds throughout the Corridor, with Track 3 and 4 to be designed for a minimum speed of 40 mph for passenger operations and a minimum speed of 25 mph for freight operations on Tracks 1 and 2. Existing sidings are to be assigned stations matching the mainline stations and station equations referencing the Valuation Maps.

2.5.1 TRACK CENTERS

Track centers (distance between the centerlines of two adjacent tracks) for mainline, lead tracks, tangent tracks, and tracks parallel to mainline tracks that are not being relocated or modified will remain at existing track centerline widths. Unless agreed upon within the Comprehensive Rail Agreement, on tracks to be owned and maintained by CSXT, mainline track centers will meet or exceed CSXT's standard track centers of 15 feet. Track centers less than 15 feet will require design exception justification and formal approval by CSXT. The justification must include explanation of extenuating circumstance, limits of the standard deviation (exception), implications of not complying with the CSXT standard, and recommended infrastructure or installations to mitigate the impacts associated with the proposed exception. Exhibit E-4 of the Comprehensive Rail Agreement between CSXT and Virginia Department of Rail and Public Transportation (DRPT) specifies agreed upon Confirmed Track Separation Distances Less Than 15 feet. For the Long Bridge Project, due to the overbuild of Maryland Avenue, reduced track centers of 14 feet between mileposts 111.2 to 111.7 have been approved and will not require design exception justification and additional formal approvals. Corridor safety must be maintained in all circumstances, and in no case will track centers be reduced below their existing minimums in the same block of track.

District of Columbia Codes and Regulations specifies minimum track centers for use in the District, although the CSXT minimums are more restrictive. Track centers will be based on **Table** 2-1 below and in accordance with Virginia Passenger Rail Authority (VPRA) approval or per established agreements (e.g., Exhibit E-4 of the DRPT/CSXT Comprehensive Rail Agreement). Deviations from these values will be in accordance with *Chapter 10*.

TABLE 2-1. MINIMUM TRACK CENTERS.

Track Type	CSXT Minimum	DCMR Minimum
Main	**15 ft**	14 ft
Other Tracks	**14 ft**	14 ft
Other Track Adjacent to Main Tracks	**20 ft**[1]	15 ft

> ***Note:*** *1 – Track centers will follow the DPRT/CSXT Comprehensive Rail Agreement and locations not specifically identified will follow the standards in this table.*

The Long Bridge Project utilized the following typical sections for conceptual evaluation. Refer to *CSXT Standard Drawing 2600* series for additional track configuration details.

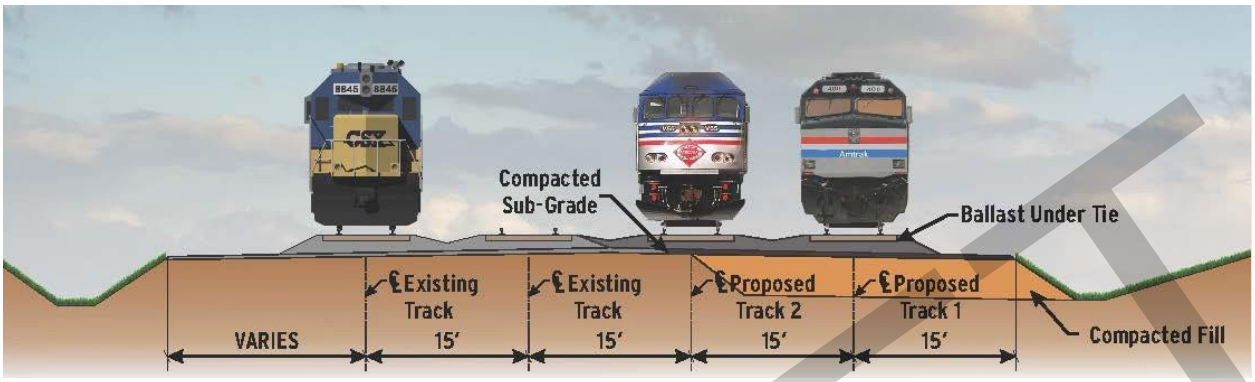


FIGURE 2-1. FOUR TRACK TYPICAL SECTION.

2.5.2 TANGENT ALIGNMENT

In compliance with AREMA, the AHJ's operating preference and passenger railway design best practices, the track geometry must maintain a minimum tangent length between designed track features. For mainline passenger tracks, the desired minimum tangent length (L) between curves can be determined by the following formula:

$$L = 3V$$

Where: L = minimum tangent length, feet
V = passenger design speed through the curve, miles per hour

The tangent length formula is based on the rail car traveling at least two seconds on tangent track between two curves. The preferred and absolute minimum tangent track lengths are reflected in **Table 2-2** for predominate track circumstances. These minimums will be met unless a design exception is formally approved by the AHJ in accordance with *Chapter 10*.

TABLE 2-2. MINIMUM TANGENT LENGTH - MAIN TRACK.

Tangent Location on Mainline Tracks	Minimum Tangent Length (Feet)	
	Preferred	Absolute MINIMUM
Between Curves	3V	200
Between Point of Switches (PS) of Turnouts (TOs)	200	100
Between PS and Curve	200	100
Between PS and Bridge	500	100
Between PS and Last Long Tie of TO	**200**	100

2.5.3 HORIZONTAL CURVE ALIGNMENT

Superelevation

Superelevation (sometimes referred to as cant internationally), is defined as the algebraic height difference in profile elevations between the low rail (curve interior rail) and high rail (curve exterior rail) for a specific track. The height difference is used to counteract, or partially counteract, the lateral forces on a train through a horizontal curve. Additional benefits include distribution of load on the rails, improved ride quality for passenger comfort, and reduced asset wear on the rail and wheel. All mainline curves will be superelevated at a minimum of one half inch. See *CSXT Standard Drawings 2510 and 2511* for further superelevation requirements. For passenger operations, AREMA recommended practices will apply.

Circular Curves

Circular curves will be defined by the chord definition of curvature. Track curvature will be compliant with the host railroad. Any existing curves will be improved to the extent possible within the constraints of the Corridor. Horizontal curvature will be adjusted between parallel tracks to accommodate additional horizontal clearance where possible.

Generally, turnouts will be placed outside of a horizontal curve in accordance with minimum tangent lengths. Single radius horizontal curves with transition spiral curves are preferred. The utilization of compound circular curves and circular curves joined by a transitional spiral will be minimized within the Project limits and if needed, the most restrictive (longest) will be used. Existing curves of these nature will be evaluated for the application of a single circular curve with transitional spiral curves.

Spiral Transition Curves

A clothoid spiral transition curve will be used on mainline tracks to connect tangents to circular curves. Curves associated with a turnout that connect the tangent from frog to a parallel track, or siding, are excluded from transitional spirals. Spirals will be designed to meet or exceed the existing spiral criteria, spirals that do not meet CSXT's requirements will require a design exception and formal approval from the AHJ. Spiral lengths will also be verified by AREMA standards to accommodate increased unbalance from passenger trains.

The graphical configuration and components are reflected in **Figure 2-2** and **Table 2-3**.

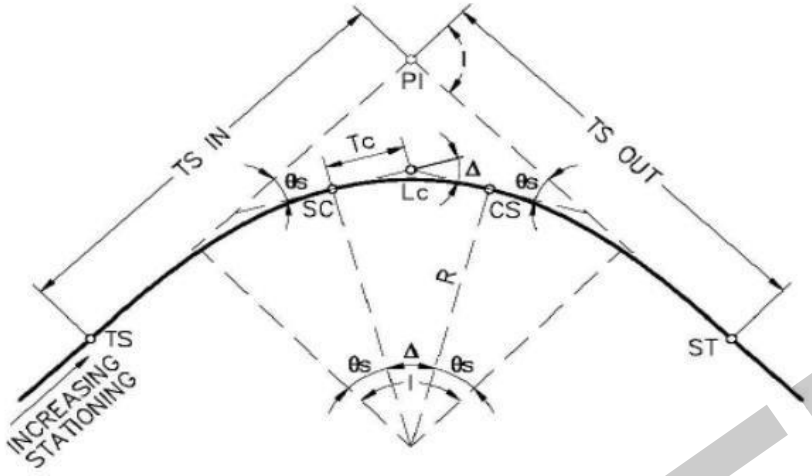


FIGURE 2-2. CIRCULAR CURVE WITH SPIRAL TRANSITION.

Table 2-3. Degree of Curvature.

D_C	Degree of Curvature
I	Total Intersection Angle
Θ_S	Spiral Angle = (L_S D_C) / 200
Δ	Central Angle of Circular Curve = I - 2 Θ_S
R	Radius of Circular Curve
T_C	Tangent Length of Circular Curve = R Tan (Δ/ 2)
L_C	Length of Circular Curve = (Δ/ 180) R
L_S	Length of Spiral
TS	Tangent to Spiral
SC	Spiral to Curve
CS	Curve to Spiral
ST	Spiral to Tangent

All mainline track will be configured with a length of spiral preferred by passenger services for passenger comfort. The length of spiral will be based on the desirable length of spiral stated in *AREMA MRE Chapter 5, Section 3.1* formula, as the longest distance as determined from the following formulas:

1. $L_S = 1.63E_UV$; or $Ls = 1.22E_UV$
2. $L_S = 1.2E_aV$

Where: E_U = unbalanced superelevation
E_a = actual superelevation applied to the curve, inches
V = passenger train design speed, mph

All spirals used on the project will require approval by the AHJ in accordance with *Chapter 10*. The desirable lengths of spiral will be reflected in 31-foot intervals.

For passenger train operations, the active total length of spiral in feet will be defined by the following formula:

$$L_s = 1.46\ Vt$$

Where: V = design speed, mph
t = time required to tilt, seconds

L_s is rounded to the nearest 100 feet (but not less than 100 feet). The criteria determining t is established on a case by case basis dependent on physical constraints along the corridor.

Acknowledging the Project Corridor has a variety of constraints, including the availability of property, historic districts, monumental districts, environmental features, commercial development, and existing retaining walls, the absolute minimum length of spiral will be based on *CSXT Plan 2511* and VRE and Amtrak Recommendations for passenger comfort.

2.6 Vertical Geometry

Vertical geometry will be based on the top of the low rail. Track profile will reflect the existing rail elevation where possible.

Individual track profiles will be developed during continued phases of the Project. Turnouts and switches are to be placed outside the limits of the vertical curve in accordance with minimum tangent lengths displayed in **Table 2-2**.

2.6.1 GRADES

Track grades reflected with the vertical geometry will represent the effective grade of the track. All track grades will be evaluated in accordance with AREMA compensated gradients. The compensation factor will be 0.04 percent per horizontal degree of curvature. The maximum grade allowed without compensated grade is 1.5 percent. Compensated gradients are not to exceed 1.50 percent for new construction without formal approval and an accepted design exception from CSXT. Any deviation will be subject to review and acceptance of the operating railroad with the design exception process detailed in *Chapter 10*.

For mainline track, the desired length of constant track grade between vertical curves will be the greater of either 100 feet or the result of the following formula:

$$L = 3V$$

Where: L = minimum tangent length, feet
V = freight design speed in the area, mph

2.6.2 VERTICAL CURVATURE

All changes in track grades will be connected with a parabolic curve in accordance with *AREMA MRE, Chapter 5, Section 3.6*. Mainline tracks will utilize the following equation for both crest and sag curves.

$$L = \frac{2.15(DV^2)}{A}$$

Where: L = length of vertical curve, feet (rounded up to the next 10 feet, minimum length of 100 feet)

D = Absolute value of the algebraic difference in rates of grades (expressed as a decimal)
V = Speed of freight train, mph
A = vertical acceleration, ft/sec/sec (ft/sec^2)

The recommended vertical accelerations (A) for passenger and freight trains for both crest and sag curve are as follows (**Table 2-4**):

Table 2-4. Recommended Vertical Acceleration.

Train Type	Acceleration
Passenger Train	0.60
Freight Train	0.10

The longest vertical curve length resulting from the vertical accelerations will be applied to the track profile. Vertical lengths will be rounded to the next 10 feet with a minimum length of 100 feet. Special track work must be in accordance with minimum tangent lengths displayed in **Table 2-2**.

2.7 Clearances

Railroad clearances refer to the recommended minimum separation between tracks in both a horizontal and vertical component. Horizontal clearances are references from the track centers to obstructions on either side of the track. Vertical clearances are referenced from the top of rail to the vertical obstruction. In track conditions with superelevation, the vertical clearance is referenced from the high rail. Since the Project does not include station work, clearance requirements associated with pedestrian access are not included.

Railroad clearance standards are defined by *CSXT Standard Plans 2604 and 2605 (s)* and *DCMR, Title 24. Public Space and Safety, Chapter 24-31. Occupational Safety: Railroad Clearances*. These clearances are applicable to all new construction or design, including temporary construction or design. Clearances will also be verified per passenger requirements based on Amtrak and VRE standards for the corridor.

The lateral or horizontal clearance (distance between the track centerline and closest horizontal obstruction) will meet or be greater than CSXT's standard clearance of nine feet unless noted otherwise and/or agreed to within the DRPT/CSXT Comprehensive Rail Agreement and will include considerations for curvature and superelevation. For obstructions that are buildings normally occupied by people or that support a bridge, the lateral track distance will be 25 feet unless protected by a crash wall. Horizontal clearances must be shown from the centerline of track to the nearest obstruction if within 25 feet of the centerline of any track. Additional clearance for curvature and superelevation will be taken into account when determining the horizontal clearance. New tracks with horizontal clearance less than 9 feet to any obstruction including curvature and superelevation (other than buildings or bridge supports where it is 25 feet) will require design exceptions and formal approval by CSXT. The justification must include explanation of the extenuating circumstance, limits of the standard deviation (exception), implications of not complying with the CSXT standard, and recommended infrastructure or installations to mitigate the impacts associated with the proposed exception. Exceptions include reduced clearances between mileposts 111.2 to 111.7 due to the overbuild of Maryland Avenue in accordance with Exhibit E-4 of the DRPT/CSXT Comprehensive Rail Agreement. This

agreement allows a minimum clearance of 7.5 feet from the existing horizontal obstruction and will not require design exception justification and additional formal approvals from CSXT.

DCMR, Title 24. Public Space and Safety, Chapter 24-31. Occupational Safety: Railroad Clearances specifies minimum clearances for use in the District although the CSXT minimums are more restrictive. Lateral clearances will be based on **Table 2-5** below in accordance with VPRA approval and as detailed in the DRPT/CSXT Comprehensive Rail Agreement. Deviations from these values will be in accordance with *Chapter 10* of this BOD.

Table 2-5. Minimum Clearances.

Clearance Type	CSXT Minimum[1]	DCMR Minimum
Lateral Clearance, General	9'-0"	8'-0"
Lateral Clearance, Piers and Abutments, Without Crash Wall	25'-0"	N/A
Signals and Poles	8'-6" minimum	10-6" DESIRED
Overhead	23'-0"	22'-0"
NOTE: 1 - INCLUDING CURVATURE AND SUPERELEVATION		

Vertical roadway clearances are determined using the limited topographical information and track structure design assumptions, as well as design criteria per relevant CSXT references listed in *Section* 2.2. Any deviation from the standards will be subject to review and approval of a formal design exception. The track structure height is determined using the structure depths combined with the following criteria:

TABLE 2-6. TRACK ITEM DEPTHS.

Track Item	Height (ft)
Waterproofing and deck protection	0.10[1]
Ballast	1.00[2]
Conc. Tie + rail seat pad	0.76
Rail (136 RE)	0.61
Notes: 1 - Waterproofing thickness is 80 mils and deck protection thickness is 0.25 inches, therefore the total thickness of waterproofing and deck protection is 0.10 feet. 2 – All structures will be designed for 24 inches of total ballast, 12 inches of initial ballast and 12 inches of future ballast.	

For new structures, vertical clearance from a horizontal plane at the top of the high rail to the nearest overhead obstruction will be at least 23 feet.

2.7.1 BRIDGES

For bridge specific design criteria beyond clearances cited, refer to *Chapter 3, Railroad Bridges and Retaining Wall Structures* of this document. Actual structure depth shall be used to determine vertical clearance.

2.8 Roadbed Section

Track roadbed criteria will be compliant with *CSXT Plan 2601*. The following general criteria is applicable to the track's roadbed section. Any discrepancy between criteria and standards will be approved by DDOT, CSXT, and other federal and local agencies having jurisdictions and compliance to the NEPA documents.

2.8.1 BALLAST DEPTH

The ballast depth will extend not less than 12 inches below the low rail to the track subballast. Ballast depths are to increase proportionally for the full length of the tie in relationship to the track superelevation. All ballast materials are to be compliant with CSXT specifications and originate from a CSXT approved quarry.

2.8.2 SUBBALLAST DEPTH

Subballast depth will be a minimum of 6 inches below the ballast on mainline tracks and sidings. Subballast is to conform with CSXT specifications and is not required on ballast deck bridges.

2.8.3 SHOULDER WIDTH

Ballast shoulder width will extend beyond the end of the tie in accordance with *CSXT Plan 2602*.

2.8.4 TRACK DRAINAGE

All track construction must have drainage and stormwater management facilities designed in accordance with *CSXT Plan 2601 - Roadbed Sections*.

Track requires a decentralized approach to stormwater management because the track is a linear feature with nearly negligible width, as compared to its length, and no centralized location where stormwater BMPs can be constructed. The existing track infrastructure in cut sections generally includes ditches along one or both sides of the track for drainage. These ditches will be reconstructed to conform to the proposed typical track section in order to maintain proper drainage.

Under both existing and proposed conditions, stormwater will be conveyed via overland flow or through a drainage system consisting of underdrains installed in the rail ballast or drainage ditches alongside the tracks. Ditches and underdrains will be required to direct stormwater to safe discharge locations and to keep the ballast dry and stable.

All track construction will meet the specific drainage criteria below:

- Existing drainage patterns will be maintained wherever possible.
- To the maximum extent possible, drainage of the roadbed will be handled by a gravity system.
- Do not drain areas from beyond the track bed through the track structure. Typically, a ditch or subdrain will lie between the track and the adjacent ground area to intercept fines from an adjacent slope which would foul the ballast.
- Track drainage system, including underdrains (subdrains), will be designed to accommodate peak flows produced by a 100-year design storm without the ponding of water against the roadbed.

- Pipes and culverts shall conform to AREMA Recommendations and ASTM Specifications.
- Perforated pipe underdrains will be used in locations where the track corridor is constrained or where the adjacent grading does not allow open channel flow.
- The minimum pipe size for underdrains parallel to the tracks is 12 inch HDPE.
- Underdrains will be bedded in a trench filled with ¾-inch crushed stone wrapped in a geotextile filter fabric. Cleanouts will be spaced no more than 300 feet apart.
- The track underdrain invert will maintain a minimum depth of 4'-0" from the top of rail and its centerline will be at least 6'-6" from the track centerline.
- Underdrains under railroad tracks will be designed for Cooper E-80 loading and will have a minimum cover of 2 feet from bottom of tie to the top of pipe. Segments of underdrain crossing below track will be solid wall pipe, no perforations.

See *Chapter 7, Drainage & Stormwater Management* for additional requirements.

2.9 Special Trackwork

Special trackwork refers to trackwork units that are used for tracks to converge, diverge, or cross each other through turnouts, and crossovers. All special trackwork will be designed according to CSXT standard drawings or to pre-approved standard CSXT supplier drawings.

2.9.1 SPEEDS THROUGH TURNOUTS AND CROSSOVERS

Passenger and freight speeds for turnouts and crossovers are governed by CSXT operating rules including CSXT signal aspects and current CSXT engineering standards. **Table 2-7** shows the speeds for the turnouts and crossovers that are expected as part of the Long Bridge Project. However, a speed less than those shown may be warranted based on the nearby track geometry and final railroad signal design and will be reevaluated by VPRA and CSXT during the final design phase.

TABLE 2-7. TURNOUT DIVERGING SPEEDS.

