PART 2

PROJECT NEXT TECHNICAL REQUIREMENTS

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Project NEXT Technical Requirements

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TABLE OF CONTENTS

ATTACHMENTS

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PROJECT NEXT TECHNICAL REQUIREMENTS

These Project NEXT Technical Requirements (also known as "NEXT Technical Requirements" or "Technical Requirements") detail the scope, requirements and criteria for the design and construction of the I-495 Express Lanes Northern Extension Project ("Project NEXT" or "NEXT"). The Work, as defined in the Contract Documents, will be undertaken on behalf of the Concessionaire by the Design-Builder and/or its subcontractors, subconsultants, vendors or suppliers. A summary of the of the Project NEXT Work is provided in Attachment 1.0.

Capitalized terms used in these Technical Requirements, but not otherwise defined, have the respective meanings set forth in Part 4 (NEXT General Conditions), Exhibit 1.2.1 (Project NEXT Definitions) to Part 4 (General Conditions), or Part 5 (NEXT Division I Amendments) of the Contract Documents.

1 Project Management

1.1 Overview

A. The Design-Builder shall establish and maintain an organization that effectively manages all elements of the Project NEXT Work. The Project NEXT management effort will be defined and guided by the Project NEXT Development Plans (PDPs), as described in Attachment 1.3.

B. Project NEXT management activities shall include, but not be limited to, scope, schedule, cost, safety and document management, and will be consistent with the Work Breakdown Structure (WBS) developed by the Design-Builder.

C. All Design-Builder correspondence, submittals, other required deliverables, and requests for information or action shall be provided to the Concessionaire in accordance with the requirements of the Contract Documents and are subject to the Concessionaire's acceptance or approval.

D. The Design-Builder acknowledges and accepts that Concessionaire's management, review, concurrence, approval, inspection, variation, and/or acceptance of the Work is subject to the Virginia Department of Transportation's (VDOT) review, concurrence, approval, inspection, variation, and/or acceptance of the Work and that all Design-Builder submittals and deliverables must be submitted (or provided) to VDOT for concurrent approval.

E. The Design-Builder also acknowledges and accepts that Concessionaire's management, review, concurrence, approval, inspection, variation, and/or acceptance of the Work may also be subject to other Governmental Approvals or third-party review, concurrence, approvals, inspections, variations, and/or acceptance.

F. The Design-Builder acknowledges and accepts that as public-private partnership between the Concessionaire and VDOT, there are certain activities and approvals associated with

Project NEXT which only VDOT or third parties can perform or provide. The Design-Builder is responsible for ensuring VDOT or third party participation in such activities and required to obtain any such approvals required to complete the Project NEXT Work.

1.2 Project Administration

1.2.1 General Requirements

A. The Design-Builder's management approach shall provide all components of an effective and efficient management system, including: communication and reporting; documentation of Work; supervision of Work personnel and activities; all tools, facilities, and materials; environmental protection and mitigation; safety of Work personnel; interface with stakeholders; and any other management elements needed to produce and document a quality, safe, efficient, and operable Project NEXT that complies with the Contract Documents.

B. Any licensed contractors or lower tier subcontractors working for or on behalf of the Design-Builder shall prequalify (or be prequalified) with VDOT and shall have received a certification of qualification prior to undertaking Work on Project NEXT. This requirement does not apply to consultants, manufacturers, suppliers, or haulers.

C. Subcontracting or otherwise delegating any portion of the Work shall not relieve the Design-Builder of any responsibility for the fulfilment of the Contract Document requirements. Further, delegation or subcontracting of the Design-Builder's responsibilities shall not eliminate the Design-Builder's obligation to report directly to the Concessionaire, unless the Concessionaire expressly agrees to accept reports or communications from third parties.

1.2.2 VDOT Oversight

A. Through VDOT's Northern Virginia District Megaprojects Office, VDOT will provide oversight of Project NEXT, including the review and approval of all designs (and associated submittals) and the inspections and acceptance of all construction (and associated submittals).

B. VDOT's designated manager for Project NEXT will be the primary point of contact for the Concessionaire and Design-Builder; however, only the Concessionaire has authority to direct and authorize the Design-Builder to perform the Project NEXT Work. The Design-Builder shall not take direction from VDOT representatives (or its consultants).

1.2.3 Submittals

A. The Design-Builder shall prepare, revise, and finalize all submittals to be accurate, complete, and in a form and at a level of detail to enable the Concessionaire to satisfactorily discharge its review and approval obligations, which include concurrent reviews and approvals by VDOT and may include reviews and approvals by other governmental agencies and third-parties.

B. The Design-Builder shall submit for review and approval, a Submittal Register that details the content, schedule, and proposed packaging of the required Design

Documentation and Construction Documentation by the Design-Builder. The purpose of this Submittal Register is to understand the Design-Builder's design and construction approach and sequencing and to allow for proper allocation of Concessionaire resources to review the submissions.

C. The Submittal Register shall be approved prior to the submission of any Design Documentation and/or Construction Documentation. The Submittal Register shall identify all submittal packages that the Design-Builder intends to submit for review and approval. Submittal packages not included in the approved Submittal Register will not be reviewed without prior approval.

D. The Design-Builder shall include in the NEXT Baseline Schedule and in all other Project NEXT Schedules all proposed design and construction submittals listed in the Submittal Register.

E. Following the commencement of the Work, the Design-Builder shall provide monthly updates to the Submittal Register referenced above in its Monthly Progress Report. Updates that are more frequent may be requested and the Design-Builder shall reasonably comply with such update requests.

F. Unless otherwise mutually agreed by all parties, weekly submittal status meetings shall be conducted by the Design-Builder to review all anticipated submittals, current submittals and pending re-submittals.

G. If, at any given time, the Design-Builder makes multiple submittals, the Design-Builder shall indicate the priority assigned to each submittal to foster a timely and coordinated review.

H. The Design-Builder shall provide all Design Documentation and Construction Documentation as electronic files formatted as per VDOT Computer Aided Drafting and Design (CADD) Manual and, if required, sealed by a Professional Engineer licensed in the Commonwealth of Virginia. These documents will include, but are not limited to, the following items:

1. Design calculations and analysis;
2. Mix designs;
3. Reports, studies, and investigations;
4. Project NEXT Schedule;
5. Design Public Hearing and/or Public Meeting Documentation;
6. Design Documentation, including documentation of key design decisions, permitting, right of way submittals, right of way and/or construction revisions;
7. Construction Documentation, including detailed design submittals and Approved for Construction (AFC) Documents, construction sketches, shop drawings, working drawings, and diagrams;
8. Traffic Control Plans and Maintenance of Traffic (MOT) documentation;

9. Soil boring logs, laboratory test results, quality control records and audits, and all other testing and inspection documentation, etc.;
10. Material communications relating to Design Documentation and Construction Documentation;
11. Responses to reviewed comments;
12. Change (Work) Orders (including all related communications and disputes resolution proceedings);
13. Governmental Approvals; and
14. Third party approvals.

I. The Design-Builder shall deliver all electronic submittals using the Project NEXT Electronic Document Management System (EDMS), unless otherwise directed. E-mail may be used to notify the Concessionaire of the availability of submittals.

J. Submittal packages shall be well organized and consistent with the approved Submittal Register. The Design-Builder shall include on all submittals the complete State project and job designation numbers. Items or component materials shall be identified by the specific item number and specification reference. All submittals shall be prepared in US Customary Units in accordance with the applicable Standards and Specification in Attachment 1.5a.

K. All design submittals shall be submitted electronically in *.pdf format. AFC Documents shall include the designs in *.pdf format, CADD files in *.dgn format, and hard copies. The Concessionaire may request the Design-Builder provide CADD *.dgn files of any submittal to facilitate its review. Five (5) hard copies of all AFC Documents shall be provided within two business days of the electronic submittal via the Project NEXT EDMS. The Design-Builder shall provide hard copies of any Design Documentation or Construction Documentation submittals upon request.

L. Electronic versions of the AFC Documents shall be submitted within seven (7) business days of receiving final design approval. AFC Documents shall not incorporate any changes to the approved Final for Approval documents unless otherwise approved. Upon receipt of the electronic AFC Documents, the Concessionaire will provide any comments to the Design-Builder within three (3) business days. If comments are provided, the Design-Builder shall address and resubmit within three (3) business days. If no comments are provided, the Design-Builder shall provide five (5) hard copies of all AFC Documents within three (3) additional business days.

M. Hard copies of the AFC Documents shall be 11" x 17." The Concessionaire is required to provide two (2) hard copies of AFC Documents for VDOT's records and two (2) hard copies of for the Federal Highway Administration's (FHWA) records.

N. Submittals will be deemed "received" (thereby triggering the applicable timeframe for review) upon receipt of the complete package of electronic files, inclusive of all required information necessary to perform a complete review. Packages received after 3:00pm will be deemed received the following business day. The Concessionaire will notify the

Design-Builder within three (3) business days if the package is incomplete and will include the basis for the submittal being deemed incomplete.

O. The Design-Builder shall include with each submittal the signed cover sheets as described below.

1. A cover sheet, signed by the Design-Builder's Representative, that includes the following certifications:
   a. The Design-Builder certifies that [description of submittal] was prepared by professionals (with proper licensing, as required) having the requisite qualifications, certifications, credentials, skills, and experiences needed to prepare the submittal in accordance with the Contract Documents and good industry practice.
   b. The Design-Builder certifies that: (1) it has reviewed the submittal for completeness; (2) the submittal accurately depicts the Work to be undertaken or performed; and (3) the submittal was prepared in accordance, and otherwise complies, with:
      (i) the NEXT Contract Documents;
      (ii) the Technical Requirements;
      (iii) the approved QMSP;
      (iv) applicable Law; and
      (v) Governmental Approvals.

   Any deviations from these requirements must be have been previously identified by the Design-Builder and approved prior to the submittal. Documentation of any such approval must be included with the submittal.
2. A cover sheet, signed by the subcontractor, supplier, or consultant that prepared or is otherwise in responsible charge of the submittal, shall include the following certification:
   a. The [name of Contractor (or Designer)], which is under contract with the Design-Builder to perform services related to Project, certifies that it prepared or is otherwise in responsible charge of the [description of submittal].
   b. The [description of submittal] was prepared by professionals (with proper licensing, as required) having the requisite qualifications, certifications, credentials, skills, and experiences needed to prepare the submittal in accordance with good industry practice and the requirements of the Contract Documents.
   c. The [description of submittal] is complete and accurately depicts the Work to be undertaken or performed; and the submittal was prepared in accordance with, and otherwise complies with:
      (i) the Contract Documents;
      (ii) the Technical Requirements;

(iii) the approved QMSP;

(iv) applicable Law; and

(v) Governmental Approvals.

P. The Concessionaire may request interim submittals at any time for any of the above noted items for complex or unusual elements of the Work, or for elements where no applicable standards exist, if the Concessionaire can reasonably demonstrate that additional information is necessary to complete review of any such Work. Such interim submittals shall be developed to address the specific requests for information and shall be submitted within ten (10) days from the request, or other such timeframe as may be mutually agreed.

Q. If the Design-Builder's approved Design Documentation needs to be revised after approval of the AFC Documents, then the Design-Builder shall use either a Notice of Design Change (NDC) or a Field Design Change (FDC) or to document the change. Any required NDC or FDC shall be submitted for review prior to implementation of construction associated with the NDC or FDC. NDC and FDC review and approval shall be completed within fourteen (14) days of receipt of a complete and accurate submittal by the Design-Builder. Any basis for disapproval will be provided to the Design-Builder in writing. Unless otherwise mutually agreed by all parties, weekly meetings shall be conducted to review open and forthcoming NDC and FDC submittals.

R. Requests for Information (RFIs) may be submitted to request information or clarification. However, RFIs responses shall not be deemed a change any requirements of the NEXT Contract Documents nor shall they serve as documentation of changes to AFC Documents. As noted above, such changes to AFC Documents shall be revised using either the NDC or FDC process.

S. The Concessionaire's review of the Design-Builder's submittals will relate only to conformance to and compliance with the requirements of the NEXT Contract Documents. Any deviation from these requirements must be specifically described and accompanied by explicit supporting justification. This review shall not relieve the Design-Builder of responsibility for errors and/or omissions in the submittals.

T. The Design-Builder shall also provide, through the Project designated Electronic Document Management System, copies of all correspondence, meeting minutes, and other external documents (including e-mails) constituting any and all material Project NEXT communications with:

1. Governmental Authorities;
2. Business and Project NEXT stakeholders;
3. Landowners;
4. News media;
5. Utilities;
6. Railroads or transit entities; and
7. Community stakeholders.

1.2.4 Plans and Drawings

A. The Design-Builder shall furnish all plans and drawings showing such details as are necessary to give a comprehensive understanding of the NEXT Work. Except as otherwise shown on the plans, dimensions shown on the plans are measured in the respective horizontal or vertical planes. Dimensions that are affected by gradients or vertical curvatures shall be adjusted as necessary to accommodate actual field conditions and shall be specifically denoted on the working drawings.

B. The Design-Builder shall furnish working drawings as required or requested.

C. Plans and drawings that will be prepared by the Design-Builder include: a) Design and Construction Plans covering individual work packages, including interface points used by the Design-Builder during its design review process, b) Permitting Plans, c) Design Public Hearing Documentation (if required), d) Right-of-Way Plans, e) Shop Drawings and Working Drawings, f) Traffic Control Plans, g) As-Built Plans and all approved changes to these plans, including Notice of Design Changes (NDCs), Field Design Changes (FDCs), and Non-Conformance Reports (NCRs).

1. The Design-Builder shall provide design submittals at each of the following design stages. The Design-Builder may elect to omit some stages noted below as optional, however, Design-Builder shall assume all cost and schedule risk associated with any such omissions:
    a. (Optional) Interim: less than 100% complete – submission shall include an indication of the submittal's (or any component thereof) percentage of completeness to ensure the review comments are appropriate for the submission.
    b. (Optional) Final for Review: 100% complete – submission will reviewed with expectation of being 100% complete.
    c. Final for Approval: 100% complete – submission will be reviewed with expectation of being 100% complete and ready for construction.
    d. Approved for Construction (AFC) – Immediately following approval of the Final for Approval submittal, distribution of approved documents to be used for construction.

D. Plans and drawings shall not incorporate any deviations from the Technical Requirements unless the changes are specifically denoted, together with justification, and are approved in writing.

E. The Design-Builder shall use working groups and over the shoulder review meetings with the Concessionaire to address Project concerns, resolve technical issues, facilitate design development, and provide preliminary reviews of plans and other submittals. These forums do not replace the formal submittal, review and approval processes required for all Design Documentation and Construction Documentation.

F. A Professional Engineer licensed in the Commonwealth of Virginia shall certify plans and drawings for falsework supporting a bridge superstructure; concrete structures and

pre-stressed concrete members; lighting, signal, and pedestrian poles; electrical and communication systems infrastructure; sign structures; breakaway support systems; anchor bolts; retaining walls and foundations.

G. If a railroad, municipality, or other third-party entity is required to review the plans or working drawings, the Design-Builder shall submit with the design a plan of its proposed means and methods and shall provide the Concessionaire with evidence of approval by the railroad, municipality, or other entity providing the approval before performing any related work. The plans shall be clear and legible, and details shall be drawn to scale.

H. Prior to manufacture of non-standard items, the Design-Builder shall furnish a certification of the acceptability of the design of such non-standard item, as determined from a review that shall be made on behalf of the Design-Builder by a Professional Engineer licensed in the Commonwealth of Virginia. Such certification shall cover all design data, supporting calculations and materials. Non-standard designs previously certified or approved will not require recertification, provided no changes are made.

I. Review of the Design-Builder's plans and drawings will relate only to conformance to and compliance with the Contract Documents, including these Technical Requirements. Any proposed deviation(s) from these requirements must be specifically described and accompanied by explicit supporting justification. The Concessionaire's review shall not relieve the Design-Builder of responsibility for errors and/or omissions in the plans and drawings.

1.2.5 Location of Offices and Accommodations for Concessionaire's Staff During the Project

A. The Concessionaire encourages co-location of its key staff with the Design-Builder during the design and construction period. The Concessionaire desires to cooperate with the Design-Builder during the design development and review periods in order to create efficiencies for the benefit of the Project.

B. The Design-Builder shall establish one primary field office or dedicated Class C or better office space, the location of which is to be determined and mutually agreed to by the Design-Builder and the Concessionaire, but which is expected to be in the vicinity of the Project corridor. This work shall consist of locating, procuring, furnishing, erecting, equipping, maintaining, cleaning (weekdays), and removing and restoring property upon completion of use of the field office. The Design-Builder has the option to either provide modular trailers or to rent office accommodations to satisfy the Project office requirements.

C. Design-Builder shall provide, maintain, and manage fully outfitted, furnished and networked office space for Design-Builder, Concessionaire, and VDOT use including at a minimum insurance, lease agreements, Utility connections, Utility service, internet service, maintenance, janitorial, security and other services necessary to provide the required office facilities. Workspaces provided for Concessionaire and VDOT personnel shall be available for their exclusive use at any time during the design and construction of the Project NEXT.

Project Field Office Requirements

Space	Quantity	Minimum Size (SF)
Office (Concessionaire)	2	100
Office (VDOT)	2	100
Workstation Cubicle (VDOT & Concessionaire)	10	64
Conference Room (Shared)	2	250
File Room (Shared)	1	100
Storage Room (Shared)	1	100
Kitchen (Shared)	1	---
Washroom (Shared)	1	---

D. Design-Builder shall provide parking facilities sufficient for the number of Design-Builder and Concessionaire personnel assigned to the location plus visitor parking.

E. Design-Builder shall be responsible for loss to property as a result of fire, theft, malicious acts, and other human activity or related causes.

F. Design-Builder shall provide Concessionaire continuous access and maintain, at a minimum, the following systems and equipment at the field office location:

1. High-speed internet connection with minimum 100 Mbps download/100 Mbps upload with static IP address;
2. Two Network connected color printers/scanners/copiers/faxes, minimum 600 dpi and 30 pages per minute, staple, duplex and paper handling up to 11" x 17";
3. Computer network wiring for each office, desk and conference room to support access to any VDOT-provided file server (for VDOT's dedicated use) or other networked devices.

G. Design-Builder shall provide field office site and floor plans for review and comment no less than 30 calendar days prior to occupancy.

H. The field office shall be available and operational from 30 days after the latter of Financial Close or Work Notice to Proceed to 30 days after Final Completion. Furnishings and equipment specified shall be in sound and functional condition throughout the duration of the project.

I. The field office and equipment as required herein shall remain the property of the Design-Builder.

J. The Design-Builder shall provide and maintain in a neat, sanitary condition such accommodations for the use of its employees, as well as the employees or agents of the Concessionaire and VDOT, as may be needed to comply with the requirements of applicable Law.

K. The field office shall be weatherproof, tightly floored and roofed, constructed with an air space above the ceiling for ventilation, supported above the ground and anchored against movement. The floor-to-ceiling height shall be at least 7 feet 6 inches. The inside walls and ceilings shall be constructed of Masonite, gypsum board, or other similarly suitable materials as permitted by fire and building codes. The exterior walls, ceiling, and floor shall be insulated.

L. Lighting, Heating, and Air Conditioning: The field office shall have satisfactory functional lighting, electrical outlets, heating equipment, an exhaust fan, and air conditioner connected to an operational power source. Electrical power and fuel for heating equipment shall be furnished by the Design-Builder.

1.2.6 Document Management System

A. The Concessionaire shall establish and maintain an Electronic Document Management System (EDMS) to store and record all material documents generated on Project NEXT, including those records required by Law.

B. In the provision of an EDMS, the Concessionaire will:

1. Use data systems, standards, and procedures with consistent naming and searching protocols;
2. Ensure document retention for any minimum statutory period(s);
3. Provide a secure EDMS, such that only authorized users have access and that it is protected from theft, damage, unauthorized or malicious use;
4. Provide a mechanism for the electronic transfer of metadata along with the associated document in standard business file format; and
5. Provide the Design-Builder with written procedures and training of staff who will be required to access all relevant documents. All electronic information shall be searchable.

C. In the relevant Project Development Plan, the Design-Builder shall:

1. Reference the specific EDMS tool to be used by the Concessionaire and the access methods available to the Design-Builder and others that may need access to the system;
2. Describe methods by which all documents issued and received by the Design-Builder shall be uniquely coded and retrievable in a user-friendly format;
3. Describe upon completion of the Project NEXT, the transfer of EDMS data and files, such that the Concessionaire has a complete set of material project documentation in electronic format and written documentation on the contents of the data.

1.2.7 Project Meetings

A. Authorized Representatives and other pertinent representatives of the parties shall meet regularly to discuss issues affecting the administration of the Work and to implement the

necessary procedures, including those relating to submittals and approvals, to facilitate the ability of the parties to perform their obligations under the Contract.

B. Prior to the start of construction activities for specific portions of the Work, the parties and their respective representatives shall conduct pre-construction meetings to discuss the Design-Builder's planned construction operations. At the pre-construction meeting, the parties shall discuss, among other things, safety, the sequence of the Work, scheduling, constructability issues, coordination with Separate Contractors, Governmental Authorities and Utilities, and maintenance of traffic.

C. The Design-Builder shall hold monthly progress meetings with the Concessionaire. During such meetings, progress during the prior month, Work to be undertaken during the next month, and encountered or anticipated issues, and overall project schedule updates shall be reviewed. These meetings shall be attended by the Design-Builder Representatives and other personnel as requested, including relevant subcontractor and VDOT representatives. Meetings will occur monthly beginning the month after the Limited Notice to Proceed is issued and continue until Final Completion. The Design-Builder shall be responsible for preparing, maintaining and distributing minutes of the meetings to all attendees for review. The meeting minutes shall be provided within three days after the monthly progress meeting or such other timeframe as mutually agreed. The parties may cancel a monthly progress meeting from time to time if they mutually agree that such meeting is not necessary.

D. The Design-Builder and/or the Concessionaire shall conduct other meetings as needed to complete the Project's design and construction.

1.3 Project Development Plans

1.3.1 General Requirements

A. The Design-Builder shall prepare and submit Project Development Plans (PDPs) in accordance with the requirements of Attachment 1.3 and Section 5.1.2 of Part 3 (NEXT Design-Build Contract).

B. Such PDPs shall address the activities of the Design-Builder and shall not obligate the Concessionaire or VDOT to perform any activity unless agreed to in writing.

C. The Design-Builder shall develop and maintain a quality control and quality assurance system for the PDPs as part of its overall Quality Management System Plan (QMSP).

D. The Concessionaire may audit and monitor the activities described in the PDPs to assess the Design-Builder's compliance. Any audit findings shall be adequately addressed within 30 days of the Concessionaire's audit report.

1.3.2 Project Development Plan Updates

A. The Design-Builder shall annually (or more frequently if requested by the Concessionaire) assess the effectiveness of its PDPs and have mechanisms in place to monitor progress and identify opportunities for improvement.

B. A PDP or procedure shall be updated pursuant to Attachment 1.3, if such PDP or an associated procedure:

1. does not adequately address the matters it is intended to address;
2. does not conform or is otherwise necessary to comply with any Contract Document requirements;
3. has to be changed because of an audit;
4. no longer represents current or appropriate practice; or
5. is required by the NEXT Technical Requirements to be updated.

1.4 Schedules

1.4.1 Design-Builder Schedule Manager

A. The Design-Builder shall within thirty (30) days of the Notice of Intent to Award the Design-Build Contract, identify and submit for Concessionaire approval, the individual that will be designated as the Design-Builder's Schedule Manager, including a summary of relevant qualifications and experience.

B. This individual shall be responsible, on behalf of the Design-Builder, for the development and approval of the all Project schedules, including the Initial Baseline Schedule, Baseline Schedule, monthly updates, any revised Baseline Schedules and any required Recovery Schedule(s). The Schedule Manager shall be experienced with developing and managing Critical Path Method schedules for design-build projects of a similar size, scope and complexity as the Project. Proficiency with the most current version of Primavera scheduling software and a minimum of ten (10) years of experience in design-build project scheduling is required. The designated Schedule Manager shall be an individual who is dedicated to the Project and is required to be available to the Project on an as-needed basis immediately upon Contract Award and for the duration of construction operations, including pre-construction activities.

C. If for any reason, including a request from the Concessionaire related to performance, the approved Schedule Manager must be replaced during the Contract term, the Design-Builder shall provide at least fourteen (14) days' notice of such and seek formal approval of the replacement. The Design-Builder shall ensure this function is maintained during any transition period.

1.4.2 Project NEXT Schedules

A. Schedule Purpose, Format, and Content

1. The purpose of the Project NEXT Schedule is to ensure that adequate planning, scheduling, and resource allocations occur to provide a reasonable and executable work plan, cash flow projections, and continuous monitoring and reporting for the NEXT Work performed or remaining. The Baseline Schedule and the monthly updates to the Project Schedule shall be used for coordinating the Work, monitoring

the progress of Work performed, identifying Work to be performed, evaluating changes, and a tool for measuring progress.

2. The Project NEXT Schedule shall consist of the Project NEXT Initial Baseline Schedule, the Baseline Schedule, updates to the Project NEXT Schedule, any revised Baseline Schedules, any required Recovery Schedule(s) and the As-Built Schedule.

3. Project NEXT Schedules will be reviewed in accordance with the VDOT Post-Award Scheduling Guide and the American Association for the Advancement of Cost Engineering (AACE) International Recommended Practice No. 53-06 as appropriate. Acceptance of the Project NEXT Schedule will not relieve the Design-Builder from its responsibility to complete all Work within the Project NEXT Schedule. In addition, the Concessionaire's acceptance of any Project NEXT Schedule creates neither a warranty, expressed or implied, nor an acknowledgment of the reasonableness of the activities, logic, durations, or cost loading of the Design-Builder's Project NEXT Schedule. Furthermore, acceptance of the Project NEXT Schedule will not relieve the Design-Builder from complying with all other requirements of the Contract Documents.

4. Terms not defined in the Contract Documents shall have the same meanings ascribed to them in the AACE International Recommended Practice No. 10S-90 ("Cost Engineering Terminology").

B. General Requirements

In the Project NEXT Schedule(s), the Design-Builder shall:

1. Ensure that the actual number of activities in the schedule is sufficient to assure adequate planning of the Work and to permit monitoring and evaluation of progress and perform the analysis of alleged time impacts. If at any time the Concessionaire determines that the level of detail in the Design-Builder's schedule(s) is not sufficient for adequately planning or monitoring the progress of the Work, remaining Work or the analysis of time impacts, the Design-Builder will expand the level of schedule detail to satisfy the Concessionaire's request;

2. Ensure that design activities identify Final for Approval and AFC Documents;

3. Apply the Critical Path Method (CPM) of network calculation to generate the Project NEXT Schedule (the critical path shall be based on the longest network path through the Project NEXT schedule) and prepare the Project NEXT Schedule using the Precedence Diagram Method (PDM) to establish relationships and interdependencies between the individual activities required to complete the Project NEXT;

4. Ensure that activity identification numbers, textual descriptions, and codes are consistently applied in the Project NEXT Schedule and are unique for each specific activity. Descriptions should clearly define the type of work, area of work and should be assignable to a single contractor responsibility.;

5. Divide all Work prior to NEXT Final Completion Date into activities with appropriate logic ties to show the Design-Builder's overall approach to sequencing, include logical relationships between activities reflecting the Design-Builder's actual intended sequence of Work; and logically tie all activities to avoid open ends. Acceptable logic relationships include Finish to Start, Start to Start and Finish to Finish. The use of negative lags and Finish to Start lags is specifically prohibited;
6. Show the Project NEXT milestones, including the issuance of any Notices to Proceed, any agreed interim milestones, the NEXT Service Commencement Date, and the NEXT Final Completion Date;
7. Show phasing of the Work as detailed in the plans, subcontractor work, procurement, fabrication, delivery, installation, testing of materials and equipment, commissioning of systems, and any long-lead time orders for major or significant materials and equipment;
8. Allocate an estimated cost to the appropriate lowest level elements (activities) of the Work Breakdown Structure (WBS) by use of labor, material and equipment resources;
9. Reflect the required coordination with other contractors working within or adjacent to the Project Site, utility owners, Governmental Agencies, transit entities and railroads, engineers, architects, contractors, and suppliers;
10. Identify regulatory approvals required and the dates by which such approvals are necessary;
11. Be fully compliant with the Contract Documents;
12. Conform to the Work Restrictions (Section 1.8) and Maintenance of Traffic (Section 1.9) requirements;
13. Incorporate all required right of way acquisition activities;
14. Incorporate all required utility coordination, adjustment, and relocation activities; and
15. Incorporate all work necessary to complete installation and testing of TMS equipment and systems necessary to commence TMS operations in accordance with these Technical Requirements (including TMS Interface Plan).
16. Float available in the schedule, at any time shall not be considered for the exclusive use of either the Concessionaire or the Design-Builder. Any float generated due to the efficiencies of either party is not for the sole use of the party generating the Float; rather it is a shared commodity to be reasonably used by either party. Efficiencies gained as a result of favorable weather within a calendar month, where the number of days of normally anticipated adverse weather is less than expected, will also contribute to Float for the Project. Any schedule accepted by the Concesionaire showing the Work being completed prior to the contractual completion dates shall be considered to have Float. No time extensions will be granted unless an approved delay which impacts the Project's critical path

consumes all available Float and extends the Work beyond the contractual completion dates.

17. Use of Float suppression techniques, such as; preferential sequencing, lag logic restraints, zero total or free float constraints, extending activity times, or imposing constraint dates other than as required by the contract, shall be cause for rejection of any Project schedule or its updates.

C. Monthly Progress Earnings

1. General
   a. The Monthly Progress Earning Schedule will be based on cost data generated from the Project NEXT Schedule. The progress earnings schedule shall depict planned progress based on anticipated earnings and shall depict monthly comparisons of actual versus planned progress, including: (1) illustrating the schedule variance graphically by plotting the budgeted cost of work performed (BCWP) and the budgeted cost of work scheduled (BCWS); and (2) reporting the schedule performance index (SPI), defined as the ratio of BCWP divided by BCWS for the Project NEXT to date and the monthly projections through Final Completion.
   b. The Schedule of Values (SOV) is a detailed, itemized list of payment activities for which the Design-Builder desires to be paid and establishes the value or cost of each detailed part of the Work. An initial SOV shall be derived from the cost-loaded, Approved Initial Baseline Schedule, and a complete SOV shall be derived from the cost- loaded, Approved Baseline Schedule. The Design-Builder shall allocate the Contract Amount in the SOV consistent with the Price Proposal.
   c. The Design-Builder shall submit an initial SOV for Approval with the Initial Baseline Schedule and a Baseline SOV for Approval with the Baseline Schedule. Each SOV shall be generated by the corresponding schedule file through the use of assigned labor, material and equipment resources.
   d. The purpose of cost-loading the Project Schedule is to tie activities with payment activities in order to monitor progress for making payment.

2. Payment Activities
   a. The Design-Builder shall attach costs to those activities in the Initial Baseline Schedule and Baseline Schedule for which the Design-Builder desires to be paid. The Design-Builder shall not assign costs to activities for which it is not ultimately responsible, *i.e.* the Concessionaire, VDOT, or Third-Party activities.
   b. The SOV shall include payment activities for the items identified on the Price Proposal. The SOV shall show the purchase and delivery costs for Materials and Permanent Equipment that the Design-Builder anticipates it shall request payment prior to installation.

c. The SOV shall include payment activities for punch-list work leading to Final Completion.

d. The Design-Builder shall meet with the Concessionaire to demonstrate its conversion of the Price Proposal to the SOV structure as part of its development of the Baseline Schedule.

e. Except for mobilization and the continuing activities, the SOV shall be prepared to a level of detail so that the average value of the payment activities is greater than $50,000, and no payment activity value shall be less than $10,000 or greater than $1,000,000 without prior Approval.

f. Each payment activity shall include a directly proportional amount of Design-Builder overhead and profit. The Contract Amount shall be allocated to accurately reflect the Design-Builder's cost for such activity and shall not artificially inflate, unbalance, or front-load payment activities.

g. When requested, the Design-Builder shall substantiate payment activity values with data that will validate their accuracy. The sum of the individual values shown on the SOV shall equal the total Contract Amount.

h. The SOV shall include payment activities sufficient to cover all efforts necessary to meet all Contract Document requirements and successfully complete the Work for the following continuing activities utilizing Level of Effort:

(i) Project Management and staffing;

(ii) Production of As-Built Plans;

(iii) Scheduling;

(iv) Environmental Compliance;

(v) Quality Control;

(vi) Quality Assurance

(vii) Project Office and Associated Equipment;

(viii) Public Information;

(ix) Design Management;

(x) Maintenance during Construction; and

(xi) Design Support during Construction.

3. Measurement of Progress

a. For any activity where partial payment for partial completion may be requested by the Design-Builder, sufficient detail shall be provided to clearly define the work elements included and demonstrate the level of completion. Any such partial payments shall be made in accordance with Section 6.2 of Part 4 (NEXT General Conditions).

b. For continuing activities, payment shall be made based on the total project percent completion for the month payment is being requested.

D. The scheduling software used by the Design-Builder shall be the latest version of Primavera Project Management software (P6).

E. An accepted Project Schedule showing work completing in advance of the NEXT Service Commencement Date or Final Completion Date, will be considered to have Float.

F. The Design-Builder shall maintain at all times, at its office, a minimum of one complete set of all schedule reports in electronic (.xer and .pdf) format. All schedule reports shall be available for inspection and audit. Additional reports may be required as future needs dictate, and the reports listed above may be deleted (by mutual consent of the parties).

G. The Design-Builder shall exercise resequencing logic to minimize any delays before requesting any extension of time and the implementation of any resequencing logic shall be fully explained in schedule update narratives.

1.4.3 NEXT Initial Baseline Schedule

A. The NEXT Initial Baseline Schedule is the Design-Builder's conceptual plan for the design and construction of the Project NEXT. This schedule shall be used to monitor performance of the Work until the Baseline Schedule is approved.

B. The schedule submitted with the Design-Builder's Proposal shall be the NEXT Initial Baseline Schedule

C. The NEXT Initial Baseline Schedule, which shall outline the Design-Builder's proposed plan to accomplish the Work, shall be in the same general format as the Baseline Schedule, as described in the Technical Requirements. The NEXT Initial Baseline Schedule shall include at least the following:

1. Schedule activities representing all Work to the WBS Level 3 or greater as set forth in AACE International Recommended Practice No. 37R-06 "Schedule Levels of Detail – As Applied in Engineering, Procurement and Construction" (AACE-37R-06); and

2. Individual cost loaded (using labor, material and equipment resources) Schedule activities, designated as payment activity at WBS Level 2 or greater as set forth in AACE-37R-06.

1.4.4 Baseline Schedule

A. Within the time set forth in Part 3 (NEXT Design-Build Contract), Section 11.1.2, the Design-Builder shall submit, for review and approval, a proposed Baseline Schedule, which shall include the Design-Builder's detailed plan for design and construction of the Project NEXT. The Design-Builder shall develop its proposed Baseline Schedule from the NEXT Initial Baseline Schedule. The Design-Builder shall submit an electronic versions of the proposed Baseline Schedule created in the Primavera proprietary exchange format (*.xer) and .pdf format. Hard copies shall be provided upon request.

B. Within twenty-eight (28) days of the Concessionaire's receipt of the proposed Baseline Schedule, the Concessionaire shall notify the Design-Builder in writing of its approval or disapproval of the proposed Baseline Schedule, and of any comments it has or amendments it wishes the Design-Builder to make. The Design-Builder shall revise the proposed Baseline Schedule and re-submit the same within fourteen (14) days its review and approval. Within twenty-eight (28) days of the Concessionaire's receipt of the re-submitted proposed Baseline Schedule, the Concessionaire shall notify the Design-Builder in writing of its approval or disapproval. Upon approval, the proposed Baseline Schedule will become the Baseline Schedule.

C. The Baseline Schedule shall include a well-organized WBS, the development of which is based on a deliverable-oriented methodology that captures all the Project NEXT activities. The WBS shall allow schedule summarization at a minimum of four hierarchical WBS Levels, such as: Project NEXT areas (Level 1), WBS elements (Level 2), work packages and deliverables (Level 3) and the detail control level (Level 4) to which the individual schedule activities are assigned their WBS code.

D. Activities in the Baseline Schedule shall be assigned Project NEXT specific activity codes.

E. The Baseline Schedule shall include all major activities of the Work in sufficient detail to enable the Concessionaire to monitor and evaluate design and construction progress from the Limited Notice to Proceed Date until Final Completion.

F. The Baseline Schedule shall include separate activities for major submittals proposed by the Design-Builder, together with appropriate activities for reviews or approvals, provided that such review and/or approval times shall be no less than the time provided for such reviews in the Contract Documents.

G. The Baseline Schedule shall be broken down into work packages and deliverables generally completed in not less than one but no more than 30 calendar days, or as mutually agreed (unless such deliverable is a procurement or other non-construction activity), and with dollar value (price) of each appropriate lowest level element of the WBS identified. The total cost loaded into the Baseline Schedule shall be equal to the total of the NEXT Design-Build Contract amount.

H. The Work shall be broken down in sufficient details to identify the phase, stage, feature, type of Work, deliverable, and specific location in which the Work occurs, including as applicable:

1. Project NEXT milestones, including the anticipated issuance of any Notices to Proceed, the commencement of design work and the commencement of construction activities, the NEXT Service Commencement Date, and the NEXT Final Completion Date;
2. Administrative activities such as key submittals, notifications, and reviews;
3. Design activities showing all Work required to complete each stage of design and deliverable;
4. Public involvement activities;

5. Environmental and permitting activities;
6. ROW acquisition activities showing all parcels;
7. Utility relocations and adjustments, including all specific types and locations;
8. Procurement, fabrication, and delivery activities of materials;
9. Construction start-up activities such as mobilization, staging areas, surveying, clearing and grubbing, and construction access;
10. Maintenance of Traffic (MOT) activities, including major traffic pattern shifts;
11. Construction activities broken down by phase stage, feature, type of work, and specific location, as applicable;
12. Demolition dates for existing bridges and completion dates for: a) the replacement bridges at Old Dominion Drive, Georgetown Pike, Live Oak Drive and the 495 General Purpose lanes over the Dulles Toll Road ramp, b) commencement and completion dates for the widening and rehabilitation of the existing 495 General Purpose lane bridges over Scott's Run, c) rehabilitation of the George Washington Memorial Parkway bridges, d) commencement and completion dates for any new Express Lanes fly-over ramps, and e) Lewinsville Road bridge and approach sidewalk modifications.
13. Traffic Management System (TMS) infrastructure construction, procurement of equipment, device installation, systems commissioning, integrations, testing, and in-service equipment Burn Period prior to Final Completion; and
14. Other necessary miscellaneous activities that consume time, for example, installation and removal of temporary systems or structures such as shoring, load tests, curing, demolition, testing and acceptance periods, including all activities necessary for the complete testing and inspection of all Work as necessary to achieve proper activation and use of the Work, punch list, clean-up, and demobilization.

I. Activity calendars shall be assigned using project-level calendars. Use of global calendars is not allowed and shall be cause for rejecting the Project NEXT Schedule. Activity codes shall be defined and assigned to the individual activities to allow for filtering, grouping, and sorting of activities by project phase, responsibility, area, phase, stage, feature, work type, change orders, and other major work category, as applicable. Activity codes shall be assigned using project-level activity codes. Use of global activity codes is not allowed and shall be cause for rejecting the Project NEXT Schedule.

J. The Design-Builder shall develop a weather calendar identifying normal adverse weather for each month of the Project and apply that weather calendar to activities subject to adverse weather. The Design-Builder shall provide data to substantiate its calculation of normal adverse weather for review and approval.

K. Constraints shall be used sparingly and only on a case-by-case basis. The use of constraints on activities other than those specified in the Design-Build Contract must be approved by the Concessionaire. Constraints such as "Mandatory Start" or "Mandatory

Finish" that violate network logic are not allowed and shall be cause for rejecting the Project NEXT Schedule. If the NEXT Design-Build Contract includes a specified "start-no-earlier than" milestone, then the NEXT Design-Build Contract milestone activity shall be constrained with a "Start On or After" constraint, with a date equal to the date specified in the NEXT Design-Build Contract. If the NEXT Design-Build Contract includes a specified Intermediate Milestone or Final Completion milestone, then the NEXT Design-Build Contract intermediate completion milestone activity or Final Completion milestone activity shall be constrained with a "Finish On or Before" constraint, with a date equal to the date specified in the NEXT Design-Build Contract.

L. The Project NEXT Schedule software settings shall be defined according to the following Primavera (P6) settings:

1. Schedule dates shall be shown in the "Month-Day-Year" format.
2. Duration type for all activities shall be specified as "Fixed Duration & Units."
3. Percent Complete type for all activities shall be specified as "Physical % Complete."
4. The "Drive activity dates by default" checkbox in the Project NEXT Details Resources tab shall be marked.
5. The "Link Budget and At Completion Cost for not started activities" checkbox in the Project Details Calculation tab shall be marked.
6. The "Reset Remaining Cost and Units to Original" in the Project Details Calculation tab shall be specified.
7. The "Subtract Actual from At Completion" under "When updating actual units or costs" in the Project Details Calculation tab shall be specified.
8. The "Update units when costs changes on resource assignments" checkbox in the Project Details Calculation tab shall be marked.
9. The "Link Actual and Actual This Period Units and Cost" checkbox in the Project Details Calculation tab shall be marked.
10. Specify "Retained Logic" in the Scheduling Options dialog box for scheduling progressed activities.
11. Specify "Longest Path" in the Scheduling Options dialog box for defining critical activities.
12. Specify "Finish Float = Late Finish – Early Finish" in the Scheduling Options dialog box as the schedule calculation option to compute total float.

M. The Project NEXT Schedule shall use "Stored Period Performance" with Financial Periods to commence on the first day of a month and end on the last day of a month.

N. The Project NEXT Schedule shall be calculated using the precedence diagram network logic method and the CPM. The use of Primavera P6 resource-leveling to determine sequence, order, or timing of the activities is not allowed and shall be cause for rejecting any Project NEXT Schedule.

1.4.5 Monthly Progress Reports and Project Schedule Updates

A. The Project NEXT Schedule will be current, reflecting actual progress at the time of submittal and will be kept current and submitted as a component of the Monthly Progress Report (further described below).

B. The Design-Builder's Monthly Progress Report shall include the following:

1. Document control certification sheet (verification that all field documentation is being maintained);
2. Description of specific construction activities and deliverables occurring during the previous month (reporting period) and description of activities that were either planned to have started or finished within update period that were not either started or completed during update period and an explanation for the variance between the planned and actual performance;
3. Description of specific construction activities and deliverables planned for the next two reporting periods;
4. Progress narrative that describes, at a minimum, the overall progress for the preceding month, a critical path analysis, a discussion of problems encountered and proposed solutions thereof, any pending delay analysis or TIAs, and float. With each submission of the Project NEXT Schedule, the Design-Builder also shall include:
    a. An electronic working copy of the Project NEXT Schedule (in .xer file format). Each submission shall have a unique file name to indicate the type and order of submission;
    b. A narrative progress report of the Project NEXT Schedule that describes, at a minimum, the Design-Builder's plan of operation for meeting any interim milestones, the NEXT Service Commencement Date and the NEXT Final Completion Date, an evaluation of the critical path, a discussion of Project NEXT specific issues encountered since the last submission as such issues relate to the schedule, proposed solutions thereof, work calendars, constraints, delays experienced, and the status of any submitted or pending Time Impact Analyses, float consumption and reasons for such consumption, documentation of any logic changes, duration changes, resource changes or other relevant changes;
    c. Time-scaled logic diagram indicating the critical path, early start and early finish dates, total float, sorted and grouped by the WBS;
    d. Tabular schedule reports grouped by WBS and sorted by Start indicating for each WBS, activity, the activity number, description, original duration, remaining duration, physical percentage completion, cost percentage complete, original budgeted cost, cost this period, cost to date, and cost to complete;
5. A comparison of actual and planned progress, including: (1) illustrating schedule variance graphically by plotting and budgeted cost of work performed (BCWP) and the budgeted cost of work scheduled (BCWS), and (2) reporting the scheduled performance index (SPI), defined as the ratio of BCWP divided by BCWS;

6. Identification of activities requiring Concessionaire, VDOT, or FHWA or other third-party approvals, input or assistance, to the extent reasonably known;
7. Action items/outstanding issues;
8. A work breakdown structure Level 3, 4 or greater design and construction schedule;
9. Project NEXT cost summary;
10. Quality management reporting, as defined within the Design-Builder's QMSP, including quality inspection reports and daily inspection reports;
11. A statement by the Design-Builder that the Baseline Schedule is the only schedule being executed to perform the Work;
12. Nonconformance reports and resolution reports, Deficiency, Field Design Change, Notice of Design Change, and Variance reports;
13. Right of way acquisition activities;
14. Environmental permitting and compliance activities;
15. Utility relocation activities;
16. Disadvantage Business Enterprise (DBE), Small, Women-owned, and Minority-owned Business (SWaM) and on the job training quarterly usage;
17. Safety activities, including discussion on Incidents and monthly metrics as required;
18. Sustainability reporting related to the use, re-use, and savings of energy, materials, and environmental resources;
19. Digital photographs with descriptions of the progress of Project NEXT;
20. A summary of any outstanding potential issues, potential change orders, any delays and the measures adopted (or to be adopted) to overcome such issues;
21. Details of any aspect of the Work that may jeopardize the completion and measures being (or to be) adopted to overcome such aspect and a list of approvals needed to adopt such measures; and
22. A summary of complaints, property damage claims, and OCIP insurance claims.

C. The Monthly Progress Report shall describe the work performed since the previous update, as well as the Design-Builder's plan for accomplishing the remaining Work. It shall describe the current status of the Project NEXT and any deviations from scheduled performance, as well as the causes and effects of the deviations. It shall also describe any progress deficiencies or schedule slippages, as well as any actions taken or proposed to avoid or mitigate the progress deficiencies or schedule slippages.

D. Monthly Progress Reports shall have a reporting period ending on the last day of each calendar month, shall be submitted on or before the 15th of the month following the reporting period and shall be consistent with the invoice submitted for the same period.

E. The Concessionaire will notify the Design-Builder of any comments within five days of receipt of an acceptable submission of a Monthly Progress Report. If the Concessionaire requests that the Monthly Progress Report needs a specific revision, the Design-Builder shall make the requested changes within five (5) days after receiving the Concessionaire's request or such other time frame as mutually agreed between the parties.

F. Project NEXT Schedule Updates:

1. The Design-Builder shall update the Project NEXT Schedule no less than monthly to reflect actual progress to date and to forecast progress going forward (the "Project NEXT Schedule Updates"). The Project NEXT Schedule Update shall be submitted as an attachment to the Monthly Progress Report. The Data Date used to calculate the schedule shall be the first day following the last day of the reporting period. Project NEXT Schedule Updates shall comply in all respects with the schedule requirements set forth in this section.
2. The Design-Builder shall submit two versions of each Schedule Update. The first submission shall be a status-only update that captures the Design-Builder's progress in isolation (i.e. actual starts and actual finishes, percentage complete and applicable updates to cost loading). The second submission shall include any proposed adjustments as necessary to account for items such as sequence changes and faster or slower than anticipated production.
3. The Approved NEXT Initial Baseline Schedule will be the basis for Project NEXT Schedule Updates until such time as the Baseline Schedule is approved. Thereafter, the Baseline Schedule shall be the basis for Project NEXT Schedule Updates.
4. Project NEXT Schedule Updates shall depict activities that have started, are on-going, or completed as of the new data date; show actual start dates for activities that have started; and actual finish dates for completed activities.
5. Project NEXT Schedule Updates shall depict percent complete for in progress activities. Activity percent complete for work-in-place shall be based on the amount of work completed relative to the total amount of work planned for the activity.
6. Project NEXT Schedule Updates shall depict remaining duration for on-going activities. Remaining duration for unfinished activities shall be based on the amount of time required to complete the remaining work as of the new data date.
7. Activity relationships for the remaining activities shall be modified as necessary to correct out-of-sequence progress for on-going activities or to reflect the Design-Builder's current plan for completing the remaining Work.
8. All changes to the Project NEXT Schedule shall be documented in detail in the Monthly Progress Report. Such changes include, but are not limited to, additional, revised or deleted activities, durations, calendar assignments, or logic ties.
9. The Project NEXT Schedule Update submitted with the last Monthly Progress Report will be identified by the Design-Builder as the As-Built Schedule.

1.4.6 Weekly Reporting

A. During the performance of the Work, the Design-Builder shall provide a weekly report, which shall include the following:

1. Specific design and construction schedule activities using the same WBS coding included in the Baseline Schedule, including locations for the week concluding and the upcoming three-week period;
2. Rolling 3-week forward-looking inspection notice, which shall include the fabrication schedule and planned construction activities; and
3. MOT weekly update, regarding any scheduled lane closures and identification of work areas for the ensuing two weeks.

1.4.7 Revisions To Baseline Schedule

A. If the Concessionaire believes in its reasonable discretion that the Baseline Schedule needs a specific revision either in logic, activity duration, WBS, manpower, or cost, the Concessionaire will request in writing that the Design-Builder make such revisions. The Design-Builder shall give due consideration suggested revisions and, upon consultation with the Concessionaire, if determined appropriate, make such revisions within ten (10) days after receiving the Concessionaire's request or such other timeframe as mutually agreed between the parties. Once approved, this update shall then become the Baseline Schedule. At no time shall the Design-Builder continue to reflect an item of non-concurrence from the Concessionaire in the updates to the Baseline Schedule, provided that if an item of non-concurrence has been referred to dispute resolution, then the Design-Builder shall continue to perform its Work in accordance with the then current Baseline Schedule in effect until such time as the dispute is resolved and an updated Baseline Schedule is approved.

B. In the event of a delay for which the Concessionaire grants relief from the NEXT Final Completion Date to the Design-Builder, the Baseline Schedule will be revised accordingly.

C. The Design-Builder shall archive copies (including .xer files) of all approved Project NEXT Schedules, including Monthly Schedule Updates.

1.4.8 Project Recovery Schedule

A. Whenever the Monthly Progress Report shows either the Service Commencement Date or the NEXT Final Completion Date has 30 days or more of negative float, if requested, the Design-Builder shall submit within fifteen (15) days, a Project NEXT Recovery Schedule for approval. Project NEXT Recovery Schedule submittals shall include a list of all activities changed, added or deleted along with all logic changes, and an accompanying narrative explaining the nature of the changes.

B. Once a Project NEXT Recovery Schedule is reviewed and approved, it shall become the Baseline Schedule and be used as the basis for subsequent Monthly Progress Reports.

1.4.9 Time Impact Analysis (Prospective)

A. In conjunction with the submission of a proposed change, the Design-Builder shall submit any proposed schedule impact (a time impact analysis or TIA) it claims to the Critical Path, if any, that the proposed change will create, in the TIA format, as prescribed in AACE Recommended Practice 52R-06 and submitted as outlined herein. Failure to submit a TIA in conjunction with the submission of a proposed change shall be tacit agreement that the proposed change does not impact the time of performance.

1. The TIA shall be based on the date on which the alleged delay is claimed to have occurred, or, in the event of a proposed change, the date on which the implementation of such change is proposed to be commenced.

2. The TIA shall show the current status of the Work using the current Baseline Schedule. The Concessionaire, at its sole discretion, may request that the current Baseline Schedule be updated to reflect the progress on the day immediately prior to a claimed delay event. The time computation of all affected activities shall be detailed in the TIA along with a demonstration of steps used to mitigate impacts. Cost of mitigation measures shall be fully documented within the TIA, if applicable.

3. Each TIA shall include a Fragmentary Network ("fragnet") demonstrating how the Design-Builder proposes to incorporate the impact into the Baseline Schedule. A fragnet is defined as the sequence of new activities and/or activity revisions, logic relationships, and resource changes that are proposed to be added to the existing schedule to demonstrate the influence of impacts to the schedule. The Design-Builder understands it has a duty to mitigate any and all alleged delay events, whether prospective or retrospective, and such analysis will take advantage of the factual events leading to the alleged delay impacts; and shall take into consideration all possible mitigation methods, techniques, and available resources, including but not limited to logic changes, resource allocations, activity durations, and consideration of calendar changes. The fragnet shall identify the predecessors to the new activities and demonstrate the impacts to successor activities. The Design-Builder shall include a narrative report describing the effects of new activities and relationships to milestones and the NEXT Final Completion Date with each TIA.

4. The Design-Builder shall not be entitled to any extension of the Term automatically as the result of an activity delay. The Design-Builder recognizes that certain events will not affect the existing critical activities or cause non-critical activities to become critical, thereby not causing any effect on the NEXT Final Completion Date.

5. Two copies of each TIA report together with an electronic file (in .xer file format) of the Project NEXT Schedule impact analysis shall be submitted.

6. Upon approval, a copy of the TIA will be returned to the Design-Builder and incorporated into the next update to the Baseline Schedule. The TIA will be reviewed in accordance with AACE International Recommended Practice No. 52R-06 "Time Impact Analysis As Applied in Construction."

7. A TIA will be approved or disapproved within twenty-eight (28) days following receipt thereof, unless subsequent meetings or negotiations are necessary. The approved TIA related to an approved Change shall be incorporated into, and attached to the applicable Work Order. A disapproved TIA will be returned to the Design-Builder with appropriate comments for revisions or the basis for denying the alleged delay.

