66 Express Lanes
Exhibit C

Draft Technical Requirements
Purpose

The purpose of this Exhibit is to identify the scope and technical requirements (“Technical Requirements”) to develop and operate the Project. The Work required by the Technical Requirements shall be undertaken by or on behalf of the Developer.

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1 Project Management

1.1 Overview

1.1.1 The Developer shall establish and maintain an organization that effectively manages all elements of the Project. This Project management effort will be defined and guided by the Project Development Plans (PDP) as described in the Comprehensive Agreement (Agreement).

1.1.2 Project management activities shall include but not be limited to scope, schedule, cost, and document management, and will be consistent with the Project Work Breakdown Structure (WBS) developed by the Developer.

1.2 Project Administration

1.2.1 General Requirements

The Developer’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 equipment, facilities, and materials; environmental protection and mitigation; safety of Work personnel; and any other management elements needed to produce and document a successful quality, safe, efficient, and operable Project.

1.2.2 Submittals

A. The Developer shall draft, revise, and finalize submittals to be accurate, complete, and in a form and at a level of detail to enable the Virginia Department of Transportation (herein referred to as Department) to discharge satisfactorily its review and approval obligations. The Developer shall refer to Section 10.05 of the Comprehensive Agreement in regards to the Department’s rights in terms of the submittal review process.

B. The Developer shall provide for the electronic transfer of material project records (i.e., hard copies and electronic copies of all correspondence, meeting minutes, emails, and other external documents), in standard business file format, including but not limited to communications between:

1. Governmental Authorities;
2. Business and Project stakeholders;
3. Landowners;
4. News media;
5. Utilities;
6. Transit entities and railroads; and
7. Community stakeholders.

C. The Developer shall provide all Design Documentation and Construction Documentation as both hard copy and electronic files. These documents will be deemed received by the Department upon submission of both electronic and hard copy files, inclusive of all required information necessary to perform a complete review. Packages received after 3:00 p.m. will be deemed received the following business day. The Department will notify the Developer within seven (7) days of submission if the package is incomplete. These documents shall include, but are not limited to, the following items:

1. Design calculations and analysis;
2. Mix designs;
3. Reports, studies, and investigations;
4. Project Schedule;
5. Design Public Hearing Documentation;
6. Design Documentation for Project Development Plans;
7. Detailed design submittal and Approved for Construction (AFC) documents covering individual work packages, construction sketches, shop drawings, and diagrams;
8. All changes to the AFC documents, including Notice of Design Changes (NDCs), Field Design Changes (FDCs), and Non-Conformance Reports (NCRs);
9. Soil boring logs, laboratory test results, quality control records and audits, etc.;
10. Material communications relating to Design Documentation and Construction Documentation;
11. Responses to review comments from the Department;
12. Change Orders (including all related communications and dispute resolution proceedings);
13. Governmental Approvals, and;
14. Third party approvals.

D. Design submittals shall be submitted in *.pdf format and hard copy. AFC Documents shall include the CADD files in *.dgn format, *.pdf format, and hard copy. All *.dgn files shall be searchable. Any *.tif files provided shall be searchable.

E. The Department may request the CADD *.dgn files at interim design submittals to facilitate review.

F. The Developer shall provide five hard copies of all submittal documents for the Department’s review.

G. The Developer shall transfer all electronic document submittals into the Project Electronic Database Management System (EDMS) or through a secure website maintained by the Developer. All files shall be well organized and easy to locate in accordance with the Agreement. The file transfer shall be conducted as follows:

   E-mail may be used to notify the Department of the availability of the document files, and if a file transfer protocol or SharePoint website or other type of approved electronic data storage and retrieval system is used, the e-mail must include a link to the document file to facilitate access and download.

H. Whenever the Developer is obligated to make a submittal pursuant to the Agreement, the Developer shall include with such submittal the signed cover sheets described below.

   1. A cover sheet, signed by the Developer’s Representative, which includes the following certifications:

      1.1 The Developer certifies that [description of submittal] was prepared by professionals having the requisite qualifications, certifications, credentials, skills, and experience needed to prepare the submittal in accordance with the requirements of the Agreement and licensed by the Commonwealth of Virginia as required.

      1.2 The Developer certifies that it has reviewed the submittal for completeness, the submittal accurately depicts the Work to be undertaken or performed, and the submittal was prepared in accordance to and otherwise complies with:

          • the Agreement;

          • the Technical Requirements;
• the approved Quality Management System Plan (QMSP);

• applicable Law; and

• Governmental Approvals.

I. The Developer shall include in the Initial Baseline Schedule and in all other Project Schedules all proposed major design and construction submittals that will require the Department’s review and approval.

J. The Developer shall submit to the Department for its review and approval a schedule for the submission of Design Documentation and Construction Documentation. The purpose of this schedule of submissions is to allow for proper allocation of resources by the Department. The schedule of submissions shall be approved by the Department prior to the submission of Design Documentation or Construction Documentation to the Department by the Developer.

K. Following the commencement of design Work, the Developer shall provide monthly updates to the schedule of submissions referenced above in its Monthly Progress Report. More frequent updates may be requested by the Department. The Developer shall reasonably comply with such update requests.

L. Unless otherwise approved by the Department, weekly submittal status meetings will be held to review all anticipated submittals, current submittals, and pending re-submittals.

M. The Department highly recommends and encourages Technical Work Group (TWG) and Over the Shoulder Review (OTSR) meetings with the Developer. The purpose of such meetings would be to address Project concerns, technical issues, requests for information (RFIs), and to facilitate the development and advance review of plans.

N. If at any given time the Developer makes multiple submittals, the Developer shall indicate to the Department the priority assigned to each submittal to foster a timely and coordinated review by the Department.

O. Documents that will be reviewed and approved by the Department include the AFC Construction Documentation covering individual work packages including interface points used by the Developer during its design review process, the Design Public Hearing Documentation, other Design Documentation, and all changes to the AFC Plans including NDCs, FDCs, and NCRs.

P. The Department may request interim submittals at any time for complex or unusual elements of the Work or for elements where no applicable standards
exist. Such interim submittals shall be developed to address the Department’s specific requests for information and shall be submitted within 21 days from the request by the Department.

Q. NDCs and FDCs that are required after issuance of the Department’s approval of the AFC drawings must be submitted to the Department for review prior to construction associated with the NDC or FDC.

1.2.3 Location of Field Office and Accommodations for Department’s Staff during the Construction Period

A. The Developer shall establish one field office, the location of which is to be determined and mutually agreed to by the Developer and the Department, but which is expected to be within 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. This office shall be for the exclusive use of the Department’s engineers and inspectors. The Developer has the option to either provide modular trailers or rent office accommodations to satisfy the Project office requirements.

B. The field office shall include the following:

1. Minimum of 150 square feet per person, in order to accommodate a minimum of 20 persons;

2. Minimum of 4 12-foot x 12-foot walled offices;

3. Minimum of 20 8-foot x 8-foot cubicles or work areas with work surface, cabinets and drawers, and other standard items in office cubicles;

4. Standard office furniture, office supplies, and office implements (including but not limited to items such as a desk sized 60 inches x 34 inches, ergonomic chairs with rolling casters, rolling pad, office equipment and supplies such as staplers, tape dispenser, scissors, pens, mechanical pencils, paper, note pads, fasteners, markers, etc.);

5. One 4-drawer metal fire protection file cabinet per person;

6. One 4-shelf bookcase per office or cubicle;

7. One 24-inch x 36-inch dry erase board with eraser and markers per office and cubicle;

8. One computer or laptop connection per person or workstation;
9. Networking and internet capabilities for all computer connections and copying equipment;

10. Infrastructure and access capabilities to the internet. High-speed internet access for Department staff shall be through a secure network;

11. Two black and white laser printers;

12. Two color laser printers;

13. One microwave oven with a minimum 1,000 watts;

14. One full-size refrigerator (minimum 17 cubic feet with ice maker);

15. One wastebasket per person;

16. First Aid kit(s) sized and designed for the minimum staff number and containing eye and skin protection for emergencies;

17. One copy machine with the following minimum features: capable of coping 8½ inch x 11 inch up to 11 inch x 17 inch documents, sorter, automatic feed and paper selection, magnification and reduction, and service contract for maintenance and drum toner replacement;

18. Two scanner/plotter/fax machine;

19. Smoke detectors and fire extinguishers in accordance with local codes;

20. Installation and payment of phone service available for each office and cubicle, with answering and message services;

21. Installation and payment of High-Speed internet service available for each computer;

22. Installation and payment of utilities to operate all field office functions;

23. Minimum 20 parking spaces readily adjacent to the office structure;

24. Minimum 14-foot x 24-foot conference room with conference table and conference chairs to seat 20 people. Conference room to be supplied with phones suitable for conducting conference calls; video projection devices, 48’ flat panel LCD television/monitor; two dry erase boards, wall mounted, minimum 25 square feet, with eraser and markers;

25. Two plan racks for 24-inch x 36-inch drawings with 12 plan clamps;

26. One plan and drafting table (30 inches x 96 inches) with adjustable stool;
27. Receptionist area with 10-foot x 10-foot counter style work area;

28. Water coolers or continual supply of bottled water adequate for 40 people;

29. A watertight office structure with a robust HVAC system to maintain a temperature of 72 degrees Fahrenheit in all areas of the office throughout all seasonal effects;

30. Adequate separate lavatory facilities to account for a minimum of 20 personnel, both men and women;

31. All utility (electric, gas, water, sewer, telecommunications, phone) feeds, connections, disconnections, and bill payments shall be borne by the Developer;

32. A 12-foot x 14-foot kitchen area with a sink and one lunch-style table and chairs to seat a total of 6 people;

33. A 12-foot x 14-foot storage room with a door having a locking assembly, and 10 spare keys that shall be provided to the Department;

34. Adequate number of windows to allow for natural light entrance per local architectural standards or building code. Windows shall have screens and the capability to open to allow the entrance of outside air. Windows shall also have locking assemblies;

35. Adequate overhead lighting in all parts of the office per architectural standards;

36. Exterior doors that shall be equipped with adequate locking assemblies, and 30 spare keys that shall be provided to the Department;

37. One paper shredder;

38. Weekday janitorial services;

39. Exterior way finding and Project office identification signage; and

40. All aforementioned requirements shall be in compliance with and pursuant to the Americans with Disabilities Act (ADA). Any conflict between the ADA requirements and those listed under this section shall be resolved in favor of the more stringent requirement.

C. The Developer shall provide storage facilities for the Department’s nuclear gages which shall not be within 10 feet of any structures. The facility shall be provided with electrical power and shall be equipped for an interior switched light and two, 120V, 15 amps, grounded, weatherproof, duplex
receptacle for recharging up to 4 gages. The storage facility for the nuclear gages shall be weatherproof, tightly floored and roofed, having a tamper resistant key operated lock with 4 keys furnished to the Department. The Developer shall install 4, fixed restraining bars for locking of individual nuclear gages with the storage facility.

D. The field office and equipment as required herein shall remain the property of the Developer.

E. The field office shall be separated from buildings and trailers used by the Developer. The Developer’s construction staff shall be housed in field offices located on or adjacent to the Project.

F. The Developer 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 Department, as may be needed to comply with the requirements of applicable Law.

G. 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-floor 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.

H. In regard to 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. At least one of the light fixtures shall be a fluorescent light situated over the plan and drafting table. There also shall be at least one 100-watt exterior light fixture at each exterior doorway. Electrical power and fuel for heating equipment shall be furnished by the Developer.

1.2.4 Documentation Management System

A. The Developer shall establish and maintain an EDMS for Project-specific needs only to store and record all material documents generated on the Project, including those records required under law.

Any information stored on this EDMS shall be subject to the Freedom of Information Act (FOIA) as governed by the Code of Virginia, unless a timely request for exemption, citing the specific FOIA exemption provision, is received and approved by the Department. For purposes of this clause, “timely” shall mean any time prior to receipt of a FOIA request by the Department for records that the Developer claims an exemption.
B. In the provision of an EDMS, the Developer shall:

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, and unauthorized or malicious use;

4. Provide a mechanism (mutually agreed by both parties) for the electronic transfer of metadata along with the associated document in standard business file format for uploading into the EDMS employed by the Department; and

5. Provide the Department with written procedures and training of staff who will be required to access all relevant documents generated under the Agreement. All electronic information submitted to the Department shall be searchable and legible to the extent practical.

C. In the relevant PDP, the Developer shall describe:

1. The specific EDMS tool to be used by the Developer and the access methods available to the Department and others that may need access to the system;

2. Methods by which all documents issued and received by the Developer shall be uniquely coded and retrievable in a user-friendly format;

3. Routing, filing, control, search capabilities, and retrieval methods for all documents;

4. Methods to facilitate data sharing, including written procedures for accessing and searching all documents by all Project team members; and

5. Upon completion of the Project, the transfer of EDMS data and files such that the Department has a complete set of material Project documentation in electronic format and written documentation on the contents of the data.

1.2.5 Project Meetings

A. Authorized Representatives and other pertinent representatives of the parties shall meet within 10 days after the earlier of (1) Limited Notice to Proceed, issued in accordance with the Agreement, or (2) the Financial Close Date, to discuss issues affecting the administration of the Work and to implement the
necessary procedures, including those relating to submittals and approvals, and to facilitate the ability of the parties to perform their obligations under the Agreement.

B. Within fourteen (14) days, or other period of time as mutually agreed by the parties, after the satisfaction of the conditions precedent to begin construction as set forth in the Agreement, the parties and their respective representatives shall conduct a pre-construction meeting to discuss the Developer’s planned construction operations. At the pre-construction meeting, the parties shall discuss, among other things, the sequence of the Work; scheduling; constructability issues; coordination with governmental agencies, transit and railroad entities, and utility companies; and maintenance of traffic and quality assurance and quality control procedures.

C. The Developer shall hold monthly progress meetings with the Department. During such meetings, Work completed during the prior month, Work scheduled and underway during the current month, Work to be undertaken during the next month, and issues encountered or anticipated issues shall be reviewed. The Developer shall collect and report on pertinent information from any Contractors responsible for Work completed during the specified duration and Work scheduled during the upcoming reporting duration. These meetings shall be attended by the Developer Representative and other personnel as requested by the Department, including relevant Contractors. Meetings will occur monthly beginning the month after the first Limited Notice to Proceed is issued and shall continue until Project Completion. The Developer shall be responsible for preparing, maintaining, and distributing minutes of the meetings to all attendees for review. The meeting minutes shall be provided to the Department within 3 days after the monthly progress meeting or such other time frame as approved by the Department. The parties occasionally may cancel a monthly progress meeting if they mutually agree that such meeting is not necessary.

D. The Department and Developer shall agree to other meetings as appropriate.

1.3 Project Development Plans

1.3.1 General

A. The Developer shall provide PDPs that comply with the requirements set forth in Attachment 1.3.

B. PDPs shall not obligate the Department to perform any activity unless agreed to in writing by the Department.
1.3.2 Project Development Plans

A. The Developer shall produce and maintain a quality control and quality assurance system for the PDPs. This shall include current documentation showing its internal quality reviews and results of compliances, non-compliances, and corrective actions taken.

B. The Department may audit and monitor the activities described in the PDPs to assess the Developer’s compliance.

C. All statements and procedures contained in the PDPs shall be of an auditable nature.

D. The PDPs and updates shall be made available to the Department in electronic format and hard copies, as requested.

1.3.3 Project Development Plan Updates

A. The Developer shall update and improve 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 procedure:

1. Does not adequately address the matters it is intended to address;

2. Does not conform or is otherwise necessary to comply with the Agreement;

3. Has to be changed because of an audit;

4. No longer represents current or appropriate practice; or

5. Is required by the Agreement to be updated.

1.3.4 Submission Timetable

The PDPs shall be submitted in accordance with Attachment 1.3 for Department review and approval.
1.4 Schedules

1.4.1 Project Schedules

A. The purpose, format, and content of the Project Schedule shall be as follows:

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

2. The purpose of the Project 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 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 as a tool for measuring progress.

3. Project Schedules will be reviewed in accordance with the VDOT Post-Award Scheduling Guide and the AACE Recommended Practice No. 53R-06 as appropriate. Acceptance by the Department of any Project Schedule will not relieve the Developer from its responsibility to complete all Work within the Project Schedule. In addition, the Department’s acceptance of any Project Schedule creates neither a warranty, expressed or implied, nor an acknowledgment of the reasonableness of the activities, logic, durations, or cost loading of the Developer’s Project Schedule. Furthermore, acceptance of the Project Schedule will not relieve the Developer from complying with all the requirements of the Agreement, including, without limitation, requirements, sequences, constraints, and obligations.

B. As general requirements of the Project Schedule, the Developer 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;

2. Ensure that design activities identify AFC Documents;

3. Apply the Critical Path Method (CPM) of network calculation to generate the Project Schedule (the Critical Path shall be based on the longest network path through the Project) and prepare the Project Schedule using the Precedence Diagram Method (PDM) to establish relationships and interdependencies between the individual activities required to complete the Project;
4. Ensure that activity identification numbers, textual descriptions, and codes are consistently applied in the Project Schedule and are unique for each specific activity;

5. Divide all Work prior to the Project Completion Date into activities with appropriate logic ties to show the Developer’s overall approach to sequencing, including logical relationships between activities reflecting the Developer’s actual intended sequence of Work; and logically tie all activities to avoid open ends;

6. Show the Project milestones, including commencement of design Work; the anticipated issuance of Limited Notice to Proceed, Intermediate Milestone dates; Service Commencement, and Project Completion Dates;

7. Show phasing of the Work as detailed in the design 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 and planned value to the appropriate lowest level elements (activities) of the WBS;

9. Reflect the required coordination with other Department contractors, utility owners, governmental agencies, transit entities and railroads, engineers, architects, contractors, and suppliers;

10. Identify regulatory approvals and Department inspections required and the dates by which such approvals and inspections are necessary;

11. Be fully compliant with the Agreement;

12. Conform to the Work Restrictions and Maintenance of Traffic requirements;

13. Reflect the Right of Way (ROW) Acquisition and Relocation Plan; and

14. Reflect the Utilities Plan.

C. The Monthly Progress Earning Schedule is based on cost data generated from the Project Schedule and shall depict planned progress based on anticipated earnings. The Monthly Progress Earning Schedule shall depict monthly comparisons of actual versus planned progress, including illustrating the schedule variance graphically by plotting the BCWP and the BCWS and reporting the SPI. The SPI is defined as the ratio of BCWP divided by BCWS for the Project to date and the monthly projections through Project Completion. For each occurrence of Major Maintenance or construction of a
Developer Project Enhancement during the Operating Period, the Developer shall follow the principles above for the preparation and approval of a Project Schedule relating to such Work and will perform progress monitoring and reporting.

D. The scheduling software employed by the Developer shall be compatible with the Department’s scheduling software. The Developer’s scheduling software must have the capability to import and export data in the Primavera proprietary exchange format (*.xer). As of the Agreement Date, the Department’s scheduling software is Primavera’s Project Management software (P6).

E. Float available in the Project Schedule, at any time, shall not be considered for the exclusive use of either the Department or the Developer. During the course of the Work, any float generated 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. A schedule showing work completing in advance of the Project Completion Date, and accepted by the Department, will be considered to have Project float. Project float will be a resource available to both the Department and the Developer. No time extensions will be granted unless a Delay Event occurs that impacts the Project’s Critical Path, consumes all available Float or contingency time, and extends the work beyond the Project Completion Date as defined by the Agreement.

F. If the parties cannot agree to a Schedule, either party may refer the disagreement to the dispute resolution procedures set forth in the Agreement.

G. The Developer shall maintain at all times, at its office, a minimum of 1 hard copy complete set of all schedule reports shown above. All schedule reports shall be available to the Department for inspection and audit. Additional reports may be required as future needs dictate.

1.4.2 Initial Baseline Schedule

A. The Initial Baseline Schedule is the Developer’s conceptual plan for the design and construction of the Construction Project and is attached to the Agreement. This schedule shall be used to monitor performance of the Work until the Baseline Schedule is approved by the Department pursuant to the Agreement.

B. The Initial Baseline Schedule shall be submitted as part of the Technical Proposal and shall comply with the requirements of the Instructions to Proposers.
1.4.3 Baseline Schedule

A. Within sixty (60) days of the Commercial Close Date as indicated in the Instructions to Proposers, the Developer shall submit to the Department for its review and approval a proposed Baseline Schedule, which shall include the Developer’s detailed plan for design and construction of the Project. The Developer shall develop its proposed Baseline Schedule from the Initial Baseline Schedule. The Developer shall submit to the Department 6 hard copies (printed on 11-inch x 17-inch paper) of its proposed Baseline Schedule, along with an electronic version of the proposed Baseline Schedule created in the Primavera proprietary exchange format (*.xer).

B. Within 21 days of the Department's receipt of the proposed Baseline Schedule, the Department shall notify the Developer in writing of its approval or disapproval of the proposed Baseline Schedule, and of any comments it has or amendments it wishes the Developer to make. The Developer shall give due consideration to the Department's suggested amendments or comments and, to the extent it deems appropriate, revise the proposed Baseline Schedule and re-submit the same to the Department for its review in accordance with this clause B for the Department’s approval. Within fourteen (14) days of the Department’s receipt of the re-submitted proposed Baseline Schedule, the Department shall notify the Developer in writing of its approval or disapproval. Upon approval by the Department, the proposed Baseline Schedule will become the Baseline Schedule. If the parties cannot agree to a mutually acceptable Baseline Schedule, either party may refer the disagreement to the dispute resolution procedures set forth in the Agreement. Until such time as the dispute is resolved, the Initial Baseline Schedule will be used for the design and construction of the Project. The Baseline Schedule shall include an organized WBS, the development of which is based on a deliverable-oriented methodology that captures all the Project activities. The WBS shall allow schedule summarization at a minimum of four hierarchical WBS levels, such as: Project 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.

C. Activities in the Baseline Schedule shall be assigned project-specific activity codes.

D. The Baseline Schedule shall include all major activities of the Work in sufficient detail to enable the Department to monitor and evaluate design and construction progress from the Financial Close Date until Project Completion.

E. The Baseline Schedule shall include separate activities for major submittals proposed by the Developer, together with appropriate activities for the
Department’s review or approval, provided that such review and approval times by the Department shall be no less than the time provided for such reviews in the Agreement.

F. The Baseline Schedule shall be resource-loaded with estimated quantities, broken down into work packages and deliverables generally completed in not less than one but no more than 20 days, or as mutually agreed (unless such deliverable is a procurement or other non-construction activity), 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 cost of the Design-Build Contract.

G. 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 milestones;
2. Administrative activities such as key submittals, notifications, and review by the Department, FHWA, and other regulatory agencies;
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, construction access, etc.;
10. Maintenance of Traffic (MOT) activities;
11. Construction activities broken down by phase stage, feature, type of work, specific location, etc. as applicable;
12. 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, demobilization, etc.

H. Activity calendars shall be assigned using project-level calendars. Use of global calendars is not allowed and shall be cause for rejecting the 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, Work Orders, Disadvantage Business Enterprise, 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 schedule.

I. Constraints shall be used sparingly and on a case by case basis, as necessary. Constraints such as “Mandatory Start” or “Mandatory Finish” that violate network logic are not allowed and shall be cause for rejecting the schedule. If the Agreement includes a specified “start-no-earlier than” milestone, then the Agreement milestone activity shall be constrained with a “Start On or After” constraint, with a date equal to the date specified in the Agreement. If the Agreement includes a specified Intermediate Milestone or Project Completion milestone, then the Agreement intermediate completion milestone activity or Project Completion milestone activity shall be constrained with a “Finish On or Before” constraint, with a date equal to the date specified in the Agreement.

J. The Project schedule software settings shall be defined according to the following Primavera P6 settings:

1. Schedule dates shall be shown in the “Month-Day-Year” date format, with two-digit numbers for the month, day, and year (e.g., 05-01-13).
2. Duration type for all activities shall be specified as “Fixed Duration & Units.”
3. The “Drive activity dates by default” checkbox in the Project Details Resources tab shall be marked.
4. The “Link Budget and At Completion Cost for not started activities” checkbox in the Project Details Calculation tab shall be marked.
5. The “Reset Remaining Cost and Units to Original” in the Project Details Calculation tab shall be specified.
6. The “Subtract Actual from At Completion” under “When updating actual units or costs” in the Project Details Calculation tab shall be specified.
7. The “Recalculate Actual Units and Cost when duration % complete changes” checkbox in the Project Details Calculation tab shall be marked.

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.

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

1.4.4 Monthly Progress Reports and Project Schedule Updates

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

B. During the Construction Period, the Developer’s Monthly Progress Report shall include the following:

1. Document control certification sheet (verification that all field documentation is being maintained);

2. Specific construction activities and deliverables occurring during the previous month (reporting period);

3. 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 SIAs, and float. With each submission of the Project Schedule, the Developer also shall include:

4.1 Two sets of compact disks containing an electronic working copy of the Project Schedule (in *.xer file format). Each submission shall have a unique file name to indicate the type and order of submission. Each compact disk shall be labeled to indicate the type of submission, file name, and schedule data date.

4.2 A narrative progress report of the Project Schedule that describes, at a minimum, the Developer’s plan of operation for meeting the Intermediate Milestones and the Project Completion Date, an evaluation of the Critical Path, a discussion of Project-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 SIA, float consumption, documentation of any logic changes, duration changes, resource changes or other relevant changes.

4.3 Time-scaled logic diagram indicating the Critical Path, early start and early finish dates, and total float, sorted and grouped by the WBS.

4.4 Tabular schedule reports sorted by total float, work areas, and a detailed predecessor and successor report sorted by activity number. The tabular schedule reports also must include the schedule of values and major work item quantities generated from the Project Schedule. For each WBS, the cost reports shall depict the activity number, description, original duration, percentage completion, original budgeted cost, cost this period, cost to date, and cost to complete.