Turnout Data	Switch Length & Type	Passenger (MPH)	Freight (MPH)
#15	26'–0" Curved	30	30
#20	39'–0" Curved	45	45

2.9.2 TURNOUTS AND CROSSOVERS

All turnouts and crossovers will meet the criteria below:

- All turnouts, including those within a crossover, are intended to be constructed of new 136-RE Continuous Welded Rail (CWR) and concrete ties. Turnouts incorporated into existing timber track or industrial sidings are to be constructed of new 136-RE CWR and timber ties. Turnout components, including switch points, stock rails, closure rails, guard rails, and frog wing rails are to be fabricated from new, high strength HH rail.
- A minimum of 30 feet will be provided from PS to Insulated Joint.
- Crossovers are to be located on parallel tracks only.
- Standard crossovers are preferred to be on 15-feet track centers.

The application of non-standard turnouts and crossovers, such as equilateral turnouts, require approval in accordance with *Chapter 10*. The following situations may warrant non-standard turnouts and crossovers:

- Crossovers in non-parallel tracks; and
- Crossovers with track centers less than 15 feet.

2.10 Track Gauge

The standard track gauge is 4 feet-8.5 inches. Track gauge is measured between the gauge inside of the heads of rails at 5/8 inch below the top of rails.

2.11 Rail

The rail section to be used will be new 136RE Continuous Welded Rail (CWR). Premium rail may be required according with CSXT engineering standards depending on final track geometry alignments, including curvature and expected traffic.

2.12 Rail Anchoring

Rail anchors are to be applied on conventional ballasted track construction utilizing concrete ties, tie plates, and tie clips.

2.13 Tie Plates

Tie plates and fasteners will be double shoulder tie plates with tie clips.

2.14 Ties

2.14.1 CONCRETE TIES

All new mainline track, turnouts, and crossovers construction is intended to utilize concrete ties. In areas where track is existing and to remain, timber ties may be utilized for proposed connections. The following criteria is applicable:

- Concrete tie spacing is 20 inches, center of tie to center of tie, except as noted in CSXT Plans for special trackwork.
- Concrete ties are to be compliant with the type and material specification of CSXT.
- Concrete ties will transition to timber north of the RO Interlocking.
- Typical concrete tie dimensions to be 9 feet long, 10 inches high, and 13 inches wide
- Concrete tie rail seat shall be a flat smooth surface +/- 1/32 inch
- Concrete tie rail seat shall provide a cant of 1 in 40 +/- 5 toward center line of tie unless otherwise specified

2.14.2 TIMBER TIES

The application of timber ties is at the discretion of VPRA and CSXT. Timber ties are to meet the following criteria:

TABLE 2-8. TIMBER TIE DIMENSIONS.

Parameter	Dimension
Length	8.5 feet
Height	7 inches
Width	9 inches

The maximum center of tie to center of tie spacing is 20 inches; the minimum is 18 inches.

2.15 Communications and Signals

The project delivery Contract will coordinate directly with CSXT to develop conceptual and preliminary communications and signals (C&S) designs and agreements. This separate design contract will run concurrently and share a similar timeline with the Long Bridge Project consultant team contract and work efforts. The consultant team will incorporate the C&S design information into the Long Bridge Project as appropriate and will coordinate directly with CSXT and DDOT throughout the Project.

3 Railroad Bridges and Retaining Wall Structures

3.1 Overview

The Long Bridge Project contains a variety of structural elements including undergrade bridges, pedestrian/bicycle bridges, and retaining walls. This chapter provides design criteria for rail related structures, including bridges and retaining walls. *Chapter 4* provides design criteria for pedestrian/bicycle facilities.

American Railway Engineering and Maintenance-of-Way Association (AREMA) Design Criteria will be utilized for structures supporting railroad live loading unless otherwise referenced within this document.

3.1.1 OWNERSHIP

Ownership for bridges is as follows:

- Potomac River Undergrade Bridge VPRA
- WMATA/I-395 Undergrade Bridge VRPA
- Ohio Drive SW Undergrade Bridge VPRA
- Washington Channel Undergrade Bridge VPRA
- Maine Avenue SW Undergrade Bridge VPRA

3.1.2 REFERENCES

- AREMA Manual for Railway Engineering (MRE), 2022 Edition
- CSX Transportation (CSXT) Design and Construction Standard Specification Vol. 1, March 1, 2021
- CSXT MWI 2800 Series
- CSX Public Projects Information Manual
- District Department of Transportation (DDOT) Design and Engineering Manual (DEM), January 2019
- DDOT Standard Specifications for Highways and Structures, October 2020
- Virginia Department of Transportation (VDOT) Modifications to the American Association of State Highway and Transportation Officials (AASHTO) Load and Resistance Factor Design (LRFD) Bridge Design Specifications, 8th Edition, 2017
- Note: this reference is only applicable to the Potomac River Undergrade Bridge
- VDOT Manual of the Structure and Bridge Division, Part 2, Design Aids and Typical Details, 2021
- Note: this reference is only applicable to the Potomac River Undergrade Bridge
- AASHTO LRFD Bridge Design Specifications, 9th Edition, 2020
- AASHTO Standard Specifications for Highway Bridges, 17th Edition, 2002
- AASHTO Vessel Collision Design, 2009

- Washington Metropolitan Area Transit Authority (WMATA) Adjacent Construction Project Manual, September 2015
- AASHTO/AWS Bridge Welding Code D1.5, 8th Edition
- AASHTO Guide Specifications for Seismic Isolation Design, 4th Edition
- Virginia Railway Express (VRE) Standards
- Amtrak Standards
- AISC Steel Construction Manual – 13th Edition
- USCG, Bridge Lighting and Other Signals

3.2 Special Requirements

3.2.1 SPAN CONFIGURATION

All spans will be simple spans. Continuous spans are prohibited (CSXT X-A). Piers will generally align with existing substructures and shall maintain existing navigational clearances.

Skewed spans shall be avoided where practical. Where skewed spans are necessary, the skew shall be minimized to the extent practicable. Skewed spans shall be designed such that the dead load counteracts computed live load uplift by a factor of 1.5.

Through plate girders (TPGs) are only permitted for up to two track bridges, except through plate girders will be allowed at Ohio Drive SW and Maine Avenue SW. Intermediate girders are not permitted for double track bridges. Stringers, if required, will frame into floorbeams. All stringers will have top and bottom flanges clipped at an angle not greater than 45 degrees to permit field removal and installation. Intermediate floorbeams will frame into the girder web using double angle connection angles and high strength bolts. (CSXT X-D)

Through plate girder web depths are to be consistent for all spans of the Potomac River Undergrade Bridge. Web depths shall also be consistent for all spans of the WMATA/I-395 Undergrade Bridge.

Concrete superstructures are not permitted over roadways.

3.2.2 DESIGN SPEED

The design maximum allowable speed (MAS) is 60 mph for the purpose of bridge design. Actual speeds may vary. See *Chapter 2, Railroad* for additional speed information.

3.2.3 DESIGN LIFE

Design Service Life.....100 years

3.2.4 DISTRIBUTION OF AXLE LOADS

For the design of ballast deck beams and girders spaced symmetrically about the centerline of tangent track, the axle loads will be distributed equally to all beams or girders whose centroids are within a lateral width equal to the length of tie plus twice the minimum distance from bottom of tie to top of beams or girders. Distribution of loads to transverse floorbeams will be in accordance with AREMA 15 – 1.3.4.2.3. Distribution for loads for other conditions will be determined by a recognized method of structural analysis.

3.2.5 BRIDGE DECK

The rail bridges will use ballasted deck construction.

All bridges will be designed with non-composite interaction between the superstructure and deck. (CSXT V-C)

Concrete deck shall not be used on through girder spans due to unintended composite behavior causing deck cracking.

Steel deck shall be a minimum of one inch thick.

Shear studs are not permitted. (CSXT IX-F1)

Waterproofing membrane shall be spray applied and shall be PPG, Eliminator, or approved equal. The waterproofing membrane shall be a minimum of 80 mils with a minimum 0.25 inch thick integrated ballast mat. If a thicker waterproofing membrane is used, the integrated ballast mat may be optional at the approval of CSXT. Concrete underlayment may be required to slope the ballast mat and waterproofing toward the provided drainage structures.

One foot (1'-0") minimum ballast depth below the tie (measured from top of deck waterproofing to bottom of tie, at the centerline of the low rail) plus an additional one foot (1'-0") for future track reprofiling will be used for calculating dead load on the structure to accommodate future track raises. (CSXT V-D, CSXT IV-B).

Rail and ties will meet criteria specified in *Chapter 2, Railroad*.

Walkways

Three-foot walkways shall be provided along the project corridor as described below:

- One walkway on bridges carrying two tracks;
    - The walkway is preferred on the upstream (track left) side of the Potomac River Undergrade Bridge and the WMATA/I-395 Undergrade Bridge;
    - The walkway may be located on the inside of the girder (on the ballast section) in lieu of an external "catwalk" walkway for the Potomac River Undergrade Bridge and the WMATA/I-395 Undergrade Bridge;
- Two walkways, one on each side of the bridge, on bridges carrying four tracks;
    - The proposed walkways on the Ohio Drive SW and Maine Avenue SW Undergrade bridges may have isolated points with less than 3 feet of width;
- Walkways shall be provided adjacent to retaining walls.

3.2.6 BEARINGS AND BEARING REPLACEMENT CONSIDERATIONS

Bearing stiffeners shall be CJP welded or finish to bear with fillet welds for both top and bottom flanges.

Intermediate stiffeners shall be on both sides of the web (in pairs). They shall be extended to the bottom flange with a tight fit or light driving fit with no weld on the tension flange, except any intermediate stiffeners within a distance of D from the centerline of bearing, which must be fastened to tension flange per AREMA 15-1.7.8e, or any intermediate stiffeners at knee brace locations which shall also be fastened to both flanges.

Anticipated bearing types are described in respective TS&L Reports. Shock pads shall be provided at each bearing. Shock pads shall be ½" thick, 31 ply preformed elastomeric bearing pads conforming to Federal Specifications MIL-C-882C. The shock pads shall be placed between the masonry plate and concrete substructure.

Provisions shall be made for bearing replacements.

Jacking locations shall be provided at each end floorbeam or end diaphragm. Jacking loads for the bearing replacement condition shall accommodate full dead load including future ballast and need not include live load on the bridge. (CSXT X-B, X-D).

3.2.7 TRACK GEOMETRICS AND CLEARANCES

Use MWI 2604 for clearance envelopes.

Navigational clearance over the Potomac River: Any new structures located over the Potomac River are subject to meeting the navigational requirements for the area set by the United States Coast Guard. The minimum vertical clearance has been set at 20 feet above the current mean high water (MHW) elevation of 1.54 per the United States Coast Guard (USCG) Preliminary Navigation Clearance Determination (PNCD) dated March 5th, 2020.

Minimum vertical clearance for undergrade bridges to be replaced will be as follows:

- Potomac River Undergrade Bridge over GWMP Span 14'-6"
- Potomac River Undergrade Bridge Navigational Channel Span 20'-0"
- Potomac River Undergrade Bridge over Ohio Drive SW (West) Span 14'-6"
- WMATA/I-395 Undergrade Bridge over I-395 Span 16'-6"
- Ohio Drive SW Undergrade Bridge 12'-6"
- Washington Channel Undergrade Bridge TBD
- Maine Avenue SW Undergrade Bridge 14'-6"

All construction activities will comply with FAA and MWAA requirements.

Refer to *Section 2.7* of this document for information regarding clearance between track centers.

Crashbeams

Crashbeams will be integrated with steel fascia beam TPGs for Ohio Drive SW (East) and Maine Avenue SW Undergrade Bridges. A superficial fascia beam and barrier system will be provided at these locations to protect main load carrying elements from vehicular impact and meet aesthetics requirements. This beam will be designed to mimic the look of a typical steel TPG which will include a small overlapping gap between the bottom and top section. The bottom section acts as a sacrificial crash beam while the top section carries a walkway with a steel parapet connected to the main load carrying girders. Design will follow MWI 1911 Design and Construction Standard Specifications - Section 070330.

3.2.8 BRIDGE DRAINAGE

- For bridge spans over land, bridge drainage shall be carried off structure through an on-structure drainage system to outfalls at the bridge ends or connection into the track drainage system. For spans of the Potomac River Undergrade Bridge and Washington Channel Undergrade Bridge over water, bridge drainage may be conveyed via on-structure drainage systems to downspouts at pier locations which outfall directly into the water below.
- Free-fall systems that outlet bridge drainage directly onto land or roadways shall not be permitted.
- There are additional retaining wall drainage outlets throughout the corridor which outlet into either drainage structures or surface ditches.

See *Chapter 7, Drainage & Stormwater Management* for additional requirements.

3.2.9 UTILITIES

Below is a comprehensive list of impacted utility owners on a per structure basis for coordination:

- Potomac River Undergrade Bridge
    - CSXT
    - DC Water
    - Dominion Power
    - National Park Service (NPS)
    - Potomac Electric Power Company (PEPCO)
    - Verizon
    - WMATA
- WMATA/I-395 Undergrade Bridge
    - AT&T
    - CSXT
    - DC Water
    - DDOT
    - NPS
    - Verizon
    - WMATA
- Ohio Drive SW Undergrade Bridge
    - CSXT
    - NPS
    - PEPCO
    - Verizon
    - Washington Gas
- Washington Channel Undergrade Bridge

  - AT&T
  - CSXT
  - DDOT
  - Verizon

- Maine Avenue SW Undergrade Bridge

  - AT&T
  - Capital Transit Company
  - CSXT
  - DC Water
  - DDOT
  - General Services Administration (GSA)
  - PEPCO
  - Verizon

See *Chapter 8, Utilities* for additional requirements.

3.2.10 NAVIGATION LIGHTING

Navigation lighting shall be provided for the Potomac River Undergrade Bridge and Potomac River Bike-Ped Bridge, as they are bridges that cross waterways, which support nighttime navigation. Navigation lights are required for display and shall be in accordance with Part 118 Bridge Lighting and Other Signals of Title 33 Navigation and Navigable Waterways, CFR.

Approval of navigation lights and other required signals shall be obtained, prior to construction, from the Coast Guard District Commander (Bridge Office) with jurisdiction over the bridge project area.

3.2.11 COMMUNICATIONS AND SIGNALS

Refer to *Section 2.15* and coordinate with CSXT on communication and signal designs and their respective foundations, and how it will relate with proposed foundations along the project corridor.

3.3 Loads

3.3.1 DEAD LOADS

TABLE 3-1. STRUCTURAL COMPONENTS.

Steel	490 pcf
Normal Weight Reinforced Concrete	150 pcf
Ballast	120 pcf, 12 inch minimum depth beneath tie plus additional future 12 inch depth
Timber	60 pcf

See AREMA 15.1.3.2 for additional items not listed.

A 10 percent increase will be considered as an allowance for the dead load of splice and fill plates, stiffeners, nuts and bolts, welds, and other miscellaneous components during analysis for

all structural steel components. Designer shall verify reinforced concrete unit weight for densely reinforced concrete elements and adjust accordingly.

TABLE 3-2. NON-STRUCTURAL ELEMENTS.

Track rails, inside guard rails and their fastenings (AREMA Chapter 15 Section 1.3.2.b)	200 plf/track
Concrete ties	800 lbs each
Utilities	To be based on specific utilities on each individual bridge
Drainage	To be based on the specific system on each bridge

3.3.2 LIVE LOAD

Superstructure elements will be designed for Cooper E-80 Loading or the Alternate Live Load with full diesel impact, whichever produces the greatest stress, per *AREMA Chapter 15 Section 1.3.3*. Proposed substructure elements will be designed for Cooper E-90 loading at the following locations:

- Ohio Drive SW Undergrade Bridge
- Washington Channel Undergrade Bridge
- Maine Avenue SW Undergrade Bridge

All other undergrade bridge substructure elements and temporary structural elements will be designed for Cooper E-80 loading.

Any structure carrying the Tracks 3 & 4 access road from Ohio Drive SW (West) will be designed for a singular AASHTO HS-20 vehicle.

3.3.3 IMPACT LOADS & ROCKING EFFECT

Full diesel impact loads based on 60 mph will be calculated as per *AREMA Chapter 15 Section 1.3.5*. Impact forces will be considered for strength design and will also contribute to the fatigue stress range with the appropriate fatigue impact factor applied.

Impact forces due to rocking effects will be considered for strength design and will also contribute to the fatigue stress range.

The distribution of rocking loads to members supporting the track will be based on the configuration and spacing of members supporting the track. For live load acting on multiple tracks, force couples will be applied in the manner that will produce the worst-case response.

CENTRIFUGAL FORCE

Centrifugal force based on a 60 mph operating speed will be calculated as per *AREMA Chapter 15 Section 1.3.6*. The sharpest degree of curvature on the span will be used when the span carries multiple tracks. Centrifugal force will be considered for strength design and determining the fatigue stress range.

3.3.4 VESSEL IMPACT

For the purposes of computing vessel impact risk analysis, the Potomac River Undergrade Bridge will be considered "Critical." Design of the pier protection (fender system) adjacent to piers adjacent to the Potomac River Navigation Channel shall be in accordance with AREMA 8-23.

Design of the piers away from the Potomac River Navigation Channel shall be in compliance with AASHTO 2020 Design Specifications 9th Edition and AASHTO Vessel Collision Design 2009.

The vessel data required for bridge design includes type of vessels and size distributions, travel frequencies, typical vessel speeds, and loading conditions. To determine the vessel size distribution at the bridge site, information on both present and projected future vessel traffic is needed. Waterway information including alignment, channel width, currents, depths, and river stages are also needed. *Appendix D* includes current vessel use through the study area.

The vessel impact analysis will be performed based on the findings of the navigational study and scour evaluation study. The combination of vessel impact and scour shall be evaluated for two cases potentially during storm and high-water conditions:

- Minimum impact loads associated with a drifting empty barge breaking loose from its moorings and hitting the bridge. The design barge will be a 300 ton unloaded hopper barge as defined by AREMA or a AASHTO 200 ton barge.
    - The water surface elevation for the design flood shall be used to perform the drifting barge impact risk assessment.
    - The drifting barge impact speed shall be set equal to the estimated design flood event current values at each individual pier location.
    - The drifting barge impact load will be combined with 50 percent of the predicted long-term scour plus 50 percent of the predicted short-term scour.
- Maximum impact loads associated with the design vessel class while transiting the navigation channel under typical waterway conditions.

3.3.5 EFFECT OF SCOUR

The rail bridge substructures in or adjacent to waterways will be designed to safely support the structure subjected to the design scour. Substructures subjected to scour will be designed in accordance with *AREMA Chapter 8* and may include pile foundations, foundations on rock, foundations located below the maximum estimated scour depth, or any other means and provide adequate scour protection. Scour depths shall be checked for the design flood, overtopping flood, and any other events that could produce worse scour following *AREMA Chapter 8 Section 5.6.3*. The worst-case scour shall be designed for. Where it is possible scour cones overlap, the total scour shall be considered. Refer to *Chapter 6* for additional scour considerations.

3.3.6 BUOYANCY

Buoyancy will be considered as it affects the design of either the substructures and foundations.

3.4 Design Method

3.4.1 STEEL DESIGN

Steel superstructures will be designed per AREMA criteria using the Allowable Stress Design Method.

Fracture Critical Members, as defined by AREMA 15 – 1.14.2, shall comply with requirements provided in AREMA 15-1.14. Serviceability criteria such as fatigue and deflection shall comply with AREMA Chapter 15.

3.4.2 SUBSTRUCTURE DESIGN

Concrete substructures, H-piles, and micropiles will be designed per AREMA criteria using the Load Factor Design Method.

All substructure stability design will follow the Allowable Stress Design Method.

Pipe piles and drilled shafts will follow the Allowable Stress Design Method for load calculations and Load Factor Design Method for reinforcing.

Substructure Design will include provisions set forth by *CSXT Criteria for Undergrade Railroad Bridges (CSXT XI)*.