1.4.10 Delay Claim Analysis (Non-Prospective)

A. In the event of a claimed delay that the Design-Builder alleges has impacted the Critical Path of the Project NEXT, the Design-Builder shall prepare a delay claim using a retrospective observational analysis format as prescribed by the AACE 29R-03 Recommended Practice for Forensic Schedule Analysis. Such analysis will take advantage of the factual events leading to the alleged delay impacts; and shall take into consideration all possible mitigation methods, techniques, and available resources; and minimize any prospective analysis or conclusions. The Concessionaire will approve or reject such claim within twenty-eight (28) days following receipt thereof, unless subsequent meetings or negotiations are necessary. A rejected claim will be returned to the Design-Builder with appropriate comments for revisions or the Concessionaire's basis for denying the alleged delay.

1.5 Standards and Specifications

1.5.1 General Requirements

A. The Work shall conform to all applicable Standards and Specifications set forth in Attachment 1.5a. Where the Design-Builder's design requires methods or procedures not covered by the attached list of Standards and Specifications, the Design-Builder shall obtain approval before using such methods or procedures, not to be unreasonably withheld or delayed.

B. All Work shall comply with the NEXT Contract Documents and these Technical Requirements, including all applicable Attachments. The Design-Builder may submit a written request for the use of non-VDOT standards only if specific VDOT standards do not exist. The Design-Builder is responsible for demonstrating that any non-VDOT that is proposed conforms to applicable AASHTO Standards.

C. When a provision of "Division I – General Provisions" of the Road and Bridge Specification is applicable, Part 5 of the Contract Documents (NEXT Division I Amendments) shall apply.

1.5.2 Design Criteria

A. The Design Criteria established for Project NEXT are provided in Attachment 1.5b. The Design-Builder shall comply with these functional classifications, design speeds, and other design criteria specified in Attachment 1.5b.

B. Attachment 1.5c identifies Design Exceptions and Design Waivers to the established design criteria already approved for use on Project NEXT. The Design-Builder is

responsible for obtaining any other Design Exceptions or Waivers required to construct and operate the Project, including those identified in Attachment 1.5c and not yet obtained as of the RFP, unless the Design-Builder's final design eliminates the need for the specified Design Exception or Design Waiver. The Design-Builder is also required to obtain approval of any necessary modifications to previously-approved Design Exceptions and/or Design Waivers if the final design conditions warrant such modifications.

1.5.3 Interpretation of Standards and Specifications

A. Standards for the Design-Builder's Work and order of precedence are as set forth below. The VDOT Road and Bridge Standards, and Road and Bridge Specifications including Supplemental Specifications, Special Provisions, Special Provision Copied Notes, and supplementary documents listed in Attachment 1.5a are all part of these Technical Requirements. A requirement occurring in one shall be as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete and compliant Project NEXT. In case of a discrepancy, the following order of priority will apply, with the highest governing item appearing first and the least governing item appearing last:

1. These Technical Requirements and Attachments
2. Special Provision Copied Notes in Attachment 1.5a, Section B
3. Special Provisions in Attachment 1.5a, Section B
4. Supplemental Specifications in Attachment 1.5a, Section B
5. Standards and Specifications listed in Attachment 1.5a, Section A
6. Reference Documents listed in Attachment 1.5a, Section C
7. Standard Drawings (calculated dimensions, unless obviously incorrect, will govern over scaled dimensions) in Attachment 1.5a, Section A

B. Each party shall promptly notify the other party if it discovers an obvious and plain error or omission in the text of the Technical Requirements attributable to a word processing, administrative, or similar oversight. The parties will then coordinate to make such corrections as are necessary to restore the intent of the language.

C. The standards, special provisions, and reference guides applicable for the Work shall be the version of those documents as listed in Attachment 1.5a or those in effect as of the issuance date of the RFP, including all supplements, errata, revisions and interims as of the issuance date of the final RFP Addendum. It is the responsibility of the Design-Builder to ensure that all relevant Standards and Specifications have been applied.

1.6 Right of Way

A. For any pre-construction activities that require access to properties outside existing VDOT rights-of-way, the Design-Builder shall obtain legal rights of entry in accordance with the requirements of the Code of Virginia §33.2-1011 (Right to enter on land to

ascertain its suitability for highway and other transportation purposes; damage resulting from such entry).

B. New right of way (ROW) and easements anticipated to be needed for Project NEXT are shown on the RFP Conceptual Plans. The Design-Builder will confirm and finalize the right of way and easement requirements based on the Design-Builder's final design and construction methods. Additionally, the Design-Builder shall propose and obtain utility easements based on the Design-Builder's final design and construction methods. If the Design-Builder proposes changes that exceed the ROW limits shown on the RFP Conceptual Plans, then the Design-Builder must demonstrate that there are no reasonable alternatives to acquiring the additional right of way and any such changes shall be subject to approval. The Design-Builder shall also be responsible for any time or cost impacts associated with any National Environmental Policy Act (NEPA) Document re-evaluations and VDOT Design Public Hearings required due to the revised ROW limits.

C. The Design-Builder shall provide acquisition services required for the acquisition of all property rights or interests (e.g., fee ROW and permanent, temporary, and utility easements) necessary for Project NEXT, with the exception of the replacement property required for project impacts to Scott's Run Nature Preserve as defined in Section 3.3.9 and Attachment 3.3.

D. The Design Builder shall provide certain right of way (ROW) acquisition services for the Project. ROW acquisition services shall include the preparation of ROW plans, title examinations, appraisal, appraisal review, negotiation, relocation assistance and advisory services, closings, and legal services. The Design-Builder shall coordinate and determine required right of way for utility relocations and coordinate preparation of all required easement agreements, right of way plans and documentation for acquisition and vacation of existing property rights. All appraisers and acquisition firms shall be selected from VDOT's prequalified appraisers, review appraisers and right of way contracting consultants lists (listed on VDOT's website). VDOT's Right of Way and Utility Division State Right of Way Manager for Special Projects will retain authority for approving just compensation, relocation benefits, and settlements. VDOT's Right of Way and Utility Division State Right of Way Manager for Special Projects must issue a Notice to Commence Right of Way acquisition prior to any offers being made to acquire property. VDOT's Right of Way and Utility Division State Right of Way Manager for Special Projects must also issue a Notice to Commence Construction once the property has been acquired prior to commencing construction on the property. The required right of way plans and documentation will be reviewed by VDOT and, as required, FHWA.

E. Right of way costs shall be handled in accordance with Section 2.1.6 of Part 4 (NEXT General Conditions).

F. Prior to preparing any Right of Way Plans required for Project NEXT, the Design-Builder shall conduct a workshop(s) with the Concessionaire and VDOT to review and confirm the specific parcels to be acquired, the form of property rights to be obtained, and the detailed schedule for acquisition activities. Periodic updates (at least bi-weekly) tracking the status of the acquisition activities for each parcel shall be provided by the Design-Builder until acquisition of all required parcels is complete.

G. The Design-Builder shall adhere to the requirements set forth in the Right of Way Manual of Instructions, Chapter 10.

H. The Design-Builder shall be responsible for preparing a Limited Access Line Changes Request and for obtaining the Commonwealth Transportation Board (CTB) approval for such changes. The CTB must approve the Limited Access Establishment request prior to obtaining design approvals and prior to Right of Way Plan approvals.

1. The approximate location of proposed limited access line changes are shown on the RFP Conceptual Plans. The Design-Builder shall finalize the location of all limited access lines with its design, and shall prepare a Limited Access Line Changes Request as described in the VDOT Road Design Manual, Chapter 2E. The request (including exhibits/maps, a CTB Decision Brief, agenda narrative, and a completed Limited Access Line Change Checklist) seeking CTB action shall be submitted to the VDOT Project Manager for review and comment ninety (90) calendar days prior to the scheduled CTB meeting. VDOT will provide comments to the Design-Builder on the Limited Access Line Changes Request, prepare additional information as may be required for the CTB meeting, and place this item on the agenda for the CTB meeting. The Design-Builder shall address any comments on the initial request and resubmit the revised request to the VDOT Project Manager sixty (60) calendar days prior the CTB meeting. The Design-Builder's Approved for Construction and As-Built plans shall show the approved limited access lines and date of designation per the Road Design Manual. The Design-Builder shall be responsible for any schedule delays and associated costs for the establishment of the Limited Access Line Changes.

2. The time required for preparing the Limited Access Line Changes request shall be included in the Design-Builder's Baseline Schedule and all associated costs shall be included in the Contract Price. Any schedule impact to the Project as a result of any delay in submittal, resolution of review comments, and approval of the Limited Access Line Changes Request is the responsibility of the Design-Builder.

3. The impact of Limited Access on a property must be considered by the appraiser and may create damage(s) to the property (-ies) that would result in a monetary compensation. For rights of way within the proposed limited access lines, the Design-Builder shall acquire in the name of the Commonwealth.

I. The Design-Builder shall modify the existing Dominion Power easement in the vicinity of Scott's Run Nature Preserve based its final design in this area.

J. The Design-Builder shall not be responsible for any property acquisition or associated acquisition services for the Scott's Run Nature Preserve Section 6(f) replacement parcel as defined in Section 3.3.9 and Attachment 3.3.

K. The Design-Builder shall carry out its right of way acquisition responsibilities in accordance with the following requirements:

1. The Design-Builder shall acquire property in accordance with all applicable federal and state laws and regulations, including but not limited to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (the

"Uniform Act), and Titles 25.1 and 33.2 of the 1950 Code of Virginia, as amended. The acquisition of property shall follow the guidelines as established by VDOT and other state and federal guidelines that are required and VDOT's Right of Way Manual of Instructions. All acquistions shall be subject to FHWA approval and completed in accordance with the requirements in 23 CFR 635.309 and 23 CFR 635.709

2. The Design-Builder shall submit a Project-specific ROW Acquisition and Relocation Plan for review and approval in accordance with the requirements in Attachment 1.3.

3. The Design-Builder shall submit, as part of the ROW Acquisition and Relocation Plan, procedures for handling ROW acquisitions and relocations for approval before beginning ROW activities. These procedures must show the Design-Builder's methods, including the appropriate steps and workflow required for title examinations, appraisals, and review of appraisals, negotiations, acquisition, and relocation. The Concessionaire shall have a period of twenty-eight (28) days to review and either approve or refuse said documents, submittals including its review and approval of just compensation, relocation benefits, and administrative settlements.

4. The Design-Builder shall have access to, and use VDOT's ROW and Utilities Management System (RUMS) to manage and track the acquisition process, including easements. All entries made into RUMS shall be made within 5 business days of the contact occurring to accurately reflect current project status. VDOT's standard forms and documents, as found in RUMS, shall be used. Any changes to the forms and documents must be approved by VDOT and the Office of Attorney General. The Concessionaire will coordinate with VDOT to provide training and technical assistance to the Design-Builder in the use of RUMS.

5. The Design-Builder shall provide a current title examination for each parcel at the time of the initial offer to the landowner. Each title examination report shall be prepared by a VDOT-approved title company, in accordance with VDOT's Right of Way Manual of Instructions, and shall include title insurance commitment. Should the Design-Builder select a law firm to certify title examinations, the certifying attorney shall provide evidence of professional liability insurance. The Concessionaire reserves the right to determine if the professional liability insurance coverage is sufficient.

6. The Design-Builder shall prepare appraisals and appraisal reviews in accordance with VDOT's appraisal guidelines. The appraiser shall be on VDOT's approved fee appraiser list.

7. The Design-Builder shall provide appraisal reviews complying with technical review guidelines of VDOT's appraisal guidelines. The reviewer shall be on VDOT's approved fee appraiser list. The Concessionaire will review the Design-Builder's appraisal waiver, appraisal, and appraisal review for each parcel, and shall have the decision of final approval of each appraisal and just compensation offer.

8. The Design-Builder shall make all reasonable efforts to contact the landowner or the landowner's representative to discuss its offer to purchase the property. The Design-Builder may not employ the use of Rights of Entry for construction purposes until the Design-Builder has made a bonafide offer to the landowner to acquire the property.
9. VDOT shall make direct payments to property owners for negotiated settlements and relocation benefits and make deposits with the appropriate court for condemnation cases. Payment documentation is to be prepared and submitted with the Acquisition Report (Form RW-24). The Design-Builder shall be responsible for disbursement of payments to the property owner, providing indefeasible title to VDOT, and filing of any necessary Virginia and federal tax forms related to such payments.
10. The Design-Builder shall prepare, obtain execution of, and record documents conveying title to such properties to the Commonwealth of Virginia and deliver all executed and recorded general warranty deeds. For all property purchased in conjunction with the Project NEXT, title will be acquired in fee simple, except that, with prior written approval, permanent easements may be acquired in lieu of fee simple interest for the construction, maintenance, and use of items such as noise barriers, retaining walls, storm drainage structures, and earthen slopes. All property shall be conveyed to "Commonwealth of Virginia, Grantee" by a VDOT -approved general or special warranty deed, free and clear of all liens and encumbrances except encumbrances expressly permitted in writing by VDOT in advance.
11. All easements, except for private utility company easements, shall be acquired in the name of "Commonwealth of Virginia, Grantee." Private utility company easements will be acquired in the name of each utility company, unless they are acquired by eminent domain, in which case they will be acquired in the name of the Commonwealth of Virginia.
12. The Design-Builder shall use its best efforts to conclude negotiations with landowners amicably. VDOT shall make the ultimate determination in each case as to whether settlement is appropriate or whether the filing of a condemnation action is necessary. The Design-Builder shall not request the filing of a Certificate of Take until the landowner has been given a reasonable amount of time to consider the offer or terminate the negotiations. If, despite the Design-Builder's best efforts, it is unable to reach a settlement with any landowners, as a last resort VDOT will handle any necessary condemnation proceedings subject to the following. Prior to VDOT filing a condemnation proceeding, the Design-Builder shall prepare or cause to be prepared all necessary paperwork and supporting documentation required for the proceeding and it shall deliver that documentation to VDOT, including the notice of filing the Certificate of Take or Deposit. VDOT will review the submitted documentation for compliance with VDOT's rules, regulations, policies, and when approved, will then file the condemnation proceeding(s) and handle such proceeding(s) in accordance with VDOT's Right of Way Manual of Instructions. VDOT shall not process a filing of a Certificate of Take or Deposit until the Design-Builder has demonstrated that all required efforts to settle amicably with

landowners have been completed, nor solely to accommodate or accelerate the Design-Builder's construction schedule.

13. The Office of Attorney General, Commonwealth of Virginia, shall act as VDOT's legal counsel and will assign cases to fee counsel and review and approve their billing. Support and testimony for condemnations shall be provided by the Design-Builder, as required.

14. The Design-Builder shall be responsible for all contacts with landowners for ROW or construction items, prior to initiation of condemnation proceedings. The Design-Builder shall provide documentation of all contact with property owners (including participants and organizations), a summary of discussions, agreed upon items, follow-up activities, and copies of items distributed, including but not limited to appropriate and timely documentation in the RUMS.

15. Upon completion of all activities related to a specific parcel, the Design-Builder will upload all final and approved documentation for that parcel to the Project's Electronic Document Management System.

16. The Design-Builder is responsible for conducting required environmental site assessments for each property acquisition in accordance with the requirements of Section 3.3.5. The Design-Builder shall exercise reasonable care in determining whether a property to be acquired for rights of way may contain concealed or hidden wastes or other materials or hazards requiring remedial action or treatment. When there is reason to believe that such materials may be present, the Design-Builder shall notify VDOT within three (3) calendar days. The Design-Builder shall not proceed with acquiring such property until receiving written notification from VDOT.

17. During the acquisition process and until the VDOT record retention deadline has expired after the latter of Final Completion or the Commonwealth has indefeasible title to the property, all Project NEXT documents and records not previously delivered, including design and engineering costs, construction costs, costs of acquisition of ROW, and all documents and records necessary to determine compliance with the laws relating to ROW Acquisition and the costs of relocation of Utilities shall be maintained and made available by Design-Builder for inspection or audit.

L. The Design-Builder shall be responsible, at its sole expense, for demolishing and disposing of all existing buildings from the ROW and permanent and temporary easements.

M. The Design Builder shall exercise care to minimize impacts and damages to property, businesses, and residences, including noise, vibrations, temporary traffic patterns, and clearing of tree buffers. The Design Builder shall address public, business, and government comments in coordination with VDOT within 21 days of receipt; however, the responsibility to coordinate, address and/or respond to the comments shall be the Design Builder's. Where requested, the Design Builder shall provide stakeout and marking of existing property lines and impacts..

N. If the Design-Builder and/or its sub-consultant(s) fails to strictly follow the Uniform Act and its implementing regulations found in 49 CFR Part 24, Titles 25.1 and 33.2, or the State and Federal guidelines in the performance of the acquisition and/or relocation processes or services, or fails to obtain or create any mandatory written documentation in their right of way parcel file, or if any such failures result in an action for inverse condemnation, trespass, nuisance, interference with use and enjoyment of property or similar taking of or harm to real property, the Design-Builder shall be responsible for any and all costs, expenses or damages, including attorneys' and expert witnesses' fees, as well as any additional monies paid to the landowners to reach a settlement or to pay for a court award.

1.7 Utilities

1.7.1 General Requirements

A. Project NEXT is a VDOT-sponsored project and the Design-Builder shall enjoy all of the benefits and responsibilities of VDOT as it pertains to prior rights, statutory rights, or any other right relating to utility relocations, subject to VDOT's ability to assign those rights.

B. The Design-Builder shall submit, for review and approval, a Utilities Plan in accordance with Attachment 1.3 requirements. The Utilities Plan will define and detail the utility coordination, adjustment, and relocation activities during the design and construction of the Project.

C. The Design-Builder shall coordinate and conduct a preliminary utility review meeting with all affected utility owners to assess and explain the impact of the Project NEXT. The Concessionaire and VDOT representatives shall be included in this meeting.

D. The Design-Builder shall schedule and conduct Utility Field Inspections in accordance with the procedures set forth in the VDOT's Utility Manual. The Design-Builder shall provide meeting minutes for each Utility Field Inspection.

E. Separate from the Utilities Plan, the Design-Builder shall prepare and submit a preliminary Utilities Report within sixty (60) days of issuance of Work NTP that includes a listing of all known utilities located within the Project NEXT limits and a conflict evaluation and cost responsibility determination for each utility. This report shall include copies of easements, plans, or other supporting documentation that substantiates any compensable rights of the utility owner.

F. The Design-Builder shall be responsible for all efforts, costs and scheduling necessary for any utility-related aspects of the Work. This includes, but is not limited to: utility coordination, utility designations, utility locates (test holes), conflict evaluations, cost responsibility determination, utility relocation designs, utility relocations and adjustments, utility reimbursements, determination of existing utility easements (including VDOT maintenance easements), the inclusion of such easements on plans, and replacement land rights acquisition, and coordination of any utility betterments. Costs for any utility betterment(s) (excluding the Project NEXT Work on Concessionaire and

VDOT's roadside equipment, communications and power cables and conduits, and VDOT leased telecommunications) shall not be included in the Design-Builder's cost, but shall be reimbursed directly to the Design-Builder from the utility owner through agreement with the requesting utility owner.

G. The Design-Builder shall be responsible for coordinating the Project NEXT construction with all utilities that may be affected (including the Concessionaire and VDOT's roadside equipment, communications and power cables and conduits, and VDOT leased telecommunications). The Design-Builder shall be responsible for coordinating the work of its Contractors and the various utilities. The resolution of any conflicts between utilities and the construction of the Project NEXT shall be the responsibility of the Design-Builder. No additional compensation or time will be granted for any delays, inconveniences, or damage sustained by the Design-Builder or its subcontractors due to interference from utilities or the operation of relocating utilities.

H. Any additional work resulting due to changes in utility owners' requirements shall be at the Design-Builder's risk. The Design-Builder is responsible to identify all Utility Owners within Project NEXT limits and to coordinate with them.

I. If the Design-Builder desires the temporary or permanent adjustment of utilities (including the Concessionaire and VDOT's communications and power cables and conduits) for its own benefit, it shall conduct all negotiations with the utility owners and pay all costs in connection with the adjustment.

J. The Design-Builder shall initiate early coordination with all utilities (including the Concessionaire and VDOT's roadside equipment, communications and power cables and conduits, and VDOT lease telecommunications) located within the Project NEXT limits. The Design-Builder is responsible for identifying the owner, type, size, height and number of bridge-attached cables, overhead cables, number of underground cable/conduits, pipes, services, and horizontal and vertical (depth) location of underground utilities to include service connections and laterals with the utility owners.

K. The Design-Builder shall verify the prior rights of each utility owner's facilities if claimed by a utility owner. If there is a dispute over prior rights with a utility, the Design-Builder shall be responsible for resolving the dispute.

L. The Design-Builder shall identify and acquire any replacement utility easements or required right of way needs of all utilities necessary for relocation due to conflicts with the Project NEXT. The Design-Builder shall coordinate with the utility owners to obtain temporary construction easements or agreements.

M. The Design-Builder shall provide the roadway and bridge design plans to all utility owners as soon as the plans are of sufficient detail such that the utility owners can fully understand the Project NEXT impacts. The utility owners will use the Design-Builder's design plan for preparing relocation plans and estimates. If a party other than the Utility Owner prepares relocation plans, the plans shall contain a concurrence box where the Utility Owner signs and accepts the relocation plans as shown.

N. The Design-Builder shall obtain the following from each utility that is located within the Project NEXT limits as appropriate:

1. Relocation plans including letter of "no cost" where the utility does not have a compensable right;
2. Utility agreements including cost estimate and relocation plans where the Utility has a compensable right;
3. Utility easement forms to be executed by the landowner, if necessary;
4. Letters of "no conflict" where the utility's facilities will not be impacted by the Project NEXT; and/or
5. Bridge attachment agreements between VDOT and the utility owner, if necessary.

O. The Design-Builder is to use a two-party agreement, similar to the Master Utility Agreement (MUA) utilized by VDOT (provided for in VDOT's Utility Manual) to establish the general framework for addressing the utility issues within the Project NEXT affecting a Utility Owner. The two-party agreement between the Design-Builder and the Utility company will set forth the terms and conditions under which the Utility work will be performed, and will adhere to VDOT's Utility Manual. Included in the two party agreement will be the statement (with reference to the Concession Agreement) that this work is being performed as a VDOT project. All agreements relative to utility relocation are to be between the Design-Builder and the specific utility owner. This includes the agreements for authorization to relocate facilities, as well as any reimbursement terms/agreements. In addition, a written monthly utility status update shall be provided to document the status of the coordination.

P. The Design-Builder shall review all relocation plans to ensure that relocations comply with VDOT Utilities Manual of Instruction, the Utility Relocation Policies and Procedures, VDOT's Land Use Permit Regulations, these Technical Requirements and any pertinent Special Provisions. The Design-Builder shall also ensure that there are no conflicts with the proposed roadway improvements, and ensure that there are no conflicts between each of the utility owner's relocation plans. The Design-Builder shall prepare and submit all relocation plans. The Design-Builder is expected to assemble the information included in the relocation plans in a final and complete format and in such a manner that the Concessionaire may approve the submittals with minimal review. The Design-Builder shall meet with VDOT's Regional Utilities Manager within thirty (30) days of Limited Notice to Proceed to gain a full understanding of what is required with each submittal. The Design-Builder shall receive necessary written approvals prior to authorizing Utilities to commence relocation construction, and in turn, the Utility Owners shall not begin their relocation work until authorized by the Design-Builder. Each relocation plan submitted must be accompanied by a certification from the Design-Builder stating that the proposed relocation will not conflict with the proposed roadway improvement and will not conflict with another Utility Owner's relocation plan.

Q. The Design-Builder shall be responsible for new Utility service connections, including full coordination with the Utility Owners, acquisition of easements and payment of connection fees. The Design-Builder shall also be responsible for paying the monthly Utility bills associated with new service panels, up to and including the NEXT Service Commencement Date. Service accounts for any Express Lanes service panels shall be

transferred to the Concessionaire (or VDOT for any VDOT service panels) upon achievement of Service Commencement. A detailed list of service accounts that will be transferred to either the Concessionaire or VDOT shall be provided to the Concessionaire and VDOT for review and confirmation before the transfer is made with each Utility company.

R. The Concessionaire, in coordination with VDOT, may, at its discretion, provide limited assistance in negotiations with Utility Owners and will provide available VDOT documents concerning prior rights in a timely manner as requested by the Design-Builder. In any case, neither the Concessionaire nor VDOT shall incur any liability in providing such assistance and shall not be required to initiate or participate in any legal action other than as a witness or to produce documents.

S. The Design-Builder shall make all reasonable efforts to design the Project NEXT to avoid conflicts with Utilities, and minimize impacts where conflicts cannot be avoided. The Design-Builder shall Protect In-Place impacted utilities, if possible. The Design-Builder shall be responsible for ensuring that Utility service interruptions are minimized.

T. The Design-Builder shall ensure the Utility Owners submits as-built drawings and Land Use Permit applications upon completion of their respective relocation and (or) adjustments.

U. The Design-Builder shall be responsible for ensuring the appropriate abandonment or removal of all abandoned Utilities (including the Concessionaire and VDOT's roadside equipment, communications and power cables and conduits, and VDOT leased telecommunications) within the Project NEXT limits.

V. At the time that the Design-Builder notifies the Concessionaire that the Design-Builder deems the Project NEXT to have reached Final Completion, the Design-Builder shall certify that all Utilities have been identified and conflicts have been resolved and that those Utilities with compensable rights or other claims related to relocation or coordination with the Project NEXT have been relocated and their claims and compensable rights have been satisfied or will be satisfied by the Design-Builder.

W. The Design-Builder shall accurately show the final location of all Utilities (including the Concessionaire and VDOT's roadside equipment, communications and power cables and conduits, and VDOT leased communications) on the As-Built Plans in accordance with Section 3.18 of these Technical Requirements.

X. Underground utility data provided with the RFP was obtained and depicted in accordance with "CI/ASCE 38-02, Standard Guidelines for the Collection and Depiction of Subsurface Utility Data", and is S.U.E. Quality Level C. Surveys were performed to locate existing utility surface features (i.e., manholes, handholes, etc.) where found, and this information was correlated with information obtained from utility records (S.U.E. Quality Level D info). Utility information was obtained for the Project area using the following sources:

1. G.I.S. data available from utility owners;
2. Mapping available from utility owners; and

3. VDOT plans from adjacent projects (or past projects) depicting utility information. It is possible that utilities exist within the Project area that are not depicted in the RFP Documents.

1.7.2 Design-Builder's Responsibility for Utility Property and Services

A. At points where the Design-Builder's operations are on or adjacent to the properties of any utility (including railroads, transit properties, and the Concessionaire and VDOT's field devices, communications and power cables and conduits, and VDOT leased telecommunications), and damage to which might result in expense, loss, or inconvenience, Work shall not commence until arrangements necessary for the protection thereof have been completed. The Design-Builder shall cooperate with owners of utilities so that:

1. Removal and adjustment operations may progress in a timely, responsible, and reasonable manner, and
2. Duplication of adjustment work may be reduced to a minimum, and services rendered by those parties will not be unnecessarily interrupted.

B. The Design-Builder shall be responsible for ensuring the proper relocation of any cellular telephone towers or equipment required for the construction and operation of Project NEXT, including necessary coordination with the cellular provider and VDOT. The responsibilities, timing and costs for any cell tower modifications or relocations will be administered in accordance with terms of the existing lease agreements or permits with VDOT.

C. If any utility service (including utilities owned or operated by the Concessionaire or VDOT) is interrupted as a result of accidental breakage or of being exposed or unsupported, the Design-Builder shall promptly notify the proper authority, cease all construction operations until repairs are completed and the system is fully operational, and shall cooperate fully with the authority in the restoration of service. If utility service is interrupted, repair work shall be continuous until service is restored. The Design-Builder will be responsible for all costs necessary for such repair and any associated time impacts to Project NEXT. To assist with expediting the restoration of services impacted by the Design-Builder during construction operations, the Design-Builder shall submit an Unexpected Outage Resolution Process in advance of initiating work near existing utilities. The Unexpected Outage Resolution Process shall include at least a description of the process to be used to identify determination of responsibility and party responsible for mitigating the outage and restoring the service, timeline for restoration, flow chart of the overall process, and contact information identifying key personnel from the project parties that will be immediatedly engaged upon a utility strike or unexpected utility outage.

D. The Design-Builder shall comply with all requirements of the Virginia Underground Utility Damage Prevention Act (the Miss Utility law).

E. The Concessionaire's and VDOT's utilities, including roadway lighting cable and conduit, traffic management systems cable and conduit, as well as Concessionaire and VDOT-owned fiber optic lines, are located within the Project NEXT limits and are not

marked by the Miss Utility. The Design-Builder is responsible for field marking of the Concessionaire's and VDOT's utilities. For VDOT facilities, the Design-Builder may either elect to use at its own discretion and cost, VDOT's Utility Marking System (www.vdotutilitymarking.virginia.gov) or a qualified utility locating service provider familiar with VDOT-owned utilities. For the Concessionaire's facilities, the Design-Builder must use a qualified utility locating service provided nominated by the Concessionaire and familiar with the Concessionaire-owned utilities. It is the Design-Builder's sole responsibility to have these utilities marked (or re-marked), and maintain such markings throughout the life of the Project NEXT. The Design-Builder will be responsible for all cost necessary for these utility markings.

F. The Design-Builder shall exercise care to prevent damage or disruption to any existing Concessionaire utilities and associated devices. Any strikes or outages caused by the Design-Builder and/or its subcontractor(s) shall be reported to the Concessionaire immediately and repaired immediately. The Design-Builder shall be responsible for repairs or damages to these utilities or devices caused by its actions or those of its subcontractors.

1.7.3 Dominion Virginia Power Transmission Lines

A. For all work in the vicinity of the Dominion Virginia Power (DVP) overhead transmission lines within the Project NEXT limits, the Design-Builder shall seek to minimize impacts to existing Dominion assets and protect the existing DVP easement.

B. Any changes to the design shown in the RFP Conceptual Plans related to the DVP assets or the existing DVP easement shall be submitted to DVP for review and approval. The Design-Builder shall verify DVP acceptance of such designs prior to submitting any associated final design packages for approval. The Design-Builder is also responsible for obtaining an updated DVP Letter of Consent for any encroachments into the existing DVP easement and an updated DVP License Agreement for any use of the DVP Swinks Mill Substation property.

C. Work within the DVP easement or adjacent to DVP assets shall also be subject to the following conditions and restrictions:

1. Full and proper access shall be maintained to the Swinks Mill Substation at all times during construction.
2. The shared use path connection to Spencer Road shall not impair or impede use of the entrance drive to the Swinks Mill Substation. The shared use path may be co-located with the DVP entrance drive, but widening and reconstruction of a portion of the entrance drive may be required to meet DVP requirements.
3. Lights or signs over 10 feet in height shall not be permitted within the DVP easement.
4. Details for excavations within 50 feet vicinity of DVP assets must be approved by DVP prior to initiating any ground disturbance activities.
5. All piles or piers within 50 feet of any DVP transmission tower shall be vertically drilled and not placed towards the transmission structure(s).

6. A minimum of 20 feet of separation is required between all construction equipment and the DVP transmission lines.
7. Required outages must be coordinated in advance with DVP in accordance with its policies and procedures.
8. Final noise wall heights adjacent to existing DVP Structures 2029/38 and 2029/39 shall be reviewed and approved by DVP to confirm adequate vertical clearances.
9. Existing vertical clearances are to be maintained between existing DVP Structures 2108/54 and 2108/53 at Old Dominion Drive. Any reductions in vertical clearances (higher roadway profile, taller signs, etc.) shall be reviewed and approved by DVP.
10. Existing vertical clearances are to be maintained between existing DVP Structures 2029/44 and 2029/43 at Georgetown Pike. Any reductions in vertical clearances (higher roadway profile, taller signs, etc.) shall be reviewed and approved by DVP.
11. Proposed traffic signals at Georgetown Pike are to have a minimum horizontal offset of 30 feet from the centerline of DVP Transmission Line 2029. If this offset cannot be met, vertical clearances shall be reviewed and approved by DVP.
12. Placement of additional fill material around the base of existing guy supported transmission towers must be coordinated in advance with DVP to establish required measures for corrosion protection of the tower base material and tower grounding components.

1.7.4 Restoration of Work Performed by Others

A. The Concessionaire or VDOT may construct or reconstruct any Utilities within the limits of the Project NEXT or grant a permit for the same at any time.

B. If authorized, the Design-Builder shall allow any person, firm, or corporation to make an opening in the roadway within the limits of the Project NEXT upon presentation of a duly executed permit from VDOT or any municipality for sections within its jurisdiction. Any such roadway shall be restored to the pre-existing condition at the completion of the work by the entity performing the work.

1.8 Work Restrictions

1.8.1 Work Hours

A. The Design-Builder is advised that its general operations may proceed seven days a week, 24 hours a day, subject to the limitations conditions noted in the Technical Requirements and applicable lane closure restrictions detailed in Section 1.8.2.

B. The Design-Builder shall be responsible for obtain any variance or waiver from applicable noise or lighting restrictions for work outside hours allowed by local jurisdictions.

1.8.2 Temporary Roadway Closures

A. Lane and Shoulder Closures

1. Allowable lane closures for temporary lane and/or shoulder closures shall be in accordance with the tables below. All lane closure requests shall be reviewed and approved by the Concessionaire (for the Express Lanes) or VDOT (for the General Purpose lanes).
2. The Design-Builder shall restore all lanes of traffic per the times specified in the the "Allowable Lane Closure Hours" tables below. Restoration of traffic shall mean the completion of all construction work, the removal of all traffic control devices, signs, workers, materials, and equipment from the roadway.
3. The Concessionaire reserves the right to monitor traffic conditions affected by the Work and impose additional temporary restrictions (such as terminating a lane closure early or adjusting the allowable lane closure hours on a limited basis), as may be necessary to ensure safe traffic operations within the Project limits.
4. The Design-Builder may seek changes or extensions to the Allowable Lane Closure Hours on a case-by-case in accordance with the requirements of Section 1.8.5.

Allowable Lane Closure Hours

INTERSTATE 495 (BELTWAY)					
WEEKDAY		**Inner Loop**			
		Single-Lane Closures or Shoulder	**Two-Lane Closures**	**Multiple-Lane Closures**	**Complete Road Closure**
Segment 1	**A. L. Bridge to Springfield Interchange**	10:00AM to 3:00PM 9:30PM to 5:00AM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 5:00AM
Segment 2	**Springfield Interchange to W.W. Bridge**	10:00AM to 3:00PM 9:30PM to 5:00AM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 5:00AM
All lanes open at 12:00 noon on Friday					
WEEKDAY		**Outer Loop**			
		Single-Lane Closures or Shoulder	**Two-Lane Closures**	**Multiple-Lane Closures**	**Complete Road Closure**
Segment 1	**A. L. Bridge to Springfield Interchange**	9:30AM to 2:30PM 9:30PM to 5:00AM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 5:00AM
Segment 2	**Springfield Interchange to W.W. Bridge**	10:00AM to 3:00PM 9:30PM to 5:00AM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 5:00AM
All lanes open at 12:00 noon on Friday					
WEEKEND		**Inner/Outer Loop**			
		Single-Lane Closures or Shoulder	**Multiple-Lane Closures**		**Complete Road Closure**
Friday to Saturday		10:00PM to 8:00AM	11:00PM to 7:00AM		12:00AM to 5:00AM
Saturday to Sunday		10:00PM to 9:00AM	11:00PM to 8:00AM		12:00AM to 5:00AM
Sunday to Monday		9:30PM to 5:00AM	11:00PM to 5:00AM		12:00AM to 5:00AM

	EXPRESS LANES	
	Single-Lane Closures or Shoulder	**Complete Road Closure****
WEEKDAY	9:30PM (Sunday to Thursday) to 4:00AM (Monday to Friday)	11:00PM to 4:00AM
WEEKEND	11:00PM (Friday to Saturday) to 9:00AM (Saturday to Sunday)	11:00PM to 4:00AM
** Complete Road Closure on Express Lanes limited to 30 minutes or less.		

ROUTE 267 CONNECTOR				
WEEKDAY	**Eastbound**		**Westbound**	
	Single-Lane Closures or Shoulder	**Complete Road Closure**	**Single-Lane Closures or Shoulder**	**Complete Road Closure**
Monday to Friday	11:00AM to 3:00PM 9:30PM to 5:00AM	12:00AM to 4:00AM	9:30AM to 3:00PM 9:00PM to 5:00AM	12:00AM to 4:00AM
All lanes open at 12:00 noon on Friday				

WEEKEND	**Eastbound/Westbound**	
	Single-Lane Closures or Shoulder	**Complete Road Closure**
Friday to Saturday	10:00PM to 8:00AM	12:00AM to 5:00AM
Saturday to Sunday	11:00PM to 8:00AM	12:00AM to 5:00AM
Sunday to Monday	9:00PM to 5:00AM	12:00AM to 4:00AM

Single-Lane Closures* or Shoulder					
ARTERIAL	**WEEKDAY**		**WEEKEND**		
	Monday to Thursday	Friday	Friday to Saturday	Saturday to Sunday	Sunday to Monday
Major Arterials**	9:30AM to 3:00PM 10:00PM to 5:00AM	9:30AM to 2:00 PM	10:00PM to 9:00AM	10:00PM to 8:00AM	10:00PM to 5:00AM
All Other Roadways	9:00AM to 3:30PM 9:00PM to 5:00AM	9:00AM to 2:00 PM	10:00PM to 9:00AM	9:00PM to 9:00AM	10:00PM to 5:00AM

Multiple-Lane Closures					
ARTERIAL	**WEEKDAY**		**WEEKEND**		
	Monday to Thursday	Friday	Friday to Saturday	Saturday to Sunday	Sunday to Monday
Major Arterials**	10:00PM to 5:00AM	Not allowed until 11:00PM	11:00PM to 5:00AM	11:00PM to 6:00AM	11:00PM to 5:00AM
All Other Roadways	9:00PM to 5:00AM	Not allowed until 10:00PM	10:00PM to 6:00AM	10:00PM to 6:00AM	10:00PM to 5:00AM

**Single-lane closures only permitted for multiple-lane roadways.*
***Major Arterials defined as Primary Roads, high volume Secondary Roads, and all other routes that connect directly to Interstates.*

Notes:

1. Complete Road Closures: 30 minutes maximum or an approved time frame to facilitate the lifting and placing of bridge beams, demolition and removal of bridge elements, and erection or removal of overhead sign panels and other structures. Complete roadway closures of more than 30 minutes may be permitted; subject to the approval of any required maintenance of traffic, traffic control, and/or detour plans.
2. Complete Road Closures: Following a 30 minute closure, subsequent 30 minute closures are not permitted until traffic has returned to free flow conditions and all traffic stopped from the previous closure has passed the construction site
3. Limited Access Highways are defined as high speed high volume roadways with limited access, such as Dulles Toll Road, Dulles Airport Access Road, Dulles Connector Road and the George Washington Memorial Parkway.
4. Major Arterials are defined as Primary Roads, high volume Secondary Roads, and all other routes that connect directly to Interstates, such as Rte. 123, Rte. 694, Rte. 738 and Rte. 193.
5. Single-lane closures are only permitted for multiple-lane roadways.
6. Long-term closures of the shoulders adjacent to the general purpose lanes are allowable pursuant to the applicable provisions of these Technical Requirements.
7. Some roadway closures will require coordination and permit(s) with the agency having jurisdiction over the roadway. These allowable hours shall be applicable to both stationary and mobile lane closures, as well as shoulder closures.

B. Lane Closure Request Procedure

1. Multi-lane closures of I-495 for any Work will require coordination with appropriate Governmental Authorities, stakeholders and public notice. The Design-Builder shall provide a minimum of three (3) weeks advance notice. This advance notice will allow the Concessionaire and Design-Builder to coordinate on a public outreach campaign and/or advertising to reach affected motorists and target audiences. Alternate dates can be advertised in the event of inclement weather.
2. Total closures of I-495 for any surface, overhead, or underground work will require coordination with the Concessionaire, VDOT and appropriate Governmental

Authorities, and stakeholders. The Design-Builder shall provide a minimum of 30 days advance notice of such anticipated closures. This advance notice will allow the Concessionaire and Design-Builder to coordinate on a public outreach campaign and/or advertising to reach affected motorists and target audiences. Alternate dates can be advertised in the event of inclement weather.

3. Following such notice, a coordination meeting shall be held between the Design-Builder, the Concessionaire, and VDOT to review and finalize the plan for such closures.

4. The Design-Builder shall submit all lane and/or shoulder closure requests to the Concessionaire representative and VDOT Project Manager for coordination purposes (for determination of conflicts with other projects, for instance) at least ten (10) days in advance of the proposed lane and/or shoulder closures, stating the location, purpose, date, time, and duration of the closure. The Design-Builder shall coordinate construction activities and lane closures that affect scheduled transit service with the respective transit agencies.

5. The Design-Builder shall be responsible for entering all scheduled lane closures into VDOT's Lane Closure Advisory Management System (LCAMS) and VA Traffic at least ten (10) days prior to the actual lane closure. The Design-Builder shall also be responsible for coordinating and eliminating all LCAMS conflicts related to the Design-Builder's scheduled lane closures no later than close of business Thursday the week prior to the closure. The Design-Builder shall confirm at least twenty-four (24) hours before any scheduled lane and/or shoulder closure (72 hours for a complete road closure) and shall include a written reiteration of the proposed tasks and a listing of materials, labor, and equipment to be utilized, in order for the VDOT Public Safety and Transportation Operations Center (PSTOC) to post the information on the VDOT website and VA511 system and the Concessionaire to post on the Express Lanes website.

6. The Design-Builder must contact the VDOT Northern Region Transportation Operations Center (703-877-3449) 15 minutes prior to executing all lane and/or shoulder closures and re-contact the VDOT TOC within 15 minutes of the work being completed and lane and/or shoulder closures removal.

7. For all 495 Express Lanes closures, the Design-Builder is required to coordinate directly with the Concessionaire and comply with the current Permit to Work processes in place for the Express Lanes, including the use of electronic forms and submittals. An approved Permit to Work will be required prior to commencing any work within the 495 Express Lanes, or work impacting any 495 Express Lanes facilities or equipment. All Permit to Work requests shall be submitted a minimum of ten (10) business days prior to the intended work start date. Notification of the Design-Builder commencing and completing work in the Express Lanes shall be in accordance with the approved Authority to Work permit issued by the Concessionaire. Failure to comply with the terms of an issued Authority to Work permit or working within the active Express Lanes without such a permit will result

in immediate suspension of the Design-Builder until the proper authorization is provided.

C. The Design-Builder shall provide the required advance notification via variable message and required static signing for lane closures. Once a closing is in place, Work shall begin immediately and shall progress on a continuous basis to completion or to a designated time.

D. The closure may be delayed if excessive traffic backup or queuing is already present at the scheduled start of Work. Traffic backups must dissipate before any scheduled lane closures or successive closings can be implemented.

E. The minimum clear distance between two separate lane closings, that is, from the last traffic cone of the first closing to the first cone of the second closing in the same roadway, shall be one mile.

F. The Concessionaire reserves the right to monitor traffic conditions affected by the Work and to make necessary restrictions as may be warranted or as emergency situations dictate. Queues in excess of 3 miles or delays over 1 hour will be cause to cease the closure and to re-evaluate approval of similar closures in the future.

1.8.3 Lane Closure Types

A. All lane and shoulder closures shall be identified as one of the following types:

1. Type 1 – A lane closure resulting in a significant impact on traffic, such as stopping traffic completely, closing two or more lanes, any lane closures in an existing reversible facility, closing an exit or entrance ramp at freeway interchanges or changing traffic patterns. This type of closure would require extensive media and stakeholder notification and coordination among various local and state agencies
2. Type 2 – A lane closure resulting in minor or no impact on the flow of traffic, such as closing one lane on a four-lane roadway during off-peak traffic hours.
3. Type 3 – A lane closure that would close a shoulder (right or left) on a roadway or ramp.

1.8.4 Lane Closure Liquidated Damages

A. Lane closure liquidated damages will be assessed against the Design-Builder if all lanes are not open to traffic during the times required by Section 1.8.2 or in an approved request for temporary lane closure. The liquidated damages will be assessed per the formula in the table below and continue until all lanes are opened as determined by the Concessionaire and/or VDOT.

Lane Closure Liquidated Damages

Elapsed Time (min)	I-495 and all Ramps (includes General Purpose Lanes and Express Lanes)	Other Limited Access Highways and Major Arterials	All Other Roads
1-5, or any portion thereof	$0	$0	$0
Every additional minute or any portion thereof after initial 5 minutes stated above	$1,000 for the sixth minute plus $1,000 per each additional minute	$1,000 for the sixth minute plus $500 per each additional minute	$500 for the sixth minute plus $500 per each additional minute

Notes:

1. If a Non-Permitted Closure occurs, the Concessionaire will notify the Design-Builder thereof and of the amount of associated Lane Closure Liquidated Damages in writing within 48 hours of the Non-Permitted Closure.
2. If there are no additional Non-Permitted Closures occurring within 90 days, the Concessionaire shall refrain charging of the Lane Closure Liquidated Damages for the prior Non-Permitted Closures. Otherwise, the Design-Builder shall pay all Lane Closure Liquidated Damages within 30 days of the date on which last written notice of Lane Closure Liquidated Damages is given to the Design-Builder for violating having two (2) or more Non-Permitted Closure occurrences within 90 days.
3. Once there is a clean period of 90 days without a Non-Permitted Closure occurrence, the new 90 days period will start for future Lane Closure Liquidated Damages. All Lane Closure Liquidated Damages charges will be capped at $100,000 per Non-Permitted Closure.

B. In addition to the assessed liquidated damages for failure to restore traffic lanes, the Design-Builder will not be allowed further lane closures until the reason for the failure are evaluated and the Design-Builder can provide assurance that the causes have been corrected. A formal submission as to the reasons for the failure to restore traffic lanes within the contract lane closure restrictions and the proposed corrective measures must to be provided within two (2) days of the occurrence. The Concessionaire will respond to the adequacy of the submission within two (2) working days of receipt. No modification of the Contract Price or Contract time(s) will be granted or considered for these days.

C. The Concessionaire may, at its sole discretion, choose not to assess liquidated damages for failure to open traffic if such cause is not related to or caused by the Design-Builder's operations.

1.8.5 Design-Builder Request for Additional Lane Closures

A. The Design-Builder may submit a request to work outside the stated lane closure hours by providing adequate justification (including traffic analysis) demonstrating the viability of the request. Closures of longer durations than those listed in Section 1.8.2 will require a review of plans, implementation of detours, and public outreach.

B. Any request for deviation from the allowable lane closure hours must be submitted a minimum of fourteen (14) days in advance of the work.

1.8.6 Night Work

A. In areas where Work is to be performed during the hours of dusk or darkness, the Design-Builder shall furnish, place, and maintain lighting facilities capable of providing light of sufficient intensity to facilitate good workmanship and proper inspection at all times. The lights shall be arranged so as not to interfere with or impede traffic approaching the work site(s) from either direction or produce undue glare to property owners.

B. Lighting of work site(s) may be accomplished using any combination of portable floodlights, standard equipment lights, existing street lights, and temporary street lights that will provide the proper illumination. The Design-Builder shall provide a light meter to demonstrate that the minimum light intensity is being maintained

C. The Design-Builder shall furnish and place warning signs to alert approaching motorists of lighted construction area(s). These warning signs shall be four feet (4') x four feet (4'). The Design-Builder's vehicles used on Project NEXT shall be provided with amber flashing lights that shall be in operation while in the work area. The Design-Builder's equipment shall be provided with a minimum of three square feet of reflective sheeting that is visible to approaching motorists. The Design-Builder shall provide his personnel with proper Personal Protective Equipment (PPE), which shall be worn at all times while the workers are within the work area.

D. The Design-Builder shall provide sufficient fuel, spare lamps, generators, and other necessary equipment to maintain the lighting of the work site. The Design-Builder shall utilize padding or shielding or locate mechanical and electrical equipment to minimize noise generated by lighting operations as directed. Noise generated by portable generators shall comply with all applicable Law.

1.8.7 Holidays

A. Moving/mobile, short duration, short-term stationary, or intermediate-term stationary temporary traffic control zone lane closures on mainline lanes, shoulders, or ramps shall not be performed during the following Holiday time periods without the written permission of the Concessionaire. Additionally, a long-term stationary temporary traffic control zone shall not be initially put in place, adjusted, or removed during the following Holiday time periods without the written permission of the Concessionaire:

- **January 1:** From noon on the preceding day until noon on the following day, except as indicated in Section 1.8.7.B below.
- **Inauguration Day:** From 3:30 p.m. on the preceding day until 9:30 a.m. on the following day.
- **Martin Luther King, Jr. Day**: From noon on the preceding Friday to noon on the following Tuesday.
- **Presidents Day:** From noon on the preceding Friday to noon on the following Tuesday.
- **Easter:** From noon on the preceding Friday to 9:30 a.m. on the following Monday.

- **Memorial Day:** From noon on the preceding Friday to noon on the following Tuesday.
- **July 4:** From noon on the preceding day until noon on the following day, except as indicated in Section 1.8.7.B below.
- **Labor Day:** From noon on the preceding Friday to noon on the following Tuesday
- **September 11:** No daytime closures.
- **Columbus Day:** From noon on the preceding Friday to noon on the following Tuesday.
- **Election Day** (the Tuesday following the first Monday in November): No daytime closures.
- **Veterans Day:** From noon. on the preceding day until noon on the following day, except as indicated in Section 1.8.7.B below.
- **Thanksgiving Day:** From noon on the Wednesday proceeding Thanksgiving Day until noon on the following Monday.
- **Christmas Day:** From noon on the preceding day until noon on the following day, except as indicated in Section 1.8.10.B below.

B. If the Holiday occurs on a Friday or Saturday, no lane closures will be permitted from 5:00 a.m. on the preceding Thursday to Noon on the following Monday. If the Holiday occurs on a Sunday or Monday, no lane closures will be permitted from 5:00 a.m. on the preceding Friday to Noon on the following Tuesday.

1.8.8 Use of Explosives

A. The Design-Builder shall obtain approval for use of explosives on the Project. Explosives shall be stored and used in a secure manner. Prior to prosecuting the Work, the Design-Builder shall conduct an on-site review of the Work involved and develop a plan of operations for performing excavating work. Where feasible, the Design-Builder shall explore other means of loosening and/or reducing the size of the excavation without blasting. When blasting becomes necessary, the Design-Builder's plan of operations shall include a blasting plan detailing the blasting techniques to be used during excavation operations requiring the use of explosives. Both plans shall be submitted for review prior to commencing blasting operations.

B. Explosives shall be purchased, transported, stored, used, and disposed of by a Virginia Certified Blaster in possession of a current criminal history record check and commercial driver's license with hazardous materials endorsement and a valid medical examiner's certificate.

C. The Design-Builder shall be responsible for damage resulting from the use of explosives. The Design-Builder shall notify each property and Utility Owner having a building, structure, or other installation above or below ground in proximity to the site of the Work of its intention to use explosives. Notice shall be given sufficiently in advance of the start of blasting operations. The review of the Design-Builder's plan of operations,

blasting plan, and notification of property owners shall in no way relieve the Design-Builder of its responsibility for damage resulting from its blasting operations

1.8.9 Miscellaneous Work Restrictions

A. Dulles Toll Road/Dulles Airport Access Road. The Design-Builder shall follow all applicable Metropolitan Washington Airports Authority (MWAA) rules, regulations, and policies when working on the either the Dulles Toll Road or the Dulles Airport Access Road, including but not limited to: additional lane closure restrictions on the mainlines and approach roadways and access to work permitting process. Additional information on MWAA-specific requirements are provided in Section 1.11.4.

B. NEXT Work in Maryland. The Design-Builder shall follow all applicable Maryland Department of Transportation – State Highway Administration (MDOT-SHA) rules, regulations, and policies when working on I-495 in Maryland, including but not limited to: lane closure restrictions and access to work permitting processes. Additional information on MDOT-SHA-specific requirements are provided in Section 1.11.5.

C. George Washington Memorial Parkway. The Design-Builder shall follow all applicable NPS rules, regulations, and policies when working on the George Washington Memorial Parkway, including but not limited to: additional lane closure restrictions and access to work permitting processes. Additional information on NPS-specific requirements are provided in Section 1.11.6.

D. Langley Swim and Tennis Club (728 Live Oak Drive, McLean, VA 22101). The Design-Builder shall not perform any Work within the Langley Swim and Tennis Club parking lot limits, inclusive of any paved areas of the parking lot and/or entrances, for the time period between May 1 through October 31 that would result in the loss of any parking space in the Langley Swim and Tennis Club parking lot, or impact Langley Swim and Tennis Club driveway access from Live Oak Drive.

1.9 Maintenance of Traffic

1.9.1 General Requirements

A. VDOT will develop and administer an overall Transportation Management Plan for Project NEXT corridor that focuses on broader strategies and solutions to facilitate mobility and safety during the construction period.