5. A comparison of actual and planned progress, including illustrating the schedule variance graphically by plotting the BCWP and the BCWS and reporting the SPI, which is defined as the ratio of BCWP divided by BCWS;

6. Identification of activities requiring Department and U.S. Federal Highway Administration (FHWA) input or assistance, to the extent reasonably known;

7. Action items and outstanding issues;

8. A work breakdown structure Level 1 or Level 2 or Level 3 or Level 4 design and construction schedule;
9. Project cost summary;

10. Quality management reporting, as defined within the Developer’s QMSP, including quality inspection reports and daily inspection reports;

11. A statement by the Developer that the Baseline Schedule is the schedule being executed to perform the Work;

12. NCRs and resolution reports;

13. ROW acquisition activities;

14. Environmental permitting and compliance activities;

15. Utility relocation activities;

16. Disadvantage Business Enterprise (DBE) and Small, Women-owned, and Minority-owned Business (SWaM) quarterly usage;

17. Safety activities;

18. Digital photographs of the progress of the Project; and

19. A summary of any outstanding potential issues, any Delay Events or Compensation Events and the measures adopted (or to be adopted) to overcome such issues.

C. Monthly Progress Reports shall have a reporting period ending on the last day of each calendar month and shall be submitted on or before the 15th of the month following the reporting period.

D. Project Schedule Updates shall include the following:

1. Developer shall update the Project Schedule monthly to reflect actual progress to date and to forecast progress going forward (the “Project Schedule Updates”). The Project Schedule Update shall be submitted as an attachment to the Monthly Progress Report. The last day of the reporting period shall be the status date or data date used to calculate the schedule. Project Schedule Updates shall comply in all respects with the schedule requirements set forth in this section.

2. The Approved Initial Baseline Schedule will be the basis for Project Schedule Updates until such time as the Baseline Schedule is approved by the Department. Thereafter the Baseline Schedule shall be the basis for Project Schedule Updates.

3. Project Schedule Updates shall depict activities that have started, are ongoing, or completed as of the new data date; show actual start dates for
activities that have started; and show actual finish dates for completed activities.

4. Project Schedule Updates shall depict percent complete for ongoing 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.

5. Project Schedule Updates shall depict remaining duration for ongoing 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.

6. Activity relationships for the remaining activities shall be modified as necessary to correct out-of-sequence progress for ongoing activities or to reflect the Developer’s current plan for completing the remaining Work.

7. All changes to the Project 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.

8. The Project Schedule Update submitted with the last Monthly Progress Report will be identified by the Developer as the Developer’s As-Built Schedule.

9. If the Department requests that the Monthly Progress Report needs a specific revision, the Developer shall make the requested changes within five (5) days after receiving the Department’s request or such other time frame as mutually agreed between the parties. If the Developer objects to the Department’s request for revisions, the Developer may refer the matter to dispute resolution pursuant to the Agreement.

E. During the Construction Period, the Developer shall provide a weekly report, which shall include the following:

1. Specific construction schedule activities, including location for the week concluding and the upcoming week;

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 (2) weeks.
1.4.5 Revisions to Baseline Schedule

A. If the Department requests the Baseline Schedule needs a specific revision either in logic, activity duration, WBS, or manpower, the Developer shall make the requested revisions within 10 days after receiving the Department’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 Developer continue to reflect an item of non-concurrence from the Department in the updates to the Baseline Schedule, provided that if an item of non-concurrence has been referred to dispute resolution, then the Developer 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 agreed to. If the Developer objects to the Department’s request for revisions, the Developer may refer the matter to dispute resolution pursuant to the Agreement.

B. In the event of a Delay Event for which the Department grants relief from the Project Completion Date to the Developer in accordance with the terms of the Agreement, the Baseline Schedule will be revised to reflect the relief granted and submitted to the Department for approval in accordance with the Agreement.

1.4.6 Project Recovery Schedule

A. Pursuant to the Agreement, whenever the Monthly Progress Report shows the Project Completion Date has sixty (60) days of negative float, the Developer shall submit a project recovery schedule to the Department for approval. Project 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 recovery schedule is reviewed and approved by the Department, it shall become the Baseline Schedule and be used as the basis for subsequent Monthly Progress Reports. The Developer shall archive all approved Project Schedules.

1.4.7 Schedule Impact Analysis (SIA)

A. Time Impact Analysis (TIA) for Proposed Extensions of Time (Prospective)

In conjunction with the submission of a proposed change, the Developer shall submit any proposed schedule impact as a result of impacts 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.

The following shall apply if a TIA is required by the Agreement:
1. The TIA shall be based on 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 time computation of all affected activities shall be shown in the TIA along with a demonstration of steps used to mitigate impacts.

3. Each TIA shall include a Fragmentary Network (or fragnet) demonstrating how the Developer proposes to incorporate the impact into the Baseline Schedule. A fragnet is defined as the sequence of new activities 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 fragnet shall identify the predecessors to the new activities and demonstrate the impacts to successor activities. The Developer shall insert the fragnet into the Baseline Schedule, run the schedule calculations, and submit the impacted schedule in accordance with this section. The Developer shall include a narrative report describing the effects of new activities and relationships to Agreement milestones and the Project Completion Date with each TIA.

4. Except as provided in the Agreement, the Developer shall not be entitled to any extension of the Term automatically as the result of an activity delay. The Developer 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 Project Completion Date.

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

6. Upon approval, a copy of the TIA signed by the Department will be returned to the Developer and incorporated into the next update to the Baseline Schedule. The TIA will be reviewed by the Department 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 by the Department in its reasonable discretion within 21 days following receipt thereof, unless subsequent meetings or negotiations are necessary. The approved TIA related to a Change shall be incorporated into and attached to the applicable Change Order. A disapproved TIA will be returned to the Developer with appropriate comments for revisions or the Department’s basis for denying the alleged Delay Event. If no agreement is reached,
either party may refer the matter to dispute resolution pursuant to the Agreement.

B. Delay Event Claim Analysis (Non-Prospective)

In the event of a claimed Delay Event that the Developer alleges has impacted the Critical Path of the Project, the Developer shall, in accordance with the Agreement, prepare a delay claim analysis 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; take into consideration all possible mitigation methods, techniques, and available resources; and minimize any prospective analysis or conclusions.

1.5 Standards and Specifications

1.5.1 General Requirements

A. The Work shall conform to the Standards and Specifications set forth in the Agreement and Attachment 1.5, considering lifecycle and operations and maintenance requirements. Where the Developer’s design requires design methods or construction procedures not covered by the attached list of Standards and Specifications, the Developer shall obtain the Department’s approval before using such methods or procedures. The 21-day deemed approval clause shall not apply to this provision. The Department will not unreasonably withhold or delay approval. The Developer’s obligations to conform the Work to the requirements set forth in manuals described in the Agreement and Attachment 1.5 will be satisfied if the Work meets the engineering objectives set forth in such manuals.

B. Subject to the provisions of the Agreement, Work carried out during the Operating Period shall comply with the Department’s then-current Standards and Specifications, including any revisions or supplements. The Developer shall request Department approval for the use of non-Department standards if specific Department standards do not exist prior to design and construction.

C. The Developer shall derive the functional classifications, design speeds, special load requirements, design criteria, and other applicable design issues using the Technical Requirements and the Standards and Specifications set forth in Attachment 1.5. The Developer shall convert metric units to English units, as applicable.

1.5.2 Interpretation of Standards and Specifications

A. Department Standards for Performance are interpreted using the following guidelines: The Virginia Department of Transportation Road and Bridge Standards and the Virginia Department of Transportation Road and Bridge
Specifications; supplemental specifications, special provisions, and special provision copied notes issued by the Department; and the Standards and Specifications and supplementary reference documents listed in Attachment 1.5 to 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 Project. 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. Technical Requirement stated in this Exhibit C
2. Special provision copied notes issued by the Department
3. Special provisions issued by the Department
4. Supplemental specifications issued by the Department
5. Standards and Specifications listed in Attachment 1.5
6. Reference documents listed in Attachment 1.5
7. Design Documentation

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 guidelines applicable for the Construction Period shall be the version of those documents as listed in Attachment 1.5, including all supplements, errata, revisions, and interims.

D. Following the Work period, all subsequent design and construction shall meet the standards current at the time the Work is performed. It is the responsibility of the Developer to ensure that all relevant standards and specifications have been applied.

1.6 Right of Way

1.6.1 General Requirements

A. General: Terms not defined herein or in the Agreement shall have the same meanings ascribed to them in the VDOT Right of Way Manual of Instructions.
B. The Developer’s conceptual design included in its Proposal shall be wholly contained within the ROW limits shown on the Request for Proposal (RFP) Conceptual Plans, with the exception of temporary construction, permanent drainage, and utility easements (other than permanent drainage easements for stormwater management facilities). Stormwater management facilities shall be wholly contained within the ROW limits shown on the RFP Conceptual Plans. Utility easements have not yet been identified or shown on the RFP Conceptual Plans. Deviations from the proposed ROW limits shown on the RFP Conceptual Plans will be subject to Department approval.

The Developer’s final design shall also be contained with the ROW limits shown on the RFP Conceptual Plans, with the exception of temporary construction, permanent drainage, and utility easements (other than permanent drainage easements for stormwater management facilities) and where minor adjustments are required during final design process, and only after approval from the Department. If the Developer proposes significant changes that exceed the ROW limits shown on the RFP Conceptual Plans, then this shall be considered a deviation of the Agreement. As discussed herein, the Developer shall be responsible for any time or cost impacts and any National Environmental Policy Act (NEPA) document re-evaluation associated with Developer’s design changes that extend beyond the ROW limits reflected in the RFP Conceptual Plans and approved by the Department.

C. The Developer, acting as an agent on behalf of the Commonwealth of Virginia (Commonwealth), shall provide all ROW acquisition services for the Project’s acquisition of fee ROW and permanent, temporary, and utility easements. ROW acquisition services shall include attorney-certified title reports, appraisal, appraisal review, negotiations, relocation assistance, and advisory services and parcel closings, to include an attorney’s final certification of title. The Developer’s lead ROW acquisition consultant shall be a member of the Department’s pre-qualified ROW contracting consultants (listed on the Department’s website) and the Developer’s ROW team shall include the Department pre-qualified appraisers and review appraisers (also listed on the Department’s website).

D. The Department will approve the scope of the appraisal and the appraiser, just compensation, relocation benefits, and settlements. The Department will issue a Notice to Commence Right of Way Acquisition to the Developer prior to any offers. This represents a Hold Point in the Developer’s Baseline Schedule.

E. The Department will also issue a notice to commence construction to the Developer once the property has been acquired.
F. The Department will perform a RW300/301 plan review and approval for all parcels prior to the issuance of a Notice to Commence Right of Way Acquisitions. Any revisions to the Project’s acquisition of fee ROW or permanent, temporary, and utility easements subsequent to the RW300/301 approval shall be submitted to the Department for review and approval.

G. The Developer shall acquire property in accordance with all 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 text of Title 33.2 may be found at this URL: http://law.lis.virginia.gov/vacode/title33.2/.

H. The acquisition of property shall follow the guidelines as established by the Department and other state and federal guidelines that are required and the VDOT Right of Way Manual of Instructions and the VDOT Utility Manual of Instructions, as well as IIM-LD-243 and Chapter 12 of the VDOT Survey Manual. All conveyance documents for the acquisition of any property interest shall be accompanied by properly marked plan sheets and profile sheets.

I. The Developer may not employ the use of Rights of Entry until the property owner has been made a legitimate offer to acquire the property.

J. If the Developer or the ROW subconsultant does not follow the Uniform Act and its implementing regulations found in 49 CFR Part 24 in the performance of the acquisition or relocation processes, or fails to obtain or create any mandatory written documentation in their ROW parcel file, the Developer shall be responsible for any and all expenses determined to be ineligible for reimbursement of federal funding.

K. ROW Relocations:

1. The Department shall designate a hearing officer to hear any relocation assistance appeals. The Department agrees to assist with any out of state relocation by persons displaced within the rights of way by arranging with such other state(s) for verification of the relocation assistance claim.

2. The Department will entertain the use of relocation incentive payments on projects with significant numbers or critical relocations. Such incentive payments shall be presented to the Department for approval. If the Department approves the incentive payments it will seek FHWA approval. Any relocation incentive payments shall be uniformly administered so that all landowners and displaced of a similar occupancy receive fair and equitable treatment. Under no circumstances is a relocation incentive to be used without the Department’s prior approvals.
3. The Department will entertain the use of protective leasing to ensure the availability of housing or apartments for relocation purposes. Such protective leasing plans must be presented to the Department for approval prior to their implementation.

L. Section 33.2-1032 of the Code of Virginia, 1950, as amended, provides that the Commissioner of Highways may acquire lands on which graves are located through either voluntary conveyance or condemnation. In the course of relocating such graves, the Commissioner of Highways, through the Office of the Attorney General, will appoint an attorney to prepare the Order and Petition for the exhumation and re-interment of the graves. The Developer shall be responsible for verifying the number of graves, locating next of kin if possible, acquiring new grave sites, and managing the grave relocations as outlined in Chapter 3.4.7 of the Right of Way Manual of Instructions, latest revision.

M. The Developer shall submit a Project-specific Acquisition and Relocation Plan to the Department for VDOT ROW approval prior to commencing ROW activities. No offers to acquire property shall be made prior to the Acquisition and Relocation Plan approval and a Notice to Commence Acquisition. This represents a Hold Point in the Offeror’s CPM Schedule. The Acquisition and Relocation Plan shall describe the Offeror’s methods, including the appropriate steps and workflow required for title examinations, appraisals, review of appraisals, negotiations, acquisition, and relocation, and shall contain the proposed schedule of ROW activities, including the specific parcels to be acquired and all relocations. The schedule shall include activities and time associated with the Department’s review and approval of just compensation, relocation benefits and administrative settlements. The plan shall allow for the orderly relocation of displaced persons based on time frames not less than those provided by the Uniform Act. This plan shall be updated as necessary during the life of the Project and all updates must be submitted to the Department for approval. The plan approval is based on the plan providing a reasonable and orderly workflow and the plan being provided to the Department Representative as completed.

N. The Department will make decisions concerning the review and approval of just compensation, approval of relocation benefits, approval of administrative settlements and approval of closing or condemnation packages on behalf of the Department. The Department Representative is committed to issuing decisions on approval requests within 21 days. This commitment is based on the plan providing a reasonable and orderly workflow and the work being provided to the Department Representative as complete. Submission of documents requiring the Department approval shall contain the necessary language and certifications as shown on the examples provided in the Appendix to Chapter 10, Special Projects, of the Right of Way Manual.
O. The Developer shall obtain access to and use the Department’s Right of Way and Utilities Management System (RUMS) to manage and track the acquisition process. RUMS will be used for Project status reporting; therefore, entries in RUMS shall be made at least weekly to accurately reflect current Project status. The Department standard forms and documents, as found in RUMS, will be used to the extent possible. Training in the use of RUMS and technical assistance will be provided by the Department.

P. The Developer shall provide a current title examination (no older than sixty (60) days) for each parcel at the time of the initial offer to the landowner. Each title examination report shall be prepared by a Department approved attorney or title company. If any title examination report has an effective date that is older than sixty (60) days, an update is required prior to making an initial offer to the landowner. A title insurance policy in favor of the Commonwealth of Virginia in form and substance satisfactory to the Department shall be provided by the Developer, for every parcel acquired by voluntary conveyance.

Q. The Developer shall submit a scope of work detailing the type of appraisal to be prepared for each parcel and the name of the proposed appraiser for the Department review and approval in writing prior to commencing the individual parcel appraisal. The proposed appraiser shall be of an appropriate qualification level to match the complexity of the appraisal scope. The Developer shall prepare appraisals in accordance with the Department’s Appraisal Guidelines. The review appraiser shall be on the Department’s approved fee review appraiser list. Alternatively the Developer may submit an exception request to use a review appraiser who is not on the Department’s approved review appraisal list for the Department’s approval. The Department shall issue a final approval of all appraisals.

R. Payment documentation is to be prepared and submitted to the Department with the Acquisition Report (RW-24). The Developer shall make payments of benefits to property owners for negotiated settlements, relocation benefits, and payments to be deposited with the court.

S. The Developer 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 to the Department. Prior to the recordation of any instrument, the Department shall review and approve the document. For all property purchased in conjunction with the Project, title will be acquired in fee simple (except that the Department may, in its sole discretion, direct the acquisition of a ROW easement with respect to any portion of the ROW) and shall be conveyed to the “Commonwealth of Virginia, Grantee” by a Department-approved general warranty deed, free and clear of all liens and encumbrances, except encumbrances expressly permitted by the Department in writing in advance of deed recordation. 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 when the private utility company has prior recorded easements.

T. The Developer shall be responsible for all contact with landowners for ROW or construction items.

U. The Developer shall be responsible for all contact with the displacees for relocation assistance.

V. The Developer shall maintain access at all times to properties during construction.

W. The Developer shall use reasonable care in determining whether there is reason to believe that property to be acquired for ROW 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 Developer shall notify the Department within three (3) calendar days. The Developer shall not proceed with acquiring such property until written notification is received from the Department.

X. During the acquisition process and for a period of three (3) years from either (1) the date each owner of a property and each person displaced from the property receives the final payment, or (2) from the date the state receives federal reimbursement of the final payment made to each owner of a property and to each person displaced from a property, whichever is later, and until the Commonwealth of Virginia has indefeasible title to the property, all Project documents and records not previously delivered to the Department, including but not limited to design and engineering costs, construction costs, costs of acquisition of rights of way, and all documents and records necessary to determine compliance with the laws relating to the acquisition of rights of way and the costs of relocation of utilities, shall be maintained and made available to the Department for inspection and audit. This also would apply to the FHWA on projects with federal funding. Throughout the design, acquisition, and construction phases of the Project, copies of all documents and correspondence shall be submitted to both the Central Office and the respective Regional Right of Way Office.

Y. Prior to Project Completion, the Developer shall provide and set the Department RM-1 ROW monuments within the Project limits.

Z. Any existing ROW fencing impacted by the Developer’s design and construction activities shall be restored or replaced in the same configuration relative to the improvements as the existing fencing. Any new fencing shall be in accordance with Section 3.9.
AA. The Developer shall notify the Department of any and all encroachments (temporary or permanent) within the ROW prior to Project Completion.

BB. The Developer shall abide with all federal, state, and local regulations that require relocating WMATA traction power substations, tie-breaker stations, transit power and communications systems, pedestrian bridges, access roads, parking, or any additional WMATA facilities impacted by the Project Work. This includes, but is not limited to, all applicable Commonwealth of Virginia regulations and Fairfax County Special Exception/2232 local land use approvals as required.

1.6.2 Condemnation

The Department will make the determination in each case as to whether settlement is appropriate or whether the filing of an eminent domain action is necessary, taking into consideration the recommendations of the Developer. When the Department authorizes the filing of a certificate, the Developer shall prepare a Notice of Filing of Certificate and the certificate assembly. All required documents necessary to file a certificate shall be forwarded along with a prepared certificate to the Department. The Department will execute the certificate and return the assembly to the Developer. The Developer shall update the title examination and shall file the certificate.

When the Department determines that it is appropriate, the Developer shall be responsible for continuing further negotiations for a maximum of sixty (60) days after a certificate is filed, in order to reach settlement after the filing of certificate. After that time the case will be assigned to an outside attorney appointed by the Department and the Office of the Attorney General. When requested, the Developer shall provide the necessary staff and resources to work with the Department and its attorney throughout the entire condemnation process until the property is acquired by entry of a final non-appealable order, by deed, or by an Agreement After Certificate executed and approved by the Department and the appropriate court. The Developer will provide updated appraisals (i.e., appraisal reports effective as of the date of taking) and expert testimony supporting condemnation proceedings upon request by the Department.

1.7 Utilities

1.7.1 General Requirements

A. This is a Department sanctioned project and the Developer shall enjoy all of the benefits and responsibilities of the Department as it pertains to prior rights, statutory rights, or any other right relating to utility relocations, subject to the Department’s ability to assign those rights.

B. The Developer shall submit for review and approval by the Department a Utility Plan that details the schedule and proposed activities of the Developer.
and the utility owners during the Construction Period to the level of detail and extent to which such information is known at the time of submission. Such information will be updated periodically as additional information becomes available during later stages of design. The Utility Plan shall include, but is not limited to, assertions to the following:

1. Durations and schedules for planned utility relocations have been coordinated with utility owners.

2. Durations for utility relocations by utility owners are adequate for the type and scope of services being provided. 

3. The use of float for utility relocation activities is in accordance with the Technical Requirements.

C. The coordination, design, and relocation of all utilities shall comply with these Technical Requirements and the standards and specifications set forth in Attachment 1.5. Additional Work required because of changes in utility owners’ requirements shall be at the Developer’s risk. It is the Developer’s responsibility to verify whether other utility owners exist within the Project limits and coordinate with them.

D. The Developer shall be responsible for coordinating the Project construction with all utilities that may be affected (including the Department’s communications and power cables and conduits). The Developer shall be responsible for coordinating the work of its Contractors, subcontractors, and the various utilities. The resolution of any conflicts between utility owners and construction of the Project shall be the responsibility of the Developer. No additional compensation or time will be granted for any delays, inconveniences, or damage sustained by the Developer or its subcontractors because of interference from utilities or the operation of relocating utilities.

E. If the Developer desires the temporary or permanent adjustment of utilities for its own benefit, it shall conduct all negotiations with the utility owners and pay all costs in connection with the adjustment.

F. At a minimum, the Developer shall be responsible for utility designations, utility locates (test holes), conflict evaluations, cost responsibility determinations, utility relocation designs, utility relocations and adjustments, utility reimbursement, determination of existing utility easements and the inclusion of such easements on plans, replacement land rights acquisition, and utility coordination required for the Project. The Developer is responsible for coordinating all necessary utility relocations and adjustments. All efforts and cost necessary for utility designations, utility locates (test holes), conflict evaluations, cost responsibility determination, utility relocation and utility bridge attachment designs, utility relocations and adjustments, utility
reimbursements, replacement land rights acquisition, and utility coordination shall be included in the Developer’s cost.

G. All costs for utility relocations, excluding betterments, shall be included in the Developers price proposal. Utility betterments shall not be included in the price proposal but shall be reimbursed to the Developer through agreement with the requesting utility owner. Betterments must be requested by and approved by the affected utility owner and must meet Buy America requirements.

H. The compensation paid to landowners for replacement land rights shall be included in the Developer’s cost in accordance with the Agreement.

I. The Developer shall submit a Utilities Plan for the Department to review and approve in accordance with the Agreement. The Developer shall also submit a plan view of the initial utility designation survey. The utilities plan view shall be clear and legible, and details shall be drawn to scale. The Developer shall develop and maintain a utility tracking report as part of the Utilities Plan.

J. The Developer shall initiate early coordination with all utilities located within the Project limits. The Developer shall identify and acquire any replacement utility easements or required ROW needs of all utilities necessary for relocation because of conflicts with the Project. The Developer shall coordinate with the utility owners to obtain temporary construction easements or agreements.

K. The Developer shall provide all utilities with roadway and bridge design plans as soon as the plans have reached a level of completeness adequate to allow them to fully understand the Project impacts. The utility will use the Developer’s design plan for preparing relocation plans and estimates. If a party other than the utility prepares relocation plans, the plans shall include a concurrence box where the utility signs and accepts the relocation plans as shown.

L. The Developer shall coordinate and conduct a preliminary review meeting with all affected utilities to assess and explain the impact of the Project.

M. The Developer shall schedule and conduct a utility field inspection for each project segment in accordance with the procedures set forth in the Department’s Utilities Manual. The Developer will provide meeting minutes for each utility field inspection.

N. The Developer shall verify the prior rights of each utility’s facilities if claimed by a utility owner. If a dispute occurs over prior rights with a utility, the Developer shall be responsible for resolving the dispute. The Developer shall prepare and submit to the Department a preliminary utility status report
within sixty (60) days of issuance of Limited Notice to Proceed that includes a listing of all known utilities located within the Project 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 utilities. The Developer shall obtain the following from each utility that is located within the Project limits:

1. Relocation plans, including a 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; and

5. Bridge attachment agreements between the Department and the utility owner, if necessary.

O. The Developer will use a two-party agreement, similar to the Master Utility Agreement (MUA) utilized by the Department (provided for in the Department’s Utility Manual), to establish the general framework for addressing the utility issues within the Project affecting a utility owner. The two-party agreement between the Developer and the utility company will set forth the terms and conditions under which the utility work will be performed, and will adhere to the Department’s Utility Manual. Included in the two-party agreement will be the statement (with reference to the Agreement) that this work is being performed as a Department project. Preparing all agreements relative to the utility relocation is to be between the Developer and the utility. This includes the agreements for authorization to relocate facilities as well as any reimbursement terms and agreements.

P. The Developer shall review all relocation plans to ensure that relocations comply with the Department’s Utilities Manual and the Department’s Land Use Permit Regulations. The Developer shall also ensure that no conflicts exist with the proposed roadway improvements, and that no conflicts exist between each of the utility’s relocation plans. The Developer shall prepare and submit to the Department all relocation plans. The Developer is expected to assemble the information included in the relocation plans in a final and complete format and in such a manner that the Department may approve the submittals with minimal review. The Developer is expected to meet with the Department’s Regional Utilities Manager within 45 days prior to the first utility submittal to gain a full understanding of what is required with each submittal. The Developer shall receive written approvals from the Department prior to authorizing utilities to commence relocation.
construction. The utilities shall not begin their relocation work until authorized by the Developer. Each relocation plan submitted must be accompanied by a certification from the Developer stating that the proposed relocation will not conflict with the proposed roadway improvement and will not conflict with another utility’s relocation plan.