Substructure shall be designed for Vehicular Impact per AASHTO 3.6.5 (CT – 600K) and/or AASHTO 2.3.2.2.1 (Redirect or Absorb) with the following load combinations:

- D+E+CT @150 Allowable – Service Load Design
- 1.0D+1.0E+1.0CT – Load Factor Design

3.4.3 RETAINING WALL AND CRASHWALL DESIGN

Retaining walls shall be designed per AREMA criteria using Allowable Stress Method and the stability requirements outlined in *AREMA 8-5.4*.

Crashwalls shall be detailed per *AREMA 8-2.1.5, CSXT Overhead Bridge Criteria* and *DDOT DEM 16.7*.

3.5 Fatigue

The lowest acceptable fatigue detail category shall be stress category C (10 ksi).

Number of constant stress cycles, N, will be greater than 2,000,000.

The stress range (algebraic difference between maximum and minimum stress in a member subjected to cyclic loading that results in net tension) will be less than the allowable fatigue stress range defined in *AREMA Table 15-1-9* for a number of cycles greater than 2,000,000.

For members receiving load from more than one track, the impact load will be applied on the number of tracks designated in *AREMA Table 15-1-5*.

3.6 Seismic Design

3.6.1 STRUCTURE IMPORTANCE CLASSIFICATION

Immediate Safety: 4.0

Occupancy Factor: 4 (More than 10 Passenger Trains per Day)

Hazardous Material Factor: 4 (minimum value permitted)

Community Life Factor: 4 (maximum value permitted)

Immediate Value: 4.0

Railroad Utilization Factor: 4 (Over 50 million gross tons annual traffic)

Detour Availability Factor: 1.00 (No Detour Available)

Replacement Value: 4.0

Span Length Factor: 3 (Span length between 125 ft and 250 ft)

Bridge Length Factor: 2.0 (over 1,000 ft)

Bridge Height Factor: 0.75 (Less than 20 ft)

Bridge Height Factor: 1.00 (Between 25 and 40 ft)

3.6.2 PERFORMANCE CRITERIA

The performance criteria for each of the limit states listed below are described in *AREMA Chapter 9, Sections 1.3.2* and *1.3.3* and utilizing the USGS Interactive Hazard Tool for B/C Soil classification.

TABLE 3-3. PERFORMANCE CRITERIA.

Limit State	Return Period (Years)	Peak Ground Acceleration (% Gravity)
Serviceability	100	A_{100} = 0.7
Ultimate	475	A_{475} = 2.4
Survivability	2,475	A_{2475} = 6.9

3.6.3 SITE COEFFICIENT

Site Class: Soil Profile as determined by boring exploration and geotechnical analysis and recommendations in accordance with AREMA MRE.

3.6.4 ANALYSIS PROCEDURE

Multi-Modal Analysis Procedure, without soil structure interaction.

Load combinations using the Alternate Method, 100% + 30% procedure.

3.6.5 DETAILING PROVISIONS

Detailing Provisions as per *AREMA 9-1.4.7* will be used where applicable, with the exception that Continuous Welded Rail (CWR) will not be relied upon for redundant load path for seismic forces.

3.6.6 DAMPING ADJUSTMENT FACTOR

The damping adjustment factor will be computed with the values that are given in *AREMA Chapter 9, Table 9-C-1*:

- Concrete: D = 1.00
- Structural Steel: D = 1.18

3.6.7 LOAD COMBINATIONS

Only one track will be loaded with full live load in any seismic load combination, regardless of the number of tracks actually supported by the structure being designed.

3.7 Materials and Equipment

3.7.1 GENERAL

All materials will be in accordance with *CSXT Design and Construction Standard Specifications, Division 7 – Structures*.

3.7.2 CONCRETE

All concrete materials and properties shall be in accordance with CSXT Design and Construction Standard Specifications, Division 7 - Structures.):

3.7.3 STRUCTURAL STEEL

All steel members to be detailed and fabricated to place the rolled direction of the member in the direction of primary stress.

Structural steel will conform to requirements of ASTM A709, Grade 50W (AASHTO M270) unless otherwise noted. Grade HPS 70W requires approval per CSXT 0701252.1B. (AREMA 15.1.2.1)

Steel for miscellaneous secondary elements will conform to the requirements of ASTM A709, Grade 36 (AASHTO M270).

All structural steel will meet Charpy impact test requirements for Zone 2.

Flange-to-web welds shall be complete joint penetration (CJP) per CSXT Public Projects Manual, derivation from this requires CSXT approval.

Plate girder flanges shall not exceed 4 inch thickness.

Weathering steel will be used for all undergrade bridges. Weathering steel shall be unpainted, except as noted otherwise in the plans.

3.7.4 REINFORCING STEEL

All reinforcing steel shall be deformed bars conforming to the requirements of ASTM A615, Grade 60 (AASHTO M31, Grade 60), and shall be hot-dip galvanized conforming to the requirements of ASTM A767, unless otherwise specified. Reinforcing steel shall be fabricated prior to galvanizing.

All reinforcing splices of deformed bars will be achieved by lap splices or galvanized full-mechanical splices, in accordance with AREMA.

#4 reinforcing bars shall be the minimum bar size used in main load carrying members. Reinforcing shall be spaced to meet the requirements of VDOT (Potomac River Undergrade Bridge only), DDOT, AREMA, or CSXT, whichever is more stringent.

Minimum clear cover to reinforcing steel will be as noted below:

Top of deck slab	2 1/2 in
Bottom of deck slab	1 1/2 in
Pier caps (main steel and secondary steel)	3 in
CIP piers and precast pier segments	
External surface	3 in
Internal surface	2 in
Pier footings	3 in
All other principal reinforcement	2 1/2 in
All other stirrups and ties	2 in

Minimum cover for reinforcing steel in concrete pier surfaces exposed to seawater or spray at or below elevation +10 shall be 4 inches.

3.7.5 FASTENERS

All bolts will be 7/8-inch minimum diameter high-strength bolts (unless otherwise specified) conforming to ASTM F3125, Grade A325 (AASHTO M164) Type 3 (slip critical connection Class B) and shall be hot-dip galvanized.

Contact surfaces of bolt parts will meet Class B requirements for Slip Critical Joints in accordance with AREMA specifications.

All bolted connections will use a minimum of three (3) bolts as per AREMA (15.1.5.9.c)

All steel nuts shall conform to ASTM A563 (AASHTO M291), hardened washers shall conform to ASTM F436 (AASHTO M293) and be hot-dip galvanized in accordance with AASHTO A153 (AASHTO M232) unless otherwise specified, and bolts shall be coated after installation. (AREMA 15.1.2.1)

3.7.6 WELDING ELECTRODES

All welding electrodes will conform to the requirements of AASHTO/AWS D1.5. All welding electrodes will have a minimum tensile strength of 70 ksi unless otherwise noted. (DDOT, VDOT, AREMA)

All welds will be subject to non-destructive testing.

Welding of Fracture Critical Members (FCMs) shall be in accordance with Section 12 of AWS D1.5, except as modified in AREMA Chapter 15 Section 1.14 and DDOT Amendments.

3.7.7 ANCHOR RODS AND BOLTS

Anchorage of the superstructure will consist of anchor rods, couplers and anchor bolts as specified by rocking effects. All anchor rods will be swedged and in accordance with ASTM F1554 (AASHTO M314), Grade 55. The anchor rods will be grouted into circumferentially corrugated galvanized steel or plastic sleeves cast in the concrete. Anchor couplers will be capable of developing 150 percent of the minimum yield strength of the anchor bolts or rods. Heavy hex nuts will conform to ASTM A563 (AASHTO M291). Hardened washers will conform to ASTM F436 (AASHTO M293), plate washers will conform to ASTM A709 (AASHTO M270) Grade 36. Anchor rods, bolts, couplers, nuts, and washers will be hot-dip galvanized in accordance with ASTM A153 (AASHTO M232).

3.8 Retaining Walls

3.8.1 GENERAL

Retaining wall systems under consideration include reinforced concrete cantilever walls, soldier pile and lagging walls, and proprietary gravity type retaining walls (T-Walls or comparable prefabricated modular walls). Mechanically stabilized earth retaining systems and sheet pile walls are not permitted for permanent structures(CSXT XI-B2). Sheet pile walls may be used in temporary construction, such as for support of excavation, or for specifically approved permanent applications.

Walls with an exposed height greater than 30 inches will be installed with a fence, handrail, or barrier to prevent workers from falling. Height of fences, handrails, or barrier will meet the minimum requirements of *AREMA 15-8.5*. The wall height shall include additional height for future ballast depth.

Adjacent tracks with more than one foot of elevation difference shall be separated by a wall.

Wall drainage will be provided in accordance with geotechnical and manufacturer's recommendations.

3.8.2 LOADS

Cooper E-90 loads (without impact) will be utilized for live load track surcharge. Live load track surcharge will be applied through fill using a 1H:2V distribution starting from the base of the tie.

Earth pressures from external loads from adjacent structures will be computed using pressure distributions from *AREMA 8-5.3*.

Horizontal earth pressure will be calculated from boring data and the geotechnical analysis and recommendations.

Horizontal and vertical earth pressures will include an additional 1 foot of ballast. (CSXT V-D)

Passive resistance from fill in front of wall will be neglected for design.

3.8.3 EMBANKMENTS

Earth embankments shall have a maximum slope of 2:5 horizontal to 1 vertical (2H:1V) or flatter.

3.9 Foundation Design

3.9.1 GENERAL

Foundations are anticipated to be supported on drilled shafts, steel pipe piles, steel H-piles, micropiles, or as determined by the results of the Supplemental Geotechnical Investigation. Foundations will be designed from boring data and geotechnical analysis and recommendations. Precast concrete driven piles are prohibited. Piers within waterways will be shaped to minimize turbulent flow. The impact of the new foundations on the existing foundations shall be investigated and minimizing such impact shall be considered in foundation selection.

3.9.2 REFERENCES

In addition to those mentioned in *Section 3.1.2*, the following references below apply:

- Unified Facilities Criteria (UFC) Soil Mechanics, UFC 3-220-10N, 2005
- AASHTO Guide Specifications for Seismic Isolation Design, 3rd Edition
- Federal Highway Administration (FHWA) Drilled Shafts: Construction Procedures and Design Methods, FHWA-NHI-18-024, September 2018
- FHWA Design and Construction of Driven Pile Foundations Reference Manual, Volume I and II, FHWA-NHI-16-009, July 2016
- FHWA Geotechnical Engineering Circular No. 4, Ground Anchors and Anchored Systems, FHWA-IF-99-015, 1999
- FHWA Ground Improvement Methods, Volume I and II, FHWA-SA-98-086, 1998
- FHWA Geotechnical Engineering Circular No. 3, Design Guidance: Geotechnical Earthquake Engineering for Highways, Volume I and II, FHWA-SA-97-076 and 077, 1997
- UFC Geotechnical Engineering Procedures for Foundation Design of Buildings and Structures, UFC 3-220-01N, 2005
- FHWA Micropile Design and Construction Reference Manual, FHWA-NHI-05-039, December 2005
- AASHTO Standard Specifications for Highway Bridges, 17th Edition, 2002
    - Note: this reference is for geotechnical design parameters

3.9.3 DESIGN LIFE

Foundations shall be designed for a 100-year service life.

3.9.4 APPROACH SLABS

Approach Slabs are required to support E-80 Loading and will be included as dead load on the foundation. Minimum length of approach slab will be 25 feet along the track alignment.

3.9.5 DRIVEN PILE FOUNDATIONS

Steel piles (pipe, H-piles, taper tube) or treated timber piles will be considered and assessed based on cost, constructability, and adequacy. Timber piles will not be considered in locations where any portion of the pile is within the water table or otherwise exposed to water. Timber piles are prohibited for structures supporting freight traffic.

Design considerations will be given to foundation alternatives including the use of steel piles within District Waters to account for the potential of Microbiologically Influenced Corrosion (MIC). Design consideration to mitigate potential MIC will consist of the following:

- Use of sacrificial steel; and
- Protection systems, such as cathodic protection applied to the steel casing for any left-in-place steel casing with reinforced concrete core.
    - Epoxy coating is permitted for retaining wall foundations, but is prohibited for bridge foundations.
    - Coal tar is prohibited.

The use of battered piles will be considered for structures with lateral loads up to a maximum batter of 3:12 (horizontal:vertical).

Factor of safety shall be 2.25 with dynamic load testing performed.

Within the zone of scour, lateral support will be ignored in determining allowable axial pile capacity in compression. Additional lateral loads due to flow will be applied within the zone of scour.

Negative side friction due to settlement of upper compressive soils will be considered in determining allowable axial pile capacity in compression. Liquefaction induced settlements will only be considered for seismic analysis.

Concrete Filled Pipe Piles

Steel pipe piles may be filled with concrete. Concrete filled pipe piles shall include proper detailing to ensure composite action. If details cannot be included, pipe piles shall be designed as non-composite.

Concrete filled pipe piles within the zone of scour to five feet below the design scour elevation shall be designed to support all applied loads without the steel pipe. In this zone, the pipe pile is considered a form with no structural carrying capacity.

3.9.6 DRILLED SHAFTS

Design of drilled shaft foundations will conform to *AREMA 8-24*.

Within the zone of scour, lateral soil support will be ignored in determining allowable axial pile capacity in compression.

Factor of safety shall be 2.5 for axial capacity.

Negative side friction due to settlement of upper compressive soils will be considered in determining allowable axial pile capacity in compression. Liquefaction induced settlements will only be considered for seismic analysis.

3.9.7 MICROPILES

Requirements related to micropile foundations will conform to *AREMA 8-4.4.6* and *FHWA-NHI-05-039*.

Micropiles are not recommended for any foundations susceptible to scour.

Negative side friction due to settlement of upper compressive soils and liquefaction induced settlements will be considered in determining allowable axial pile capacity in compression.

Factor of safety for axial capacity shall be 2.0 with load testing performed.

4 Pedestrian/Bicycle Facilities

4.1 Overview

The Pedestrian and Bicycle Facilities include at-grade and on-structure facilities in both Virginia and Washington, DC. Primarily, these facilities include two pedestrian-bicycle bridges and the ramps/sidewalks/trails connecting these structures to existing facilities. The following are descriptions of the three main parts of this basis of design section:

Trail Design (Part 4.2): Includes Mount Vernon Trail (MVT, both temporary and permanent trails), as well as geometrics of the pedestrian-bicycle bridge over the Potomac River ("River Bridge"), and its ramps. Trail Design includes all project's shared-use pathways, which are designed to accommodate both bicyclists and pedestrians.

Other Pedestrian Facility Design (Part 4.3): Includes the geometrics of the new pedestrian bridge over Maine Avenue SW ("Maine Avenue Bridge") and the sidewalks along Ohio Drive SW (West) and Maine Avenue SW.

Structural Design of Pedestrian/Bicycle Bridges (Part 4.4): Includes the structural design of the "River Bridge" which spans George Washington Memorial Parkway (GWMP)/MVT/Potomac River/Ohio Drive SW (West) and the "Maine Avenue Bridge" spanning Maine Avenue/Maiden Lane, as well as the ramp, stair, and wall structures connecting to the bridges.

The criteria included herein are project-specific criteria and standard criteria highlights and modifications. Additional criteria and design methods are included within the specified references and structural calculations for individual components.

4.2 Trail Design

4.2.1 REFERENCES

Design specifications used in the Trail Design include the following:

- Americans with Disabilities Act Standards for Accessible Design (ADA)
- District Department of Transportation (DDOT) Design and Engineering Manual (DEM), January 2019
- DDOT Bicycle Facility Design Guide, 2020 (DDOT Bike Guide)
- American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, 2012 (AASHTO Bike Guide)
- Advanced Notice of Proposed Rulemaking on Accessibility Guidelines for Shared Use Paths (ANPRM)
- Navigation Study, 2019 (Nav Study)
- Hazard Analysis, 2019
- National Park Service (NPS) Active Transportation Guidebook

Additional documentation is anticipated and may be referenced in subsequent drafts.

4.2.2 DESIGN SPEED

Design speed varies by facility and project area. Design speed is based on the *AASHTO Bike Guide, Section 5.2.4*. Considerations for design speed include the horizontal and vertical geometry of the trail, expected user volume and type, and the overall context of the trail corridor and its surrounding areas.

The following design speeds are used for each project area:

TABLE 4-1. DESIGN SPEED.

Project Area	Design Speed	Notes
MVT	**18 mph**	Standard shared-use path design speed
MVT (temporary)	**12 mph**	A reduced design speed will be used for the temporary trail based on its alignment and expected proximity to active work zones
River Bridge	**18 mph**	Standard shared-use path design speed
River Bridge Ramps	**12 mph**	A reduced speed will be used due to the horizontal alignment and intersections at either ends of the ramps

4.2.3 TRAIL WIDTH

The trail width varies by facility and project area. Citing available guidance and standards, the at-grade trail width for the project is set at a minimum 12 feet of paved width, with 2-foot shoulders on both sides of the trail. The trail width is based on the *AASHTO Bike Guide, Section 5.2.1*. Considerations for width include the existing and expected user volumes, site conditions, and the overall context and functionality of the project area.

A recovery area is defined as a graded shoulder area with a maximum cross-slope of 16.67 percent (1V:6H) that is recoverable in all weather conditions. A recovery area of 5 feet is generally preferred for trails (this preferred recovery area is inclusive of the 2-foot shoulder). At a minimum, a 2-foot shoulder/recovery area will be maintained from the trail's paved edge to any lateral obstructions. Refer to the *AASHTO Bike Guide, Section 5.2.1*, for more detail.

The following tables include the design widths for each project area:

TABLE 4-2. TRAIL WIDTH - AT-GRADE TRAILS.

Project Area	Pavement	Shoulders	Recovery Area	Notes
MVT	**12'-0"**	**2'-0"**	**2'-0" min. 5'-0" pref.**	Known high user volume shared-use path and available width along project corridor
MVT (temporary)	**10'-0"**	**2'-0"**	**2'-0" min.**	Reduced width proposed given site constraints and desire to slow users along work zones

For the future Anacostia Riverwalk Trail width, see *Section 4.3*. This facility is considered a sidewalk with potential for future development during this phase of design.

The River Bridge represents a standalone structure as it is not a continuation of a trail or sidewalk/sidepath, but rather a connection between a trail and a sidewalk. As such, the required bridge width needs to meet DEM minimum width requirements. *Section 20.9 of the DEM* requires the minimum width between railings to be 12 feet. Based on known and anticipated trail volumes, and site conditions, the rail-to-rail with of the River Bridge will be 14 feet.

TABLE 4-3. TRAIL WIDTH – STRUCTURES.

Project Area	Total Between Railings	Notes
River Bridge	**16'-0"**	Satisfying recommended minimum widths for two-way shared-use paths
River Bridge Ramps	**16'-0"**	Match bridge width

4.2.4 MINIMUM HORIZONTAL CURVE RADIUS

The minimum horizontal curve radii of the proposed trails vary based on the design speed (see **Table 4-1**) and site conditions. In general, a minimum horizontal radius of 27 feet is required for the 12-mph design speed, and a minimum horizontal radius of 60 feet is required for a design speed of 18 mph. *Section 5.2.5 of the AASHTO Bike Guide* shall be referenced for all other details pertaining to horizontal alignment requirements.

4.2.5 CROSS-SLOPE

Shared-use paths must be accessible to all individuals, including those with disabilities. As such, these facilities need to follow ADA Standards and not exceed a cross-slope of 2 percent.

4.2.6 STOPPING SIGHT DISTANCE

Stopping sight distance along a trail is determined by the following factors: travel speed, coefficient of friction, and trail grade. Stopping sight distance will adhere to requirements in the *AASHTO Bike Guide, Section 5.2.8*. The following formula is used to determine stopping sight distance along a trail (Table 5-4 of the *AASHTO Bike Guide*):

U.S. Customary		
$S = \frac{V^2}{30(f \pm G)} + 3.67V$		
where:		
S	=	stopping sight distance (ft)
V	=	velocity (mph)
f	=	coefficient of friction (use 0.16 for a typical bike)
G	=	grade (ft/ft) (rise/run)

FIGURE 4-1. STOPPING SIGHT DISTANCE.