B. The Design-Builder shall be responsible for a preparing and implementing a Project-wide Maintenance of Traffic (MOT) Plan for Project NEXT in accordance with Attachment 1.3 and construction phase or location-specific maintenance of traffic and traffic control plans. All stages and phases of construction, including installation and testing of the Traffic Management System (TMS), shall be covered by the Project-wide MOT Plan and specific maintenance of traffic and traffic control plans.

C. The Design-Builder is responsible for the safety of the work zone. The Design-Builder shall comply with all applicable requirements for maintenance of traffic and work zone

safety, including Section 512 of the VDOT Road and Bridge Specifications and the Virginia Work Area Protection Manual.

D. The Design-Builder shall ensure safe and efficient traffic management during construction, including provisions for the movement of people, goods, and services through and around the Project NEXT Site while minimizing impacts to pedestrians, bicyclists, local residents, businesses, and commuters.

E. The Design-Builder shall provide a designated MOT Manager to perform the following:

1. Coordinate implementation of the Project-wide MOT Plan;
2. Oversee the design and implementation of the construction phase or location-specific maintenance of traffic and traffic control plans for all planned Work;
3. Provide a single point of contact to address maintenance of traffic and work zone safety issues;
4. Coordinate maintenance of traffic and traffic control activities with the public/community outreach staff and the Concessionaire;
5. Provide portable message signs and police presence as required by the Virginia Work Area Protection Manual and these Technical Requirements; and
6. Coordinate maintenance of traffic and traffic control activities with adjacent projects.

F. The MOT Manager shall be a Professional Engineer licensed in the Commonwealth of Virginia with demonstrated maintenance of traffic and traffic control implementation experience. The MOT Manager shall be Advanced Work Zone Safety certified and have completed the necessary training on the proper practices and methods for the maintenance of traffic and traffic control measure installation, maintenance and removal. Any other Design-Builder personnel responsible for inspection, installation or removal of any maintenance of traffic or temporary traffic control measures shall have the Advanced Work Zone Safety certification.

G. The Design-Builder shall conduct daily and weekly maintenance of traffic inspections to ensure all traffic controls, devices and traffic patterns, including pavement markings, are in compliance with the approved plans. Design-Builder shall provide a weekly report that summarizes the results of these inspections and corrective actions taken to address any identified deficiencies.

1.9.2 Maintenance of Traffic and Traffic Control Plans

A. The Design-Builder shall prepare all necessary construction phase or location-specific maintenance of traffic and traffic control plans, including plans depicting the sequencing of the work. Approval of such plans is required prior to the initiation of construction, a detour, or a traffic shift. All maintenance of traffic and traffic control plans or documents shall signed and sealed by a qualified Professional Engineer. Any temporary traffic controls or barriers shall be shown on the AFC Documents.

B. Preliminary roll plans showing the Design-Builder's intended maintenance of traffic and construction sequencing shall be prepared and submitted for review and comment prior to initiating final design.

C. Any proposed use of taper, lane widths, signage or other element that does not meet the requirements of the Virginia Work Area Protection Manual and/or MUTCD must be approved.

D. Temporary drainage design shall be provided with each phase of the traffic control plans.

E. All maintenance of traffic and traffic control plans affecting and adjacent to MWAA facilities (Dulles Toll Road and Dulles Airport Access Road) are subject to review and approval by MWAA.

F. All maintenance of traffic and traffic control plans affecting and adjacent to the George Washington Memorial Parkway are subject to review and approval by the National Park Service (NPS) and/or FHWA Eastern Lands Division.

G. All maintenance of traffic and traffic control plans affecting and adjacent to I-495 in Maryland are subject to review and approval by the MDOT-SHA.

1.9.3 Traffic Analyses

A. The Design-Builder shall prepare traffic analyses and modeling for all construction phases and stages, exclusive of short-term closures, to determine traffic impacts and appropriate control measures. The scope of the traffic analyses and the assumptions to be used will vary depending on the magnitude of the closure, detour or construction activity and are subject to approval. The Design-Builder shall use analytical/deterministic (HCM-based) or traffic simulation/optimization tools for the analyses. Traffic analyses and modeling shall also be required for all construction activities requiring a detour or any lane closures.

B. If additional traffic counts are required, it will be the responsibility of the Design-Builder to collect such data. The timing, type and duration of such traffic counts shall be confirmed prior to completion.

C. Additionally, for local roads with signalized intersections, signal timing plan reviews will be required; The Design-Builder shall note that any proposed detour utilizing local neighborhood streets will require coordination with the applicable locality, as appropriate, and are subject to the terms and conditions of their approvals, where required.

1.9.4 Maintenance of Traffic During Construction

A. The Design-Builder shall maintain the following lane configurations for roadways within the Project limits:

1. I-495: Four lanes (minimum of 11 feet each) in each direction with at least one full and one reduced shoulder in each direction. Existing ramps and/or auxiliary lanes to be retained, except for the existing I-495 northbound shoulder use lane which is not required to be maintained during construction. A full shoulder is considered to

be a minimum of 10 feet wide plus any additional width necessary for stopping sight distance and other applicable requirements. A reduced shoulder is considered to be a shoulder that is reduced below a width that is sufficient for a legal vehicle or truck to safely access or the vehicle width is not contained within the limits of the shoulder striping, but is of sufficient width necessary for stopping sight distance and other applicable requirements.

a. In constrained areas of bridge construction where there is not sufficient available width to provide both a full and reduced shoulder, and where pull-off areas are provided in accordance with the Virginia Work Area Protection Manual at the beginning and end of the constrained area, two reduced shoulders will be permitted for a maximum distance of 1,000 feet.

b. I-495 NB Bridge over Dulles Toll Road Ramps E1 and G3: With appropriate operational justification and supporting traffic analysis, the Design-Builder may propose to use three lanes (minimum of 11 feet each), reduced shoulders, and temporary detour of existing I-495 NB General Purpose lane-to-WB Dulles Toll Road ramp traffic in order to permit construction of the bridge in two phases. The reduction to three lanes in this area shall be limited to a maximum distance of 0.5 miles. Any proposed concepts and supporting justification shall be submitted for review and approval a minimum of six weeks prior to submission of any associated maintenance of traffic plans.

2. Arterial Roadways (Old Dominion Drive, Georgetown Pike, Balls Hill Road, and Live Oak Drive): Existing number of through lanes and all turning movements.

3. George Washington Memorial Parkway: Existing number of lanes in accordance with NPS requirements for shoulders and lane widths.

4. Dulles Toll Road: Existing number of lanes in accordance with MWAA requirements for shoulders and lane widths.

B. Construction signs and pavement markings (temporary) shall be installed, maintained, adjusted, and removed by the Design-Builder throughout the duration of the Project.

C. Work zone information shall be shared with VDOT's Northern Region Operations Advanced Traffic Management System (ATMS) and any other regional ATMS.

D. The Design-Builder shall provide attenuator trucks in accordance with the Virginia Work Area Protection Manual. Only TL-3, Type I Re-Directive Impact Attenuator shall be used on interstates, limited access highways, major arterials, and its associated ramps unless otherwise approved. TL-3, Type II Non-Redirective Impact Attenuator may only be used with movable barrier.

E. The Design-Builder shall be responsible for coordinating directly with the Virginia State Police and/or other authorized law enforcement agencies to provide uniformed law enforcement officer with a marked law enforcement vehicles equipped with a blue flashing lights during any operations involving lane closures and/or rolling lane closures, during all night time closures for work within or adjacent to travel lanes, and any other operation as required by the Virginia Work Area Protection Manual. All costs for such services shall be the Design-Builder's responsibility.

F. Certified flaggers shall be provided in sufficient number and locations as necessary for control and protection of vehicular and pedestrian traffic in accordance with the requirements of the Virginia Work Area Protection Manual. Flaggers shall be able to communicate to the traveling public in English while performing the job duty as a flagger at the flagger station. Flaggers shall use sign paddles to regulate traffic. Flagger certification cards shall be carried by flaggers while performing flagging duties. Flaggers found not to be in possession of their certification card shall be removed from the flagging site and operations requiring flagging will be suspended. Further, flaggers performing duties improperly will have their certifications revoked.

G. The Design-Builder shall confirm the location of any new emergency crossovers between the Express Lanes and General Purpose lanes with law enforcement and emergency services and shall maintain any existing emergency crossover access during construction.

H. Construction signs and pavement markings (temporary) shall be installed, maintained, adjusted, and removed by the Design-Builder throughout the duration of Project NEXT. These items shall be shown on and coordinated with the Sign Sequencing Plan defined in Section 3.9.3 of these Technical Requirements.

I. Long-term closures of the shoulders adjacent to the general purpose lanes are allowable if the required shoulders per Section 1.9.4.A are provided and the closure is separated by an approved concrete barrier configuration. Where concrete barriers are used to close the shoulder, the Design-Builder shall provide pull-off areas in accordance with the Virginia Work Area Protection Manual.

J. The Design-Builder shall schedule construction operations so that approved continuous access is provided for all roads and properties. Connections or entrances shall not be disturbed by the Design-Builder until necessary. Once connections or entrances have been disturbed, they shall be maintained and completed as follows:

1. Connections that had an original paved surface shall be brought to a grade that will smoothly and safely accommodate vehicular traffic through the intersection, using pavement. Connections that had an original unpaved surface shall be brought to a grade that will smoothly and safely accommodate vehicular traffic through the intersection, using either the required material or a temporary aggregate stabilization course that shall be placed as soon as practicable after connections are disturbed.

2. Mainline connections shall have all lanes open during construction. If there are delays in prosecution of work for other connections, connections that were originally paved shall have at least two lanes maintained with a temporary paved surface. Those that were not originally paved shall be maintained with a temporary aggregate stabilization course.

3. Mainline access/egress connections shall have all lanes open during construction unless otherwise agreed with the Concessionaire. Other entrances shall be graded concurrently with the roadway with which they intersect. Once an entrance has been disturbed, it shall be completed as soon as is practicable, including placing the required base and surface course or stabilization. If the entrance must be

constructed in stages, such as when there is a substantial change in the elevation of the roadway with which it intersects, the surface shall be covered with a temporary aggregate stabilization course or other suitable salvaged material until the entrance can be completed and the required base and surface or stabilization course can be placed.

K. Connections with roads and public and private entrances shall be kept in a reasonably smooth condition at all times. Stabilization or surfacing material shall be applied to connections and entrances.

L. If the Design-Builder elects to complete the rough grading operations for the entire Project NEXT or exceeds the length of one full day's surfacing operations, the rough grade shall be machined to a uniform slope from the top edge of the existing pavement to the ditch line.

M. When the surface is to be widened on both sides of the existing pavement, construction operations involving grading or paving shall not be conducted simultaneously directly opposite each other and the surface of pavement shall be kept free from soil and other materials that might be hazardous to traffic. Prior to opening of new pavement to traffic, shoulders shall be roughly dressed for a distance of three feet from the edge of the paved surface.

N. Where the Design-Builder places obstructions such as suction or discharge pipes, pump hoses, steel plates or any other obstruction that must be crossed by vehicular traffic, they shall be bridged in accordance with approved plans. Traffic shall be protected by the display of warning devices both day and night. If operations or obstructions placed by the Design-Builder damage an existing traveled roadway, the Design-Builder shall cease operations and repair damages.

O. Where existing hydraulic cement concrete pavement is to be patched on an active travel lane, the operation of breaking and excavating old pavement shall extend for a distance of not more than one-quarter mile. Patching shall be coordinated with excavating so that an area of not more than one-eighth mile in which excavated patches are located shall be left at the end of any day's work. Necessary precautions shall be taken to protect traffic during patching operations.

P. If the Design-Builder fails to remedy unsatisfactory maintenance, thus not complying with these Technical Requirements within a mutually agreed upon time after receipt of a written notice, the Concessionaire may proceed to engage other forces, equipment, and material to provide such maintenance. The Design-Builder shall reimburse the Concessionaire for the costs of any Concessionaire-provided maintenance.

1.9.5 Detours and Temporary Roadways

A. Detour plans shall be developed by the Design-Builder and presented for approval. The Design-Builder shall coordinate detour plans with local, state and federal agencies (as applicable) and submit and update in advance of any planned detour activity. The Design-Builder shall be responsible for all planning, consultation and coordination with affected parties, and the design, implementation and monitoring, and maintenance of detours.

B. The Design-Builder shall be responsible for design and construction of any additional improvements that may be needed on alternate routes based on the traffic analyses and coordination with the Concessionaire.

C. Temporary roadways, diversion channels, sediment and erosion control features or bridges required by the Technical Requirements will be planned, designed and provided by the Design-Builder.

D. The Design-Builder shall construct, maintain, and remove temporary structures and approaches necessary for use by traffic. After new structures have been opened to traffic, temporary structures and approaches shall be removed. The proposed design of temporary structures shall be submitted for approval prior to construction or installation.

E. All existing sidewalks, shared-use paths, and associated entrances, intersections or access points that will be affected by the work zone or by temporary traffic control measures shall be maintained to provide safe and continuous access or a safe and convenient alternate must be provided by the Design-Builder. In no event shall sidewalks or shared use paths be closed without approved alternative facilities in place.

1.10 Quality

1.10.1 General Requirements

A. The Design-Builder shall develop, implement, and maintain a quality management system that includes a Quality Management System Plan (QMSP) that meets the applicable Standards and Specifications set forth in Attachment 1.5a, including VDOT Minimum Requirements for Quality Assurance & Quality Control on Design-Build & Public-Private Transportation Act Projects (QA/QC Guide). Where appropriate, the QMSP shall also incorporate requirements from VDOT Manual of Instructions for Materials Division, applicable design manuals, Construction Manual, Instructional Informational Memoranda, Maintenance Manual, Survey Manual, Right of Way Manual, Utility Relocation Manual, and Inspection Manual, as well as the Road and Bridge Specifications, Road and Bridge Standards, MUTCD, and Virginia Work Area Protection Manual.

B. The QMSP shall describe the system, policies, and procedures that address the Work required, delivering the Project and providing documented evidence that the Work is performed in accordance with the Contract Documents.

C. The Design-Builder, subcontractors, suppliers and consultants shall adhere to the QMSP.

D. Neither the Design-Builder nor any of its subcontractors, suppliers or consultants, shall be delegated quality management responsibility in any manner such that the Design-Builder is relieved of any responsibility or liability for the performance of those entities. At all times, contractual and otherwise, and by all means, the Design-Builder shall be contractually responsible for the quality compliance of the Project no matter the provider of services or supplier of material.

E. The Design-Builder shall review and report its compliance with all PDPs, in accordance with the schedule in Attachment 1.3, as part of their quality management system.

F. The Design-Builder and its subcontractors, suppliers, or consultants shall ensure that their quality records are available to enable them to monitor and establish whether the Design-Builder's obligations under the Contract are met.

1.10.2 Design Quality Management

A. The Design-Builder is responsible for design quality in accordance with the QA/QC Guide. The Design Manager shall be responsible for establishing and overseeing a QA/QC program for all pertinent disciplines involved in the design of the Project, including review of design, working plans, shop drawings, specifications, and constructability of the Project. This individual shall be responsible for all of the design, inclusive of QA/QC activities. Members of the Design QA/QC team are responsible for review of all design elements to ensure the development of the plans and specifications are in accordance with the requirements of the Contract. Design QA should be performed by one or more member(s) of the lead design team that are independent of the Design QC. The Project design control plan will provide the Concessionaire assurance that the design plans and submittals will meet all contract requirements. The Quality Assurance Manager (QAM) shall verify that all design related work packages submitted for payment have been certified by the Design Manager as being in conformance with the Contract and the Design QA/QC Plan.

B. Appendix 2 of the QA/QC Guide provides minimum requirements that shall be met for development of the Design QA/QC Plan.

1.10.3 Construction Quality Management

A. The Design-Builder shall develop, execute, and maintain a Construction QA/QC Plan for the full duration of the Construction Period in accordance with the QA/QC Guide. The Design-Builder shall have the overall responsibility for both the QA/QC activities and shall be responsible for all QA activities and QA sampling and testing for all materials used and work performed on the Project. These QA functions shall be performed by an independent firm that has no involvement in the construction and QC program and activities. There shall be a clear separation between QA and construction, including separation between QA inspection and testing operations and construction QC inspection and testing operations, including testing laboratories. Two independent, AASHTO Material Reference Laboratory-certified testing laboratories will be required, one for QA testing and one for QC testing.

B. The Quality Assurance Manager shall also mean the Lead Quality Manager.

C. The QAM shall have the responsibility to enforce the Contract Document requirements when deficient materials or unsatisfactory finished products fail to conform. The QAM, in accordance with his or her assignment, shall be responsible to observe the construction in progress and to ensure the QA/QC testing and inspection is being performed.

D. The Design-Builder shall establish and maintain a Quality Assurance Auditing and Non-conformance Recovery Plan (AR Plan) for uniform reporting, controlling, correction and

disposition, and resolution of non-conformance (including disputed non-conforming items) issues that may arise on the Project. The Design-Builder's AR Plan shall establish a process for review and disposition of non-conforming workmanship, material, equipment, or other construction and design elements of the Work, including the submittal of the design review process for field changes. All deficiencies (hereinafter referred to as a Non- Conformance), including those pertaining to rules, regulations, and permit requirements, shall be documented by the QAM. An NCR referenced by a unique number shall be forwarded within seven (7) days of discovery of the non-conformance. Non-conformance procedures are provided in the QA/QC Guide.

E. The Design-Builder shall also be responsible for providing QA/QC testing for all materials manufactured off-site.

F. The Design-Builder may use VDOT's resources for the following construction quality control activities where VDOT routinely provides these services:

1. Off-site programmatic inspection, including supplier plant acceptance inspections;
2. Off-site programmatic testing, including supplier plant acceptance testing; and
3. Items on the VDOT's pre-approved list.

G. Any inspections by Concessionaire or VDOT representatives shall not relieve the Design-Builder of any obligation to furnish acceptable materials and to provide acceptable designs and complete construction in accordance with the Contract Documents.

H. The Concessionaire shall be reimbursed by the Design-Builder for all expenses associated with off-site plant inspections if a non-conforming condition causes the need for any additional Concessionaire off-site plant inspection.

I. The QAM shall establish quantities prior to commencing construction, and provide the Concessionaire a total number of QC, QA Independent Assurance (IA) and Independent Verification Sampling and Testing (IVST), Owner's (the Concessionaire) Independent Assurance (OIA), and Owner's Independent Verification Sampling and Testing (OVST) required as a result of the quantities and the sampling and testing requirements as set forth in Table A-3 and A-4 of the QA/QC Guide. The Concessionaire will make the final determination of the actual number of OIA and OVST tests to be performed.

J. The QAM shall be responsible for the QA inspection, witnessing and testing of all materials and equipment used and work performed on the Project to include observing the Contractor's QC activities, maintaining the Materials Notebook, documentation of all materials, sources of materials and method of verification used to demonstrate compliance with the Contract. The QAM shall be vested with the authority and responsibility to stop any work not being performed according to the Contract. The construction QA and QC inspection personnel shall perform all of the construction inspection and sampling and testing work. This includes the documentation of construction activities and acceptance of manufactured materials. The Design-Builder's Quality Assurance firm shall have a presence onsite during any and all construction operations to ensure all construction work and QC activities are being performed.

K. The QAM shall assign, at a minimum, one Lead QA Inspector for Construction to the Project prior to the start of construction. This individual must be on the site full-time for the duration of all construction of the Project, shall be responsible to observe construction as it is being performed, to include all QC activities to ensure inspection and testing, and correction of any non-conformities of the Work are being performed. The Lead QA Inspector for Construction shall be supported by other QA inspectors under his/her direction to ensure at any time all construction operations and QC activities are being observed. The Lead QA Inspector for Construction shall report directly to the QAM.

L. In addition to the Lead QA Inspector for Construction, the QAM shall assign the following additional Lead QA Inspectors, who shall report to the QAM:

1. Lead QA Inspector for Electrical and Traffic Management Systems;
2. Lead QA Inspector for MOT; and
3. Lead QA Inspector for Environmental Compliance.

M. All sampling and testing shall be performed by a laboratory that is accredited in the applicable AASHTO procedures by the AASHTO Accreditation Program (AAP). For test methods not accredited by AAP, the laboratory must comply with AASHTO R18 (most current Edition) and must be approved. Two independent testing laboratories will be required, one for QA testing and one for QC testing. The entity(ies) performing QA operations, inspections, sampling, and laboratory testing and the entity(ies) performing QC operations, inspections, sampling, and laboratory testing shall be unique and independent from one another.

N. The Design-Builder shall not perform destructive sampling or testing of the work without written authorization. Unauthorized destructive sampling or testing will cause the work to be considered unacceptable. In the event the Design-Builder is granted authorization to perform destructive sampling or testing, the Design-Builder shall obtain the approval for the method and location of each test prior to beginning such sampling or testing. In addition, destructive sampling and testing shall be performed in the presence of the Concessionaire.

O. All construction QA/QC personnel shall hold current materials certifications for the types of materials testing that they are assigned to perform in accordance with the QA/QC Guide and for the safety and use of nuclear testing equipment as required by the Road and Bridge Specifications. The QA programs shall be performed under the direction of the QAM. The QC programs shall be performed under the direction of the Design-Builder's Construction Manager. The Concessionaire shall have the right to order the removal of any construction QA/QC personnel, including the QAM and the Design-Builder's Construction Manager for poor performance at the Concessionaire's sole discretion. The QA/QC plans shall include procedures for rapid reporting of any non-compliances and shall include the process for implementing any necessary remedial actions.

P. All electrical and TMS testing will be performed in accordance with applicable electrical and communications standards and documented to meet the design details, standards, and system requirements.

Q. As applicable, the Design-Builder shall provide, prior to Service Commencement or Final Completion, a complete set of Project records that include, but are not limited to, the following:

1. Project correspondence;
2. Project diaries;
3. Test reports;
4. Invoices;
5. Materials books;
6. Certified survey records;
7. DBE and SWaM records;
8. Right of way records;
9. Utility records;
10. Warranties;
11. As-built drawings; and
12. Special tools.

1.10.4 Materials Supply and Quality Requirements

A. The QMSP shall describe procedures for ensuring that materials used throughout the Work conform to the requirements of the Contract Documents. Unless otherwise specified in the Technical Requirements or subject to mutual agreement, materials, equipment, and components that are to be incorporated into the finished Work shall be new. As part of the AFC Documents, the Design-Builder shall submit statements of the known origin, composition, and manufacture of all materials to be used in the Work, including optional or alternate items, using VDOT's Form C-25.

B. All materials or equipment (excluding the equipment maintained and operated by the Design-Builder) physically installed, which will become part of the completed Work, whether it is permanent or temporary, must conform to the requirements of the Contract Documents, and shall be furnished with valid test data required to document the quality of the material or equipment at least two weeks prior to delivery. The Design-Builder shall change the source of supply and furnish material or equipment from other approved sources, if the requirements are not met, and shall notify the Concessionaire of this change, and provide the same identifying information noted in this section, at least two weeks prior to delivery. Materials shall not contain Hazardous Waste or be furnished from a source containing toxic, hazardous or regulated solid wastes.

1.10.5 Inspection of Work

A. The Design-Builder is responsible for continuous quality control and quality assurance in accordance with the QMSP. All stages, materials, and details of the Work, including

machines and plant equipment used in processing or placing materials, are subject to independent inspection by the Concessionaire, VDOT and/or authorized third-parties.

B. If materials are used or Work is performed without following the QMSP or relevant procedures, the Design-Builder may be required to remove and replace non-conforming Work or material at no additional cost. The Design-Builder shall abide by the QMSP in terms of correcting defective, deficient, or non-conforming Work. Any such defective, deficient, or non-conforming Work that is not completely replaced or otherwise remains in place, must be accepted prior to the addition of any new Work being constructed on or adjacent to the defective, deficient, or non-conforming Work, unless otherwise mutually agreed by all parties. Approval or disapproval of non-conforming Work shall be given within fourteen (14) days of submittal, or as otherwise mutually agreed. The Concessionaire shall reduce the payment due to the Design-Builder if the Concessionaire elects to accept any non-conforming Work.

C. If an inspection reveals that Work has not been properly performed, the Design-Builder shall promptly inform the Concessionaire of the schedule for correcting such Work and the time when an inspection of the corrected Work can be made.

1.10.6 Removal of Unacceptable or Unauthorized Work

A. No Work shall be done until the Design-Builder establishes the applicable right of way, lines and grades. Work that is done beyond the lines shown on the plans, unless otherwise agreed, will be considered unauthorized. Such Work shall be subject to review and may be ordered removed or replaced.

B. Any Work by the Design-Builder that does not conform to the Technical Requirements, must be promptly identified by the responsible party, as identified in the QMSP. Work will be considered unacceptable if it: (a) does not conform to the requirements of the Contract; (b) is performed contrary to the instructions of the Concessionaire; or (c) is performed without the authorization of the Concessionaire. Unacceptable work shall be remedied or removed immediately unless otherwise determined, and replaced in an acceptable manner at the Design-Builder's expense. Full payment will not be made for any defective, deficient, or non-conforming Work, until such time the Work is satisfactorily completed and accepted. The Concessionaire may elect, in its sole discretion, to accept otherwise unacceptable work at a reduced price and with a warranty extended to five (5) years for the subject portion of the Work.

C. If the Design-Builder fails to comply promptly with any order of the Concessionaire or the Quality Assurance Manager made under the provisions of the QMSP, the Concessionaire or the Quality Assurance Manager will have the authority to cause unacceptable or unauthorized Work to be remedied, or removed and replaced. If the Design-Builder fails to exercise the appropriate management of the Work with regards to the remedy of defective, deficient, or non-conforming Work, or the prevention of such defective, deficient, or non-conforming Work from re-occurring, the Concessionaire shall have the right to stop or suspend the affected Work until such time the defective, deficient, or non-conforming Work is remedied, and if necessary remedied by other means at the Design-Builder’s expense.

1.11 Third Parties and Permitting

1.11.1 Permitting

A. The Design-Builder shall obtain permits, approvals, and coordinate with any relevant Governmental Authorities and other entities necessary to complete Project NEXT. All Governmental Approvals applicable to the Work will be the responsibility of the Design-Builder, with the exception of those Governmental Approvals for which the Concessionaire or VDOT is responsible per the Contract Documents. The Design-Builder shall provide copies of all permits and permit modifications upon receipt.

B. The Design-Builder will be responsible for all costs associated with compliance with any ordinance and Law or any violations of Law attributed to the activities of the Design-Builder.

C. If any work is performed on property owned or controlled by a governmental authority or agency, the Design-Builder shall follow any entity-specific permitting requirements as specified in Sections 1.11 of these Technical Requirements.

1.11.2 Third Parties

A. If any portion of Project NEXT is located within the limits of a municipality or locality, military installation, or other federally owned property, the Design-Builder shall cooperate with the appropriate officials and agents in the prosecution of the Work to the same extent as with the Concessionaire.

B. The Design-Builder shall coordinate its activities with municipalities and localities, MWAA, NPS, MDOT-SHA and other contractors working in the area. As required by the Contract Documents, the Design-Builder's work program and schedule shall consider and coordinate with the work of other contractors involved with adjacent work, including maintenance, in the corridor.

C. If other separate contracts are awarded by the Concessionaire or by other Governmental Authorities, including projects under the PPTA, affect the Design-Builder's Work, including work related to abutting or connecting roadways and maintenance work, the Design-Builder shall coordinate its work with the work being performed by the other contractors. The Concessionaire will contractually require its separate contractors to cooperate with, and coordinate their activities with, the Design-Builder.

D. The Design-Builder shall be responsible for contacting other contractors regarding their anticipated schedules to complete the associated projects or key milestones of the associated projects.

E. The Design-Builder shall not impede the access or progress of such work by other contractors, but shall cooperate and coordinate with other contractors for the timely completion of all construction activities. This shall include attendance at coordination meetings deemed necessary or advantageous to properly schedule and sequence the respective work.

1.11.3 Fire Hydrants

A. No Work shall be undertaken around fire hydrants until provisions for continued service have been approved by the local fire authority.

B. When the Design-Builder's Work requires the disconnection of "in service" fire hydrants, the Design-Builder shall notify the locality's fire department or communications center at least 48 hours prior to disconnection. In addition, the Design-Builder shall notify the locality's fire department or communications center no later than 24 hours after reconnection of such hydrants.

1.11.4 Metropolitian Washington Airport Authority Permitting

A. Designs for Work on Dulles Toll Road and Dulles Airport Access Road facilities may be subject to additional coordination, review and comment, and approval by MWAA representatives. If required by MWAA, the Design-Builder shall prepare separate design submittals for Work on Dulles Toll Road and Dulles Airport Access Road facilities at least at the preliminary, interim and final stages to secure the MWAA's approval.

B. The Design-Builder shall support and attend technical and coordination meetings with the Concessionaire and MWAA representatives as required, including but not limited to design, access, security, and construction coordination related meetings. The Design-Builder shall prepare the necessary documents for review in advance of these meetings and prepare and provide meeting minutes within 48 hours of such meetings.

C. Construction activities within the Dulles Toll Road or Dulles Airport Access Road limits, including lane closures, require permits and/or prior approval from MWAA. Additional details on MWAA-specific permitting requirements are provided in Attachment 1.11a.

1.11.5 Maryland State Highway Administration Permitting

A. Designs for Work on I-495 in Maryland may be subject to additional coordination, review and comment, and approval by MDOT-SHA representatives. If required, the Design-Builder shall prepare separate design submittals for Work on in Maryland and along George Washington Memorial Parkway facilities at least at the preliminary, interim and final stages to secure the MDOT-SHA approval.

1. The Design-Builder shall follow all applicable MDOT-SHA design standards, specifications, special provisions and other requirements, which are available at: https://www.roads.maryland.gov/mdotsha/pages/Index.aspx?PageId=65

   Additional MDOT-SHA requirements specific to maintenance of traffic, access to work permitting processes and lighting design are provided in Attachment 11.1.b.

2. In additional to the applicable requirements in Section 1.7 (Utilities), the Design-Builder shall work directly with Pepco to establish any proposed points of service for electric power required for NEXT Work in Maryland.

3. Lane closure permit applications and contact information can be found at https://www.roads.maryland.gov/OOC/Traffic-Control-Permit-Application.pdf.

4. Design-Builder Requests for Information from MDOT-SHA, including requests for MDOT-SHA As-Builts, Inspection Reports, or technical studies are to be directed to the MDOT P3 office. Direct inquires may be sent to Bryan Townsend at BTownsend3.consultant@mdot.maryland.gov.

B. The Design-Builder shall support and attend technical and coordination meetings with the Concessionaire and MDOT-SHA representatives throughout the Construction Period, including but not limited to design, access, security, and construction coordination related meetings. The Design-Builder shall prepare the necessary documents for review in advance of these meetings and prepare and provide meeting minutes within 48 hours of such meetings.

C. VDOT will be responsible for obtaining the access permit required by MDOT-SHA for Work to be performed in Maryland associated with Project NEXT. The Design-Builder shall submit to MDOT-SHA the design of elements to be constructed in Maryland, along with the proposed maintenance of traffic and traffic control plans for such work. Upon MDOT-SHA review (and revision, if necessary), and approval of the plans, the Design-Builder shall notify the Concessionaire and VDOT no less than 90 days prior to the planned execution of the work in Maryland. The Design-Builder will be notified once the permit has been obtained Work is authorized to be performed in Maryland.

1.11.6 National Park Service Permitting

A. Designs for Work on George Washington Memorial Parkway facilities may be subject to additional coordination, review and comment, and approval by NPS representatives. If applicable, the Design-Builder shall prepare separate design submittals for Work on George Washington Memorial Parkway facilities at least at the preliminary, interim and final stages to secure the NPS approval.

B. The Design-Builder shall support and attend technical and coordination meetings with the Concessionaire and NPS representatives as required, including but not limited to design, access, security, and construction coordination related meetings. The Design-Builder shall prepare the necessary documents for review in advance of these meetings and prepare and provide meeting minutes within 48 hours of such meetings.

1.11.7 Fairfax County Park Authority Permitting

A. Designs for Work on Scott's Run Nature Preserve or other Fairfax County Park Authority (FCPA) facilities may be subject to additional coordination, review and comment, and approval by FCPA representatives. If applicable, the Design-Builder shall prepare separate design submittals for Work on Scott's Run Nature Preserve property at least at the preliminary, interim and final stages to secure the FCPA approval.

B. The Design-Builder shall support and attend technical and coordination meetings with the Concessionaire and FCPA representatives as required, including but not limited to design, access, security, and construction coordination related meetings. The Design-Builder shall prepare the necessary documents for review in advance of these meetings and prepare and provide meeting minutes within 48 hours of such meetings.

1.12 Emergency Services

A. The Design-Builder shall comply with the Concessionaire requirements for participation in industry and statutory initiatives regarding emergency management.

B. The Design-Builder's response to emergencies and extraordinary circumstances as part of Project NEXT will be consistent with regional or VDOT emergency evacuation plans and shall ensure that:

1. Safety of motorists, pedestrians and workforce personnel shall be the primary objective for all decisions and actions;
2. Clearance of a travel lane for emergency response vehicles shall be by the most expedient route whether General Purpose lanes or Express Lanes (in such circumstances, the decision of VDOT or the emergency services in charge shall govern);
3. Military vehicles acting in an emergency response capacity or in defense of the sovereign homeland of the United States of America shall be given free and unrestricted access to the Express Lanes;
4. If the U.S. Secret Service, in coordination with the Virginia State Police, determines movements of the President of the United States require use of the Express Lanes, the Design-Builder shall cooperate and comply fully with respect to Work activities, lane closures and traffic management;
5. VDOT reserves the right, by direction of the Northern Virginia District Administrators or the Northern Regional Operations (NRO) Director, to assume and exercise control of the Express Lanes in part and/or in their entirety, including all applicable systems and field devices via available interfaces; and
6. The Design-Builder will, as needed, participate in emergency management exercises conducted by the Concessionaire, VDOT, or other Governmental Authorities.

C. During special events that have significant impact on traffic flow, the Design-Builder shall designate a responsible party in charge to work with VDOT's NRO Special Events and Incident Management Coordinator to develop traffic management plans for the event.

D. Should the Design-Builder fail to respond to an emergency or extraordinary circumstance in a timely manner, the Concessionaire shall have the right to take necessary and appropriate action to handle such emergency or extraordinary circumstance.

1.13 Safety

A. The Concessionaire and the Design-Builder recognize that in every circumstance, activity, and decision related to Project NEXT, the safety of the public and Design-Builder, Concessionaire, and VDOT personnel is the primary concern. Ensuring and maintaining safety on Project NEXT is paramount.

B. The Design-Builder's designated Safety Manager shall be responsible for overall Project health and safety programs and shall have the necessary expertise and experience

required to ensure compliance with applicable laws, the Design-Builder's safety program, and the Concessionaire's safety requirements. If for any reason, including a request from the Concessionaire related to performance, the approved Safety Manager must be replaced during the Contract term, the Design-Builder shall provide notice of such and seek formal approval of the replacement. The Design-Builder shall ensure this function is maintained during any transition period.

C. The Design-Builder shall comply with the Virginia Occupational Safety and Health Standards adopted under the Code of Virginia and the duties imposed under the Code. Any violation of the requirements or duties that is brought to the attention of the Design-Builder or any other person shall be immediately corrected.

D. Compliance with current construction safety and health standards and the Safety aspects of these Technical Requirements is a condition of the NEXT Design-Build Contract, and shall be made a condition of each subcontract entered into by the Design-Builder. The Design-Builder and any Contractor shall not require any worker employed in performance of the NEXT Work to place themselves in surroundings or under working conditions that are unsanitary, hazardous, or dangerous to their health or safety, as determined under construction safety and health standards promulgated by the U.S. Secretary of Labor in accordance with the requirements of Section 107 of the Contract Work Hours and Safety Standards Act.

E. The Design-Builder shall comply with the safety requirements listed below, the Health, Safety, and Environment Requirements included in Attachment 1.13 and the policies and procedures included in the Design-Builder's approved Health, Safety and Security Plan.

1. The Design-Builder shall ensure that the Health, Safety and Security Plan and associated policies and procedures are provided to all relevant personnel before such personnel are permitted access to the Project NEXT site or perform any Project NEXT Work.
2. The Design-Builder shall ensure that all required safety training is properly conducted in a timely manner. At a minimum, foremen and above assigned to the Project shall have CPR, First Aid, and OSHA-10 certification, or demonstrate completion of necessary training and achievement of such certifications within 90 days of assignment to the Project.
3. Specialized training (e.g., work zone safety, confined space, erosion and sediment control, energized lines, etc.) shall be provided to all relevant personnel if such training is required.
4. Hard hats and appropriate safety footwear (steel or composite toe) as per OSHA 1926.100 and ASTM F 2413 (Specification for Performance Requirements for Protective Footwear) shall be worn while participating in or observing all types of field Work when outside of a building or outside the cab of a vehicle, and exposed to, participating in or supervising construction.
5. Respiratory protective equipment shall be worn whenever an individual is exposed to any item listed in the OSHA standards as needing such protection unless it is shown that the employee is protected by engineering controls.

6. Adequate eye protection (safety glasses as per ANSI/ISEA Z87.1-2010 (Z87+) - Standard for Occupational and Educational Eye and Face Protection Devices) shall be worn in the proximity of grinding, breaking of rock and/or concrete, while using brush chippers, striking metal against metal, or when working in situations where the eyesight may be in jeopardy.
7. A Class 3 high visibility shirt, vest, or jacket as per ANSI/ISEA 107-2004 (Standard for High-Visibility Safety Apparel and Headwear) shall be required and properly worn at all times on the Project Site or when on or near any roadway, whether or not protected by a concrete or steel barrier. In addition, Class 3 pants are required whenever not protected by a concrete or steel barrier. Note: These must be worn over any other clothing such as rain coats.
8. Standards and guidelines of the current Virginia Work Area Protection Manual shall be used when setting, reviewing, maintaining, and removing traffic controls.
9. Flaggers shall be certified in accordance with the Virginia Flagger Certification Program.
10. No person shall be permitted to position themselves under any raised load or between hinge points of equipment without first taking steps to support the load by the placing of safety bar or blocking.
11. All Federal, State and local regulations pertaining to explosives shall be strictly followed.
12. All electrical tools shall be adequately grounded or double insulated. Ground Fault Circuit Interrupter (GFCI) protection must be installed in accordance with the National Electrical Code (NEC) and current Virginia Occupational Safety and Health agency (VOSH). If extension cords are used, they shall be free of defects and designed for their environment and intended use.
13. No person shall enter a confined space without training, permits, and authorization.
14. Fall protection shall be required whenever an employee is exposed to a fall six feet or greater.
15. Hearing protection as per ANSI/ISEA S12.68-2007 for hearing protection must be carried at all times and must be worn when working near areas where excessive noise is being generated.
16. When working near hot areas, such as road asphalting, long sleeve cotton shirts and pants must be worn whether night or day.
17. All damaged or worn PPE must be replaced immediately. No person may undertake any task using or wearing faulty PPE.

F. If the Design-Builders' actions (or that of its subcontractors or suppliers) create an unsafe environment for the Design-Builder's workers, Concessionaire or VDOT personnel, or the travelling public, upon notification, the Design-Builder shall immediately stop operations in that location to identify the cause(s) and resolve the safety issues. All reports of unsafe behavior received by the Design-Builder will be promptly investigated

and, where necessary, changes made to the personnel. construction methods or work zone protections.

G. If required by the Design-Builder's or any subcontractor's performance, or as requested, the Design-Builder shall conduct root cause analyses to determine those factors that are contributing to safety-related incidents and/or trends that are negatively affecting the performance of the work, the health and safety of workers, or the travelling public. In each instance, the Design-Builder shall identify and implement appropriate corrective actions.

H. Safety Reporting

1. The Design-Builder shall submit, on a monthly basis, a Safety Statistics Report that shall, at a minimum, include the following information:
   a. Number and Rate of First Aid Cases;
   b. Number and Rate of Recordable Cases;
   c. Number and Rate of Lost Work Day Cases;
   d. Number of Days Away from Work;
   e. Number of Field Work Hours;
   f. Number of Near-Miss Incidents;
   g. Number of Utility Hits;
   h. Number of Investigation Reports;
   i. Number of Property Damage Claims; and
   j. Number of Field Personnel.

   This information shall be provided for Direct Hire, Subcontract, and Total Labor on the Project. Information shall be provided for Current Month, Year-to-Date, and Project-to-Date.

2. For any First Aid, Near Miss, Injury, Illness, or Property Damage Incident involving the Design-Builder (including subcontractors, consultants and suppliers), within 24-hours of the incident, the Design-Builder shall provide a detailed Report of Incident that shall include time and date, brief description, classification type, location of injury. Within one week of the incident, the Design-Builder shall provide any update of the 24-hour report and an analysis of the root cause of the incident.

3. The Design-Builder shall submit, on a monthly basis, a Safety Corrective Actions Register showing all actions for the month (not just from incident sources, i.e. audits and inspections), their corrective action type (e.g. elimination, administration, isolation, engineering) and their status (open or closed).

I. Safety Leadership Team

1. The Design-Builder shall participate in and support the Safety Leadership Team established for the Project NEXT. The Safety Leadership Team will operate under a charter to provide strategic direction for continuing improvement of the Project's safety performance.

2. The Safety Leadership Team shall be chaired by the Design-Builder's NEXT Safety Manager and shall include senior representatives from the Design-Builder, Concessionaire, and VDOT.
3. The Safety Leadership team shall meet on at least a monthly basis to review the following performance metrics:
    - Safety performance goals, to assure they are suitable and remain suitable for the entire project;
    - Analyses of trends or incidents, near misses, hazards, observations, and implement appropriate corrective actions;
    - Status of corrective actions and Safety Leadership Team actions;
    - Effectiveness of hazard and risk controls; and
    - Innovative ideas and actions to improve Safety performance.
4. The Safety Leadership team shall undertake regular site visits and establish a Project safety observation program that encourages all parties to make and record safety observations (both positive and areas for improvement) with a view to discussing trends at the monthly meetings.

1.14 Adjacent Project Coordination

A. The timing and scope of Project NEXT may overlap with other active VDOT, Concessionaire, or third-party projects in the vicinity of the Project limits. The Design-Builder shall coordinate and interface with the respective project teams and their associated consultants and contractors throughout the duration of the project to ensure that the respective projects are safely and properly coordinated and scheduled.

B. In addition, VDOT conducts annual structural and bridge inspection/maintenance, regular roadway maintenance and paving maintenance that may include work within the Project NEXT limits. Similar maintenance activities may be conducted by MWAA or NPS. The Design-Builder shall cooperate and provide the necessary access to the VDOT, MWAA, or NPS forces to complete these activities. Existing projects that have been awarded for construction and any emergency maintenance projects and their respective contractors shall have priority in scheduling activities in any areas where planned work overlaps.

1.15 Sustainability

1.15.1 General

A. Sustainability requirements shall be integrated by the Design-Builder into design and construction of the Project. In general, sustainability shall address practices in the following categories:

1. Energy use;
2. Land and Water use;
3. Materials use; and
4. Environmental quality.

B. The Concessionaire has established a goal to achieve a Silver Award rating as recognized by the Envision™ Sustainable Infrastructure Rating System of the Institute for Sustainable Infrastructure (ISI). The Design-Builder shall register the Project with the ISI and achieve at least a Silver Award rating for the Project.

C. The Design-Builder shall provide a qualified Sustainability Coordinator to manage the development of a Sustainability Plan and coordinate implementation of the Plan. This individual shall be an ISI credentialed Envision Sustainability Professional with experience in linear infrastructure projects and a full understanding of the sustainability design and construction processes and programs.

D. The Design-Builder shall comply with the Concessionaire's monthly sustainability reporting requirements and include such reporting in the Monthly Progress Report.

1.15.2 Energy Use

A. The Design-Builder shall identify and implement an energy use and emissions strategy that identifies processes and methods to:

1. Avoid or reduce energy use;
2. Improve energy efficiency;
3. Source low carbon energy (onsite); and
4. Source low carbon energy (offsite).

1.15.3 Land and Water Use

A. The Design-Builder shall identify and implement initiatives to reduce the construction footprint of the Work (permanent and temporary).

B. The Design-Builder shall minimize total water consumption and potable water consumptions by:

1. Using water efficient controls, fixtures, and fittings;
2. Collecting, treating, and reusing process water;
3. Using recycled water or treated water;
4. Rainwater reuse;
5. Using water from recycled water networks; and
6. Collecting, treating and reusing groundwater and stormwater.

C. The Design-Builder shall meter and record water consumed within temporary facilities and used within the construction site, including, but not limited to, major plant and processing equipment.

1.15.4 Materials Use

A. Waste and Materials

1. The Design-Builder shall reduce materials use through materials avoidance and reduction strategies and minimize construction materials volumes through design refinement, construction planning and construction methods.
2. The Design-Builder shall reuse construction and demolition waste where practicable.
3. The Design-Builder shall source all lumber products used in the Work (permanent and temporary) from either re-used lumber, post-consumer recycled lumber or from Forest Stewardship Council (FSC) certified lumber suppliers where practicable.
4. The Design-Builder shall avoid the production of hazardous waste.
5. The Design-Builder shall ensure that at least 90% of inert and non-hazardous construction waste, excluding spoil, and at least 90% of office waste is recycled or alternatively beneficially reused.
6. The Design-Builder shall negotiate and implement packaging take back arrangements with suppliers where practicable.
7. The Design-Builder shall select compostable or reusable temporary erosion control devices where practicable.
8. The Design-Builder shall provide recycling facilities within the Construction Site.
9. The Design-Builder shall mulch all cleared vegetation (excluding weeds). The mulch shall be reused on site to the maximum extent possible and any remaining mulch shall be sent to an offsite compost facility.

B. Spoil Management

1. The Design-Builder shall identify and implement initiatives to both reduce spoil quantities, which will be generated during the performance of the Work, and maximize the beneficial reuse of spoil.
2. The Design-Builder shall ensure that the environmental and social impacts of spoil transfer and reuse are effectively managed and minimized.

1.15.5 Environmental Quality

A. The Design-Builder shall identify and implement initiatives for biodiversity enhancement and enhancing habitat connectivity.

B. The Design-Builder shall minimize clearance of vegetation during construction of the Work.

C. The Design-Builder shall undertake any revegetation work as soon as practicable.

D. The Design-Builder shall identify and implement pollution control initiatives and target zero pollution incidents.

1.15.6 Sustainable Procurement

A. The Design-Builder shall develop, implement, and maintain procurement processes for informing subcontractors regarding sustainable procurement requirements for purchase of materials, goods, and services.

1.15.7 Sustainability Plan

A. The Design-Builder shall prepare and submit a project-specific Sustainability Plan within sixty (60) days after Limited Notice to Proceed.

B. The Design-Builder's Sustainability Plan shall include the following elements:

1. Introduction and Basis;
2. Goals;
3. Sustainability Commitments – list all sustainability elements (mandatory, voluntary, or optional);
4. Implementation Process and Responsibilities;
5. Monitoring Implementation, Measurement, Reporting and Verification; and
6. References.

The Sustainability Plan shall also be consistent with, or include as a component, the Envision Guidance Manual, Envision Credit Cover Sheets, and Envision Pre-Assessment Checklist.

C. The Design-Builder's Sustainability Plan shall include mandatory and voluntary elements for sustainability on the Project and include a process for identifying and submitting additional cost-effective sustainability opportunities as the Project progresses.

D. Capture of existing regulatory standards, local government policies and programs, and project requirements that reflect sustainability elements.

E. The Design-Builder's progress reporting on each criteria element shall be provided on a monthly basis in a tabulated format, list the following for each criteria element:

1. Basis of the Criteria (Code/Document Reference);
2. Detailed description of the Sustainability Criteria Element/commitment;
3. Benefits: Functional, Maintenance, Cost, Schedule, and Life Cycle; and
4. Environmental Benefits – Short and Long Term Implementation Method/Status/verification, including reasons for non-implementation.

2 Public Information and Communications

2.1 Public Information

2.1.1 General Requirements

The Design-Builder, in collaboration with the Concessionaire, shall develop the required process and procedures for public and stakeholder outreach, media relations, and public information during the Work period in the form of a Communications, Public Outreach, and Community Engagement Plan (hereafter "Communications Plan"), which will be consistent with the NEXT Technical Requirements, including the requirements in Attachment 1.3. These processes and procedures will acknowledge that there are differing responsibilities for Concessionaire, Design-Builder, and VDOT during the Work period.

2.1.2 Interface and Liaison with the Concessionaire and VDOT

A. Management protocols shall be developed between the Design-Builder's Project NEXT communications team, the Concessionaire, and VDOT. These protocols shall address:

1. Regime for regular reporting communications activities, current and outstanding community issues, and recent media activity;
2. Media interfaces, providing clarity of responsibility in relation to media comment on particular aspects of Project NEXT;
3. Stakeholder relations, including Design-Builder's responsibilities for briefing and providing information to stakeholders on Project NEXT progress and construction milestones;
4. Requirements for the Concessionaire's review and comment on Project NEXT communications, and public outreach materials;
5. Processes for managing communications surrounding emergency management and recovery operations; and
6. Requirements for interface and liaison with VDOT on public and stakeholder outreach, media relations and public information matters.

B. Meetings and public interface required by federal and state law will be conducted in accordance with the current version of VDOT's Public Involvement Manual. The Design-Builder shall conduct additional meetings, public interface, and marketing activities in accordance with the approved Communications Plan.

C. The Design-Builder shall collaborate with the Concessionaire in the development of all communications and marketing strategies to ensure they are consistent with both parties' values, needs, and goals. The Design-Builder shall provide the Concessionaire with advance copies of project-related communications materials for review and approval prior to dissemination. The Concessionaire will provide any comments in a timely fashion.

D. The Concessionaire reserves the right to review and comment on any public communications materials prepared by the Design-Builder related to Project NEXT, including publicity and branding materials.

2.1.3 Project Communications Team

A. The Design-Builder shall establish a Project NEXT communications team through which all communication and public outreach activities on Project NEXT on behalf of the Design-Builder will be coordinated. The project communications team will include representatives from the Concessionaire, Design-Builder, and VDOT.

B. The Project NEXT communications team will include:

1. the Concessionaire's Public Affairs Manager and adequate support staff and/or consultants, who shall have responsibility for coordinating delivery of the Communications Plan. The Public Affairs Manager will manage the relationship with VDOT's communication team and reporting on all communications and outreach activities;

2. a Design-Builder's Public Information Manager and adequate support staff and/or consultants, who shall have responsibility for coordinating the Design-Builder's community outreach and public information activities during the Work period. The Public Information Manager will report to the Design-Builder's Project Manager but also will support the broader Project NEXT communications team.

C. The Project NEXT communications team to develop and agree upon team protocols for communication between team members, incorporating measures related to notification and approval timeframes, media interface, and preparation of Project NEXT communication materials.

D. The Design-Builder shall within thirty (30) days of the Notice of Intent to Award the Design-Build Contract, identify and submit for approval, the individual that will be designated as the Design-Builder's Public Information Manager, including a summary of relevant qualifications and experience.

1. This individual shall be responsible for overall administration and management of the comprehensive design-build phase communications and public engagement program in coordination with communications representatives from VDOT and the Concessionaire. The individual shall have the necessary expertise and experience required to develop and manage communications programs to mitigate relevant project risks and provide stakeholders with necessary information. The designated Public Information Manager shall be an individual who is dedicated to the Project and is required to be available to the Project on an as-needed basis immediately upon Contract Award and for the duration of construction operations, including pre-construction activities. The individual shall be employed or engaged as a consultant directly by the Design-Builder entity. The Public Information Manager shall be experienced in developing and executing communications programs for design-build projects of a similar size, scope and complexity as the Project. This individual shall attend any required public outreach, public meetings, and participate in all construction-related communications activities on behalf of the Design-Builder.

2. If for any reason, including a request from the Concessionaire related to performance, the approved Public Information Manager must be replaced during the Contract term, the Design-Builder shall provide notice of such within fourteen (14) days and seek formal approval of the replacement. The Design-Builder shall ensure this function is maintained during any transition period.

2.1.4 Design-Builder's Communications Plan

A. The Design-Builder shall deliver an integrated Communications Plan for the Work period that:

1. provides an effective framework for communication between the Design-Builder, Concessionaire, VDOT, travelers, residents and stakeholders;
2. effectively engages and educates the community in the design and construction of Project NEXT to minimize negative impacts and maximize positive outcomes;
3. builds a strong and effective relationship with stakeholders and the community within the Project area during the Work period; and
4. identifies and manages risks associated with Project NEXT.

B. The Communications Plan, consistent with the Concessionaire's goals for Project NEXT, shall be presented for review, comment, and acceptance and will form the basis for all Design-Builder communication activities during the design and construction of Project NEXT.

C. The Communications Plan shall provide a detailed outline of communication tools and strategies to be employed during each phase of the Work period.

D. The Communications Plan shall contain a crisis communications plan and procedures for timely identification and notification of a crisis, coordination with the Concessionaire, and responsiveness to the media. VDOT will serve as the official spokesperson for matters related to construction crisis communications.

2.1.5 Public Engagement and Awarenesss

A. The Design-Builder shall develop and implement a notification program intended to provide information to motorists and stakeholders to facilitate the MOT during ongoing construction activities. This shall include packaging of all MOT information, such as anticipated delays and lane closures, and sharing such information with the Project NEXT communications team on a regular basis throughout the Work period, to facilitate communication with the media, stakeholders, and the broader community. The Design-Builder may need to create graphics to support the program around construction activities.