Q. The Department will provide reasonable assistance in negotiations with utility owners and will provide available Department documents concerning prior rights in a timely manner as requested by the Developer, but the Department shall incur no liability in providing such reasonable assistance and shall not be required to initiate or participate in any legal action other than as a witness or to produce documents.

R. The Developer shall design the Project to avoid conflicts with utilities and minimize impacts where conflicts cannot be avoided. The Developer shall be responsible for ensuring that utility service interruptions are minimized.

S. The utility attachments on bridges shall not be permitted unless approved by the Department.

T. Where possible, utility manholes should be located outside of any pedestrian areas (sidewalks, paths, etc.). Where manholes are located within a sidewalk or shared use path, the manhole covers must be ADA compliant.

U. The Developer shall be required to obtain a Department Land Use Permit for installation of any asset outside the footprint of the Express Lanes and on Department ROW including median areas. These assets include but are not limited to generator sites, electrical service panels, and other Traffic Management System equipment. The Developer shall be required to follow the VDOT Land Use Permit process. The Developer shall be required to submit as-built documentation of these assets as part of the permit process.

V. The Developer shall ensure the utility owners submits as-built drawings and Land Use Permit applications upon completion of its relocation and (or) adjustments. The Department will issue an as-built permit to the utility owners within 21 days of receipt of as-built drawings and Land Use Permit applications.

W. The Developer shall be responsible for ensuring the appropriate abandonment or removal of all abandoned utilities within the Project ROW.

X. At the time that the Developer notifies the Department that the Developer deems the Project to have reached Project Completion, the Developer shall certify to the Department 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 have been
relocated and their claims and compensable rights satisfied or will be satisfied by the Developer.

Y. The Developer shall accurately show the final location of all utilities on the as-built drawings for the Project. The Developer will ensure the utility companies submit as-built drawings upon completion of their relocation or adjustments. The Department shall issue an as-built permit to the utility companies after receipt of permit application and as-built drawings.

1.7.2 Developer’s Responsibility for Utility Property and Services

A. At points where the Developer’s operations are on or adjacent to the properties of any utility, including railroads, 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 Developer shall cooperate with utility owners 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. If any utility service is interrupted as a result of accidental breakage or of being exposed or unsupported, the Developer shall promptly notify the proper authority and shall cooperate fully with the authority in the restoration of service. If utility service is interrupted, repair shall be continuous until service is restored.

C. The Department’s Traffic Management System (TMS) fiber optic communication lines and associated electrical distribution lines are located throughout the project limits in conjunction with other public utilities. The TMS utilities will not be located by Miss Utility. The Developer is responsible for all field markings of all Department-owned utilities pursuant to the Agreement. The Developer shall exercise care to prevent damage or disruption to the TMS. However, in the event the Developer or its contractor(s) damage the TMS during operations, the Developer shall immediately notify the McConnell Public Safety and Transportation Operations Center (MPSTOC) as well as the Department project manager and cease all construction operations until repairs are completed and the system is fully operational. Except as set forth in the Agreement, the Developer shall be responsible for all cost necessary for repair and time impact to the project. Additionally, the Department has an agreement with the U.S. Army Corps of Engineers (USACE) to share capacity in a duct bank that also contains the Department cable. The USACE cable is in orange and orange with white stripe HDPE ducts. If damage occurs to USACE cables, the Developer shall immediately notify the USACE and the MPSTOC.
D. The Developer shall comply with all requirements of the Virginia Underground Utility Damage Prevention Act (the Miss Utility law).

E. The Department’s facilities, including roadway lighting cable and conduit, traffic management systems cable and conduit, and Department-owned fiber optic lines, are not marked by the Miss Utility. Therefore, the Developer may either elect to use at its own discretion and cost the Department on-call consultant or alternatively use a competent contractor or consultant familiar with the Department-owned utilities. Moreover, the Department shall, if available, furnish the Developer with a set of as-built plans for such markings. It is the Developer’s sole responsibility to have these utilities marked, maintain the markings throughout the life of the project, and assume physical and financial arrangements to have these utilities marked and re-marked. The Developer will be responsible for all cost necessary for these utility markings.

F. The Developer shall determine whether other utilities are present in addition to those identified by the Notification Center report and shall afford those additional utilities an equivalent notification protocol.

1.7.3 Restoration of Work Performed by Others

A. The Department may construct or reconstruct any utilities within the limits of the Project or grant a permit for the same at any time.

B. Subject to authorization by the Department, the Developer shall allow any person, firm, or corporation to make an opening in the highway within the limits of the Project upon presentation of a duly executed permit from the Department or any municipality for sections within its corporate limits.

1.8 Work Restrictions

1.8.1 General Requirements

A. The Developer shall be responsible for a Transportation Management Plan (TMP) in accordance with Instructional and Information Memorandum IIM-LD-241 (Work Zone Safety and Mobility) and TE 351 on Work Zone Speed Analysis, which shall include but not be limited to the following:

1. The Developer’s MOT plans development shall be consistent with the Agreement, including these Technical Requirements.

2. The Developer shall comply with pertinent requirements for maintenance of traffic for the Work. The Developer is responsible for the safety of the work zone. The Developer shall appoint a single point of contact to address MOT and safety requirements for the work zone.
3. The Developer shall conduct all work necessary to provide safe and efficient MOT during construction, including provisions for the movement of people, goods, and services through and around the Project while minimizing impacts to pedestrians, bicyclists, local residents, businesses, and commuters. In no event shall sidewalks or shared use paths be closed unless first approved by the Department, considering planned and designed alternative facilities by the Developer.

4. The Developer shall coordinate activities including but not limited to communications, public outreach, and stakeholder engagement; lane closures; and MOT and TCP implementation with the Department-administered TMP program.

B. The Department will provide and administer a TMP that will include the Developer’s MOT plans on the Project. The Department’s TMP will include strategies for:

1. Traffic operations;

2. Local network operations;

3. Transit/Travel Demand Management (TDM);

4. Communications and outreach;

5. Additional Virginia State Police and Safety Service Patrol; and

6. Other strategies to maintain mobility and safety in the work zone.

1.8.2 Work Hours

A. The Developer is advised that its general operations may proceed seven days a week, 24 hours a day, during the Construction Period, except as may be modified herein.

B. This is contingent upon the Developer obtaining a variance or waiver of all applicable noise restrictions, as stated in the Agreement.

1.8.3 Temporary Roadway Closures

A. Lane and Shoulder Closures

To facilitate construction and minimize inconvenience to the public, the Developer is advised of, and shall comply with, the closure limitations listed in Table 1.8a. The Department reserves the right to modify the closure limitations in Table 1.8a, and any modification shall be handled under the Allowance for Additional Lane Closure Restriction by the Department or Developer Request for Additional Lane Closures.
B. The Developer shall provide the Department at the designated location with a weekly work zone plan of all closures on the Wednesday prior to the next week’s planned work activity.

C. The lane closure approval and coordination process shall conform to the requirements of the Department.
### Table 1.8a: Roadway Lane and Shoulder Closures

#### INTERSTATE 66

<table>
<thead>
<tr>
<th>WEEKDAY</th>
<th>Eastbound</th>
<th>Westbound</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Single-Lane Closures or Shoulder</td>
<td>Two-Lane Closures</td>
</tr>
<tr>
<td>Segment 1</td>
<td>10:00 AM to 3:30 PM</td>
<td>9:00 PM to 5:00 AM</td>
</tr>
<tr>
<td>West of US 15 to US 29 (at Exit 43)</td>
<td>8:00 PM to 5:30 AM</td>
<td>N/A</td>
</tr>
<tr>
<td>Segment 2</td>
<td>10:00 AM to 3:30 PM</td>
<td>9:00 PM to 5:00 AM</td>
</tr>
<tr>
<td>US 29 (at Exit 43) to US 29 (at Exit 52)</td>
<td>8:00 PM to 5:00 AM</td>
<td>11:00 PM to 5:00 AM</td>
</tr>
<tr>
<td>Segment 3</td>
<td>11:00 AM to 3:30 PM</td>
<td>9:30 PM to 5:00 AM</td>
</tr>
<tr>
<td>US 29 (at Exit 52) to US 50</td>
<td>8:00 PM to 5:00 AM</td>
<td>N/A</td>
</tr>
<tr>
<td>Segment 4</td>
<td>11:00 AM to 3:30 PM</td>
<td>10:00 PM to 5:00 AM</td>
</tr>
<tr>
<td>US 50 to East of Beltway (b)</td>
<td>9:00 PM to 5:00 AM</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**All lanes open at 12:00 noon on Friday**

**Consider opening shoulder lane, where Applicable**

#### WEEKEND

<table>
<thead>
<tr>
<th>All Segments</th>
<th>Eastbound/Westbound</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Single-Lane Closures or Shoulder</td>
</tr>
<tr>
<td>Friday to Saturday</td>
<td>9:00 PM to 9:00 AM</td>
</tr>
<tr>
<td>Saturday to Sunday</td>
<td>9:00 PM to 9:00 AM</td>
</tr>
<tr>
<td>Sunday to Monday</td>
<td>8:00 PM to 5:00 AM</td>
</tr>
</tbody>
</table>
## Single-Lane Closures* or Shoulder

<table>
<thead>
<tr>
<th>ARTERIAL</th>
<th>WEEKDAY</th>
<th>WEEKEND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Monday to Thursday</td>
<td>Friday</td>
</tr>
<tr>
<td>Limited Access Highway (c)</td>
<td>10:00 AM to 3:00 PM</td>
<td>9:30 AM to Noon</td>
</tr>
<tr>
<td></td>
<td>10:00 PM to 5:00 AM</td>
<td>10:00 PM to 9:00 AM</td>
</tr>
<tr>
<td>Major Arterials (d)</td>
<td>9:00 AM to 3:00 PM</td>
<td>9:00 AM to Noon</td>
</tr>
<tr>
<td></td>
<td>9:30 PM to 5:00 AM</td>
<td>10:00 PM to 9:00 AM</td>
</tr>
<tr>
<td>All Other Roadways</td>
<td>9:00 AM to 3:30 PM</td>
<td>9:00 AM to Noon</td>
</tr>
<tr>
<td></td>
<td>9:00 PM to 5:00 AM</td>
<td>10:00 PM to 9:00 AM</td>
</tr>
</tbody>
</table>

## Multiple-Lane Closures

<table>
<thead>
<tr>
<th>ARTERIAL</th>
<th>WEEKDAY</th>
<th>WEEKEND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Monday to Thursday</td>
<td>Friday</td>
</tr>
<tr>
<td>Limited Access Highway (c)</td>
<td>10:00 PM to 5:00 AM</td>
<td>Not allowed until</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11:00 PM to 11:00 PM</td>
</tr>
<tr>
<td>Major Arterials (d)</td>
<td>10:00 PM to 5:00 AM</td>
<td>Not allowed until</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10:00 PM to 10:00 PM</td>
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<tr>
<td>All Other Roadways</td>
<td>9:00 PM to 5:00 AM</td>
<td>Not allowed until</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10:00 PM to 10:00 PM</td>
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</tbody>
</table>

## INTERSTATE 495 (BELTWAY)

### Inner Loop

<table>
<thead>
<tr>
<th>WEEKDAY</th>
<th>Single-Lane Closures or Shoulder</th>
<th>Two-Lane Closures</th>
<th>Multiple-Lane Closures</th>
<th>Complete Road Closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segment 1</td>
<td>A. L. Bridge to Springfield Interchange</td>
<td>10:00 AM to 3:00 PM</td>
<td>10:00 PM to 5:00 AM</td>
<td>11:00 PM to 5:00 AM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9:30 PM to 5:00 AM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Segment 2</td>
<td>Springfield Interchange to W.W. Bridge</td>
<td>10:00 AM to 3:00 PM</td>
<td>10:00 PM to 5:00 AM</td>
<td>11:00 PM to 5:00 AM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9:30 PM to 5:00 AM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*All lanes open at 12:00 noon on Friday*
### INTERSTATE 495 (BELTWAY)

#### WEEKDAY

<table>
<thead>
<tr>
<th>Segment 1</th>
<th>A. L. Bridge to Springfield Interchange</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outer Loop</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single-Lane Closures or Shoulder</td>
</tr>
<tr>
<td>Segment 1</td>
<td>9:30 AM to 2:30 PM</td>
</tr>
<tr>
<td>Segment 2</td>
<td>10:00 AM to 3:00 PM</td>
</tr>
<tr>
<td>All lanes open at 12:00 noon on Friday</td>
<td></td>
</tr>
</tbody>
</table>

#### WEEKEND

<table>
<thead>
<tr>
<th>Segment 2</th>
<th>Springfield Interchange to W.W. Bridge</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inner/Outer Loop</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single-Lane Closures or Shoulder</td>
</tr>
<tr>
<td>Segment 2</td>
<td>10:00 PM to 9:00 AM</td>
</tr>
<tr>
<td>Segment 2</td>
<td>10:30 PM to 7:00 AM</td>
</tr>
</tbody>
</table>

#### EXPRESS LANES

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Complete Road Closure**</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WEEKDAY</strong></td>
<td>9:30PM (Sunday to Thursday) to 4:00AM (Monday to Friday)</td>
<td>11:00PM to 4:00AM</td>
</tr>
<tr>
<td><strong>WEEKEND</strong></td>
<td>11:00PM (Friday to Saturday) to 9:00AM (Saturday to Sunday)</td>
<td>11:00PM to 4:00AM</td>
</tr>
</tbody>
</table>

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(a) Complete Road Closures: 20 minutes maximum or a time frame approved by the Department 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

(b) Multiple lane closures shall utilize the Auxiliary travel (shoulder) Lane, as approved by the Department, per the lane closure approval process. The Auxiliary travel (shoulder) Lane shall be treated as a travel lane only.

(c) Limited Access Highways are defined as high speed high volume roadways with limited access, such as Rt. 234 Bypass, Rt. 286, and Rt. 28.

(d) Major Arterials are defined as Primary Roads, high volume Secondary Roads, and all other routes that connect directly to Interstates, such as US.15, US.29, US 50, Rt.123, Rt.234, Rt. 243, Gallows Road, Stringfellow Road.

(e) The Developers must maintain three lanes of traffic during daytime hours as permitted per Table 1.8a,
- Single-lane closures are only permitted for multiple-lane roadways
- Two lanes and multiple lanes closure shall not be permitted West of US 15 or East of Beltway
- Long-term closures of the shoulders adjacent to the general purpose lanes are allowable pursuant to the Agreement.
- Some roadway closures will require coordination and permit with the agency having jurisdiction over the roadway.
D. Temporary Roadway Closures in the Reversible HOV Ramps

1. The existing reversible high-occupancy vehicle (HOV) ramp hours of operations (set forth in Table 1.8b) shall remain in place during the Construction Period, unless otherwise specified by the Department with advance notice to the Developer. During the Construction Period, the Department shall be responsible for the operation of the existing reversible ramps, including gate operations and reversal of the flow of traffic.

2. The complete ramp closures at Stringfellow Road and Monument Drive shall not be permitted in the reversible ramps within the project limits during the Construction Period, unless approved by the Department in advance with proper TMP efforts. These adjustments shall be handled under the Allowance for Additional Lane Closure Restriction by the Department or Developer Request for Additional Lane Closures.

<table>
<thead>
<tr>
<th>Table 1.8b Reversible Ramp Hours of Operations at Stringfellow Road and Monument Drive</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monday – Thursday and Friday (until 7:00 p.m.)</strong></td>
</tr>
<tr>
<td>7:00 p.m. – 5:00 a.m.</td>
</tr>
<tr>
<td>5:30 a.m. – 9:30 a.m.</td>
</tr>
<tr>
<td>10:00 a.m. – 3:00 p.m.</td>
</tr>
<tr>
<td>3:00 p.m. – 7:00 p.m.</td>
</tr>
<tr>
<td><strong>Friday Evening – Saturday – Sunday</strong></td>
</tr>
<tr>
<td>7:00 p.m. Fri – 5:00 a.m. Mon</td>
</tr>
</tbody>
</table>

All gate operations and reversal of traffic must occur within permitted closure periods only. The start of the gate operation to open the ramps must begin by 5:00 a.m. If the facility is not cleared to be open to traffic by 5:00 a.m., unless approved by the Department, all associated Lane Closure Liquidated Damages will be assessed beginning at 5:01 a.m. as stipulated in the Agreement.

E. Lane Closure Types

Type 1 – A lane closure resulting in a significant impact on traffic, such as stopping traffic completely, closing two or more lanes, 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, as identified in the Public Information and Communications Plan.
Type 2 – A lane closure resulting in minor or no impact on the flow of traffic, such as closing one lane on a 4-lane roadway during off-peak traffic hours.

Type 3 – A lane closure that would close a shoulder (right or left) on a roadway or ramp.

Table 1.8c lists the advance notices required for each type of lane closure or independent pedestrian bridge closure.

<table>
<thead>
<tr>
<th>Type</th>
<th>Minimum Advance Notice (days)</th>
<th>Maximum Advance Notice (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>14</td>
</tr>
</tbody>
</table>

F. The Baseline Schedule shall identify construction phases. The schedule will be reviewed in detail to assure that the scheduling meets the objectives for expediting the Project and minimizing traffic disruptions.

G. Confirmation shall be made 24 hours before any scheduled lane closure and shall include a written reiteration of the proposed tasks and a listing of materials, labor, and major equipment to be used. Complete road closures require a 72-hour advance confirmation for coordination. The Developer is responsible for providing adequate advance notification via variable message and required static signing for lane closures in accordance with the Virginia Work Area Protection Manual (VWAPM) and the Manual on Uniform Traffic Control Devices (MUTCD). Once a closing is in place, work shall begin immediately and shall progress on a continuous basis to completion or to a designated time.

H. Traffic backups must dissipate before successive closings can be implemented.

I. The minimum clear distance between two separate lane closings (i.e., from the last traffic cone of the first closing to the first cone of the second closing in the same roadway) shall be two miles.

J. A meeting shall be held between the Developer and the Department project manager a minimum of 4 weeks prior to the erection of any portion of the structural steel or concrete girder bridges that will require complete lane closures or detour. The Developer, the fabricator, the shipper, the erector, and the Developer’s safety representative shall attend this meeting. Representatives of the Department project manager and Virginia public
agencies who will be present include, but are not limited to, the Virginia State Police, Fairfax County Police, and WMATA.

Lane closures, shoulder closures, or work that impacts traffic flow will not be permitted on September 11, Inauguration Day, and holidays as indicated here. For the purposes herein, the term “holiday” shall apply to New Year’s Day, Martin Luther King Jr. Day, President’s Day, Easter, Memorial Day, Independence Day, Labor Day, Columbus Day, Veteran’s Day, Thanksgiving Day, and Christmas Day. The Department may adjust lane closure times to accommodate shopping seasons associated with the aforementioned holidays. Additional restrictions for other holidays or special local events may be necessary. These adjustments shall be handled under Allowance for Additional Lane Closure Restriction by the Department and/or the Developer’s Request for Additional Lane Closures.

Following are holiday and special event closure times that will NOT be permitted for lane or shoulder closures:

- January 1: From noon on the preceding day until noon on the following day, with the exception of *
- 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 Friday until noon on Tuesday
- President’s Day: From noon on Friday until noon on Tuesday
- Easter: From noon on Friday until 9:30 a.m. Monday
- Memorial Day: From noon on Friday until noon on Tuesday
- July 4 (Independence Day): From noon on the preceding day until noon on the following day, with the exception of *
- Labor Day: From noon on Friday until noon on Tuesday
- September 11: No daytime closures
- Columbus Day: From noon on Friday until noon on Tuesday
- Veteran’s Day: From noon on the preceding day until noon on the following day, with the exception of *
- Thanksgiving Day: From noon on the Wednesday preceding Thanksgiving Day until noon on the Monday following Thanksgiving Day
• Christmas Day: From noon on the preceding day until noon on the following day, with the exception of *

* If the Holiday occurs on a Friday or Saturday: No daytime closures on the preceding Thursday to noon on the following Monday. If the Holiday occurs on a Sunday or Monday: No daytime closures on the preceding Friday to noon on the following Tuesday.

K. Extension of a lane closure time, except as approved by the Department, is not acceptable and triggers Lane Closure Liquidated Damages in accordance with the Agreement. The Lane Closure Liquidated Damages for failure to restore all lanes to traffic by the designated times as described in the Agreement and shall be assessed starting from the end of the approved time. Restoration of traffic shall mean the completion of all construction work; the removal of all traffic control devices and signs; and removal of all workers, materials, and equipment from the roadway. The charges apply regardless of the day or date.

L. The Lane Closure Liquidated Damages are set forth in the Agreement. If a Non-Permitted Closure occurs, the Department will notify the Developer thereof and of the amount of associated Lane Closure Liquidated Damages in writing. If there are no additional Non-Permitted Closures occurring within ninety (90) days, the Department shall refrain charging of the Lane Closure Liquidated Damages for the prior Non-Permitted Closures. Otherwise, the Developer shall pay all Lane Closure Liquidated Damages to the Department for having two (2) or more Non-Permitted Closure occurrences within ninety (90) days. Once there is a clean period of ninety (90) days without a Non-Permitted Closure occurrence, the new ninety (90) day period will start for future Lane Closure Liquidated Damages. A Non-Permitted Closure is any lane closure outside the Agreement unless approved by the Department.

M. In addition to the provisions listed in subsections K and L above, if the Developer causes the assessment of Lane Closure Liquidated Damages for failure to restore traffic lanes, and depending upon the severity (15-minute delayed opening or more than two delay incidents in one week) of the closure violations as determined by the Department, the Developer will not be allowed further lane closures until the reasons for the assessment are evaluated and the Developer can provide assurance that the causes have been corrected.

N. The Department reserves the right to monitor traffic conditions affected by the work and to make additional restrictions as may be necessary, such as terminating a lane closure early. These adjustments shall be handled under the Allowance for Additional Lane Closure Restriction by the Department and/or Developer Request for Additional Lane Closures.
1.8.4 Allowance for Additional Lane Closure Restriction by the Department or Developer Request for Additional Lane Closures

A. At the Department’s reasonable discretion and approval, the Developer 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.

B. Closures of longer durations than those listed in Tables 1.8a and 1.8c will require a review of plans, implementation of detours, and public outreach.

C. The Department reserves the right to monitor traffic conditions affected by the work and to make additional restrictions as may be necessary, such as terminating a lane closure early.

D. General Requirements

1. The Department will track any additional lane closure time granted outside of time allowed in the Agreement.

2. Any additional time granted must comply with all the requirements set forth in the Agreement.

3. Developer acknowledges that instances will arise where the Developer may not be allowed to implement an approved lane closure during events that are beyond the Department’s control.

4. The Developer shall be cognizant of and compliant to traffic demands during special events. Construction activities or lane closures that will affect event traffic may be stopped early or not allowed to implement a closure for special events such as, but not limited to, the following list:

   4.1 Presidential motorcades traveling through project limits;

   4.2 Special events with regional impacts;

   4.3 Special sport events with regional impacts;

   4.4 Major accidents and incidents with regional impacts;

   4.5 Holiday or seasonal traffic patterns;

   4.6 Natural or other disasters requiring regional evacuations; and

   4.7 Any time restrictions relative to work in or over WMATA facilities.
E. Calculating Hours

1. Additional time (lane closures) – Any additional time requested by the Developer and granted by the Department beyond the approved hours within the Agreement will be added for every instance and every location at 15-minute intervals.

2. Additional Time (complete closures) – If a full closure of roadway not specified in the Agreement is implemented in lieu of a 30-minute total temporary closure, hours will be calculated in the same manner as the hours that were requested and approved for the specific closure.

3. Time Deducted – When the Developer is not allowed to implement a lane closure by the Department during the approved hours within the Agreement, the hours during which such lane closure is not allowed will be deducted from the total hours accumulated.

F. Documentation

1. Within the first sixty (60) days, the Department and Developer will develop and agree on a format of documenting this information. The form should at least contain date, hours allowed, hours disallowed, impacted time, etc.

2. By the 10th of each month, the Department and Developer will reconsolidate and agree on the resultant amount of hours allowed and disallowed.

G. Allowance

1. At the end of the Project, the Department and the Developer will reconcile the resultant impacted time or additional granted time by subtracting the additional time granted by the Department from the time the Developer was disallowed per the Technical Requirements in accordance with the Agreement to implement the lane closures. The Department and the Developer will endeavor to maintain a neutral balance of resultant impacted and additional granted time throughout the duration of the project.

2. Any lane closures affected by inclement weather, snow and the snow removal process, emergency Department maintenance repair safety shutdowns, major accidents, and any stoppage by WMATA are not subject to above allowance and are excluded from the calculations and compensations.
H. General

Notwithstanding anything to the contrary, it is agreed that:

1. The Department will provide the Developer with as much notice as is possible with respect to any lane closure request by the Developer that is not approved by the Department.

2. The Developer will provide the Department with as much notice as is possible with respect to any inability of the Developer to implement lane closures that are otherwise allowed within the Agreement.

3. If the Department disapproves requests for lane closures from the Developer, or otherwise prevents the Developer from implementing lane closures that are otherwise permitted by the Agreement, and the impact of such actions by the Department is more than 180 cumulative hours, such actions shall constitute a Department Change.

1.8.5 Night Work

A. In areas where Work is to be performed during the hours of dusk or darkness, the Developer 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 the Work site(s) may be accomplished using any combination of portable floodlights, standard equipment lights, existing street lights, temporary street lights, etc. that will provide the proper illumination.

C. The Developer shall furnish and place warning signs to alert approaching motorists of lighted construction area(s). These warning signs shall be 4 feet (1,200 mm) x 4 feet (1,200 mm). The Developer’s vehicles used on the Project shall be provided with amber flashing lights that shall be in operation while in the work area. The Developer’s equipment shall be provided with a minimum of 3 square feet of reflective sheeting that is visible to approaching motorists. The Developer shall provide its personnel with reflective vests, which shall be worn at all times while the workers are within the Work area. The Developer shall provide a light meter to demonstrate that the minimum light intensity is being maintained.