Source: AASHTO Bike Guide, Table 5-4. Minimum Stopping Sight Distance

4.2.7 INTERSECTION SIGHT DISTANCE

The trail along the project corridor will only intersect with other trails and/or pedestrian walkways. As such, guidance provided in *Figure 5-16* within *Section 5.3.2* of the *AASHTO Bike Guide* will be followed.

4.2.8 TRAIL GRADE

Trail longitudinal profile grades will adhere to ADA standards, as trails (also known as shared-use paths) must be accessible to all users. The maximum grade of the trails within the project will not exceed 5 percent. If site conditions constrain compliance with the 5 percent maximum grade, refer to the U.S. Access Board website for current information regarding accessibility provisions.

4.2.9 VERTICAL CURVE

A minimum vertical curve length of 6 feet is required to accommodate the average length of a bicycle. Additional detail for vertical curve design can be found in *Section 5.2.8 of the AASHTO Bike Guide*, including the use of Table 5-5 which establishes the following equation to calculate necessary vertical curve length based on stopping sight distance:

U.S. Customary		
$S < L \quad L = 2S - \frac{200\left(\sqrt{h_1} + \sqrt{h_2}\right)^2}{A}$ $S < L \quad L = 2S - \frac{AS^2}{100\left(\sqrt{2h_1} + \sqrt{2h_2}\right)^2}$		
where:		
L	=	minimum length of vertical curve (ft)
A	=	algebraic grade difference (percent)
S	=	stopping sight distance (ft)
h_1	=	eye height (4.5 ft for a typical bicyclist)
h_2	=	object height (0 ft)

FIGURE 4-2. CREST VERTICAL CURVE LENGTH.

Source: AASHTO Bike Guide, Table 5-5. Length of Crest Vertical Curve to Provide Sight Distance

4.2.10 VERTICAL CLEARANCES

The vertical clearances above the trails to overhead obstructions will be 10 feet minimum per the *AASHTO Bike Guide, Section 5.2.10*. It is assumed that equestrian accommodations are not required on any trails. Furthermore, it is assumed no special overhead clearances are required for maintenance equipment.

The vertical underclearances of the River Bridge will be as follows:

TABLE 4-4. RIVER BRIDGE UNDERCLEARANCE.

Facility Below	Min. Vert. Clearance	Notes
GWMP	**17'-6"**	1'-0" greater than adjacent bridges. ***(Note this is less than the standard 17'-6" in DEM 13.3.1.*)***
MVT	**10'-0"**	Overhead clearance for trail users
Potomac River	**1'-0"** over design storm	Freeboard requirement per DEM 28.4.1, refer to Bridge Hydraulics Section for additional information.
Potomac River (Nav. Channel)	**20'-0"** over mean high water	Per Nav Study Table 1-2

For underclearance of the Maine Avenue Bridge, see *Section 4.3*.

4.2.11 BRIDGE HORIZONTAL CLEARANCE FROM RAILROAD

Chapter 22 of the Draft Environmental Impact Statement (DEIS) states that 25 feet of separation between the River bridge and the railroad bridge structures is required for construction and maintenance over the river. Figure 22-4 of the DEIS (also Figure 2-4 of the Section 106

Programmatic Agreement, Final Environmental Impact Statement (FEIS) Appendix B) shows the River Bridge 25 feet from the railroad bridge, measured from the inside face of the River Bridge railing to the outside face of the railroad bridge's railing.

4.2.12 RAILINGS AND SCREENS

Railings will be used in all locations where there is a 45-degree (1V:1H) or steeper drop-off of greater than 1 foot in height within a horizontal distance of five feet from the edge of trail. Additionally, railings will be used based on trail side slopes per *AASHTO Bike Guide 5.2.1*.

The railings will have a minimum height of 3.5 feet per *DEM 20.3*.

Railing openings will not exceed 6 inches per *AASHTO Bike Guide 5.2.10* and will include a smooth rub rail at 3.5 feet above ground and shall not impede stormwater runoff, per *DEM Chapter 36*.

For railing design forces see *Section 4.3*. Railings on pedestrian/bicycle facilities are not designed for vehicular collision forces.

Screens will be used on the River Bridge over the Potomac River in accordance with the recommendations of the Hazard Analysis and DDOT Standard Drawings. Chain-link fence will not be used per *DEM 20.8*.

4.2.13 ADJACENT ROADWAY OFFSETS AND BARRIERS

The temporary MVT will be separated from the GWMP by a vehicular barrier. Additionally, the temporary MVT will be offset from the vehicular barrier by the greater of the following:

- The design deflection of the barrier
- 2 feet

4.2.14 EMERGENCY VEHICLE ACCESS AND ACCOMMODATIONS

Emergency vehicle access will be provided to the River Bridge per the Hazard Analysis. Access will be provided from both sides of the river, with a clear path accommodating an ambulance with a 42-foot turning radius. Physical barriers will be located to prevent motorized vehicles from entering the River Bridge and ramps, but the barriers will be removeable to allow access by emergency vehicles. The removable barriers will be designed in accordance with the AASHTO Bike Guide.

4.2.15 DRAINAGE

The relocated permanent MVT and the temporary MVT drainage design are to use a minimum cross-slope of **1 percent** per the *AASHTO Bike Guide (Section_5.2.11)*. Special considerations may be necessary where the temporary MVT crosses under the existing railroad bridge and runs between the GWMP and the bridge abutment.

The River Bridge deck drainage over the Potomac River is designed for sheet flow across the deck and off the bridge. A cross-slope and free-draining curb system will be used in coordination with the truss manufacturer.

For the bridge spans over GWMP, the MVT, and Ohio Drive, as well as the bridge ramps, drainage is designed as a closed drainage system with flow across the deck to a curb and down grade to a scupper and downspout. The curb, scupper, downspout components must be coordinated with the truss manufacturer (for truss spans) or deck design (for deck-slab spans).

Refer to *Chapter 7, Drainage and Stormwater Management* for additional information.

4.2.16 SPECIAL CONSIDERATIONS

The River Bridge structure is subject to aesthetic review and approval by various agencies, including but not limited to the Commission of Fine Arts (CFA), National Capital Planning Commission (NCPC), NPS, and the District of Columbia State Historic Preservation Office (DC SHPO). The structures will be designed to meet the approved aesthetics and will comply with the EIS and Section 106.

Advisory, wayfinding, and interpretive signage accommodations will be included in final design.

Deck lighting and navigation lighting will be provided on the River Bridge and are anticipated to be owned and maintained by DDOT.

Navigation lighting, signage, and markings will meet USCG regulations.

Lightning arrestors and grounding plan shall be included in final design.

4.3 Other Pedestrian Facilities Design

4.3.1 REFERENCES

Design specifications used for Other Pedestrian Facilities Design include the following:

- Americans with Disabilities Act Standards for Accessible Design (ADA)
- DDOT Design and Engineering Manual (DEM), January 2019
- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities, 2021 (AASHTO Ped Guide)
- 2010 ADA Standards for Accessible Design (ADAAG)

4.3.2 DESIGN WIDTH

Pedestrian facility design width will vary based on the facility type and location within the project area. Generally, proposed facilities shall tie into existing facilities at a width equal to or greater than the existing facility.

The following table represents pedestrian-specific site locations, and the subsequent minimum and preferred widths for each project area:

TABLE 4-5. DESIGN WIDTH.

Project Area	Design Width	Notes
Maine Avenue Bridge	**8'-0"**	The DEM cites the minimum sidewalk width in this land-use as 8'-0", and the AASHTO Ped Guide confirms the 8'-0" minimum
Maine Avenue Bridge Ramps and Stairs	**8'-0"**	The DEM cites the minimum sidewalk width in this land-use as 8'-0", and the AASHTO Ped Guide confirms the 8'-0" minimum
Maine Avenue sidewalk	**Varies**	Measured face of abutment wall to back of curb. This an over-built sidewalk to match the sidewalk beneath the adjacent structure, with consideration for a future trail (12'-0" trail with 5'-0" buffer from curb could be one future layout, or a barrier could be added for a different layout)
Potomac River Bridge Optional Stairs	**8'-0"**	This inclusion of these optional stairs (at the ramps on either end of the River Bridge) in the design is TBD. 8'-0" matches the AASHTO Ped Guide

4.3.3 SIDEWALK/RAMP GRADE

Sidewalk and ramp grades will adhere to ADA standards and DDOT DEM Section 31.2.1.3. The maximum grade of the trails within the project will be **5 percent**. If site conditions constrain compliance with the 5 percent maximum grade, 8.33 percent grade is acceptable over short distances in accordance with ADAAG 2010. Refer to the U.S. Access Board website for current information regarding accessibility provisions.

4.3.4 VERTICAL CLEARANCES

The vertical clearances above the pedestrian facilities to overhead obstructions will be **10 feet minimum** per *AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities*.

The vertical underclearances of the Maine Avenue Bridge will be as follows:

TABLE 4-6. MAINE AVENUE BRIDGE UNDERCLEARANCE.

Facility Below	Min. Vert. Clearance	Notes
Maine Avenue	**17'-6"**	DEM 13.3.1
Maiden Lane	**17'-6"**	DEM 13.3.1

4.3.5 DRAINAGE

Sidewalks will be sloped to match adjacent sidewalks with a minimum cross-slope of 1 percent.

The Maine Avenue Bridge deck drainage (including ramps) is designed for closed drainage across the deck to a curb and down grade to a scupper and downspout. The curb, scupper, downspout components must be coordinated with the truss manufacturer.

Refer to *Chapter 7, Drainage and Stormwater Management* for additional information.

4.4 Structural Design of Pedestrian-Bicycle Bridges

4.4.1 REFERENCES

Design specifications used in the structural design of the pedestrian-bicycle structures include the following:

- DDOT Design and Engineering Manual (DEM), January 2019
- AASHTO LRFD Guide Specification for the Design of Pedestrian Bridges, 2009 2nd Edition with 2015 interims (AASHTO Ped Bridge Guide)
- AASHTO LRFD Bridge Design Specifications (AASHTO Bridge), 9th Edition, 2020
- AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 6th Edition, 2013 with 2015, 2019, and 2020 interims (AASHTO Signs)
- AASHTO Guide Specifications for LRFD Seismic Bridge Design, 2011 2nd Edition with 2012, 2014, and 2015 interims (AASHTO Seismic)

Other references that may be included in the structural design of the pedestrian-bicycle structures include the following:

- AASHTO Guide Specifications for Seismic Isolation Design, 2014 4th Edition
- AASHTO/AWS Bridge Welding Code D1.5, 2008
- International Building Codes (IBC)
- Federal Highway Administration (FHWA) Guides

4.4.2 DESIGN METHOD

Structures will be designed in accordance with Load and Resistance Factor Design (LRFD) method.

4.4.3 SPECIAL DESIGN CONSIDERATIONS

- Material specifications and details will comply with the agency approval requirements as they relate to aesthetics. Per the EIS, the Pedestrian-Bicycle bridge over the GWMP, MVT and the Potomac River will consist primarily of prefabricated truss spans.
- Structures will be designed to accommodate all components and attachments, such as screening, drainage, and lights, as applicable.
- Other considerations may include future jacking, construction loads, and maintenance requirements.

4.4.4 DESIGN LIFE

Design service life is 100 years.

4.4.5 DEAD LOAD

The self-weight of the prefabricated trusses will be taken as the largest weight estimate from a minimum of two suppliers plus a 10 percent contingency for the potential to increase during the final design and fabrication of the trusses. For design cases that reduce dead load, the lightest weight estimate without contingency will be considered.

In addition to the self-weight of the truss, dead load of the deck, railings, lighting, and all components and attachments not accounted for in the truss self-weight must be included in the design of the bridge's superstructure, bearings, substructure, and foundations. The components included in the manufacturer's estimated dead load and those calculated by the design engineer must be clearly defined and closely coordinated.

Additional dead load considerations may include future overlay, additional aesthetic features not determined at this phase, and/or future utility allowances (specifications TBD).

4.4.6 LIVE LOADS

Structures will be designed for the greater of truck loading or pedestrian loading *per AASHTO Ped Bridge Guide*. See **Table 4-7**.

Equestrian patch loading for decks will be checked.

No special heavy emergency vehicle (for example fire truck) or heavy maintenance vehicle loading above the *AASHTO Ped Bridge Guide* will be accommodated.

TABLE 4-7. LIVE LOADS.

Live Load	Magnitude	Notes
Pedestrian Loading (PL)	**90 psf (No allowance for reduction)**	Load will be patterned to produce the maximum load effect (*AASHTO Ped Bridge Guide 3.1*)
Vehicle Load (LL)	**H10 Truck**	AASHTO Ped Bridge Guide 3.2

4.4.7 WIND LOADS

Structures will be design for horizontal wind load in accordance with *AASHTO Signs 3.8 and 3.9*, including an Importance Factor of 1.15 per *AASHTO Ped Bridge Guide 3.4*.

Additionally, a concurrent uplift force of 0.020 ksf over the full deck will be applied at the windward quarter point of the deck per *AASHTO Ped Bridge Guide*.

4.4.8 RAILING LOADS

Railings will be designed for pedestrian loads of 0.050 klf vertically, plus 0.50 klf horizontally, plus 0.20 kip concentrated load in any direction per *AASHTO Bridge 13.8.2*.

Railings are not designed for vehicular collision loads.

For railing height and detailing requirements see *Section 4.2*.

Curbs, deck, and/or bridge components supporting railings will be designed and detailed to accommodate the railing loads and transfer those loads into the deck, as applicable.

4.4.9 THERMAL LOADS

Thermal forces and movements will be in accordance with the *DDOT DEM 19.7* and *AASHTO Bridge 3.12.2 and 14.4*.

4.4.10 STREAM PRESSURE AND BUOYANCY LOADS

Bridge and ramp anchor bolts will be designed for stream pressure and buoyancy loads for the design storm elevation and checked for the 100-year storm elevation and in accordance with DDOT DEM.

4.4.11 SEISMIC LOADS

Structures will be designed for seismic loads in accordance with AASHTO Seismic and DDOT DEM.

Soil class, profile, and site parameters shall be based on site specific boring exploration and geotechnical analysis and recommendations.

4.4.12 VEHICULAR COLLISION LOAD

Substructure units and walls within roadway clear zones will be designed for vehicular collision loads in accordance with AASHTO Bridge.

4.4.13 VESSEL COLLISION LOAD

For the navigation channel, an independent fender system will be designed and included as part of the Potomac River Undergrade Bridge. Refer to the Railroad Bridge section for specifications.

For all piers, including those away from the navigation channel, piers, foundations, and superstructures as applicable shall be designed for the minimum empty barge load at mean river velocity, as specified in *AASHTO Bridge 3.14.1*.

4.4.14 DEFLECTIONS AND VIBRATIONS

Bridge deflections due to live loads and wind loads will meet the recommendations of *AASHTO Ped Bridge Guide Sections 5 and 6.*

4.4.15 CONSTRUCTION LOADS

Construction live loads and erection loads will be determined by the final design team.

4.4.16 MATERIALS

Materials will comply with *AASHTO Bridge*, *DDOT DEM,* and *DDOT Standard Specifications for Highways and Structures*.

Concrete cover to reinforcement will follow *DEM Table 13-1*.

Structural steel HSS members shall meet CVN test requirements per DDOT DEM.

The railing and screen material is TBD (stainless or galvanized steel under review).

See plan general notes for additional material specifications.

4.4.17 FOUNDATIONS

Foundations shall be designed based on geotechnical analysis and recommendations in accordance with AASHTO Bridge and DDOT DEM.

4.4.18 RETAINING WALLS

Refer to retaining wall section in *Chapter 3*. With the following exceptions:

The Live Load Surcharge equivalent heigh of soil will be 2 feet for parallel retaining walls and abutments per AASHTO Bridge C3.11.6.4. This section's commentary states that the "traditional value" of 2 feet corresponds to an H10 truck, which is the design live load for these structures.

Mechanically Stabilized Earth (MSE) walls will be allowed adjacent to pedestrian/bicycle bridges only and will be designed for 100-year service life.

5 Roadway

5.1 Project Background

The roadway improvements are limited and based on the approved Operator Signoff Plans developed during the Environmental Impact Statement (EIS) phase. They generally consist of the following proposed and temporary improvements:

- Proposed
    - 14th Street SW off ramp to Maine Avenue SW will be realigned to facilitate the construction of the proposed railroad bridge.
    - Pavement mill and overlay treatments along all roadways where maintenance of traffic layouts modify the existing pavement markings.
- Temporary
    - The temporary George Washington Memorial Parkway (GWMP) median widening to support the temporary median crossover into the proposed construction staging area south of the existing CSX Transportation (CSXT) railroad bridge over the GWMP and the Potomac River.
    - Minor temporary widening of I-395 on-ramp to GWMP for construction access.
    - All other temporary traffic shifts are anticipated to occur within the existing curb lines and edge of existing pavement where the restoration as identified above in the proposed section.

5.2 Safety

Roadway design intentions are to provide a safe and reliable roadway infrastructure attaining the highest level of service within the physical and economical Project constraints. Design goals will be to apply the standard roadway design criteria. Designers are to provide justification for any physical, environmental, or economic constraints preventing standard criteria. Standard criteria deviations are to be collaborated with the Authority Having Jurisdiction (AHJ), and approved by the AHJ, prior to implementing minimum criteria.

The Virginia Passenger Rail Authority (VPRA)and the host railroad (CSXT) reserves the rights to review, approve, deny, and/or issue a permit for all improvements either passing over or under the rail Corridor. Roadway design shall be attentive to rail operation safety, traveling public safety, and the safety of the neighboring communities and commercial businesses.

5.3 Design Criteria

5.3.1 ROADWAY STANDARDS

Roadway designs are to be compliant with the AHJ. AHJ approval is required for alternate or "minimum" design criteria prior to application in accordance with *Chapter 10*. In the absence of a design criteria standard, the designs are to be applicable to the *American Association of*

State Highway and Transportation Officials (AASHTO) Policy on Geometric Design of Highways and Streets, 7th Edition, 2018.

The designs will consider the latest edition of the following:

- District Department of Transportation (DDOT) Design and Engineering Manual (DEM), January 2019
- DDOT Standard Specifications for Highways and Structures, 2013
- AASHTO, A Policy on Geometric Design of Highways and Streets
- AASHTO Roadside Design Guide, 4th Edition 2011
- National Park Service (NPS) Active Transportation Guidebook
- Virginia Department of Transportation (VDOT) Road Design Manual
- Arlington County Design guidance documents

Where the proposed roadway designs are primarily a result of replacing the roadway infrastructure due to construction impacts associated with bridge and railroad infrastructure construction improvements, the intent of the roadway designs is to replace-in-kind the existing roadway conditions and layout.

5.3.2 DESIGN CONTENT

The design content is to be compliant with the AHJ. The following roadway design elements are expected for all designs based on the design stage:

- Layout (Reflecting existing topographic features and proposed features)
- Right-of-way
- Typical Sections
- Traffic signing, lighting, and striping
- Traffic signalization
- Horizontal and vertical alignments
- Vertical profile of primary roadway and relevant connecting roadways
- Drainage structures and networks
- Erosion and sediment control
- Existing and proposed structural improvements (bridges and retaining walls)
- Utility conflicts/relocations
- Cross-sections (50-foot intervals and critical locations)
- Construction phasing and maintenance of traffic during construction

5.4 Maintenance of Traffic

The temporary work zones for the project will be designed in accordance with *Part 6 of the Manual of Uniform Traffic Control Devices (MUTCD), Roadside Design Guide,* and the *D.C. Temporary Traffic Control Manual* to provide for the safe and efficient movement of vehicles, pedestrians, and bicyclists through each phase of construction. On travel ways within VDOT or Virginia locality jurisdiction, work zones will be designed in accordance with the *Virginia Work Area Protect Manual (VWAPM, 2011 Edition, Version 2)*.

5.4.1 ALLOWABLE WORK HOURS

This section will define the allowable work hours and road closures after traffic analysis and coordination with DDOT and NPS is complete during the design build phase of the project.

5.4.2 TEMPORARY CONDITION DESIGN CRITERIA

Temporary conditions vary based on facility and work requirements. Duration of allowable closures will be coordinated with the appropriate agency.