B. The Design-Builder shall support the Concessionaire's development of a public engagement and awareness program to fit within the context of the broader Communications Plan for Project NEXT. The Design-Builder shall provide design information or graphics as requested to support the Concessionaire's efforts related to:

1. Education about dynamic pricing;

2. Information on requirements for using HOT Lanes, including HOV eligibility and transponder requirements;
3. Plans for the opening of Project NEXT to traffic and communications that will facilitate a safe and smooth Service Commencement; and
4. Education about driver information systems in use on the HOT Lanes, so motorists understand on-road sources of information and lane controls signals.

2.1.6 Stakeholder Outreach and Information

A. The Design-Builder's and the Concessionaire's communications team shall maintain an open dialogue with the stakeholders and communities surrounding Project NEXT with the objective of building a long-term relationship based on trust and respect. The Design-Builder shall work with the communities to identify specific concerns and strategies for mitigation.

B. The Design-Builder shall participate in any Project NEXT public hearings, citizen information meetings, and informational briefings in collaboration with the Concessionaire and VDOT. The Design-Builder shall be responsible for the preparation and production of all materials necessary for such meetings or hearings, including roll plots, static visuals, and fact sheet handouts, as well as provide the necessary support staff members to participate and answer questions as required.

C. The Design-Builder's Public Information Manager shall be the designated point of contact for the stakeholders to ask questions and share concerns and information during the Work period. The Public Information Manager shall respond to inquiries or forward them to the Concessionaire and/or VDOT (as appropriate) within 24 hours.

D. The Design-Builder's communication team will be responsible for informing direct-impact residents of relevant upcoming field or construction activities that will or have the potential to be disruptive to the community. These activities include:

1. anything requiring access to neighborhood common area or resident property for any reason;
2. any work conducted in VDOT right of way related to noise barrier construction, demolition, vegetation removal, closure of local streets, and earthwork;
3. outreach, communication and coordination related to the noise barrier balloting process; and
4. communications tactics that may be required by the Design-Builder may include:
    a. Door to door outreach,
    b. Direct Mail,
    c. Automated dialer campaigns,
    d. Broad e-mail campaigns,
    e. Mail campaigns,
    f. Geo-targeted social media campaigns, and
    g. Staffing community events to answer questions from the general public.

E. The Design-Builder shall join the Concessionaire and VDOT at all informal and formal meetings and briefings with affected stakeholders, including:

1. communication with property owners in direct impact areas;
2. businesses, non-profit organizations and chambers of commerce;
3. local, regional, state and federal transit and transportation groups, including operators and groups advancing the interests of bicyclists and pedestrians;
4. homeowner associations, citizen's associations, civic associations, rotary and social organizations, groups of renters and other local community members; and
5. schools, churches and environmental or other interest groups.

F. The Design-Builder shall also:

1. Develop and maintain a comprehensive stakeholder database to track and manage stakeholder communication;
2. Support the Concessionaire's efforts in developing and maintaining Project NEXT website or webpage; ensuring that the website shall, at a minimum, contain a graphical Project NEXT overview, maps and graphics, contact information, plan of work for the coming month, overall Project NEXT schedule, a frequently asked questions area, and updated Project NEXT photos. The Design-Builder shall use a professional photographer to capture project progress during corridor-wide photo shoots on a regular (not less than quarterly) basis. The Design-Builder will coordinate with the Concessionaire to create a photo shot list for the photographer. The website shall be updated as necessary throughout the duration of the Work period;
3. Develop, in collaboration with the Concessionaire, a proactive program of stakeholder engagements to brief local stakeholders on Project NEXT's progress, features, and benefits;
4. Where possible, afford stakeholders the opportunity to provide input to project planning and development;
5. Develop tailored marketing and communications material for relevant stakeholder groups; and
6. Establish partnerships with local groups and organizations where there is mutual benefit in supporting Project NEXT.

2.2 Media Relations

2.2.1 Media Outreach

A. While there will be some overlap between the Parties on some communications and outreach activities during the Work period, the Concessionaire and VDOT will serve as the primary sources to the news media and community stakeholders on specific lane closures, delays, detours, and other construction-related impacts associated with Project NEXT. The Design-Builder's communications team will put processes in place to ensure

close coordination with VDOT and the Concessionaire on media outreach activities, issues, and responses, and will promote consistency with the Communications Plan.

B. The Design-Builder shall support and follow the media protocols developed by the Concessionaire and VDOT, including:

1. Share any media inquiries directly with VDOT and the Concessionaire to allow VDOT and the Concessionaire to provide timely response to media inquiries regarding Project NEXT;
2. Provide relevant Project NEXT information in support of the media in a timely fashion; and
3. Assist the Concessionaire and VDOT in identifying media opportunities and implementing media events.

2.3 Project Marketing

2.3.1 Project Branding

All public communications on Project NEXT will be undertaken within the framework of a uniform project 'brand' to ensure consistency of the marketing and communications across all project phases. The branding will be developed by the Concessionaire. The Design-Builder shall follow the project branding guidelines when performing public communications.

2.3.2 Market Research and Analysis

The Concessionaire will design communication, marketing, and public outreach activities to respond to the issues, attitudes, and attributes of the communities and market segments relevant to Project NEXT. The Design-Builder shall support these efforts as requested.

2.4 Elected Official and Agency Outreach

A. The Design-Builder and the Concessionaire will coordinate closely in outreach and communications to elected officials and other key stakeholders. The Project NEXT communications team will develop and agree upon a protocol to ensure consistent and effective communications to elected officials and key stakeholders related to Project NEXT.

B. The Design-Builder shall support the Concessionaire and the VDOT as requested to implement the elected official and agency outreach plan by:

1. Creating information materials such as letters, electronic newsletters, fact sheets, maps, graphics, FAQs and press releases as requested;
2. Attending and/or delivering briefings and meetings with local, state and federal elected and appointed officials and their aides related to the design and construction of Project NEXT.

3 Design and Construction Requirements

3.1 General

A. Project NEXT shall be designed and constructed pursuant to the Contract Documents, including the requirements, criteria, standards and specifications set forth in these Technical Requirements.

B. Project NEXT shall be designed and constructed to accommodate the future roadways, ramps, and bridges shown in the *Future Project NEXT Phase 2 Concept Roll Plots* and *2045 Design Year Concept Geometry Roll Plots* provided in Attachment 1.0.

C. The Work shall not preclude the local, state, and federal long-range transportation planning improvements and the ultimate planned roadways in the Metropolitan Washington Council of Government's approved Visualize 2045 Constrained Long-Range Plan (October 2018).

D. All Design Documentation and Construction Documentation shall comply with the requirements of applicable Governmental Authorities.

E. Where the Work to be performed does not meet minimum American Association of State Highway and Transportation Officials (AASHTO) Standards and Specifications, the Design-Builder shall submit a Design Exception, pursuant to VDOT's Instructional and Informational Memorandum on Design Exceptions, (using LD-440 format) for approval.

F. Where the Work to be performed meets or exceeds minimum AASHTO design criteria, but does not meet VDOT's minimum Standards and Specifications, the Design-Builder shall submit a Design Waiver (using LD-448 format) for approval.

G. The Design-Builder is responsible for design and construction of any mitigation measures identified in or required by the approved Design Exceptions and Design Waivers.

H. The Design-Builder is solely responsible for acquiring all necessary approvals of Design Exceptions and Design Waivers listed in Attachment 1.5c but not obtained by the Concessionaire prior to Contract Award. If any element of an approved Design Exception or Design Waiver is changed during design or construction, the Design-Builder is required to resubmit the application package for re-evaluation and approval. Previously submitted Design Exceptions and Design Waivers are subject to re-evaluation, if additional information becomes available that was not known at the time of initial submittal or conditions change that were used in the analysis of the original Design Exception or Design Waiver and, in either case, if such additional information or changed conditions materially affect the premise on which the original Design Exception or Design Waiver at issue was based.

I. The Design-Builder shall make all reasonable efforts to ensure that the condition of existing buildings, structures, roadways, sidewalks, paths, trails, signs, lighting, Concessionaire TMS and VDOT roadside and traffic signal equipment, or other property that is to remain is not adversely affected by the performance of the Work. Prior to commencing Work the Design-Builder shall perform property pre-condition surveys and

monitor their condition during the Work period. The Design-Builder shall repair any damage caused by the Work to at least a condition comparable to that which existed immediately prior to the damage. The Concessionaire, VDOT and applicable third-parties shall be given the opportunity to witness any pre-condition surveys and/or monitoring and the Design-Builder shall make the results available before commencing any Work that may affect their property.

J. The properties and quality of materials to be used in the Work shall conform to the specified values or range of values in the Standards and Specifications specified in the Technical Requirements. If permissible tolerances are exceeded or if consistent deviations from the plans or abrupt changes in grade occur, even though within the tolerances, the Design-Builder shall ensure that the affected areas are reconstructed to conform to the specified tolerance such that the Work is fit for its intended purpose.

K. Project NEXT is considered part of the Strategic Highway Network (STRAHNET).

L. All Design Documentation and Construction Documentation shall be in US Customary units.

M. The Design-Builder shall ensure that areas used for the Work are subject to continual and un-interrupted removal of rubbish, scrap material, and debris. Work sites shall have a neat, safe and orderly appearance at all times. Prior to Final Completion the Design-Builder shall remove its construction equipment, materials and debris from Project NEXT Right of Way and other property used by or adjacent to Project NEXT.

N. When removal of mailboxes and newspaper boxes is made necessary by construction operations, the Design-Builder shall place them in temporary locations so that access to the boxes will not be impaired. Prior to Final Completion, boxes shall be placed in their permanent locations as agreed with the Concessionaire, upgraded to current criteria, and left in as good condition as when found.

O. The Design-Builder shall make all reasonable efforts to preserve property and improvements along the boundary lines of and adjacent to the Work unless the removal or destruction is absolutely required and consistent with the Construction Documentation. The Design-Builder shall use suitable precautions to prevent damage to such property. If property is damaged, the Design-Builder shall restore property to a condition similar or equal to that existing before such damage was done by repairing, rebuilding, or restoring, or making settlement with the property owner. Where property of third parties has been damaged and repaired by the Design-Builder, the Design-Builder shall obtain from the owner a release from any claim against the Concessionaire.

3.2 Not Used

3.3 Environmental

3.3.1 Environmental Documentation

A. FHWA has issued a NEPA Document and NEPA Decision for Project NEXT. The Design-Builder shall comply with the environmental commitments set forth in the approved NEXT Environmental Assessment and the NEXT Finding of No Significant Impact (FONSI) and any additional environmental commitments resulting from the Design-Builder's changes to the design or construction limits shown in the RFP Conceptual Plans.

B. (Not used.)

C. The Design-Builder shall ensure that the environmental commitments and all conditions of regulatory approvals made in the NEPA Document and FONSI (NEPA Decision) applicable during the performance of the Work are followed or implemented.

D. If the Design-Builder proposes changes to Project NEXT design and/or Project limits, the Design-Builder shall be responsible for preparation of any studies or information required for the re-evaluation of the NEPA Decision for Project NEXT and any associated Design Public Hearings. The Design-Builder shall also perform any right of way re-evaluation reviews needed to determine that the Right of Way to be acquired is in compliance with the NEPA Document and NEPA Decision. The Design-Builder shall perform all such studies and additional environmental investigations that result from such circumstances with no increase to the Contract Price nor extension of the Contract Time.

E. Prior to right of way authorization for total and partial takes, the Design-Builder shall provide the Concessionaire with the approved right of way plans and the Re-evaluation for RW Authorization (EQ-201). The Design-Builder shall perform the right of way re-evaluation review to determine the Right of Way to be acquired is in compliance with the NEPA Document and NEPA Decision. For all acquisitions of Project NEXT Right of Way, if the Concessionaire determines that the plans are not consistent with the NEPA Document and NEPA Decision, the Design-Builder shall revise the plans until they are consistent; or the Design-Builder shall provide necessary studies and other information needed to support VDOT's completion and re-evaluation of the NEPA Document for FHWA approval. VDOT will provide copies of all right of way re-evaluation reviews to the FHWA for their review and approval.

F. The Design-Builder shall update and finalize the Document Re-evaluation for Plans, Specifications, and Estimates (PS&E) Authorization (EQ-200), and update and finalize the Environmental Certification/Commitments Checklist (EQ-103) prior to the Work being released for construction. VDOT will perform the Environmental Certification review and PS&E re-evaluation review and determine if plans are consistent with the scope of the NEPA Document and the environmental commitments included in the NEPA Decision. If VDOT or FHWA determines that the plans are not consistent with the NEPA approvals, the Design-Builder shall revise the plans until they are consistent; or the Design-Builder shall provide necessary studies and other information needed to support completion and re-evaluation of the NEPA Document for FHWA approval.

VDOT will provide copies of all Environmental Certification reviews and PS&E re-evaluation reviews to the FHWA.

G. If the Project includes phased work, each phase will be clearly identified and provided in a manner that allows separate authorization of right of way acquisition and construction for each phase. The Design-Builder shall verify that the EQ-200, EQ-201, and EQ-103 forms have been updated and finalized prior to obtaining approval signatures for each title sheet submittal required for right of way acquisition and construction approval.

H. The Design-Builder is responsible for compliance with applicable Law for potential staging and disposal areas outside the Project NEXT limits. The Design-Builder is also responsible for obtaining a property owner agreement for potential areas outside the existing right of way. Any such potential locations within the existing VDOT right of way, but outside the Project limits, will require the Design-Builder to obtain a Land Use Permit from VDOT.

3.3.2 Environmental Compliance

A. The Design-Builder is responsible for compliance with all applicable state and federal environmental laws, regulations, and permits. If, at any time, the Design-Builder is deemed to not be in compliance, the Concessionaire has the authority to suspend work, in whole or in part, until such time as the deficiencies or non-compliant items have been corrected. Should any non-compliant item(s) be identified during construction, immediate (and continuous, if necessary) corrective action shall be taken by the Design-Builder to bring the item(s) back into compliance.

B. The Design-Builder shall be responsible for compliance with pre-construction and construction-related environmental commitments and permit conditions. The Design-Builder shall assume all obligations and costs incurred by complying with the terms and conditions of the permits and certifications. The Design-Builder will be responsible for all costs, fines, penalties, and delays associated with any non-compliant items.

C. The Design-Builder shall carry out environmental commitments during design and construction, as applicable, as identified in the NEPA Document and NEPA Decision, the final Document Re-evaluation for Right of Way Authorization (EQ-201) and PS&E Authorization (EQ-200), and the final Environmental Certification/Commitments Checklist (EQ-103). The Design-Builder shall provide supporting documentation verifying compliance will all environmental commitments.

D. The Environmental Management Plan shall include tracking of Project NEXT environmental conditions, commitments, and approvals. The Design-Builder shall provide quarterly update of progress and compliance with NEPA Document and NEPA Decision commitments and any other environmental approvals.

E. The Concessionaire reserves the right to perform quality assurance of the environmental monitoring of Project NEXT to determine whether the Design-Builder is complying with environmental commitments to Governmental Authorities and is performing activities in accordance with Law and applicable Technical Requirements.

F. The Design-Builder shall stipulate that any facility used in the performance of the NEXT Work is not listed on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20 (unless the Design-Builder confirms that Project NEXT is exempt under the Clean Air Act as amended (42 USC 1857, et seq., as amended by P.L. 91-604), the Federal Water Pollution Control Act as amended (33 USC 1251 et seq. as amended by P.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR, Part 15) during the term of the Project.

3.3.3 Water Quality Permits

A. A Preliminary Jurisdictional Determination (PJD), dated January 15, 2020, was received for this project, and jurisdictional areas are present within the Project limits. The Design-Builder may use the PJD to support the acquisition of necessary water quality permits in accordance with applicable Law and regulations.

B. The Design-Builder is responsible for any necessary field investigations delineations, coordination, determinations, applications, needed to identify or confirm impacts to jurisdictional streams and wetlands required for construction of Project NEXT.

C. The Design-Builder is responsible for obtaining all water quality permits, including the development and implementation of avoidance and mitigation measures, required to construct the Project, including those necessary for utility relocations, borrow sites, disposal sites, staging and laydown areas, and access points. Should the Design-Builder propose design changes, permitting requirements may also change. The Design-Builder remains responsible for obtaining any and all necessary water quality permits and permit modifications required by the regulatory agencies

D. The Design-Builder is responsible for the administration of required state and federal water quality permits and permit modifications required for construction of Project NEXT. The Design-Builder shall be responsible for compliance with pre-construction, construction-related and post-construction permit conditions.

E. Compensation or stream restoration construction for impacts to streams and wetlands, including the purchase of wetland and stream credits, are the responsibility of the Design-Builder.

F. The Design-Builder shall be listed as the "permittee" in all cases. These permits, and any permit modifications, are to be obtained by the Design-Builder and any conditions verified prior to commencing construction. Any fines or delays associated with water quality permit violations arising out of the performance of the Design-Builder's obligations under such permits are the responsibility of the Design-Builder.

G. The Design-Builder shall not be allowed to begin Work in jurisdictional areas until the permits are secured. Prior to beginning any Work in the jurisdictional areas covered by the water quality permits, the Design-Builder shall notify the Concessionaire, VDOT, and permitting agencies in writing, or obtain a waiver of any required notification period from regulatory agencies. The Design-Builder shall not proceed with Work covered by the water quality permits until the Concessionaire releases such work in writing.

H. The Design-Builder shall contemporaneously provide copies of all permits, documentation, and correspondence with regulatory agencies. Construction activities shall not impact regulated areas within the Project limits until all applicable water quality permits have been issued to the Design-Builder.

I. At the conclusion of the Project, the Design-Builder shall notify the Concessionaire, VDOT, and the regulatory permitting agencies in writing of the completion of the work in the jurisdictional areas covered by the water quality permits. At the completion of the Project, the Design-Builder is required to transfer any Virginia Marine Resources Commission (VMRC) permit(s) to the Concessionaire.

J. The Design-Builder shall conduct all operations near rivers, streams, or impoundments in accordance with applicable water quality permits and shall not conduct clearing or grubbing within 100 feet of the limits of ordinary high water or a delineated wetland, unless specifically authorized in the permits.

K. The Design-Builder shall ensure that Project schedules accommodate any Special Provisions, Time of Year Restrictions (TOYR), and the duration of permit acquisition from the regulatory agencies. The Design-Builder shall be responsible for adhering to permit conditions and Special Provisions, as identified in the permit authorizations including but not limited to TOYR, avoidance and minimization recommendations, restoration of temporary impact areas, and countersinking culverts.

3.3.4 Water Pollution

A. The Design-Builder shall exercise every reasonable precaution throughout the Term to prevent pollution of rivers, streams, and impoundments. Pollutants, such as chemicals, fuels, lubricants, bitumens, raw sewage, paints, sedimentation, and other harmful material, shall not be discharged into or alongside rivers, streams, or impoundments or into channels leading to them.

B. The Environmental Management Plan shall include a contingency plan for reporting and immediate actions to be taken in the event of a dump, discharge, or spill. Construction discharge water shall be filtered to remove deleterious materials prior to discharge into state waters. During specified spawning seasons, discharges and construction activities in spawning areas of state waters shall be restricted so as not to disturb or inhibit aquatic species that are indigenous to the waters. Neither water nor other effluence shall be discharged onto wetlands or breeding or nesting areas of migratory waterfowl. When used extensively in wetlands, heavy equipment shall be placed on mats.

C. Temporary construction fills and mats in wetlands and flood plains shall be constructed of approved non-erodible materials and shall be removed by the Design-Builder upon completion of any Work in wetlands or flood plains, unless specifically approved (in writing) to be left in place. The Design-Builder shall revegetate the disturbed area in accordance with Erosion and Sediment Control requirements and Water Quality Permits.

D. If the Design-Builder dumps, discharges, or spills any oil or chemical that reaches or has the potential to reach a waterway, it shall immediately notify all appropriate jurisdictional state and federal agencies and shall take immediate actions to contain, remove, and

properly dispose of the oil or chemical in accordance with the local, State and federal requirements.

E. Excavated material shall be disposed of in approved areas above the mean high water mark shown on the plans in a manner that will prevent the return of solid or suspended materials to state waters. If the mark is not shown on the plans, the mean high water mark shall be considered the elevation of the top of stream banks.

F. Constructing new bridge(s) and dismantling and removing existing bridge(s) shall be accomplished in a manner that will prevent the dumping or discharge of construction or disposable materials into rivers, streams, or impoundments in violation of Law. Construction operations in rivers, streams, or impoundments shall be restricted to those areas where channel changes are permitted and must be entered for the construction of structures. Rivers, streams, and impoundments shall be cleared of falsework, piling, debris, or other obstructions placed therein or caused by the performance of the Work.

G. Stabilization of the streambed and banks shall occur immediately upon completion of the Work or during the Work if construction activities are suspended for more than 15 days. The Design-Builder shall prevent stream constriction that would reduce stream flows below the minimum, as defined by the State Water Control Board, during construction operations.

H. If it is necessary to relocate an existing stream or drainage facility temporarily to facilitate construction, the Design-Builder shall design and provide temporary channels or culverts of adequate size to carry the normal flow of the stream or drainage facility. Prior to beginning the Work, the Design-Builder shall submit a temporary relocation design of streams or drainage facilities for review and approval. Temporary bridges or other structures shall be used to maintain existing stream crossings will be made. All costs for the temporary relocation of streams or drainage facilities shall be included in the Contract Price.

3.3.5 Hazardous Materials

A. The Design-Builder shall perform any additional studies and investigations as necessary to constitute an appropriate level of due diligence and/or determine actions to ensure due care with respect to Hazardous Materials, including Known Pre-Existing Hazardous Materials Locations, at a minimum, as recommended in the NEXT Environmental Assessment *Hazardous Materials Technical Memorandum* (February 2020). The Design-Builder shall submit a summary of its findings for review and approval.

B. The Design-Builder's Environmental Management Plan shall include a construction hazardous materials management plan, which shall include:

1. Copies of any environmental site assessments undertaken;
2. Detailed recommendations for further study or site evaluation, where such studies or evaluations are considered necessary to determine impacts to Project NEXT from identified or suspected contamination;
3. Plans for management of any Hazardous Materials used or generated by the Design-Builder during the Work period, and

4. For any property proposed for acquisition which contains, or could reasonably be expected to contain, a Hazardous Environmental Condition attributable to Known Pre-Existing Hazardous Materials, the appropriate plan for containment, management, mitigation, and/or remediation.

C. The Design-Builder shall not acquire any property or property rights until all required Environmental Site Assessments (Phase I and Phase II) are complete and approved.

D. Following the acquisition and vacation of properties and associated activities, the Design-Builder shall perform asbestos inspections of all structures to be demolished (including bridge structures) and if necessary, shall perform asbestos abatement and asbestos monitoring. The Design-Builder shall perform abatement of asbestos-containing materials and asbestos project monitoring in accordance with all Law, as well as the applicable Standards and Specifications set forth in Attachment 1.5a.

E. The Design-Builder shall be responsible for the development of a Spill Prevention, Control, and Countermeasure Plan as required by regulation and for submission of any required plan(s) prior to start of construction. In the event of spills or releases of petroleum products and other hazardous liquids or solid materials, the Design-Builder shall take immediate action to contain and eliminate the spill release, including the deployment of environmental protection measures to prevent the migration of the spill into the waters of the United States and of worker exposure protection measures. The Design-Builder shall notify the Concessionaire immediately of all instances involving the spill, discharge, dumping or any other releases or discovery of hazardous materials into the environment and shall provide all required notifications and response actions.

F. The Design-Builder shall manage solid waste, hazardous waste, and hazardous materials in accordance with all applicable federal and state environmental regulations and shall implement good housekeeping, waste minimization and pollution prevention practices.

G. Unless a structure has been otherwise classified, the Design-Builder shall assume all coated structures are Type B.

H. Asbestos inspection, abatement and project monitoring shall be performed by individuals and firms licensed by the Virginia Department of Professional and Occupational Regulation. Asbestos abatements shall not be performed by an asbestos contractor who has an employee/employer relationship with, or financial interest in, the laboratory utilized for asbestos sample analysis nor shall the asbestos contractor have an employee/employer relationship with, or financial interest in, the asbestos inspector and project designer working on the Project. Copies of all asbestos inspection, monitoring and disposal records shall be provided.

I. For any asbestos waste and other non-hazardous waste, the Design-Builder shall have the signatory responsibility for the waste shipping manifest(s) and/or bill(s) of lading. For hazardous waste, the Design-Builder shall be considered the co-generator and shall be responsible for preparing the hazardous waste shipping manifest(s) for the VDOT's signature and as otherwise consistent with the signatory requirement under Section 411 of the VDOT Road and Bridge Specifications.

J. The Design-Builder shall retain copies of all property studies, documents prepared for containment, management, mitigation and/or remediation, asbestos-related records and any other construction–related Hazardous Materials records. A final copy of all such records shall be submitted within thirty (30) days after Final Completion.

3.3.6 Air Quality

A. The Project has been assessed for potential air quality impacts and conformity with all applicable Federal and state air quality regulations and requirements. This project is located within an 8-Hour Ozone Nonattainment area and a volatile organic compounds (VOC) and nitrogen oxides (NOx) Emissions Control Area. As such, all reasonable precautions should be taken to limit the emissions of VOC and NOx during construction of the project. In addition, the following VDEQ air pollution regulations shall be adhered to during the construction of this project: 9 VAC 5-130-10 et seq. (Open Burning restrictions); 9 VAC 5-45-760 et seq. (Cutback Asphalt restrictions); and 9 VAC 5-50-60 et seq. (Fugitive Dust precautions).

B. The Design-Builder shall comply with all applicable Federal and state regulatory requirements, the State Air Pollution Control Law and Rules of the State Air Pollution Control Board, including notifications required therein.

C. Burning shall be performed in accordance with all applicable Law under the constant surveillance of watchpersons. Care shall be taken so that the burning of materials does not destroy or damage property or cause excessive air pollution. The Design-Builder shall not burn rubber tires, asphalt, used crankcase oil, or other materials that produce dense smoke. Burning shall not be initiated when atmospheric conditions are such that smoke will create a hazard to the motoring public or airport operations. Provisions shall be made for flagging vehicular traffic on affected roadways, if visibility is obstructed or impaired by smoke. At no time shall a fire be left unattended and all applicable open burning restrictions shall be followed.

D. Asphalt mixing plants shall be designed, equipped, and operated so that the amount and quality of air pollutants emitted will conform to the Rules of the State Air Pollution Control Board. Emission standards for asbestos incorporated in the EPA's National Emission Standards for Hazardous Air Pollutants apply to the demolition or renovation of any institutional, commercial, or industrial building, structure, facility, installation, or portion thereof that contains friable asbestos.

3.3.7 Noise Mitigation

A. Noise Barrier Requirements

1. The Design-Builder shall provide permanent noise mitigation in compliance with the V*irginia State Noise Abatement Policy* and the VDOT *Highway Traffic Noise Impact Analysis Guidance Manual* and applicable Standard and Specifications set forth in Attachment 1.5a.

2. Three types of noise barriers will be required for Project NEXT for new and replacement walls. The Design-Builder's Technical and Price Proposals shall be based on the design and construction of the following surface area quantities:

Noise Barrier Quantities

Barrier Type	Barrier Quantity
Ground Mounted Noise Barriers	205,600 square feet
Retaining Wall Mounted Noise Barriers	260,900 square feet
Bridge Mounted Noise Barriers	6,200 square feet

3. These barrier quantities are considered to be the total square footage of the total noise absorption area (surface area of the exposed noise barrier wall and posts facing the roadway) above: a) the existing (or future) ground level (for ground-mounted barriers), b) the elevation of the earth retained by the retaining wall (for retaining wall-mounted barriers), or c) the top elevation of parapet or structural element supporting the noise barrier (for bridge-mounted barriers). The area of any retaining walls or bridge structures used to support the noise barrier panels are not to be included in the determination of final quantities constructed by the Design-Builder for the purposes of determining any quantity adjustments, nor are other and associated works, such as foundations, drainage, wall structural supports, and wall panel areas below finished grade. Based on the results of the Final Noise Abatement Design Report(s) (NADR) and the associated final design plans for noise barriers, if the total surface area of noise barriers (ground mounted, retaining wall mounted and/or bridge mounted) is different than these quantities, one of the following scenarios will apply:
   a. If the total square foot quantity of each or any type of noise barrier constructed is less than the square foot quantities specified above, the Design-Builder shall credit the Concessionaire for the amount of quantity reduction multiplied by the unit price provided for that noise barrier type in the Design-Builder's Price Proposal.
   b. If the total square foot quantity of each or any type of noise barriers constructed is more than the square foot quantities specified above, the Concessionaire will compensate the Design-Builder for the amount of quantity increase multiplied by the unit price provided for that noise barrier type in the Design-Builder's Price Proposal.
   c. Once the final noise barrier quantities have been determined and verified, any credits and compensations provided in (a) and (b) above will be offset against each other such that one aggregate adjusting credit or compensation will be made to the Design-Builder or the Concessionaire for all three types of noise barriers.
4. The unit pricing for each type of noise barrier wall included in the Design-Builder's Price Proposal shall include all direct and incidental costs necessary to design and construct the noise barriers.

B. Potential Noise Barriers 12A2 and 13B/NSA26 (located in the vicinity of the I-495/Dulles Toll Road interchange) identified in the NEXT Environmental Assessment *Noise Technical Report* (February 2020) are not required for Project NEXT.

C. Potential Noise Barriers C and Barrier 10 (in CNE C as identified in the NEXT Environmental Assessment *Noise Technical Report* (February 2020)) shall be evaluated as one continuous noise barrier to minimize the effects of flanking noise to the noise sensitive sites between the two barriers. In the event a continuous barrier is not found to be feasible and reasonable in this area, the barriers shall be evaluated separately as done in the preliminary noise analysis. The Design-Builder shall ensure that any noise barrier gap that remains between Barrier 10 (Extension) and Barrier C be filled in with noise barrier at least as high as the northermost point of Barrier 10 (Extension) and/or the southernmost point of Barrier C. The gap noise barrier shall be excluded from the Final Design Noise Analysis and instead included in a separate Technical Memorandum and included for construction in all design plans.

D. Final Design Noise Analysis

1. The final barrier location(s) and dimension(s) will be determined during the final design noise analysis and development of the NADR(s). The Design-Builder shall re-analyze all noise sensitive receptors in the project area to confirm whether noise mitigation is required. Draft and Final versions of NADR shall be submitted for review and approval. All noise barriers should be named as presented in the *Noise Analysis Technical Report* (February 2020) prepared as part of the NEXT Environmental Assessment.

2. The final design noise analysis and mitigation designs will be based on the specific environmental traffic data (ENTRADA) developed for the NEXT Environmental Assessment preliminary noise analysis. The Design-Builder shall be responsible for updating the previous ENTRADA for Design Year 2045 based on the Design-Builder's approved design. If required by the Design-Builder's final design, existing noise barriers will be replaced or relocated. The Design-Builder shall include the replacement of all existing noise walls in their NADR analyses.

3. The Design-Builder shall field verify all dimensions of the existing noise barriers within the Project NEXT corridor to confirm the assumptions necessary for the final noise study modeling.

4. If reflective panels for noise barrier walls are to be considered or proposed in any locations, the Draft and Final NADR shall consider any impacts from the use of such panels in determining the final noise barrier requirements.

5. Upon approval of the Final NADR, VDOT shall prepare a concurrence letter outlining the results of the analysis for VDOT's Chief Engineer and FHWA. All noise barriers recommended for construction and concurred with by the Chief Engineer and FHWA are included in the scope of Project NEXT. Once concurrence is achieved, the Design-Builder shall prepare and mail letters by "certified return receipt" to benefitted receptors to ascertain the desire to have noise barriers

constructed as part of Project NEXT. In the event a sufficient number of benefitted receptors do not reply, a second mailing may be required.

E. Noise Barrier Wall Design and Construction

1. Prior to submitting a noise barrier wall plan for the Concessionaire's review, the Design-Builder shall have the noise consultant that completed the NADR review the plan set and certify that the proposed design meets the noise abatement requirements. This certification will be included in the plan set when it is submitted for review.
2. If deviations in the horizontal or vertical alignment of a noise barrier are proposed following concurrence from the Chief Engineer or FHWA, then the Design-Builder shall perform any additional noise analysis and provide the results for review and approval prior to construction (to include fabrication of any unique panels or posts). This will include a plan and profile view of the roadway with the alignments recommended barrier and the proposed design. A justification of the deviation will be included with the plan set. The revised NADR chapter for the noise barrier for which modification is requested will be submitted with this additional information. Written approval of the barrier deviation will be required before the Design-Builder can submit Final for Approval Documentation.
3. A key plan will be clearly labeled to show the location of the ground-mounted noise barriers, retaining wall noise barriers, and bridge-mounted noise barriers.
4. Plan view will provide the alignment of the noise barrier with the roadway plan view.
5. Profiles of the wall alignment will include the noise attenuation line and the existing and proposed elevation. If combo walls (i.e. noise barrier mounted on retaining wall) or bridge-mounted barriers are present along the alignment, different line patterns will be used to distinguish the each type of noise barrier wall being used.
6. Stations of the roadway and noise barrier will be included on both the plan and profile views.
7. Noise barrier walls shall be designed (including location, grading, and drainage) to provide maintenance access for personnel and equipment. The back of the noise barrier wall (including wall elements) shall be offset a minimum of one (1) foot from the existing VDOT right of way line. A ten (10) foot wide permanent maintenance area shall be provided behind the noise barrier wall, inclusive of the necessary right of way and permanent easement widths. Noise barriers shall be located a minimum of ten (10) feet from existing retaining walls or other existing elements to remain in order to accommodate the ten (10) foot maintenance area. If the 10-foot wide maintenance area behind the noise barriers cannot be feasibly provided, the 10-foot permanent easement may be reduced as approved, provided that the noise barriers can be maintained from the roadway side.

8. A minimum 3 foot wide bench of a slope of 4:1 or flatter shall be provided at the front and back of the noise wall to allow for inspection and maintenance access. The bench shall be sloped away from the wall.
9. All new or replacement noise barriers in the vicinity of the Dominion Virginia Power overhead lines shall accommodate the sag requirements for these lines, or the Design-Builder shall relocate the barrier to avoid any conflicts.
10. The maximum height of new noise barriers mounted on structures (retaining walls or bridges) shall be limited to 30 feet. For continuous noise barriers that include a portion mounted on a structure, the full height required by the Final NADR shall be used for the ground-mounted section(s). The height of "in-kind" replacements for existing noise barriers shall meet or exceed the existing barrier top elevation.
11. For any noise barriers installed on top of MSE retaining walls, the Design-Builder shall meet the structural requirements in Section 3.15.3 and use approved lightweight barrier panels.
12. The color, texture, and finish of all noise barriers shall comply with the aesthetic treatment and color requirements in Section 3.11. Noise barriers shall include a sound absorptive finish on the roadway side. No absorptive finish is required on that portion of the base panels below ground and 6 inches above the ground line.
13. Lightweight noise barrier panels may be used in lieu of concrete panels on retaining walls and bridge structures, provided that all noise attenuation and absorption performance requirements identified in the Final NADR are met. VDOT-approved lightweight panels must be used.
14. The Design-Builder shall apply a VDOT-approved sealant to any noise barrier within 15 feet of a travel lane or shoulder to prevent deterioration of the vertical surfaces from snow removal brine and chemicals.
15. Use of access doors is not allowed unless approved. Access shall be provided via gaps and overlaps in the noise barriers with a 3:1 overlap to gap ratio. If the use of access doors is approved, the Design-Builder shall provide the plans for review and approval. Personnel access doors shall have:
    a. A minimum inside frame dimension of 48-inches by 86-inches;
    b. Stainless steel hardware, industrial grade pull handle;
    c. A deadbolt lock with key on both sides;
    d. Open away from I-495; and
    e. A minimum 4-ft by 4-ft, 4-inch thick concrete pad on both sides of the door.
16. When a ground-mounted noise barrier is located within the clear zone, it shall be protected by a standard MB-7D concrete barrier with a four foot wide special design gravel dam using Aggregate Material No. 78 between the concrete barrier and the noise barrier according to the details in Chapter 2E of the Roadway Design Manual. This requirement shall not apply to noise barriers (including combo noise barrier/retaining walls) within the clear zone that are designed to resist minimum

vehicular collision forces in accordance with the minimum requirements set forth in the applicable Standards and Specification listed in Attachment 1.5a.

17. Noise barrier design shall be coordinated with first responders to ensure access to fire hydrants and other emergency equipment, where feasible.

18. Noise barriers shall be designed and constructed in accordance with the soil parameters included in the final approved Geotechnical Engineering Report.

19. The Design-Builder shall begin construction of new noise barriers within sixty (60) days of the demolition of an existing noise barrier and/or cutting of trees that were acting as a screen for adjacent properties. The Design-Builder shall complete construction of any new noise barrier intended to replace an existing noise barrier and/or trees that were acting as a screen for adjacent properties within 240 days from the start of the demolition of the existing noise barrier or cutting of trees, whichever occurs first, unless otherwise approved. If the Design-Builder is unable to begin construction of a new noise barrier within 60 days of the demolition of an existing noise barrier and/or cutting of trees that were acting as a screen for adjacent properties, the Design-Builder shall provide temporary noise mitigation to noise sensitive receptors where the existing noise barriers and/or trees were removed.

F. Construction Noise

1. The Design-Builder's operations shall be performed so that exterior noise levels measured do not exceed 80 decibels. Noise-sensitive locations are locations where lowered noise levels are essential if the location is to serve its intended purpose, such as residences, hospitals, nursing homes, churches, schools, libraries, parks, and recreational areas.

2. The Design-Builder shall monitor its construction-related noise. If construction noise levels exceed 80 decibels at any noise-sensitive locations, the Design-Builder shall take necessary corrective or preventative actions before proceeding with construction operations at these locations.

3. The Design-Builder shall be responsible for costs associated with the abatement of construction noise and the delay of operations attributable to non-compliance with these requirements.

4. The Design-Builder is responsible for obtaining any required local government noise ordinance variances or waivers necessary to complete the Work, including those required for night-time operations or work that may adversely affect noise-sensitive locations. If the local government identifies a violation, the Design-Builder is responsible for all necessary corrective actions and associated costs, including penalties or fines.

5. Equipment shall in no way be altered so as to result in noise levels that are greater than those produced by the original equipment. When feasible, the Design-Builder shall establish haul routes that direct his vehicles away from developed areas and ensure that noise from hauling operations is kept to a minimum.

6. These requirements are not applicable if the noise produced by sources other than the Design-Builder's operation at the point of reception is greater than the noise from the Design-Builder's operation at the same point.

3.3.8 Cultural Resources

A. In the event that a previously unidentified historic property (prehistoric or historic district, archaeological site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places) is discovered once construction has begun, the Design-Builder shall immediately halt all construction work in the area of the resource and in surrounding areas where additional subsurface remains can reasonably be expected to occur. Work in all other areas of Project NEXT may continue. The Design-Builder shall immediately notify the Concessionaire. The Concessionaire and VDOT, in cooperation with the Design-Builder, shall then address the discovery in accordance with one of the applicable processes described at 36 CFR 800.13. VDOT shall be responsible for conducting any technical studies needed to determine whether the resource is eligible for inclusion on the National Register of Historic Places and whether Project NEXT will affect the resource, and for implementing appropriate treatment as determined through FHWA's consultation with the Virginia State Historic Preservation Officer (SHPO). Pursuant to §10.1- 2302 of the Code of Virginia, prior to conducting any archaeological investigations on state-controlled lands (including state-owned highway right of way), the Design-Builder must first obtain a permit from the Director of the Virginia Department of Historic Resources.

B. In the event fossils, meteorites, or other articles of paleontological or rare mineralogical interest are discovered during construction, the Design-Builder shall immediately suspend work at the site of the discovery and notify the Concessionaire. The Concessionaire will immediately notify the proper Governmental Authorities charged with the responsibility of investigating and evaluating such finds. The Design-Builder shall cooperate and assist the Concessionaire in protecting, mapping, and removing the finds in consultation with the proper Governmental Authorities.

C. Any archaeological remains, fossils, meteorites, or other articles of paleontological or rare mineralogical interest found on state-controlled lands (including state-owned highway right of way) are the property of the Commonwealth of Virginia. Articles recovered from other than state-controlled lands are the property of the landowner unless other agreement is reached with the owner.

D. When the discovery of historic properties, fossils, meteorites, or other articles of paleontological or rare mineralogical interest delay the progress or performance of the Work, the Design-Builder shall notify the Concessionaire immediately.

E. The Design-Builder shall consider historic properties to be design constraints and avoid impacting them. In addition, the Design-Builder shall notify the Concessionaire in advance of any other project-related activities, including but not limited to staging, borrow/disposal, and any temporary or permanent easements, proposed to be located on or within the view shed of historic properties. These activities, any changes to the design, alignment, right of way limits, or easements, or any additions to the Project, such as

stormwater management facilities, stream or wetland mitigation sites, or noise barriers, will require review, and could require additional cultural resources studies and/or coordination with the VA SHPO. The Design-Builder is responsible for conducting all cultural resources studies necessitated by the proposed changes, in accordance with the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation*, and the Virginia Department of Historic Resources' most current *Guidelines for Conducting Survey in Virginia*, while VDOT is responsible for coordinating both the studies and the proposed changes with the VA SHPO. The Design-Builder shall then carry out any additional cultural resources commitments that result from such coordination at its sole expense and at no additional cost to the Project.

3.3.9 Section 4(f) and Section 6(f) Resources

A. Any use of Section 4(f) and Section 6(f) Resources on this Project is addressed in the Project NEXT Environmental Assessment and FONSI. One Section 4(f) resource, the George Washington Memorial Parkway, and one resource designated as both Section 4(f) and Section 6(f), Scott's Run Nature Preserve are located within the Project limits.

B. To address Section 4(f) and Section 106 impacts to the George Washington Memorial Parkway, the Design-Builder shall be responsible for the design and construction of the following mitigation measures: a) associated with the National Park Service Finding of No Significant Impact (NPS FONSI), and any b) "context-sensitive" designs required by NPS in the vicinity of the George Washington Memorial Parkway.

C. To address Section 4(f) and Section 6(f) impacts to Scott's Run Nature Preserve, the Design-Builder shall develop its design of Project NEXT to not preclude construction of a future replacement parcel ("Fairfax County Park Authority Replacement Parcel") with proposed right of way limits as shown in Attachment 3.3. All construction activities associated with temporary construction easements are to be completed within six (6) months of the commencement of such activities to avoid any additional permanent use of Section 6(f) lands. The Design-Builder will be responsible for any additional Section 6(f) replacement lands required due to non-compliance with this requirement.

D. The Design-Builder shall consider any Section 6(f) resources to be design constraints and avoid any further impacts to them beyond those identified in the RFP Conceptual Plans, including but not limited to staging, borrow/disposal, and permanent/utility easements. The Design-Builder shall be responsible for obtaining the appropriate approvals from Fairfax County Park Authority for any temporary construction easements required on Scott's Run Nature Preserve property

E. Any changes to the right of way limits or easements as shown on the RFP Conceptual Plans, proposed by the Design-Builder may require additional technical studies and analysis to be performed by the Design-Builder at the Design-Builder's cost. The Design-Builder shall be responsible for notifying VDOT of plan revisions, right of way/easement changes, and providing any necessary studies and other necessary information to support the Design-Builder's completion of any additional required Section 4(f), Section 6(f), or Section 106 documentation. VDOT will be responsible for the coordination of any Section 4(f), Section 6(f), or Section 106 documentation with

FHWA and other affected agencies. The Design-Builder shall then carry out any additional commitments that result from such coordination at its sole expense and no additional cost or time delays to the Project.

3.3.10 Threatened and Endangered Species

A. The NEXT Environmental Assessment *Natural Resources Technical Report* (February 2020) identified those potential Threatened and Endangered (T&E) species where habitats may be present within the vicinity of the Project NEXT corridor. The Design-Builder is advised that new and updated T&E species information is continually added to agency databases and is responsible for updating these findings as necessary to complete any required T&E species coordination, consultation, or approvals.

B. The Design-Builder shall be responsible for any coordination and consultation (including additional field surveys) to obtain updated information, requirements, and clearances from environmental and other regulatory agencies that provide T&E species oversight. The Design-Builder shall copy VDOT's District Environmental Manager on any submittals requesting concurrence from USFWS on effect determinations of federally-listed species. This additional T&E species coordination and consultation is also a standard component of the water quality permit acquisition process and may result in permit conditions for which the Design-Builder will be responsible. The Design-Builder is responsible for ensuring that all T&E species are correctly identified and impacts assessed, noting that more or fewer resources may be present than initially identified. Avoidance and minimization shall be implemented to the greatest extent possible. The Design-Builder shall provide copies of all documentation and correspondence with regulatory agencies.

C. The Design-Builder shall take appropriate measures to minimize damage or destruction of any known habitat for T&E species.

D. The Design-Builder shall obtain any required waiver(s) of time of year restrictions for the northern long-eared bat (Myotis septentrionalis) relying on the findings of the Programmatic Biological Opinion for Final 4(d) Rule on the Northern Long-Eared Bat and Activities Excepted from Take Prohibition.

E. For any Endangered Species Act consultation conducted by the Design-Builder:

1. The Concessionaire and VDOT's District Environmental Manager must review the USFWS Project Review Package and transmittal letter prior to submittal to USFWS for informal consultation and must be copied on any submittal by non-VDOT entities.

2. For formal consultation, VDOT's District Environmental Manager must submit formal consultations through the FHWA. If formal consultation is required, the Design-Builder is responsible for developing or obtaining any necessary documentation to support its effect determination.

3.4 Geotechnical

3.4.1 Geotechnical Design

A. The Design-Builder's Geotechnical Design Engineer shall be responsible for ensuring that all geotechnical investigations, analysis and recommendations that are necessary for the design and construction of Project NEXT are performed in accordance with these Technical Requirements. The Geotechnical Design Engineer shall coordinate with the Design Manager to ensure that all geotechnical design and construction considerations have been properly considered in the design and included in the work plans, specifications, copied notes, and constructability reviews for Project NEXT. This individual shall have a minimum fifteen (15) years of geotechnical engineering experience. The Geotechnical Design Engineer shall have experience and expertise working in the region and/or in areas of similar geologic settings with similar project features and be a Professional Engineer licensed in the Commonwealth of Virginia.

B. The Concessionaire has prepared a Geotechnical and Pavement Data Report (GDR) provided in Attachment 3.4a. The Design-Builder shall confirm and supplement the GDR as required to support its design and proposed construction methods. The Design-Builder shall collect appropriate data for geotechnical evaluation of embankments, soil and rock cuts, culverts, bridge and wall structures, noise barriers, stormwater management facilities, minor structures, including drainage pipes, and any other earth-supported structures or elements of highway design and construction. The Design-Builder shall be responsible for obtaining any Governmental Approvals required for any borings needed in performance of the Design-Builder's geotechnical investigation for Project NEXT. The Design-Builder shall complete laboratory tests in accordance with pertinent VTM, ASTM or AASHTO standards and analyze the data to provide design and construction requirements. Soils and materials tests shall be performed by a laboratory accredited by AASHTO for each test it conducts for Project NEXT, unless otherwise approved.

C. The Design-Builder shall provide records of all subsurface explorations and describe the soils encountered and their depth limits, in accordance with the requirements outlined in Chapter III of VDOT Manual of Instructions for Materials Division and conduct the investigation in accordance with an approved exploratory boring plan(s). Preliminary and final/design geotechnical investigations shall be performed to meet the minimum requirements set forth in the applicable Standards and Specification listed in Attachment 1.5a. The final geotechnical investigation plan(s) shall be in compliance with Chapter III of VDOT Manual of Instructions for Materials Division, the AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications, and VDOT Modifications; and Section 700.05 (c) of the VDOT Road and Bridge Specifications unless otherwise approved. The Design-Builder shall provide electronic copies of all subsurface explorations in accordance with the boring log template available on the website address included in Chapter III of VDOT Manual of Instructions for Materials Division. The electronic files shall be provided by a certified Professional Geologist or a suitably qualified registered Professional Engineer licensed in the Commonwealth, in gINT© software, before beginning of construction. Upon request, the Concessionaire

will provide VDOT's gINT© and Microsoft Access file structures for the Geotechnical Database Management System.

D. The Design-Builder shall incorporate reliability assessments in conjunction with standard geotechnical analysis methods as described in this section. An acceptable method for reliability evaluation is given by Duncan, J.M. (April 2000) *Factors of Safety and Reliability in Geotechnical Engineering*, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Discussions and Closure August 2001. A suitable design will provide a probability of success equal to or greater than 99%.

Reliability assessments need not be performed in conjunction with analyses for structural foundations and external (bearing capacity, eccentric/overturning, sliding)/internal stability design of retaining walls, which shall be evaluated based on the required limit state in the AASHTO LRFD Bridge Design Specifications. Design-Builder shall address, however, the variability of soil parameters used in the analyses for structural foundations and retaining walls, as detailed in AASHTO LRFD Bridge Design Specifications Section C10.4.6.1.

The aspects of Project NEXT for which reliability assessments shall be made include: 1) the factors of safety for global stability, and 2) the settlement of embankment slopes, retaining walls, and any other major structures. The variability of the subsurface conditions shall be directly incorporated into the reliability assessments. Where not already required by the Technical Requirements, settlement monitoring shall be provided by the Design-Builder where the probability of success equal to or greater than 99% cannot be achieved for settlement evaluations. The Design-Builder may propose alternative methods for evaluating variability of subsurface conditions, reliability, and minimum factors of safety prior to submission of its design calculations and drawings. The Concessionaire may accept or reject such proposed methods.

E. The Design-Builder shall provide geotechnical engineering reports and technical memoranda that summarize pertinent subsurface investigations, test, and engineering evaluations for all aspects of the Work. Technical specifications for construction methods that are not adequately addressed in the Standards and Specifications set forth in Attachment 1.5a shall be provided by the Design-Builder. The Design-Builder shall review the Construction Documentation to assure that they have appropriately incorporated the geotechnical components. The quality control-quality assurance documents shall document how each specific geotechnical recommendation or requirement is addressed in the Construction Documentation, and shall reference the drawings that incorporate the pertinent results. The results of the geotechnical investigation and laboratory results shall support the design and construction efforts to meet the requirements for the pavement design set forth in Attachments 1.5a and 1.5b and Section 3.8. The Design-Builder shall have the Geotechnical Engineering Design Report approved before beginning construction of the portion(s) of Project addressed in the report.

F. The Design-Builder shall minimize differential settlements of the approach to a bridge for new construction and when applicable provide construction recommendations to

address soil-structure interaction to accommodate the unique construction methods applied to Project NEXT.

G. All geotechnical work related to the evaluation and design of total and differential settlement shall be completed to satisfy and post-construction performance requirements (i.e., settlement tolerances).

H. The Design-Builder shall design and construct pavements, subgrades, and embankments to meet the required performance requirements and the following post-construction settlement tolerances:

1. Total vertical settlement less than two inches over the initial 20-years, and less than one inch over the initial 20-years within one hundred (100) feet of bridge abutments;
2. Settlement that will not impede positive drainage of the pavement surface, especially within the travel lanes, nor subject the roadway to flooding in area where it is applicable;
3. Settlement that does not result in damage to adjacent or underlying structures, including utilities; and
4. For pavement sections of approach slabs, bridge decks, and tie-ins to the Project, grade tolerances shall be measured with a 10-foot straightedge. The variation of the surface from the testing edge of the straightedge between any two contacts with the surface shall not be more than plus (+) 0.25-inch to minus (-) 0.125 -inch at structures and (+/-) 0.25-inch at Project tie-ins.

   Humps, depressions, and irregularities in all pavement sections exceeding the tolerances specified above will be subject to correction by the Design-Builder. The Design-Builder shall notify the Concessionaire for any non-conformance items

   The Design-Builder shall consider settlement and design foundations (bridges, retaining walls, pipes and other structures) based upon Attachment 3.4b. Attachment 3.4b outlines two options for managing settlement of structures: (i) limit total settlement to ½" and subsequently limit the need for a refined analysis of the superstructure and substructure; or (ii) allow the Design-Builder to design the structure for its estimates of Elastic, Consolidation, and Secondary settlement (total settlement) and subsequently communicate the total and differential settlement in the general note to the Design Documentation. In either case, a general note shall be placed on the Design Documentation that communicates the amount of settlement evaluated and accommodated by the structure. Specific general note language, along with notes to the designer, are set forth in Attachment 3.4b.

I. In either case defined in Attachment 3.4b, the total vertical and/or differential settlements of the proposed structures shall not exceed the performance tolerance noted above for pavements and bridge decking. In addition, angular distortion between adjacent foundations greater than 0.008 radians in simple span and 0.004 radians in continuous span structures is not permitted unless approved.

J. In the vicinity of existing structures, the Design-Builder shall analyze settlement and flexibility of the existing substructure elements due to changes in loading and shall minimize the impact on the existing structure. In any case, the total settlement of the existing ground shall be limited to ½ inch over 20 years within 100 feet of the structure. If the reduction of total settlement is not feasible, the Design-Builder shall develop an engineered solution that isolates any existing structure(s) from the adjoining settlement.