D. The Developer shall provide sufficient fuel, spare lamps, generator, etc., to maintain the lighting of the Work site. The Developer shall utilize padding or shielding or locate mechanical and electrical equipment to minimize noise generated by lighting operations as directed by the Department. Noise generated by portable generators shall comply with all applicable laws.
E. The Developer shall provide sufficient uniformed law enforcement officers with a marked law enforcement vehicle equipped with a blue flashing light for all nighttime Work that is performed within the travel lanes.

F. Construction Noise

1. The Developer’s operations shall be performed so that exterior noise levels measured during a noise-sensitive activity shall be not more than 80 decibels. Noise-sensitive activity is any activity for which lowered noise levels are essential if the activity is to serve its intended purpose. Such activities include those associated with residences, hospitals, nursing homes, churches, schools, libraries, parks, and recreational areas.

2. Developer shall monitor its construction-related noise if requested by local agencies, the Department, or neighboring property owners. If construction noise levels exceed 80 decibels during noise-sensitive activities, the Developer shall take corrective action before proceeding with operations.

3. The Developer 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. Developer shall determine whether certain portions of the Project that produce objectionable noise should be restricted or prohibited between 10 p.m. and 6 a.m. subject to Department approval. If other hours are established by local ordinance, the local ordinance shall govern.

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 Developer shall establish haul routes that direct its vehicles away from developed areas and ensure that noise from hauling operations is kept to a minimum.

These requirements are not applicable if the noise produced by sources other than the Developer’s operation at the point of reception is greater than the noise from the Developer’s operation at the same point.

1.8.6 Allowance for Law Enforcement Utilization

A. It is understood by all parties that the Developer will work with and comply with the direction of the Department to determine the use of law enforcement during temporary traffic control operations involving lane closures or rolling lane closures, and any other operation as covered in Appendix C of the Virginia Work Area Protection Manual.
B. The law enforcement utilization in lieu of using flag persons will be excluded from the total cost.

C. The Department shall be responsible for all costs incurred by law enforcement agencies specific to the Project through the Service Commencement Date. As such, any amount paid by the Developer through the Service Commencement Date to the law enforcement agencies will be reimbursed to the Developer on an allocable cost basis, without any markup.

1.8.7 Use of Explosives

A. The Developer shall obtain approval from the Department in order to use explosives on the Project. Explosives shall be stored and used in a secure manner in compliance with all federal, state, and local regulations. Prior to prosecuting the Work, the Developer shall conduct an on-site review of the work involved and develop a plan of operations for performing excavating work. Where feasible, the Developer shall explore other means of loosening and or reducing the size of the excavation without blasting. When blasting becomes necessary, the Developer’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 to the Department 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 Developer shall be responsible for damage resulting from the use of explosives. The Developer 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 to enable owners to take steps to protect their property. The review of the Developer’s plan of operations, blasting plan, and notification of property owners shall in no way relieve the Developer of its responsibility for damage resulting from its blasting operations.

1.9 Maintenance of Traffic

1.9.1 General Requirements

A. MOT development shall be consistent with the Agreement, including these Technical Requirements.
B. Work zone information shall be shared with the Department’s Northern Region Operations Advanced Traffic Management System (ATMS) and any other regional ATMS and shall be approved by the Department.

C. The Developer shall provide a MOT engineer to perform the following:

1. Coordinate implementation of the TMP as developed by the Department;
2. Oversee the design and implementation of the MOT plans;
3. Coordinate MOT activities with the public and community outreach staff and the Department;
4. Implement traffic management strategies; and
5. Be continuously available during construction until Project Completion and elimination of all construction traffic control.

D. Unless otherwise approved by the Department, the MOT engineer shall be a Professional Engineer registered in the Commonwealth of Virginia who demonstrates MOT design management and implementation experience of similar project complexity. The MOT engineer shall have completed the training and examination by the Virginia Department of Transportation on the proper practices and methods for the MOT installation, maintenance, and removal of temporary traffic control devices and hold the Verification of Completion of Advanced Work Zone Traffic Control Training certificate in his or her possession.

E. The Developer shall prepare traffic analyses and modeling for all MOT phases and stages, exclusive of closures identified in the Agreement, in order to identify traffic impacts. The Developer shall use analytical and deterministic (HCM-based) or traffic simulation and optimization tools for the analyses. Traffic analyses and modeling shall also be required for all construction activities requiring a detour, requiring closure of multiple lanes, or deviating in any way from what is set forth in the Agreement.

F. Traffic analyses will vary depending on the magnitude of the closure, detour, or other change. The scope of the traffic analyses and the assumptions to be used will be determined in a meeting held with the Department.

G. All MOT plans and documents shall have a valid digital professional engineering stamp held by the MOT engineer.

H. All Temporary Traffic Controls shall be shown on AFC Plans.

I. 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 by the Department in its sole discretion. TL-3, Type II Non-Redirective Impact Attenuator may only be used with movable barrier.

J. All stages and phases of construction, including installation and testing of the Electronic Toll and Traffic Management (ETTM) system, shall be covered by an MOT plan.

K. If any sidewalk or shared use path is requested to be closed under the requirements of section 1.8.1(A)3 the alternative routes considered shall be covered by an MOT plan.

1.9.2 MOT During Construction

A. The MOT engineer or designee shall be continuously available for MOT-related activities during construction until Project Completion and elimination of all construction traffic control.

B. The construction activities will be completed in accordance with the Traffic Management Plan, and with the requirements of the Agreement and the Department’s Instructional and Information Memorandum IIM-LD-241 (Work Zone Safety and Mobility) and TE 351 on Work Zone Speed Analysis will be adopted for MOT on the Project.

C. The Developer shall maintain traffic consistent with the agreed upon TMP.

D. The Developer shall conduct daily and weekly MOT inspection to ensure all traffic devices and traffic patterns are in compliance with the VWAPM and MUTCD standards. A weekly MUTCD report shall be provided to the Department and include the following:

1. Date discrepancy was identified;
2. Description of discrepancy;
3. Corrective action required;
4. Date corrective action should be taken; and
5. Date corrective action was completed.

E. The Developer shall develop temporary Traffic Control Plans (TCPs) for each stage of construction including the installation and testing of the ETTM system that shows the Developer’s proposed construction staging and proposed traffic control devices consistent with the MOT plan.

F. The Developer will be required to provide a uniformed law enforcement officer with a marked law enforcement vehicle equipped with a blue flashing
light during set-up and take-down of all daytime intersection closures involving two or more lanes of traffic.

G. Detour plans shall be developed by the Developer and presented to the Department for approval. The Developer shall coordinate detour plans with local, state, and federal agencies (as applicable) and submit and update the MOT plan well in advance of any planned detour activity. The Developer shall be responsible for all planning, consultation, and coordination with impacted parties, design, implementation and monitoring, and maintenance of detours—whether within or outside the Project ROW. The provision of detours and marking of alternate routes will not relieve the Developer of the responsibility for ensuring the safety of the public or from complying with any requirements of the Agreement.

H. ROW for temporary highways, diversion channels, sediment and erosion control features, or bridges required by the Technical Requirements will be planned, designed, and provided by the Developer.

I. During any suspension of Work, the Developer shall temporarily open to traffic such portions of the Project and temporary roadways as may be agreed upon by the Developer and Department.

J. Unless a design exception or design waiver is granted, the geometric design for temporary roadways and temporary traffic control shall be designed, at a minimum, to the existing posted speed limit.

K. 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 VWAPM. 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 in accordance with the requirements of the VWAPM. 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 by the Department. Further, flaggers performing duties improperly will have their certifications revoked.

L. Long-term closures of the shoulders adjacent to the general purpose lanes are allowable provided the closure is separated by concrete barrier as approved by the Department.

M. Where concrete barriers are used to close the shoulder, the Developer will be required to provide pull-off areas per the requirement of the VWAPM.
N. 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.

O. The Developer shall schedule construction operations so that approved continuous access is provided for all roads, sidewalks, shared use paths, and properties. Connections or entrances shall not be disturbed by the Developer 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 delays occur 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 and egress connections shall have all lanes open during construction unless otherwise agreed with the Department. 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.

P. When the Developer elects to complete the rough grading operations for the entire project or exceed 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.

Q. 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 on sections directly opposite each other. 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 3 feet from the edge of the paved surface.

R. Where the Developer 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 plans submitted by the Developer and approved by the Department. Traffic shall be protected by the display of warning devices both day and night. If operations or obstructions placed by the Developer damage an existing traveled roadway, the Developer shall cease operations and repair damages.

S. Where existing hydraulic cement concrete pavement is to be patched, the operation of breaking and excavating old pavement shall extend for a distance of not more than two miles. Patching shall be coordinated with excavating so that an area of not more than one-half 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.

T. The Developer 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 to the Department for its approval together with other associated Design Documentation prior to Limited Notice to Proceed.

U. If the Developer fails to remedy unsatisfactory maintenance not complying with these Technical Requirements after receipt of a written notice by the Department, the Department may proceed with adequate forces, equipment, and material to maintain the project, without interference from the Developer. The cost of the maintenance, plus 25 percent for supervisory and administrative personnel (including fully burdened wages plus overhead), will be paid by the Developer.

V. The Developer shall open to traffic, and further maintain, certain sections of the Work as directed by the Department. Such opening shall not constitute acceptance of the work or any part thereof or a waiver of any provision of the Agreement.

W. Developer shall enter or shall cause to enter all lane closures on a weekly basis with appropriate daily confirmations for accuracy into the Department’s Lane Closure Advisory Management (LCAM) system.

X. All MOT plans affecting and adjacent to WMATA facilities are subject to review and approval by WMATA.
Y. All temporary traffic signal plans shall be submitted to the Department for review and approval prior to the Construction Phase, detour, or traffic shift. Construction signs and pavement markings (temporary) shall be installed, maintained, adjusted, and removed by the Developer throughout the duration of the Project.

Z. Sidewalk or shared use path connections that had an original paved surface shall be brought to a grade that will smoothly and safely accommodate pedestrian and bicycle traffic through the intersection.

1.10 Third Parties and Permitting

1.10.1 Permitting

A. The Developer shall coordinate in its dealings with Governmental Authorities and other entities having interests in the Project, with assistance from the Department. All government and other entity approvals applicable to design and construction Work will be the responsibility of the Developer. The Developer shall provide copies of all permits and permit modifications to the Department upon receipt.

B. The Developer shall obtain any required waiver or variance of each applicable city or county noise ordinance as needed to prosecute the Work. The Department will make reasonable efforts to assist the Developer in obtaining any such waiver or variance. The Developer shall adhere to the requirements of the noise waiver in planning, and performing any construction activities through noise mitigation if warranted. If the city or county identifies a violation all costs associated with any delays or corrective action is the responsibility of the Developer.

C. The Developer 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 Developer in accordance with the Agreement.

1.10.2 Third Parties

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

B. The Developer shall coordinate its activities with other contractors, localities, WMATA, and Norfolk Southern Railway working in the area. As provided in the Agreement, the Developer’s work program and schedule shall consider and coordinate with the work of other contractors, localities, WMATA, and Norfolk Southern Railway involved with adjacent work, including maintenance, in the corridor.
C. If other separate contracts are awarded by the Department or by other Governmental Authorities, including projects under the PPTA, that affect the Developer’s work, including work related to abutting roadways and connectors and work associated with a TAMS contract, the Developer will coordinate its work with the work being performed by the other contractors. The Department shall require its separate contractors to cooperate with, and coordinate their activities with, the Developer.

D. The Developer shall be responsible for contacting other contractors, localities, WMATA, and Norfolk Southern Railway regarding their anticipated schedules to complete the associated projects or key milestones of the associated projects they may be working on. These contractors may be working on other improvement projects such as, but not limited to, the following:

1. I-66 Widening from US 15 in Haymarket to US 29 in Gainesville
2. VDOT preventative maintenance contracts
3. VDOT operational contracts
4. Transform I-66 Inside the Beltway
5. I-66 Active Traffic Management Project Interstate
6. I-66 and US 15 Interchange Reconstruction
7. any projects listed in the current 6-year plan
8. any localities projects
9. any WMATA or railroad projects
10. City of Fairfax (Routes 29 and 50)
11. I-66 Westbound Shoulder Improvement UPC105596

E. The Developer 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 by the Department or the Contractor.

F. The Developer and/or separate contractor shall assume all liability, financial or otherwise, in connection with its contract and shall protect and save harmless the Department from any and all damages and claims that may arise because of any inconvenience, delay, or loss the Developer experiences as a result of the presence and operations of other design-builder(s) and/or
separate contractor(s) working in or near the work covered by the Developer’s contract. The Developer shall also assume all responsibility for any of its work not completed because of the presence or operation of other design-builder(s) and/or separate contractor(s).

G. The Developer shall be responsible for coordinating the design and construction of this Project with CBE, the I-495 Express Lanes concessionaire.

1.10.3 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 Developer’s Work requires the disconnection of ‘in-service fire hydrants, the Developer shall notify the locality’s fire department or communications center at least 24 hours prior to disconnection. In addition, the Developer shall notify the locality’s fire department or communications center no later than 24 hours after reconnection of such hydrants.

1.11 Emergency Services

1.11.1 Liaison

The Developer shall comply with the Department requirements for participation in industry and statutory initiatives regarding incident and emergency management throughout the Term.

1.11.2 Emergencies and Extraordinary Circumstances

A. Subject to the Agreement, the Developer’s response to emergencies and extraordinary circumstances during the Term as part of the Project will be in accordance with the Agreement and not inconsistent with the Department’s emergency operations and evacuation plan and shall ensure the following:

1. Safety of motorists, pedestrians, bicyclists, 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 the Department 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 or other dignitary require use of the 66 Express Lanes, the Developer shall cooperate and comply fully with their instructions with respect to work activities, lane closures, and traffic management;

5. The Department reserves the right, by direction of the Northern Virginia District Administrator, the Northern Regional Operations (NRO) Regional Operations Director, or designee to assume and exercise control of the 66 Express Lanes in part or in their entirety, including all applicable systems and field devices via available interfaces, pursuant to the Agreement; and

6. The Developer will, as needed, participate in emergency exercises conducted by governmental authorities.

B. During special events that have significant impact on traffic flow, the Developer shall designate a responsible party in charge to work with the Department’s NRO Special Events or incident management Coordinator to develop traffic management plans for the event.

C. Should the Developer fail to respond to an emergency or extraordinary circumstance in a timely manner in accordance with the requirements of the Agreement, the Department shall have the right to take necessary and appropriate action to handle such emergency or extraordinary circumstance.

D. The Developer shall assure that interoperable radio communications are available and utilized between its Operations Center and the Department’s Transportation Operations Center.

E. The Developer shall assure that its personnel operate in a manner consistent with the Commonwealth of Virginia’s Statewide Traffic Incident Management Plan. The Developer shall train its roadway responders to the Strategic Highway Research Program 2 or equitable standard, as endorsed by the Commonwealth of Virginia’s Statewide Traffic Incident Management Committee.

F. The Developer may request the Department’s Safety Service Patrol or incident management coordinator assistance if needed. The Department may request the Developer’s Safety Service Patrol or incident management coordinator assistance, if needed. Neither the Department nor the Developer are required to provide assistance to the other entity, and provisions will be at the discretion of the assisting entity.

G. The Department vehicles may use the Developer’s roadways, without charge, for response to incidents, regardless of location, when use of the Developer’s roadways result in safer or prompter response.
1.12 Safety

1.12.1 General Requirements

A. In accordance with the Agreement, the Department and the Developer recognize that in every circumstance, activity, and decision related to the Project, safety of the public, Department personnel, and Developer personnel is the primary concern. Ensuring and maintaining safety on the Project shall supersede any and all other objectives.

B. The Developer shall designate a full-time Project designated safety representative for the Term. The Project safety representative shall ensure that Developer safety plans, policies, and methods are compliant with all applicable standards, regulations, and laws. The Project designated safety representative, and designees, shall be available to the Department and emergency services personnel at all times.

1.13 Quality Assurance and Quality Control

1.13.1 General Requirements

A. The Developer shall or shall cause to be developed, implemented, and maintained a quality management system that includes a QMSP that meets the standards and specifications set forth in Attachment 1.5, including the Department’s 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 the Department’s Manual of Instruction-Materials Division, 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 was performed in accordance with the Agreement.

C. The Developer’s Contractors, sub consultants, 2nd tier or 3rd tier subconsultants shall adhere to the QMSP.

D. Neither the Developer nor any of its Contractors, subconsultants, or suppliers shall be delegated quality management responsibility in any manner such that the Developer is relieved of any responsibility or liability for the performance of those entities. At all times, contractual and otherwise, and by all means, the Developer shall be contractually responsible for the quality compliance of the Project no matter the provider of services or supplier of material.
E. The Developer shall review and report to the Department its compliance with all PDPs, in accordance with the schedule in Attachment 1.3, as part of their quality systems.

F. The Developer and its Contractors shall ensure that their quality records are available to the Department, in accordance with the Agreement, in order to enable them to monitor and establish whether the Developer’s obligations under the Agreement are met.

1.13.2 Design Management

A. The Developer 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 Agreement. 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 Department assurance that the design plans and submittals will meet all contract requirements. The 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 Agreement 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.

1.13.3 Construction Management

A. The Developer shall develop, execute, and maintain a Construction QA/QC Plan for the full duration of the Agreement in accordance with the Department’s QA/QC Guide. The Developer 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, AMRL-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 Quality Assurance Manager (QAM) shall have the authority to enforce the Agreement requirements when deficient materials or unsatisfactory finished products fail to conform to the Agreement. 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 in accordance with the Agreement. The Developer shall establish and maintain a Quality Assurance Auditing and Nonconformance 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 Developer’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 to the Contractor and the Department within seven (7) days of discovery of the non-conformance. Non-conformance procedures are provided in the QA/QC Guide.

D. The Developer shall also be responsible for providing QA/QC testing for all materials manufactured offsite.

E. The Developer may use the Department’s resources for the following construction quality control activities where the Department routinely provides these services:

1. Offsite programmatic inspection, including supplier plant acceptance inspections;

2. Offsite programmatic testing, including supplier plant acceptance testing; and

3. Items on the Department’s pre-approved list.

Inspection by the Department Representative shall not relieve the Developer of any obligation to furnish acceptable materials and to provide acceptable engineered designs and completed construction that is in accordance with the Agreement.

F. The Department shall be reimbursed by the Developer for all expenses associated with off-site plant inspections if a non-conforming condition causes the need for a Department off-site plant inspection.

G. The QAM shall establish quantities prior to commencing construction, and provide the Department a total number of QC, QA Independent Assurance (IA) and Independent Verification Sampling and Testing (IVST), Owner’s
(the Department) 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 Department will provide all OIA and OVST tests and, therefore, final determination of the actual number of OIA and OVST tests to be performed will be made by the Department based on these quantities.

H. The QAM shall be responsible for the QA inspection and testing of all materials used and work performed on the Project to include observing the Contractor’s QC activities, maintaining the Materials Notebook (including adherence to the Special Provision for Design-Build Tracking (DBT) numbers included in the RFP Information Package), documentation of all materials, sources of materials and method of verification used to demonstrate compliance with the Agreement. This includes all materials where QA testing is to be performed by the Department. The QAM shall be vested with the authority and responsibility to stop any work not being performed according to the Agreement. The construction QA and QC inspection personnel shall perform all of the construction inspection and sampling and testing work in accordance with the Agreement. This includes the documentation of construction activities and acceptance of manufactured materials. The Developer’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 in accordance with the Agreement requirements.

I. 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 in accordance with the Agreement. 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.

J. 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/ITS/Tolling;
2. Lead QA Inspector for MOT; and
3. Lead QA Inspector for Environmental Compliance.
K. 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 by the Department at its sole discretion. 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.

L. All construction QA/QC personnel shall hold current Department 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 Developer’s construction manager. Substitution of Developer’s construction manager and the QAM shall require Department approval. In addition, the Department shall have the right to order the removal of any construction QA/QC personnel, including the QAM and the Developer’s construction manager for poor performance at the sole discretion of the Department project manager. The QA/QC plan shall include rapid reporting of non-compliance to the Department project manager, and shall include the remedial actions to be taken as discussed in the QA/QC Guide.

M. All Electrical/ITS/Tolling testing will be performed in accordance with electrical and communications standards and documented to meet the design details, standards, and system requirements.

N. The Developer shall provide, prior to final application for Payment, 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.

1.13.4 Removal of Unacceptable Work

A. Work will be considered unacceptable if it: (a) does not conform to the requirements of the Agreement; (b) is performed contrary to the instructions of the Department; or (c) is performed without the authorization of the Department. Unacceptable work shall be remedied or removed immediately unless otherwise determined by the Department, and replaced in an acceptable manner at the Developer's expense. The Department may elect, in its sole discretion, to accept otherwise unacceptable work at a reduced price and a warranty extended to five (5) years for the subject portion of the work when acceptance is considered to be in the best interest of the public.

B. The Developer shall not perform destructive sampling or testing of the work without written authorization of the Department. Unauthorized destructive sampling or testing will cause the work to be considered unacceptable.

C. In the event the Developer is granted authorization to perform destructive sampling or testing, the Developer shall obtain the approval of the Department 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 Department.

D. If the Developer fails to comply immediately with any order of the Department made under the provisions of section Agreement, the Department will have the authority to cause unacceptable work to be removed and replaced and to deduct the cost from any monies due or to become due the Developer.
2  **Communications**

2.1  **General Requirements**

2.1.1  **General Requirements**

The Developer in collaboration with the Department shall develop procedures for public outreach, media relations, and marketing in the form of a Communications Plan, which will be consistent with the Agreement and the requirements included in Attachment 1.3. The Communications Plan shall define the roles and responsibilities between the Department and the Developer.

2.1.2  **Project Communications Team**

A. The Developer shall establish a Project communications team through which all communication and public outreach activities will be coordinated.

B. The Project communications team shall include a single point of contact responsible for coordinating Project communications with the Department.

2.1.3  **Interface and Liaison with the Department**

A. Management protocols shall be developed between the Developer’s Project communications team and the Department. These protocols shall detail:

1. Regular reporting to the Department on communications and public information activities, current and outstanding community and political issues, and recent media activity;

2. Media protocols, providing clarity of responsibility in relation to media comment on particular aspects of the Project;

3. Stakeholder relations protocols, assigning responsibility for briefing and information to stakeholders on Project progress and milestones;

4. The development and approval of Project marketing, communications, and public outreach material; and

5. Processes for managing communications surrounding emergency management and recovery operations.

B. Meetings and public interface required by federal and state law shall be conducted in accordance with the current version of the Department’s *Policy Manual for Public Participation in Transportation Projects*. The Developer, in coordination with the Department, shall conduct additional meetings,
public interfacing, and marketing activities in accordance with the Communications Plan.

C. The Developer shall collaborate with the Department in the development of all communications and marketing strategies to ensure they are consistent with both parties’ values, needs, and goals. The Developer shall provide the Department with advance copies of all Project communications materials for review and approval prior to dissemination.

### 2.2 Public Outreach

#### 2.2.1 Stakeholder Outreach

A. The Developer shall plan and hold a Design Public Hearing in collaboration with the Department to present its Preliminary Design in accordance with Department policies and procedures. The Developer shall prepare all materials necessary for the Design Public Hearing.

B. The Developer shall develop and maintain a comprehensive stakeholder database to track and manage stakeholder communications.

C. The Developer shall provide content and support as needed to update and maintain the Department’s Project Website, which will serve as the sole site for Project information through Project Completion.

D. The Developer shall provide a point of contact and phone number for the public to ask questions and share concerns during the Project. The point of contact shall respond to inquiries within a reasonable time under the circumstances.

E. The Developer shall hold informal meetings with affected stakeholders as necessary and as directed by the Department.

#### 2.2.2 Elected Official and Agency Outreach

A. As part of the Communications Plan, the Developer shall provide the planning and effort necessary for effective elected official and agency outreach. At a minimum, the elected official and agency outreach plan shall include status updates, key stakeholder issues, and upcoming Project activities.

B. The Developer shall support the Department as needed to implement the elected official and agency outreach plan.
2.3 Media Relations

2.3.1 Media Outreach

A. The Developer shall support the Department in implementing a targeted, well-managed, earned media, and paid advertising program to engage the traveling public about construction-related issues and timelines throughout the Project.

B. The Developer shall assist the Department in identifying media opportunities, implementing media events, and informing and responding to the media about the Project.

C. The Developer shall:

1. Provide a set of its media protocols related to the Project, upon which the Department and Developer shall agree, including guidelines for information sharing, policies to promote consistent messages, and procedures specific to managing emergencies and incidents.

2. Monitor all media coverage of the Project.

D. The Developer shall provide the Department with advance copies of all press releases and press materials for review and approval prior to dissemination.

2.4 Express Lanes Communications

2.4.1 Communication Program

A. No less than twelve (12) months prior to the Service Commencement Date the Developer shall implement a public education and marketing program to ensure that motorists and all stakeholder groups are educated about the features and benefits of the Project, so that they can make an informed choice about their use of the Express Lanes once open to traffic.

B. The Developer shall provide a public engagement and awareness program to fit within the context of the broader Communications Plan for the Project. It shall address but will not be limited to:

1. Education about dynamic pricing, if used;

2. Information on requirements for using 66 Express Lanes, including HOV eligibility and transponder requirements;

3. Plans for the opening of the Project to traffic and communications that will facilitate smooth ongoing operations;
4. Interfacing with the Department’s E-ZPass marketing and communications, to facilitate distribution of transponders to motorists who intend to use the 66 Express Lanes;

5. Education about driver information systems in use on the 66 Express Lanes, so motorists understand on-road sources of information that will facilitate choice and lane control signals (LCS) of the lane-use management system (LUMS), if applicable;

6. Provision of information to motorists and stakeholders to facilitate the MOT during ongoing maintenance activities during the Operating Period. This shall include:

   6.1 Packaging of all MOT information, such as anticipated delays and lane closures, for provision to the Project communications team and to the Department’s communication team on a regular basis, to facilitate communication with the media, stakeholders, and the broader community; and

   6.2 Communications with property owners in direct impact areas.

C. No less than 12 months prior to the Service Commencement Date, the Developer shall establish a customer facing website that informs the public on the operational nature of the Express Lanes.