Maintenance of traffic criteria for 14th Street SW/I-395 will be based on Interstate criteria with a design speed of 40 mph. The following requirements will be used for maintenance of traffic:

TABLE 5-1. ALLOWABLE TEMPORARY CONDITION DESIGN CRITERIA – INTERSTATE.

Minimum Number of Lanes	2
Minimum Lane Width	11 feet
Minimum Shoulder Width	0 feet
Minimum Ramp Width	16 feet
Minimum Ramp Shoulder Width	0 feet
Minimum Clear Zone	14 feet

Maintenance of traffic criteria for GWMP will be based on Other Freeway or Expressway criteria with a design speed of 40 mph. The following requirements will be used for maintenance of traffic:

TABLE 5-2. ALLOWABLE TEMPORARY CONDITION DESIGN CRITERIA - GEORGE WASHINGTON MEMORIAL PARKWAY.

Minimum Number of Lanes	1
Minimum Lane Width	11 feet
Minimum Shoulder Width	N/A
Minimum Ramp Width	16 feet
Minimum Ramp Shoulder Width	0 feet
Minimum Clear Zone	14 feet

Maintenance of traffic criteria for Ohio Drive SW will be based on Local Street criteria with a design speed of 25 mph. The following requirements will be used for maintenance of traffic:

TABLE 5-3. ALLOWABLE TEMPORARY CONDITION DESIGN CRITERIA - OHIO DRIVE SW.

Minimum Number of Lanes	1 with temporary flagging or temporary traffic signals
Minimum Lane Width	10 feet
Minimum Shoulder Width	N/A
Minimum Clear Zone	12 feet

Maintenance of traffic criteria for Maine Avenue SW will be based on Principal Arterial criteria with a design speed of 15 mph. The following requirements will be used for maintenance of traffic:

TABLE 5-4. ALLOWABLE TEMPORARY CONDITION DESIGN CRITERIA - MAINE AVENUE SW.

Minimum Number of Lanes	2
Minimum Lane Width	9 feet
Minimum Shoulder Width	N/A
Minimum Clear Zone	12 feet

5.4.3 PEDESTRIAN AND BICYCLE ACCESS

This section will define the minimum sidewalk widths and allowable detours to be determined in coordination with DDOT.

6 Bridge Hydraulics

6.1 References and Resources

A variety of sources were referenced in the design of the Long Bridge Project. These references included design documents developed by the regulatory agencies involved in review and approval of the project, industry accepted references such as the Federal Highway Administration (FHWA) and Hydraulic Engineering Circular (HEC) manuals that provide the foundation of the design, and previous studies of the project area.

6.1.1 REGULATORY APPROVAL

The proposed design of the bridge will go through the approval process from several different entities. These include the Department of Energy and the Environment (DOEE), Federal Emergency Management Agency (FEMA), the United States Coast Guard (USCG), United States Army Corps of Engineers (USACE), National Park Service (NPS), and the District Department of Transportation (DDOT).

6.1.2 DESIGN GUIDELINES

Design guidelines, specifications, and manuals include the following:

- Applicable FHWA HEC manuals
- DDOT Design and Engineering Manual (DEM), January 2019
- Environmental Impact Statement (EIS)

6.1.3 ENVIRONMENTAL IMPACT STATEMENT

Hydraulic design criteria provided herein reference the Environmental Impact Statement (EIS) created through DDOT and the Federal Railroad Administration (FRA) for the Long Bridge project on June 11, 2018. The purpose of the study was to obtain and document information related to present and future navigation uses and the needs of the waterways near the Long Bridge, for the purpose of developing and evaluating alternatives for the Project.

USCG issued a Preliminary Navigation Clearance Determination (PNCD) on March 5th, 2020, specifying a 20-foot minimum vertical clearance for the Navigational Channel of the Proposed Potomac River Structures.

6.2 Data Collection

Information collected for this project includes topographic surveys, existing plans and/or as-builts, previous studies, flood data, and channel characteristics.

6.2.1 SURVEY AND AS-BUILTS

A survey was performed in the vicinity of the bridge, and survey points were collected to create the bathymetry (below water surface elevations) in the surrounding area upstream and downstream of the bridge.

As-built plans of the three bridges just upstream of the rail bridge include the 14th Street bridge titled "Superstructure for New West Highway Bridge Over Potomac River, Vicinity 14th Street" dated 7/14/1959, "New West Highway Bridge and Approaches Over Potomac River, Vicinity of 14th Street" dated 3/11/1964, and "Substructure for New West Highway Bridge Over Potomac River, Vicinity 14th Street" dated 7/14/1959.

6.2.2 EFFECTIVE FEMA STUDY

The current FEMA Flood Insurance Study (FIS) and associated Flood Insurance Rate Map (FIRM) panels of the study area are effective as of September 27, 2010. The FIRM panels that cover the project area are: 1100010018C, 1100010019C, 1100010056C, and 1100010057C. After these documents became effective, additional Letter of Map Revisions (LOMRs) within the study area became effective which include 15-03-2388P-110001 and 20-03-0337P-110001.

6.3 Level of Analysis/Method of Analysis

A "no rise" determination was concluded to incorporate the proposed design. HEC-RAS 6 was used to complete the hydraulic analyses.

6.4 Hydrology

The following sections detail the proposed hydrologic analysis used to calculate the 10-, 50-, 100-, and 500-year storm frequency discharges.

6.4.1 PREVIOUS HYDROLOGIC STUDIES

Hydrologic information is provided in the latest FEMA study of the Potomac River within the project area and is dated September 27, 2010. Riverine Hydrologic Analysis Update was performed to validate the flood levels from the previous study.

For the riverine portions of the Potomac River, the effective FIS is based on a flood frequency analysis of annual peak discharge data collected at USGS gage for the Potomac River near the Washington, DC Little Falls Pumping Station (USGS Station No. 01646500), which is not tidally influenced. The years of data covered are from 1931 – 2020. Flood frequencies are developed using the program PeakFQ and the Bulletin 17B method.

Additional documents include:

- Climate Change Adaptation Plan for the District of Columbia (2015 DOEE) to account for Sea Level Rise (SLR);
- Climate Ready DC (DOEE, 2016);
- DDOT Climate Change Action Plan (DDOT, 2013)

6.4.2 TIDAL HYDROLOGY

For the tidally influenced portions of the Potomac River, the effective hydrology is based on a stage-frequency analysis of measured water-surface elevations recorded at National Ocean Service (NOS) gage no. 8594900, which is located at Haines Point, near the confluence of the Potomac and Anacostia Rivers. The update to the tidal hydrology uses this same location as a

point of analysis. Highest water surface elevations at this location were used to determine the water surface elevations used in the downstream boundary conditions of the hydraulic model.

6.5 Hydraulic Design Criteria

6.5.1 VERTICAL CLEARANCES AND NAVIGATION

Storm surge was considered in the design of the bridge including riverine and coastal surge for the full length of the structures. Both bridges navigational superstructures are above the 100-year event storm surge elevation. The Potomac River Undergrade Bridge and Potomac River Bike-Ped Bridge ramps on both sides meet the 1 foot freeboard DDOT requirement with ramp structures over edges of the river for the 10-year event storm surge. The north end of the ramp for the Bike/Pedestrian Bridge and their fill sections is within the 100-year event, however these volumes are very small relative to the main channel opening.

The USCG is requiring 20 feet above MHW (Elevation 1.54 NAVD88) for the proposed bottom (low chord) of the superstructure elevations for both bridges. The navigation channel spans for both bridges meet this clearance requirement by meeting or exceeding the elevation of 21.54.

6.6 Hydraulic Analysis

The hydraulics of the bridge were evaluated using HEC-RAS version 6 (USACE, 2021). The analysis includes the development of the Duplicate Effective, Existing Conditions, and Proposed Conditions Models.

6.6.1 DUPLICATE EFFECTIVE ANALYSIS

The Effective HEC-RAS Model was created for FEMA as part of the June 1, 2020, LOMR report 20-03-0337P-110001. This hydraulic model became effective on October 19, 2020, for Washington D.C. A duplicate effective model was created from the current effective model in order to conclude a "no-rise" determination for the proposed design..

6.6.2 EXISTING CONDITIONS ANALYSIS

The Existing Conditions model includes the latest available datasets of topography and bathymetry, updating the cross section elevations while maintaining the extent and overbanks of the Effective model. Information added or modified in the Existing Conditions model includes:

- The Yellow Line Metro Bridge geometry
- Two new cross sections for the Potomac-Anacostia junction to account for the widening in the intersection
- Hydrologic revisions
- New boundary conditions to evaluate a combination of scenarios that reflect riverine and coastal influences

A seamless high-resolution topo-bathymetric dataset was assembled from publicly available sources and current in-terrain surveys obtained for the project. This dataset was used in the HEC-RAS hydraulic modeling as well as in the ADCIRC coastal modeling.

Topobathymetry sources:

- LiDAR Topography (USGS), post-Sandy - 2014
- Latest Hydrographic Survey Activity (USACE), 2015-2020
- Lidar and bathymetry, Coastal National Elevation Dataset CoNED (USGS), post-Sandy – 2015
- NCEI Coastal Relief Model (NOAA), 1998
- General Bathymetric Chart of the Oceans GEBCO - open data contributors
- Current terrain survey

Five different resolution topobathymetry DEM's were created for different extents:

- High resolution 1-meter for Washington D.C. including the Potomac riverbed (from Little Falls, MD. to Alexandria, VA.)
- Medium resolution 30-meter DEM for the Lower Potomac River (Downstream from D.C.) to the Chesapeake Bay (Lewisetta, VA.)
- Low resolution 100-meter DEM for the Chesapeake Bay.
- Low resolution 500-meter DEM for the Chesapeake Bay connection with the Atlantic Ocean.
- Coarse Bathymetry for Atlantic Ocean and Gulf of Mexico Bed

6.6.3 PROPOSED ANALYSIS

The Proposed Conditions Model incorporates the Potomac River Undergrade and Bike-Ped bridges and any proposed physical changes within the floodplain near Long Bridge. The model updates the Existing Conditions geometry with the Proposed Conditions geometry and keeps the existing hydrology and boundary conditions.

6.7 Coastal Analysis

6.7.1 PREVIOUS COASTAL STUDIES

Existing coastal studies and observational data include the following:

- North Atlantic Comprehensive Coastal Study (NACCS)
- FEMA coastal studies
- Analyses of National Oceanic and Atmospheric (NOAA) gage data
- Others as appropriate

6.7.2 COASTAL ANALYSIS UPDATE

An analysis of the applicability of data from existing coastal studies was used to develop design criteria and identify the required updates for the coastal analysis.

6.7.3 IMPACT OF STORM SURGE

The impacts of storm surge on design conditions at the bridge site were analyzed by specifying downstream boundary conditions reflective of storm surge at various return intervals (25-, 50-, 100-year for example). The storm surge driven water surface elevations at the downstream boundary were obtained from previous coastal studies or the NOAA observation stations at Haines Point and Lewisetta.

6.7.4 IMPACT OF SEA LEVEL RISE

The impact of sea level rise shall be considered for the project location and incorporated as appropriate into the storm surge estimates discussed in *Section* 6.7.3. NOAA Station #8594900 is within one mile of the Project and provides long-term record of water levels since 1924. The USACE Sea-Level Change Calculator (Version 2021.12) will be used to generate scenarios projecting future changes to sea level to this Station.

6.7.5 COMPOUND FLOODING

Finally, design water surface elevation and currents were obtained by analyzing the HEC-RAS results and quantifying the combined impacts of pluvial and fluvial flooding, and storm surge.

6.8 Scour Analysis and Countermeasures

6.8.1 DESIGN CRITERIA

The latest HEC-18 and HEC-25 guidelines were used to calculate the scour estimates at each structure of the bridge for the 100-year storm event.

6.8.2 METHODOLOGY

Estimation of total scour considers three primary components: (1) Long-term degradation of the riverbed, (2) Contraction scour at the bridge, and (3) Local scour at the piers. Scour evaluations will focus on piers since abutments will be constructed on the overbanks and outside of the main channel. Scour shall be considered for each pier location assuming the proposed ground elevation.

A D50 value of 0.02 millimeters shall be assumed for the scour analysis.

6.9 Hydrodynamic and Wave Loading

6.9.1 DESIGN CRITERIA

Coastal hydrodynamic and wave simulations were carried out to determine the 100-year flood elevations, wave conditions, and currents using the *American Association of State Highway and Transportation Officials (AASHTO) Guide Specifications for Bridges Vulnerable to Coastal Storms (2008)*.

7 Drainage and Stormwater Management

7.1 References

The overall project limits are located in multiple jurisdictions that have unique drainage design requirements and regulations. The following standards and manuals be used as reference for the drainage design in accordance with the specific jurisdiction.

- District Department of Transportation (DDOT) Design and Engineering Manual (DEM), January 2019
- DDOT Standard Drawings
- DC Water Standard Design Guidelines, Drawings, and Specifications
- Virginia Department of Transportation (VDOT) Drainage Manual
- VDOT Road and Bridge Standards
- VDOT Road and Bridge Specifications
- American Association of State Highway and Transportation Officials (AASHTO) Highway Drainage Guidelines
- Federal Highway Administration (FHWA) Hydraulic Engineering Circular-14Hydraulic Design of Energy Dissipators for Culverts and Channels (HEC-14)
- HEC-22 Urban Drainage Design Manual

7.2 Design Criteria

Storm drainage systems will be designed to provide safe roadway and trackbed conditions and adequately convey design flows. The existing storm drain system will be maintained where feasible. Existing survey, utilities, and other information needs to be obtained and confirmed prior to the drainage design. See Chapter 2-Railroad Section 2.8.4-Track Drainage and Chapter 3 Section 3.2.8 -Bridge Drainage for drainage design criteria for proposed track roadbed and bridge structures.

7.2.1 CLOSED DRAINAGE SYSTEMS

Design frequency, sizing, location, and spacing for storm drain system are based on the stormwater drainage calculations, spread, bypass flow, and efficiency requirements for the jurisdiction. Horizontal clearance will be maintained between the proposed drainage system and all underground structures. Culverts and closed drainage systems are designed and sized to accommodate the design flows.

Drainage from bridge superstructures or embankments must not discharge across a railroad right-of-way, National Park Services lands, public property, or private property without property owner approval.

The following criteria applies to the closed drainage system design of the Long Bridge project:

- Design Frequency Highway: 25-year storm event with pipes flowing full

- Design Frequency Railroad: 100-year storm event
- Sag Conditions: Must design for 50-year event for pipes draining to a sag condition
- Minimum Highway Drainage Pipe Size: 18 inches
- Minimum Railroad Drainage Pipe Size: 12 inches
- Basin Connect Pipe Size: 15 inches
- Minimum Pipe Flow Velocity: 3 feet per second
- Minimum Pipe Cover: 3 feet
- Hydraulic Grade Lines: Must not rise above crown of pipe
- Manholes for Highway Drainage: required at each slope/grade change or change in alignment
- Manhole Connections: No more than 3 total pipes allowed entering or leaving
- Maximum Highway Manhole Spacing: 400 feet, connecting pipe must be 50 feet or less

Also, much of the downtown District Columbia area falls within the Combines Sewer Watershed. Additional design criteria apply to those watersheds and sub-watersheds which are regulated by DC Water.

7.2.2 OPEN CHANNEL FLOW

Open channels are designed to provide positive flow that has non-erosive velocities. Open channels shall be designed to meet the following criteria:

- Hydraulic calculations are required for all proposed open channels
- The final channel design must provide 6 inches of freeboard above the design flow elevation
- Channel inverts and top of bank elevations are required for all open channels
- Typical cross sections are required for each reach of open channel
- Channel lining design will be provided for non-erosive velocities
- Channel design shall also incorporate a pilot channel to handle lower flow events

7.2.3 CULVERT DESIGN

Culverts shall be sized to accommodate the following design flows based upon the roadway classification:

Railroad Corridor	100 year storm event
Freeways	50 year storm event
Principal Arterials	50 year storm event
Minor Arterials/Collectors	25 year storm event
Local Streets	10 year storm event

Also, adequate inlet and outfall protection for all culverts will be evaluated and designed in accordance with HEC-14.

7.3 Stormwater Management

Within the Washington, DC area, stormwater retention volume (SWR_V) will be calculated for all major land disturbing activities in accordance with the Department of Energy and the Environment (DOEE) Stormwater Management Guidebook. For most areas of Washington, DC, this retention volume (called SRV) is calculated using a 1.2-inch rainfall event. An additional volume of storage for water quantity control will be required by DOEE to reduce the post development discharge to pre-existing (typically "meadow") conditions. Portions of the Project within the Anacostia Waterfront Development Zone (AWDZ) as defined in the DOEE Stormwater Management Guidebook are subject to additional restrictions as defined in the DOEE Stormwater Management Regulations.

For project areas within Virginia, stormwater quality control and stormwater quantity control will be required in accordance with the Virginia Stormwater Management Handbook.

In accordance with DOEE practice, railroad ballast (both existing and new) is considered impervious because the underlying soil interface typically does not infiltrate. Railroad bridges crossing waterways and locations in Virginia are excluded from this practice. In addition, existing rail lines are eligible for Maximum Extent Practical (MEP) considerations. Underdrain may be considered a detention practice provided a dead storage stone area is located below the invert of the underdrain. Additional coordination is required to establish appropriate stormwater management in ballasted areas the context of this project. Refer to *Chapter 11, Additional Considerations* for additional discussion.

7.3.1 REFERENCES

Proposed stormwater management will be designed in accordance with the latest edition of the following standards and manuals:

- DOEE 2020 Stormwater Management Guidebook
- DDOT Design and Engineering Manual (DEM), January 2019
- DDOT 2014 Green Infrastructure Standards
- DC Water Green Infrastructure Utility Protection Guidelines
- VDOT Drainage Manual
- Virginia Department of Environmental Quality (DEQ) Stormwater Design Specifications

7.3.2 BMP DESIGN CRITERIA

Important considerations for the design of all stormwater management facilities (also known as BMPs) are as follows:

- Any proposed BMP must have soil borings and field infiltration tests within the proposed BMP limits.
- Groundwater levels must be at least 4-feet below the proposed BMP bottom elevation.
- BMP facilities cannot be located within existing floodplain limits.
- BMP facilities must meet certain pollutant removal requirements.

DOEE is also considering changes to their current floodplain regulations with the 500-year event becoming the regulated floodplain rather than the current 100-year floodplain limits. This proposed change will have an impact on any proposed BMP location as well as its design. The proposed regulation changes have not yet been made law but could be in effect at the time the Long Bridge Project goes under construction.

Since the project area consists of the National Park Service (NPS) George Washington Memorial Parkway (GWMP), NPS National Mall and Memorial Parks (NAMA), and DDOT Right-of-Way (ROW), the design criteria for BMP Facilities for these three areas are subject to different review agencies, which follows:

- BMP Facilities in NPS GWMP – Virginia DEQ
- BMP Facilities in NPS NAMA – DC DOEE
- BMP Facilities in DDOT ROW – DC DOEE & DDOT

7.4 Erosion and Sediment Control

Within the District of Columbia and Virginia, Erosion and Sediment Control (ESC) design is required to temporarily protect water resources from sediment pollution and increases in runoff associated with active land disturbance, clearing, and grading activities. Therefore, ESC Plans are required for all portions of a construction project and need to be properly phased to provide the maximum amount of protection to the receiving waterways.