K. The Design-Builder's qualified geotechnical engineer shall perform an inspection of all pavement subgrades and minor structure excavations immediately prior to placement of aggregate base, subbase, or bedding materials to identify excessively soft/loose or saturated soils that exhibit excessive pumping, weaving, or rutting under the weight of the construction equipment. Such soils are also considered unsuitable and must be removed or modified in place to provide adequate support for embankment, pavement subgrade or minor structures.

3.4.2 Slope Design

A. Embankments and certain aspects of retaining wall design are not addressed by LRFD. Embankments and cut slopes shall be designed in accordance with Section 305 of the VDOT Manual of Instructions for Materials Division. Cut and fill slopes shall be no steeper than 2H:1V. Reinforced soil slopes steeper than 2H:1V will not be allowed on this Project. All cut and fill slopes shall be designed to be stable for the interim construction stages, for the end-of-construction condition, and for design-life conditions. Slopes in Potomac Formation clays and silts shall be designed using residual strength values as determined by laboratory testing, neglecting any cohesion. The Design-Builder is responsible for verifying the stability of all slopes, including those retained by structures.

B. The following factors of safety are to be used with limit equilibrium methods of analysis to identify factors of safety for representative sections of all soil cut and soil embankment fill slopes and/or where slopes are supporting, or are supported by, retaining structures. The factors of safety listed are valid for subsurface investigations performed in accordance with Chapter III of VDOT Manual of Instructions for Materials Division or for site-specific investigation plans approved by VDOT's Materials Engineer. Approval of site-specific investigation plans with reduced boring frequency may require higher factors of safety. Circular failure surfaces shall be analyzed by methods such as the Modified Bishop, Simplified Janbu, or Spencer methods. In addition, block (i.e., wedge failure) analyses may be required to verify the minimum factor of safety. All slope stability analyses shall consider the effects of groundwater, external loads, tension cracks, and other pertinent factors as applicable. The factors of safety specified below are not applicable for rock cut slopes.

Minimum Factors of Safety for Soil Cut/Fill Slopes

Basis of Soil Slope Analysis Parameters	Factor of Safety	
	Involves Structure or Critical Slope[1]	Non-Critical Slope
In-situ or lab. tests and measurements[2,3]	1.5	1.3
No site specific tests	N/A[3]	1.5

Notes:

1. A critical slope is defined as any slope that is greater than 25 ft. in height, any slope that affects or supports a structure or interstate roadway, or a slope where failure would result in significant cost for repair, or damage to, private property.
2. Site specific in-situ tests include both groundwater measurements and SPT testing, but may also include CPT or DMT.
3. Parameters for critical slopes involving structures must be based on specific laboratory testing.
4. Problem soils (fissured or heavily over-consolidated soils), must be analyzed using shear strength parameters determined from appropriate laboratory strength tests.
5. Problem soils shall be analyzed for short-term stability and long-term stability shall be analyzed using residual strength parameters obtained from laboratory shear testing. Residual shear strength parameters should be determined by drained direct shear tests using sufficient stress reversals to obtain large strains as discussed in the U.S. Army Corps of Engineers laboratory testing procedures EM-1110-2- 1906. Many reversals are required to reach residual strengths and some references suggest using a pre-split sample (Ref. Engineering properties of Clay Shales, Report No. 1 by W. Haley and B.N. MacIver).
6. Construction plans shall specify use of soil types consistent with the parameters used in slope analyses.

C. Potomac Formation clay/silts may be present within the limits of the proposed construction. Global and slope stability analyses of Potomac Formation clay/silts shall be analyzed using residual strength parameters for problem soils wherever they are encountered and/or mapped on local geologic/soils maps.

3.4.3 Pipe Installation Methods

A. Culverts or utility pipes shall be installed by either conventional methods in accordance with Section 302.03 of VDOT's Road and Bridge Specifications and VDOT's IIM-LD-254 (Selection of Pipe Type), or Jack and Bore and/or by Micro-tunneling in accordance with the applicable Special Provisions. Trenchless technology other than these methods of installation is not permitted unless otherwise approved. The Design-Builder shall choose which of the methods of installation is best suited for the ground and site conditions where the work is to be performed and that will meet the design requirements of the proposed culverts or utility pipes.

B. Any utility or storm drain installations that crosses the I-495 mainline travel lanes or ramps shall be installed using trenchless methods. Under no circumstance shall open trench installation of a utility or storm drain be allowable across any mainline travel lanes, shoulders, or ramps that are actively in use during full pipe installation (i.e. lane or ramp closures for pipe installation will not be permitted). Additional changes to traffic patterns utilized only for the installation of pipes using open cut methods shall not be

permitted. The Design-Builder shall be responsible for requesting and receiving approval for any installations proposed to use the open cut method prior to plan submissions reflecting this work.

C. The Design-Builder shall establish both the vertical and horizontal tolerances in support of the design. Such tolerances shall be noted on the construction plans. The design tolerance may be more stringent than what is called for in the both the Jack and Bore and Micro-Tunneling Special Provisions; however, under no circumstances shall the performance requirements and design tolerances used in design of either culverts or utility pipes exceed those specified in Road and Bridge Specifications and the applicable Special Provisions without approval. Performance requirements and tolerance stipulated in the Special Provision for Micro-Tunneling shall also apply to conventional tunneling methods.

3.4.4 Geotechnical Exploration Plan Submission and Approval

A. The Design-Builder shall develop a Geotechnical Exploration Plan (GEP) to supplement information provided in the Geotechnical and Pavement Data Report (GDR) provided in the RFP. Additional explorations shall be performed, as determined necessary by the Design-Builder and to meet the minimum requirements of the Project.

B. The exploration shall meet or exceed the minimum requirements stated in Chapter III of the VDOT Manual of Instructions for Materials Division, AASHTO LRFD Bridge Design Specifications, and AASHTO Manual on Subsurface Investigations. The Design-Builder shall determine the specific scope of the GEP (exploration locations, depths, etc.).

C. No field exploration work for the Design-Builder's GEP can proceed without written approval.

D. Any exploration work performed by the Design-Builder without written approval of the Concessionaire may not be considered part of the supplemental information required for final design.

E. The Design-Builder's Geotechnical Engineer of Record shall submit the GEP for review and comment at least thirty (30) days before commencement of the work. This shall include at a minimum:

1. An overview of the GEP and objectives;
2. GEP phases and schedule;
3. Number and depths of the proposed borings/cone penetrometer soundings or other proposed explorations, monitoring wells, and other field investigations to meet the minimum requirements of the Project;
4. Drilling methodology;
5. In-Situ Soil sampling types and frequency;
6. Lab tests and quantities;
7. Site access and restoration plans and right-of-entry permits;

8. Maintenance of Traffic Plan, if required;
9. Utility clearance procedure; and
10. A hard copy and electronic .pdf file graphically presenting the GEP including proposed boring and sounding locations.

F. Written comments on the Design-Builder's proposed GEP will be provided. A Comment Resolution Meeting shall be held after the receipt of the Design-Builder's responses. The Design-Builder shall be responsible for meeting coordination, meeting minutes, and distributing the final resolution for concurrence. The Design-Builder shall resubmit for review and final approval, the GEP that addresses all comments received on the GEP.

G. Following completion of exploratory work, all as-performed boring/field testing locations shall be surveyed. The survey shall determine station and offset, elevation, and state plane coordinates, which shall be included on the boring logs with accuracy as stated in Chapter III of the VDOT Manual of Instructions for Materials Division. Following drilling and laboratory work, the Design-Builder shall retain all samples until Final Completion and shall provide such samples in accordance with Section 303.06 of Chapter III of the VDOT Manual of Instructions for Materials Division.

H. Laboratory testing of soil and groundwater samples shall be performed in accordance with AASHTO testing procedures. Laboratories conducting geotechnical testing shall be either AASHTO accredited for the testing being performed or fulfill the requirements of AASHTO R18 for qualifying testers and calibrating/verifying of testing equipment for those tests being performed. All lab test results shall be included in the Geotechnical Engineering Report.

3.4.5 Unsuitable Materials

A. Unsuitable Material is defined as material used as embankment fill, and in cut areas to a depth of at least three (3) feet below subgrade directly beneath pavements and at least two (2) feet beneath the bedding of minor structures and laterally at least two (2) feet beyond the outside edge of the pavement shoulders and bedding limits of the minor structures that meets one or more of the following criteria: classifies as CH, MH, OH and OL in accordance with the Unified Soil Classification System (USCS); contains more than five (5) percent by weight organic matter; exhibits a swell greater than five (5) percent as determined from the California Bearing Ratio (CBR) test using VTM-8; exhibits corrosive or aggressive soil properties as deemed by the Geotechnical Engineer of Record; exhibits strength, consolidation, durability of rock or any other characteristics that are deemed unsuitable by the Design-Builder's Geotechnical Design Engineer for use in the Work. All materials within the uppermost three (3) feet of a pavement subgrade that exhibits a CBR value less than that stipulated in the pavement design shall also be considered unsuitable.

B. The anticipated locations and methods of treatment for unsuitable materials identified by the Design-Builder's Geotechnical Design Engineer shall be shown on the design plans and cross sections. Acceptable methods of treating unsuitable soils are: a) complete removal from 2 feet beyond the outside edge of shoulder on each side of the pavement or bedding limits of minor structures and replacement with structural fill; b) partial

removal to at least 3 feet below final pavement subgrade or minor structure bedding elevation to within the limits noted in (a) and replacement with select fill, type I, minimum CBR 30 and geosynthetic material; c) raising grades with select fill and geosynthetic material to provide a minimum three (3) feet of separation between these soils and final pavement subgrade or minor structure bedding; and/or d) chemical stabilization of the soils to a minimum depth of 12 inches below final pavement subgrade. Highly plastic clays and elastic silts mapped as Potomac Formation or Iredell, Jackland or Jackland-Haymarket complex (problem soils) shall not be chemically stabilized. Unsuitable materials and methods of treatment shall be identified on the plans and cross-sections as required by VDOT's Road Design Manual.

C. Saturated or very dry and/or loose or very soft coarse- and fine-grained soils that exhibit excessive pumping, weaving or rutting under the weight of construction equipment are also considered unsuitable, unless they can be moisture conditioned through either mechanical or chemical means to an acceptable moisture content that allows adequate compaction to meet project specifications, and classification testing indicates they are not otherwise unsuitable. Topsoil, peat, coal, and carbonaceous shale shall also be considered unsuitable material. All unsuitable material shall be disposed of and/or treated as discussed in Section 106.04 of the VDOT Road and Bridge Specifications at no additional cost. Topsoil or other organic soils are also considered unsuitable for use in embankment fill other than as a cover for slopes for the purpose of establishing vegetative cover. When used as cover for slopes, the thickness of topsoil shall not exceed twelve (12) inches.

3.4.6 Corrosion Potential for Deep Foundations

A. The Design-Builder shall evaluate the potential corrosive effects of the soils in all areas in which steel piles will be used. Steel piles in this context include but are not limited to H-piles, pipe piles, and permanent sheet piles. A series of four tests shall be performed for all soils being evaluated for corrosion potential. These four tests are AASHTO T 289 (pH), AASHTO T 288 (resistivity), AASHTO T 291 (chlorides) and AASHTO T 290 (sulfates). The minimum frequency of corrosion series testing shall be as follows:

1. At all substructure unit locations containing steel piles, perform the corrosion series testing every five feet below the proposed footing elevation to a depth of twenty feet below the proposed footing. If proposed fill will be placed below the footing, begin the testing protocol at the top of the existing ground.
2. At alternating substructure unit locations (e.g., Abutment A, Pier 2, etc.), perform the corrosion series testing within each distinctly different stratum between a depth of twenty feet below the footing and the groundwater table. For single-span structures, perform this testing protocol at both abutments.
3. At alternating substructure unit locations (e.g., Abutment A, Pier 2, etc.), perform the corrosion series testing within five feet of the groundwater surface. For single-span structures, perform this testing protocol at both abutments.
4. For all other foundation applications containing steel piles, including retaining walls, corrosion series testing shall be performed at maximum 300 foot intervals

along the footing length. The corrosion series testing shall be performed: every five feet below the proposed footing elevation to a depth of twenty feet below the proposed footing; within each distinctly different stratum between a depth of twenty feet below the footing and the groundwater table; and within five feet of the groundwater surface.

B. Once test values are determined, the "corrosive state," as defined in Chapter 23 of the Manual of the Structure and Bridge Division shall be determined, and the magnitude of steel loss shall be calculated and included in the foundation design. Note that Chapter 23 prohibits the use of steel H-piles where one of the four test results exceeds the values shown for the "extremely aggressive" corrosive state.

C. Coatings, such as hot-dipped galvanizing, that prevent/delay corrosion of driven steel piles will not be permitted, as it cannot be guaranteed that the entire coating will survive pile installation; however, if a pile will be placed within a pre-bored hole without being driven, hot-dipped galvanizing placed in accordance with the applicable sections of the VDOT Specifications will be permitted. The AASHTO equations for Mechanically Stabilized Earth (MSE) wall steel reinforcement shall be used when calculating the loss of galvanizing. Once the zinc has been depleted, the corrosion rate as determined from the table in Chapter 23 shall apply. The annual corrosion rate after zinc depletion is the applicable value in the table divided by 75 years. Other types of anti-corrosion coatings may be considered, if approved.

D. Corrosion shall be calculated for all surfaces on the steel piles, including bolt holes, if present. Corrosion of steel connecting devices such as bolts, washers and nuts shall also be considered in the design.

3.4.7 Vibration Control

The Design-Builder shall control vibrations in accordance with the requirements of the *Special Provision for Vibration Control and Monitoring of Existing Structures & Utilities During Construction* included in Attachment 1.5a. In addition to private/adjacent properties, this includes structures under construction by others, structures owned by the Concessionaire or VDOT, and structures constructed by the Design-Builder within the scope of Project NEXT. Adjacent structures shall be defined as structures within a 200 foot radius of driving, drilling, or excavation activities. The Design-Builder shall be responsible for providing vibration monitoring and repairing any and all damage to adjacent facilities and structures for construction-induced damage. The Design-Builder shall provide vibration monitoring data reports.

3.4.8 Coordination and Review by Geotechnical Engineer

The Design-Builder's Geotechnical Engineer of Record shall identify the elements of the Project for which the Geotechnical Design Engineer or their qualified designated representative is required to monitor/inspect during construction to ensure that the completed Project will function in accordance with the design intent over its expected lifetime. This shall include but is not limited to foundation subgrades, installation and load testing of deep foundations, embankment and pavement subgrades, instrumentation and monitoring of settlement, assessment and treatment for potential weak or unsuitable soils,

rock excavation and rock slopes, and retaining structures that include tie-backs and anchors. These items shall be included as part of the NEXT Design-Builder's inspection plan outlined in its QMSP. All such inspections must be performed by a direct report (i.e., employee or directly contracted subconsultant) of the Geotechnical Engineer of Record.

3.5 Materials

3.5.1 Rights for and Use of Materials Found on Project NEXT

The Design-Builder may use in Project NEXT any materials found in the excavation that comply with the applicable Standards and Specifications set forth in Attachment 1.5a. The Design-Builder shall replace, at its own expense with other acceptable material, the excavation material removed and used that is needed for use in embankments, backfills, approaches, or otherwise, unless used on Project NEXT. The Design-Builder shall not excavate or remove any material from within the construction limits that is not within the grading limits, as indicated by the slope and grade lines. The Design-Builder shall not waste, bury, deposit, or abandon any material within the Project NEXT limits.

3.5.2 Samples, Tests, and Cited Specifications

The Design-Builder is responsible for quality control, quality assurance, and ensuring compliance with applicable specifications and testing requirements. The Design-Builder's QMSP shall outline the procedures for quality assurance, quality control, and compliance with the Technical Requirements. The Concessionaire or VDOT may conduct testing and audits in its performance of their respective oversight obligations.

3.5.3 Material Delivery

The Design-Builder shall advise the Concessionaire at least two weeks prior to the delivery of any material from a commercial source. Upon delivery of any such material to Project NEXT, the Design-Builder shall confirm that the material meets the requirements of the Technical Requirements and, if so, shall provide the Concessionaire with one copy of all invoices (prices are not required).

3.5.4 Plant Inspections

If the Concessionaire inspects materials at the source, the following conditions shall be met:

A. The Concessionaire shall have the cooperation and assistance of the Design-Builder and producer of the materials.

B. The Concessionaire shall have full access to parts of the plant that concern the manufacture or production of the materials being furnished.

C. The Design-Builder shall arrange and bear any cost associated with travel and lodging for the Concessionaire to witness factory acceptance testing (FAT) of any TMS Equipment that the Design-Builder is responsible for providing and that occurs more than 200 miles from the Project NEXT site.

D. VDOT will perform plant inspections for asphalt, aggregate, and concrete, and all materials must have a mix design currently approved.

3.5.5 Storing Materials

A. Materials shall be stored in a manner so as to ensure the preservation of their quality and fitness for the Work. When considered necessary by the Design-Builder's Quality Assurance Manager or the Concessionaire, materials shall be stored in weatherproof buildings on wooden platforms or other hard, clean surfaces that will keep the material off the ground. Materials shall be covered when directed. Stored material shall be located so as to facilitate its prompt inspection. As approved, portions of the Project NEXT Right of Way may be used for storage of material and equipment and for plant operations; however, equipment and materials shall not be stored within the clear zone of the travel lanes open to traffic.

B. Additional required storage space shall be provided by the Design-Builder. Private property shall not be used for storage purposes without the written permission of the owner. Upon completion of the use of the property, the Design-Builder shall furnish a release signed by the property owner indicating that the property has been satisfactorily restored.

C. Chemicals, fuels, lubricants, bitumens, paints, raw sewage, and other harmful materials as determined by the Design-Builder's Quality Assurance Manager or the Concessionaire shall not be stored within any floodplain, unless no other location is available and only then shall the materials be stored in a secondary containment structure(s) with an impervious liner. Also, any storage of these materials in proximity to natural or man-made drainage conveyances or otherwise where the materials could potentially reach a waterway, if released under adverse weather conditions, must be stored in bermed or diked area or inside a container capable of preventing a release. Double-walled storage tanks shall meet the berm/dike containment requirement except for storage within floodplains. Any spills, leaks, or releases of such materials shall be addressed in accordance with hazardous material requirements in the Contract Documents. Accumulated rain water may also be pumped out of the impoundment area into approved dewatering devices.

D. New TMS roadside equipment, electronic devices, network and computer gear shall be stored in an environmentally controlled space.

3.5.6 Handling Materials

Materials shall be handled in a manner that will preserve their quality and fitness for the Work. Aggregates shall be transported from storage to the Work in vehicles constructed to prevent loss or segregation of materials.

3.5.7 Unacceptable Materials

Materials that do not conform to the Technical Requirements shall be considered unacceptable. Such materials, whether in place or not, will be rejected and shall be removed from the site of the Work. If it is not practical for the Design-Builder to remove

rejected material immediately, the Design-Builder shall mark the material for identification. Rejected material whose defects have been corrected shall not be used until approval has been given in accordance with the QMSP.

3.5.8 Local Material Sources (Pits and Quarries)

A. Local material sources, other than active commercial sand and gravel and quarry operations, opened by the Design-Builder or its subcontractors shall be concealed from view from the completed roadway and any existing public roadway. Concealment shall be accomplished by selectively locating the pit or quarry and spoil pile, providing environmentally compatible screening between the pit or quarry site and the roadway, or using the site for another purpose after removal of the material, or restoration equivalent to the original use (such as farm land, pasture, or turf).

B. Should the Design-Builder wish to source construction materials from (non-commercial) new pits or quarries, the Design-Builder shall furnish a statement signed by the property owner in which the property owner agrees to the use of their property as a source of material for Project NEXT. Upon completion of the use of the property as a material source and its restoration, the Design-Builder shall furnish a release signed by the property owner indicating that the property has been satisfactorily restored. This requirement will be waived for commercial sources, sources owned by the Design-Builder, and sources furnished by the Concessionaire.

C. Local material pits and quarries that are not operated under a local or State permit shall not be opened or reopened without authorization. The Design-Builder shall prepare a site plan, including the following:

1. The location and approximate boundaries of the excavation;
2. Procedures to minimize erosion and siltation;
3. Provision of environmentally compatible screening;
4. Restoration;
5. Cover vegetation;
6. Other use of the pit or quarry after removal of material, including the spoil pile;
7. The drainage pattern on and away from the area of land affected, including the directional flow of water and a certification with appropriate calculations that verify all receiving channels are in compliance with Minimum Standard 19 of the Virginia Erosion and Sediment Control Regulations;
8. Location of haul roads and stabilized construction entrances if construction equipment will enter a paved roadway;
9. Constructed or natural waterways used for discharge;
10. Sequence and schedule to achieve the approved plan; and
11. The total drainage area for temporary sediment traps and basins shall be shown. Sediment traps are required if the runoff from a watershed area of less than three

acres flows across a disturbed area. Sediment basins are required if the runoff from a watershed area of three acres or more flows across a disturbed area. The Design-Builder shall certify that the sediment trap or basin design is in compliance with the applicable Standards and Specifications set forth in Attachment 1.5a. Once a sediment trap or basin is constructed, the dam and all outfall areas shall be immediately stabilized.

D. The Design-Builder's design and restoration shall be in accordance with good industry practice.

3.5.9 Materials Disposal

A. Unsuitable or surplus material shall be disposed of by the Design-Builder off the Project NEXT Right of Way. The Design-Builder shall obtain the necessary rights to property to be used as an approved disposal area. An approved disposal area is defined as that which is owned privately, not operated under a local or State permit and has been approved for use in disposing unsuitable or surplus material.

B. Prior to seeking approval of a disposal area, the Design-Builder shall submit a site plan. The plan shall show:

1. the location and approximate boundaries of the disposal area;
2. procedures to minimize erosion and siltation;
3. provision of environmentally compatible screening;
4. restoration;
5. cover vegetation;
6. other use of the disposal site;
7. the drainage pattern on and away from the area of land affected, including the directional flow of water and a certification with appropriate calculations that verify all receiving channels are in compliance with Minimum Standard 19 of the Virginia Erosion and Sediment Control Regulations;
8. location of haul roads and stabilized construction entrances if construction equipment will enter a paved roadway;
9. constructed or natural waterways used for discharge;
10. a sequence and schedule to achieve the approved plan; and
11. the total drainage area for temporary sediment traps and basins shall be shown. Sediment traps are required if the runoff from a watershed area of less than three acres flows across a disturbed area. Sediment basins are required if the runoff from a watershed area of three acres or more flows across a disturbed area. The Design-Builder shall certify that the sediment trap or basin design is in compliance with the applicable Standards and Specifications set forth in Attachment 1.5a. Once a sediment trap or basin is constructed, the dam and all outfall areas shall be immediately stabilized.

C. Disposal areas shall be cleared, but need not be grubbed. The clearing work shall not damage grass, shrubs, or vegetation outside the limits of the approved area and haul roads thereto. After the material has been deposited, the area shall be shaped to minimize erosion and siltation of nearby streams and landscaped in accordance with the approved plan for such work or shall be used as approved. The Design-Builder's design and restoration shall conform to these Technical Requirements.

D. The Design-Builder shall furnish the Concessionaire a statement signed by the property owner in which the owner agrees to the use of their property for the deposit of material from Project NEXT. The property owner will hold harmless the Concessionaire, their officers, their agents, and their employees. Upon completion of the use of the property as an approved disposal area and restoration thereof, the Design-Builder shall furnish the Concessionaire a release signed by the property owner indicating that the property has been satisfactorily restored. This requirement will be waived for commercial sources and sources owned by the Design-Builder.

E. The Design-Builder shall obtain a VPDES Construction Permit, as well as any other applicable permits for any disposal area(s), which shall be in compliance with the applicable Standards and Specifications set forth in Attachment 1.5a.

3.6 Drainage, Erosion and Siltation and Stormwater Management

3.6.1 Drainage

A. The criteria detailed herein, in VDOT's Drainage Manual, and associated Instructional and Informational Memoranda (IIM) shall be used to provide for flood protection, drainage design, erosion and sediment control, and stormwater management. All "should" and "may" statements in VDOT's Drainage Manual shall be interpreted as "shall" and "will" statements respectively, unless otherwise approved. All other hydraulic criteria not referenced herein, including but not limited to, increases in existing flood levels, bridge scour protection, protection of downstream waterways, upstream and downstream property impacts, and compliance with environmental and safety requirements, shall be in accordance with the applicable Standards and Specifications set forth in Attachment 1.5a.

B. Project NEXT will be governed by the Part II-C Technical Criteria under the VSMP Regulations. The Design-Builder's Final Design Documentation for any hydraulic design shall include a complete set of final drainage computations sealed and signed by a Professional Engineer licensed by the Commonwealth of Virginia in accordance with the latest IIM-LD-243.

C. The drainage design will include but not be limited to enclosed storm sewer systems, curb inlets, drop inlets, stormwater management systems for water quality and water quantity, manholes, junction boxes, culverts, headwalls, channels, ditches, bridge drainage assemblies and structures that remove and transport runoff or convey stream flows, adequate outfalls, and erosion and sediment control. These efforts shall be in

compliance with the applicable Standards and Specifications set forth in Attachment 1.5a.

D. The Design-Builder shall prepare and submit VDOT form LD-445I, the Annual Standards and Specifications form, in accordance with IIM-LD-258. Periodic site inspections shall be performed in accordance with IIM-LD-256.

E. The Design-Builder shall prepare drainage design criteria and a list of software packages to be used in the design prior to commencement of final design for review and approval.

F. The Design-Builder shall assemble and review all available data, studies, and development plans impacting the Project NEXT corridor for use in preparing the drainage design.

G. The Design-Builder shall design and install new drainage facilities and will be permitted to use existing drainage systems that have adequate hydraulic capacities and adequate structural integrity in accordance with the applicable Standards and Specifications set forth in Attachment 1.5a.

H. Existing drainage assets or facilities that must be replaced, repaired, or rehabilitated as part of Project NEXT are identified in Attachment 3.6. The Design-Builder's planned remediation measure(s) for each pipe shall be approved prior to proceeding to final design for the Project NEXT drainage system.

I. All existing drainage facilities within the Project NEXT Right of Way that the Design-Builder intends to leave in place, including those that are required to be replaced, repaired, or rehabilitated per Attachment 3.6, shall be evaluated and verified to have adequate hydraulic capacity for the ultimate land use conditions in accordance with the VDOT Drainage Manual and other applicable Standards and Specifications set forth in Attachment 1.5a. The evaluation of existing drainage facilities shall be based on the applicable design storm frequency per the current VDOT criteria.

J. All existing drainage facilities within the Project NEXT Right of Way that the Design-Builder intends to leave in place, including those which are required to replaced, repaired, or rehabilitated per Attachment 3.6, shall be evaluated and verified to have adequate structural capacity in accordance with the applicable Standards and Specifications set forth in Attachment 1.5a.

K. A preliminary Existing Drainage Assessment Report was prepared by the Concessionaire and provided as RFP Supplemental Information. The Design-Builder shall prepare an updated Existing Drainage Assessment Report for review and approval prior to proceeding to final design. The report shall include all of the pipes listed in Attachment 3.6, plus any additional pipes within the Project NEXT Right of Way that the Design-Builder intends to leave in place. The report shall identify any pipe rehabilitation measures on existing drainage assets and facilities to be completed by the Design-Builder and include a certification from the Design-Builder's structural engineer attesting to the structural adequacy of the structures and specific recommendations relative to improvements to the structural condition and serviceability of the structures. The report shall also include a certification from the Design-Builder's drainage engineer attesting to

the adequate hydraulic capacities of the existing drainage assets or facilities for use in Project NEXT.

L. Prior to the commencement of construction, the Design-Builder shall ensure that all existing drainage facilities it intends to utilize and leave in place for continued use are completely clean and free of debris and silt prior to the commencement of construction Work on or near such existing drainage facilities. The Design-Builder shall be responsible for cleaning any debris or silt accumulation caused by performance of the construction Work from all (pre-existing and new) drainage facilities used for the Project and associated costs.

M. As part of the Work, the Design-Builder may tie in or connect new drainage assets it is designing and constructing to existing drainage assets present along the I-495 Corridor. If there is an existing drainage asset the Design-Builder desires to tie in or connect to, but is prevented from doing so because of physical damage to such existing drainage asset, the Design-Builder shall repair or replace the existing drainage asset in the immediate area of the proposed tie-in or connection. Any such repair or replacement work shall be completed in accordance with the applicable Standards and Specifications set forth in Attachment 1.5a.

N. The above provisions shall not apply if the hydraulic capacity or structural integrity of the existing drainage asset to which the Design-Builder desires to connect is verified to be inadequate by the Design-Builder as a result of the proposed tie-in or connection. In that case, the Design-Builder shall, replace, repair, or otherwise upgrade the existing drainage asset to the extent of the hydraulic or structural inadequacy (in accordance with the applicable Standards and Specifications set forth in Attachment 1.5a) in order to accommodate the proposed tie-in or connection.

O. All existing culverts, storm sewer, and drainage appurtenances to be abandoned shall be removed and backfilled or filled and plugged with flowable fill.

P. No drainage inlet grate or at-grade structure will be permitted to be located or extend within the travel way of the Interstate or the associated Interstate ramps, or outside the Project NEXT Right of Way without approval.

Q. Bridge deck drainage shall be in accordance with the Section 3.15 requirements.

R. For all impacted permanent structures, the bridge, hydrology, hydraulics, and scour requirements shall be in accordance with the applicable Standards and Specification set forth in Attachment 1.5a, including, but not limited, to AASHTO LRFD Bridge Design Specifications and VDOT Modifications (the more stringent requirements shall govern).

S. A preliminary Hydrologic and Hydraulic Design Analysis Report was prepared by the Concessionaire and provided as RFP Supplemental Information. As a part of its final design, the Design-Builder shall prepare an updated Hydrologic and Hydraulic Design Analysis (H&HA) Report for impacted major culvert and/or bridge-crossing locations where the 100-year discharge is 500 cfs or more, and/or floodplain studies have been published by federal agencies. The outline for the H&HA will be in accordance with the applicable Standards and Specifications set forth in Attachment 1.5a. The Design-Builder shall ensure the H&HA is coordinated with the bridge design when bridges over

waterways are involved. The Design-Builder shall provide the final H&HA Report for review and approval prior to the commencement of construction at each impacted major culvert and/or bridge crossing location.

T. The scour analysis and reporting shall be in accordance with the applicable Standards and Specifications set forth in Attachment 1.5a and shall include all existing structures undergoing major rehabilitations and new and replacement bridges at stream crossings. The scour profile shall also include the effects of existing adjacent bridges and the effect of the new bridge on the existing adjacent bridge. Countermeasures to accommodate scour at existing piers shall only be used when approved. Scour countermeasures shall be provided at existing and new abutments in accordance with the applicable Standards and Specifications as set forth in Attachment 1.5a.

U. The Design-Builder shall perform a scour analysis on all new retaining walls parallel to stream flow or subject to longitudinal scour in accordance with VDOT Longitudinal Scour Approach" Memorandum. Retaining walls subject to longitudinal scour will be designed to withstand the 500-year super flood scour without the aid of scour countermeasures, unless otherwise agreed and approved. Appropriate bank protections and revetments are required for walls subject to flows and potential bank erosion.

V. The Design-Builder shall provide streambank stabilization of both banks of Scott's Run between Old Dominion Drive and I-495 as depicted on the RFP Conceptual Plans. The stabilization design shall be based on the requirements of the current VDOT Drainage Manual, the Virginia Stream Restoration & Stabilization BMP Guide, the Design-Builder's updated H&HA Report, and geotechnical recommendations.

W. For the culvert extension at I-495 Northbound Station 601+75 RT, the Design-Builder shall provide an enhanced outfall between the downstream end of the culvert extension to the upstream side of the existing trail as depicted on the RFP Conceptual Plans. The enhanced outfall shall be a series of grade control structures, as defined in the Virginia Stream Restoration & Stabilization BMP Guide, Chapter 4, Section 3. The Design-Builder shall provide bank protection for both banks of the tributary between the downstream side of the existing trail to the confluence with Scott's Run as depicted on the RFP Conceptual Plans. The bank protection shall follow the Virginia Stream Restoration & Stabilization BMP Guide, Chapter 3, Section 1.

X. The limits of the 12" minimum streambed material underneath the I-495 NB & SB Bridge over Scott's Run are shown in the RFP Conceptual Plans. The existing streambed material that is disturbed and/or excavated during construction may be reused, otherwise the minimum type, size, and grading of the streambed material shall be similar to the adjacent natural streambed material of Scott's Run and shall be determined by the Design-Builder and submitted for approval. The Design-Builder will be responsible to coordinate the timing and placement of the streambed material with VDOT and the Virginia Department of Environmental Quality.

Y. The Design-Builder shall not preclude the planned development of Parcels 055, 056, and 057, as presented in the Hill View Estates development plans (Fairfax County #25492-RGP-002-2) dated February 23, 2016. Access to the Project NEXT stormwater facilities is not permitted from the Hill View Estates entrance or driveways.

Z. Temporary drainage design shall be provided with each phase of the traffic control plans. For temporary spread calculations, the Design-Builder may utilize either VDOT Drainage Manual section 9.5.2.3 or section 9.3.1, Table 9-1, footnote 3c. The Design-Builder will not be permitted to utilize both criteria for the same temporary traffic pattern.

AA. During the Work period, the Design-Builder shall provide for positive drainage of all roadway facilities open to construction traffic. Construction activities shall not redirect or add drainage run-off to a private property.

BB. Metal pipes shall not be utilized for permanent installations.

3.6.2 Erosion and Siltation

A. The Design-Builder shall develop and implement an erosion and sediment control plan, a stormwater pollution prevention plan, and a post development stormwater management plan in compliance with VDOT's approved Erosion and Sediment Control and Stormwater Management standards and specifications and in accordance with applicable Standards and Specifications set forth in Attachment 1.5a.

B. The Design-Builder shall exercise temporary and permanent measures, throughout the Term, to control erosion and prevent or minimize siltation of rivers, streams, lakes, and impoundments. Erosion and sediment control measures will be installed in accordance with applicable Standards and Specifications set forth in Attachment 1.5a.

C. Erosion and sediment control measures shall be applied to erodible material exposed by any activity associated with construction, including local material sources, stockpiles, disposal areas, and haul roads. Temporary measures shall be coordinated with the Work to ensure effective and continuous erosion and siltation control. Permanent erosion control measures and drainage facilities shall be installed and operational as the Work progresses before temporary measures are removed.

D. Erosion and siltation control devices and measures shall be maintained in a functional condition at all times. The Design-Builder shall have, within the limits of Project NEXT and during all land disturbing activities, an employee certified by DEQ in Erosion and Sediment Control, who shall inspect erosion and siltation control devices and measures for proper installation and deficiencies immediately after each rainfall, at least daily during prolonged rainfall, and weekly when no rainfall event occurs. The Design-Builder shall conduct regular reviews of the location of silt fences and filter barriers to ensure that they are properly located for effectiveness and are compliant with applicable permit conditions. Deficiencies shall be corrected immediately. Such employee shall also be certified through Department of Environmental Quality Inspection Certification Program.

E. Failure on the part of the Design-Builder to maintain appropriate erosion and siltation control devices in a functioning condition may result in the Concessionaire notifying the Design-Builder in writing of specific deficiencies. The Design-Builder shall correct or take appropriate actions to correct the specified deficiencies within 24 hours after receipt of such notification.

F. Failure of the Design-Builder to maintain a DEQ-certified Erosion and Sediment Control employee on the project site during land disturbing activities will result in a Project NEXT non-compliance and suspension of Work related to any land disturbing activity, until such time as a certified Erosion and Sediment Control employee is present on the Project.

G. The Design-Builder shall be responsible for all costs, fines, penalties, and delays associated with any non-compliant items.

3.6.3 Stormwater Management

A. The Design-Builder shall develop and provide for review and approval a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP is comprised of, but not limited to, an Erosion and Sediment Control (ESC) Plan and Narrative, a Pollution Prevention (P2) Plan, a post construction Stormwater Management (SWM) Plan. The SWPPP shall be prepared and implemented by the Design-Builder in compliance with applicable requirements and standards, including the Virginia Erosion and Sediment Control Law and Regulations, the Virginia Stormwater Management Act (VSMA), and the Virginia Stormwater Management Program (VSMP) Regulations. Project NEXT will be subject to the Part II-C Technical Criteria in the VSMP Regulations (9VAC25-870). A SWPPP shall be required for all land-disturbing activities that disturb 10,000 square feet or greater, or 2,500 square feet or greater in a Chesapeake Bay Preservation Area. Land-disturbing activities that disturb one (1) acre or greater require coverage under Department of Environmental Quality's Virginia Pollutant Discharge Elimination System (VPDES) General Permit for the Discharge of Stormwater from Construction Activities ("VPDES Construction Permit"). Where applicable, the Design-Builder shall apply for and retain coverage under the VPDES Construction Permit for those land disturbing activities for which it has control. The required contents of a SWPPP for those land disturbance activities requiring coverage under the VPDES Construction Permit are found in Part II-A of the General Permit section of the VSMP Regulations (9VAC25-880-70).

B. An working ESC Plan and post-construction SWM Plan and SWPPP for the entire Project NEXT must be reviewed and approved prior to the Design-Builder applying for coverage under the VPDES General Construction Permit. This Plan Submittal shall include the proposed total expected Land Disturbance Area and Land Development Area, including off-site facilities, for the entire Project. Such plans shall be prepared in accordance with the applicable Standards and Specifications set forth in Attachment 1.5a and submitted approval before the commencement of any land disturbing activities. The SWPPP, including ESC Plan and SWM Plan, shall be kept current as design work progresses. Updated versions of the SWPPP, including ESC Plan and SWM Plan, must be submitted for review and approval before the Concessionaire will approve Final for Approval Documents. The Design-Builder shall be responsible for reading, understanding, and complying with all the terms, conditions and requirements of the permit and the SWPPP, including the following:

1. **Project NEXT Implementation Responsibilities.** The Design-Builder shall be responsible for the installation, maintenance, inspection, and, on a regular basis,

ensuring the functionality of all erosion and sediment control measures and all other stormwater and pollutant runoff control measures identified within or referenced within the SWPPP, plans, specifications, permits, and elsewhere in these Technical Requirements. The Design-Builder shall take all reasonable steps to prevent or minimize any stormwater or non-stormwater discharge that will have a reasonable likelihood of adversely affecting human health or public and/or private properties.

2. **Certification Requirements.** In addition to satisfying the personnel certification requirements contained herein, the Design-Builder shall certify its activities by completing, signing, and submitting Form C-45 VDOT SWPPP Contractor and Subcontractor Certification Statement, at least seven (7) days prior to commencing any Project NEXT related land-disturbing activities, both on-site and off-site.

3. **SWPPP Requirements for Support Facilities**. The Design-Builder shall develop a SWPPP with an ESC Plan, a P2 Plan, and a SWM Plan for submission and acceptance prior to usage of any on-site or off-site support facilities, including borrow and disposal areas, construction and waste material storage areas, equipment and vehicle storage and fueling areas, storage areas for fertilizers or chemicals, sanitary waste facilities, and any other areas that may generate a stormwater or non-stormwater discharge related to performance of the Work. Such plans shall document the location and description of potential pollutant sources from these areas and shall include a description of the controls to reduce, prevent, and control pollutants from these sources, including spill prevention and response. The Design-Builder shall submit such plans and documentation as specified herein for review and approval with the initial Plan Submittal. If the VPDES permit was previously applied for without including the Support Facilities, the Design-Builder will need to revise the SWPPP and may need to file a VPDES permit modification.

4. **Inspection Requirements.** The Design-Builder shall also have on-site, during any land disturbing operations, an individual or individuals holding a VDEQ Inspector Certification, a VDEQ Responsible Land Disturber (RLD) Certification and a VDOT Erosion and Sediment Control Contractor Certification (ESCCC) to ensure compliance with all VDEQ and VDOT ESC Plan implementation requirements. It shall be the responsibility of the Design-Builder's certified ESCCC representative and the Design-Builder's VDEQ certified ESC Inspector to monitor Project compliance with the approved SWPPP. The Design-Builder's VDEQ certified ESC Inspector must represent the Quality Assurance firm for the Project. The inspections carried out by the Design-Builder's certified ESCCC representative and the Design-Builder's VDEQ certified ESC Inspector shall be in accordance with the VDOT QA/QC Guide and Part 5 (NEXT Division I Amendments), Section 107.16(e). The inspections shall be documented and certified by both the Design-Builder's ESCCC representative and the Design-Builder's VDEQ certified ESC Inspector on the Construction Runoff Control Inspection Form (C-107 Part I). Failure of the Design-Builder to maintain a DEQ-certified SWM inspector on the Project site during construction of SWM facilities will result in a Project NEXT non-compliance and suspension of Work related to any SWM facilities, until such time as a certified SWM inspector is present on the Project.

5. **Reporting Procedures**

   a. Inspections. The Design-Builder shall be responsible for conducting inspections in accordance with the requirements herein. The Design-Builder shall document such inspections by completion of Form C-107, Construction Runoff Control Inspection Form and Continuation Sheet, in strict accordance with the directions contained within the form.

   b. Unauthorized Discharge Requirements. The Design-Builder shall not discharge into state waters, sewage, industrial wastes, other wastes or any noxious or deleterious substances, nor shall otherwise alter the physical, chemical, or biological properties of such waters that render such waters detrimental for domestic use, industrial consumption, recreational, or other public uses.

   c. Notification of Non-Compliant Discharges. The Design-Builder shall immediately notify the Concessionaire upon the discovery of, or potential of, any unauthorized, unusual, extraordinary, or non-compliant discharge from the land disturbing activity. Where immediate notification is not possible, such notification shall be not later than 24 hours after said discovery.

   d. Detailed Report Requirements for Non-Compliant Discharges. The Design-Builder shall submit within five (5) days of the discovery of any actual or potential non-compliant discharge, a written report describing details of the discharge to include its volume, location, cause, and any apparent or potential effects on private and/or public properties and state waters or endangerment to public health, as well as steps being taken to eliminate the discharge. A completed Form C-107 shall be included in such reports.

6. **Changes, Deficiencies and Revisions**

   a. Changes and Deficiencies. The Design-Builder shall report when any planned physical alterations or additions are made to the land disturbing activity or deficiencies in the Project NEXT plans are discovered that could significantly change the nature or increase the quantity of the pollutants discharged from the land disturbing activity to surface waters.

   b. Revisions to the SWPPP. Where site conditions or construction sequencing or scheduling necessitates revisions or modifications to the erosion and sediment control plan, storm water management plan, or any other component of the SWPPP for the land disturbing activity, such revisions or modifications shall be approved and documented by the Design-Builder on a designated plan set. Such plans shall be kept on the Project NEXT site at all times and shall be available for review upon request. If a revision to the SWPPP results in a significant increase to the project Land Disturbance Area, the Design-Builder, in consultation with DEQ, may need to file a VPDES permit modification.

7. The Design-Builder shall not proceed with work to be covered by the permit until permit coverage is secured and the Concessionaire releases the work in writing. Any request for an exception from the technical criteria of the VSMP regulation shall be coordinated and approved prior to receiving permit coverage. It is noted

that permit coverage, and subsequent release of work, can take up to ninety (90) days from the time that the Design-Builder submits a request for coverage that includes all required information. The Design-Builder shall provide a completed SWPPP Certification form (C-45) before commencement of any land disturbing activity and shall complete and include the SWPPP General Information Sheets in the plan assembly. The SWPPP Certification form (C-45) and SWPPP General Information Sheets shall be updated with each work segment submittal as necessary.

8. The Design-Builder shall be responsible for compliance with construction-related permit conditions and shall assume all obligations and costs incurred by complying with the terms and conditions of the permit. Any fines associated with permit or regulatory violations shall be the responsibility of the Design-Builder. Upon completion of the entire regulated land disturbing activity (including final stabilization of all disturbed areas), the Design-Builder shall provide updated/revised Permanent Best Management Practice (BMP) information in Section VI of the SWPPP General Information Sheets for each post construction BMP placed into service on the Project, provide As-Built drawings of all post-construction stormwater management facilities located on the Project, complete the VPDES Construction Permit Termination Notice form (LD-445D), and submit all documents for processing.

C. The Design-Builder shall be responsible for the design and construction of stormwater management facilities as required for the Project in accordance with the latest version of IIM-LD-195, and the other standards and reference documents listed in Attachment 1.5a, including the Virginia Stormwater Management Program Act and the Virginia Stormwater Management Program (VSMP) Regulation, and shall comply with the minimum geotechnical requirements contained therein. The locations of potential stormwater management facilities identified in the RFP Conceptual Plans are preliminary and have not been fully evaluated to determine if these locations are suitable, feasible, or sufficient to address all of the stormwater management requirements of the Project. The Design-Builder, as a part of final design, shall develop a final post-construction stormwater management plan and construct facilities that meet all applicable requirements.

1. The Design-Builder is to insure proper access for maintenance vehicles and personnel to any stormwater management facility and that any specific proprietary facilities have proper maintenance details included in the As-Built Plans. When a stormwater management basin is located outside limited access fencing, maintenance access should be provided from a separate public road where economically feasible. When maintenance access can only be provided from a limited access roadway, a locked gate shall be provided.

2. A preliminary Drainage and Stormwater Management Report was prepared by the Concessionaire and provided as RFP Supplemental Information. The Design-Builder shall prepare an updated Drainage and Stormwater Management Report as part of its final design incorporating all drainage, hydraulic and SWM calculations and analysis, including pre- and post-development discharges at project limit

outfall locations, capacities, and supporting data, such as drainage areas (with maps), ground cover calculations, etc., in accordance with the documentation requirements as outlined in the VDOT Drainage Manual. Drainage area maps shall show, at a minimum, the basin limits, flow path used for the time of concentration calculations and the different land uses. For offsite drainage areas the most detailed available mapping shall be used such as County GIS mapping. Summary tables for ditches, spread, storm sewer, and hydraulic grade lines shall be prepared per the VDOT Drainage Manual and contain as a minimum all the information shown in the standard VDOT forms. The summary forms for ditches, spread, and storm sewer calculations shall be organized and show the drainage system in order from upstream to downstream with a separate table for each individual ditch or storm sewer system. Hydraulic grade lines summary tables shall show the hydraulic grade line elevations for each individual system in a downstream to upstream order.

3. For drainage pipes (storm sewer or culverts) under the Interstate or the Interstate ramps, a minimum diameter of 24-inches shall be used.

4. For connections where a new drainage pipe (storm sewer or culverts) is required between the culverts underneath existing I-495 travel lanes and where the height of fill is over 20 feet, a minimum diameter of 60-inches shall be used.

5. To address the water quality impacts of Project NEXT, the Design-Builder may use Nutrient Credits to meet up to eighty percent (80%) of the required Total Phosphorus (TP) removal requirement. The Concessionaire will be responsible for acquiring up to 42 pounds of Nutrient Credits at an approved location for use on Project NEXT to count toward the Design-Builder's 80% TP removal requirement. The Concessionaire's acquisition of Nutrient Credits shall be limited to the lesser of 42 pounds or the amount needed to meet the 80% of the TP removal requirement based on the Design-Builder's final design,. Any remaining TP removal requirements must be met by the Design-Builder's purchase of additional Nutrient Credits at an approved location (up to the allowable limit) or addressed with on-site, above-ground SWM facilities. The facilities TP Mass Load Removal efficiencies must be based on the Part II-C requirements, including the 1999 Virginia Stormwater Management Handbook, Volume II, Table 5-15.

6. Use of underground detention facilities and manufactured treatment devices is prohibited.

7. Plantings for bioretention swales or other proposed water quality features shall be developed in accordance with the Virginia DEQ criteria for appropriate species, density, and planting zones for developing water quality features.

8. Bioretention and dry swales will be permitted in fill sites and adjacent to retaining walls pending approval of the Design-Builder's geotechnical analysis and proposed measures as necessary to mitigate impacts to the adjacent fill slopes and retaining walls. The Design-Builder's stormwater design submittals shall include geotechnical analysis, recommendations, and construction measures as necessary to mitigate fill slopes and retaining walls adjacent to these facilities.

9. Use of sand filters and infiltration facilities, as defined in 9VAC25-870-93, 9VAC25-870-96, and the Virginia Stormwater Management Handbook, is prohibited.

3.7 Roadway Design

3.7.1 General Requirements

A. The Design-Builder shall prepare the final geometric design of the roadway. Functional classifications for roadways and specific design criteria for Project NEXT are to be developed per the standards, specifications and criteria set forth in Attachments 1.5a and 1.5b.

B. The alignments and profile as provided in the RFP Conceptual Plans have been reviewed and have been found to be acceptable for use on Project NEXT and for potential future general purpose lane improvements. The Design-Builder shall confirm the necessary details during final design and may propose revised designs that meet the applicable design criteria and standards without impairing the essential functions and characteristics of the design, including safety, traffic operations, desired appearance, maintainability, environmental protection, drainage, future considerations, and the constraints of any regulatory approvals. Both the Concessionaire and VDOT will have the right to accept or reject such revised designs.

C. Except as allowed by the Design Exceptions and Design Waivers set forth in Attachment 1.5c, the design speed for the NEXT portion of the 495 Express Lanes shall be 70 miles per hour minimum south of Georgetown Pike. The design speed for the NEXT portion of 495 Express Lanes north of Georgetown Pike and modifications to the existing I-495 general purpose lanes shall be 60 miles per hour minimum. The design speed for all exit or entrance ramps and other roadways shall be in accordance with Attachment 1.5b. Except as allowed by the Design Exceptions and Design Waivers set forth in Attachment 1.5c and any additional Design Exceptions and Design Waivers obtained by the Design-Builder, the NEXT portion of the 495 Express Lanes and shoulders, and I-495 general purpose lanes and shoulders, shall meet VDOT's criteria for Interstate highways, as described in the Standards and Specifications set forth in Attachments 1.5a and 1.5b.

D. Except as allowed by the Design Exceptions and Design Waivers set forth in Attachment 1.5c and any additional Design Exceptions and Design Waivers obtained by the Design-Builder, all new and existing ramps shall be designed with a parallel design, with the exception of exit ramps (which may be designed as taper-type exits) and the convergence of DTR Ramps D2 and G3 (which may be designed as a taper-type entrance). Acceleration and deceleration lengths shall be designed to meet AASHTO requirements, including operational characteristics of the ramp. Where AASHTO indicates a desirable dimension or a range of lengths, the desirable or larger values shall be used, unless constraints prohibit this length and the reduction justification is approved.

E. Design-Builder shall provide a continuous physical barrier wall between the northbound and southbound Express Lanes, and tubular delineators (flexible channelizing posts)

between the General Purpose Lanes and the Express Lanes throughout the corridor. Median cross-overs between the northbound and southbound Express Lanes shall use utilize tubular delineators consistent with those in use on the existing 495 Express Lanes to deter unauthorized use.

F. Standard MC-3B Asphalt Curb shall be used in conjunction with paving under guardrail on fill heights over 7.5 feet.

G. New or replacement guardrail shall be provided in accordance with the requirements in Section 3.10.

H. The Design-Builder shall design and construct Project NEXT to accommodate the future extension of the 495 Express Lanes northward towards Maryland. The required accommodations are as follows:

1. The Design-Builder shall construct the Phase 1 and future southbound pavement from the I-495 General Purpose Lanes gore area at Ramp NW (approximate Station 272+00) to the "southbound interface line" as shown in the RFP Conceptual Plans. The pavement in this area shall be of sufficient width, elevation, and cross-slope in order for the future Maryland project configuration to connect at the "southbound interface line" and overlay and restripe the pavement south of this interface.
2. The Design-Builder shall construct the Phase 1 and future northbound pavement from approximately 300 feet south of Live Oak Drive (approximate Station 674+00) to the "northbound interface line" as shown in the RFP Conceptual Plans. The pavement in this area shall be of sufficient width, elevation, and cross-slope in order for the future Maryland project configuration to connect at the "northbound interface line" and overlay and restripe the pavement south of this interface.
3. The Design-Builder shall construct the Phase 1 and future pavement for Ramps G21, G22, G23, E21, E22, NW, and SW as shown in the RFP Conceptual Plans. The pavement along these ramps shall be of sufficient width, elevation, and cross-slope for the future Maryland project and/or future expansion of the Georgetown Pike interchange (as shown in the *2045 Design Year Concept Geometry Roll Plots* provided in Attachment 1.0) to connect with an overlay and restriping.

I. All roadside features throughout the areas defined in Section 3.7.1.H shall be located such that they do not require relocation as part of the Maryland project or future expansion of the Georgetown Pike interchange (as shown in the *2045 Design Year Concept Geometry Roll Plots* provided in Attachment 1.0).

3.7.2 Requirements for Operational Analysis

A. The Design-Builder shall be responsible for compliance with applicable commitments and operational improvements required by the approved Project NEXT Interchange Justification Report (IJR).

B. The Design-Builder shall provide an operational analysis for any proposed changes to the Project NEXT designs as presented in the RFP Conceptual Plans and/or the approved

Project NEXT IJR. If any such changes are deemed acceptable, the Design-Builder shall prepare any necessary IJR amendments.

C. The operational analysis shall demonstrate that the Design-Builder's revised design does not have an adverse impact on the safety and operation of the existing and proposed facility based on an analysis of current and future design year traffic. Traffic and operational analysis shall conform to all applicable VDOT and FHWA requirements.