2.4.2 Project Branding

A. The Developer shall provide graphics and artwork to support the Project brand. The graphics and artwork shall be consistent with the branding used on other Express Lane systems in the Northern Virginia region and must be approved by the Department prior to publication.

B. The Developer shall conduct market research as necessary to guide marketing and communication activities.

C. The Developer shall establish Project communication benchmarks and measure and report on community awareness, attitudes, and satisfaction towards the Project.
3 Design and Construction Requirements

3.1 General Requirements

3.1.1 The Project shall be designed and constructed pursuant to the design criteria and specifications set forth in the Technical Requirements. The Developer must verify and use the latest version of the documents listed herein as of the date of the final RFP issuance or latest Addenda. The Developer must meet or exceed the minimum roadway design standards and criteria.

3.1.2 If during the course of the design, the Developer determines that a specific Standard, Specification or Reference Document is required but is not listed herein, then the Developer shall first verify with the Department whether any such Standard, Specification or Reference Document exists. If not, then it shall be the responsibility of the Developer to establish the pertinent Standard, Specification, or Reference Document in accordance with generally accepted Good Industry Practice and submit to the Department for review and approval prior to inclusion in the Agreement.

3.1.3 The Developer is responsible for achieving the Work in accordance with all current Department standards as of the date of the final RFP issuance, including any revisions and addenda. If a construction element is not adequately addressed within VDOT Standard Specifications or the Special Provisions listed for the purpose of the Public Private Partnership project design, it is the responsibility of the Developer to develop alternative specifications in accordance with generally accepted Good Industry Practice for Department review and approval.

3.1.4 The Work shall not conflict or impede with local, state, and federal long-range transportation planning improvements. Any Work that does so conflict or impede, must first be approved by the Department and may require removal in the future, at the Developer’s sole expense, in order to accommodate a Long Range Transportation Planning Improvement.

3.1.5 All Design Documentation and Construction Documentation shall comply with the requirements of applicable Governmental Authorities including the Washington Metro Area Transit Authority (WMATA) and the Developer shall solely be responsible for acquiring design criteria deviations from WMATA for WMATA related work.

3.1.6 Design Exceptions will be required for any element of the design among the fourteen controlling criteria that do not meet AASHTO minimum design standards. Design Waivers will be required for any element that meets AASHTO minimum design standards, but does not meet the Department minimum standards or for any element other than the fourteen controlling criteria that do not meet AASHTO minimum design standards. The Developer will be required to follow
the process as described in the latest version of IIM LD-227, S&B 70 regarding Design Exceptions and Design Waivers. The Developer shall submit design exceptions for Department and FHWA approval and design waivers for Department approval. The Department has the sole right to approve or reject any additional DEs or DWs that were not included in the RFP package.

3.1.7 The table of outstanding design exceptions and design waivers related to the Department’s RFP Conceptual Plans are included in Attachment 3.1. Substandard design features in the RFP Conceptual Plans for which improvements can and shall be made to eliminate the need for design exceptions and design waivers are listed in Attachment 3.1 and shall be included in the Developer’s cost proposal. By submitting its cost proposal, the Developer certifies that the Project concept submitted in its cost proposal is fully compliant with the minimum design requirements as outlined in the Agreement. Although these design exceptions and design waivers listed in Attachment 3.1 have been discussed with FHWA, the Developer shall ultimately be responsible for preparing and submitting design exceptions and design waivers for FHWA and Department approval. Previously submitted design exceptions and design waivers are subject to reevaluation 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, such additional information or changed conditions affects the premise on which the original design exception or design waiver at issue was based.

3.1.8 The Developer shall ensure that the condition of existing buildings, structures, roadways, sidewalks, paths, trails, lighting and signal equipment, or other property that is to remain is not affected by the performance of the Work. Prior to commencing Work the Developer shall perform property pre-condition surveys and monitor their condition during the Work Period. The Developer shall repair any damage deemed to be caused by the Work. The Department shall be given the opportunity to witness any pre-condition surveys or monitoring and the Developer shall make the results to the Department before commencing any Work that may affect the property. Any damaged curb ramp that needs to be replaced shall be brought up to current standards as required by ADA.

3.1.9 The Project is considered part of the Strategic Highway Network (“STRAHNET”).

3.1.10 All Design Documentation and Construction Documentation shall be in English units.

3.1.11 The Developer shall ensure that areas impacted by 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. Upon Project Completion, or other such timeframe as may be agreed to by both parties, the Developer shall remove its construction equipment, materials and debris from the
Project ROW and other property adjacent to the Project.

3.1.12 The Developer shall 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 Developer shall use suitable precautions to prevent damage to such property. If property is damaged, the Developer shall restore property to a condition similar or equal to that existing before such damage was done by repairing, rebuilding, or restoring, as may be directed by the Department, or making settlement with the property owner. The Developer shall secure from the owner a release from any claim against the Department. A copy of this release shall be furnished to the Department.

3.1.13 The Developer shall provide certified letters to the property owners at the address on record that comply with the Code of Virginia § 33.2-1011, Right of Entry. Copies of the letters, signed return receipt or proof of delivery shall be provided to the Department fifteen (15) days after the proof of delivery. Notice of intent to enter shall be deemed made on the earlier of the date of mailing, if mailed, or on the date delivered.

3.2 Environmental

3.2.1 Environmental Document

A. FHWA has issued a NEPA decision for the Project. A copy of the Finding of No Significant Impact (FONSI) and Revised Environmental Assessment (EA) dated [Month Day, Year (expected to be defined early 2016)] is included in the RFP Information Package. The Department will complete a final document re-evaluation for RW Authorization (EQ-201) prior to RW authorization and a final document re-evaluation for PS&E Authorization (EQ-200) and final Environmental Certification/Commitments Checklist (EQ-103) prior to the Department releasing the Project for construction.

B. The Developer shall carry out environmental commitments during design, right-of-way acquisition, and construction, as applicable, as identified in the FONSI/EA, the PS&E Re-evaluation, and the Environmental Certification forms. All commitment compliance shall be supported by appropriate documentation, to be provided by the Developer to the Department.

C. Any changes in the scope or footprint of the established basic Project concept, proposed by the Developer and acceptable to the Department, may require additional environmental technical studies and analysis to be performed by the Developer. The Developer shall be responsible for notifying the Department of plan revisions, scope changes, and providing any necessary studies and other necessary information to support the Department’s completion and re-evaluation of the NEPA document. The
Department will be responsible for the coordination of any environmental documentation re-evaluation with FHWA. The Developer shall then carry out any additional environmental commitments that result from such coordination.

3.2.2 Cultural Resources

If No Adverse Effect

A. On December 2, 2015, the VA SHPO determined the Project would have No Adverse Effect on historic properties in the Area of Potential Effects (APE). However, there were conditions accompanying the determination of No Adverse Effect. The APE for architectural resources includes the project footprint and extends approximately 500 feet beyond the existing Department right of way on both sides of the transportation corridor as well as other areas beyond 500 feet that are visible from the road. The proposed park-and-ride (P&R) lots also are within the APE. The APE for archaeology includes the project footprint and extends approximately 100 feet from the existing Department ROW on both sides of the corridor, and also includes beyond 100 feet needed for stormwater ponds. The proposed P&R lots also are within the APE. Copies of relevant VDOT and VA SHPO correspondence and RFP Conceptual Plans showing the location of historic properties are included in the RFP Information Package. It is expected there are nine historic properties in the Project’s APE, as shown in Table 3.2 below. Table 3.2 is provided for reference only.

<table>
<thead>
<tr>
<th>Town, City, or County</th>
<th>DHR No.</th>
<th>Resource Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fauquier County, Prince William County</td>
<td>030-1016</td>
<td>Thoroughfare Gap Battlefield</td>
</tr>
<tr>
<td>Prince William (Gainesville, Haymarket)</td>
<td>030-5152</td>
<td>Buckland Mills Battlefield</td>
</tr>
<tr>
<td>Prince William</td>
<td>076-5381</td>
<td>Gainesville District School, 14550 John Marshall Highway</td>
</tr>
<tr>
<td>Prince William; Fairfax</td>
<td>076-0271</td>
<td>Manassas National Battlefield Park (also part of Manassas Battlefield Historic District)</td>
</tr>
<tr>
<td>Prince William; Fairfax</td>
<td>076-0271</td>
<td>Manassas Battlefield Historic District</td>
</tr>
<tr>
<td>Fairfax County (Centreville)</td>
<td>029-0428</td>
<td>Centreville Historic District</td>
</tr>
<tr>
<td>Fairfax (County) – portion in project area</td>
<td>053-0276</td>
<td>Washington and Old Dominion Railroad Historic District</td>
</tr>
<tr>
<td>Fairfax (County)</td>
<td>44FX1552</td>
<td>Prehistoric Camp/Lithic Scatter, archaeological site</td>
</tr>
<tr>
<td>Fairfax (County)</td>
<td>44FX1834</td>
<td>Civil War winter camp, archaeological site</td>
</tr>
</tbody>
</table>
B. The Developer shall consider historic properties to be design constraints and avoid impacting them beyond what is shown on the RFP Conceptual Plans. In addition, the Developer shall avoid any other project-related activities on or within the viewshed of these historic properties, including but not limited to staging, borrow and disposal, and any temporary or permanent easements. Please note that any changes to the design, alignment, right-of-way limits, or easements shown on the RFP Conceptual Plans may require review by the Department and could require additional cultural resources studies or coordination with the VA SHPO. The Developer is responsible for conducting all cultural resources studies necessitated by the proposed changes, while the Department is responsible for coordinating both the studies and the proposed changes with the VA SHPO. The Developer 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.

3.2.3 Section 4(f) Resources

A. A Section 4(f) de minimis determination was made with respect to the following Section 4(f) resource:

<table>
<thead>
<tr>
<th>Section 4(f) Resource</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random Hills Park</td>
<td>[0.03] acres — de minimis</td>
</tr>
</tbody>
</table>

B. The Developer should consider 4(f) resources to be design constraints and avoid any impacts to them beyond the acres of use identified in this section. In addition, the Developer shall avoid any other project-related activities on these resources, including but not limited to staging, borrow and disposal, and temporary or permanent easements.

C. Any changes to the right-of-way or easements as shown on the RFP Conceptual Plans, proposed by the Developer and acceptable to the Department, may require additional technical studies and analysis to be performed by the Developer. The Developer shall be responsible for notifying the Department of plan revisions, right-of-way/easement changes, and providing any necessary studies and other necessary information to support the Department’s completion of any required 4(f) documentation. The Department will be responsible for the coordination of any 4(f) documentation with FHWA. The Developer 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.

3.2.4 Water Quality Permits and Compensatory Mitigation

A. The Developer shall obtain all necessary environmental clearances, permits, and approvals required to accomplish the work as noted in the Agreement. The Developer shall be responsible for performing necessary design and
fieldwork to support the acquisition of necessary water quality permits independently and directly from the regulatory agencies. The Developer will be the Permittee. The Developer should note that the wetland delineations are provided for informational purposes only. The Developer shall be responsible for verifying permit requirements prior to construction. Regulatory agencies will make the final determination as to which state and federal water quality permits will be required during coordination with the Developer.

B. The Developer shall determine the applicability of water quality permits for the Project (to include utilities to be relocated by the Developer for the Project). Should it be determined that water quality permits are required, the Developer shall conduct the preliminary field assessment including, but not limited to, wetland delineation, stream assessment, and permit impact sketches. The Developer shall also determine the required sequencing methodology to limit Project impacts to wetland systems. The Developer shall utilize this information to obtain required permits.

C. If the Developer determines water quality permits are not required based on information generated, the Developer shall notify the Department in writing, so that the Department can authorize the Developer to execute the work. Any deviations that the Developer makes to the Project footprint or scope may render the permit determination invalid and will require additional consideration.

D. If the Developer determines that wetlands or stream mitigation is required to secure the permit authorization, the Developer shall provide the required compensatory mitigation. The Developer shall account for all costs associated with water quality permit acquisition, as well as compensatory mitigation, in its price proposal.

E. The Developer shall note that avoidance, minimization, and mitigation measures associated with permit acquisition will require close coordination between the Developer and the Department. If permit issuance is delayed or permits are denied, the Developer shall be responsible for any schedule delays and associated costs.

F. Should the Developer propose design changes acceptable to the Department, permitting requirements may also change; the Developer remains responsible for obtaining all necessary water quality permits and permit modifications required by the regulatory agencies to accommodate the design changes.

G. The Developer 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 Developer 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.

H. The Developer shall be responsible for compliance with pre-construction,
construction-related permit conditions, as well as post-construction
monitoring if required by regulatory agencies. This shall include costs
associated with acquiring water quality permits and additional compensatory
mitigation for the Project if needed.

I. The Developer shall provide to the Department 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 Developer. The
Developer shall not proceed with work covered by the water quality permits
until the Department releases the work in writing. The Department may
release a portion or all of such work not in jurisdictional areas, but may order
a suspension of the same work after its release. The Developer shall not be
allowed to begin work that pre-determines the work required in
the jurisdictional areas until the permits are secured.

J. After receiving the Department’s release of the Work, the Developer shall
notify the Department and the regulatory permitting agencies in writing
fourteen (14) days prior to beginning work in the jurisdictional areas covered
by the water quality permits.

K. The Developer shall allow environmental compliance inspections by the
Department, and regulatory agencies as required by permits and to facilitate
any interim compliance reviews and assessments.

L. At the conclusion of the Project, the Developer shall notify the Department
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 Developer is required to transfer any Virginia
Marine Resources Commission (VMRC) permits back to the Department.

M. The Developer shall carry out any additional permit conditions and
commitments that result from changes in footprint or scope (assuming it is
approved by the Department); additionally the Developer shall be responsible
for any schedule delays.

N. All permitted construction activities shall be identified as Hold Points in the
Developer’s CPM Schedule.

3.2.5 Threatened and Endangered Species

A. The Department has performed preliminary database reviews to determine
the Project’s potential effects on threatened and endangered (T&E) species,
indicating that the following state and federally listed T&E species were identified in the required search area: northern long-eared bat (*Myotis septentrionalis*), harperella (*Ptilimnium nodosum*), dwarf wedgemussel (*Alasmidonta heterodon*), brook floater (*Alasmidonta varicosa*), wood turtle (*Glyptemys insculpta*).

B. The Developer shall be advised that new and updated T&E information is continually added to agency databases. The Developer shall be responsible for any subsequent coordination to obtain updated information, requirements, and clearances from environmental regulatory agencies that provide threatened and endangered species oversight. This additional T&E species coordination is also a standard component of the water quality permit acquisition process and may result in permit conditions for which the Developer will be responsible. The Developer is responsible for ensuring that all T&E species are correctly identified and impacts assessed, noting that more or less resources may be present than initially identified. Avoidance and minimization shall be implemented to the greatest extent possible. The Developer shall provide to the Department copies of all documentation and correspondence with regulatory agencies.

### 3.2.6 Hazardous Materials

A. The Department performed studies to determine the potential for hazardous materials or contamination within the Project area. Information pertaining to these studies is included in the RFP Information Package and constitutes Known Pre-existing Hazardous Materials. In addition, the Developer shall comply with the applicable contract special provisions and guidance documents.

B. The Developer shall manage solid waste, hazardous waste, and hazardous materials in accordance with all applicable federal, state, and local environmental regulations and shall implement good housekeeping, waste minimization and pollution prevention practices.

C. Unless a structure has been otherwise classified, the Developer shall assume all coated structures are Type B.

D. The Developer shall perform asbestos inspections on all structures (including bridge structures) and, as applicable, perform asbestos abatement, abatement monitoring, notifications and demolition in accordance with Department procedures and specifications. Prior to demolition, asbestos abatement shall be performed for all structures found to contain regulated asbestos materials (RACM) and non-RACM that is expected to become friable (i.e. RACM) during the course of demolition The Developer shall make all appropriate abatement and demolition notifications as required by federal, state, and local regulations.
E. 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 or 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 to the Department.

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

G. The Developer 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 to the Department prior to start of construction. In the event of spills or releases of petroleum products and other hazardous liquids or solid materials, the Developer 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 Developer shall notify the Department 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.

H. The Developer shall not acquire property until any required Phase I Environmental Site Assessment is complete and approved. This shall represent a Hold Point in the Developer’s CPM Schedule.

3.2.7 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. The Air Quality Analysis Report, dated May 11, 2015, is provided in the RFP Information Package. The Report identifies federal and state regulatory requirements that must be adhered to during construction of the project.

B. This Project is located within an 8-Hour Ozone Nonattainment area, an Annual Fine Particulate Matter (PM$_{2.5}$) Nonattainment area, a Carbon
Monoxide Maintenance area (applies only to projects within the city of Alexandria and Arlington County), and a volatile organic compounds (VOC) and nitrogen oxides (NOx) emission control area. As such, all reasonable precautions should be taken to limit the emissions of VOC, NOx, and particulate matter during construction of the project. In addition, the following Virginia Department of Environmental Quality (VDEQ) air pollution regulations must 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. The Developer will be required to adhere to the limitations outlined in the Special Provision for Volatile Organic Compound Emissions Control Areas.

3.2.8 Noise Mitigation

A. The Developer shall provide permanent noise mitigation in compliance with the State Noise Abatement Policy (SNAP) and the Highway Traffic Noise Impact Analysis Guidance Manual. The final barrier location(s) and dimension(s) will be determined during the final design noise analysis. A Noise Abatement Design Report (NADR) shall be furnished by the Developer at its sole cost and expense.

B. The final noise mitigation design will utilize the specific environmental traffic data (ENTRADA) spreadsheets that were developed for the I-66 project with the appropriate future design year. The Developer shall be responsible for developing and updating the ENTRADA for the Final NADR based on the approved design and or latest design information.

C. Upon approval of the Final Design Noise Analysis the Department shall prepare a concurrence letter outlining the results of the analysis for the Department’s Chief Engineer and FHWA. Once concurrence is achieved the Developer shall prepare and mail letters “certified return receipt” to benefitted receptors.

D. All sound barriers should be named as presented within the NADR.

E. Prior to submitting a sound barrier plan for the Department’s review, the Developer will 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 to the Department for review.

F. If deviations in the horizontal or vertical alignment of a sound barrier or the roadway alignment are proposed following concurrence from the Chief Engineer or FHWA, then additional documentation will be provided with the plan set when the set is submitted to the Department for review. 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 sound barrier for which modification is requested will be submitted with this additional information.

G. The Department’s written approval of the barrier deviation will be required for the approval of AFC Documentation.

H. A key plan will be clearly labeled to show the location of the ground-mounted combo wall (sound barrier on retaining wall) and bridge-mounted sound barriers.

I. Plan view will provide the alignment of the sound barrier with the roadway plan view.

J. Profiles of the wall alignment will include the noise attenuation line and the existing and proposed elevation. If combo walls or bridge-mounted barriers are present along the alignment, the pattern of the line will be different so that all lines can be distinguished.

K. Stations of the roadway and sound barrier will be included on both the plan and profile views.

L. Unless otherwise noted on the plans or approved by the Department, sound barrier walls shall be designed with a 10-foot wide maintenance area behind the walls with access for personnel and equipment. Access may be provided by access doors for personnel. Gaps may be provided in the walls with a 3:1 overlap to gap ratio. If the 10-foot wide maintenance area is unavailable, or requires support of excavation or right-of-way acquisition, the 10-foot maintenance area dimension may be reduced with the approval of the Department.

M. The area between the barrier and the sound barrier wall shall be designed to avoid debris accumulation.

N. Sound barrier design will be coordinated with first responders to ensure access to fire hydrants and other emergency equipment, where feasible.

O. Sound barrier design should periodically provide pedestrian and bicycle access to the shared use path along the north side of I-66. These access locations should provide adequate sight distance for bicyclists entering from the adjacent neighborhoods. These locations can be co-located with other access needs.

P. General notes that state the following will be included:
1. “Sound barriers will be designed and constructed in accordance with the Special Provisions for Sound Barrier Walls included in the Attachment 1.5. The barrier aesthetic treatment and color is defined in the Special Provisions.

2. “Sound barriers will be designed and constructed in accordance with the roadway cross-sections in the plans.”

3. “Sound barriers will be designed and constructed in accordance with the soil parameters included in the Geotechnical Report.”

4. “Access door requirements and locations shall be determined prior to design as directed by the Department.” Door standard size shall be nominal 4 feet x 7 feet.

5. “All sound barrier walls will have sound absorptive finish, unless otherwise noted.”

Q. The Developer is responsible for obtaining local noise ordinance variances prior to scheduling of night time operations pursuant to the Agreement.

R. The Developer shall construct the proposed sound barrier wall prior to demolishing an existing sound barrier wall unless otherwise approved by the Department. The Developer shall demonstrate that the new sound barrier wall cannot be constructed without first demolishing the existing sound barrier wall.

S. The Developer shall begin construction of new sound barrier walls within sixty (60) days of the start of demolition of an existing sound barrier wall or cutting of trees whichever occurs first, unless otherwise approved by the Department. The Developer shall complete construction of any new sound barrier wall intended to replace an existing sound barrier wall or trees which were acting as a screen for adjacent properties within 240 days from the start of demolition of the existing sound barrier wall or cutting of trees whichever occurs first, unless otherwise approved by the Department.

T. The Developer shall use the preliminary noise analysis to plan for and price the amount of sound barriers to be delivered as part of the Project. Following the Agreement Date, the Developer shall prepare a final noise analysis to support the Final NADR. The Final NADR will, among other things, help the Department to confirm the final amount of sound barriers to be delivered as part of the Project. Based on the results of the final noise analysis, one of the following scenarios may apply:

1. If the square foot quantity of noise walls constructed is less than the square foot quantity of sound barriers as shown on the RFP Conceptual
Plans and to the heights indicated in the preliminary noise analysis, the Developer shall credit the Department for the amount of reduction.

2. If the square foot quantity of sound barriers constructed is more than the square foot quantity of noise walls as shown on the RFP Conceptual Plans and to the heights indicated in the preliminary noise analysis, the Department shall compensate the Developer for the amount of increase.

For both clauses above, the unit price of credit or compensation shall be as indicated at the time of bid, agreed to by the Department, and deemed all-inclusive

3.2.9 Environmental Compliance

A. The Developer is responsible for compliance with all applicable state and federal environmental laws, regulations, and permits. If, at any time, the Developer is not in compliance with all applicable environmental laws, regulations, Executive Orders, commitments, etc., the Department 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 corrective action shall be taken by the Developer to bring the item(s) back into compliance.

B. The Developer shall be responsible for any schedule delays and associated costs as a result of any delays or shut downs associated with non-compliance. Any monetary fines associated with violations or any environmental restoration activities required to resolve violations shall be the responsibility of the Developer.

C. The Developer shall carry out environmental commitments during design and construction, as applicable, as identified in the EA, the Document Re-evaluations for RW Authorization (EQ-201) and PS&E Authorization (EQ-200), and the Environmental Certification and Commitments Checklist (EQ-103). All commitment compliance shall be supported by appropriate documentation, to be provided by the Developer to the Department.

D. The Developer shall be responsible for compliance with pre-construction and construction-related environmental commitments and permit conditions. The Developer shall assume all obligations and costs incurred by complying with the terms and conditions of the permits and certifications. Any fines associated with environmental permit or regulatory violations shall be the responsibility of the Developer.
3.3 Geotechnical

3.3.1 Geotechnical Design

A. Geotechnical design engineer. This individual shall be responsible for ensuring that all geotechnical investigations, analysis and recommendations that are necessary for the design and construction of the Project are performed in accordance with the 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 the Project. This individual shall have geotechnical engineering experience and expertise working in the region and/or in areas of similar geologic settings with similar project features for this Project. The geotechnical design engineer shall be a licensed professional engineer in the Commonwealth of Virginia.

B. The minimum soil parameters to be used for design of foundations for sound barrier walls, minor retaining walls (e.g., less than 15 feet in height) and for the design of non-critical slopes (e.g., less than 25 feet in feet) shall be in accordance with the standards and specifications set forth in Attachment 1.5.

C. The Developer shall collect appropriate data for geotechnical evaluation of embankments, soil and rock cuts, culverts, pavements, bridge and wall structures, sound walls, stormwater management facilities, minor structures including drainage pipes, and any other earth-supported structures or elements of highway design and construction. The Developer shall be responsible for obtaining any Regulatory Approvals required for any borings needed in performance of the Developer’s geotechnical investigation for this Project. The Developer shall be responsible for obtaining all necessary permits and utility clearances as required by the Department, the Commonwealth of Virginia, or any other jurisdictional body or owner prior to accessing public or private property for the purpose of conducting geotechnical field work and shall provide the necessary traffic control in accordance with the Work Area Protection Manual. The Developer shall complete laboratory tests in accordance with pertinent 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 the Project, unless otherwise approved by the Department. The Developer shall have a geotechnical report approved by the Department before beginning construction. The Department will not be responsible for any costs incurred that were based on geotechnical assumptions.