7.4.1 REFERENCES

The latest edition of the following codes and standards specific to ESC design are followed in the development of the ESC plans:

- DOEE 2020 Stormwater Management Guidebook
- DOEE 2017 Erosion and Sediment Control Manual
- DOEE Soil Erosion and Sediment Control Handbook
- DOEE Soil Erosion and Sediment Control General Notes
- Review Checklist for Soil Erosion and Sediment Control Plans
- Virginia Erosion and Sediment Control Handbook
- VDOT Road and Bridge Standards

The project area consists of the NPS George Washington Memorial Parkway (GWMP), NPS National Mall and Memorial Parks (NAMA), and DDOT ROW. The design criteria for these three areas are subject to different review agencies, which are listed as follows:

- ESC in NPS GWMP – Virginia Department of Environmental Quality (DEQ)
- ESC in NPS NAMA – DC Department of Energy and Environment (DOEE)
- ESC in DDOT ROW – DC DOEE and the District Department of Transportation (DDOT)

8 Utilities

Available utility records have been received from the existing utilities owners within the project limit. This phase of design is based on existing utilities records, which will be verified by survey. Existing utilities and owners within the vicinity of the project limits include:

- Railroad owned utilities
- Franchise utilities in the railroad Right-of-Way (ROW)
- District Department of Transportation (DDOT) owned utilities
- DC Water utilities
- National Park Service (NPS) owned utilities
- Washington Metropolitan Area Transit Authority (WMATA) owned utilities
- Dark Fiber (no record, federal/military lines may run within the project area)

TABLE 8-1. UTILITY AGENCIES

Utility Agency	Area
AOC Connect	DC
AT&T Local	DC/VA
AT&T Corporation and AT&T Network Operations	DC
AT&T Core/AT&T Legacy/AT&T Long Distance	DC
Lumen Engineering (Formerly Century Link National)	DC/VA
Comcast	DC/VA
DC Water and DC Clean Rivers	DC
DDOT Signals and Streetlights	DC
Dominion VA Power	VA
Excelon Corp (PEPCO / PEPCO Network Cable)	DC
Fiberlight (Formerly Espire)	DC/VA
Jones Utilities	VA
MWAA	VA
NPS - GWMP	VA
NPS - NAMA	DC
Openband of Virginia	VA
PEPCO	VA
RCN	DC
Sprint / T Mobile	DC
Verizon	DC/VA
Verizon Business (MCI)	DC
Washington Gas	DC/VA
Windstream-KDL	VA
WMATA	DC/VA
X-O Communications (Verizon)	DC
Zayo Group (Formerly Above Net)	DC/VA

8.1 References

The latest edition of the following codes and standards specific to utilities will be followed:

- DDOT Design and Engineering Manual (DEM), January 2019
- ASCE Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data
- DC Water Project Design Manual, Volume 3, Linear Asset Design
- DC Water Standard Details and Specifications

8.2 Impacts and Relocation Approach

Any existing utilities impacted by the project will require close coordination to determine where those lines can be relocated to as well as overall sequencing and phasing of the relocation work. Experience indicates that the affected utility owner can take as long as 2-years or more to design and construct any proposed relocations which could impact the overall Long Bridge Project construction schedule.

Also, shall a particular utility need to be relocated, the utility owner will require that utility designation (Quality Level B) and test hole data (Quality Level A) information be provided to them so they can evaluate their relocation options.

Utility relocations as well as new utility systems must be designed to limit impacts to the critical root zone areas of any existing trees. This is an extremely important consideration for both DDOT and NPS.

Finally, the Maine Avenue SW area of the project has other legacy utility items including abandoned foundations, abandoned streetcar (trolley) tracks, and an abandoned GSA steam tunnel which may also be impacted by the project.

9 Landscape Design

Landscape design for this project includes protection and restoration on both the George Washington Memorial Parkway (GWMP) and National Mall and Memorial Parks (NAMA) parkland adjacent to the Potomac River. Section 106 Programmatic Agreement requires two components for planting mitigation resulting from construction activities.

Vegetation Protection Plan Includes areas within the Limits of Disturbance (LOD) wherever vegetation is to be removed, impacted, or protected. Existing vegetation will be surveyed, and specific measures will be outlined to protect trees during temporary and permanent construction activities.

Vegetation Restoration Plan Includes areas within the LOD where vegetation will be replaced to reestablish historic planting plans, while incorporating guidance from historic and recent Cultural Landscape Inventories (CLIs). Plantings are prohibited from the railroad roadbed.

Proposed Landscape Plan Incorporates elements from the Vegetation Protection and Restoration plans, with additional plantings for screening, mitigating potential erosion issues, and compliance with BMPs planting requirements.

9.1 References

Design specifications and mitigation commitments used in the Landscape Protection and Restoration Plans include the following:

- Combined Final Environmental Impact Statement/Record of Decision and Final Section 4(f) Evaluation
- Vegetation at Long Bridge Interim Assessment
- Section 106 Programmatic Agreement
- Virginia Department of Rail and Public Transportation (DRPT)-National Park Service (NPS) Mitigation Agreement

CLIs:

- 2010 Cultural Landscape Inventory for Lady Bird Johnson Park
- 2014 Mount Vernon Memorial Highway - South of Alexandria Cultural Landscape Inventory
- 2016 Theodore Roosevelt Island Cultural Landscape Inventory

GWMP Vegetation Cultural Landscape Report (CLR):

- 2009 Vegetation of the GWMP Central Section (Alexandria to Arlington Memorial Bridge) Vegetation Information (Volumes One and Two)

Historic American Buildings Surveys (HABS) and Historic American Landscapes Surveys (HALS):

- Historic American Engineering Record for Mount Vernon Memorial Highway - George Washington Memorial Parkway portion
- Historic American Landscapes Survey of Mount Vernon Memorial Highway, George Washington Memorial Parkway along Potomac River from McLean to Mount Vernon, VA

Mount Vernon Memorial Highway (MVMH) Cultural Landscape Report:

- Mount Vernon Memorial Highway Cultural Landscape Report – Volume 1 History
- Mount Vernon Memorial Highway Cultural Landscape Report – Volume 2 – Design Documentation

National Register:

- Lyndon Baines Johnson Memorial Grove National Register of Historic Places Registration Form
- George Washington Memorial Parkway National Register of Historic Places Registration Form

National Mall and Memorial Parks (NAMA) CLIs:

- 2008 Constitution Gardens Cultural Landscapes Inventory
- 2017 East Potomac Golf Course Cultural Landscape Inventory
- 2015 Thomas Jefferson Memorial Cultural Landscape Inventory

CLR – Treatment:

- 1999 Lincoln Memorial Grounds Cultural Landscape Report
- NPS Golf Courses Cultural Landscape report and Treatment Guidelines
- 018 Rock Creek and Potomac Parkway, Potomac Waterfront Section Cultural Landscape Report
- 1996 Thomas Jefferson Memorial Landscape Overview
- 2020 Tidal Basin Viewshed Analysis

HABS:

- Hains Point - East Potomac Park Historic American Buildings Survey
- Hains Point - East Potomac Park Historic American Buildings
- West Potomac Park Historic American Buildings Survey

HALS:

- Tidal Basin - West Potomac Park Historic American Landscaping Survey
- Historic American Landscape Survey - 1910 Japanese Flowering Cherry Trees in East Potomac Park

History and Architecture:

- Chappell 1973 West Potomac Park History Historic Resource Study
- East Potomac Park HSR Final 508c 2019
- Lincoln Memorial Historic Structure Assessment Report

National Register:

- National Mall National Register of Historic Places Registration Form

Other References:

- Protecting Historic Trees During Construction. National Center for Preservation Technology and Training, March 2021

9.2 Vegetation Protection Plan

9.2.1 APPROACH

In close collaboration with the National Park Service (NPS), a Vegetation Protection Plan will provide documentation of the site's existing conditions, including existing tree species, caliper, and health. The Vegetation Protection Plan will identify which trees may be impacted by construction activities.

Specifications will indicate protection measures necessary to mitigate construction damage in temporary staging and permanent construction areas. The Vegetation Protection Plan will be provided during the Preliminary Engineering Phase, and further refined through the project.

9.2.2 TREE SURVEYING CRITERIA

During the August 2021 site walk, the NPS confirmed that a 6-inch diameter at breast height (DBH) would be the minimum tree size required to be surveyed. Existing shrubs would be recorded as massings, not individual specimens.

9.2.3 TREE PROTECTION CRITERIA

Tree protection will be recommended based on collaboration with arborist recommendations and NPS tree protection standards. Primary attention will be placed to minimize soil compaction, severing of roots, trunk and limb injury, and limb breakage around all trees in the LOD.

9.2.4 NAMA HEADQUARTERS

During the July 2021 site walk, NAMA staff informed the design team that a historic cherry tree was located near the NPS trailer. Species is Okame Cherry (Prunus 'Okame') near where the temporary construction impacts will occur.

9.2.5 CONSTRUCTION AREA SCREENING

Screening around construction staging areas and planting will be provided as part of the Vegetation Protection Plan, incorporating standard NPS screen fencing.

9.3 Vegetation Restoration Plan

9.3.1 APPROACH

Combining available references, specifically CLIs and CLRs, a Vegetation Restoration Plan will be developed to mitigate trees removed as part of this project. The restoration area for this project will occur within the Project Limits of Work.

9.3.2 RESTORATION PLANTING PALETTE

The proposed plant palette will be based on historic NPS planting plans, drawing on NPS recommended cultivars if alternate species are preferred for availability, disease resistance, or maintenance considerations. The GWMP portion of the project has had three historic plantings plans: 1932, 1965, and 1980s.

9.3.3 MITIGATION RATIO

Per the Section 106 Programmatic Agreement, restoration will be for the same number of caliper inches removed. For example, if three 24-inch trees are removed, then 72 inches of caliper would need to be restored by new tree plantings.

9.4 Proposed Landscape Plan

9.4.1 APPROACH

The Proposed Landscape Plan will incorporate relevant drainage and stormwater designs, including any Best Management Practices (BMP) planting and revegetation to mitigation erosion. The Landscape Plan will be reviewed by the Signatories to the Section 106 Programmatic Agreement, as stipulated in the agreement.

9.4.2 INVASIVE SPECIES MANAGEMENT

The design team will work closely with the NPS to specify an appropriate management strategy for invasive species. Application of herbicide treatment(s), species targeted for removal, and schedule have been coordinated with NPS during multiple meetings.

9.4.3 VEGETATIVE SCREENING

NPS reiterated the importance of viewsheds during each site walk. With vegetation being cleared and new structures being built, there are opportunities to selectively screen or frame views that may have not previously been possible.

10 Approvals and Design Exceptions

10.1 Design Exceptions

The designer is expected to adhere to the practices and criteria specified in the Basis of Design (BOD). The Virginia Passenger Rail Authority (VPRA) and Federal Railroad Administration (FRA) recognize that design exceptions may be required for criteria not met on the National Highway System. These deviations may be necessary for avoidance of environmental impacts or due to physical constraints. These changes must be approved by the Authority Having Jurisdiction (AHJ) prior to implementing the criteria change.

All design exceptions are to be submitted by the design team in writing to VPRA and FRA for distribution to the AHJ. Each variation request will be logged for tracking and distributed to the appropriate AHJ for consideration. Those stakeholders having jurisdiction will provide a written response to the variance request.

The designer is requested to provide adequate information for the exception. Adequate information includes, but is not limited to:

- Applicable BOD Chapter and Section
- Implications of applying BOD criteria
- Rationale and justification for the request and the location(s) and/or length where the exception may apply
- Benefits of exception
- Graphical representation through plan/profile/typical section
- Cost estimate reflecting increases or savings
- Identification of exception regarding the minimum standard and its relevance to the desirable standard
- Identification of effects of the exception to the freight and intercity passenger rail system operations and maintenance, if any, and appropriate potential mitigation measures
- Supporting documentation, including a description of the specific design element and the applicable criteria
- Professional engineer signature and seal of the design engineer of record
- Elements proposed to be constructed or installed to mitigate the risks associated with not constructing the items to applicable standards and that warrant a requested for an exception

The AHJ reserves the right to request additional information to understand the implications of the variance.

10.2 Design Waivers

Design waivers are required for potential for deviations to the technical criteria presented in the BOD or other controlling AHJ criteria that are not considered design exceptions. The designer is requested to provide adequate information for the design waiver request to the AHJ.

11 Additional Considerations

The Basis of Design (BOD) is intended to be a living document. As such, several specific considerations or criteria remain outstanding throughout the document and as listed below.

- In accordance with the Department of Energy and the Environment (DOEE) practice, railroad ballast (both existing and new) is considered to be impervious because the underlying soil interface typically does not infiltrate. However, existing rail lines are considered eligible for Maximum Extent Practical (MEP) considerations and properly designed underdrains may be considered an approved detention practice for water quantity control attenuation. Further coordination regarding final Best Management Practices (BMPs) design and detailing is required to define water quality and quantity criteria.
    - The Virginia Department of Environmental Quality (DEQ) officials considers railroad ballast as pervious on the Virginia side of the project.
- Bridge decks over existing water bodies do not trigger a stormwater obligation. However, DOEE may require mitigation measures to mitigate stream impacts.

As information becomes available and coordination with stakeholders continues, this section may be removed in future drafts.

Appendices

Appendix A - Definitions

Key abbreviations used for terms for this Project are identified in **Table A-1**.

Table A-1. Definitions

ABBREVIATION	DEFINITION
AAR	Association of American Railroads
AASHTO	American Association of State Highway Transportation Officials
AHJ	Authority Having Jurisdiction
AMTRAK	National Railroad Passenger Corporation and Subsidiaries
AREMA	American Railway Engineering and Maintenance-Of-Way Association
BOD	Basis of Design
CFA	Commission of Fine Arts
CFS	Cubic Feet Per Second
CSXT	CSX Transportation
DC SHPO	District of Columbia State Historic Preservation Office
DDOT	District Department of Transportation
DEQ	Virginia Department of Environmental Quality
DHR	Virginia Department of Historic Resources
DOEE	District Department of Energy and the Environment
DRPT	Virginia Department of Rail And Public Transportation
EIS	Environmental Impact Statement
ES	Engineering Stationing
F/S	Feet per Second
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HEC-18	Hydraulic Engineering Circular No. 18
HEC-RAS	Hydrologic Engineering Center – River Analysis System
HY-8	Culvert Hydraulics Analysis Program
KLF	Kips per Linear Foot
KSI	Kips per Square Inch
LBS	Pounds
MAS	Maximum Allowable Speed
MPH	Miles Per Hour
MP	Mile Post
MRE	Manual for Railway Engineering
MT-1, MT-2, MT-3	Main Track #1, #2 And #3
MUTCD	Manual of Uniform Traffic Control Devices
NCPC	National Capital Planning Commission
NPS	National Park Service
PCF	Pounds per Cubic Foot
PLF	Pounds per Linear Foot
PSF	Pounds per Square Foot
ROW	Right-Of-Way
SCC	Virginia State Corporation Commission, Division of Utility and Railroad Safety

Table A-1. Definitions (Cont.)

ABBREVIATION	DEFINITION
US-ACOE	United States Army Corps of Engineers
VDOT	Virginia Department of Transportation
VRE	Virginia Railway Express
VPRA	Virginia Passenger Rail Authority
WMATA	Washington Metropolitan Area Transit Authority

EXHIBIT C: Performance and Payment Bonds

FORM OF PERFORMANCE BOND

BOND NO._____

PENAL SUM: $[●]

KNOW ALL MEN BY THESE PRESENTS, THAT:

WHEREAS, the Virginia Passenger Rail Authority ("Owner") has awarded to [●], a [●] duly organized and existing under the laws of the State of [●] ("Design-Builder") a contract ("Contract") for the [●] ("Project") dated [●]; and

WHEREAS, one of the conditions of the Contract is that Design-Builder provide this duly executed instrument ("Bond").

NOW THEREFORE, We, the undersigned Design-Builder and [●], a corporation duly organized and existing under and by virtue of the laws of the State of [●] and authorized to transact business as a surety within the Commonwealth of Virginia ("Surety"), are held and firmly bound unto Owner, as obligee, and its successors and assigns in the sum of [●], lawful money of the United States of America, for the payment of which, well and truly be made to Owner, Design-Builder and Surety bind themselves and each of their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents. Any reference to the "Surety" in this Bond shall be read as a reference to the Co-Sureties and each of them on the basis of such joint and several liability.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT:

1. The Contract is hereby incorporated by reference herein as if said Contract were fully set forth herein. Initially capitalized terms not otherwise defined herein shall have the meanings set forth in the Contract.

2. If Design-Builder shall at all times promptly, and faithfully perform the Contract and any alteration in or addition to the obligations of Design-Builder arising thereunder in strict accordance with the terms and conditions of the Contract, including the matter or infringement, if any, of patents or other proprietary rights, and all guarantees and warranties, including the guarantee and warranty periods, established by the Contract, and comply with all of the covenants therein contained, in the manner and within the times provided in the Contract, and shall fully indemnify and save harmless Owner from all costs and damages which it may suffer by reason or failure so to do, and shall fully reimburse and repay Owner all outlay and expenses which it may incur in making good any default, and reasonable counsel fees incurred in the prosecution of or defense of any action arising out of or in connection with any such default, then Surety's obligations under this Bond shall be void; otherwise such obligations shall remain in full force and effect.

3. This Bond shall cover the cost to perform all the obligations of Design-Builder arising out of or required under the Contract, and the obligations covered by this Bond specifically include Design-Builder's liability for liquidated damages as specified in the Contract.

4. Whenever Design-Builder shall be, and is declared by Owner to be in default under the Contract, the Surety shall within thirty (30) days of receipt of a letter from Owner in the form set forth in Schedule A:

(a) remedy such default; or

(b) submit to Owner a proposed plan to procure a new contractor using a delivery method and process acceptable to Owner, and thereafter tender to Owner a proposed contract procured using the Owner-accepted procurement process for completion of the Contract by a contractor acceptable to Owner, secured by performance and payment bonds issued by a qualified surety, combined with payment to Owner of the amount of damages in excess of the remaining Contract balance incurred by Owner as a result of the default, including costs of completion; or

(c) waive the Surety's right to remedy such default or submit to Owner a proposed plan to procure a new contractor and with reasonable promptness under the circumstances, make payment of the full penal sum of the bond to Owner.

5. In the event that Surety disputes its liability under this Bond, which includes any allegations of fraud, such dispute shall be determined in the first instance in accordance with the dispute resolution process ("DRP") attached hereto as Schedule B. If Surety fails to make an election within the thirty (30) days set forth in paragraph 4 of this Bond, then the claim shall be deemed to be in dispute for purposes of this paragraph. A Decision, as defined in Schedule B, shall be rendered within thirty (30) days of the Adjudication Commencement Date, or as otherwise extended pursuant to the DRP. The Decision shall be binding on the Surety, Design-Builder, and Owner as to their respective rights and obligations under this Bond but subject to each party's right to commence a de novo appeal of the Decision to a court of competent jurisdiction at any time. The parties shall immediately begin to comply with the Decision and the terms of this Bond until the Final Completion Date under the Contract notwithstanding of, and during, any appeal de novo of the Decision and unless or until such time as a court of competent jurisdiction issues a final order or ruling vacating or modifying the Decision, either in whole or in part, at the conclusion of any de novo appeal of the Decision (the "Obligation to Comply with the Decision"). Surety's costs to fulfill its Obligation to Comply with the Decision is limited to the penal sum of the Bond.

6. The parties acknowledge that the Obligation to Comply with the Decision is of the essence of the Bond, and the parties agree that Surety's failure to fulfill its Obligation to Comply with the Decision will cause irreparable harm to Owner and Design-Builder. Accordingly, Surety waives and releases any right it may have to initiate any action in court seeking a stay of its obligations arising pursuant to the Decision or seeking a stay of enforcement of the Decision.

Surety's only recourse to court processes in connection with the Decision is to file for a de novo appeal of the Decision while continuing to fulfill its Obligation to Comply with the Decision. In any such de novo appeal or in any action seeking enforcement of the Decision, the Surety (a) waives any right to file for an interim stay of its obligations arising pursuant to the Decision or to seek a stay of enforcement of the Decision, (b) waives any right to object to or contest an action brought to enforce specific performance of Surety's obligations arising pursuant to the Decision and waives all defenses in such an action, and (c) consents to an order or ruling directing and requiring Surety to perform its obligations arising pursuant to the Decision, and that an action for such an order or ruling may be sought on an expedited (emergency) basis under the rules of the court. The parties' Obligation to Comply with the Decision does not alter any party's right to pursue a de novo appeal of the Decision in a court of competent jurisdiction.