3.8 Pavement

The locations and scope of work for pavement improvements, including areas of widening and new pavement construction, areas of pavement demolition and reconstruction, areas of resurfacing (mill and overlay), including at the project termini transition zones are provided in the RFP Conceptual Plans and shown on Attachment 3.8 (Minimum Pavement Requirements). The required pavement improvements and associated design requirements in this Section 3.8 have been developed to: a) maximize the reuse of existing pavement, b) ensure that minimum pavement section requirements are consistently met, and c) optimize roadway profiles and grades.

Areas of reconstruction and new pavements, including new shoulders, shall meet the requirements of Section 3.8.2. Areas of existing pavement reuse shall meet the requirements set forth in Sections 3.8.3 and 3.8.5. Reuse of existing pavement may require a build-up or a decrease in the pavement section in order to provide appropriate cross slopes and the resulting pavement sections shall meet minimum pavement section criteria of this Section 3.8. Where existing composite pavements are reused, all cracks and transverse joints in the pavement shall be repaired in accordance with the requirements in Section 3.8.4.

3.8.1 General Pavement Requirements

A. Pavement designs for all travel lanes and shoulders shall meet the requirements of this Section 3.8 and Chapter VI – *Pavement Design and Evaluation* of the VDOT Manual of Instructions for Materials Division. The Design-Builder may propose changes to the specified minimum pavement sections for the Express Lanes and General Purpose travel lanes and shoulders that either a) increases the thickness of the base or subbase layers specified in Section 3.8.2 or b) uses an alternative base, drainage, and/or subbase layer type and thickness that meets or exceeds the Structural Number of the minimum pavement sections specified in Section 3.8.2 without compromising long-term strength or durability. Use of a consistent pavement design for the Express Lanes and General Purpose lanes and shoulders for the entire length of the Project is required. Changes to the minimum pavement sections that rely on Resilient Modulus and/or a CBR value that violates the requirements of Section 3.8.1.E are not acceptable. Any proposed variations to the pavement designs must be presented and accepted as part of the RFP response. Final details for any accepted RFP variations are subject to approval during the detailed design phase.

B. The Design-Builder shall prepare and incorporate final pavement design details into the plans, typical sections, profiles, and cross-sections in accordance with the applicable Standards and Specifications set forth in Attachment 1.5a. This shall include, but is not

limited to, underdrains, stormwater inlets and pipes, and pavement sections reflecting the elements identified in the Design-Builder's final pavement design.

C. The Design-Builder shall add the following note to the typical section sheets in the construction plans: "The VDOT District Materials Engineer shall be notified within 24 hours of exposing the existing concrete, and at least 48 hours prior to placement of widening pavement, to allow for verification of the exposed edge of pavement."

D. Pavement design and construction shall meet the requirements of the Federal pavement policy, 23 CFR 626 (Chapter 1).

E. The minimum pavement sections shall be based upon the following requirements:

1. A minimum soil CBR value of 5 within three (3) feet of subgrade (therefore all imported fill material shall have a minimum CBR value of 5),
2. All subgrade is compacted in accordance with the applicable sections of the VDOT Road and Bridge Specifications and applicable special provisions, and
3. All unsuitable materials identified in the Design-Builder's final roadway plans and Geotechnical Engineering Reports shall be properly removed or modified.

F. Pavements shall be designed to ensure positive drainage on the pavement surface and within the pavement structure, including connecting to existing or any new sub-drainage systems. Pavement drainage layers between adjacent pavement sections must consist of similar material and permeability. Drainage layers shall extend continuously across travel lanes and shoulders, connect to appropriate sub-drainage systems, and accommodate pavement internal drainage from existing or adjacent pavement. The existing pavement shall be shown on the typical sections.

1. Standard UD-4 edgedrains shall be required for all pavements on this project. Modified UD-1 underdrains shall be installed in lieu of standard UD-4 edgedrain for pavement sub-drainage in wet areas, areas of high groundwater, springs, and in cuts greater than 25 feet. The modification consists of wrapping the aggregate with geotextile drainage fabric.
2. Standard Combination Underdrain (CD-1) shall be provided at the lower end of cuts.
3. Standard Combination Underdrain (CD-2) shall be provided at grade sags, bridge approaches, and at the lower end of undercut areas.

G. Any pavement reconstruction on arterials, local streets, or interchange ramps not specified in Section 3.8.2 shall be designed to meet the design-year traffic and match the existing pavement type at tie-ins in accordance with VDOT Standard WP-2 and in accordance with VDOT's pavement design standards and guidelines per Chapter VI of the VDOT Manual of Instructions for Materials Division.

H. Unpaved areas surrounding pavements shall be graded to direct surface water away from paved areas. Any utility excavations or excavations for storm drains within pavement areas shall be backfilled with compacted structural fill in accordance with applicable sections of VDOT's Road and Bridge specifications and applicable special provisions.

I. For new and resurfaced pavements in the Express Lanes and General Purpose lanes, the Design-Builder shall conduct necessary testing and confirm that the average International Roughness Index (IRI) for each 0.01-mile section is 70.0 Inches Per Mile or lower. This testing shall be completed prior to Service Commencement (for the Express Lanes pavements) and prior to Final Completion (for the General Purpose lanes pavements). Rideability testing shall be conducted for all pavements following the placement of the final surface course and completed in accordance with Virginia Test Method 106 – *Ride Quality Testing on Ride Specifications Projects – (Pavement Design)*. If the minimum IRI rideability requirement of 70.0 Inches per Mile or lower for each 0.01-mile section of new pavement is not achieved in the initial test, the Design-Builder shall replace the pavement and re-test to verify that the minimum IRI rideability requirements have been met.

J. The Design-Builder shall submit, no later than thirty (30) days before the submission of associated final Design Documentation, a Pavement Design Report that documents the assumptions, considerations, and decisions contributing to the Design-Builder's proposed pavement design, including the following:

1. Pavement design details by location, including structural layer materials, general specifications, and thicknesses;
2. Relevant pavement evaluation data (structural and functional) and condition information for adjacent pavements;
3. Relevant geotechnical data and drainage information to verify the pavement design(s);
4. Design criteria used in determining the pavement design(s), including annual average daily traffic, percentage heavy vehicles, cumulative traffic loading, pavement material strength factors, and pavement design life;
5. Design calculations documenting the pavement design(s) in accordance with the specified design methodology; and
6. A minimum soil CBR value of 5 within three (3) feet of subgrade (therefore all imported fill material shall have a minimum CBR value of 5).

3.8.2 Minimum Pavement Sections for New Pavement Construction

A. All new travel lane and shoulder pavements shall comply with the following minimum pavement sections:

I-495 NB/SB Express / General Purpose Lanes (High-Side Widening Section)		
Layer	**Material**	**Thickness**
1-Surface	Asphalt Concrete, Type SMA-9.5	1.5 in.
2-Intermediate	Asphalt Concrete, Type SMA-12.5	2.0 in.
3-Base	Asphalt Concrete, Type BM-25.0D+0.4 high modulus, high binder (PG64H-22)	13.0 in.
4-Cement Treated Aggregate (CTA) base	Cement Treated Aggregate Base Material, Type I	10.0 in.
I-495 NB/SB Express / General Purpose Lanes (Low-Side Widening Section)		
Layer	**Material**	**Thickness**
1-Surface	Asphalt Concrete, Type SMA-9.5	1.5 in.
2-Intermediate	Asphalt Concrete, Type SMA-12.5	2.0 in.
3-Base	Asphalt Concrete, Type BM-25.0D+0.4 high modulus, high binder (PG64H-22)	13.0 in.
4-Subbase	Aggregate Base Material, Type I, Size 21B connected to a UD-4 edgedrain beneath the outside edge of paved shoulder or beneath curb and gutter	10.0 in.

Dulles Toll Road and adjoining Ramps (High-Side Widening Section)		
Layer	**Material**	**Thickness**
1-Surface	Asphalt Concrete, Type SMA-9.5	1.5 in.
2-Intermediate	Asphalt Concrete, Type SMA-12.5	2.0 in.
3-Base	Asphalt Concrete, Type BM-25.0D	12.0 in.
4-Cement Treated Aggregate (CTA) base	Cement Treated Aggregate Base Material, Type I	6.0 in.

Dulles Toll Road and adjoining Ramps (Low-Side Widening Section)		
Layer	**Material**	**Thickness**
1-Surface	Asphalt Concrete, Type SMA-9.5	1.5 in.
2-Intermediate	Asphalt Concrete, Type SMA-12.5	2.0 in.
3-Base	Asphalt Concrete, Type BM-25.0D	12.0 in.
4-Subbase	Aggregate Base Material, Type I, Size 21B connected to a UD-4 edgedrain beneath the outside edge of paved shoulder or beneath curb and gutter	14.0 in.

Old Dominion Drive		
Layer	**Material**	**Thickness**
1-Surface	Asphalt Concrete, Type SM-9.5A	1.5 in.
2-Intermediate	Asphalt Concrete, Type IM-19.0A	2.0 in.
3-Base	Asphalt Concrete, Type BM-25.0A	6.5 in.
4-Subbase	Aggregate Base Material, Type I, Size 21B connected to a UD-4 edgedrain beneath the outside edge of paved shoulder or beneath curb and gutter	12.0 in.
Georgetown Pike and adjoining Ramps, George Washington Memorial Parkway and adjoining Ramps		
Layer	**Material**	**Thickness**
1-Surface	Asphalt Concrete, Type SM-9.5D	1.5 in.
2-Intermediate	Asphalt Concrete, Type IM-19.0D	2.0 in.
3-Base	Asphalt Concrete, Type BM-25.0A	6.5 in.
4-Subbase	Aggregate Base Material, Type I, Size 21B connected to a UD-4 edgedrain beneath the outside edge of paved shoulder or beneath curb and gutter	12.0 in.

Balls Hill Road		
Layer	**Material**	**Thickness**
1-Surface	Asphalt Concrete, Type SM-9.5A	1.5 in.
2-Base	Asphalt Concrete, Type BM-25.0A	8.5 in.
3-Subbase	Aggregate Base Material, Type I, Size 21B connected to a UD-4 edgedrain beneath the outside edge of paved shoulder or beneath curb and gutter	12.0 in.

Live Oak Drive		
Layer	**Material**	**Thickness**
1-Surface	Asphalt Concrete, Type SM-9.5A	1.5 in.
2-Intermediate	Asphalt Concrete, Type IM-19.0A	2.0 in.
3-Base	Asphalt Concrete, Type BM-25.0A	3.0 in.
4-Subbase	Aggregate Base Material, Type I, Size 21B connected to a UD-4 edgedrain beneath the outside edge of paved shoulder or beneath curb and gutter	12.0 in.

Note: All widening on the high side of existing pavement cross-slopes shall utilize CTA in lieu of 21B.

B. New paved shoulders for the 495 Express Lanes, General Purpose lanes, and ramps shall be constructed to match the minimum requirements for new and widened travel lane pavements provided in Section 3.8.2.

C. Pavement adjacent to guardrails shall be in accordance with VDOT Standard MC-4.

D. All pavement widening shall be completed in accordance with VDOT Standard WP-2 with the pavement section identified in Section 3.8.2. Where widening existing pavement, the existing pavement shall be saw cut full depth to expose the existing edge of full depth concrete pavement as identified by nine inches (9") (+/- one inch (1")) of Portland cement concrete overlaid with variable depths of asphalt concrete.

E. The existing outside shoulders of the I-495 General Purpose Lanes shall be demolished and reconstructed in accordance with the pavement section criteria of Section 3.8.2, except in the following approximate limits (as shown in the RFP Conceptual Plans) where the existing shoulder was previously constructed to meet minimum pavement requirements:

1. I-495 Northbound, between Stations 583+00 and 701+00
2. I-495 Southbound, between Stations 192+50 and 209+50

The Design-Builder shall confirm these approximate extents based on its final pavement design. All existing underdrains that are impacted by the proposed reconstruction shall be removed and replaced to provide positive drainage to the nearest available outlet.

F. When widening existing pavement, the pavement subgrade slope shall be designed such that the existing pavement subbase can properly drain to the edgedrain. Additionally, the bottom of the new BM-25.0 layer shall be placed to align with the bottom of the existing base asphalt. All pavement widening shall be completed up through the base layer prior to building-up and/or placing the surface course over both the existing pavement and the widened pavement.

3.8.3 Existing I-495 Composite Pavement Resurfacing Requirements

A. In areas of resurfacing and reuse, the existing pavement shall be milled to a minimum depth of four (4) inches and replaced with a minimum of two and one- half (2.5) inches of asphalt concrete BM-25.0D+0.4 (high modulus, high binder, PG 64H-22) prior to building up and/or placing the new surface course, except on I-495 NB General Purpose lanes between approximate Stations 614+00 and 701+00 (as shown on the RFP Conceptual Plans) where milling of the existing surface course only requires milling to a depth of two (2) inches prior to build-up.

Where existing composite pavement (plain jointed concrete overlaid with asphalt concrete) will be resurfaced and reused, a minimum of eight (8) inches of asphalt concrete overlying a nominal nine-inch-thick (9" thick) concrete slab is required for the I-495 General Purpose Lanes. A minimum of three (3) inches of asphalt concrete overlying a nominal nine-inch-thick (9" thick) concrete slab is required for the 495 Express Lanes. A minimum of 16.5 inches of asphalt concrete is required for reusing the previously constructed shoulders defined in 3.8.2.E as travel lanes. The surface and intermediate courses for existing pavement build-up areas (two (2) inches SMA-12.5 under one and

one-half (1.5) inches SMA-9.5) shall match the new pavement criteria in Section 3.8.2. For build-ups greater than three and one-half (3.5) inches, BM-25.0D shall be used beneath the pavement surface and intermediate course.

B. After milling, all cracks shall be cleaned of all debris and sealed with a Type B crack sealant in accordance with the *Special Provision for Sealing Cracks in Asphalt Concrete Surfaces or Hydraulic Cement Concrete Pavement*. The final surface asphalt shall be placed uniformly over the entire pavement (travel lanes and paved shoulders).

C. Data on the existing pavement thickness, including pavement cores and a Ground Penetrating Radar (GPR) study of the northbound and southbound travel lanes and shoulders within the project extents, are provided in the Geotechnical and Pavement Data Report (Attachment 3.4a)

D. Where existing composite pavements will be resurfaced, repair and seal transverse joints in the existing composite pavements in accordance with Section 3.8.4.

3.8.4 Joint Repairs in Existing Composite Pavement Sections

A. Where the existing composite pavement is to be reused and resurfaced, repairs to transverse joints and the sawcutting and sealing of transverse joints shall be performed in accordance with the requirements of this Section 3.8.4 and the joint repair details shown on the Sheet 2C series of the RFP Conceptual Plans. The final, as-constructed joint repair locations and types shall be documented in the As-Built Plans. Two types of joint repairs will be required for Project NEXT:

1. Type 3 Repairs – Type 3 repair locations are typically characterized by primary reflective crack over a joint surrounded by greater than one-half (½) inch of additional cracking
2. Type 4 Repairs – Type 4 repair locations are typically characterized by one of the following: a previous utility crossing; previous repair work over an existing joint; open or degraded expansion joints from previous construction; evidence of failed concrete slabs; or as mutually-agreed upon by the Design-Builder and the Concessionaire.

After final resurfacing, all transverse joints, including those requiring Type 3 and 4 repairs, shall be saw cut and sealed in accordance with the VDOT *Special Provision for Sawing and Sealing Joints in Asphalt Overlays Over Jointed Concrete Pavements*, and as shown on Sheet 2C of the RFP Conceptual Plans. The cost for sawcutting and sealing the Type 3 and Type 4 repairs locations (as required by the joint repair details for each) shall be included in the unit cost for Type 3 and Type 4 joint repairs. Additional details and reference information on existing joint conditions are provided in Attachment 3.4a (Geotechnical and Pavement Data Report)

B. I-495 SB General Purpose Lanes: A field evaluation of the existing composite pavement joints in the I-495 southbound General Purpose lanes between approximately 0.45 miles south of the overpass at Old Dominion Drive (approximate Station 191+25 as shown on the RFP Conceptual Plans) and the south abutment to the American Legion Bridge was conducted by the Concessionaire and the results are provided in the Geotechnical and

Pavement Data Report (Attachment 3.4a), Appendix C. The approximate joint location, distress width, distress length, and anticipated repair type are shown in tabular form on the Sheet 2C series of RFP Conceptual Plans. The joint locations and joint repair types shall be included in the Design-Builder's final plans for approval, and shall be confirmed by the Design-Builder and confirmed in the field by the Concessionaire and VDOT representatives prior to completing the repair work.

C. I-495 NB General Purpose Lanes, North of Old Dominion Drive: VDOT previously surveyed and repaired joints in the existing composite pavements in the I-495 northbound General Purpose lanes between the overpass at Old Dominion Drive (approximate Station 614+00 as shown on the RFP Conceptual Plans) and the south abutment to the American Legion Bridge. The Design-Builder shall evaluate the existing pavement conditions to determine if additional Type 3 or Type 4 repairs are required, and the tabulated approximate joint location, distress width, distress length, and anticipated repair type shall be included in the Design-Builder's final plans for approval. The joint locations and joint repair types shall be confirmed in the field by the Concessionaire and VDOT representatives prior to completing the repair work.

D. I-495 NB General Purpose Lanes, South of Old Dominion Drive: No previous joint surveys or repairs have been conducted on the I-495 northbound General Purpose lanes between the southern project limits and the Old Dominion Drive overpass bridge (approximate Station 614+00 as shown on the RFP Conceptual Plans). It is anticipated that repairs will be required in this area. The Design-Builder shall evaluate the existing pavement conditions to determine where Type 3 or Type 4 repairs are required, and the tabulated approximate joint location, distress width, distress length, and anticipated repair type shall be included in the Design-Builder's final plans for approval. The joint locations and joint repair types shall be confirmed in the field by the Concessionaire and VDOT representatives prior to completing the repair work.

E. The Design-Builder shall notify the Concessionaire and the VDOT Northern Virginia District Materials Engineer (DME) at least 48 hours in advance of each joint repair, so that the Concessionaire and DME can verify the correct repair types and locations on the pavement.

F. The locations of all transverse joints requiring sawcutting and sealing, Type 3 Repairs and Type 4 Repairs in the southbound and northbound lanes shall be determined or confirmed by the Design-Builder in the field prior to final resurfacing of all existing pavements. The Design-Builder shall confirm and/or identify the type, width, length, and if needed, depth of the repair, and with mutual agreement and direction from the Concessionaire's or VDOT's on-site authorized representatives, complete the repair. The Design-Builder shall provide a plan showing the proposed joint repair types and locations for review. No joint repairs shall be completed until the plan has been reviewed and approved.

G. The Design-Builder shall use the following quantities for the various transverse joint treatments for the purposes of preparing the Technical and Price Proposals:

1. Sawcutting and Sealing – 39,840 linear feet (for those joints that only require sawcutting and sealing)

2. Type 3 Joint Repairs – 8,500 linear feet (includes the required sawcutting and sealing of all such joints)
3. Type 4 Joint Repairs – 2,600 linear feet (includes the required sawcutting and sealing of all such joints)

H. If the Concessionaire-approved final quantities for each type of joint treatment are different than the quantities specified in Section 3.48.4.H, one of the following scenarios will apply:

1. If the total linear foot quantity of each or any type of joint treatment is less than the specified quantities, the Design-Builder shall credit the Concessionaire for the amount of quantity reduction multiplied by the unit price in the Design-Builder's Price Proposal for each type of joint treatment.
2. If the total linear foot quantity of each or any type of joint treatment is more than the specified quantities, the Concessionaire will compensate the Design-Builder for the amount of quantity increase multiplied by the unit price in the Design-Builder's Price Proposal for each type of joint treatment.

   Once the final joint treatment quantities have been determined and verified, any credits and compensations provided per (1) and (2) above will be offset against each other such that one aggregate adjusting credit or compensation will be made to the Design-Builder for all three types of joint treatments.
3. The unit pricing for each type of joint treatment included in the Design-Builder's Price Proposal shall include all direct and incidental costs necessary to complete the required work as shown in Sheet 2C of the RFP Conceptual Plans.

3.8.5 Existing Pavement Resurfacing Requirements in Project Termini Transition Zones

A. Where existing pavements will be resurfaced at the project termini transition zones, the Design-Builder shall match or build-up the pavement to meet the final roadway surface design. The existing top of pavement elevations and existing pavement thicknesses shall not be reduced.

B. In these transition zone areas of resurfacing on I-495, the existing pavement shall be milled to a minimum depth of four (4) inches and replaced with a minimum 2.5 inches of asphalt concrete BM-25.0D+0.4 (high modulus, high binder, PG 64H-22) prior to building up and/or placing the new surface course except on I-495 NB General Purpose lanes between Sta 614+00 and Sta 702+83 where the existing surface only needs to be milled to a depth of two (2) inches prior to build-up.

C. In these transition zone areas of resurfacing on side roads and adjacent highways, the existing pavement shall be milled to a minimum depth of one and one-half (1.5) inches and replaced with a minimum one and one-half (1.5) inches of surface asphalt concrete specified for the roadway in Section 3.8.2.

D. After milling, all cracks shall be cleaned of all debris and sealed with a Type B crack sealant in accordance with the *Special Provision for Sealing Cracks in Asphalt Concrete*

or Hydraulic Cement Concrete Pavement. The final surface asphalt shall be placed uniformly over the entire pavement (travel lanes and paved shoulders).

E. Where existing composite pavements will be resurfaced, repair and seal transverse joints in the existing composite pavements in accordance with Section 3.8.4.

F. If the Design-Builder removes any existing pavement markings from any roadway to install temporary markings to facilitate its Work, the Design-Builder shall mill and resurface the roadway to meet the applicable Standards and Specifications set forth in Attachment 1.5a and replace pavement markings in accordance with Section 3.9.2 prior to Service Commencement.

3.8.6 Temporary Pavement

A. Where traffic is temporarily shifted onto an existing paved shoulder and this pavement is intended to be used by the Project configuration at the end of the Work, the pavement must either meet or be modified to meet the requirements in Section 3.8.2. This pavement shall remain in place after the Work is complete.

B. Temporary pavement that is required and is not intended to be used by the Project configuration at the end of the Work shall meet the requirements of Section 3.8.6.C. Such pavements shall be completely removed once it is no longer in service.

C. The Design-Builder shall be responsible for any temporary pavement design and construction. Temporary pavements shall be designed in accordance with the AASHTO Guide for the Design of Pavement Structures and the VDOT Manual of Instructions for Materials Division. All temporary pavement designs shall be submitted for review and approval upon submittal of the relevant temporary traffic control plans. All temporary pavement designs for interstate travel lanes or ramp pavements shall have a minimum 6 inches of asphalt concrete and a minimum of 6 inches of plain aggregate (21B) and shall meet the following minimum design criteria:

1. Design Life – 6 months minimum or such longer duration as may be required per the Design-Builder's MOT sequencing
2. Reliability – eighty-five percent (85%) minimum
3. Initial Serviceability – 4.2 minimum
4. Terminal Serviceability – 2.8 minimum
5. Standard Deviation – 0.49 minimum
6. CBR value for subgrade soils determined through laboratory tests.

Any proposed reuse of existing paved shoulders as temporary pavements for maintenance of traffic during construction shall be evaluated by the Design-Builder's engineer and meet the above design criteria. Such pavement evaluation shall be submitted for approval prior to or as part of the pertinent temporary traffic control plans submittal.

D. The Design-Builder shall be responsible for maintenance of all temporary pavements and temporary pavement markings to provide reasonably smooth riding surface and adequate

visibility of temporary markings at all times of the day and during adverse weather conditions.

E. Any paved shoulder areas used for temporary traffic shall be restored after any such temporary use for the Project has concluded. This restoration work must include the milling of one and one-half (1.5) inches of existing asphalt and placement of a new one and one-half- (1.5-)inch asphalt concrete surface course overlay specified for the roadway in Section 3.8.2, and the installation of pavement markings and/or inlaid plastic markers in accordance with VDOT requirements.

3.8.7 Full Depth Patching of Existing PCC Pavement

A. The existing Portland cement concrete (PCC) pavements at the approaches to George Washington Memorial Parkway bridge within the project limits exhibit areas of deterioration and failed patching and shall be repaired by full depth patching. Approximate limits are shown in Attachment 3.8. All patching shall be in accordance with the VDOT *Special Provision for Patching Hydraulic Cement Concrete Pavement* listed in Attachment 1.5a.

B. A quantity of 400 square yards of full depth patching (minimum 8" depth) shall be utilized by the Design-Builder for the purposes of preparing the Technical and Price Proposals. The final quantity shall be determined by the Design-Builder. If the Concessionaire-approved final quantity of full depth patching is different that the specified quantity, the following scenarios shall apply:

1. If the total quantity of full depth patching is less than the specified quantity, the Design-Builder shall credit the Concessionaire for the amount of quantity reduction multiplied by the unit price in the Design-Builder's Price Proposal for the full depth patching.
2. If the total quantity of full depth patching is more than the specified quantity, the Concessionaire will compensate the Design-Builder for the amount of quantity increase multiplied by the unit price in the Design-Builder's Price Proposal for the full depth patching.
3. The unit pricing for the full depth patching shall be included in the Design-Builder's Price Proposal and shall include all direct and incidental costs necessary to complete the required work.

C. The locations of all areas requiring full depth patching shall be determined or confirmed by the Design-Builder in the field. The Design-Builder shall provide a plan showing the proposed repair locations for review. No patching repairs shall be completed until the proposed repair plan has been reviewed and approved. The Design-Builder will complete the repair upon mutual agreement and direction from the Concessionaire's or VDOT's on-site authorized representatives.

3.9 Traffic Engineering

3.9.1 General

A. The Design-Builder shall provide plans for all traffic control devices with its Design Documentation. The Design Documentation for traffic control devices shall be submitted as a complete package for review and approval for each Construction Segment. Submittal(s) shall include all new and existing traffic control devices within the Project NEXT limits and those relevant signs outside the Project NEXT limits.

B. All new and existing traffic control devices shall be designed, and installed (or modified) to comply with the applicable Standards and Specifications set forth in Attachment 1.5a and the requirements of the maintaining agency.

C. The Design-Builder shall be responsible for the design and construction of all Project NEXT traffic control devices.

D. Traffic control devices shall include all signs, traffic signals, pavement markings, pavement markers, roadway and interchange lighting, overhead signs (with associated lighting as may be required) and tubular delineators (channelizing posts) along with foundations, posts, structures and mounting hardware necessary within and leading to the Project NEXT limits.

E. Installation of new (and modification of existing) traffic control devices along with their support structures, and associated lighting (as may be required) outside the Project NEXT limits which are necessary to orderly transition, guide, and regulate traffic to/from Project NEXT.

3.9.2 Pavement Markings

A. The Design-Builder shall furnish, install and maintain pavement markings, reflective pavement markers, and tubular delineators meeting the applicable Standards and Specifications set forth in Attachment 1.5a. Transitions to/from new markings, markers, and delineators to existing shall be continuous such that road users may discern only a minimum change in the delineation concept.

B. On any pavement reconstruction undertaken by the Design-Builder, the Design-Builder shall tie-in and match the existing markers and pavement marking systems.

C. Temporary markers, pavement markings and striping shall not be placed on the final surface course unless approved.

D. All existing pavement markings and markers that do not conform to the final traffic patterns shall be eradicated and removed. Following eradication, the roadway surfaces shall be replaced in accordance with Section 3.8.5.F .

E. Metal casing inlaid pavement markers shall not be used. Any existing metal casing inlaid pavement markers shall be removed and replaced when any lane shifts are implemented for construction sequencing or maintenance of traffic. New or replacement plastic inlaid markers shall meet the requirements of Road and Bridge Standards PM-8 and other applicable Standards and Specifications set forth in Attachment 1.5a.

F. Permanent pavement markings (lane division lines, edge lines, ramp and gore markings) on the NEXT Express Lanes and ramps and the I-495 General Purpose lanes and ramps shall be Type B, Class VI, patterned pre-formed tape.

G. Purple E-Z Pass Logos shall be installed at the locations shown on the RFP Conceptual Plans. The logos shall meet the criteria shown in Attachment 3.9a, including the installation of the pavement message "ONLY" at each location as indicated.

H. High-Contrast Pavement Markings shall be used on all bridge decks and concrete pavements.

I. The use of thermoplastic pavement markings and pavement marking tape shall conform to the applicable Standards and Specifications in Attachment 1.5 and requirements in Attachment 3.9b.

J. Channelizing posts used in any emergency crossovers shall match existing channelizing posts used in existing emergency crossovers on 495 Express Lanes and be yellow in color.

K. Channelizing posts used to separate Express Lanes traffic from General Purpose lanes traffic shall match existing channelization posts used on 495 Express Lanes and shall be white in color.

3.9.3 Static Signs

A. The Design-Builder shall design, fabricate, and install all necessary guide (destination), directional, information, tolling, route marker, mile marker, trail blazers, regulatory and warning, and supplemental signs, including support structures, required for Project NEXT to meet the applicable Standards and Specifications set forth in Attachment 1.5a.

B. The Design-Builder shall provide all foundations, posts (or poles) and structures required for the Project NEXT signage. The Design-Builder shall be responsible for removing and disposing of existing sign structures that are removed or replaced as part of Project NEXT.

C. The Design-Builder shall not change the signing concept or sign locations shown in the RFP Conceptual Plans unless approved. The Design-Builder shall supplement and modify existing ground mounted regulatory, warning, milepost and trail blazer signage to provide a complete and final design. The Design-Builder shall prepare roll plans consisting of the Project Signage Roll Plan and the Trail Blazer Roll Plan and present the plans for review and comment. The Project Signage Roll Plan will be used for reviewing the spacing, placement and legend of dynamic message and static signs on the I-495 corridor and connecting roadways for all guide signs and HOT lane signs applications. The Trail Blazer Roll Plan will be used for reviewing existing and proposed static signs (trail blazers and route marker assemblies) on highways, feeder roadways, and other roadways directing and notifying motorists of the access to the Express Lanes and/or General Purpose lanes, as applicable. The Design-Builder shall be responsible for designing and implementing modifications to existing trail blazer and route marker assemblies as required to accommodate any NEXT Project signage.

1. The Project Signage Roll Plan shall show proposed locations for relocating existing signs, existing signs and structures to remain, and proposed locations for new signs and structures. All proposed signs shall have an identification reference number and existing structures identified with corresponding VDOT structure number. The roll plans shall also identify all existing structures that are scheduled for modification, removal or require a structural analysis for re-use (including adding, deleting or modifying sign panels).
2. The Project Signage Roll Plan shall also display signing, both existing (to remain) and proposed, for all Mainlines, ramps and interchanges, as well as for the arterial streets, frontage roads, and any other roadways that contain signing that is affected by Project NEXT.
3. The Project Signage Roll Plan shall also include the locations of all proposed and existing Dynamic Message Signs. The roll plan features shall include, but are not limited to, the existing and proposed roadway alignments, right of way, baseline of construction (including stationing), and existing topography at the tie-in points of the roadway limits of work. The proposed pavement markings depicting the entire alignment shall also be shown on the roll plans to fully represent the traffic control device concept.
4. The Trail Blazer Roll Plan shall show all existing and proposed highways and feeders with all existing and proposed trail blazers and router marker assemblies to I-495 and NEXT Express Lanes for at least one mile from the nearest Express Lanes entrance point or to the extent of the existing I-495 routing signs. New Express Lanes trailblazers should be co-located with existing I-495 trailblazers to the extent possible. All trail blazing signs (Express Lanes and General Purpose Lanes) shall be of the same size.
5. Submittal and approval of the Project Signage Roll Plan and Trail Blazer Roll Plan shall occur prior to final design. Preliminary line of sight analyses (including plan and profile exhibits) shall be prepared as part of the roll plan submittals, including an evaluation of the orientation of Dynamic Message Signs, in order to confirm all signs will have full and proper spacing and visibility to motorists and have an unobstructed view from the driver's perspective. A detailed cross-section or sign elevation for each sign structure must be provided along with the Project Signage Roll Plan and Trail Blazer Roll Plan that show at least the existing features adjacent to the sign structure, all dimensions needed to install the foundations and sign structures, sign panel locations relative to travel lanes, existing and proposed grades, and right-of-way limits or impacts. The Design-Builder is responsible for making any changes to the signing concept in order to provide adequate line of sight in accordance with Section 3.9.3.S .

D. Existing fixed sign panels can be re-used or relocated, if they are demonstrated to be in good condition with no damage or deterioration and are in accordance with the requirements of the applicable Standards and Specifications set forth in Attachment 1.5a. Where legend changes are needed on existing signs, the Design-Builder may choose to

provide new replacement sign panel or overlay the existing panel that otherwise comply with current standards..

E. The NEXT Express Lanes signage scheme will:

1. Match and support continuous integration of the NEXT Express Lanes with the existing road network;
2. facilitate seamless navigation of the road network, including access to, travel along and egress from the NEXT Express Lanes; and
3. be consistent with the existing directional and regulatory signing system on the existing road network and the 495 Express Lanes.

F. The types of signage that constitutes Project NEXT signage includes:

1. Regulatory and warning signs;
2. advance direction signs;
3. intersection direction signs;
4. trail blazer signs;
5. destination signs;
6. advance exit signs;
7. exit direction signs;
8. advance and confirmation toll signs (static and dynamic); and
9. rules of use permission signs.

G. All new full span sign structures and foundations shall be designed to accommodate an additional static sign load of 200 sf for future use. All cantilever and butterfly sign structures and foundations shall be designed to accommodate an additional static sign load of either 50 sf, or a 25% increase in the sign panel area shown in the RFP Conceptual Plans, whichever is greater, for future use.

H. The Design-Builder shall relocate all signs within the construction limits that conflict with construction work. Signs that otherwise comply with current standards but are not needed for the safe and orderly control of traffic during construction may be removed and stored in a manner that will prevent damage and reinstalled in their permanent locations prior to Service Commencement.

I. Sign structures may be built into the bridge support only for signs to be viewed by traffic traveling over the bridge. Signs to be viewed by traffic traveling under the bridge shall be installed on a sign structure independent of the bridge.

J. The Design-Builder shall be responsible for coordination with local agencies or jurisdictions as needed design and install signage necessary for Project NEXT, and securing any required Governmental Approvals.

K. The Design-Builder shall maintain all existing signs during construction, unless they are to be removed permanently or are to be replaced as required by Project NEXT. For any

existing signs that require relocation or modification due to construction (including traffic shifts during construction, the Design-Builder shall provide pertinent details, such as sign designs, mounting details, locations prior to relocation or modification for review and approval.

L. The Design-Builder shall modify or remove existing signs and structures that are rendered inaccurate, ineffective, confusing, or unnecessary based on the approved final design for Project NEXT. Where sign panels are replaced or added to existing sign structures, vertical strut lengths will be designed or modified as needed to not extend beyond the limits of the new sign panels. The Design-Builder shall obtain approval prior to making any such changes.

M. The Design-Builder shall identify and provide a summary of all existing signage affected by Project NEXT, including signs and associated sign structures that are outside the physical limits of roadway construction. For modifications (including adding, deleting or modifying sign panels) to any existing overhead/cantilever sign structure affected by Project NEXT, the Design-Builder shall provide a comprehensive structural analysis prior to the commencement of design in accordance with the requirements of Section 3.15..

N. Signs shall incorporate highly reflective sheeting material. Overhead and ground-mounted signs which do not require lighting must use Type XI retroreflective sheeting. Sign lighting shall be provided only at those locations where such lighting is determined to be required following the completion of an Overhead Sign Lighting Study in conformance with IIM-TE-380 (Overhead Sign Lighting).. Where required, sign lighting shall conform with VDOT's standard lighting requirements for freeway operations.

O. Post Interchange Signs (as defined in MUTCD Section 2E.38) shall be installed on Project NEXT in accordance with applicable standards where space and/or permanent structures permit.

P. The Design-Builder shall place milepost and intermediate markers at 0.2 mile intervals on the east side of the northbound General Purpose Lanes and on the west side of the southbound General Purpose Lanes. Milepost and intermediate markers shall be placed on the median barrier at 0.2 mile intervals in both directions on the Express Lanes

Q. The mile markers shall conform to MUTCD Figure 2H-2, Reference Location Signs, and intermediate markers shall conform to MUTCD Figure 2H-3, Intermediate Reference Location Signs.

R. For signing along I-495 and the Dulles Toll Road, all guide signs, dynamic message signs, and supplemental guide signs on overhead structures shall be installed such that 800 foot minimum spacing is maintained between signs. In areas where the 800 foot minimum spacing cannot be maintained, the Design-Builder shall seek a variance to reduce the spacing.

S. The Design-Builder shall perform line of sight analysis for all sign panel and Dynamic Message Signs to confirm drivers have sufficient time to read the sign messages, and signs are not visually obstructed. For signs that are determined to not meet line-of-sight

requirements, the Design-Builder shall provide an alternative compliant solution for approval prior to completing final design and construction for such signs.

T. The Design-Builder shall provide accurate and detailed elevations for all sign structures used for Project NEXT, including all dimensions, existing physical features, relevant roadway dimensions, and proposed constructed features to confirm physical locations and orientation.

U. Clearview font will be used in accordance with the latest VDOT Instructional & Informational Memorandum (IIM-TE-337).

V. The Design-Builder shall prepare and submit for approval a Sign Sequencing Plan and a Sign Unveiling Plan. These plans shall provide a location drawing, as well as a narrative describing a detailed sequence, including timing and timeline, for covering and removing the existing signs and unveiling the covered existing and completed new signs. The Sign Sequencing Plan shall be focused on signs during construction activities, while the Sign Unveiling Plan shall be focused on opening the completed lanes to traffic. The Sign Sequencing Plan shall be finalized and approved at least thirty (30) days prior to the commencement of construction activities that require signage changes. The Sign Unveiling Plan shall be finalized no later than sixty (60) days prior to Service Commencement.

W. The use of purple backgrounds shall be as depicted in the NEXT Express Lanes signing concept provided in the RFP Conceptual Plans. The Design-Builder is responsible for obtaining necessary approvals for any deviations from the use of purple backgrounds shown in the RFP Conceptual Plans. The Concessionaire will facilitate coordination with FHWA and support the Design-Builder in obtaining such approval.

3.9.4 Traffic Signals

A. The Design-Builder shall design, supply and install all necessary temporary and permanent traffic signals and related infrastructure (including traffic signal cabinets that can only be purchased from VDOT) for Project NEXT as required by this section and the applicable Standards and Specifications set forth in Attachment 1.5a.

B. The Design-Builder shall comply with applicable portions of the VDOT NRO Traffic Signal Permit Process Guidelines and Northern Region Special Provisions for Traffic Signal Construction, including but not limited to inspection, testing, and acceptance requirements and procedures.

C. The Design-Builder shall be responsible for submitting traffic signal timing data a minimum of sixty (60) days prior to activation of any newly installed traffic This includes eight (8) time-of-day timing plans to reflect cycle lengths necessary to accommodate changes in traffic patterns for weekdays and weekends. The eight timing plans consist of four timing plans for weekdays (AM, Midday, PM, Off-peak) and four timing plans for weekends (Saturday Peak, Sunday Peak, Weekend before peak, and Weekend after peak). All timing plans shall be reviewed and approved by VDOT. Traffic signal timing data is to be provided in an electronic file format compatible with the Synchro/SimTraffic program. Following approval, the timing plans must be formatted into the current controller format for implementation by the Design-Builder.

D. The Design-Builder shall collect turning movement volumes for each traffic signal in the system. Where available, the Concessionaire shall provide projected peak hour turning movement volumes to the Design-Builder for existing traffic signals. The Design-Builder shall be responsible for developing off-peak volume estimates that are associated with off-peak timing plans. If necessary, the Design-Builder shall conduct new traffic counts to support timing plans development for the signal design or modification.

E. The Design-Builder shall provide communications between the maintaining agency's traffic signal system and all temporary and permanent traffic signals for Project NEXT. The communications medium shall be broadband compatible with the maintaining agency's communication system or plan.

F. New or reconstructed traffic signals on Project NEXT will be designed and constructed (and integrated with existing traffic signals and corridor systems, if applicable) using the following approach:

1. The Design-Builder shall design, program, adjust controller timings, test, and commission the new or reconstructed signalized intersections for coordinated operations. The Design-Builder shall provide optimized timing plans (basic and coordinated) for all signals in the coordinated system. Coordinated timing plans include signal cycle, phase splits and order, and offset times, along with implementation schedule. Coordinated timing shall include at least the number of plans that are in the current system schedule, but additional plans may be required to accommodate traffic conditions.

2. Timing plans shall be submitted for review, comment, and approval prior to testing and implementation. Timing plans shall be submitted in a memorandum that describes the assumptions and strategies that were used to develop the plans. Associated Synchro files shall also be provided for review. Timing plans shall be developed based on the final roadway, marking, and pedestrian facility design at each signalized intersection and previously approved timing plans shall be amended and resubmitted by the Design-Builder for approval in response to subsequent design changes that effect signal timing. Timing plans shall only be implemented after all review comments have been addressed and approval has been granted.

3. The Design-Builder shall configure any traffic signal detection equipment to provide continuous traffic counts at the intersection according to maintaining agency requirements.

4. The Design-Builder shall test and commission any new local signalized intersection for network operations with the existing traffic signal system and will re-time adjacent signals, as needed, to accommodate network demand.

5. The Design-Builder shall optimize traffic signal timing at intersections with Project NEXT entry and exit ramps and approaching roadways to ensure that traffic does not produce queues that create a safety hazard on either Project NEXT or the approaching roadways or ramps.

G. Fully Accessible Pedestrian Signals (APS) shall be provided. All pedestrian displays shall be countdown signals. Pedestrian pushbuttons shall be a minimum of 5 cm (2 in)

across in one dimension and all design shall be in accordance with the applicable Standards and Specifications set forth in Attachment 1.5a.

H. The Design-Builder shall keep the existing signalized intersections within the Project limits functional during the Work period. If existing or permanent signals must be shut down, the Design-Builder shall provide temporary signals or appropriate traffic controls. Temporary signal shut down shall not be permitted.

I. For each phase defined in the maintenance of traffic and temporary traffic control plans for Project NEXT and roadway designated as detours, the Design-Builder shall develop signal timing plans. All signal timing analysis files (i.e. Synchro) and plans shall be submitted for review and approval. The Design-Builder shall implement, test, and adjust signal timings to prevailing conditions. The Design-Builder shall develop signal timing plans for all Peak Periods and non-Peak Periods.

J. The Design-Builder shall install and be responsible for all aspects of temporary and permanent traffic signal installation to include, but not be limited to, design, obtaining permits, installation, rehabilitation of disturbed areas, and installation of electric utility service power and hardwire broadband communication connections.

K. The Design-Builder shall install and connect dedicated metered electric utility power service for temporary and permanent traffic signals for Project NEXT.

L. Conductor/communication cables shall be placed in a separate buried conduit, embedded conduit, and structure and bridge-mounted conduit. Aerial or direct buried cable installations are not allowed. Intermingling of communication and power cables in the same conduit or junction boxes is not allowed.

M. The Design-Builder shall not open trench any existing pavement for the installation of conduit, except in areas that will be overlaid or rebuilt. For overlays over trench areas, the new pavement section shall match the existing pavement section.

3.9.5 Roadway Lighting

A. Roadway lighting shall conform to this section and the Standards and Specifications set forth in Attachment 1.5a.

B. The Design-Builder shall install lighting for new or modified entry and exit connections to the NEXT Express Lanes and where required as a condition of the IJR or an approved Design Exception or Design Waiver. The Design-Builder shall complete a lighting analyses for these locations in accordance with IIM-TE-390. Continuous roadway lighting is not required for the NEXT Express Lanes.

C. The Design-Builder shall install lighting for any underpasses under which sidewalk or shared use paths traverse.

D. The Design-Builder shall design and construct any permanent roadway lighting such that the lighting systems for the General Purpose lanes and the Express Lanes are separately operated and maintained by VDOT and the Concessionaire.

E. Temporary and permanent lighting facilities for the project shall be installed to ensure lighting facilities meet current Department Lighting Design Standards and Guidelines

(found in Chapter 2 of the VDOT Traffic Engineering Design Manual) and ANSI/IESNA RP-8 requirements

F. Light Emitting Diode (LED) luminaires shall be used for all new lighting.

G. All lighting design shall:

1. Be prepared in accordance with the USDOT Roadway Lighting Handbook; VDOT Road and Bridge Specifications; Illuminating Engineering Society of North America Recommended Practices (RP-8-18); AASHTO Roadway Lighting Design Guide and the VDOT *Special Provision for Light Emitting Diode (LED) Luminaires*.
2. Include point-to-point lighting analysis and calculations performed using AGI-32 computer software; and
3. Use fixtures with required Backlight-Uplight-Glare (BUG) rating.

H. A comprehensive verification of existing roadway lighting conditions, including but not limited to the documentation of lights currently not working, shall be done within 90 days of Construction Segment Approval and submitted for review and confirmation.

I. The Design-Builder shall preserve all existing lighting (or install temporary replacements) along the existing 495 Express Lanes, 495 General Purpose lanes and any interchanges throughout the Construction Period in order to avoid any diminution of the existing lighting conditions for a period of more than thirty (30) days. If an outage is necessary for construction or preservation of existing lighting is not feasible, the Design-Builder shall provide functionally-equivalent temporary lighting until the completion of the outage restoration or replacement Work.

J. The Design-Builder shall install new or replacement roadway lighting as necessary to provide equal or better lighting conditions for any existing permanent roadway lighting that is impacted by the Design-Builder's Work. Such lighting shall conform to the requirements of this section and the Standards and Specifications set forth in Attachment 1.5a.

3.9.6 Power

A. The Design-Builder shall design, install, and connect all electrical power service required for the construction and operation of Project NEXT.

B. Where new duct bank is installed, the Design-Builder shall provide and install, for VDOT, power conduit along or adjacent to the Project, consisting of:

1. Two 4-inch VDOT conduits with pull tape and tracer wire;
2. Separate electrical junction boxes spaced no more than 500 feet apart for the VDOT and Concessionaire power facilities; and
3. New power cable from existing VDOT assets served by the existing duct bank to the nearest power source.

C. Power within defunct existing duct bank shall be de-energized and safely abandoned per industry standards. All abandoned junction boxes and vaults shall be removed or backfilled with suitable material.

D. The Design-Builder shall be responsible for new utility service connections, including full coordination with the utility owners and payment of connection fees. The Design-Builder shall be responsible for paying the monthly utility bills associated with new service panels, up to and including the date of Service Commencement.

E. The Design-Builder is responsible to perform or cause to be performed the design, supply, and installation of all new power feeds (from service panel to power source) necessary or feed modifications requiring service upgrade from the electric utility company as part of the Work. All service panels shall be capable of monitoring and reporting alarms for the main power and each branch circuit, the current flow, and any tripped breakers. The Design-Builder shall provide telemetry equipment at each Express Lanes service panel to report the current and breaker status of each circuit and main power. The telemetry equipment shall be capable of providing status information for troubleshooting power related outages and help to determine if the trouble is a loss of power from the utility provider, a tripped circuit breaker, or a severed distribution line between the service panel and the field device.

F. The Design-Builder shall install and have connected dedicated and metered SE-5 power service for new or relocated traffic signals, separate dedicated and metered SE-9 power service for any General Purpose lanes ITS and lighting (sign, roadway, and interchange) and separate dedicated and metered SE-9 power service for Express Lanes TMS and lighting. Shared meters and service panels are not allowed.

G. During the Construction Period, the Design-Builder shall provide back-up electrical power service to support Operations and Maintenance Work in emergency situations where the primary power source is not available Extended power outages of VDOT ITS and Concessionaire TMS roadside equipment is not allowed.

H. The power supply for the Concessionaire's TMS roadside equipment or devices shall be metered independently from any non-TMS equipment. The power supply for any Express Lanes-only lighting shall be metered independently from any VDOT power supply. The existing power supplies for all (both Concessionaire and VDOT-owned) existing roadside equipment and infrastructure must remain in service at all times during construction.

I. The Design-Builder shall provide back-up power (generators and UPS) for the operation of TMS roadside equipment (including informational and pricing dynamic message signs and traffic detectors).

1. Generator sizing shall be determined by the Design-Builder based on the projected equipment loading.
2. Propane fuel supply lines between the generators and the fuel storage tank shall be above ground.
3. All VDOT roadside equipment cabinets shall have UPS installed to provide back-up power.

J. Vehicle access shall be provided at each generator site for refueling. Such access shall accommodate safe ingress/egress for a typical refueling vehicle. Steel or concrete bollards shall be placed around the generator site to prevent refueling and maintenance vehicles from damaging the generator equipment or propane fuel tanks.

K. Phase taping of electrical conductors shall not be permitted. Electrical conductors shall have a continuous colored jacket between connection and termination points.

L. Power infrastructure shall not share conduit or junction boxes with communications infrastructure.

M. For the Project NEXT TMS power infrastructure shown in the RFP Conceptual Plans, the Design-Builder shall not change the location of the Project NEXT conduit and junction box locations without approval.

N. Grounding and surge protection for all TMS equipment, structures and infrastructure shall meet the requirements as specified in the Attachment 3.16a (TMS Special Provisions) and as shown on the RFP Conceptual Plans. In addition, where applicable, the Contractor shall adhere to the latest edition of the National Electric Code (NEC) and the VDOT Road and Bridge Specifications.

O. The Design-Builder shall be responsible for determining the roadway lighting needs in accordance with Section 3.9.5 and designing and installing the necessary roadway lighting infrastructure including but not necessarily limited to conduit, junction boxes, conductors, service panels, control centers, etc.

P. Grounding and bonding shall be provided for any metal fencing or handrails located underneath the Dominion Virginia Power transmission lines.

3.10 Barriers, Guardrails and Fences

3.10.1 Barriers and Guardrail

A. The Design-Builder shall ensure that the clear zone within the Project limits is free from hazards and fixed objects. In the event that removal or relocation of hazard and fixed objects from the clear zone is not feasible, the Design-Builder shall design and install an approved guardrail barrier system and end treatments, where appropriate, for protection in accordance with AASHTO Manual for Assessing Safety Hardware (MASH). The same clear zone requirement applies to existing conditions affected by this Project where guardrail upgrade will be required.

B. All existing guardrail within the Project limits, including along side streets and frontage roads, shall be upgraded by the Design-Builder to meet current standards. This may require the upgrade of guardrail to the nearest logical termination point beyond the current Project limits in accordance with the VDOT Road Design Manual, Appendix I and IIM-TE-366.

C. All guardrail on this project shall be MASH compliant, Midwest Guardrail Systems standard, guardrail as noted in the VDOT Road and Bridge Standards and VDOT Road Design Manual, Appendix J.

D. The design of the concrete barrier in front of noise barriers shall account for fixed object attachments and/or appropriate safety hardware.

E. Prior to installation of guardrail, permanent barrier, fixed object attachments, and impact attenuators, the Design-Builder shall field verify the proposed layout and obtain Concessionaire and VDOT concurrence with the Design-Builder's installation plan. The Design-Builder shall also provide a copy of the manufacturer's recommendations for installation of all guardrail terminals.

F. Flexible ground mounted delineators (channelizing posts) shall be provided to separate the outside Express Lane and the inside General Purpose lane.

G. Glare screens or extended height barriers shall be installed on all new or replacement concrete median barriers that are replacing existing concrete median barriers with glare screens. Extended height concrete barriers shall conform to VDOT Standard MB-12 (A, B, or C).

3.10.2 Fences

A. The Design-Builder shall be responsible for securing the Work and providing all temporary fencing necessary to ensure the safety of the work force and members of the public.

B. The Design-Builder shall perform a safety risk analysis to determine whether fencing should be used to separate the noise barrier wall erection work zones from adjacent properties and, if such analysis shows that fencing is required, the Design-Builder shall provide temporary six-foot-high (minimum) chain link security fencing at any such locations.

C. Fencing on bridges and abutments, where applicable shall be black, vinyl coated, ClearVu, Beta, BearGrille mesh or equivalent. Standard Details for fencing shall be modified as necessary to accommodate light poles and signage. All fences and handrails shall be grounded in accordance with VDOT Road and Bridge Standards, and VDOT Road and Bridge Specifications, Sections 410, 504, and 507. The proposed fence and railing shall be grounded according to the National Electric Code (NEC). Chain link fence is prohibited.

D. All SWM facilities shall be surrounded by vinyl-coated, black chain link or equivalent fencing, and access gate(s) of sufficient size to accommodate maintenance equipment shall be provided. Appropriate security mechanisms for the gates shall be provided to prevent/deter unauthorized entry. "No Trespassing" signs shall be installed at entrances to all SWM facilities.

E. Fencing surrounding all generator sites shall include screening to match that in use on existing 495 Express Lanes generator sites. The open area within the generator site fencing shall be covered with six (6) inches of compacted gravel (Aggregate Base

Material Type 1, Size 21) and a four (4) inch concrete slab to provide a level surface for installation of equipment and fuel tank.

F. New or replacement Limited Access fencing (in locations where the existing fencing is removed) shall be installed to delineate the final right of way limits and to protect the limited access highway in those locations at all times where the noise barrier wall is not acting as a barrier. The Design-Builder shall also be responsible for relocation or replacement of any Limited Access fencing affected by the Project. Any new right of way or limited access fencing shall be VDOT Standard Fence Woven Wire Fabric to match the existing limited access fencing.