D. The Developer shall provide to the Department records of all subsurface explorations and describe the soils encountered and their depth limits, in
accordance with the requirements outlined in Chapter 3 of the Department’s *Manual of Instructions* for Materials Division and the investigation in accordance with an approved exploratory boring plan(s) approved by the Department. The Developer may elect to perform roadway borings at twice the spacing identified in Chapter III of the *Manual of Instructions* provided the Developer assumes all responsibility and liability for any changed or unknown conditions at the unexplored locations. All other (e.g., bridge, retaining wall, sound barrier wall, minor foundations, etc.) boring spacing requirements shall be in accordance with Chapter 3 of the *Manual of Instructions*. Preliminary and final and design geotechnical investigations shall be performed to meet the minimum requirements set forth in Attachment 1.5. The final geotechnical investigation shall be in compliance with Chapter 3 of the Department’s *Materials Manual of Instructions*, the AASHTO LRFD Bridge Design Specifications, and VDOT Modifications; and Section 700.04 (c) of the VDOT Road and Bridge Specifications unless otherwise approved by the Department. The Developer shall provide electronic copies of all subsurface explorations in accordance with the boring log template available on the Website address included in Chapter 3 of the Department *Manual of Instructions* for Materials Division. The electronic files shall be provided by a certified Professional Geologist or a suitably qualified registered Professional Engineer in the State, in gINT© software, before beginning of construction. Upon request, the Department will provide its gINT and ACCESS file structures for the Geotechnical Database Management System.

**E.** Where applicable, the Developer shall incorporate reliability assessments in conjunction with standard analysis methods. An acceptable method for evaluation of reliability 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 percent. The aspects of this Project for which reliability assessments shall be made include: 1) the selection of soil parameters used in the design of all foundations and retaining walls, 2) the factors of safety for slope stability, and 3) the settlement and bearing capacity of embankments. Except as mentioned in (1) above, reliability assessments need not be performed for structural foundations and retaining walls, which will be evaluated based on the required limit states in LRFD. The Developer may propose to identify specific, non-critical features, and alternative methods for evaluating variability of subsurface conditions, reliability and minimum factors of safety, prior to submission of its design calculations and drawings. The Department may, in its sole discretion, accept or reject such proposed methods.

**F.** The Developer shall provide to the Department geotechnical design and construction memoranda that summarize pertinent subsurface investigations,
test, and engineering evaluations. Technical specifications for construction methods that are not adequately addressed in the standards and specifications set forth in Attachment 1.5 shall be provided by the Developer. The Developer 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 1.5 and 3.7.

G. The Developer 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 this Project. All geotechnical work shall be completed to satisfy baseline and post-construction contract performance requirements, as described below.

H. Design and construct pavements, subgrades, and embankments to meet the following post-construction settlement tolerances:

1. Total vertical and differential settlements that will not be a deterrent to achieve and maintain the post-construction performance requirements for overall ride quality and localized roughness of the pavements nor exceed the grade tolerances of pavement sections of approach slabs, bridge decks, and tie-ins to the Project;

2. Settlement that will not impede positive drainage of the pavement surface especially within the travel lanes nor subject the roadway to flooding;

3. Settlement that does not result in damage to adjacent or underlying structures, including utilities; and

4. Humps and depressions exceeding the specified tolerance will be subject to correction by the Developer. The Developer shall notify the quality assurance manager or the operation and maintenance manager and the Department for any non-conformance items.

I. The Developer shall consider settlement and design foundations (bridges, retaining walls, pipes and other structures) based upon Attachment 3.3. In summary, Attachment 3.3 outlines two options for managing settlement of structures: (1) limit total settlement to .5 inch and subsequently limit the need for a refined analysis of the superstructure and substructure; or (2) allow the Developer to design the structure for its estimates of elastic, consolidation,
and Secondary Settlement (total settlement) and subsequently communicate the total and differential settlement in a the general note to the Design Documentation. In either case, a general note shall be placed on the Design Documentation which 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 3.3.

### 3.3.2 Slope Design

Cut and fill slopes shall be no steeper than 2H:1V. 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.

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 slope areas higher than 10 feet, or where slopes are supporting on, or are supported by, retaining structures. The factors of safety listed in Table 3.3 are valid for subsurface investigations performed in accordance with Chapter III of the Department’s Materials Division’s *Manual of Instructions* or for site-specific investigation plans approved by the Department’s Materials Engineer. Table 3.3 is not applicable for rock cut slopes.

<table>
<thead>
<tr>
<th>Basis of Soil Slope Analysis Parameters</th>
<th>Factor of Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-situ or lab tests and measurements(^2,^3)</td>
<td>1.5</td>
</tr>
<tr>
<td>No site specific tests</td>
<td>N/A(^3)</td>
</tr>
</tbody>
</table>

1. A critical slope is defined as any slope that is greater than 25 feet in height, affects or supports a structure, or whose 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 must be analyzed for short- and long-term stability using residual strength parameters obtained from laboratory shear testing. These parameters must 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.
Global and slope stability analyses of Potomac Formation clay and slits shall be analyzed using residual strength parameters for problem soils wherever they are encountered.

3.3.3 Unsuitable Materials

Unsuitable Material is defined as material used as embankment fill, and in cut areas to a depth of at least 3 feet below subgrade directly beneath pavements and at least 2 feet beneath the bedding of minor structures and laterally at least 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 5 percent by weight organic matter; exhibits a California Bearing Ratio (CBR) value less than 5 (US 15 to Route 28) or less than 2.5 (Route 28 to I-495) when tested in accordance with VTM-8; exhibits a swell greater than 5 percent as determined from the CBR test using VTM-8; exhibits strength, consolidation, durability of rock or any other characteristics that are deemed unsuitable by the Developers’ geotechnical engineer or as denoted in the Agreement for use in the Work. All materials within the uppermost 3 feet of a pavement subgrade that exhibits a CBR value less than that stipulated in the pavement design shall also be considered unsuitable. The anticipated locations and methods of treatment for unsuitable materials identified by the Developer’s qualified geotechnical engineer shall be shown on the design plans and cross sections. Saturated or very dry 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 treated as discussed in accordance with the Agreement at no additional cost to the Department. 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 12 inches. Acceptable methods of dealing with these unsuitable soils are: 1) 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; 2) partial removal to at least 2 feet below final pavement subgrade or minor structure bedding elevation to within the limits noted in (a) and replacement with select fill and geosynthetic material; 3) raising grades with select fill and geosynthetic material to provide a minimum 2 feet of separation between these soils and final pavement subgrade or minor structure bedding, and 4) chemical stabilization of the soils to a minimum depth of 12 inches below final pavement subgrade. All unsuitable materials shall be disposed off-site at no additional cost to the Department.
3.3.4 Embankments and Retaining Walls

Embankments and certain aspects of retaining wall design are not addressed by LRFD. Embankments and cut slopes shall be designed in accordance with VDOT Materials Division’s MOI. The maximum slope ratio to be used for cut or roadway embankment fill slopes shall not be steeper than 2H:1V. The Developer is responsible for verifying the stability of all slopes, including those retained by structures.

All retaining walls shall be designed in accordance with the applicable Department and AASHTO requirements, including Soil Design Parameters for Sound Barrier Walls, Retaining Walls and Non-Critical Slopes included in the RFP Information Package. If the Developer 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 Special Provisions for approved proprietary MSE walls. The Developer shall provide both global and external stability analysis utilizing a computer program acceptable to the Department and submit the results of the analysis, including boring logs, laboratory data, and any other applicable data, to the Department geotechnical engineers for review. The wall supplier shall provide to the Developer, for submittal to the Department, an internal stability analysis that validates the design of the wall. Retaining walls shall be designed to control settlements within tolerances identified by VDOT Guidelines for Preparation of Alternate Retaining Wall Plans.

Material and Construction requirements shall follow the VDOT Manual of the Structure and Bridge Division, Volume V – Part 11 “Geotechnical Manual for Structures” and applicable special provisions listed in Attachment 1.5. Where undercutting and material replacement is required to reduce settlement or improve bearing capacity and global stability, areas requiring repair shall be clearly identified on the plans with notes provided to aid plan review, construction, and inspection.

3.4 Materials

3.4.1 Rights for and Use of Materials Found on Project

With approval of the Department, the Developer may use in the Project any materials found in the excavation that comply with the standards and specifications set forth in Attachment 1.5. The Developer 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. The Developer 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 Developer shall not waste, bury, deposit, or abandon any material
within the Project limits. The Department may consider at its sole discretion certain exceptions to this requirement on a “case-by-case basis.”

3.4.2 Samples, Tests, and Cited Specifications

The responsibility for quality control, quality assurance, and ensuring compliance with applicable specifications and testing requirements lies with the Developer. The Developer’s QMSP shall outline the procedures for quality assurance, quality control, and compliance with the Technical Requirements. The Department, at its discretion, may conduct testing and audits in its performance of Oversight Services.

3.4.3 Disposal Areas

A. Unsuitable or surplus material shall be disposed of by the Developer off the Project ROW. The Developer 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 by the Department for use in disposing unsuitable or surplus material.

B. Prior to the Department approving a disposal area, the Developer 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 3 acres flows across a disturbed area. Sediment basins are required if the runoff from a watershed area of 3 acres or more flows across a disturbed area. The Developer shall certify that the sediment trap or basin design is in compliance with the standards and specifications set forth in Attachment 1.5. 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 by the Department. The Developer’s design and restoration shall conform to the requirements of the Agreement.

D. The Developer shall furnish the Department a statement signed by the property owner in which the owner agrees to the use of their property for the deposit of material from the Project. The property owner will hold harmless the Department, its officer, its agents, and its employees. Upon completion of the use of the property as an approved disposal area, the Developer shall furnish the Department 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 Developer, and sources furnished by the Department.

E. The Developer will obtain VPDES Construction Permit as well as any other applicable permits for Disposal Site, which shall be in compliance with Department standards and specifications.

3.5 Drainage

3.5.1 Drainage Report

The drainage work shall include the design and construction of culverts, open channels, storm sewer systems, underdrains, bridge deck drainage assemblies and structures, downstream channel and flood protection measures, stormwater management facilities, and erosion and sediment control measures in compliance with the standards and reference documents listed in Attachment 1.5 and the VDOT Erosion and Sediment Control and Stormwater Management Programs. The Developer shall provide the Department 2 paper and 2 electronic copies of a final drainage report incorporating all drainage calculations including pre and post development discharges, 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. Each milestone submission of drainage analysis shall include 2 paper and 2 electronic copies of the drainage report for the Department’s approval.

3.5.2 Drainage Design Documentation

Final Design Documentation for any hydraulic design shall include a complete set of final drainage computations sealed and signed in accordance with IIM-243.

A. The drainage design shall include but not be limited to enclosed storm sewer systems, inlets, stormwater management systems for water quality and water quantity, manholes, junction boxes, conduits, culverts, headwalls, end sections, channels, ditches, bridge and major structure hydraulics, scour analysis, scour countermeasures, adequate outfalls, and erosion and sediment control.

B. The Developer shall prepare drainage design criteria and a list of software packages to be used in the design prior to the first drainage submission for review and approval.

C. The Developer shall assemble and review all available data, studies, and development plans impacting the I-66 Corridor for use in preparing the drainage design. The Developer shall perform a hydrologic analysis of the I-66 Corridor and all offsite areas that drain through or impact the I-66 Corridor.

D. All existing drainage facilities within the I-66 Corridor ROW that the Developer intends to leave in place shall be evaluated and verified to have adequate hydraulic capacity for ultimate land use conditions; in accordance with the current VDOT Drainage Manual at Developer’s cost. If an existing facility does not have adequate hydraulic capacity, the Developer shall upgrade the facility at Developer’s cost. The Developer shall also evaluate and verify the structural adequacy of any existing drainage facilities which the Developer intends to leave in place for continued use. If an existing facility is not structurally adequate due to additional embankment or live loading, the Developer shall upgrade the facility at Developer’s cost. If an existing facility is structurally adequate, then the Department will determine whether to rehabilitate or replace the drainage system to ensure a continued service life of 100 years. Where the Department desires the Developer to carry out the rehabilitation, the Developer will produce a schedule of work required and agree with the Department a schedule for carrying out such work as a Department Change.

E. The Developer shall provide new storm water management facilities and for the replacement of capacity for any existing storm water management facilities that may be removed or impacted in accordance with applicable standards and specifications set forth in Attachment 1.5.
F. 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, unless otherwise approved by the Department.

G. As part of the Work, the Developer may tie in or connect new drainage assets it is designing and constructing to existing drainage assets present along the I-66 Corridor. The Developer shall be required to cause such facilities to be clean and free of debris and silt prior to Project Completion. If there is an existing drainage asset the Developer desires to tie in or connect to, but is prevented from doing so because of physical damage to such existing drainage asset not caused by or attributable to the Developer’s activities, the Developer shall repair or replace the existing drainage asset in the immediate area of the proposed tie-in or connection so it can perform the proposed tie-in or connection. Any such repair or replacement work shall be completed in accordance with the standards and specifications set forth in Attachment 1.5. Where the Department desires the Developer to carry out the repair work, the Developer will produce a schedule of work required and agree with the Department on a schedule for carrying out such work as a Department Change.

H. The foregoing provision shall not apply if the hydraulic capacity or structural loading of any existing drainage asset is verified to be inadequate, as determined pursuant to the Agreement, as a result of the Developer proposed tie-in or connection. In that case, the Developer shall, at its sole cost and expense, replace, repair, or otherwise upgrade the existing drainage asset (in accordance with the standards and specifications set forth in Attachment 1.5) in order to accommodate the proposed tie-in or connection.

I. All existing culverts, storm sewer, and drainage appurtenances to be abandoned shall be removed or filled and plugged in accordance with Attachment 1.5.

J. See Structures and Bridge Section for bridge deck drainage requirements.

K. For all impacted permanent structures and bridges, the hydrology, hydraulics, and scour requirements shall be in accordance with the requirements set forth in Attachment 1.5, including but not limited to AASHTO Load and Resistance Factor Bridge Design Specifications (the more stringent requirements shall govern).

L. The Developer will perform a comprehensive design analysis for impacted major culvert or bridge-crossing locations where the 100-year discharge is 500 cfs or more, or floodplain studies have been published by federal agencies. The outline for the comprehensive design analysis will be in accordance with the standards and specifications set forth in Attachment 1.5.
The Developer will ensure the hydraulic analysis is coordinated with the bridge design when bridges over waterways are involved.

M. The scour analysis and reporting shall be in accordance with the standards and specifications set forth in Attachment 1.5 and shall include all existing structures undergoing restoration of structural integrity, widening and new and replacement bridges at stream crossings. Countermeasures to accommodate scour at existing piers shall only be used when approved by the Department. Scour countermeasures shall be provided at existing and new abutments in accordance with the standards and specification as set forth in Attachment 1.5.

N. The Developer will perform a scour analysis on all new retaining walls parallel to stream flow or subject to longitudinal scour. 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 by the Department. Appropriate bank protections and revetments are required for walls subject to flows and potential bank erosion.

O. During the Work period the Developer 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.

3.5.3 For the purposes of developing the price proposal, the Developer shall assume that the existing drainage pipes and culverts within the Project limits and which are a functional element of the proposed drainage design, are structurally deficient and are to be plugged and abandoned in accordance with VDOT Road and Bridge Standard PP-1, removed, or replaced with adequate structures designed and constructed in support of the Developer’s final drainage design. Developers should note that the Department has not assessed the structural condition of the existing pipes and culverts within the Project limits. If after award the Developer investigates the structural condition of the affected existing pipes and culverts, and as a result proposes use (or repair) of some or all, then it shall be done only with the Department’s approval. The Developer shall assess the structural condition of the structures by performing a visual and video inspection of the existing pipes and culverts utilizing the assessment criteria for Post Installation Inspections presented in VDOT Supplemental Specification 302. The Developer shall provide the Department with an inspection report documenting their assessment following the methodology as prescribed in the supplemental specification. The report shall include specific recommendations relative to the structural condition and serviceability of the structures. With the Department’s approval, drainage pipes and box culverts deemed repairable shall be rehabilitated in accordance with the Department’s guidelines including, but not limited to those methods outlined in Chapter 8, of the VDOT Drainage Manual and Special Provisions SU302001B Pipe Rehabilitation and SU302002A Pipe Replacement.
3.5.4 **Underdrain outfall locations are not shown in the RFP Conceptual Plans and it shall be the responsibility of the Developer to develop the underdrain design including adequate outfall locations. The Developer may, at its discretion, utilize access structures (i.e. manholes, cleanouts, etc.) in lieu of EW-12’s in order to outfall an underdrain according to the guidelines set forth in the VDOT Road and Bridge Standards and the VDOT Drainage Manual while maintaining the ability for the underdrain to be accessed in the future for maintenance purposes.**

3.5.5 **Stormwater Pollution Prevention Plan (SWPPP)**

A. A SWPPP, including, but not limited to, an Erosion and Sediment Control (ESC) Plan and Narrative, a Pollution Prevention (P2) Plan, and a post construction Stormwater Management (SWM) Plan shall be prepared and implemented by the Developer in compliance with applicable requirements of the standards and reference documents listed in Attachment 1.5 including the Virginia Erosion and Sediment Control Law and Regulations and the Virginia Stormwater Management Program (VSMP) Law and Regulations.

B. It shall be the responsibility of the Developer to have a qualified person within their team structure, other than the ESC and post construction SWM Plan designer, who is authorized and/or certified by the Department of Environmental Quality (DEQ) to perform plan reviews, independently review and certify that the ESC Plans and Narrative and post construction SWM Plan for the Project are in accordance with the VDOT Approved ESC and SWM Standards and Specifications. Before implementing any ESC or post construction SWM measures not included in the VDOT approved ESC and SWM Standards and Specifications, a variance or exception respectively must be requested through the District Drainage Engineer in accordance with the latest versions of IIM-LD-11, IIM-LD-195, IIM-LD-242 and IIM-LD-246.

C. The Developer shall complete and submit the ESC and SWM Plan Certification form (LD-445C) to the Department project manager. The Developer shall provide the Department two (2) paper and two (2) electronic copies each on CD of the final ESC Plan and Narrative, P2 Plan and post construction SWM Plan incorporating all calculations, analysis, documentation and evaluations required to demonstrate compliance with the applicable stormwater management regulations. The ESC Narrative shall specifically include calculations (with supporting data) documenting that the design meets the water quantity requirements for downstream channel flood protection in the ESC Law and the VSMP Regulations, as appropriate, for each location where stormwater is discharged from the Project site.

D. For Projects Requiring VPDES Coverage (Total land disturbance ≥ 1 Acre)
1. The Project requires coverage under the VPDES General Construction Permit for the Discharges from Construction Activities (VPDES Construction Permit). The Developer is responsible for providing to the Department the necessary information needed to secure permit coverage for the Project. The Developer shall be responsible for all fees necessary for coverage under the VPDES General Construction Permit. The Developer shall be responsible for acquiring VPDES Construction General Permit coverage and letter directly from VA DEQ.

The Developer shall also complete the applicable sections of the VPDES Construction Permit Registration form (LD-445), VPDES Construction Permit Contact Information (LD-445A). These forms along with the completed ESC and SWM Plan Certification form (LD-445C) shall be submitted to the Department. The Department will review the submitted information and, if complete and acceptable, process a request for release of construction work in accordance with the Department’s guidelines as outlined in the latest version of IIM-LD-242. If any information submitted by the Developer is found to be incomplete or unacceptable, the assembly will be returned to the Developer for corrective action and resubmission.

2. A working conceptual ESC and post construction SWM Plan and SWPPP for the entire Project must be submitted for review and approval with the initial application for permit coverage. This initial conceptual plan submittal shall include the proposed total expected Land Disturbance Area and Land Development Area, including any off-site facilities, for the entire Project. Where the Project will be constructed in segments, the Developer shall submit a finalized ESC Plan, a post construction SWM Plan and a P2 Plan, including the expected Land Disturbance Area, for the proposed initial work segment in addition to the conceptual plan for the entire Project. It is expected that the individual work segment submittals will be self-sustaining and not incur a deficit in post construction SWM design requirements requiring mitigation on future work segments. Subsequent work segment submittals shall include required modifications to the Land Disturbance Area value. However, these modifications, in total, shall not exceed the initially submitted Land Development Area value. The Developer shall not proceed with work to be covered by the permit until permit coverage is secured and the Department project manager releases the work in writing. It is noted that release of work, can take up to ninety (90) days from the time that the Developer submits a request for coverage that includes all required information. This represents a Hold Point in the Developer’s CPM Schedule. Developer shall provide a completed SWPPP Certification form (LD-455E) before commencement of any land disturbing activity and shall complete and include the SWPPP General Information Sheets in the plan assembly per the latest version of
IIM-LD-246. The SWPPP Certification form (LD-455E) and SWPPP General Information Sheets shall be updated with each work segment submittal as necessary.

3. The Developer 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 Developer. Upon completion of the entire regulated land disturbing activity (including final stabilization of all disturbed areas), the Developer shall provide updated and 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, complete the VPDES Construction Permit Termination Notice form (LD-445D) and submit both documents to the Department. The Developer shall process VPDES Construction Permit termination from VA DEQ. In addition to Deputy QAM for Environmental Compliance, the Developer shall also have on-site during any land disturbing operations an individual or individuals holding a DEQ Inspector Certification, a DEQ Responsible Land Disturber (RLD) Certification and a VDOT Erosion and Sediment Control Contractor Certification (ESCCC) and DEQ SWM Inspector certification to ensure compliance with all DEQ and the Department erosion and sediment control and stormwater management plan implementation requirements.

3.5.6 Post-Construction Stormwater Management Facilities

A. The Developer shall be responsible for the design and construction of stormwater management facilities as required for the Project in accordance with the Part IIC technical criteria of the Virginia Stormwater Management Program Law and Regulations, the latest version of IIM-LD-195, and the other standards and reference documents listed in Attachment 1.5 including the Virginia Stormwater Management Program Law and Regulations. The Department has identified potential locations for post construction stormwater management facilities as part of the RFP road plans. However, these locations 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 Developer, as part of their final design, shall evaluate these locations, and if found acceptable, develop a final post construction stormwater management plan. The Developer shall make reasonable efforts to locate stormwater management facilities within the Department ROW and to minimize impacts to surrounding communities.

B. If any of the locations are found to be unacceptable, the Developer must identify other acceptable location(s) to meet the post construction stormwater
management requirements of the Project. The Developer is to ensure proper ingress and egress to any stormwater management facility and that any specific proprietary facilities have proper maintenance details included in the Record (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. The Developer, as part of their final design, shall minimize impacts to existing tree space to provide a buffer between proposed SWM facilities and adjacent properties. If the Developer elects to utilize offsite treatment through participation in a local watershed comprehensive stormwater management plan, coordination between the Developer and applicable localities will be facilitated through the Department. The Developer shall verify feasibility of use of existing or proposed regional facilities with applicable localities and shall be responsible for all cost, schedule impacts, and legal implications thereof.

C. The Department will make available a maximum of 102.3 pounds per year of phosphorous credits to meet up to 25% of the Project’s phosphorous removal requirements as prescribed in IIM-LD-251. If the Developer determines that additional phosphorus reduction is required, the Developer will provide for and include the required compensatory mitigation in the post construction SWM Plan. The Developer shall account for all cost associated with the post construction Stormwater Management Plan, as well as additional compensatory mitigation above the 102.3 pounds provided, in its price proposal.

The Developer may elect to purchase additional nutrient credits, above the 102.3 pounds per year, to satisfy up to 25% of the post-construction water quality reduction requirements for the Project. It is the responsibility of the Developer to investigate the availability of nutrient credits and as such their purchase shall be at their risk. All costs associated with the purchase of additional nutrient credits shall be included in the Developer’s price proposal. The use of nutrient credits shall be identified in the Developer’s SWPPP. Where the Developer elects to purchase nutrient credits, the Developer shall complete Attachment 3.5, the Nutrient Credit Assignment Agreement and shall submit the agreement to the Department for execution. The agreement is to be used for the transfer of the ownership of additional nutrient credits from the purchaser to the Department. The agreement is to be completed with the appropriate project specific information and a copy of the bill of sale between the Nutrient Credit Bank and the purchaser is to be attached to the Agreement. A copy of the executed agreement is to be included with the BMP information submitted with the VPDES Construction Permit Termination form LD-445D.
3.5.7 Other Drainage Requirements

A. All drainage facilities (existing and newly constructed) located within the Project limits that are disturbed or extended as a part of the project and are functional elements of the final design shall be rendered in a serviceable condition, free from debris and physical obstructions. Accumulated debris resulting from project construction activities shall be removed by the Developer, as such maintaining the original line and grade, hydraulic capacity or construction of the facility prior to Project Completion.

B. An assessment of the serviceable condition (cleanness) of the existing drainage structures located within the Project limits should be conducted prior to the commencement of any land disturbing activities by the Developer and provided to the Department project manager. The Developer shall be responsible for cleaning the existing drainage facilities that the Developer intends to tie into or otherwise impacts, the degree of impact notwithstanding. The Developer is also responsible for cleaning any existing drainage facilities to be maintained by them in the future. The Developer shall not be responsible for cleaning existing drainage facilities that will be maintained by the Department and is not impacted by the Developer.

3.5.8 Scour

A. The Developer shall be required to conduct scour analysis in accordance to FHWA, “Evaluating Scour at Bridges – HEC 18 (current version),” and “Bridge Scour and Stream Instability Countermeasures – HEC 23 (current version).” Other procedures can also be considered during the scour evaluation upon prior approval by the Department. The Department may, in its sole discretion, accept or reject such proposed procedures.

B. All aspects related to scour elevations (including, but not limited to, shoring modifications, impacts to the maintenance of traffic, and utility conflicts) shall be included in the proposed price. All scour elevation shall be approved by the Department. The Developer will be responsible for the final design and construction of the foundations for this Project, including the final Hydrologic and Hydraulic Analysis and the final Scour Analysis, in accordance with the Agreement.