7. On the day following the Final Completion Date ("Step-Down Date"), the Penal Sum of [●] shall automatically be reduced to [●], with the understanding that such reduced Penal Sum shall be the aggregate liability of the surety and shall only be applicable to any claims submitted, or suits, or actions brought, after the Step-Down Date. For the avoidance of doubt, the entire Penal Sum of [●] is subject to any claims submitted, or suits or actions brought, against the Bond prior to the Step-Down Date; *provided, however*, that notwithstanding anything to the contrary herein, Surety's aggregate liability hereunder shall in no event exceed the Penal Sum of [●].

8. Surety, for value received, hereby stipulates and agrees that no change, extension of time, alterations, additions, omissions or other modifications of the terms of the Contract, or in the Work to be performed with respect to the Project, or in the specifications or plans, or any change or modification of any terms of payment or extension of time for any payment pertaining or relating to the Contract, or any rescission or attempted rescission by Design-Builder of the Contract, or this Bond, shall in any way affect its obligations on this Bond, and Surety does hereby waive notice of such changes, extension of time, alterations, additions, omissions or other modifications.

9. Correspondence or claims relating to this Bond shall be sent to Surety at the following address: [●]

10. Schedules A and B are an integral part of this Bond and are specifically incorporated herein as if set out in full in the body of this Bond.

11. If any provision of this Bond is found to be unenforceable as a matter of law, all other provisions shall remain in full force and effect.

12. Any provision in this Bond which conflicts with applicable laws, regulations, and ordinances, shall be deemed modified to conform to applicable laws, regulations, and ordinances. This Bond shall be governed by and construed in accordance with the laws of the Commonwealth of Virginia, without regard for conflicts of laws principles, and any action seeking enforcement of the Bond will be litigated exclusively in the courts of the Commonwealth of Virginia.

13. ***[Note: Use in case of multiple sureties ("Co-Sureties") or, otherwise, delete; If Co-Sureties are used, modify the preceding language accordingly to reflect this]*** The Co-Sureties agree to empower and designate a single "Lead Surety" with authority to act on behalf of all of the Co-Sureties with respect to this Bond, so that Owner will have no obligation to deal with multiple sureties hereunder. All correspondence from Owner to the Co-Sureties and all claims under this Bond shall be sent to the Lead Surety and shall be deemed served upon all Co-sureties. The Lead Surety may be changed only by delivery of written notice (by personal delivery or by certified mail, return receipt requested) to Owner designating a new Lead Surety, signed by all of the Co-Sureties. The initial Lead Surety is [●].

[*Signature Page Follows*]

IN WITNESS WHEREOF, We have hereunto set our hands and seals on this _____ day of _____ 20____.

DESIGN-BUILDER (full legal name):
Address:

By: _____
Title:
Contact Name:
Phone: ( )

SURETY (full legal name):
Address:

By: _____
Title:
Contact Name:
Phone: ( )

[Note: Date of this Bond must not be prior to date of Contract.]

[Note: If more than one surety, then add appropriate number of lines to signature block.]

[Note: A copy of a certificate that the Surety (or Co-Sureties) is (are) authorized to transact business in Virginia must be attached.]

[Note: The Bond shall be signed by authorized persons. Where such persons are signing in a representative capacity (*e.g.*, an attorney-in-fact), but are not a members of the firm, partnership, or joint venture, or an officer of the legal entity involved, evidence of authority including the appropriate power of attorney documentation must be attached.]

SCHEDULE A
FORM OF DEMAND

Date

Re: Performance Bond No.: [___] (the "Bond")

Principal: [_____] (the "Principal")

Obligees: Virginia Passenger Rail Authority (the "Obligee")

Contract: The Design-Build Contract, dated [_____] between the Principal as Design-Builder and the Virginia Passenger Rail Authority for the [●] Project (the "Contract")

Dear Sir:

Pursuant to the Bond, the Obligee hereby certifies that:

1. the Principal is and continues to be in default of the Principal's obligations under the Contract;

2. the Obligee has issued a notice of default to the Principal in accordance with the provisions of the Contract; and

3. the Obligee has honored and will continue to honor and perform in all material respects its obligations under the Contract.

We hereby demand that the Surety honor its obligations under the Bond forthwith.

The Obligee acknowledges that if the Surety intends to dispute its liability pursuant to the Bond, then the parties shall proceed immediately with the DRP set forth in Schedule B.

Yours truly,

Virginia Passenger Rail Authority

By: _____
Name:
Title:

SCHEDULE B
DISPUTE RESOLUTION PROCESS

Given the on default nature of the Bond, the Principal, the Surety and the Obligee acknowledge that they may not agree whether the Surety is liable to perform or make payment pursuant to the Bond. To ensure that such disputes are determined quickly so as to allow for the orderly and timely completion of the Contract, the Principal, the Surety and the Obligee agree to submit such disputes to the dispute resolution process set out below. Terms not defined herein shall have the meaning ascribed to them in the body of the Bond. The parties acknowledge that any decision rendered in the dispute resolution process (an "Award") will be binding, but subject to appeal de novo by any party at any time to a court of competent jurisdiction.

1. "Dispute" means a disagreement as to the Surety's liability pursuant to the Bond following an Obligee's Demand.

2. Disputes arising out of or in connection with the Bond shall be submitted for binding resolution to adjudication (the "Adjudication") administered by JAMS – The Resolution Experts! ("JAMS") in accordance with the procedure set out below. The JAMS' Dispute Resolution Rules for Surety Bond Disputes, effective as of the effective date of the Bond shall apply to the resolution of any Dispute unless modified by the provisions herein, in which case, the provisions of this Bond shall govern.

3. The Surety or the Obligee shall demand Adjudication by filing an Adjudication statement electronically with JAMS, and serving electronic copies by email upon the Principal and the Obligee, utilizing the electronic forms and filing directions provided by JAMS on its website at www.jamsadr.com. The Adjudication statement shall set forth in detail the factual and legal issues submitted for Adjudication and shall be sent no later than 10 days following the Obligee's Demand.

4. Within three (3) Business Days after the Adjudication statement is filed and served, the parties shall appoint an adjudicator (the "Adjudicator") who shall be a panelist on the JAMS Global Engineering & Construction Panel ("JAMS GEC Panel") of dispute adjudicators. JAMS shall appoint an Adjudicator administratively from the JAMS GEC Panel if the parties fail to appoint an Adjudicator within the three day period. The Adjudicator shall be under a duty to act impartially and fairly and shall serve as an independent neutral.

5. The Adjudication shall commence on the date that JAMS receives the Adjudication statement and initial deposit of funds, and confirms the appointment of the Adjudicator (the "Adjudication Commencement Date"). Unless the Adjudicator decides otherwise, the Principal, the Surety and the Obligee shall pay the final fees and expenses of Adjudication in accordance with the provisions set forth in the Contract governing the payment of fees and expenses of dispute resolution. In an Adjudication in which the Adjudicator determines that the Principal and Surety are aligned with the same commonality of interest against the Obligee, the Principal and Surety jointly shall be charged with one share and the Obligee will be charged with one share. Should any party fail to deposit funds as required by JAMS, any other party

may advance the deposit, and the amount of that advance deposit will be taken into consideration in the Adjudicator's decision.

6. Upon commencement of the Adjudication, the Adjudicator is empowered to take the initiative in ascertaining the facts and the law, and to exercise sole discretion in managing the Adjudication process. Among other things, the Adjudicator may require the parties to make additional factual submissions such as sworn witness statements and business documents, may interview important witnesses after notice to the parties and affording opportunity to attend, may request and consider expert reports and may call for memoranda on legal issues. Notwithstanding the foregoing, the Adjudicator must decide the following questions:

   a. Is the Principal in default of the Principal's obligations under the Contract?

   b. Is the Surety liable to perform in accordance with Paragraph 4 and/or 5 of the Bond?

7. The Adjudicator shall issue a written decision (the "Decision") which shall be binding upon and enforceable by the parties through the completion of the Principal's obligations under the Contract, subject to any party's right to commence an appeal de novo in a court of competent jurisdiction at any time in accordance with the terms of the Bond. Any payment required in the Decision shall be made immediately. The Decision shall be issued through JAMS as soon as practicable but in no event later than thirty (30) calendar days of the Adjudication Commencement Date or within any later time agreed upon by the parties. Unless the parties agree otherwise, the Decision shall state reasons therefore and shall be admissible in later administrative, arbitral or judicial proceedings solely concerning Surety's liability pursuant to the Bond between the parties.

8. This 30 calendar day period also may be extended by the Adjudicator in its sole discretion up to 14 days in the event that JAMS has requested any party to make an additional fee and expense deposit and such funds have not been deposited as requested or advanced by another party.

9. Any party may request clarification of the Decision within five (5) business days after issuance, and the Adjudicator shall endeavor to respond within an additional five (5) business days, and, subject to any party's right to commence an appeal de novo in a court of competent jurisdiction at any time in accordance with the terms of the Bond. any payment shall be made immediately thereafter. Unless the parties agree otherwise, the Decision shall state reasons therefore and shall be admissible in later administrative, arbitral or judicial proceedings between the parties. The parties shall comply with the Decision, unless and until subsequently vacated or modified, through the completion of the Principal's obligations under the Contract.

10. Upon any settlement by the parties of the Dispute prior to issuance of a Decision, the parties shall jointly terminate the Adjudication. Such removal or termination shall not affect the parties' continuing joint and several obligations for payment to JAMS of unpaid fees and expenses.

If the Decision is that the Surety is liable to perform in accordance with Paragraphs 4 and 5 of the Bond, then notwithstanding the commencement of any appeal de novo of the Decision, the Surety shall perform in accordance with the Decision and with the terms of the Bond until the Principal's Obligations under the Contract are completed, but not to exceed the penal sum of the Bond**.**

FORM OF PAYMENT BOND

BOND NO._____

BOND AMOUNT: $[●]

KNOW ALL MEN BY THESE PRESENTS, THAT:

WHEREAS, the Virginia Passenger Rail Authority ("Owner") has awarded to [●], a [●] duly organized and existing under the laws of the State of [●] ("Design-Builder") a contract ("Contract") for the [●] Project ("Project") dated [●]; and

WHEREAS, one of the conditions of the Contract is that Design-Builder provide this duly executed instrument ("Bond").

NOW THEREFORE, We, the undersigned Design-Builder and [●], a corporation duly organized and existing under and by virtue of the laws of the State of [●] and authorized to transact business as a surety within the Commonwealth of Virginia ("Surety"), are held and firmly bound, jointly and severally, unto Owner, as obligee, and its successors and assigns, in the sum of [●], lawful money of the United States of America, for the payment of which, well and truly be made to Owner and Claimants, Design-Builder and Surety bind themselves and each of their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT:

1. The Contract is hereby incorporated by reference herein as if said Contract were fully set forth herein. Initially capitalized terms not otherwise defined herein shall have the meanings set forth in the Contract.

2. If Design-Builder shall: (a) make payments of all sums due to all persons and entities having a direct contract with Design-Builder, or a direct contract with a subcontractor having a direct contract with Design-Builder, for supplying labor, material, and/or supplies used directly or indirectly by Design-Builder in the prosecution of the Work provided in the Contract (such persons and entities hereinafter referred to collectively as "Claimants"); and (b) shall fully indemnify and save harmless Owner from all costs and damages which Owner may suffer by reason of Design-Builder's failure to fulfill its obligations to Claimants under clause (a) above, including but not limited to, fully reimbursing and repaying Owner reasonable counsel fees incurred as a result of any action arising out of or in connection with any such failure, then Surety's obligations under this Bond shall be void; otherwise such obligations shall remain in full force and effect.

3. All Claimants shall have a direct right of action only against Surety and Contractor under this Bond; *provided, however,* that no claim, suit or action shall be brought by any Claimant after the expiration of one (1) year following the date on which Claimant last performed labor or

last furnished or supplied materials to the Project. Any suit or action must be brought in a state or federal court of competent jurisdiction located in the Commonwealth of Virginia.

4. Any Claimant who does not have a direct contractual relationship with Contractor shall, as a condition precedent to bringing such claim, suit or action, provide written notice thereof to Contractor, Surety, and Owner, no later than ninety (90) days from the date Claimant last supplied labor or materials, stating with substantial accuracy the amount claimed, the name of the person for whom the work was performed or to whom the material was furnished, and the dates on which such labor or materials were supplied.

5. Surety shall, after receipt of reasonable notice to Surety of any claim, demand, suit or action brought against Owner by a Claimant, defend, with counsel approved by Owner, indemnify and hold harmless Owner from any and all claims, demands, suits or actions brought by any Claimant. Owner shall have a direct right of action against Surety and Contractor for any breach by Surety of its obligation to defend, indemnify and hold harmless Owner.

6. Surety, for value received, hereby stipulates and agrees that no change, extension of time, alterations, additions, omissions or other modifications of the terms of the Contract, or in the Work to be performed with respect to the Project, or in the specifications or plans, or any change or modification of any terms of payment or extension of time for any payment pertaining or relating to the Contract, or any rescission or attempted rescission by Contractor of the Contract, or this Bond, or any conditions precedent or subsequent in this Bond attempting to limit the right of recovery of Claimants otherwise entitled to recover under this Bond, shall in any way affect its obligations on this Bond, and Surety does hereby waive notice of such changes, extension of time, alterations, additions, omissions or other modifications.

7. Surety acknowledges that the amounts owed to Contractor under the Contract shall first be available for the performance of the Contract, including Owner's superior right to use the funds due for the completion of the Work, and then may be available to satisfy claims arising under this Bond. Owner shall not be liable for the payment of any costs or expenses or claims of any Claimant under this Bond and shall have no obligation to make payments to, or give notice on behalf of, any Claimant.

8. Any provision in this Bond which conflicts with applicable laws, regulations and ordinances shall be deemed modified to conform to applicable laws, regulations and ordinances.

9. Contractor or Owner shall furnish a copy of this Bond or permit a copy to be made upon request by any person or entity who may be a Claimant as defined above.

10. ***[Note: Use in case of multiple sureties ("Co-Sureties") or, otherwise, delete; If Co-Sureties are used, modify the preceding language accordingly to reflect this]*** The Co-Sureties agree to empower and designate a single, "Lead Surety" with authority to act on behalf of all of the Co-Sureties with respect to this Bond, so that Owner and Claimants will have no obligation to deal with multiple sureties hereunder. All correspondence from Owner and Claimants to the Co-Sureties and all claims under this Bond shall be sent to such designated Lead Surety and service of such correspondence or notice upon the Lead Surety shall constitute service upon all co-sureties. The Lead Surety may be changed only by delivery of written notice (by personal delivery or by

certified mail, return receipt requested) to Owner designating a single new Lead Surety, signed by all of the Co-Sureties. The initial Lead Surety shall be [●].

11. This Bond shall be governed by and construed in accordance with the laws of the Commonwealth of Virginia, without regard for conflicts of laws principles, and any action seeking enforcement of the Bond will be litigated exclusively in the courts of the Commonwealth of Virginia.

[*Signature Page Follows*]

IN WITNESS WHEREOF, We have hereunto set our hands and seals on this _____ day of _____ 20____.

DESIGN-BUILDER (full legal name):
Address:

By: _____
Title:
Contact Name:
Phone: ( )

SURETY (full legal name):
Address:

By: _____
Title:
Contact Name:
Phone: ( )

[Note: Date of this Bond must not be prior to date of Contract.]

[Note: If more than one surety, then add appropriate number of lines to signature block.]

[Note: A copy of a certificate that the Surety (or Co-Sureties) is (are) authorized to transact business in Virginia must be attached.]

[Note: The Bond shall be signed by authorized persons. Where such persons are signing in a representative capacity (*e.g.*, an attorney-in-fact), but are not a members of the firm, partnership, or joint venture, or an officer of the legal entity involved, evidence of authority including the appropriate power of attorney documentation must be attached.]

EXHIBIT D: Forms

FORM A

ACKNOWLEDGMENT OF RECEIPT OF RFQ, ADDENDA, AND RESPONSES TO QUESTIONS

_____
(Name of Respondent)

We hereby acknowledge receipt of RFQ No. 1-001-23-0002 for the South Package of the Long Bridge Project dated June 30, 2023, subsequent amendments, and responses to questions issued by VPRA.

Addendum No.	**Date Issued**
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Response to Questions No.	**Date Issued**
_____	_____
_____	_____
_____	_____
_____	_____

_____ _____
(Signed) (Date)

_____
(Printed or Typed Name)

_____
(Title)

FORM B

RESPONDENT'S ORGANIZATION INFORMATION

RESPONDENT (INDIVIDUAL FIRM/JOINT VENTURE / PARTNERSHIP/OTHER)			
Name of Entity and State of Organization (if applicable): Address:			
NAME(S) OF ORGANIZATION MEMBER(S)			
Company Name	Address/Phone & E-mail	**State of Organization**:	**% Share of Equity Interest**
Principal Participant(s)			
Lead Designer			
IDQM Firm(s)			

FORM C

LEGAL AND DISPUTES HISTORY

Name of Respondent: _____

Firm Name: _____

Provide the following information. Use additional pages as needed.

Legal Issues to be resolved:

Identify any legal issues that must be resolved by Respondent, any Principal Participant, the Lead Designer (if not a Principal Participant), or IDQM firm(s) to permit Respondent to carry out its obligations if awarded the DBA. **If there are no such legal issues, affirmatively state that there are none.**

Dispute Resolution Proceedings:

Provide a list of all litigation, arbitration, mediation, dispute review board or other alternative dispute resolution proceedings, each involving amounts in excess of $250,000 and related to performance in which any Principal Participant, Lead Designer (if not a Principal Participant) or IDQM has been involved during the past 5 years. For Principal Participants, the projects listed shall only be those initiated by or against a project owner. For the Lead Designer and IDQM, identify only those projects by or against (i) project owners or (ii) contractors, where the Lead Designer or IDQM was engaged to perform design/engineering services for a project (e.g., design-build projects). State whether each proceeding was resolved against the firm or its insurers/sureties or resulted in reduction in compensation to the firm. Additionally, provide this information for any unresolved, outstanding proceedings.

List	Owner Initiated Proceedings (Y/N)	Resolution/Outcome	Indicate if Unresolved or Outstanding	Current Owner Contact Name, Phone & E-mail.

Liquidated Damages:

Describe any assessment of liquidated damages against any Principal Participant over the past 5 years. Describe the causes/reasons for the assessment and the amounts assessed. Describe any outstanding damage claims by or damages due and owing to any owner/agency.

Project Name	Cause of Delay(s)	Amount Assessed	Describe Outstanding Damage Claims by Any Owner	Current Owner Contact Name, Phone & E-mail.

Termination for Cause:

Describe the conditions surrounding any contract (or portion thereof) entered into by any Principal Participant, Lead Designer (if not a Principal Participant), or IDQM over the past 10 years that has been terminated for cause, or which required completion by another party. Describe the reasons for termination and the amounts involved, and claims lost or won regarding the termination.

Project	Describe Reason for Termination	$ Amount Involved/ Claims Lost or Won	Current Owner Contact Name, Phone & E-mail.

Disciplinary Action:

Explain any disciplinary action taken against any Principal Participant, Lead Designer, or IDQM within the past 5 years, including suspension from the right to propose/bid or removal from any Respondent/bid list.

Project	Describe Action Taken	Current Owner Contact Name, Phone & E-mail.

FORM D

PRINCIPAL PARTICIPANT AND LEAD DESIGNER CERTIFICATION

Complete for each Principal Participant and the Lead Designer.

1. Has the firm or any other officer or director thereof been indicted or convicted of bid, procurement, fraud or other contract related crimes or violations or any felony or serious misdemeanor within the past five years? If yes, describe.

2. Has the firm ever sought protection under any provision of any bankruptcy act? If yes, describe.

3. Has the firm ever been debarred or suspended from performing work for the federal government or any state or local government? If yes, describe.

(Must be signed by an authorized representative of each Principal Participant and the Lead Designer)

Firm: _____

By: _____

Title: _____

Name of Respondent: _____

Form E

CONFLICT OF INTEREST DISCLOSURE

Respondent Name: _____

Disclose any actual or potential conflict of interest under VPRA's Organizational Conflict of Interest Policy. If no actual or potential conflict of interest exists, state as such.