G. The Design-Builder shall provide metal hand rails (for fall protection and safety of maintenance personnel), for all retaining walls with a height in excess of four (4) feet except where the top of the wall is located adjacent to a roadway shoulder in which case a concrete barrier shape shall be used. Metal railing shall conform to VDOT Standard HR-1, galvanized and powder-coated (Color shall match AMS Standard 595-36492 Gray or as required).

3.11 Aesthetics

A. Structural elements of Project NEXT shall be designed and constructed to be visually consistent with the rest of the I-495 Corridor and, where applicable, compatible with any specific third-party requirements.

B. The material, finish, color, and texture of noise barrier walls, retaining walls, and bridge elements shall be as specified in the table below.

Aesthetic Surface Finishes

Item	Surface Finish	Surface Color [1]
Noise Barrier Walls (Precast Concrete) – South of Georgetown Pike		
Roadway Side	Vertically Fluted	Match AMS Standard 595-36492 Gray
Landowner Side	Fuzzy Raked [2]	Natural Concrete
Noise Barrier Walls (Precast Concrete) – North of Georgetown Pike		
Roadway Side	Drystack	Match AMS Standard 595-36492 Gray
Landowner Side	Drystack	Match AMS Standard 595-36492 Gray
Noise Barriers – Structure Mounted	Visually similar to adjacent ground mounted noise barriers	Match AMS Standard 595-36492 Gray
Noise Barrier Posts [3]	N/A	Concrete or galvanized steel for ground mounted barriers and galvanized

Item	Surface Finish	Surface Color [1]
		steel for structure mounted barriers
MSE Retaining Walls and Panels (including MSE Walls at Bridge Abutments)	Fractured Fin on Cruciform Shaped Panels Walls Adjacent to Live Oak Drive over I-495 Abutments: Drystack	Match AMS Standard 595-36492 Gray
All Other Retaining Walls	Smooth Concrete Walls Adjacent to Live Oak Drive over I-495 Abutments: Drystack	Match AMS Standard 595-36492 Gray
Bridge Elements (Parapets, Abutments and Piers)	Live Oak Drive over I-495 (Abutments): Drystack Other Bridges: No Architectural Treatment Required	Natural Concrete Bridge Abutments shall match AMS Standard 595-36492 Gray

Notes:

1. Color stain (matching AMS Standard 595-36492 Gray) shall be applied to the Roadway side surface of concrete wall elements as required to provide uniform color for retaining walls and precast concrete noise barriers throughout the Project NEXT Corridor (notably for contiguous runs of precast concrete noise barriers and/or retaining walls and when adjoining with structure mounted noise barriers). Bridge abutments that connect or align with retaining walls and/or noise barriers and abutments that will be visible from the I-495 roadway shall receive the color staining.
2. Drystack architectural treatment (stained to match AMS Standard 595-36492 Gray) shall be used in lieu of Fuzzy Raked finish on the Landowner sides of Noise Barrier 13E-2 for the entire length and Noise Barrier 13A beginning at approximate 495 Express Lanes_SB Station 236+00 (north of the existing Dominion Virginia Power substation) continuing north to Georgetown Pike.
3. Noise barrier posts within the same contiguous run of noise barrier wall shall utilize the same post type (i.e. concrete or galvanized steel) unless otherwise approved.

C. Where existing structural elements that are to be incorporated into Project NEXT have aesthetic treatments, the surface finish for new and adjacent elements (for noise barriers, retaining walls, bridge parapets and walls, and bridge abutments, etc.) shall match existing. Where these existing structural elements currently have no architectural or aesthetic treatments, such new and adjacent elements shall receive a smooth concrete finish. The existing and new structural elements in these cases shall be stained to match AMS Standard 595-36492 Gray.

D. The Design-Builder shall submit an Aesthetics Roll Plan detailing the proposed types, materials, and aesthetic finishes of all retaining wall and noise barrier elements

throughout the Project NEXT Corridor for approval prior to the fabrication of any wall or noise barrier panels. The Aesthetics Roll Plan is intended to summarize the Design-Builder's proposed means and methods for achieving a consistent aesthetic for walls and noise barriers throughout the Project in accordance with this Section 3.11. The submittal shall include plan views and wall elevations showing locations and designations of all proposed retaining walls and noise barriers, with information regarding the types of retaining wall systems (i.e. MSE, soldier pile, tie-back, gravity, etc.), noise barrier wall types (i.e. ground mounted, structure mounted, etc.), post types (i.e. concrete or steel), photos of existing adjacent elements being incorporated (where applicable), and the proposed aesthetic surface finishes. Representative photos and details from the manufacturers of proposed products shall be included.

E. Noise barrier wall posts shall not utilize post caps. Top of noise barrier wall posts shall be flush with the top of wall panel. Coping at top of wall shall not be provided.

3.12 Landscaping

A. Prior to commencing any land disturbance activities, the Design-Builder shall complete a survey and prepare an inventory of wooded areas within the anticipated limits of construction (including areas adjacent to communities within the VDOT right-of-way). This survey shall identify the number, caliper and species of trees that are 12-inch caliper or larger and the types and locations of existing trees shall be depicted on a Tree Inventory Roll Plan submitted for approval. This inventory shall form the basis for replacement tree plantings required per Section 3.12.C.

B. The Design-Builder shall re-establish existing grass areas following completion of construction activities with low growing, native and non-competitive grasses prior to Final Completion, and properly maintain these areas for the duration of the Warranty Period. All plant materials shall be indigenous to the area and be able to adapt and survive in roadside environments.

C. Following completion of construction activities, the Design-Builder shall re-establish trees on the remainder of any existing wooded areas that were disturbed and are not used for any Project elements or facilities. Replacement tree plantings are not required on the roadway side of any sound barrier walls or retaining walls. A Tree Replacement Roll Plan shall be prepared and submitted for approval prior to any re-plantings. New plantings shall meet the following minimums: a) Shade trees - two (2)-inch caliper stock trees planted twenty (20) to thirty (30) feet on center and b) evergreen and flowering trees planted ten (10) to twenty (20) feet on center. Two replacements trees are required for any removed trees which are twelve (12)-inch or greater caliper. Where remaining wooded areas are too small or steep for adequate tree growth, the Design-Builder shall provide densely planted shrubs. All tree planting areas shall be stabilized with low growing, native, and non-competitive grasses. Any plants used shall conform to the American Standard for Nursery Stock (ANSI-Z60.1-2004), container grown or balled and burlapped. Trees and plant materials shall be indigenous to the area and be able to adapt and survive in roadside environments. The Design-Builder is to establish the new

trees and properly maintain these areas for the duration of the Warranty Period. Locations where damages have been paid to private property owners for tree removal shall be exempt from these replanting requirements.

D. In areas where only grading for future shared-use paths shown in the RFP Conceptual Plans, such areas shall be seeded with low growing, native and non-competitive grasses prior to Final Completion, and the Design-Builder properly maintain these areas for the duration of the Warranty Period. All plant materials shall be indigenous to the area and be able to adapt and survive in roadside environments.

E. The Design-Builder shall provide the plantings and/or landscaping to meet environmental mitigation commitments specified in Section 3.3.10. prior to Final Completion, and properly maintain these areas for the duration of the Warranty Period. All plant materials shall be indigenous to the area and be able to adapt and survive in roadside environments.

F. Any plantings or landscaping required to stabilize disturbed areas during construction to maintain permit conditions or meet requirements of Governmental Authorities shall be the Design-Builder's responsibility.

3.13 Not Used

3.14 Sidewalks and Shared Use Paths

A. The Design-Builder shall design and construct the sidewalks and shared-use (pedestrian and bicycle) paths identified in the RFP Conceptual Plans. The Design-Builder shall also not preclude the future construction of any planned sidewalks or shared-use paths identified in the RFP Conceptual Plans. If noise barrier walls are present, sidewalks and shared-used paths shall be constructed on the residential side of the existing and planned noise barriers.

B. The Design-Builder shall coordinate with VDOT's District Bicycle Pedestrian Coordinator and local jurisdictions on the design, maintenance of traffic (including detours, if necessary), and construction staging of the sidewalks and shared-use paths within the Project limits.

C. All new, modified, or reconstructed sidewalks and shared-use paths shall be designed and constructed in accordance with these Technical Requirements and the applicable Standards and Specifications set forth in Attachment 1.5a, VDOT Road Design Manual Appendix A(1) and IIM-LD-55. Such facilities shall terminate with accessibility ramps. Any such accessibility ramp shall be matched on the opposite side of the roadway with a receiving accessibility ramp and a minimum 5'x5' landing area, if not a continuous path or sidewalk.

D. The Design-Builder shall design and provide drainage, if needed, for any new independent shared-use path bridges, or underpasses (box culverts or other). Drainage scupper grates on the bridge shall follow VDOT Road Design Manual Appendix A(1)

and should preferably be located within the 2-foot shoulder of the path, but not located within the path itself.

E. Where possible, utility manholes should be located outside of any sidewalks or shared-use paths. Utility access manholes may be located within the 2-foot shoulder of the 10-foot shared-use path, but not within the path itself. Where manholes are located within a sidewalk or shared-use path, the manhole covers must be ADA compliant.

F. For the portions of the new shared use path along I-495 NB north of Balls Hill Road designated as "Grading and Gravel for Future Shared Use Path" in the RFP Conceptual Plans, the Design-Builder shall complete the final grading and construct the shared use path subbase layer specified in 3.14.G.

G. Concrete and asphalt pavement designs for sidewalks and shared-use paths shall be in accordance with the following requirements.

Sidewalks

- Subbase – four (4) inches Aggregate Base Material Type I, Size No. 21A or No. 21B extended (four) 4 inches on either side of the surface.
- Surface – four (4) inches Hydraulic Cement Concrete, Class A3

Shared Use Paths

- Subbase – six (6) inches Aggregate Base Material, Type I, Size No. 21B extended six (6) inches on either side of the surface.
- Base – three (3) inches Asphalt Concrete, Type IM-19.0A estimated at 360 lbs/yd^2
- Surface - one (1) inch Asphalt Concrete, Type SM-9.0A estimated at 118 lbs/yd^2

Grading and Gravel for Future Shared Use Paths

- Subbase – ten (10) inches Aggregate Base Material, Type I, Size No. 21B extended six (6) inches on either side of the surface.

H. All existing sidewalks, shared-use paths, recreational trails and associated entrances, intersections or access points that will be affected by construction activities or by temporary traffic control measures shall be maintained (e.g., open to users) to provide safe and continuous access or a safe and convenient alternate must be provided by the Design-Builder.

3.15 Structures and Bridges

3.15.1 Bridges and Culverts

A. General Requirements

1. All new bridges, bridge replacements, widening and/or modifications of existing bridges (including any geometric changes to roadways on and underneath the

existing bridge), repair of existing bridges, new culverts and retaining walls, and modifications to existing culverts and retaining walls shall be designed in accordance with AASHTO LRFD Bridge Design Specifications including its Errata ("AASHTO LRFD") and all current revisions and VDOT modifications (IIM-S&B-80 *VDOT Modifications to AASHTO LRFD Bridge Design Specifications*) issued as of the issuance date of the RFP. All other structures shall be designed to the appropriate design Standards and Specifications set forth in Attachment 1.5a.

2. The Design-Builder shall comply with VDOT's Manual for the Structure and Bridge Division.
3. Infinite life fatigue requirements shall apply to all bridges.
4. Bridges shall be designed to meet all applicable hydraulic requirements, including current FEMA and VDOT guidelines as described in the latest edition of the VDOT Drainage Manual. The Design-Builder shall deliver a final Hydrologic and Hydraulic Analysis and final Scour Analysis for the proposed bridge designs as outlined in these Technical Requirements. These analyses shall be submitted for review and approval prior to the commencement of bridge construction.
5. Bridge width and length shall be determined by the functional classification of roadway(s) being considered and the facility being intersected. Under no circumstance shall the minimum vertical clearance be less than 16 feet 6 inches over existing and proposed roadways and streets carrying vehicular traffic, unless an applicable Design Exception or Design Waiver is approved.
6. The horizontal clearance of all bridge substructure elements are shown on the RFP Conceptual Plans and have been accepted for use on the Project NEXT. The Design-Builder shall not change these horizontal clearances unless approved.
7. Each new bridge parapet or rail shall include a bridge conduit system. The conduit system shall comprise of two 2-inch diameter conduits. A junction box system shall be required for each of the conduits. No more than two (2) conduits shall be embedded in each parapet or railing. The location of the first conduit shall be as shown in the standard drawing for Bridge Conduit System. The location of the second conduit shall be designed such that crash test criteria for the parapet or railing is not voided. Existing electrical service shall be maintained throughout construction.
8. The Design-Builder shall use Concrete Low Shrinkage Class A4 Modified, for all bridge decks, bridge parapets/railings, bridge sidewalks/shared-use paths, and bridge medians.
9. Post-tensioning of any type shall not be allowed (with or without grout or ducts).
10. High Performance Steel Grade HPS 100Wshall not be allowed.
11. High Performance Steel Grade HPS 70W shall only be allowed with an approved Design Waiver.
12. Concrete deck slab widening up to 80' wide does not require longitudinal joint.

13. Furnishing and placing hydraulic cement concrete for concrete elements whose minimum dimensions exceed five (5) feet shall be performed in accordance with the *Special Provision for Hydraulic Cement Concrete for Massive Construction*. Regardless of minimum concrete element dimensions, the maximum allowable thermal gradient between the core and skin temperature of a concrete pour is limited to 35° Fahrenheit and the maximum allowable temperature in any portion of the concrete pour shall be 170° Fahrenheit for slag and cement mixes and 160° Fahrenheit for fly ash and cement mixes. For concrete elements where the minimum dimension is five (5) feet or less, and where the potential for exceeding the maximum allowable thermal gradient and maximum allowable temperature limits above may exist, it shall be the Design-Builder's responsibility to determine if the *Special Provision Hydraulic Cement Concrete for Massive Construction* should be used for furnishing and placing the hydraulic cement concrete for such elements.
14. The proposed Georgetown Pike Bridge over I-495 shall be designed for future ramp loads framed to both sides of the proposed bridge as shown in the *2045 Design Year Concept Geometry Roll Plots* provided in Attachment 1.0. The Design-Builder shall submit the design calculations including the future ramp loads as part of Stage I Report for this structure and with its final design to demonstrate that the proposed superstructure and substructure will accommodate future ramp loads.

B. Details and Drawings

1. All details and drawings should be in accordance with the VDOT Manual of the Structure and Bridge Division. Should any such details not be applicable, Design-Builder shall implement a modified version of the requirement such that it is in compliance with AASHTO LRFD.
2. Details and drawings not specifically included in the Manual of the Structure and Bridge Division may only be included in the structural plans and working drawings after review and approval. Should any such details not be acceptable, the Design-Builder shall make the necessary modifications or shall submit an alternate detail that is acceptable.
3. Any new bridge, replacement bridge or repairs, and modifications to existing bridges or structures (including any geometric changes to roadways on or underneath the existing bridge) shall be designed, detailed, and submitted as a plan package for review and approval. A preliminary type, size and location plan, including all proposed stages of construction (as applicable), shall be submitted for review and approval prior to proceeding with final design. The stage construction plans shall outline expected methods of protecting roadway users and pedestrian traffic during each stage. Additional requirements for Plan Submittals shall be as outlined in other sections.

C. Superstructure

1. Bridge type and layout shall be based on reducing long-term maintenance costs. The use of continuous span units and jointless bridge design technologies shall be

used as outlined in the VDOT Manual of the Structure and Bridge Division, Part 2 Chapter 17. The Virginia Abutment details shall be developed as shown in VDOT Manual of the Structure and Bridge Division.

2. VDOT standard parapets and rails shall be used. Parapets shall be 42" concrete F-shape parapets except at locations where CPSR series railing is specified in the RFP Conceptual Plans.
3. All bridges with pedestrian and/or bicycle facilities shall include CPSR railing in accordance with VDOT Structure and Bridge Manual.
4. VDOT standard pedestrian fences for all applicable structures shall be vertical fencing with curved top. All fence elements shall be the requirements of Section 3.10.2.
5. Joints in bridges may be used only with specific written approval through an approved Design Waiver.
6. On the plans, all deep foundation units shall be numbered.
7. No timber bridge elements of any kind will be acceptable in proposed structures.
8. Either prestressed concrete or structural steel beams and girders may be used.
9. For prestressed concrete alternatives, the precast concrete Bulb-T sections adopted by VDOT shall be used. AASHTO shapes will not be permitted.
10. A sleeper pad will be required when the bridge abutment is either integral or semi-integral.
11. The use of asphalt overlays on concrete bridge decks shall not be permitted.
12. All connections of ramp bridges to intersecting overpass structures shall be made without the introduction of joint at the interface between the ramp bridge and the overpass. The connection at the intersection between the two structures, shall be designed either as a moment connection or, if a moment connection is impractical, a shear connection with a link slab (see Manual of the Structure and Bridge Division Part 2 file 32.09-2 for a typical detail of a link slab).
13. When the introduction of a simple span is required to accommodate unique bridge layout requirements, options for eliminating the joints at the ends of a simple span shall be evaluated by the engineer of record and approved prior to use. Such options may include, but not limited to, the construction of links slabs, or deck extensions.
14. The use of prestressed deck panels as stay-in-place forms shall not be permitted.
15. Use of fracture critical elements is not permitted. The use of integral pier caps is not permitted.
16. For curved steel girder bridge superstructures on reverse curves or having a span that exceeds 240 feet, a three-dimensional finite element analysis using LARSA 4D software shall be used to analyze and design superstructure components including, but not limited to, plate girders and crossframes. LARSA 4D shall be used for load rating such bridges in accordance with IIM-S&B-86. Should any other software be

proposed for use in design or determining load ratings shall be submitted for approval.

17. The Design-Builder shall submit girder erection plans, procedures and calculations in accordance with the applicable Standards and Specifications set forth in Attachment 1.5a.

18. Bridge span lengths in excess of 300 feet will not be allowed without specific approval, nor will any geometric changes that reduce the design speed of ramps be considered. Additional requirements for bridge span lengths greater than 240 feet include:

    a. Design Waiver approval must be obtained;

    b. No variable depth girders;

    c. No hybrid girder sections;

    d. No elastomeric bearings;

    e. No uplift, no counterweights and no tie-downs allowed for any support location;

    f. Virginia style abutments with tooth joints are required;

    g. Any variation in bay spacing to be limited and exterior girder shall have a constant width deck overhang;

    h. Since AASHTO distribution factors do not apply, grid or 3D analysis shall be performed. If radial layout for bridge, only 3D analysis shall be performed;

    i. Thermal analysis by LARSA 4D to be performed to account for deck stiffness and determine bearing orientation and Substructure loads;

    j. Load rating shall be in accordance with IIM-SB-86 using LARSA 4D;

    k. Shipping, Erection, and Stability Report shall be submitted prior to construction. This Report shall include consideration of effective width of shipped girder, effect of skew as needed and method of detailing;

    l. Neither detailing method nor deck placement sequence shall be changed during construction unless a revised Shipping, Erection, and Stability Report is submitted;

    m. Permanent lateral bracing shall be subject to approval during the detailed design phase; and

    n. Temporary lateral bracing, if used, must be included in the structural analysis, as well as the effect when it is removed.

D. Substructure

1. The Design-Builder shall ensure that all recommendations related to the suitability of foundation material for spread footings at the time of construction are confirmed in the field by the Geotechnical Engineer registered and licensed by the Commonwealth of Virginia. Foundation recommendations for the proposed bridge shall be submitted for review prior to the submittal of final foundation construction plans.

2. The use of steel piles in pile bents shall not be permitted. Pile bent supports shall not be used at any grade separation structure (overpass or underpass).
3. Areas around bearing seats shall be designed to permit jacking and replacement of bearings. The design forces for jacking shall not be less than 1.3 times the permanent load reaction at the bearing, adjacent to the point of jacking.
4. Piers used for all bridges shall be limited to the following types: hammerhead piers with rectangular columns, multi-column piers with square or circular columns, and wall piers.
5. Substructures shall be self-supporting under all service life conditions, including superstructure replacement. Superstructure shall not participate in the stability or strength of the substructure.
6. The maximum abutment backwall width without an expansion joint shall be 80 feet.

E. Existing Bridges

1. General Requirements
   a. The Design-Builder is required to submit plans for the modification of an existing structure that are consistent with applicable Standards and Specifications set forth in Attachment 1.5a. Plan sets are also required to show all changes, including but not limited to vertical and horizontal clearances, lane configurations on and beneath the bridge, addition of bridge conduit systems, and other modifications.
   b. All modifications to existing bridges, including complete or partial removal of a bridge, shall be staged as necessary to maintain travel lanes for the duration of construction and in accordance with these Technical Requirements. Additionally, the Design-Builder shall provide continuous and safe access for pedestrians and bicycle traffic through or around the limits of construction. Temporary pedestrian and bicycle access must comply with Americans with Disabilities Act Guidelines for State and Local Government facilities.
   c. It is the Design-Builder's responsibility to obtain and verify any required as-built field details and dimensions needed for any purpose, including but not limited to modifying or dismantling any existing bridge.
   d. To obtain copies of Bridge Safety Inspection Reports, the Design-Builder must complete a CII/SSI Non-Disclosure Agreement as outlined in IIM- S&B-71 Critical Infrastructure Information (CII)/Sensitive Security Information (SSI).
   e. Barrier protection of structures shall satisfy the requirements of AASHTO LRFD, including the requirements of article 3.6.5 and the requirements of the Manual of Structure and Bridge Division Part 2, Chapter 15. Existing bridge piers, where noted on the RFP Conceptual Plans, shall be protected by a standard VDOT Bridge Pier Protection System (BPPS series). The standard BPPS series barriers shall be designed and detailed in accordance with the VDOT Manual of Structure and Bridge Division. If Bridge Pier Protection System is not provided for substructure units with 30 feet of the edge of

roadway, the substructure unit shall be designed for collision forces in accordance to AASHTO LRFD and VDOT S&B Manual.

f. Existing bridge spans shall be widened with the same beam type and same material (e.g., steel or concrete).

2. Scope of Work for Bridges to Remain in Place

The scope of work for bridges to remain in place or to be widened shall include the following:

a. Bridge repair quantities listed in Attachment 3.15a and the following:

(xii) Inspection and evaluation of bridge deck shall be limited to delineating delaminated concrete for removal prior to placement of new overlay systems.

(xiii) Inspection and evaluation of substructure shall be limited to delineating delaminated and spalled concrete for removal prior to performing substructure repair. Delineated areas shall be expanded 6 inches beyond each side, and top and bottom.

b. Additional repair work necessary to achieve a minimum condition rating of 7 for bridge decks, superstructures, and substructures. Additional supplementary inspections to determine the scope and level of additional work needed. Minimum condition rating of 7 requirement is not applicable for Lewinsville Road Bridge over I-495. Minimum condition rating of 7 is not required for George Washington Memorial Parkway Bridges over I-495 and repair quantities listed in Attachment 3.15a shall be utilized for these structures.

(i) Repair of substructure spalls and delaminations shall include providing and installing embedded galvanic anodes in accordance with the VDOT Road and Bridge Specifications.

(ii) Substructure cracks shall be repaired with Crack Repair Type B (Epoxy injection) in accordance with the VDOT Road and Bridge Specifications.

c. Bridge and approach sidewalk modifications for Lewinsville Road Bridge over I-495 as listed in Attachment 3.15b.

3. Additional Requirements

a. Only bearings that are included in the Manual of the Structure and Bridge Division Vol. V Part 3 shall be used in the widened portion of the bridge structure regardless of the superstructure type selected. Installation of new bearings and all necessary work shall be included in the scope of work for any superstructure replacement, and no existing bearing components shall be re-used. The Design-Builder shall ensure that the existing and new bearings are compatible with each other, and will not result in over stressing the existing or new bearings.

b. Existing structural approach slabs shall be in accordance with File No. 06.07 of Part 2, of the Manual of the Structure and Bridge Division where the existing

bridge is being widened or where the travel lanes are being modified unless otherwise approved.

c. The location of any deck construction joint shall be over a girder and between shear connectors from the girder to the deck, unless otherwise approved.

d. Modifications to existing bridge joints shall be in accordance with Attachments 3.15a and 3.15b, as applicable.

e. Existing bridge elements shall be evaluated to determine effects of bridge widening, joint closures or other modifications for the bridge. Regardless of design method used on the existing bridge, AASHTO LRFD shall be used for the initial evaluation of existing elements. For existing bridges not designed using LRFD and where it is determined that resulting LRFD factored loads are in excess of LRFD factored resistance, the Load Factor Method or Allowable Stress Method in accordance with the AASHTO Standard Specifications for Highway Bridges, 16th Edition, may be used for the evaluation of the existing elements.

f. When adjacent to or over waterways, existing bridge foundations shall also be evaluated for scour whenever the bridge is widened or a new adjacent bridge is constructed. If calculated total scour for the new conditions is greater than calculated total scour for the existing conditions, then existing bridge foundations shall also be designed for the new scour in accordance with the requirements of the Drainage Manual and AASHTO LRFD.

4. Dismantling and Removing Existing Structures or Removing Portions of Existing Structures

   With any demolition and temporary support over or adjacent to live traffic, the Design-Builder shall submit a plan for review and approval prior to the commencement of any demolition work. The demolition plan shall include, but is not limited to, details of protection of the underlying bridges, roadway, and users. The Design-Builder shall determine the effect of equipment loads on the bridge structure, and develop and submit plans that show the procedures for using the loaded equipment without exceeding the structure's design capacity. The Design-Builder's plans shall be signed and sealed by a Professional Engineer licensed by the Commonwealth of Virginia.

5. Live Load Rating of Modified Bridges

   a. All modifications to existing bridges shall be evaluated for their impacts on the live load rating of the bridge. In addition to the requirements set forth below, modifications to an existing bridge shall not result in the bridge requiring a posting for live load carrying capacity.

   b. If the current HL93 Rating Factor (as computed per the Manual for Bridge Evaluation) is greater than or equal to 1.0 at the inventory level, then the HL93 inventory rating factor for the modified structure shall be greater than or equal to 1.0.

c. If the current HL93 Rating Factor (as computed per the Manual for Bridge Evaluation) is less than 1.0 at the inventory level, then the HL93 inventory rating factor for the modified structure shall be greater than or equal to the inventory rating factor for the unmodified subject structure.

F. Bridge Drainage

1. The minimum dimension of pipe used in a drainage system for new bridges and widened portions of existing bridges shall be eight (8) inches.

2. To the extent possible, pipes and downspouts shall be designed to avoid interference with aesthetics of the bridge.

3. The use of ditches and open channels with grades greater than 10% shall not be permitted on slopes directly underneath a bridge or on slopes located within 100 ft. of a bridge structure. An enclosed drainage system shall be used to capture the bridge deck runoff, including runoff from its approach slab, and convey the runoff to the bottom of the slope or into a drainage system.

G. Culverts

1. General Requirements

Culverts and modifications to existing culverts shall be designed using AASHTO *LRFD Bridge Design Specifications*; Interim Specifications; VDOT Modifications (IIM-S&B-80 *VDOT Modifications to AASHTO LRFD Bridge Design Specifications*); and shall comply with the VDOT Road and Bridge Standards, Vol. I & II. Should any standard for culverts not be in accordance with AASHTO LRFD, then the Design-Builder shall verify design and implement a modified version of the requirement such that it is in compliance with AASHTO LRFD.

2. Existing Culverts

a. If the Design-Builder modifies structural elements of any existing culvert (including extensions and increased loading), then the Design-Builder is required to provide a design and plan set for the extension or modifications. The design calculations shall include assessments of any imposed settlement or differential settlement due to the new load conditions. Culvert load rating shall be performed for culvert extensions when the extended portion of the culvert will be subjected to live loading.

b. All modifications to existing culverts shall be evaluated for their impacts on the live load rating of the culvert. In addition to the requirements set forth below, modifications to an existing culvert shall not result in the culvert requiring a posting for live load carrying capacity.

(i) If the current HS-20 rating load is greater than or equal to 36 tons at the inventory level, then the HS-20 inventory rating load for the modified structure shall be greater than or equal to 36 tons.

(ii) If the current HS-20 rating load is less than 36 tons at the inventory level, then the HS-20 inventory rating load for the modified structure shall be greater than or equal to the inventory rating load for the unmodified subject structure.

H. Load Ratings for Bridges and Culverts

1. Structure load ratings are required and shall be performed in accordance with the requirements of IIM-S&B-86 – *Load Rating and Posting of Structures (Bridges and Culverts)* and the following:
   a. When a phased portion of a newly constructed structure is intended to carry traffic in a temporary configuration.
   b. Load rating of any partial configuration of the existing structure.
   c. A final, as-built, load rating analysis of each new structure reflecting traffic in its final configuration. This load rating should incorporate any as-built changes that may have been made, which in the judgment of the Design-Builder will affect the load rating (e.g., minor changes to stiffener or diaphragm locations may not affect a load rating).
2. No partial or completed structure shall be placed into service if a Load Restriction (Posting) is required based upon the load rating analyses. The Design-Builder is responsible for all remedial measures and corrective action required to provide a structure that satisfies the load rating requirement outlined in IIM-S&B-86– *Load Rating and Posting of Structures (Bridges and Culverts).*

I. Safety and Acceptance Inspection for Bridges and Culverts

1. Acceptance of the bridge structure will require the following two independent inspections:
2. A satisfactory safety and inventory inspection as described below is required prior to opening the structure or portion of the structure to public traffic. This safety and inventory inspection by VDOT will serve as the initial inspection of the structure. Data gathered will include, at a minimum, location, date completed, alignment, description, horizontal and vertical clearances, structure element description and condition data, and traffic safety features. Such inspections will be required prior to opening any newly constructed portion or phase of the bridge to traffic.
3. A satisfactory final construction inspection by VDOT is required prior to acceptance of the structure. To facilitate inspection of the structure, the Design-Builder shall ensure that all structural elements are accessible and shall provide adequate resources including:
   a. Man-lifts, bucket trucks, under bridge inspection vehicles, or other equipment necessary to inspect the structure, as well as properly trained staff of sufficient composition to support the inspections; and
   b. Plans, procedures, personnel, and equipment to implement traffic control measures.

4. The Design-Builder shall provide a minimum of thirty (30) days' notice whenever it requires VDOT to undertake an inspection. The Design-Builder's notice shall include the latest version of the plans (including all field design changes), traffic control procedures, a description of the items to be inspected and an anticipated schedule for the inspections.
5. Unless otherwise approved, structures shall be substantially complete (i.e., roadway, slopes on the approaches, and slopes underneath the structure are already in place) before the final construction inspection will be performed.

J. Plan Submission

1. The Design-Builder shall make Stage I (Preliminary Plan) submissions and Stage II (Final Plan) Submissions.
2. Stage I (Preliminary Plan) Submission
   a. The Design-Builder shall submit a Stage I (Preliminary Plan) submission for each new bridge, bridge replacement, and bridge widening and/or modification.
   b. Stage I submission must be submitted prior to any final design submittal. Final design prior to approval of the Stage I submission shall be solely at the risk of the Design-Builder.
   c. The approval of the Stage I submission shall be subject to the approval of the detailed Hydrologic and Hydraulic Analysis study and Scour Analysis (if a waterway crossing), a preliminary geotechnical report completed in accordance with the requirements of Section 3.4 Geotechnical, and roadway geometry.
   d. Stage I submission shall include: Stage I drawings prepared in accordance with the Stage I Plan Review Checklist, Stage I Report, Stage I Report Summary Form, and other preliminary plan requirements indicated in the applicable Standards and Specifications set forth in Attachment 1.5a.
   e. The Stage I report shall follow the Stage I – Report Template, which shall be provided upon request, except as modified below.
      (i) Section 3.10, Constructability Issues: The Report need not consider constructability issues (except for how it relates to maintenance of traffic; the report shall include a section on maintenance of traffic).
      (ii) Section 6, "Bridge Preliminary Recommendation" is modified as follows: the report need only describe the single alternative being presented for approval.
      (iii) Section 6, the report requirements are extended to specifically address in detail all non-standard items, unique or complex features.
      (iv) Section 7, Engineer's Cost Estimate for each Alternative, is not required.
      (v) Section 8, Schedule, is not required.
      (vi) The report will include copies of design exceptions and waivers that influence the design of the structure or roadway approaches, both over

and under, and shall include a write-up on how the design exceptions and Design Waivers affect the bridge.

3. Stage II (Final Plan) Submission
   a. The Design-Builder shall submit structure Stage II (Final Plan) submission for each new bridge, modification to an existing bridge, bridge rehabilitation, modification to lane and shoulder configuration on or under an existing bridge and/or culvert, or modifications to culvert structures.
   b. Final plans may be submitted as completed plan set(s) or in plan submission packages (i.e., foundation plan package, substructure plan package, superstructure plan package, etc.). The final plans are to be submitted according to the submission schedule provided by the Design-Builder.
   c. The Stage II drawings shall be prepared in accordance with the Stage II Plan Review Checklist.
   d. Final design calculations and construction drawings shall be signed and sealed in accordance with the VDOT Manual of the Structure and Bridge Division, Part 2, Chapter 1, Section 16: Sealing and Signing of Plans and Documents.

4. Additional Requirements for Bridges

   The Design-Builder is responsible for obtaining the VDOT B-number, Federal Identification and plan number for each new bridge included in Project NEXT. Plan sets should contain sheets that are arranged and detailed as outlined in the Manual of Structure and Bridge Division Part 2.

3.15.2 Retaining Walls

A. General Requirements

1. The retaining walls shall be designed using AASHTO *LRFD Bridge Design Specifications*; including its Errata; VDOT Modifications (IIM S&B-80 *VDOT Modifications to AASHTO LRFD Bridge Design Specifications*); The Manual of Structure and Bridge Division Part 2 Chapter 18 Earth Retaining Walls; and applicable sections of Road and Bridge Standards, Vol. I & II and as specified in the Technical Requirements. Timber lagging for post and panel walls shall be pressure treated in accordance with the VDOT Road and Bridge Specifications.
2. If the Design-Builder elects to use mechanically stabilized earth (MSE) walls, the fill material used in the reinforced zone shall be a crushed aggregate with properties in accordance with the VDOT's Special Provisions for approved proprietary MSE walls. The Design-Builder shall provide both global and external stability analysis utilizing an approved computer program submit the results of the analysis, including boring logs, laboratory data, and any other applicable data for review. The wall supplier shall provide to the Design-Builder an internal stability analysis that validates the design of the wall. Retaining walls shall be designed to control settlements within tolerances identified in VDOT's Guidelines for Preparation of Alternate Retaining Wall Plans.

3. Should any standard for retaining walls not be in accordance with AASHTO LRFD, then the Design-Builder shall verify design and implement a modified version of the requirement such that it is in compliance with AASHTO LRFD.
4. Retaining walls at bridge abutments shall be designed for a minimum service life of 100 years.
5. Except for tie-backs required for the support of retaining walls, all components of the retaining walls shall be contained within VDOT's right-of-way. Tie-backs for retaining walls may be located within permanent underground easements provided that such easements are approved.
6. MSE walls that require traffic protection at the top shall use barriers or railings on moment slabs.
7. Parapets/railings and moment slabs located on top of MSE walls shall use Concrete Low Shrinkage Class A4 Modified.
8. Concrete paved ditches shall be used behind retaining walls, except where the top of the wall is located adjacent to a roadway shoulder in which case an approved concrete barrier system shall be used. Paved ditches shall extend to the back face of the retaining wall. For soldier pile retaining walls, where a post extends behind a retaining wall panel, the ditch shall be located adjacent to the post. The area between the edge of the ditch and the back of the retaining wall panel shall be paved with 4 inches thick concrete, graded to drain away from the wall.
9. For maintenance of the area at the top of a wall or working surface, a VDOT Standard HR-1, or equivalent fencing system as approved, shall be required when routine maintenance or inspection will be performed from the working surface or platform for which there is a 4-foot or greater distance above the next lower surface (OSHA 1910.23(c)1). All HR-1 railing shall be powder coated in accordance with applicable Standards and Specifications set forth in Attachment 1.5a.
10. The following requirements in the Manual of the Structure and Bridge Division Part 2 File No. 17.01-7 Abutments, General Information and Selection Criteria, Use of MSE Walls and GRS Technology shall not apply to this Project:
    a. MSE wall location for overpass structures shall accommodate a minimum of one future lane in each direction for the roadway below the overpass.
    b. MSE wall limits shall extend sufficiently to allow future widening of the overpass by one lane in each direction.

B. Modifications to Existing Retaining Walls

1. Retaining wall modifications shall be carried out in accordance with General Requirements for Retaining Walls.
2. If any Significant Work is completed on an existing retaining wall, the Design-Builder shall ensure that all safety elements of existing retaining walls are brought up to current standards (e.g., railing). Significant Work includes, but is not limited to, the following:

3. Raising the existing retaining wall;
4. Reconstructing portions of existing retaining wall; and
5. Adding a noise barrier wall or other feature to an existing retaining wall.

C. Repair of Existing Retaining Walls

1. Repair of existing retaining walls shall be performed when Significant Work is completed on an existing retaining wall.
2. Inspection and evaluation of retaining wall repairs shall be limited to delineating spalls and delaminated concrete for removal prior to performing patching and/or crack repairs. Delineated areas shall be expanded 12 inches beyond each side, and top and bottom.

D. Plan Submission

1. The Design-Builder shall submit a preliminary plan for each new or modified retaining wall. Final design efforts prior to preliminary plan approval shall be at the risk of the Design-Builder.
2. Preliminary plans shall be submitted and approved prior to any final design submittal.
3. A retaining wall preliminary plan submittal shall include:
   a. A plan and elevation view of the wall showing all existing and proposed design features associated with the project, including existing and future utilities, noise barrier walls, sign structures, landscaping, irrigation systems, barriers, existing and proposed drainage structures, adjacent bridges, and any other necessary features identified by Design-Builder.
   b. A preliminary geotechnical report completed in accordance with the requirements of Section 3.4 (Geotechnical).
   c. Where applicable, approval of the preliminary wall submittal shall be subject to the approval of an H&HA study and scour analysis.
4. Where retaining walls are located at bridge abutments, retaining wall plans, including preliminary plans shall be included in a bridge plan submittal.

3.15.3 Noise Barrier Walls

A. Noise barrier posts shall be designed such that the minimum unbraced length is not less than the full height of the post, measured from the top of foundation to the free end of the post. Noise barrier panels shall not be used as continuous or discrete bracing.

B. Noise barrier wall posts shall not be spliced to soldier piles of retaining wall posts unless connection details are approved.

C. The requirements of the VDOT Road and Bridge Specification, Section 519.03(c)2. Structure-Mounted Barriers shall also apply to moment slab mounted noise barrier walls.

D. For any noise barriers installed on top of existing or proposed MSE retaining walls, the Design-Builder shall demonstrate that the MSE wall meets applicable standards for such use. The Design-Builder must demonstrate that the noise barrier is independently supported through the use of a moment slab and the barrier panels cannot be attached to MSE wall. The attachment of the noise barrier to the moment slab shall be in conformance with the details in the VDOT Manual of the Structure and Bridge Division. If any noise barrier is added to any existing MSE retaining wall, the Design-Builder shall ensure that all safety elements of existing retaining walls are brought up to current standards.

E. When new noise barrier walls are attached to an existing structure (e.g. an existing retaining wall or an existing bridge), the design of all elements of the existing structure and associated foundations shall be verified for compliance with requirements of AASHTO LRFD Bridge Design Specifications; Interim Specifications; VDOT Modifications (IIM S&B-80 VDOT Modifications to AASHTO LRFD Bridge Design Specifications) and other requirements of Section 3.15.

3.15.4 Traffic Structures

A. General

1. If required, Lane Use Management Signs (LUMS) shall be treated in the same manner as overhead sign structures that support variable message signs except that LUMS may be erected on cantilever structures.
2. Small (i.e., 48" x 48' max. size) regulatory type sign panels on bridge structures may be installed using brackets attached to bridge parapets and deck slabs. The edge of sign panels shall clear parapet or rail by a minimum of 12 inches.
3. Span type overhead sign structures shall not be supported on bridge deck blisters. Sign structures shall be supported on pier caps or independent foundations, unless prior written permission allows for mounting to a frame supported by the superstructure. The main bridge beams and girders shall be investigated for fatigue loading from wind loads of the sign structure. The minimum vertical clearance between the bridge deck and sign shall be in accordance with the VDOT Road and Bridge Standards. Cantilever overhead signs shall not be mounted on bridge superstructures or substructures.
4. All poles, including poles for lights, cameras, and microwave vehicle detectors, which are located within the clear zone shall be protected from vehicular impact by guardrail or barrier. Supports shall be configured such that the poles, baseplates and anchor bolts are not located within the Zone of Intrusion for Test Levels 2 and 3; and within the Truck Cab Zone of Intrusion for Test Level 4.
5. The Design-Builder will be required to obtain a Design Waiver for any overhead sign structures that exceed the maximum span limits as defined in VDOT IIM-S&B-89 – VDOT Modifications to the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.

B. Gantries

1. The design of structures, gantries, and supports used for the violation enforcement, TMS, and tolling system roadside equipment shall be standardized.
2. The design for gantries will accommodate the following:
   a. Dead loads, wind loads, and ice loads for tolling, TMS, enforcement equipment, including equipment cabling;
   b. The vertical deflection of the gantry will not exceed the equipment manufacturer's desirable design specifications; and
   c. Performance requirements for toll and enforcement equipment, to include but not be limited to, vertical clearance, twist about transverse axis, transverse rotation from level, member deflection, member natural frequency and resonance, foundation lateral deflection, maximum roadway cross slope at toll collection line, and equipment clearance from other major infrastructure items.
3. The gantry structures shall be fabricated of galvanized steel.

C. Existing Traffic Structures

1. In accordance with Section 3.9.3.M, the Design-Builder shall identify and provide a summary of the existing traffic structures that are affected by the addition, removal, realignment, or replacement of sign panels, and Dynamic Message Signs, and/or other ITS or TMS devices, including structures with signage that are outside the physical limits of roadway construction. The Design-Builder may re-use existing sign structures for the combination of the existing and proposed signs and ITS or TMS devices upon the submittal and approval of documents that include a condition assessment based on reviews of the most recent structure inspection reports, a detailed listing and plan of repair items required to address any existing defects in poor or substandard condition (if applicable), existing structural information, structural calculations, details of any proposed repairs and modifications to be performed by the Design-Builder, and a certification statement sealed by a Professional Engineer licensed in the Commonwealth that the structure meets all current structure design criteria and is fully compliant with these Technical Requirements. The structural analysis provided by the Design-Builder for each structure will be reviewed to deem whether or not the existing structure will be permitted to be modified as proposed. If the Design-Builder's analysis shows that re-use of the structures, with or without modifications, are not structurally acceptable in accordance with the applicable Standards and Specifications in Attachment 1.5a, the Design-Builder shall provide new structures in accordance with the Attachment 1.5a requirements and remove and salvage the existing structures at no additional cost.
2. VDOT Structure ID for any sign and VDOT ITS structure to be modified for reuse or to be removed shall be clearly shown on the plans. VDOT Structure ID for any existing sign may be obtained by contacting VDOT's Northern Virginia District Structure and Bridge Section. VDOT's Northern Virginia District Structure and Bridge Section shall be notified prior to the removal or relocation of any existing traffic structure.

3. Removed existing lighting poles shall not be reused (new lighting poles shall be required).
4. If applicable, existing bridge-mounted sign structures located above the proposed Express Lanes within the project limits shall be removed and if necessary replaced with new signs mounted on independent sign structures.
5. Bridge mounted signs shall be completely removed, including frames, sign panels, hardware, and incidentals. Removed materials shall become the property of the Design-Builder and shall be properly disposed of off-site. Connection bolts anchored into concrete parapets shall be mechanically cut flush with the surface of the parapet, and then removed by mechanical drilling to a depth of one-half inch below the surface of the parapet. The holes shall be patched to match the color and texture of the existing parapet surface with hydraulic cement mortar or grout conforming to Section 218 of the Road and Bridge Specifications. Connection bolts to steel beams shall be removed, and the affected areas of steel beams cleaned, primed, and painted in accordance with the requirements of Section 411 of the Road and Bridge Specifications to match the existing structure. Electrical service shall be disengaged at the nearest junction box, and all conductors shall be capped and sealed in place unless existing service is to be reused for lighting of replacement structures.

D. Inspection of Traffic Structures

1. Acceptance of new or modified sign and ITS structures will require an initial safety inspection. The purpose of an initial inspection is to verify compliance with the requirements of: Inspection and Maintenance; and IIM-S&B-82 *Traffic Structures* and to identify deficiencies, including incomplete work, and variances from approved plans and specifications and which must be rectified by the Design-Builder before the structure can be accepted.
2. The initial inspection shall be performed by VDOT. The Design-Builder shall provide Approved for Construction drawings and working drawings, including all revisions at least two weeks prior to scheduling the inspections.
3. During the initial inspection, data including but not limited to location, date completed, description, horizontal and vertical clearances, structure element description and condition, and traffic safety features will be gathered by the Design-Builder and verified by VDOT.
4. The Design-Builder shall ensure that all structural elements are accessible for inspection of all structures. This requirement may dictate that the Design-Builder provide man-lifts, barges, remote operated vehicles, bucket trucks, or other equipment necessary to inspect the structure and plans, personnel, and equipment to implement traffic control.
5. Upon completion of the initial inspection, VDOT will submit an inspection report to the Design-Builder within 10 days of the inspection either recommending acceptance of the structure or identifying deficiencies, including incomplete work, which must be rectified by the Design-Builder before the structure can be accepted.

If a structure is not accepted, the Design-Builder shall rectify the deficiencies and certify in writing the deficiencies have been corrected. Within 5 days of receipt of such certification, a follow-up inspection may be performed to verify that the deficiencies have been corrected or recommend in writing to the Design-Builder that the structure is acceptable without a further inspection.

6. The final acceptance of sign and ITS structures will occur when the initial inspection is completed and any necessary follow-up (verification) inspections are performed. The initial inspection may be accomplished through multiple inspections, as long as the inspection program is properly coordinated with all required participants.

3.15.5 Miscellaneous Requirements

A. The Design-Builder shall design and construct the parapet wall and bridge structure for the replacement Old Dominion Drive Bridge over I-495 in a manner that does not preclude the future implementation of another pedestrian-bicycle facility by others on the north side bridge.

B. The parapet and barrier walls on structures may be constructed using slip forming after review and approval of a trial section.

C. All temporary shoring and erection elements shall be dismantled and removed in their entirety following construction, unless otherwise approved.

D. The following utilities shall be designed, furnished, and installed by the Design-Builder:

1. Lighting on the bridge;
2. Under bridge lighting (if required); and
3. Any required Standpipe Fire Hydrant and Water Supply fire protection systems shall comply with the requirements of NFPA 502 Section 6.6. Prior to fire protection acceptance, the Design-Builder shall test the hose and standpipe systems for compliance with NFPA 25 and provide a letter from the Fire-Marshall confirming such successful test results.

E. The Design-Builder shall submit estimated quantities along with the associated unit costs for all standard and non-standard items in the final bridge plan submittal. The structure unit cost data is required to complete the VDOT Annual Bridge Construction Unit Cost Report which is provided to FHWA. This data shall be submitted within 120 days of the approval of the construction plan submittal.

F. Where any part of a drilled shaft, footing, or any other stiff element is to be permanently located directly beneath any permanent pavement, there shall be a minimum clearance of five (5) feet from the top of finished grade to the top of drilled shaft, footing, or stiff element.

G. Sealer used in joints at sleeper pads shall be in accordance with the requirements of Section 420 of the Road and Bridge Specifications for Class II Joint Systems.

H. Drilled shaft for support of bridges and retaining structures shall be constructed in accordance with the requirements of VDOT *Special Provision for Drilled Shafts Using Self-Consolidating Concrete* for Design-Build and PPTA Contracts.

I. Culverts used as pedestrian and multi-user facilities shall require an anti-graffiti coating on all exposed surfaces. The surfaces to be coated shall include but not limited to wingwalls, culvert walls, and culvert soffits.

J. All working or shop drawings shall be reviewed prior to formal submittal. Each submitted working/shop drawing shall be individually annotated with the resulting disposition of the drawing after the review of each sheet. Supporting computations for shop drawings may be stamped on the cover sheet only. Annotation requirements apply to all structures, whether detailed by the supplier (e.g. MSE walls, noise barrier walls, etc.) or designed and detailed by the EOR (e.g. plate girders and prestressed beams).

3.16 Traffic Management System

3.16.1 General

A. The Design-Builder shall be responsible for the planning, design and installation of the NEXT Traffic Management System (TMS) as more specifically described in this Section 3.16, and Attachment 3.16a (TMS Special Provisions), Attachment 3.16b (Notice of Impacts to Existing Assets) and Attachment 3.16c (TMS Interface Plan). The Design-Builder shall be responsible for designing and constructing the NEXT TMS to ensure constructability, meet operational and functional requirements and provide safe and adequate maintenance access.

B. The TMS shall be designed, implemented, maintained, repaired, and replaced in accordance with all applicable Standards and Specifications as set forth in Attachment 1.5a and Attachment 3.16a.

C. All TMS equipment, including but not limited to, electronic devices, network and computer gear, shall be stored in an environmentally controlled space as required in accordance with manufacturer's recommendation.

D. Locations shown on the RFP Conceptual Plans for the generator site and related equipment at George Washington Memorial Parkway interchange has been strategically located to support operations. The location cannot be moved more than 100 feet from location shown on the RFP Conceptual Plans unless approved and shall have an accessible pull-off area.

E. The Design-Builder shall provide roadway cross section drawings for each TMS device, cabinet, service point, and generator site showing the cabinet/device height above the roadway, maintenance access to the cabinet/device (both vehicular and on-foot), fall protection (where necessary), roadway slope, embankment slope and clearances to travel lane.

F. The existing Express Lanes Operations Center (HOT-OC) shall be used for the NEXT Express Lanes.

3.16.2 Existing Traffic Management Infrastructure

A. Existing VDOT-owned and maintained and Concessionaire-owned and maintained roadside equipment and infrastructure is located within the Project limits. Before impacting any existing VDOT ITS or Concessionaire TMS equipment or infrastructure, the Design-Builder shall follow "Notification of Impact" process and procedures outlined Section 3.16.20 and Attachment 3.16b. The Design-Builder shall properly dispose of all discarded or defunct TMS devices, cables, and associated electronic equipment and provide verification documentation. Existing lane control signals and cabinets, including all equipment within the cabinets, for the existing I-495 northbound shoulder use lane shall be salvaged and returned to VDOT at 8650 Bethlehem Rd Manassas, VA 20109. Design-Builder shall contact Leary Tomlin, Jr. at 571-419-1176 to make prior arrangements for returning existing equipment to VDOT.

B. Existing roadside equipment may include, but is not limited to, the following equipment located within the Project NEXT limits:

1. Weather stations;
2. Dynamic Message Signs (DMS) for the existing Express Lanes and General Purpose Lanes:
3. Closed Circuit Television (CCTV) and Automated Incident Detection (AID) cameras;
4. Traffic monitoring sensors;
5. Fiber optic cables;
6. Service panels and cabinets; and
7. Generators and UPS.
8. Lane Use Management Systems

C. The Design-Builder shall relocate or replace existing VDOT and Concessionaire roadside equipment located within the Project NEXT Right of Way that is affected by construction, including power and communication service to the equipment, and shall ensure that loss of functionality is minimized

D. The Concessionaire and VDOT will remain responsible for the operations and maintenance of the existing and relocated Concessionaire and VDOT roadside equipment, respectively upon completion of construction.

E. Existing CCTV cameras shall remain operational and fully functional without interruption for the duration of construction.

3.16.3 Systems Integration and Protocols

A. The Design-Builder shall implement a system engineering approach, consistent with FHWA 23 CFR Part 940 Intelligent Transportation System Architecture and Standards (Federal Rule 940), in the development of systems and their associated interfaces. The system engineering approach shall address the following items where applicable:

1. System architecture;
2. System specification;
3. Interface identification;
4. Interface specification;
5. Interface control;
6. System integration; and
7. Configuration management.

B. The Express Lanes TMS shall be required to interface to the VDOT's Northern Region Operations (NRO) Advance Traffic Management System (ATMS) at VDOT's Public Safety and Transportation Operations Center (PSTOC) consistent with the requirement of the *Capital Beltway I-495 HOT Lanes Program TMS to the VDOT NRO PSTOC ATMS External Interface Control Document*.

C. The Design-Builder shall develop and maintain a project-level ITS architecture that is coordinated with the Concessionaire's ITS architecture and the National Capital Region ITS Architecture. The project-level ITS architecture shall document all interconnects and information flows between the HOT-OC and the NRO PSTOC ATMS.

D. The Design-Builder shall prepare and submit a *VDOT ITS Projects – Systems Engineering and Architecture Compliance (Rule 940) Checklist*. The Checklist shall demonstrate that the Project NEXT is in compliance with Federal Rule 940.

E. The Design-Builder shall ensure that such standards, protocols and interfaces are represented in the HOT-OC Central Control Computer System (CCCS), so as to make the TMS system interoperable with the NRO PSTOC ATMS in accordance with the Interface Control Document, including any mutually agreed revisions during the Operating Period.