3.5.9 Pipe Installation Methods

Culverts or utility pipes shall be installed by either conventional methods in accordance with the VDOT Road and Bridge Specifications, or Jack and Bore or by micro-tunneling in accordance with the applicable special provisions contained in the RFP Information Package. Trenchless technology other than these methods of installation is not permitted unless otherwise approved by the Department. The Developer’s design engineer 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. The Developer’s design engineer shall be responsible to 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 design tolerances used in design of either culverts or utility pipes exceed those specified in the VDOT 2016 Road and Bridge Specifications and the applicable special provisions. Performance requirements and tolerances stipulated in the Special Provisions shall also apply to conventional tunneling methods. If trenchless technology is used to complete roadway crossings, surface settlement monitoring must be performed to verify that there is no adverse impact on the stability and performance of the embankment and pavement structure above the pipe alignments in accordance with the VDOT Road and Bridge Specifications and the Special Provisions for jack and bore or micro-tunneling, as applicable.

3.5.10 Hydraulics

The Developer shall provide and perform all investigations, evaluations, analysis, coordination, documentation, and design required to meet all Hydrologic and Hydraulic, Drainage, Stormwater Management, Erosion and Sedimentation Control, Stormwater Pollution Prevention, and Virginia Storm Water Management Program permitting requirements of the standards and reference documents listed in Attachment 1.5.

3.5.11 Hydrologic and Hydraulic Analysis (H&HA)

A. An H&HA, including scour analysis shall be completed for bridges over waterways and major culvert crossings that have a total 100-year design discharge greater than 500 cfs. The Developer shall deliver to the Department a final H&HA, including scour analysis for proposed major drainage structures. These analyses shall be submitted to the Department for review and approval prior to the commencement of construction. The H&HA shall include an established level of construction tolerance to allow for the hydraulic performance established in the H&HA to be maintained. The approval of the H&HA represents a Hold Point in the Developer’s CPM Schedule. The ultimate proposed conveyance system (inclusive but not limited to culverts, stream realignment, and outfall conveyance channels through the project area) shall be designed by the Developer to meet all applicable hydraulic requirements, including current Federal Emergency Management Administration (FEMA), FHWA, AASHTO, and the Department guidelines as described in the VDOT Drainage Manual, (including current Errata Sheet), VDOT Manuals of the Structure and Bridge Division, Hydraulic Design Advisories and applicable IIMs.
B. Natural stream design, bank hardening, and revetments will be considered as part of the hydraulic design to minimize downstream impacts in accordance with state and federal requirements applicable to the Project. Natural stream design, bank hardening and revetments shall be designed in accordance with acceptable FHWA Publications. Acceptable FHWA publications include, but are not limited to, HDS-6, HDS-07, HEC-14, HEC-18, HEC-20, and HEC-23.

C. The hydrologic and hydraulic analysis shall be documented by the completed VDOT LD-293 forms. The Developer shall provide the Department 2 paper and 2 electronic copies (Adobe PDF format) of the final H&HA, HEC-HMS, HEC-RAS (or other the Department approved analysis software for this project) Files and LD-293 on compact disc (CD). The final H&HA submittal is to include the completed VDOT form LD-450.

D. Upon completion of the installation of any major drainage structure, the Developer shall prepare a final as-built survey of the major drainage structure and related upstream and downstream appurtenances. 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 and report shall be developed based on the as-built survey and submitted to the Department 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 Developer shall be responsible for mitigating the adverse impacts of the post construction condition at no additional cost to the Department.

3.6 Roadway Design

3.6.1 General Requirements

Developer will prepare the final geometric design of the roadway elements in accordance with the standards and specifications set forth in Attachment 1.5. Functional classifications for roadways and specific design criteria on the Project are to be developed by the Developer per the standards and specifications set forth in Attachment 1.5 unless a design exception or design waiver is approved. The specific design criteria for the Project shall be submitted to the Department for review and approval, as required in Attachment 1.3.

A. The Project design speed shall meet the I-66 Corridor Improvements Project – Interchange Justification Report (IJR).
B. The Express Lanes and shoulders shall meet the Department’s criteria for freeways, as described in the standards and specifications set forth in Attachment 1.5.

C. In order to preclude toll violations and wrong-way access, Developer will provide a continuous physical barrier system throughout the corridor. The Department will have the final approval on the location and type of such barrier system.

3.6.2 Developer Responsibility

The Developer is responsible for the design of the Project and the Developer will furnish the design of the Project, regardless of the fact that the RFP Conceptual Plan has been provided to the Developer as a preliminary basis for Developer’s design. The Developer specifically acknowledges and agrees that:

A. Developer is not entitled to rely on 1) the RFP Conceptual Plan, 2) the Reference Documents, or 3) any other documents or information provided by the Department, except as permitted in the Agreement.

B. Developer is responsible for correcting any errors in the RFP Conceptual Plan through the design and construction process without any increase in the Price or extension of a Completion Deadline.

C. Developer’s warranties and indemnities hereunder cover errors in the Project even though they may be related to errors in the RFP Conceptual Plan.

D. Developer is responsible for verifying all calculations contained in the RFP Conceptual Plan or otherwise provided by the Department.

3.6.3 Conceptual Design

Developer acknowledges and agrees that if Developer chooses to deviate from the conceptual ROW contained in the RFP Conceptual Plans and approved ATCs, the Developer shall identify such deviations in writing to the Department, provide justification for the modification, and obtain specific written approval from the Department, in its sole discretion, prior to use of such modifications. Developer must obtain Department’s prior written approval to deviate from the RFP Conceptual Plans and approved ATCs unless the proposed Deviation is 1) within the conceptual ROW and requires no additional right-of-way; 2) meets the requirements of the Technical Requirements; 3) requires no new environmental approval; and 4) does not constitute a Design Exception or Design Waiver. Developer acknowledges and agrees that the requirements and constraints set forth in the Agreement and in the Governmental Approvals, as well as site conditions, will impact Developer’s ability to revise the concepts contained in the RFP Conceptual Plans and approved ATCs, in addition to the requirement to obtain approval. Notwithstanding anything to the contrary herein, if the Developer
fails to obtain a required third party approval for an ATC, the Developer will be required to comply with the original requirements of the RFP without additional cost or extension of time as set forth in the Agreement.

3.6.4 Disclaimer

A. Developer understands and agrees that the Department shall not be responsible or liable in any respect for any Losses whatsoever suffered by any Developer by reason of any use of any information contained in the RFP Conceptual Plans or Technical Requirements. Developer further acknowledges and agrees that 1) if and to the extent the Developer or anyone on the Developer’s behalf uses any of said information in any way, such use is made on the basis that Developer, not the Department, has approved and is responsible for said information, and 2) the Developer is capable of conducting and obligated hereunder to conduct any and all studies, analyses and investigations as it deems advisable to verify or supplement said information, and that any use of said information is entirely at the Developer’s own risk and at its own discretion.

B. The Department does not represent or warrant that the information contained in the RFP Conceptual Plans or Technical Requirements is either complete or accurate—including with respect to 1) the existence or need for bridges; 2) bridge lengths, locations, and types depicted in the RFP Conceptual Plans; 3) the existence or need for retaining walls; 4) retaining wall heights, lengths, or sizes depicted in the RFP Conceptual Plans; or 5) any failure or omission to depict any of the foregoing in the RFP Conceptual Plans—or that such information is in conformity with the requirements of the Department provided approvals or other Agreement. The Department does not represent or warrant the accuracy or completeness of any itemized list set forth in the Technical Requirements. The foregoing shall in no way affect the Department’s liability for necessary basic configuration changes as specified herein.

3.6.5 Requirements for Operational Analysis

The Developer shall provide an operational analysis for any changes to the I-66 HOV/Express Lanes design as presented in the Design Public Hearing that require an amendment to the I-66 HOV/Express Lanes Interchange Modification Report.

The operational analysis shall demonstrate that the Developer’s revised design does not have a significant adverse impact on the safety and operation of the existing facility based on an analysis of current and future traffic. Traffic and operational analysis shall conform to the requirements of IIM-LD-200 Development of Justification for Additional or Revised Access Points: Creation of Interchange Justification/Modification Reports.
3.7 Pavement

Pavements shall be designed and constructed to meet or exceed the minimum pavement section requirements set forth in Attachment 3.7 and as specifically detailed in “VDOT Requirements for Geotechnical Investigation, Geotechnical Design and Minimum Pavement Sections for the 66 Express Lanes.” The Developer shall validate the adequacy of the minimum pavement sections and notify the Department of its findings prior to submitting its price proposal. If the Developer’s findings require a deviation from the RFP requirements, the Developer shall notify the Department and submit the proposed revised pavement typical sections with supporting calculations for review at least 10 days prior to submission of its price proposal. Acceptable changes to the minimum pavement sections are limited to increasing the specified thickness of the base or subbase layers. Any changes to the specified minimum pavement sections or location for the pavement sections shown on the RFP Conceptual Plans require approval by the Department. The Developer shall be responsible for the final design and construction of the pavements for this Project in accordance with the Agreement. Pavement design and construction shall meet the requirements of the federal pavement policy, 23 CFR 626 (Chapter 1).

3.7.1 General

A. The general intent of this project is to salvage the existing Mainline pavement and full strength shoulders where they exist between the western limits of the project and US 29 in Centreville by widening and building up the existing pavement. Between US 29 in Centreville and the Capital Beltway, the intent is to remove the existing concrete and composite pavements to expose the existing subbase or stabilized subgrade layers. The native soils shall not be exposed where existing pavement layers are being salvaged. Any exposure of the existing subgrade soils (excluding cement stabilized subgrade) will require additional SWM treatment. The Developer shall take particular care not to damage the existing cement stabilized base or cement stabilized subgrade during removal of the existing concrete pavements. Therefore, removal means and methods shall be limited to non-impact and non-vibratory means such as saw-cutting and lifting of existing slabs.

B. All widening of the existing pavements shall be accomplished in accordance with Standard WP-2 so that the proposed widening pavement layers match the existing pavement layers in types and thicknesses) prior to building up or placing the surface course except as modified by Attachment 3.7. All existing pavement shall be saw-cut to a smooth vertical face a minimum of one foot inside the existing edge of full strength pavement in all widening areas. Widening of existing pavement shall provide for lateral drainage of the existing pavement layers by providing a free-draining aggregate (such as 21B) on the low side of the pavement cross-slope connected to a standard UD-4 edgedrain placed beneath the outside edge of the paved shoulder. An impervious base/subbase (such as CTA) shall be provided for widening on the high side of existing pavement cross-slopes. The following note shall be
added to the construction plans: The VDOT District materials engineer shall be notified as soon as the pavement saw-cuts are complete but no less than 48 hours prior to subbase/base placement in the widening areas”. All existing pavement shall be milled to a depth of 2 inches and resurfaced up to the nearest longitudinal lane divide wherever pavement markings will be eradicated or snow plowable raised pavement markers are removed.

C. Department guidelines specify that edgdrains and underdrains be provided for pavement with daily traffic volumes in excess of 1,000 vehicles per day. Therefore, edgdrains and underdrains will be required for all pavements on this project. Modified UD-1 underdrain shall be provided in lieu of standard UD-4 for pavement subdrainage in wet areas, areas of high groundwater, springs and in cuts in excess of 25 feet; the modification consists of wrapping the aggregate with geotextile drainage fabric. Standard Combination Underdrain (CD-1) shall be provided at the lower ends of cuts. Standard Combination Underdrain (CD-2) shall be provided at grade sags, bridge approaches and at the lower ends of undercut areas. Standard UD-2 shall be installed beneath all raised grass median strips (MS-2). All existing underdrains shall be removed and replaced beneath the outside edge of the new pavement and all existing cross-drains shall be extended to daylight or connected to a storm drainage structure.

D. Any pavement reconstruction on arterials or local streets not specifically included in “VDOT Requirements for Geotechnical Investigation, Geotechnical Design and Minimum Pavement Sections for I-66 Corridor Improvements from US 15 to I-495” shall be designed to meet the design-year traffic and match the existing pavement type at tie-in in accordance with standard WP-2 and in accordance with the Department’s pavement design standards and guidelines.

E. The final pavement surface on all Mainline interstate pavement shall have meet the requirements for rideability detailed in Attachment 1.5, specifically the Special Provision for Rideability.

F. As an alternative to flexible pavement the Developer may design and construct rigid pavement using Continuously Reinforced Concrete Pavement (CRCP). Rigid pavement shall be designed and constructed to meet or exceed the minimum pavement requirements set forth in Attachment 3.7.

G. Approach slabs for all bridges shall be full width from face to face of barrier or parapet (including extending under sidewalks and shared use paths).

H. Wherever applicable, the design of rumble strips in the paved shoulders shall be consistent with the Standard Documents set forth in Attachment 1.5.

I. Developer’s plans, typical sections, profiles and cross-sections shall include the appropriate elements identified as a result of the drainage analysis/design
and the pavement design. This shall include, but is not limited to, underdrains, stormwater inlets and pipes, and pavement sections reflecting the elements identified in the Developer’s final pavement design.

J. The area 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 the Road and Bridge specifications and applicable special provisions.

K. The Developer shall submit to the Department for its review, thirty (30) days before the submittal of associated final Design Documentation, a pavement design report that documents the assumptions, considerations, and decisions contributing to the Developer’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 on adjacent roads;

3. Relevant geotechnical data and drainage requirements 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; and

5. Design calculations documenting the pavement design(s) in accordance with the specified design methodology.

3.8 Traffic Engineering

3.8.1 General

A. The Developer shall provide plans for all traffic control devices with its Design Documentation. Transition from new markings, markers, and delineators to existing shall be planned such that road users will discern only a minimum change in delineation concept. Design Documentation for the Department’s review and approval for traffic control devices shall be submitted as a complete package for each construction segment. All new and existing traffic control devices within the Project limits and those signs outside the Project limits shall be installed modified or replaced in accordance with the standards and specifications set forth in Attachment 1.5.
B. All traffic control devices shall be designed and installed to comply with the standards and specifications set forth in Attachment 1.5 and the requirements of the maintaining agency.

C. The Developer shall be responsible for the design and construction of the Project signing, pavement markings, roadway and sign lighting, and traffic signals. Traffic control devices shall include:

1. All signs, signals, pavement markings, pavement markers, roadway interchange lighting and delineators necessary within the Project limits; and

2. Signs outside the Project limits that are necessary to lead traffic to and transition traffic away from the Project.

D. All existing traffic control devices impacted by the Project shall be modified, upgraded, or replaced by the Developer to meet current Department standards.

3.8.2 Pavement Markings

A. The Developer shall provide and maintain pavement markings and reflective pavement markers meeting the standards and specifications set forth in Attachment 1.5, including but not limited to, markings required for the Express Lanes.

B. On any pavement reconstruction undertaken by the Developer, the Developer shall tie in and match the existing permanent pavement marking systems.

C. Temporary pavement markings and striping may be placed on the final surface course upon approval from the Department and thermoplastic permanent marking may be used for final markings only at locations where modified WP-2 is used, such as flyover bridge tie-ins and slip ramps.

D. Snow-plowable raised pavement markers shall be used to supplement pavement markings on affected roadways if required or recommended by the Virginia Supplement to the MUTCD. All permanent snow-plowable raised pavement markers shall be installed in accordance with VDOT Standard PM-8 and/or PM-9. Damaged existing snow-plowable raised pavement markers within the Project limits shall be replaced in accordance with VDOT Standard PM-8 and/or PM-9.

3.8.3 Static and Dynamic Message Signs

A. The Developer shall design, fabricate, install and maintain all new guide, supplemental, route marker, regulatory and warning signs during construction required for this Project to meet standards and specifications set forth in
Attachment 1.5. The Developer shall also modify or remove any signage outside of the limits of the Project that is no longer appropriate or pertinent as a result of this Project. Shared facilities will be maintained in accordance with the Performance Requirements set forth in the Agreement and Attachment 4.5.

B. The Developer shall prepare a Signage Plan consisting of the Project Roll Plan and the Trail Blazer Roll Plan, and present the plans for review and comment by the Department. The Project Roll Plan will be used for reviewing the dynamic messaging and static signs on the I-66 corridor and connecting roadways to include proposed sign locations and messages for all guide signs and Express Lanes signs applications. The Trail Blazer Roll Plan will be used for reviewing static signs (trail blazers) on highways, feeder roadways and other roadways notifying motorists of the access to the 66 Express Lanes.

1. The roll plans shall show proposed locations for relocating existing signs, proposed locations for new structures.

2. The roll plans 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 the Project.

3. The roll plans 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 may also be shown on the roll plan.

4. An existing sign inventory shall be completed prior to site demolition in accordance with the VDOT Traffic Engineering Design Manual. This existing information shall be submitted at the same time as the first plan submittal for proposed signing.

5. Submittal of the roll plans to the Department shall occur prior to final design.

C. The 66 Express Lanes signage scheme will:

1. Support the integration of the 66 Express Lanes with the existing roadway network

2. Facilitate navigation of the roadway network, including access to, travel along and egress from the 66 Express Lanes,
3. Comply with the requirements for signage in the Electronic Toll and Traffic Management (ETTM) System

D. Where space allows over traffic lanes, new sign structures and foundations (full span and cantilever) shall be designed to accommodate an additional static sign load of 200 sq. ft. for future use.

E. The Developer shall be responsible for planning, coordinating, and obtaining Regulatory Approvals, if required, and removing and disposing of structures and obstructions. The Developer shall relocate all signs within the construction limits that conflict with construction work. Signs that are not needed for the safe and orderly control of traffic during construction may be removed and stored in a manner that will preclude damage and reinstalled in their permanent locations prior to Project Completion. Salvageable signs removed during construction shall be delivered to VDOT Northern Region Traffic Field Office in Manassas. All sign structures and non-salvageable signs removed during construction should be disposed of by the Developer.

F. No overhead sign structures shall be bridge-mounted or parapet mounted. Sign structures built into the bridge to support signs to be viewed by traffic traveling over the bridge shall be permitted. No sign structure foundation shall encroach on the adjacent shared use path.

G. The Developer shall be responsible for coordination with the Department or the pertinent local agencies or jurisdictions in order to install directional signage, including, without limitation, obtaining all applicable Regulatory Approval.

H. The Developer shall adjust all signage within the construction limits whose messages conflict with construction work.

I. The Developer shall provide the necessary guide, warning and regulatory signs for the Project.

J. The Developer shall maintain all existing signs during construction, unless they are to be removed permanently or have been replaced as required by the Project. For any existing signs that require relocation due to construction, the Developer shall present pertinent details—such as sign face, mounting details, locations etc.—for the Department’s review and approval, prior to relocation.

K. The Developer shall modify or remove existing signs and structures that are rendered by the Project inaccurate, ineffective, confusing or unnecessary. The Developer shall obtain the Department’s approval prior to making any such changes.
L. The Developer shall identify all existing signage impacted by the Project, 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 the Project, the Developer shall provide comprehensive structural analysis for the Department’s review and written comment prior to the commencement of design. To assist with the structural analysis, the Department will provide (if available) existing structural information, shop drawings, and foundation calculations to the Developer for each existing sign structure identified by the Developer.

M. The Department will review the structural analysis provided by the Developer for each sign structure to determine whether or not the existing structure or sign can be modified as proposed. If it is determined that modifications to the existing sign structure or signs are not structurally acceptable, the Developer shall provide new signs and structures, in accordance with Attachment 1.5, to replace the existing sign structures and signs.

N. Signs shall incorporate highly reflective sheeting material to optimize lighting installation.

O. The Developer shall place milepost and intermediate markers on I-66 at 0.2 mile intervals on the right side of the general purpose lanes.

P. The mile markers shall conform to MUTCD, Reference Location Signs, and intermediate markers shall conform to the Virginia Supplement to the MUTCD Intermediate Reference Location Signs.

Q. For signing along the Mainline, all guide signs, dynamic message signs and other 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 Developer shall obtain a design waiver or design exception from the Department to reduce the spacing.

R. The Developer shall perform line of sight analysis for all sign structures to confirm drivers have sufficient time to read the sign messages, and signs are not visually obstructed.

S. The Developer shall provide accurate and detailed elevations for all sign structures, including all dimensions, existing physical features and proposed constructed features to confirm physical locations and orientation.

T. The sign lighting shall be designed and constructed in accordance with VDOT Traffic Engineering Design Manual, the VDOT Road and Bridge Standards, VDOT Road and Bridge Specifications, and the MUTCD. All conductor and communication cables shall be in conduit and junction boxes;
no direct burial cable allowed. Power cables and communication cables shall be in separate conduit systems.

U. The Developer shall coordinate the permanent location of sign structures and all proposed, relocated, or modified with Integrated Directional Signing Program (IDSP) signs such as Supplemental Guide Signs (SGS), Specific Travel Services (Logo) Signs, General Motorist Services Signs (GMSS), Tourist Oriented Directional Signs (TODS), and all other signs approved and maintained as part of the IDSP. All impacts to IDSP signs shall be reviewed and approved by the IDSP Manager before relocation, fabrication, and installation. Whenever possible all proposed, relocated, or modified IDSP signs shall not be installed in sign assemblies with other non-IDSP signs. Where ground-mounted, IDSP signs shall be installed on 2½-inch square tube posts and concrete foundations in accordance with Standards STP-1, Standards SSP-VIA structures and foundations, or Standards SSP-VIA structures and foundation as appropriate and as approved by the IDSP Manager. The Developer is responsible for costs associated with removal and replacement of IDSP signs.

V. The limits of directional and 66 Express Lanes signage for the Project for which the Developer is responsible extend to provide sufficient information to users of the 66 Express Lanes for direction and access purposes to all entry and exit points in accordance with the standards and specifications set forth in Attachment 1.5.

3.8.4 Traffic Signals

A. The Developer shall design, supply and install all necessary temporary and permanent traffic signals and related infrastructure for the Project as provided by this section and the standards and specifications set forth in Attachment 1.5.

B. The Developer shall design the Project to include new traffic signal installations and modifications to existing traffic signal installations meeting the design requirements of the maintaining agency. The Department shall provide reasonable assistance to the Developer in obtaining the relevant design requirements from any maintaining agency.

C. The Developer shall provide communications between all temporary and permanent traffic signals for the Project and the maintaining agency’s traffic signal system. The communications medium shall be compatible with the maintaining agency’s communication system or plan.

D. New traffic signals on the Project will be integrated with existing traffic signals using the following approach:
1. The Developer shall design, program, adjust controller timings, test, and commission the new signalized intersections for coordinated operations matching the maintaining agency’s existing coordination plans. The Developer shall provide timing for existing signal coordination plans in the same format as the maintaining agency. Additionally, the Developer shall adjust signal timings for modified signals and develop signal timings for new signals. The signal timing parameters, including but not limited to vehicle and pedestrian clearance intervals, shall be calculated based on Department’s standards.

2. The Department will provide the traffic signal controller cabinets. The Developer shall obtain these cabinets from the Department facility, located in Northern Virginia. The Developer shall provide at least two weeks’ notice to the Department prior to obtaining the cabinets. The Developer shall be responsible for any damage during the transportation and may be required to reimburse the Department should replacement cabinets be required.

3. The Developer shall configure any traffic signal detection equipment to provide continuous traffic counts at the intersection according to maintaining agency requirements.

4. The Department or the maintaining agency will test and commission any new local signalized intersection for network operations with the existing traffic signal system and will retime network signals, as needed, to accommodate network demand.

5. Where possible, the Department will optimize traffic signal timing at any signalized intersections with 66 Express Lanes entry and exit ramps and approaching roadways to ensure that traffic does not normally produce queues that create a safety hazard on either the 66 Express Lanes or the approaching roadways.

E. All pedestrian displays shall be countdown signals. Pedestrian pushbuttons shall be a minimum of 0.5 cm (2 in) across in one dimension and all design shall be in accordance with Standards and Specifications listed in Attachment 1.5. Fully Accessible Pedestrian Signals (APS) shall be included approved by the Department.

F. The Developer shall keep the existing signalized intersections within the Rights of Way functional during the Work period. If signals must be shut down, the Developer shall provide temporary signals or appropriate traffic controls approved by the Department. Temporary signal shut down shall not be permitted.

G. For each phase defined in the MOT Plan and temporary traffic control plans, the Developer shall develop signal timing plans for the Project and roadways
designated as detours and submit the plans to the Department. The Developer shall implement, test, and adjust signal timings to prevailing conditions. The Developer shall develop signal timing plans for all peak and non-peak periods which may require more than eight (8) plans.

H. The Developer 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 acquiring power and communication connections.

I. The Developer shall install and connect power service for temporary and permanent traffic signals for the Project.

J. Conductor/communication cables shall be placed in buried conduit, embedded conduit, and structure and bridge-mounted conduit.

K. The Developer 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.

3.8.5 Roadway Lighting

A. Lighting conditions shall conform to the Department’s standard lighting requirements for freeway operations and shall be subject to the Department’s approval.

B. All new lights shall be Light Emitting Diodes (LED) in accordance with Attachment 1.5.

C. The Developer shall install permanent roadway lighting system for the entire roadway including interchanges. The Developer shall install lighting for any sidewalk or shared use path underpasses.

D. The Developer shall design and construct the permanent roadway lighting system such that the Department can maintain and operate the lighting system for the general purpose lanes separate from the Express lanes unless the Department and Developer mutually agree to a plan that governs cost, maintenance, and operational responsibilities.

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. Requirements for Lighting Design
All lighting design shall:

1. Be prepared in accordance with the USDOT Roadway Lighting Handbook;

2. Be performed using AGI-32 computer software; and

3. Include point-to-point lighting analysis and calculations submitted to the Developer for review and approval.

G. Roadway and Interchange Lighting

1. The Developer shall analyze roadway sections (between interchanges), and each planned interchange impacted by project, applying traffic volumes projected to five (5) years after construction to determine where lighting is required. This analysis and any lighting developed for the roadway will be consistent with the Department requirements. This shall apply to both General Purpose Lanes and 66 Express Lanes impacted by project.

2. Underpass lighting, where required by the VDOT Traffic Engineering Design Manual, for new Developer constructed I-66 bridge structures where the structures form an overpass or underpass on the Project.