Authorized Signature*: _____

Date: _____

Subscribed and sworn to me this _____ day of _____ , 20__

Notary Public _____

My commission expires: _____

* If Respondent is not organized as an organization or is a Joint Venture, partnership, or any form of consortium, then an authorized representative of each Principal Participant must sign this Affidavit.

FORM F

SAFETY QUESTIONNAIRE

Respondent's Name: _____

Firm Name: _____

1. Provide the following information for the preceding three years:

Item	2020	2021	2022
Employee hours worked (Do not include non-work time, even though paid)			
Number of lost workday cases			
Number of restricted workday cases			
Number of cases with medical attention only			
Number of fatalities			
Average Total Recordable Injury/Illness Rate			
Average Lost Work Rate			

2. Are internal accident reports and report summaries sent to management? To what levels and how often?

Position	No	Yes	Monthly	Quarterly	Annually

3. Do you hold site meetings for supervisors? Yes _____ No _____

   How Often?

   Weekly _____ Bi-Weekly _____ Monthly _____ Less often, as needed _____

4. Do you conduct Project Safety Inspections? Yes _____ No _____

   By Whom? _____

   How Often?

   Weekly _____ Bi-Weekly _____ Monthly _____

5. Does the firm have a written Safety Program? Yes _____ No _____

6. Does the firm have an Orientation Program for new hires?

   Yes _____ No _____ If yes, what safety items are included?

7. Does the firm have a program for newly hired or promoted foremen?

   Yes _____ No _____ If yes, does it include instruction of the following?

Topic	Yes	No
Safety Work Practices		
Safety Supervision		
On-site Meetings		
Emergency Procedures		
Accident Investigation		
Fire Protection and Prevention		
New Worker Orientation		

8. Does the firm hold safety meetings which extend to the laborer level?

   Yes _____ No _____

   How often? Daily ____ Weekly ____ Bi-Weekly ____ Less often, as needed ____

9. Describe the firm's approach to safety training for employees, including how new hires are trained, when training is conducting for a project, and how often employees are required to attend safety training:

10. Provide the safety record on the last Project to which the indicated Key Personnel were assigned:

Key Person	Total hours worked by all employees on Project	Number of lost workday cases on Project	Number of restricted workday cases on Project	No. of cases with medical attention only on Project	No. of fatalities on Project
Project Manager					
Construction Manager					
Safety Manager					

11. OSHA Violations

Provide information on any Occupational Safety and Health Administration (OSHA) citations and assessed penalties against the Principal Participants for any violations of its safety or health regulations in the past five (5) years.

Citation/Incident Number	Description/Disposition

Submit a copy of OSHA Form 300a for each of the last three years.

FORM G

RECORD OF DBE PERFORMANCE

Name of Respondent: _____

Firm Name: _____

Provide the information requested below for projects completed within the years 2019, 2020, 2021, and 2022 where the firm was the prime contractor. For each Principal Participant, "prime contractor" includes all projects in which the entity performed greater than or equal to 30% of construction or held an equity interest greater than or equal to 30% of the entity overseeing or responsible for construction of the project. For any project where the DBE goal, if applicable, was not achieved, attach a maximum ½ page explanation.

Project Name	DBE Participation Goal (%), if applicable	DBE Participation Achieved (%)	Current Owner Contact (Name, Phone and E-mail)

Add additional sheets if necessary.

FORM H

PROJECT EXPERIENCE DESCRIPTION

Name of Respondent: _____

Firm Name (Entity that participated on the project): Project name, location, description, and nature of work for which company was responsible:
Identify named Key Personnel who worked on the project:
Describe the project, key risks, and challenges:
Name of Client (Owner/Agency, Contractor, etc.): _____ Address: _____ _____ Contact Name: _____ Telephone:_____ Owner's Project or Contract No.:_____ E-mail: _____ Initial Contract Value (US$): _____ Final Value (US$): _____ Delivery Method (e.g., DBB, DB, CM/GC, PDB): _____ Percent of Total Work Performed by Company: _____ Commencement Date: _____ Planned Completion Date: _____ Actual Completion Date: _____ Amount of Claims: _____ Any Dispute Proceedings? Yes* __ No __ *If yes, describe on a separate sheet.

FORM I

KEY PERSONNEL

Name of Respondent: _____

Key Personnel Position	Name of Individual	Years of Experience	Education and Registrations	Employer Name	Reference Name, Title, Phone Number, and E-mail Address*
Project Manager		____ years managing similar projects ____ years of alternative delivery experience			1. 2. 3.
Design Manager		____ years of managing or performing design for similar projects ____ years of managing or performing design for alternative delivery projects			1. 2. 3.
Construction Manager		____ years managing construction of similar projects ____ years providing constructability reviews of designs ____ years of alternative delivery experience			1. 2. 3.
Quality Manager		____ years of quality management experience for similar projects			1. 2.

					3.
Independent Design Quality Manager Director		___ years of experience in the analysis and design of highways and bridge structures.			1. 2. 3.
Structures Design Manager		___ years of demonstrated experience in bridge engineering, design and analysis, including projects of similar size, type of work, and complexity as this Project. ____ years of alternative delivery experience			1. 2. 3.
Geotechnical Design Manager		____ years of experience including planning and overseeing subsurface exploration programs for bridge structures and roadways, including projects of similar size, type of work, and complexity as this Project. ____ years of alternative delivery experience			1. 2. 3.
Environmental Compliance Manager		___ years overseeing environmental compliance for similar projects			1. 2. 3.

Third-Party Coordinator		___ years of third-party management for similar projects ___ years of alternative delivery experience			1. 2. 3.
Public Information Coordinator		___ years of public information management for similar projects ___ years of alternative delivery experience			
Safety Manager		___ years managing safety for similar types of construction work			1. 2. 3.
Additional Value Personnel # 1		___ years of relevant experience			1. 2. 3.
Additional Value Personnel # 2		___ years of relevant experience			1. 2. 3.

*Provide at least two (2), but no more than three (3), references for each position.

KEY PERSONNEL COMMITMENT:

Respondent affirms that the Key Personnel identified above are available for the Project and will commit the time

necessary to fulfill the duties and responsibilities of the Key Personnel position. In the event that any identified Key Personnel cannot meet such commitment, VPRA will be damaged. Due to the imprecise nature of the damages, Respondent, if chosen as the Design-Builder for the Project, may be subject to liquidated damages as provided in the Design-Build Agreement due to the failure to commit identified Key Personnel to the Project. Respondent may not substitute or remove identified Key Personnel throughout the duration of this procurement, except as otherwise specified in Section 4.5.1 of the RFQ. The following must be signed by an authorized representative of Respondent. If Respondent has not been formed as of the date of submission of the SOQ or is a consortium, partnership or any type of Joint Venture, an authorized representative of each Principal Participant must sign below. Use additional forms as necessary.

By: _____

Name: _____

Title: _____

Entity Name: _____

FORM J

SUBCONTRACTOR INFORMATION

Name of Respondent: _____

List of all known Subcontractors other than the Lead Designer and IDQM.

SUBCONTRACTOR NAME	ADDRESS AND PHONE NUMBER	WORK PLANNED FOR THE PROJECT

FORM K

AFFIDAVIT OF NON-COLLUSION

I swear (or affirm) under the penalty of perjury:

1. That I am the Respondent (if the Respondent is an individual), a partner in the partnership (if the Respondent is a partnership), an equity member of the Respondent (if the Respondent is a joint venture), or an officer or employee of the Respondent corporation having authority to sign on its behalf (if the Respondent is a corporation);

2. That the attached SOQ submitted in response to the Long Bridge South Package Project Design Build Request for Qualifications has been arrived at by the Respondent independently and has been submitted without collusion with and without any agreement, understanding or planned common course of action with, any other provider of materials, supplies, equipment or services described in the RFQ, designed to limit fair and open competition;

3. That the contents of the SOQ have not been communicated by the Respondent or its employees or agents to any person not an employee or agent of the Respondent and will not be communicated to any such persons prior to the SOQ due date; and

4. That I am fully informed regarding the accuracy of the statements made in this affidavit.

Authorized Signature[†]: _____

Date: _____

Respondent's Firm Name:

Respondent's Federal Employer Identification Number:
_____

(Number used on Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941) (if Respondent does not have an EIN, then the EIN for each Principal Participant)

[†] If Respondent is not organized as an organization or is a Joint Venture, partnership, or any form of consortium, then an authorized representative of each Principal Participant must sign this Affidavit.

Subscribed and sworn to me this _____ day of _____ , 20__

Notary Public _____

My commission expires: _____

FORM L

LOBBYING CERTIFICATE

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) **No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned**, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of **ANY** Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan or cooperative agreement.

(2) **If any funds other than Federal appropriated funds have been paid or will be paid** to any person for making lobbying contacts to an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with **THIS** Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying", in accordance with its instructions [as amended by "Government-wide Guidance for New Restrictions on Lobbying," 61 Federal Regulations 1413 (1/19/96). Note: Language in paragraph (2) herein has been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (P.L. 104-65, to be codified at 2 U.S.C. 1601, et seq.)].

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

[Note: Pursuant to 31 U.S.C. §1352(c)(1)-(2)(A), any person who makes a prohibited expenditure or fails to file or amend a required certification or disclosure form shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each expenditure or failure.]

The Respondent/Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Respondent/Contractor understands and agrees that the provisions of 31 U.S.C. §3801, et seq., apply to this certification and disclosure, if any.

Date: _____

Company Name: _____

Signature: _____

Name: _____
(Print)

Title: _____

NOTE: CONTRACTORS ARE REQUIRED PURSUANT TO FEDERAL LAW, TO INCLUDE THE ABOVE LANGUAGE IN SUBCONTRACTS OVER $100,000 AND TO OBTAIN THIS LOBBYNG CERTIFICATE FROM EACH SUBCONTRACTOR BEING PAID $100,000 OR MORE UNDER THIS CONTRACT.

FORM M

RESPONDENT'S CLARIFICATION REQUEST

Respondent's Name: _____

RFQ Section No. or Form	Question

FORM N

PROPRIETARY/CONFIDENTIAL INFORMATION IDENTIFICATION

NAME OF RESPONDENT: _____

Pursuant to Va. Code § 33.2-299.7, Respondents may request VPRA to keep confidential trade secrets or confidential proprietary information, not publicly available, provided by a private person or entity pursuant to a promise of confidentiality where if such information were made public, the financial interest of the private person or entity could be adversely affected.

For such information to be excluded from disclosure requirements under the Virginia Freedom of Information Act, Respondent shall make a written request to VPRA:

(1) invoking such exclusion upon submission of the data or other materials for which protection from disclosure is sought;

(2) identifying the data or other materials for which protection is sought; and

(3) stating the reasons why protection is necessary.

The written notice must specifically identify the data or materials to be protected including the section of the SOQ in which it is contained and the page numbers, and state the reasons why protection is necessary. The proprietary or trade secret material submitted must be identified by some distinct method such as highlighting or underlining and must indicate only the specific words, figures, or paragraphs that constitute trade secret or proprietary information. In addition, a summary of proprietary information submitted shall be submitted on this form. The classification of an entire SOQ document as proprietary or trade secrets is not acceptable. VPRA will make the final determination of the appropriate scope and nature of the protection afforded to the requested records.

SOQ SECTION/TITLE	PAGE NUMBER(S)	REASON(S) FOR WITHHOLDING FROM DISCLOSURE

APPENDIX 1

Definitions

Capitalized terms used in this RFQ have the following meanings:

Affiliate	With respect to an entity referenced in this RFQ: a) Any Person that directly or indirectly controls, or is controlled by, or is under common control with, such entity; and b) Any other Person that owns 20% or more of the entity's equity interest.
Authorities Having Jurisdiction (AHJs)	Third party agencies that have jurisdiction over any portion of the Project.
Conceptual Design	The preliminary design of the Project prepared by VPRA that will be provided to the Design-Builder.
Contract Documents	The documents that will comprise the entirety of Design-Builder's and VPRA's obligations with respect to the Project, including the DBA and Technical Provisions.
Contract Price	Design-Builder's lump-sum price to complete the Work.
Commonwealth	The Commonwealth of Virginia.
Design-Build Agreement	The written agreement that has been fully executed between VPRA and the Design-Builder containing the terms and conditions governing the Work and all attachments thereto.
Design-Builder	The Person selected pursuant to the RFP, which enters into the Design-Build Agreement with VPRA to design and construct the Project.
Design-Build	A project delivery methodology in which the project owner contracts with a single firm that has responsibility for the design and construction of a project.
Designated Contact	The individual designated by a Respondent as the point of contact for communications with VPRA during the procurement.
DOT Component	The division, office, or mode within the USDOT awarding Federal financial assistance. This includes the FTA and FRA.
Evaluation Team	The individuals who will perform the evaluation and scoring of SOQs and Proposals.
Guarantor	A Person that guarantees the financial and performance obligations of Design-Builder.
Independent Design Quality Manager (IDQM)	An engineering firm with no contractual relationship with the Lead Designer or any subconsultant to the Lead Designer, retained by the Design-Builder to review design elements, as specified in greater detail in this RFQ.

Independent Quality Assurance (IQA)	All actions performed by VPRA to verify that the design complies with the Contract Documents, including review and comment on the Design, working with the Design-Builder and IDQM to resolve design comments, and other checks VPRA performs on the Design.
Joint Venture	A combination of two or more Persons for the purposes of undertaking the design and construction of the Project. A Joint Venture is not, itself, a distinct business entity, but may be comprised of a combination of business entities and/or individuals. If a Joint Venture is the successful Proposer, then joint venturers must each be a signatory to the DBA and must agree to be jointly and severally liable for the performance thereof.
Key Personnel	The individuals specified in Section 5.5.1 of this RFQ.
Lead Designer	The firm that leads the team performing the design of the Project. A Lead Designer may be either a Principal Participant or Subcontractor.
North Package	The northern portion of the Long Bridge project that will be separately procured and delivered.
Organizational Conflict of Interest Policy	VPRA's policy governing conflicts of interest, as described further in Section 1.6 of the RFQ.
Person	Any individual, firm, corporation, company, joint venturer, voluntary association, partnership, trust, or unincorporated organization, or combination thereof.
Point of Contact	VPRA's single point of contact for the procurement of this Project, identified in Section 1.4 of this RFQ.
Principal Participant	Any of the following entities: the Respondent; individual firms (e.g., corporation, limited liability company, limited liability partnership), general partners, or Joint Venture members of the Respondent; and/or all Persons and legal entities holding (directly or indirectly) a 15% or greater interest in the Respondent.
Procurement Rules	The rules of procurement adopted by VPRA that govern VPRA's procurements, available at: Procurement-Rules.pdf (vapassengerrailauthority.org)
Procurement Schedule	The schedule for this procurement detailed in Section 2.1.
Project	The South Package of the Long Bridge project.
Proposal	The response to the RFP submitted by a Proposer.
Proposer	A design-build entity that submits a Proposal in response to the RFP. Where context dictates, Proposer shall also mean a potential Proposer.

Quality Acceptance	For the Design, all services provided by the IDQM to verify conformance of the design with the Contract Documents and the resolution of comments on the Design. For Construction Work, all planned and systematic actions performed by VPRA to ensure that all Construction Work complies with the requirements of the Contract Documents and that all materials incorporated in the Work, all equipment used, and all elements of the Work will perform satisfactorily for the purpose(s) intended. Actions include specification reviews, document control reviews, and working plan reviews; construction inspection; materials sampling and testing at the production site and the Project site; oversight of manufacturing/processing facilities and equipment; oversight of on-site equipment; calibration of test equipment; acceptance or rejection of material; and documentation of all activities.
Quality Control (QC)	The total of all activities that are performed by the production staff of the Design-Builder, Lead Designer, Subcontractors, producers, or manufacturers to ensure the Work meets the requirements of the Contract Documents. QC may include design reviews and checks; inspection of material handling and construction; calibration and maintenance of sampling and testing equipment; working plan review; document control; production process control; any inspection, sampling, and testing done for these purposes; and documentation of QC activities.
Quality Plan	Design-Builder's plan detailing its approach to design and construction quality management for the Work.
Request for Proposals (RFP)	The request for the submission of Proposals by Shortlisted firms interested in serving as Design-Builder for the Project.
Request for Qualifications (RFQ)	This request for the submission of Statements of Qualification from entities interested in serving as Design-Builder for the Project.
Respondent	A design-build entity that submits a SOQ in response to this RFQ. Where dictated by context, Respondent shall also mean potential Respondent. A Respondent may only be a full team or entity capable of performing all services necessary to design and construct the Project.
Shortlist	The shortlist of Respondents named after evaluation of the SOQs submitted in response to this RFQ.
South Package	The southern portion of the Long Bridge project, as described in greater detail in the RFQ. The South Package is the work that is the subject of this procurement.
Statement of Qualifications (SOQ)	The submission by a Respondent in response to this RFQ.
Stipend	A payment by VPRA to a Proposer as compensation for its work product (Proposal and inclusive of any ATCs), under certain conditions, as part of this procurement.

Stipend Agreement	A legal agreement that the Stipend-Eligible Proposer must enter into and execute with VPRA in order to receive the Stipend payment.
Stipend-Eligible Proposer	A Proposer who is responsive in meeting all RFP compliance requirements by submitting a compliant and complete Technical and Price Proposal for consideration by the VPRA, who meets the requirements and limitations set forth in the Stipend Agreement in the RFP and who has executed the Stipend Agreement. A Stipend Eligible Proposer does not include (i) the Proposer selected for award and which executes a Design-Build Agreement with VPRA or (ii) the Proposer selected for award that cannot satisfactorily fulfill their obligations and meet the conditions to execute the Design-Build Agreement.
Subcontractor	A firm under contract with the Design-Builder or another Subcontractor to perform a specified portion of the Work. Subcontractor includes firms under contract at any tier to perform a specified portion of the Work.
Tangible Net Worth	The difference between the (i) the sum of paid-in capital stock plus preferred stock plus retained earnings, less (ii) the sum of treasury stock plus minority interest plus intangible assets, including goodwill, patents, and licenses, all determined in accordance with Generally Accepted Accounting Principles and as interpreted by the Securities and Exchange Commission in connection with financial statements filed pursuant to the Securities Exchange Act of 1934.
Technical Provisions	The portion of the Contract Documents that contains the technical requirements for the Project, including the performance-based and prescriptive specifications.
VPRA Website	VPRA's website on which VPRA posts information about its ongoing procurements, accessible at: https://vapassengerrailauthority.org/working-with-us/procurement/
Work	The efforts and services to be provided by the Design-Builder to complete its obligations under the Contract Documents.

APPENDIX 2

Representative List of Material Changes

List of Representative Material Changes:

(a) An event of default or bankruptcy involving the affected entity, or an entity directly or indirectly controlling of the affected entity;

(b) A change in Tangible Net Worth of 10% or more of shareholder equity;

(c) A sale, merger or acquisition exceeding 10% of the value of shareholder equity prior to the sale, merger or acquisition that in any way involves the affected entity or an entity directly or indirectly controlling the affected entity;

(d) A downgrade in credit rating for the affected entity or an entity directly or indirectly controlling the affected entity;

(e) Non-payment of any debt service when due;

(f) Inability to meet material conditions of loan or debt covenants by the affected entity or an entity directly or indirectly controlling the affected entity, which has required or will require a waiver or modification of agreed financial ratios, coverage factors or other loan stipulations, or additional credit support from shareholders or other third parties;

(g) In the current and three most recently completed fiscal years, the affected entity or an entity directly or indirectly controlling the affected entity either: (i) incurs a net operating loss; (ii) sustains charges exceeding 5% of the then shareholder equity due to claims, changes in accounting, write-offs or business restructuring; or (iii) implements a restructuring/reduction in labor force exceeding 10% of the workforce or involves the disposition of assets exceeding 10% of the then shareholder equity; or

(h) Other events known to the affected entity that represent a material change in financial condition over the past three fiscal years or may be pending for the next fiscal year.