3.16.4 TMS Design Documentation

The following TMS design documentation shall be prepared and submitted by the Design-Builder:

A. Functional Requirements – shall be a document compliant with the requirements in the TMS Interface Plan (Attachment 3.16c). and shall include characteristics of the TMS Equipment with regard to its intended capability, interface requirements for operations and system dependencies. The documentation shall describe the intended behavior and functionality of the TMS and the operational interaction with the NRO PSTOC ATMS and other stakeholders.

B. Technical Specifications - shall be a document or documents that specify the technical design of the integrated sub-systems that will comprise the TMS and its interfaces.

C. Interface Control Document – shall be a document that describes the physical and logical architecture of system interface between the HOT-OC TMS and the NRO PSTOC ATMS.

D. Process Definition Deliverable – shall set out the business processes relating to the TMS (subject to intellectual property regulations) and the processes for interacting with the appropriate the VDOT system and/or other systems as required.

E. Test Strategy – shall establish the principles of, and the Design-Builder's approach to, the testing of the TMS and the interfaces, including the test stages and processes.

F. Security Plan – shall be a document (or part of another document) that sets out how the security of the TMS shall meet the relevant requirements for enforcement evidence and that data are held securely and only accessible to authorized personnel.

G. Disaster Recovery Plan – shall be a document (or part of another document) that sets out the procedures to be adopted in the event of failure of the TMS.

3.16.5 Traffic Management System (TMS)

A. The TMS enables the Concessionaire to monitor and manage traffic flow on the Express Lanes.

B. The TMS must allow the Concessionaire to:

1. Support response to emergency situations on the Express Lanes in the shortest possible timeframe;
2. Manage traffic flow on the Express Lanes;
3. Control any regulatory DMS, on and approaching the HOT Lanes;
4. Detect and manage traffic incidents effectively, through a comprehensive incident management system, to mitigate the impacts of incidents and prevent secondary incidents from occurring;
5. Provide credible and timely driver information about travel times, traffic conditions and incident situations, contribute to the calculation of dynamic toll prices through the provision of traffic conditions data, and provide timely and accurate toll prices to motorists related to Express Lanes;
6. Provide an interface with the NRO PSTOC ATMS in accordance with the Interface Control Document;
7. Support provision of driver aid to motorists in vehicles that have stopped on the Express Lanes;
8. Permit the NRO PSTOC ATMS to control DMS (Express Lanes) via the HOT-OC TMS in accordance with the Agreement;
9. Provide for the control and monitoring of TMS components and subsystems through a modern and comprehensive computer-based control facility using graphical user-interface (GUI); and
10. Monitor facilities, plant, and equipment, if required.

C. The TMS is comprised the following roadside equipment and systems:

1. DMS for the NEXT Express Lanes to provide toll pricing and driver information and general traffic management information;
2. Traffic monitoring sensors (microwave vehicle detectors) to provide traffic volume, lane occupancy, and speed data;
3. Pan-tilt-zoom and/or fixed CCTV cameras to provide video surveillance;
4. Fixed AID cameras to provide incident and wrong-way vehicle detection; and
5. Generators and UPS to provide emergency backup power.
6. Communications infrastructure between the TMS roadside equipment and the HOT-OC; and
7. TMS equipment and/or systems located in the HOT-OC.

D. The TMS HOT-OC-based equipment and/or systems include:

1. Automatic Incident Detection subsystem
2. CCTV subsystem
3. Central Control Computer System

E. The Central Control Computer System shall have an In-Service Availability of at least 99.995% and any redundant components an In-Service Availability of at least 99.9%.

F. The TMS roadside equipment shall have an In-Service Availability of at least 99.9%.

G. Equipment cabinets shall be provided for the TMS roadside equipment at appropriate locations along the alignment and within the Project Right of Way.

3.16.6 CCTV Video Coverage

A. Dedicated CCTV cameras shall be provided for the following functions:

1. Surveillance of the NEXT Express Lanes including, approaches and interchanges;
2. Surveillance of Ramps G3 and E1 in the area where they are separated by the buffer and bollards from the Dulles Toll Road eastbound to 495 northbound for incident management;
3. AID and wrong way vehicle detection on the NEXT Express Lanes; and
4. Verify and confirm NEXT Express Lanes DMS operation as conceptually shown in the RFP Conceptual Plans.

B. Surveillance CCTV video coverage must be provided by PTZ CCTV cameras mounted on poles to enable HOT-OC operators and VDOT operators (under agreed circumstances) to observe traffic within the limits of the Express Lanes and the General Purpose Lanes, including on and off ramps at interchanges, at all hours of the day and in all weather conditions normally encountered in Virginia, consistent with reported visibility restriction (such as during snow events, rain storms, or fog). The video provided must be stable and jitter-free and suitable for video-based AID.

C. Dedicated cameras shall be provided for surveillance of the NEXT Express Lanes or to enable video-based AID under Concessionaire HOT-OC operator control.

D. CCTV line of sight distances shall provide for full CCTV coverage of the NEXT Express Lanes and VDOT General Purpose Lanes, including on and off ramps at interchanges, without image degradation. The CCTV cameras shall be placed at a minimum mounting height of forty (40) feet. Cameras installed at heights greater than fifty (50) feet will require a camera lowering system at the discretion of the Concessionaire. Prior to final design, the Design-Builder shall submit a roll plan confirming CCTV line of sight coverage for approval.

E. All cameras installed by the Design-Builder shall meet the requirements of Attachment 3.16a (TMS Special Provisions), Section 814 – Camera System.

F. The video surveillance system must enable the identification of the number and vehicle types involved in an incident at all locations within the limits of the Express Lanes.

G. The video provided must be stable at all zoom settings when viewing objects up to one mile away.

H. Where a Concessionaire camera is relocated from a mounting pole that also supports a VDOT camera, the Design-Builder shall modify the mounting pole upon relocation of Concessionaire camera to remove all defunct equipment to preserve functionality of VDOT camera.

3.16.7 Video-based AID

A. The Design-Builder shall implement video-based AID for the NEXT Express Lanes at locations where:

1. Traffic enters or exits the Express Lanes;
2. The risk of traffic incidents is expected to be higher than average, and
3. Rapid detection of incidents is required for special reasons, such as near critical infrastructure.

B. The video-based AID system should be compatible with the existing HOT-OC TMS and capable of:

1. Detecting 95% of incidents involving stopped vehicles, slow vehicles, and slow traffic that are within the field of view of an AID camera or other equipment as specified;
2. Detecting pedestrians on the roadway within the field of view of an AID camera or other equipment, as specified;
3. Detecting incidents and providing an alarm to the HOT-OC in less than 30 seconds; and
4. Detecting wrong-way vehicles; and
5. Have a false alarm rate of less than one false alarm per 10 true alarms.

C. Upon the detection of an incident, the AID system must be capable of recording the video at a rate of at least five frames per second for a period of 60 seconds.

D. Use field-of-view calculator to determine video detection zones.

E. The Design-Builder shall submit a roll plot confirming AID line of sight coverage for approval.

3.16.8 CCTV Video Recording

A. It shall be possible to simultaneously record video from CCTV cameras, as designed, at a rate of at least one (1) frame per second.

B. Sufficient capacity must be provided to store the recorded video from CCTV cameras for a 24-hour duration and continue to record video without intervention.

3.16.9 CCTV Communications Standards

A. The CCTV communications shall support the appropriate National Transportation Communications for ITS Protocol (NTCIP) 1205 communication protocol (version 1.08 or higher) to provide for functionality with the NRO PSTOC ATMS software in accordance with the Interface Control Document.

3.16.10 Traffic Monitoring Sensors (Microwave Vehicle Detectors)

A. Traffic monitoring sensors are to be installed to monitor and report in real-time traffic volume, lane occupancy and speed data on the NEXT Express Lanes and, where available, the General Purpose General Purpose General Purpose Lanes. Such sensors shall enable the Concessionaire to monitor the performance of the Project NEXT corridor.

B. Information collected on the General Purpose Lanes and NEXT Express Lanes will be made available into the existing Project systems. Data will be provided in raw form and be subject to quality control requirements prior to submittal. Data shall be aggregated in increments to be mutually agreed.

C. Traffic monitoring sensors shall be installed by the Design-Builder approximately every 1/3 mile on the NEXT Express Lanes and General Purpose Lanes, in the approximate locations shown on the RFP Conceptual Plans or as necessary to meet data collection and operational requirements.

D. Traffic monitoring sensors shall be installed on TMS poles based on the manufacturer's recommended mounting heights and roadway geometry. Each detection zone shall be shown on plans as a part of the final Design Documentation and optimized for Express Lanes data collection. Traffic monitoring sensors shall be located to gather data from both the NEXT Express Lanes and General Purpose Lanes. If a traffic monitoring sensor is unable to gather accurate data for the Express Lanes and General Purpose lanes, a second sensor shall be added. The Design-Builder shall provide a table in the plans identifying the detection lanes for each detector for the Express Lanes and General Purpose Lanes.

3.16.11 Dynamic Message Signs

A. Dynamic Message Signs (DMS) for the NEXT Express Lanes shall be located at strategic locations throughout the corridor and will display information to allow drivers to make decisions on whether to use the Express Lanes. The proposed locations shown on the RFP Conceptual Plans are conceptual only and must be finalized by the Design-Builder for suitability, readability, interferences and interdisciplinary coordination. The information to be displayed may indicate:

1. Price levels for up to three destination points for each point of entry;
2. Motorist Advisory messages.

B. DMS shall be installed at suitable distances from the Express Lanes entry points to support motorist decision making and orderly movement of traffic. All DMS (and any static sign panels co-located with DMS) shall have a minimum clearance of 19.0 feet above the highest point of paved surfaces. At each mainline entrance, a minimum of three DMS are required. A minimum of two DMS are required at all other entry points, except for the George Washington Memorial Parkway entry to the Express Lane where a single DMS shall be provided as shown in the RFP Conceptual Plans.

C. The Design-Builder shall coordinate the location of DMS with the Concessionaire to avoid over-populating signs and to seek co-gantry opportunities. The Project Signage Roll Plan will identify over-population and potential co-gantry opportunities. The Design-Builder shall incorporate agreed upon recommendations in the final Design Documentation.

D. The Tolling & Driver Information DMS shall have the following minimum features:

1. Full graphics color LED display;
2. Capability to display congestion levels on HOT and General Purpose lanes on each tolling section;
3. Capability to display toll price for destination points;
4. Capability to display travel-time information for General Purpose Lanes and Express Lanes or, alternatively, the travel time difference between General Purpose Lanes and Express Lanes;
5. Capability to display traffic management information, including warning and recommended diversions;
6. Advanced fault detection and reporting;
7. Conformance to the National Transportation Communications for ITS Protocol (NTCIP) communications protocol or other industry protocol agreed with the Concessionaire; and
8. The pricing confirmation signs (closest to the decision point) shall be connected to emergency power per the requirements of Section 3.9. Emergency power shall provide a minimum of 4 hours of run time.

E. If communication between the HOT-OC Central Control Computer System is lost and the Tolling & Driver Information DMS has no reported errors, the Tolling & Driver Information DMS shall display a user-defined graphic/message.

F. DMS cabinets shall be placed in front of DMS at a distance such that authorized personnel can read the message displayed on the DMS while working at the DMS cabinet. Each DMS shall be viewable by at least one PTZ CCTV camera such that the message displayed on the DMS can be visually confirmed by an operator in the HOT-OC.

G. The Traffic Management DMS shall have the following minimum features:

1. Full graphics color LED display
2. Capability to display traffic management information, including warning and recommended diversions;
3. Advanced fault detection and reporting; and
4. Conformance to the NTCIP communications protocol or other industry protocol agreed with the Concessionaire.

H. The DMS must not display erroneous information due to a fault with the sign or the loss of pixels.

3.16.12 TMS Availability

A. An In-Service Availability of at least 99.99% is required for the calculation of dynamic toll prices and provision of information to other systems/ devices,.

B. All other TMS functions, unless noted otherwise, must have an ISA of at least 99.9%.

C. In cases where redundancy is provided, the system must switch between redundant components seamlessly (without impact to operator functionality). The system must also provide the capability to manually switch between redundant devices to support software upgrades/revision and maintenance procedures.

3.16.13 Communications Infrastructure

A. Any existing Express Lanes or VDOT communications infrastructure must remain in place or be replaced in kind, as specified in the applicable Standards and Specifications set forth in Attachment 1.5a.

B. Communications between the TMS roadside equipment and HOT-OC shall be via a fully redundant fiber optic network using OSPF Protocol (or equivalent) to ensure no single points of failure and reliability and shall be comprise of:

1. NEXT Express Lanes trunk fiber optic loop;
2. NEXT Express Lanes distribution fiber optic loop(s); and
3. Necessary connections and/or interfaces with the existing 495 Express Lane fiber loops.

C. The NEXT Express Lanes trunk and distribution fiber optic loops shall be comprised of new armored fiber optic cable.

D. All new fiber optic cables shall be protected to prevent rodent damage, including, but not limited to, installing screens at bases of all TMS poles, installing completely sealed conduit and manhole covers, and installing manhole covers without manhole hook holes to eliminate rodent entry.

E. The new communications conduit bank for the Project NEXT shall consist of conduits with the following configuration:

1. One four inch conduit containing a 3-barrel inner duct carrying a 36-fiber NEXT Express Lanes distribution cable;
2. One four inch conduit containing a 3-barrel inner duct carrying a 36-fiber NEXT Express Lanes trunk cable;
3. Two four inch VDOT communication conduits with pull tape and tracer wire;
4. Separate communication junction boxes spaced no more than 1,000 feet apart for the VDOT and Concessionaire communication facilities; and
5. Spare conduit(s), as shown on the RFP Conceptual Plans, containing appropriate pull tape.

F. Communications and conductor cables shall be placed in separate buried conduits, embedded conduits, or structure and bridge- mounted conduits. Communications and conductor cables shall not share conduits, junction boxes, or related appurtenances.

G. The Design-Builder shall coordinate with the Concessionaire to determine which fibers need to be spliced to the existing 495 Express Lanes fiber to provide connectivity to the Express Operations Center. The Design-Builder shall be responsible for providing the necessary switch capacity and optics to support connectivity to the existing infrastructure.

H. The Design-Builder shall provide fiber splicing diagram plans showing details of every splice and termination for every fiber strand as a part of the final Design Documentation. The number, color, and fiber assignment of each buffer tube and fiber strand shall be included. No underground splices shall be allowed.

I. The maximum allowed cable length of a Category 5 or 6 Ethernet cable is 328 feet. If a longer running distance is needed, a media converter shall be used to convert Ethernet data to fiber optic signals.

J. The Design-Builder shall furnish and install new TMS equipment cabinets for exclusive use to support the Project NEXT devices. Existing VDOT equipment cabinets shall not be used. All VDOT equipment cabinets shall be ground mounted, unless otherwise approved.

K. The Design-Builder shall furnish and install new conduit for exclusive use by the Express Lanes TMS equipment. Existing VDOT conduits shall not be used.

L. Where equipment is relocated or removed from an existing VDOT cabinet, the Design-Builder shall remove and properly dispose of all non-operational equipment, and the

cabinet, if empty, in a manner that preserves the functionality of any remaining VDOT equipment.

M. Locator Wire

1. All duct banks, trenches, and bores containing non-metallic conduits with non-locatable cable (fiber optic) shall have at least one locator wire installed between all junction boxes or cabinets.
2. At all locations where non-locatable conduit is installed in a common trench, and a non-locatable conduit diverges from the common trench, a locator wire shall be installed in both trenches.
3. All locator wires shall be installed inside of conduit and shall run continuously from junction box to junction box.
4. Locator wire shall be an insulated #8 AWG stranded copper wire. The insulation shall not be green in color.

N. The Design-Builder is responsible for designing the connection diagrams, including the communications equipment to be provided in each cabinet and how the equipment connects to the fiber optic cables. The design shall be consistent with the NEXT Express Lanes Network Architecture as described in the diagram in Attachment 3.16a (TMS Special Provisions) Section 817.

O. Conduit bank locations for the Express Lanes communications infrastructure, as shown in the RFP Conceptual Plans, have been developed to maintain a fully redundant fault tolerant ring with trunk lines on each side of Project NEXT, The Design-Builder shall not change this concept of the NEXT Express Lanes conduit bank locations for communications infrastructure unless approved.

P. The Design-Builder must provide optical time domain reflectometer measurement data for all fiber connections on the Project NEXT.

3.16.14 Existing VDOT Roadside Equipment

A. Existing VDOT roadside equipment or third-party roadside equipment, installed under permit with VDOT, may include the following equipment located within the Project NEXT Right of Way:

1. weather stations;
2. DMS for the existing General Purpose lanes to provide general traffic management and HOV regulatory information;
3. Lane Use Management System – northbound inside shoulder of existing General Purpose lanes;
4. Service panels;
5. CCTV cameras; and
6. traffic monitoring sensors.

B. The Design-Builder shall relocate existing VDOT roadside equipment located within the Project NEXT Right of Way that is affected by construction, including power and communication service to the equipment, and shall ensure that loss of functionality is minimized.

C. Any third-party roadside equipment located within the Project NEXT Right of Way that is affected by construction, including power and communication service to the equipment, shall be relocated in accordance with the terms of the third-party's agreement with VDOT at no cost to the Design-Builder. The Design-Builder shall provide notification of disturbance of equipment three weeks prior to commencing such activities and coordinate the third party relocation work with Project NEXT Work.

D. VDOT will remain responsible for the operations and maintenance of the existing and relocated VDOT TMS roadside equipment.

E. Third-party equipment owners shall remain responsible for the operation and maintenance of their existing and relocated TMS roadside equipment.

F. All removed operational existing VDOT roadside equipment shall be returned to VDOT.

3.16.15 Testing

A. No later than 12 months before the Service Commencement Date, the Design-Builder shall submit a test strategy for the NEXT Express Lanes in accordance with the requirements of the TMS Interface Plan that shall include as a minimum:

1. The scope, requirements and objectives of testing with a testing and systems integration period of no less than 120 days;
2. An overall high-level plan for testing the Concessionaire TMS (and any VDOT) roadside equipment, including the test stages and processes and the scheduling of all tests prior to the Service Commencement Date; and
3. The roles and responsibilities of all those involved with the testing program and any dependencies on third parties, including Concessionaire, TMS Subcontractor and VDOT personnel.

B. Testing and commissioning, where applicable, shall be based on the application of a systems engineering methodology such as ANSI/GEIA EIA-632. Testing and commissioning shall be the primary responsibility of the Design-Builder and TMS Subcontractor with input and support from the Concessionaire (as required) and shall utilize:

1. A Verification Cross Reference Index (VCRI), which will be developed and documented to establish the way in which requirements are satisfied. The VCRI shall utilize test, demonstrate, inspect and analyze as methods for acceptance;
2. A test series that demonstrates compliance with the performance requirements through a test plan and procedures;

3. A testing strategy document that details how the testing plan will be implemented to demonstrate conformance of the proposed solution to the various functional, technical, and performance requirements;
4. A test plan document that describes how the testing strategy will be executed to demonstrate the various functional, technical, and performance requirements for compliance to requirements, which shall include:
    a. test specifications for each of the test cycles
    b. detailed requirements traceability matrix linking each of the test series to relevant requirement(s)
5. The testing and commissioning documents for the NEXT Express Lanes will provide the level of detail to ensure compliance with the overall testing requirements and the Design-Builder shall submit testing and commissioning documents a minimum of 90 days prior to testing and commissioning activity. These testing and commissioning documents shall include:
    a. System design and integration overview – The TMS Subcontractor will be responsible to provide this documentation;
    b. Level A Testing – The objective of this test is to certify roadside equipment installed by the Design-Builder is installed and fully operational in line with agreed design requirements and via executing test plans and procedures approved and witnessed by the Concessionaire and TMS Subcontractor. The TMS Subcontractor shall provide the Level A Testing Template. The Design-Builder shall be responsible for this test and shall be accountable for successful and on-time execution of this test;
    c. Level B Testing – The objective of this test is to certify roadside equipment is successfully integrated with other TMS facilities via executing test plans and procedures approved and witnessed by the Concessionaire and TMS Subcontractor. The TMS Subcontractor shall provide the Level B Testing Template. The Design-Builder shall be responsible for this test and shall be accountable for successful and on-time execution of this test;
    d. Level C Testing – The objective of this test is to certify that Concessionaire's TMS communicates and controls roadside equipment via executing test plans and procedures defined by the Design-Builder. The TMS Subcontractor will be responsible for conducting this test under and the Design-Builder shall be accountable for successful and on-time execution of this test;
    e. Factory Acceptance Testing – Tests to be conducted at the supplier's premises to verify that the equipment, subsystem or system complies with the functional and performance requirements of that supplier's subcontract;
    f. Site Acceptance Testing – Tests to be conducted at the point of installation to confirm the factory acceptance testing results, plus any omissions and/or errors noted during the factory testing;
    g. Integration Acceptance Testing – A test conducted to ensure that the complete TMS meets the end- to-end system-level functional and performance requirements in normal operating conditions; and

h. User Acceptance Testing – T o ensure that individual functions operate as defined in the requirements specification or similar documents and the complete end-to-end process is tested. User Acceptance Test will be completed at least thirty (30) days before Service Commencement of the TMS. The Concessionaire will approve successful completion of the UAT for Service Commencement. The Concessionaire will provide this documentation.

6. Where a Factory Acceptance Test of TMS equipment occurs more than 200 miles from the Project NEXT site, the Design-Builder shall arrange for and bear all costs of any travel and lodging for required for Concessionaire's representative(s) to witness such Factory Acceptance Testing.

C. The Concessionaire will participate as necessary in the development of requirements for testing and integration as outlined above where such testing and integration involves the Concessionaire's infrastructure. VDOT will participate as necessary in the development of requirements for testing and integration as outlined above where such testing and integration involves the Concessionaire's infrastructure.

3.16.16 Training

The Design-Builder shall develop and conduct a minimum of two information sessions for the Concessionaire in the operations and maintenance of the TMS devices and equipment.

A. The target audience for one information session shall be the Concessionaire's management staff and duty officers. The session shall include an overview of the capabilities and procedures used to operate the Express Lanes.

B. The target audience for another information session shall be the VDOT's Northern Virginia Traffic Operations Center operators and controllers and shall include detailed daily procedures used by the TMS in interface with the NRO PSTOC and management of incidents.

3.16.17 Maintenance Access

A. All TMS Roadside Equipment cabinets, foundations, concrete pads, and junction boxes shall be installed so as to facilitate safe and comfortable maintenance access and operation. Handrails, stairs, and access platforms shall be installed, at a minimum, consistent with OSHA standards at locations where the potential to fall more than 3' exists. These handrails, stairs and access platforms shall allow personnel to safely traverse between the nearest logical vehicle parking space on the roadside and the cabinet, and to perform any possible operational or routine maintenance function safely and comfortably without the use of specialized access or manual handling equipment, climbing slopes steeper than 3:1 or unsafe practices.

1. Cabinet heights – for all cabinets, the top of the cabinet shall not be more than 72" above the finished grade of the workspace where maintenance personnel would be expected to stand.

2. Cabinet workspace – a minimum 4 feet radius from the cabinet shall be clear and flat work area provided by concrete pad. Fall protection, consisting of galvanized metal handrails, shall be provided for all cabinet workspaces more than 3' high.
3. Communication junction box workspace on slopes – for all communication junction boxes located on slopes 3:1 or steeper and located more than 2 feet in elevation above the toe of slope, a minimum 3' x 6' concrete pad surrounding the junction box shall be provided to accommodate maintenance personnel workspace.
4. Express Lane cabinet and communication junction box access on slopes 3:1 or steeper, and located more than 5' in elevation from the roadway shoulder shall be supported by stair access from the roadway shoulder. The stairs and any necessary connecting pathway shall be OSHA compliant and have a handrail on at least one side.

B. Junction boxes shall not be installed in roadways, driveways, parking areas, ditches or public sidewalk curb ramps. Junction boxes shall be installed so as to prevent any form of water ingress, seepage, and runoff or standing water occurring over the box cover in addition to being NEMA 4X, IP65 or equal rated enclosures. Junction box length (long side) shall be parallel to the conduit run. When the conduit run is perpendicular to the roadway at the junction point, the junction box shall be parallel to the roadway. The maximum spacing between any two adjacent electrical junction boxes shall be 500 feet. The maximum spacing between any two adjacent communication junction boxes shall be 2,000 feet.

3.16.18 Specified TMS Roadside Equipment

A. New TMS Roadside Equipment used on Project NEXT shall be as specified in the table below to ensure the equipment will be fully compatible with the existing 495 Express Lanes TMS and operating protocols.

TMS Roadside Equipment

Device	Equipment Make/Model	Firmware Version
Generator/Tank with PLC Comms from TS&T	**Cummins 35GG + Comm Cabinet	latest
Telemetry Remote Terminal Unit	Moxa ioLogic E4200	latest
Telemetry Remote Monitor	PowerCommand PCC500 (SNMP)	latest
Layer 3 Switch	Cisco C9500-16X-A	latest
Layer 3 Switch Redundant Power Supply	Cisco PWR-C4-950WAC-R/2	N/A
Layer 3 Switch Network Module	Cisco C9500-NM-8X	latest
Layer 3 Switch Licensing	Cisco C9500-DNA-L-A-3Y	N/A
Layer 2 Switch	Cisco IE-4000-8T4G-E	latest
Layer 2 Switch Power Supply	Cisco PWR-IE50W- AC=	N/A
Layer 2 Switch Licensing	Cisco IE4000-DNA-A-L	N/A
Layer 2 Switch Licensing	Cisco L-IE4000-RTU=	N/A
N-Port Device Server	Moxa IA5250A	latest

Device	Equipment Make/Model	Firmware Version
CCTV (PTZ)	CohuHD Costar 4260HD RISE 4260 Series Positioner	latest
Automatic Incident Detection Camera	Cohu 3430HD Series Fixed Barrel	latest
Microwave Vehicle Detection	Wavetronix Smart Sensor HD	latest
DMS Type 2 (20mm Pixel Pitch)	**Daktronics Vanguard VF-2420-64x192-20-RGB	latest
DMS Type 2A (20mm Pixel Pitch)	**Daktronics Vanguard VF-2420-96x288-20-RGB	latest
Cabinet Power Strip	Digital Loggers Web Power Switch 7	latest
Uninterruptible Power Supply	ZincFive UP Stealth UPS (SNMP) (500W Battery)	latest
Mobile Connectivity Modem	**Cradle Point IBR 1700	latest
Mobile Connectivity Modem License	**Netcloud Manager License	N/A

Notes:

1. Firmware version indicates Equipment Make and Model Numbers required for seamless integration into existing TMS software.
2. **Indicates verification required based on project requirements.
3. Equipment requiring software licenses shall be provided with paidup licenses through the warranty. period..
4. DMS type and size shall be verified with the project requirements, design and specifications
5. Generator type and size shall be verified with the project requirements, design and specifications
6. Model numbers are subject to change based on product availability (successor model numbers shall be submitted for approval).
7. Mobile Connectivity Equipment to be used for TMS Cabinets with no communication network (fiber) access.

3.16.19 Maintenance of 495 Express Lanes Operating Systems

A. No shutdown of the 495 Express Lanes operating systems shall be permitted during the installation and testing of the Project NEXT elements. The Design-Builder shall install all TMS components and test the roadside equipment without causing shutdowns or outages to the existing 495 Express Lanes system.

B. For any temporary impacts or isolated shut-down of system elements, the Design-Builder shall coordinate directly with the Concessionaire regarding any Work within the 495 Express Lanes or Concessionaire's assets, or Work impacting any 495 Express Lanes facilities or equipment. The Design-Builder is required to coordinate directly with the Concessionaire and comply with the current Permit to Work processes in place for the Express Lanes, including the use of electronic forms and submittals. An approved Permit to Work issued by the Concessionaire shall be required prior to commencing any Work within the existing 495 Express Lanes, or Work impacting any existing 495 Express Lanes facilities or equipment.

3.16.20 Impacts to Existing Roadside Equipment

A. The Design-Builder shall be responsible for any impacts to the existing Concessionaire tolling and TMS and VDOT roadside equipment and infrastructure within the construction limits. Prompt response is required to any damage caused by the Design-

Builder and in the event the repair is not completed two hours prior to the next traffic peak, the Concessionaire shall restore critical systems and bill the Design-Builder for such restoration.

B. The Design-Builder shall reimburse Concessionaire for the damages caused by the Design-Builder, including, but not limited to, repair or replacement of the existing fiber and electrical network and the amount of lost revenue. The cost of the repair work performed will include the actual maintenance Contractor costs plus twenty-five percent (25%) for supervisory and administrative personnel. The amount of lost revenue will be determined based on the average revenue reported for the same period of the outage over the previous four week period.

C. As part of the overall construction of the Project NEXT, a process for controlling the Work that will impact existing Concessionaire tolling or TMS and VDOT roadside equipment and devices (Existing TMS Assets) is required. A significant portion of this work will depend on field conditions and the state of the system, neither of which can be determined during the design phase. The impact of construction on Existing TMS Assets shall be coordinated by the Design-Builder by the Notification of Impact (NOI) in accordance with the following subsections and the notification procedure outlined in Attachment 3.16b.

D. This NOI process shall apply to all Existing TMS Assets within the Project NEXT limits that are affected by the Design-Builder's construction activities.

E. The Work shall be governed by the general requirement that the affected Existing TMS Assets shall be maintained or returned to a condition equal to or better than the condition at the start of construction, unless otherwise indicated in the plans or approved. This shall include both the functionality and maintainability of the Existing TMS Assets.

F. While this NOI process is intended to provide specific controls on work impacting Existing TMS Assets, a number of factors both within and beyond the control of the Design-Builder may impact the Work. Specific elements of the proposed Work plan, such as schedule or means and methods of completing the Work, may require revisions that are not consistent with these provisions in order to safely and effectively complete the Work. As such, these provisions should be treated as a typical application and general framework for control of the Work. When deviations are required due to changing field conditions, no reasonable request for changes by the Design-Builder or the Concessionaire may be denied without good cause.

G. Information related to Existing TMS Assets have been prepared using a combination of original design drawings, as-built drawings, and site visits. This NOI process recognizes that complete documentation of the existing VDOT equipment and systems may be unavailable, the ability to field verify conditions as part of design is limited, and that conditions can change between the time of design and the time of construction. As part of the design development process, it has been agreed that certain information and decisions will be made during construction at such time that the elements of the system can be verified as to precise location and operational status. The Concessionaire and the Design-Builder shall work together to identify and coordinate those items that could not be addressed during design.

H. The Concessionaire and the Design-Builder shall regularly work together to coordinate work that may impact Existing TMS Assets. This coordination shall include, but not be limited to, Concessionaire staff and representatives attending regularly scheduled construction coordination meetings held by the Design-Builder.

I. "Impact" is defined as any Work that will interrupt the normal operation of the Existing TMS Assets.

J. No Work that impacts Existing TMS Assets identified in the plans shall commence without prior notification per the provisions of this NOI process.

K. The Design-Builder shall take all necessary measures to protect Existing TMS Assets during the course of the Work and maintain operation of the equipment. The means and methods for protecting Existing TMS Assets shall be determined on a case-by-case basis appropriate to the scope of the Work.

L. The Concessionaire shall make staff available upon request to assist the Design-Builder in identifying existing system conflicts and operations; conducting Equipment inspections; carrying out maintenance transfers; and testing and acceptance of completed Work. The availability of Concessionaire staff shall be coordinated per the requirements of this NOI process. When unexpected conditions arise that requires the input of the Concessionaire, the Concessionaire shall make staff or authorized representatives available within forty-eight (48) hours of Concessionaire receipt of the Design-Builder's written request.

M. The provisions of this NOI process shall apply to all Work impacting Existing TMS Assets shown on the plans, as well as to any Existing TMS Assets affected during the course of construction, but not identified on the plans. When Existing TMS Assets not identified on the plans are impacted, the Design-Builder shall follow the typical construction processes (such as RFI, FDC, and NDC) to identify and resolve the impact.

N. The Concessionaire shall notify the Design-Builder of any impacts to operations that may be attributable to work at other sites that were not anticipated in the original notification. The Design-Builder and the Concessionaire shall coordinate as necessary for unanticipated impacts to operations.

O. Unless specifically described on the plans or special provisions or directed in writing, means and methods for completing the Work related to impacted Existing TMS Assets shall be at the discretion of the Design-Builder. Means and methods shall be consistent with the requirements of the Design-Build Contract and the Standards and Specifications.

P. With the exception of the notification form, written correspondence may include e-mail to those parties listed as contacts in this NOI process or the notification form. Written correspondence shall reference the relevant notification ID number and phase of the process.

Q. Responsibility for maintenance of impacted Existing TMS Assets shall transfer to the Design-Builder per the approved schedule for start of the Work unless otherwise noted on the notification form. Responsibility for maintenance will transfer back upon completion of the Work affecting an Existing TMS Asset as detailed in the notification process. During the period when maintenance of Existing TMS Assets has been

transferred to the Design-Builder, events that impact the condition of the Existing TMS Assets shall be addressed by the Design-Builder, including warranty claims and at-fault third parties. The Concessionaire shall be notified immediately of any damage to Existing TMS Assets.

R. The Design-Builder shall be required to submit an amended NOI, if work described in initial notification is performed at least forty-eight (48) hours after date stated in the NOI form.

S. The Design-Builder shall document all changes to the Concessionaire TMS and VDOT ITS infrastructure as a result of work in the NOI in the Project NEXT As-Built Plans. An As-Built Plan will be required for all impacted Existing TMS Assets, even if such equipment is not shown on Project NEXT AFC Documents.

3.17 Maintenance During Construction

A. The Design-Builder shall prosecute the Work so as to avoid obstructions to traffic to the greatest extent practicable. The Design-Builder shall provide for the safety and convenience of the general public and residents along the roadway and the protection of persons and property.

B. The Design-Builder shall maintain the NEXT Work from the beginning of construction operations until Final Completion, except for those elements which have been accepted by the Concessionaire at Service Commencement.

C. As applicable, the Concessionaire VDOT, MWAA and NPS will maintain their respective roadways and structures used by public, pedestrian and vehicular traffic, until such time as the paved surface and roadside appurtenances in the active work area are significantly impacted by the Design-Builder's construction activities. Significant impacts include: pavement marking eradication, traffic lane shifts, surface paving, placement of temporary traffic barrier service, or similar activities. Once the Design-Builder assumes responsibility for maintenance, it shall keep the roadway and structures in acceptable operating conditions per the maintenance requirements and standards of the respective owner, and provide any necessary repairs to the roadway surfaces and bridge decks (i.e., fixing holes in the hard surface, patching the potholes and providing smooth surface). Such maintenance shall continue until the Design-Builder's construction activities on the affected assets are completed and the assets have been handed back to the respective owner.

D. The Design-Builder shall keep the portions of the roads, bridges, sidewalks and shared use paths being used by the public free from irregularities and obstructions that could present a hazard or annoyance to traffic.

E. Existing Concessionaire TMS and VDOT roadside devices shall remain operational during construction unless otherwise approved.

F. Existing detection (traffic sensors) in the corridor shall remain in place during construction activities, unless their removal is approved by the owner or operator. Replacement detection shall be installed, operational, integrated, and collecting data before taking existing detection out of service.

G. Existing continuous count stations shall remain in place and fully operational.

H. Where the Design-Builder's maintenance of traffic or traffic control plans require vehicles to operate on surfaces other than final surface or final alignment, the Design-Builder shall be responsible for maintenance of these roadways, including repair of any damage caused by its operations or use by public traffic.

I. As applicable, existing drainage facilities will be maintained by the Concessionaire VDOT, MWAA and NPS until such time that these facilities are significantly impacted by the Design-Builder's construction activities. Significant impacts include: removing or abandoning existing drainage facility, eliminating drainage facility resulting in diverting drainage to an existing or proposed drainage facility that did not previously service that drainage area or an impact due to the drainage system being inadequate to properly accept and convey this diverted or interim drainage area. Once the Design-Builder assumes responsibility for this maintenance, it shall keep the drainage facilities in acceptable operating conditions per the maintenance requirements and standards of the respective owner, and provide any necessary repairs (including cleaning of clogged inlets, pipes or outfalls). Such maintenance shall continue until the Design-Builder's construction activities on the affected assets are completed and the assets have been handed back to the owner.

J. The Design-Builder shall be responsible for maintaining any proposed SWM facilities once all connections have been completed, and shall certify that the SWM facilities have been maintained as per the Department, DEQ, and manufacturer's (for proprietary products) maintenance guidelines prior to transfer to the Department.

K. Existing lighting within the Project limits shall be maintained by the respective owner until the Design-Builder's installs new or replacement lighting. At no time shall existing lighting within the Project limits be put out of service, unless otherwise approved by the respective owner.

L. VDOT will perform snow and ice removal on all roadways within the Project limits. No lane closures will be permitted, during snow mobilization of Level 2 or above.

3.18 As-Built Plans

A. As a condition to Final Completion, the Design-Builder shall provide the record drawings and documents (As-Built Plans) of Project NEXT in accordance with the Standards and Specifications set forth in the VDOT CADD Manual, VDOT Road Design Manual, and the VDOT Post Construction Manual. As-Built Plans include any plans or drawings utilized for the construction of Project NEXT prepared by the Design-Builder and/or its Subcontractors that are updated to accurately reflect final constructed conditions, including any approved field changes or variances.

B. The As-Built Plans shall be in the same format as the construction plans, and shall be certified by the Design-Builder that they reflect the actual condition of Project NEXT at the completion of the Work. The As-Built Plans shall be organized and indexed to facilitate easy retrieval of information. Where appropriate, overlapping work packages may be combined in the As-Built Plans.

C. As-Built Plans shall be prepared by a Professional Engineer licensed in the Commonwealth. The As-Built Plans will show all adjustments and revisions to the approved construction plans made during construction (including NDC's, FDC's NCR's and approved field changes and variances) and serve as a permanent record of the actual location of all constructed elements. A certification statement (with signature and date) shall be provided by the Professional Engineer on all applicable sheets indicating that to the best of his/her knowledge, the As-Built Plans show all adjustments and revisions to the approved construction plans made during construction and serve as a permanent record of the actual location of all constructed elements.

D. During the construction phase, the Design-Builder shall maintain a complete set of Construction Documents to reflect current "As-Built" conditions showing field changes or variances marked in red on a weekly basis. The Concessionaire may audit the Design-Builder's process for maintaining these plans to determine compliance with this requirement. Any audit findings shall be adequately addressed within 30 days of the Concessionaire's audit report.

E. The Design-Builder shall provide the full set of As-Built Plans as follows: three (3) hard-copies of each plan set, one electronic file of each plan set in *.pdf format, and one electronic file of each plan set in MicroStation *.dgn format.

F. Traffic Management System As-Built Plans

1. The As-Built Plans shall have Global Positioning System (GPS) location data of all installed TMS field devices, including but not limited to; junction boxes (electrical and communication), splice cabinets, CCTV and AID cameras, Dynamic Message Sign, Microwave Vehicle Detectors, pole and ground mounted cabinets, roadway lighting and electrical service panel. A detailed list or spreadsheet of all installed or modified TMS roadside equipment devices, including at least the device location, model number, serial number, and test acceptance date shall be part of the As-Built Plans.

2. The As-Built Plans shall provide fiber optic splicing diagrams at every splice point (cabinet or underground) detailing all cable splices, terminations, equipment port assignments, and optical circuits within the communication network. The Design-Builder shall document the sequential cable length markings at each splice box and pull box wall that the cable passes through, and include the information with the as-Built documentation.

3. The As-Built Plans shall provide splicing details for all existing VDOT cabinets that have had splicing altered. Splicing details shall include specific fiber numbers.

4. The As-Built Plans shall provide a complete set of final plans showing all bores (successful and failed) on completing the work. Ensure that the plans are dimensionally correct copies of the Construction Documentation and include roadway plan and profile, cross-section, boring location and subsurface conditions as directed by the Engineer. The plans must show appropriate elevations referenced to a permanent VDOT feature (such as mast arm foundation, manhole inlet cover, or head wall). Plans must be same scale in black ink on white paper, of the same

size and weight as the Construction Documentation. Specific As-Built Plans content requirements include, but may not be limited to, the following:

a. The construction plan view shows the center line location of each facility installed, or installed and placed out of service, to an accuracy of one (1) inch at the ends and other points physically observed in accordance with the bore path report.

b. As directed, provide either a profile plan for each bore path, or a cross-section of the roadway at a station specified by the Engineer, or a roadway centerline profile. Show the ground or pavement surface and crown elevation of each facility installed, or installed and placed out of service, to an accuracy of within one (1) inch at the ends and other exposed locations. On profile plans for bore paths crossing the roadway, show stationing of the crossing on the Construction Documentation. On the profile plans for the bore paths paralleling the roadway, show the Construction Documentation stationing. If the profile plan for the bore path is not made on a copy of one of the construction profile or cross-section sheets, use a 10:1 vertical exaggeration.

c. If, during boring, an obstruction is encountered that prevents completion of the installation in accordance with the design location and specification, and the product is left in place and taken out of service, show the failed bore path along with the final bore path on the plans. Note the failed bore path as "Failed Bore Path - Taken Out of Service." Also show the name of the Utility Owner, location and length of the drill head and any drill stems not removed from the bore path.

d. Show the top elevation, diameter, and material type of all utilities encountered and physically observed during the subsoil investigation. For all other obstructions encountered during a subsoil investigation or the installation, show the type of material, horizontal and vertical location, top and lowest elevation observed, and note if the obstruction continues below the lowest point observed.

e. Include bore notes on each plan stating the final bore path diameter, product diameter, drilling fluid composition, and composition of any other materials used to fill the annular void between the bore path and the product, or facility placed out of service. Note if the product is a casing, as well as the size and type of carrier pipes placed within the casing as part of the Agreement.

5. The As-Built Plans shall show field surveyed locations of all junction boxes and roadside equipment and a coordinate table showing both the Project coordinates and latitude/longitudes for each. These plans show also show field verified cabinet numbers, service panel numbers and roadway lighting pole electrical identification numbers.

G. Drainage As-Built Plans

1. Upon completion of the installation of any major drainage structure, the Design-Builder shall complete a final as-built survey of the major drainage structures and related upstream and downstream appurtenances and prepare As-Built Plans. The as-built survey shall include the horizontal location and vertical elevations of the

constructed major drainage structure in sufficient detail to confirm pre-construction hydraulic performance. A post construction as-built Hydrologic and Hydraulic Analysis (H&HA) and report shall be developed based on the as-built survey and submitted for review and acceptance. The post-construction H&HA shall demonstrate that the anticipated post-construction hydraulic performance of the major drainage structure matches or betters that of the pre-construction H&HA. If the post-construction analysis shows an impact greater than the pre-construction H&HA or exceeds the construction tolerances established with the pre-construction H&HA, then the Design-Builder shall be responsible for mitigating the adverse impacts of the post-construction condition at no additional cost.

2. The Design-Builder is to insure proper ingress and egress to any storm water management facility and that any specific proprietary facilities have proper maintenance details included in the As-Built Plans.

3. The As-Built Plans shall include the following information:
   a. Discharge structures – structure identification number, type, locations, dimensions and elevations of all weirs, bleeders, orifices, gates, pumps, pipes, and oil and grease skimmers;
   b. Side bank and underdrain filters, or exfiltration trenches – locations, dimensions, and elevations, including clean-outs, pipes, connections to control structures and points of discharge to receiving waters;
   c. Storage areas for treatment and attenuation – storage area identification number, dimensions, elevations, contours or cross-sections of all, sufficient to determine stage-storage relationships of the storage area and the permanent pool depth and volume below the control elevation for normally wet systems;
   d. System grading – dimensions, elevations, contours, final grades or cross-sections to determine contributing drainage areas, flow directions and conveyance of runoff to the system discharge point(s);
   e. Conveyance – dimensions, elevations, contours, final grades or cross sections of systems utilized to divert off-site runoff around or through the new system;
   f. Water levels – existing water elevation(s) and the date determined;
   g. Benchmark(s) – location and description (minimum of one per major water control structure); and
   h. Wetland mitigation or restoration areas (if any) – Show the plan view of all areas, depicting a spatial distribution of plantings conducted by zone (if plantings are required by permit), with a list showing all species planted in each zone, numbers of each species, sizes, date(s) planted and identification of source of material; also provide the dimensions, elevations, contours and representative cross-sections depicting the construction.
   i. The Design-Builder is required to demonstrate that the construction adheres and conforms to the in-stream improvements as incorporated in the approved Scott's Run Stream hydraulic model for Proposed Conditions. The Design-Builder is required to prepare As-Built Plans of the constructed instream

improvements to clearly demonstrate that the improvements have been constructed per requirements.

4. If Design-Builder prefers to abandon in place any existing drainage structures or Culverts, approval must first be obtained. All abandoned drainage structures and Culverts shall be depicted on the As-Built Plans.

5. The Design-Builder shall provide As-Built Plans of all storm water management facilities. The As-Built Plans shall show the actual finished ground contours, outlet structure dimensions and elevations and other requirements as they exist at the completion of Project NEXT. These drawings shall be signed and sealed by a Licensed Professional Engineer or Land Surveyor licensed in the Commonwealth.

6. The Design-Builder shall provide certification from an independent source that the proposed BMP facilities were constructed in accordance with applicable and current industry standards, and the manufacturer's specifications.

H. Utilities As-Built Plans

The Design-Builder shall accurately show the final location of all utilities on the As-Built Plans for the Project NEXT. The Design-Builder shall ensure the Utility companies submit as-built drawings upon completion of their relocation or adjustments. VDOT shall issue an as-built permit to the Utility companies after receipt of permit application and as-built drawings.

3.19 Surveys

A. Preliminary field survey and utility data has been obtained for this Project. The field survey was conducted using conventional and aerial LIDAR methods and the data was collected within the tolerances defined in the VDOT Virginia Map Accuracy Standards. The Design-Builder is advised that this preliminary field survey and utility data provided is not represented to be complete for purposes of design and construction of the Project. The Design-Builder's scope of work shall include performing all surveying and utility designation that is necessary to design and construct the Project in accordance with VDOT's Survey Manual.

B. The preliminary field survey and utility data provided as Supplemental Information in the RFP contains the general depiction of existing conditions that the Design-Builder is obligated to verify and finalize through survey before completing constructability reviews and final design of the Project. The Design-Builder shall be responsible for obtaining any survey data, including all rights-of-entry and permits, locating and/or designating underground utilities, digital terrain model (DTM), utility test holes and obtaining other related data necessary for the design, right of way acquisition, limited access revisions, and construction of the Project. Additionally, the Design-Builder will be responsible for any updates (property owner changes, subdivisions, etc.) that may occur; updates need to be reflected on the plans in order to acquire right of way and complete the final design. Any survey changes shall be verified and certified, and submitted in final documentation.

C. The Design-Builder shall preserve all survey control monuments established by VDOT and will notify the Concessionaire as soon as it is known that a monument is in a position that will interfere with new construction or with Design-Builder activities. If a monument is disturbed, or cannot be preserved in place, the Design-Builder shall set the new monument in accordance with the applicable Standards and Specification set forth in Attachment 1.5a. The Design-Builder will be responsible to reset or relocate any survey control damaged, destroyed or located within the footprint of the final design construction limits. The control will be established by a land surveyor licensed in the Commonwealth of Virginia with complete LD-200 information and supporting computations submitted to the VDOT Project Manager.

D. All surveying work during the Construction Period shall be performed by the Design-Builder in accordance with VDOT's Survey Manual.

E. The Design-Builder shall be fully responsible for examination and verification of any data made provided by the Concessionaire, VDOT or any other Governmental Authorities.

F. Immediately after or within seven (7) days from receiving the Concessionaire's request notice, provided the information exists, the Design-Builder shall make available electronic files of all survey data, for existing and new conditions and infrastructure, which at a minimum include:

1. Survey control data;
2. Digital Terrain Model (DTM) and Construction Cross-Sections: compatible with VDOT's current DTM format;
3. Borrow Pits –All borrow pit DTM's or cross-sections, originals and finals.
4. Horizontal and Vertical Control for Bridges –Certified plats, field notes, coordinates, and computations shall be furnished by the Design-Builder prior to the Design-Builder beginning work on these structures;
5. Pipes, Culverts, Ditches and Related Appurtenances – Existing, newly installed control and as-built survey data for existing and new pipes, culverts and ditches which at a minimum include horizontal and vertical controls, type, size, materials and inlet/outlet control, catch basins and manhole and other related infrastructure; and
6. Right of Way – Existing, newly constructed/installed control and As-built survey data for right of way cross section showing roads, lane configuration, shoulders, access and egress ramps and connections, embankments, utilities, drainage and all infrastructure within the road right of way, and for areas where connecting roads and infrastructure are impacted by the work. The survey interval shall not be farther than 100-foot intervals. The data prepared by the Design-Builder shall include coordinates, type, size, material and references.

G. The Project NEXT Right of Way shall be staked by the Design-Builder in areas where work shall occur between the General Purpose Lanes and the limits of the Project NEXT Right of Way, if no limited access fence is present prior to the start of the work. Right

of Way stakes shall be placed at a minimum of 100-foot intervals on each side of the roadway or as directed, and the stakes shall be marked with both the station and offset back to centerline. All final boundary stakeouts shall be performed by the Design-Builder.

H. Final right of way monumentation shall be performed by the Design-Builder in accordance with the following:

1. RM-1: The Design-Builder shall furnish and install RM-1 right of way monuments in accordance with the Road and Bridge Standards.
2. RM-2: The Design-Builder shall furnish and install RM-2 right of way monuments and optional locator posts, including the required caps, in accordance with the Road and Bridge Standards.

   The Concessionaire shall determine if an alternative form of permanent monumentation shall be used if RM-1 or RM-2 monuments are unsuitable for marking the right of way at various locations.

   The Design-Builder shall indicate this alternative monument usage on the final As-Built Plans in accordance with VDOT's Survey Manual. Electronic data files along with paper sketches and drawings shall be furnished by the Design-Builder. All electronic data files furnished by the Design-Builder shall be in the format of the Concessionaire's current computer hardware and software.

I. Additional surveying work and supplemental layout work shall be performed by the Design-Builder as needed to successfully complete the Work. The Design-Builder shall provide and protect all construction benchmarks within the construction limits. Construction benchmarks shall be located not farther than 500 feet apart for the total length of the Project NEXT. Construction benchmarks that are disturbed during construction operations shall be reestablished by the Design-Builder. All drawings, field notes, and computations from such survey work performed by the Design-Builder shall be submitted as detailed in the Design-Builder's approved Project NEXT Development Plans.

3.20 Security

3.20.1 General Requirements

A. Subject to the requirements of the Agreement, the Design-Builder shall adhere to the intent of VDOT policy on critical infrastructure information and sensitive security information (CII/SSI) to the extent such information is directly related to the Design-Builder's performance of its obligations under the Agreement. The Design-Builder shall ensure that relevant CII/SSI is protected and not disclosed to unauthorized persons. The Design-Builder shall ensure that all personnel having access to CII/SSI for the Design-Builder and all subcontractors have met the requirements of IIM-LD-236 Critical Infrastructure (CII)/Sensitive Security Information (SSI).

B. The Concessionaire may request fingerprint-based, criminal history background checks on contractors working on specific structures or in specific functions.

C. The Design-Builder shall review with the Concessionaire any information that should be designated as CII/SSI as specific design details become available. Any requirements for security review or other inspections will be mutually agreed to with the Concessionaire.

D. The Design-Builder shall comply with all MWAA, FCPA, NPS and MDOT-SHA property security rules and requirements when working on their respective properties.

3.20.2 Design-Builder's Responsibility During Suspension of Construction

A. In case of suspension of construction Work, the Design-Builder shall take such precautions as may be necessary to prevent damage to the Work, provide for erosion control and drainage, secure all construction equipment to remove any potential hazards to the traveling public, and erect any temporary structures, signs, or other facilities necessary or appropriate for the protection of the Work and the public. During the suspension of the Work, the Design-Builder shall properly and continuously maintain in acceptable growing condition all living material in newly established plantings, seeding, and sodding furnished under the Agreement and shall take adequate precautions to protect vegetation against damage.

3.21 Hand-over Requirements

3.21.1 Asset Inventories

A. The Concessionaire requires an asset inventory to the individual asset level of all newly constructed and reused Express Lane assets in order to populate and successfully integrate the Concessionaire's Maintenance Management System in preparation for maintenance during operations.

B. The Design-Builder shall deliver, no later than 90 days prior to Service Commencement, an Express Lane asset inventory and associated data in accordance with the Concessionaire's requirements. Assets to be included in this inventory include:

1. Civil (Road, Bridge, Drainage, Roadside and Road-related structures);
2. Pavement (Mainline, Ramps and Road Markings);
3. Signage and Lighting);
4. Traffic Management System infrastructure and equipment;
5. Landscaping Plantings and Aesthetics Treatments; and
6. Other (Miscellaneous Items).

3.21.2 Spare Parts

A. Prior to Service Commencement, the Design-Builder shall provide the spare parts specified in the TMS Subcontract.

B. All costs associated with these spare parts shall be included in TMS Subcontract portion of the Design-Builder's Contract Price.

3.21.3 Warranties

A. Prior to Final Completion, the Design-Builder shall provide copies of, or transfer (where applicable), all manufacturer or supplier warranties received for materials or equipment installed on Project NEXT.