3. Lighting in vicinity of Toll Zones is required.

H. Lighting Required as Mitigation

As first order of precedence, the Developer, at its sole cost and expense, shall provide any and all lighting required as mitigation for any design exceptions or design waivers included in Attachment 3.1, or by the IJR.

3.8.6 Power

A. The Developer shall design, install, connect, and maintain electrical power service to sustain all operations for the ETTM System, including all other facilities required for the Project.

B. Where new duct bank is installed, the Developer shall provide and install, for the Department, power conduit along or adjacent to the Project, consisting of:

1. Two 2-inch Department conduits;

2. Separate junction boxes for the Department access;

3. New power cable from existing Department assets served by the existing duct bank to the nearest power source; and
4. Power within existing duct bank shall be de-energized and safely abandoned per industry standards.

C. The Developer 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.

D. The Developer shall install and have connected power service for new or relocated traffic signals and lighting (sign, roadway, and interchange) for the Project per Department requirements.

E. The Developer shall provide back-up electrical power service to support Operations and Maintenance Work in emergency situations where the primary power source is not available.

F. The power supply for the ETTM Equipment shall be separately metered.

G. Where approved by the Department, new 66 Express Lanes lighting, ITS and TMS roadside equipment may be connected to existing Department electrical service panels.

H. The Developer shall provide back-up power for the operations of the tolling systems which includes, the pricing confirmation DMS sign, CCTV cameras, and other 66 Express Lanes ITS if part of the tolling system.

3.9 Barriers, Guardrails, and Fences

3.9.1 Barriers and Guardrails

The Developer 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 Developer shall design and install an approved guardrail or barrier system and end treatments, where appropriate, for protection in accordance with NCHRP 350 or AASHTO Manual for Assessing Safety Hardware, First Edition. The same clear zone requirement applies to existing conditions affected by this Project where guardrail upgrade will be required. Existing sub-standard guardrail within the Project Limits must be upgraded by the Developer to meet current standards per IIM 220. This may require the upgrade of guardrail to the nearest logical termination point beyond the current Project limits.

3.9.2 Fences and Barriers

A. The Developer shall install right-of-way fencing to protect the Limited Access Highway where the sound wall is not acting as a barrier.
B. The Developer 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.

C. The Developer shall perform a safety risk analysis to determine whether fencing should be used to separate the sound wall erection work zones from adjacent properties and, if such analysis shows that fencing is required, the Developer shall provide temporary six-foot-high (minimum) chain link security fencing at any such locations.

D. Glare screens or extended height barriers shall be installed on all concrete median barriers separating the 66 Express Lanes with glare conditions.

E. Except for temporary fencing, all chain link fabric, posts, rails and other associated hardware for fences, including these items on permanent structures, shall be black vinyl-coated and the details for fences shall be in accordance with the standards in Attachment 1.5.

3.10 Aesthetics

3.10.1 General

A. Aesthetic treatments shall be designed to be consistent with the local landscape and architecture, as well as the developed themes of the local setting. The Developer shall coordinate with local and state agencies to develop an aesthetic concept to achieve this required consistency, including coordination with the State Historic Preservation Office, as applicable, while maintaining applicable design standards.

B. The following items will be considered in defining the aesthetics concepts for the Project design:

1. Material, finish, color, and texture of sound walls, retaining walls, bridge barriers, parapets walls, abutments, wingwalls, and piers;

2. Paved slope treatments and hardscape at interchanges and intersections;

3. Median or other specialty paving, including material, finish, and color;

4. Fencing;

5. Signage (including overhead, attached, ground-mounted, and gantries);

6. Lighting poles and lamps; and

7. Any permanent building construction for the Project, including ancillary support, operational, and toll collections.
C. Graphics, signage, and lighting shall be consistent along the entire length of the Project unless otherwise approved by the Department.

D. Aesthetic elements shall be easy to maintain and resistant to vandalism and graffiti.

E. Aesthetic elements shall be fully integrated with the overall landscape design.

F. Where structural elements have no aesthetic surface treatments specified, elements shall receive a smooth concrete finish in accordance with the standards and specifications set forth in Attachment 1.5.

3.11 Landscaping

3.11.1 General

A. The Developer shall provide landscaping as required to mitigate Project impacts to the community. In addition, landscape plans shall be provided if required by the Department of Historic Resources or the Department of Environmental Quality and in accordance with the environmental commitments. This includes watering, weeding and maintaining the landscaping for a period of two growing seasons after the plants are accepted by the Department.

B. Landscape plans shall be prepared by a licensed landscape architect and shall be submitted to the Department for review and approval. The plans shall be prepared in a format consistent with the Department’s standards for roadway plans.

C. Existing forested areas that are impacted are to be reforested after construction with 1-inch caliper stock trees planted approximately ten feet on center and stabilized with low growing, native, and non-competitive grasses.

D. All plant materials shall be indigenous to the area and be able to adapt and survive in roadside environments, as appropriate.

E. The Developer shall assume that adequate locations will be identified within the proposed ROW.

3.12 Capital Asset Facilities

3.12.1 General

A. If the Developer constructs a building within the ROW on state property, except for any of the ETTM facilities, the Developer shall submit plans and specifications to the Department of General Service’s (DGS) Bureau of Capital Outlay Management (BCOM) to obtain a building permit. At
completion, the Developer shall have the building inspected by BCOM to obtain an occupancy permit. Also any building project constructed on state property costing $500,000 or more will require an Environmental Impact Review processed through the Virginia Department of Environmental Quality and approved by the Governor. The Department does not guarantee that the Developer’s request will be desired or accepted. The Developer’s plans must be approved by the Governor as required by Section 2.2-2402 of the Code of Virginia. Further, all construction work shall comply and be consistent with the Uniform Federal Accessibility Standards as applied to buildings on government property. Also, the Developer shall obtain any other permits and approvals required under Law.

1. If the Developer wants to make changes, additions or improvements to the structure in the future, BCOM approval is required.

2. Section 2.2-1149 of the Code governs the acquisition of property for office space, district offices, residencies or area headquarters and provides that for such acquisitions, Governor approval is required and the normal DGS requirements for acquisition of capital outlay property would apply.

B. The overall design and construction shall comply with Virginia Energy Conservation and Environmental Standards, DEB Notice 12018 and all applicable building and fire codes.

C. The Developer shall obtain building permits and Regulatory Approvals for construction and occupancy.

D. The Developer shall procure any zoning variances required for construction and occupancy.

E. If the Developer should seek to construct a building at one of the Department’s maintenance facilities, the same requirements for construction outlined above will apply. The Developer will be required to sign a lease agreement to construct a new building or to lease all or part of the Department’s existing facilities at one of these locations. A minimum of four (4) months would be required to obtain a lease which would require the Governor’s approval.

F. If the Developer buys property outside of the Project ROW with the intention of retaining ownership of it throughout the Term and then transferring it to the Department when the Agreement expires, then all of the requirements for construction listed above will apply. If the Developer buys vacant property that will ultimately be owned by the state at the end of the Term, the Developer will be required to have building permits and occupancy permits for any new structures. If the Developer buys land with existing buildings and
the property will ultimately be owned by the state, the Developer will have to obtain an occupancy permit approved by BCOM.

G. If the Developer buys property outside the Project ROW, and the property will ultimately be owned by the state at the end of the Term, the Department will conduct an environmental site assessment and develop an agreement concerning the initial environmental condition of the property. The agreement shall allow the Department to periodically inspect the property for environmental or other issues and allow the Department to perform another site assessment before the property becomes state property to assure the property is environmentally acceptable. If the property is not acceptable, the Developer shall clean the property to standards acceptable to the state before the property will be approved or accepted by the Department.

3.13 Sidewalks and Shared Use Paths

3.13.1 General

A. The Developer shall design and construct the Project to include proposed pedestrian, bicycle and equestrian facilities within the Project corridor, as identified in the RFP Conceptual Plans. The Developer shall not preclude the future design and construction of pedestrian, bicycle, and equestrian facilities currently being planned or anticipated.

B. Existing pedestrian and bicycle access on facilities shall be maintained to the maximum extent possible throughout construction as per the MUTCD and the Virginia Work Area Protection Manual. Any temporary pedestrian or bicycle facility closure request shall be submitted in writing to the Department for review and approval. Advance notification of closures shall be provided to the public similar to scheduled roadway closures.

C. New facilities and modifications to existing facilities shall be designed in accordance with the standards and specifications set forth in Attachment 1.5. All new facilities interfacing I-66 or the associated Interstate ramps shall be grade separated unless otherwise approved by the Department.

D. Where a box culvert is replaced along a proposed or existing trail, the new culvert barrel carrying the path shall have sufficient width and vertical clearance to accommodate the shared-use path and a handrail adjacent to the stream. In lieu of this, a separate barrel may be solely dedicated for shared-path use. The walking surface of the path shall be located above the five-year stormwater level. Where the path also serves as an equestrian trail, the vertical clearances shall be increased accordingly.

E. The Developer shall conduct coordination meetings with all local jurisdictions and the Department to ensure existing and planned pedestrian, bicycle and equestrian facilities are identified along the Project corridor. Any planned
facility that is not constructed with this project shall not be precluded in the future. For locations where new bridge overpasses are proposed to replace existing bridges with end spans that contain slope protection, the new bridge shall not be reduced in length and the new end span shall not preclude shared-use path placement.

F. The Developer shall coordinate with the Department and local jurisdictions on the design, maintenance of traffic and construction staging of the bicycle and pedestrian facilities within the project limits.

G. Concrete and asphalt pavement designs for sidewalks and shared use paths shall be in accordance with Attachment 3.7. If a locality wants a stone dust surface on a facility, the Developer shall coordinate obtaining a maintenance agreement for the Department with the Locality. The specifications for the stone dust surface shall be approved by the Department.

H. The Developer shall design and provide drainage for any new independent pedestrian or shared-use path bridge or underpass structure. Drainage scupper grates on bridges and drainage grates in underpass structures shall be located within the 2-foot shoulder of the path unless otherwise approved by the Department. All drainage grates shall be bicycle friendly and meet ADA requirements.

I. The Developer shall design a shared use path parallel to I-66. Where proposed noise barriers are to be located near homes, the path shall be on the I-66 side of the noise barrier. In addition a roadway barrier with fencing shall separate I-66 from the new pedestrian/bicycle facility.

J. Where possible, utility manholes should be located outside of any pedestrian areas (sidewalks, paths, etc.). If necessary, utility access manholes may be located within the 2-foot shoulder of the 10-foot shared use path. Where manholes are located within a sidewalk or share use path, the manhole covers must be ADA compliant.

K. Access points to the shared use path parallel to I-66 shall be provided at approximately half mile increments. These locations may be co-located with other access needs to reduce the breaks in the sound barriers. The Developer shall coordinate with local jurisdictions regarding the locations and design of each access point. Possible access points are in the vicinity of the locations listed below:

1. Cul-de-sac on Green Post Ct (Cub Run Valley Park Area)
2. The corner of Rydell Rd and McCoy Rd (Cub Run Valley Park Area)
3. US 29 nearby I-66 Interchange (Centreville)
4. Braddock Rd at NW Quadrant of Route 28 Interchange
5. Audrey Dr (Cabells Mill Development, Centreville)
6. The cul-de-sac on Veronica Rd (Cabells Mill Development, Centreville)
7. Stringfellow Rd
8. Fair Lakes Shopping Center (between BJ’s Wholesale and Target)
9. East Market Shopping Center (behind Starbucks & UPS Store)
10. Existing trail from Waples Mill Rd (NE Quadrant of US 50 Interchange)
11. Arrowhead Dr/Rosehaven St (SW quadrant of Route 123 Interchange)
12. Bushman Dr (east of tennis courts)
13. Cul-de-sac on east end of Dellwood Dr (west of Southside Park)

L. Mile marker and wayfinding signs shall be incorporated into the design.

M. Existing trails impacted by the Project shall be replaced.

3.14 Structures

3.14.1 Types of Structures

The term “structures” shall encompass the following:

A. Bridges and Culverts as defined in IIM-S&B-27 Bridge Safety Inspection

B. Traffic Structures of the type listed in IIM-S&B-82 Traffic Structures, including Toll Gantries

C. Retaining Walls

D. Sound Walls

3.14.2 Bridges and Culverts

A. General Requirements

1. The bridges for this Project shall be designed using AASHTO LRFD Bridge Design Specifications; Interim Specifications; and VDOT Modifications (IIM-S&B-80 VDOT Modifications to AASHTO LRFD Bridge Design Specifications).
2. Infinite life fatigue requirements shall apply to all bridges.

3. Bridges shall be designed to meet all applicable hydraulic requirements, including current FEMA and the Department guidelines as described in the latest edition of the VDOT Drainage Manual. The Developer shall deliver to the Department 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 to the Department for review and approval prior to the commencement of bridge construction.

4. Bridge width and length shall be determined by the functional classification of roadway(s) being considered and the facility being intersected in accordance with the Agreement, as well as the requirements of Attachment 3.14a Bridge Replacements. 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 listed in Attachment 3.1.

5. Each bridge parapet or rail shall include a bridge conduit system. Conduit system shall comprise of 2-2” 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 maximum size of conduits embedded in parapets or railings shall be 2” diameter. The location of the first conduit shall be as shown in the standard drawing for Bridge Conduit System. The second conduit shall be located such that crash test criteria for the parapet or railing is not voided, as determined by the State Structure and Bridge Engineer.

6. The Developer shall use Low Cracking Bridge Concrete, in accordance with Attachment 1.5, for all bridge decks and bridge parapets.

7. Bridge longitudinal joints will not be permitted on new bridges or modified existing bridges, except when the joint is located within the median. When, as a result of elimination or relocation of a raised median, an existing longitudinal joint will be located outside the limits of a raised median, the longitudinal joint shall be eliminated. At a minimum, longitudinal joint elimination shall require the removal and replacement of deck concrete on either side of the joint to centerline of the adjacent girders. Furthermore, the performance of all bearings impacted by the longitudinal joint elimination shall be evaluated and all necessary modifications to bearings, including bearing replacements, shall be considered.
8. Post-tensioning of any type shall not be allowed (with or without grout or ducts). Exempt are prestressed concrete voided slabs with transverse ties or prestressed concrete box beams with transverse ties as specifically noted in the Manual of Structure and Bridge Division Vol. 5 Part 2 Chapter 12.

B. Details and Drawings

1. All details and drawings should be in accordance with Volume-V Series of the Manual of the Structure and Bridge Division. Should any such details not be available, Developer 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 Volume V Series may only be included in the structural plans and working drawings after review and approval by The Department. Should any such details not be acceptable, the Developer shall make the necessary modifications or shall submit an alternate detail that is acceptable to the Department.

3. A preliminary type, size and location plan, including all proposed stages of construction, shall be submitted by the Developer to the Department 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 in accordance with the Agreement as outlined in other sections.

3.1 The Department standard parapet and rail shall be used.

3.2 Pedestrian fence on bridges shall be (black) vinyl coated. Fence posts and rail sections shall be tested for continuity to ensure system grounding.

C. Superstructure

1. Bridge type and layout shall be based on reducing long-term maintenance costs for the Department. 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, Volume V – Part 2 Chapter 17.

2. Joints in bridges may be used only with specific written approval of the Department by the State Structure and Bridge Engineer through a design waiver.
3. No timber bridge elements of any kind will be acceptable in the proposed structure.

4. The Developer shall make reasonable efforts to design structures that do not require fracture critical bridge elements. Fracture critical bridge elements will only be permitted if demonstrated to be required and as approved by the Department.

5. Either prestressed concrete or structural steel beams and girders may be used.

6. For prestressed concrete alternatives, the precast concrete Bulb-T sections adopted by the Department shall be used. AASHTO shapes will not be permitted.

7. A sleeper pad will be required when the bridge abutment is either integral or semi-integral.

8. The use of asphalt overlays on concrete bridge decks shall not be permitted.

9. 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 Volume 5 - Part 2 file 10.02-2 for a typical detail of a link slab).

10. 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. Such options may include, but not limited to, the construction of links slabs, or deck extensions.

D. Substructure

1. The Developer 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. Pier columns for straddle bents, integral caps and integral straddle bents, if permitted, shall be protected by structurally independent, crashworthy ground mounted 54 inch high barriers in accordance with of the Manual of the Structure and Bridge Division Volume 5 Part 2, Chapter 15.

5. Piers used for all bridges shall be limited to the following types: hammerhead piers with rectangular columns, multi column piers with square columns, wall piers, circular columns for straddle piers, and dual circular columns for integral caps as detailed in Attachment 3.10 Aesthetics.

6. 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.

7. The maximum abutment backwall width without an expansion joint shall be 80 feet.

8. Piers supporting bridges over future trackways shall also be designed to comply with the AREMA Manual for Railway Engineering.

E. Vaden Drive Direct Access to 66 Express Lanes

See Attachment 3.14b Supplemental Design Requirements for the Vaden Drive Direct Access to 66 Express Lanes Ramp Structure.

F. Existing Bridges

1. General Requirements

1.1 The requirements below are in addition to those listed in the General Requirements for Structures.

1.2 For a list of existing bridges located within Project limits, see Attachment 3.14c, Existing Bridge and Culvert Information.

1.3 For a list of existing bridges which may contain asbestos, see Attachment 3.14c, Existing Bridge Information.

1.4 The Developer is required to submit plans for the modification of an existing structure that are consistent with Attachment 1.5, Standards and Specifications. Plan sets are also required to show all changes,
including but not limited to vertical and horizontal clearances, lane configurations on and beneath bridge, addition of bridge conduit systems and other modifications.

1.5 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 the provisions of Work Restrictions and Maintenance of Traffic. Additionally, the Developer 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.

1.6 It is the Developer’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.

1.7 To obtain copies of Bridge Safety Inspection Reports, Developer must complete a CII/SSI Non-Disclosure Agreement as outlined in IIM-S&B-71 CRITICAL INFRASTRUCTURE INFORMATION (CII)/SENSITIVE SECURITY INFORMATION (SSI).

1.8 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 Vol. 5 Part 2 Chapter 15.

2. Scope of Work for Bridges to Remain in Place

2.1 The scope of work for bridges to remain in place or widened shall include the following:

- Bridge specific requirements listed in Attachment 3.14d Bridge Widening and Repairs and associated repair quantities in Attachment 3.14e Bridge Repair Quantities.

- Inspection and evaluation of bridge deck may be limited to delineating delaminated concrete for removal prior to placement of new overlay systems.

- 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.
2.2 Repair of substructure spalls and delaminations shall include providing and installing embedded galvanic anodes in accordance with Attachment 1.5.

2.3 Substructure cracks shall be repaired in accordance with the Epoxy Injection Pressure Crack Sealing Special Provision included in Attachment 1.5.

2.4 If it is determined by the Developer the cost of an existing bridge widening and rehabilitation is greater than the cost of a new bridge, then the Developer shall have the option to replace entire portions of the bridge or the entire bridge.

3. Additional Requirements

3.1 Only bearings that are included in the Manual of the Structure and Bridge Division Vol. 5 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 Developer 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.

3.2 Existing structural approach slabs shall be widened to the full width of the bridge where the existing bridge is being widened or where the travel lanes are being modified unless approved otherwise by the Department.

3.3 The location of any deck construction joint shall be over a girder and between shear connectors from the girder to the deck, unless approved by the Department.

3.4 When pier or abutment seats are adjusted to improve vertical clearances, a minimum of 6 inches of existing concrete at the top of pier or abutment seats shall be removed and new concrete and galvanic anodes placed to limits required for adjusted seats.

3.5 Modifications to existing bridge joints shall be in accordance with Attachment 3.14d Bridge Widening and Repairs and Attachment 3.14e Bridge Repair Quantities.

3.6 Existing bridge elements shall be evaluated to determine effects of bridge widening, superstructure replacement, 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.

3.7 Existing bridge foundations shall also be evaluated for scour whenever the bridge is widened, or an adjacent 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

Any demolition and temporary support over or adjacent to live traffic, the Developer shall submit to the Department an approved plan for review and concurrence 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 Developer shall determine the effect of equipment loads on the bridge structure, and develop and submit plans which show the procedures for using the loaded equipment without exceeding the structure’s design capacity. The Developer’s plans shall be signed and sealed by a Professional Engineer licensed by the Commonwealth of Virginia.

5. Live Load Rating of Modified Bridges

5.1 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.

5.2 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.

5.3 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.
G. Bridge Drainage

1. The minimum dimension of pipe used in a drainage system for new bridges and widened portions of existing bridges shall be 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.

H. 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 Developer shall verify design and implement a modified version of the requirement such that it is in compliance with AASHTO LRFD.

2. Existing Culverts

   2.1 If the Developer modifies (including extensions and increased loading) structural elements of any existing culvert, then the Developer 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.

   2.2 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.

      • 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
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.

I. 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:

1.1 When a phased portion of a newly constructed structure is intended to carry traffic in a temporary configuration.

1.2 Load rating of any partial configuration of the existing structure.

1.3 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 Developer design engineer 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 Developer is responsible for all remedial measures and corrective action required to provide the Department a structure which satisfies the load rating requirement outlined in IIM-S&B-86 – Load Rating and Posting of Structures (Bridges and Culverts).

J. Safety and Acceptance Inspection for Bridges and Culverts

1. Acceptance of the bridge structure will require the following two independent inspections by the Department:

1.1 A satisfactory safety and inventory inspection by the Department as described below is required prior to opening the structure or portion of the structure to public traffic. This safety and inventory inspection by the Department will serve as the initial inspection of the structure. Data gathered will include 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.

1.2 A satisfactory final construction inspection by the Department is required prior to acceptance of the structure. To facilitate inspection
of the structure by the Department, the Developer shall ensure that all structural elements are accessible and shall provide adequate resources including:

- 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.

- Plans, procedures, personnel, and equipment to implement traffic control measures.

2. The Developer shall provide a minimum of thirty (30) days’ notice to the Department whenever it requires the Department to undertake an inspection. The Developer’s notice to the Department 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.

3. Unless otherwise approved by the Department, structures shall be substantially complete (i.e., roadway, and slopes on the approaches and underneath the structure are already in place) before the final construction inspection will be performed.

K. Plan Submission

1. The Developer shall make Stage I (Preliminary Plan) submissions and Stage II (Final Plan) Submissions.

1.1 Stage I (Preliminary Plan) Submission

- The Developer shall submit a Stage I (Preliminary Plan) submission for each new bridge, bridge replacement, and bridge widening and modification.

- Stage I submission must be submitted to the Department prior to any final design submittal, and at other appropriate times pursuant to the Department’s concurrent engineering process. Final design prior to Department approval of the Stage I submission shall be solely at the risk of the Developer.

- 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 3.3 Geotechnical, and roadway geometry.
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 standards and specifications as set forth in Attachment 1.5.

The Stage I report shall follow the “Stage I – Report Template” except as modified below.

- Section 3.10 titled “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).

- Section 6, titled “Bridge Preliminary Recommendation” is modified as follows:

  The report need only describe the single alternative selected by the Developer to be constructed:

  a) In Section 6, the report requirements are extended to specifically address in detail all non-standard items, unique or complex features; and

  b) In section 6, for new bridges, the report requirements are extended to specifically address the service requirements (including durability and inspectability) in Article 2.5.2 of AASHTO LRFD and why, if applicable, they could not be avoided.

- Section 7, entitled “Engineer’s Cost Estimate for each Alternative” is not required.

- Section 8, entitled “Schedule” is not required.

- 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.

1.2 Stage II (Final Plan) Submission

- The Developer 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 culvert or modifications to culvert structures.

- Final plans may be submitted as completed plan set(s) or in plan submission packages as approved by the Department (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 Developer.

- The Stage II drawings shall be prepared in accordance with the Stage II Plan Review Checklist.

- Final design calculations and construction drawings shall be signed and sealed in accordance with the VDOT Manual of the Structure and Bridge Division, Volume V-Part 2, Chapter 1, Section 16: Sealing and Signing of Plans and Documents.

2. Additional Requirements for Bridges

2.1 It shall be the responsibility of the Developer to request the following data from the Department’s project manager:

- B-number, federal identification and plan number for each new bridge in the Agreement

2.2 Plan sets should contain sheets which are arranged and detailed as outlined in the Manual of Structure and Bridge Division – Volume 5 Part 2.

3.14.3 Retaining Walls

A. General Requirements

1. The retaining walls 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); The Manual of Structure and Bridge Division Volume V Part 11 Chapter 10 Earth Retaining Structures; and applicable sections of Road and Bridge Standards, Vol. I & II and as specified in the Technical Requirements.

2. Should any standard for retaining walls not be in accordance with AASHTO LRFD, then the Developer shall verify design and implement a modified version of the requirement such that it is in compliance with AASHTO LRFD.
2.1 Retaining walls at bridge abutments shall be designed for a minimum service life of 100 years.

2.2 Except for tie-backs required for the support of retaining walls, all components of the retaining walls shall be contained within the Department’s right-of-way. Tie-backs for retaining walls may be located within permanent underground easements provided that such easements are approved by the Department.

2.3 MSE walls that require traffic protection at the top shall utilize barriers or railings on moment slabs.

3. Parapets located on top of MSE walls shall utilize low permeability concrete in accordance with current VDOT Specifications.

4. 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.

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 Developer shall ensure that all safety elements of existing retaining walls are brought up to current standards (example: railing). Significant Work includes, but is not limited to, the following:

   2.1 Raising the existing retaining wall; and

   2.2 Adding a sound wall or other feature to an existing retaining wall.

C. Plan Submission

1. The Developer shall submit a preliminary plan for each new or modified retaining wall. Final design efforts prior to the Department’s preliminary plan approval shall be at the risk of the Developer.

Preliminary plans shall be submitted prior to any final design submittal. The Developer shall not submit any final plans until the preliminary wall submittal has been approved by the Department.
2. A retaining wall preliminary plan submittal shall include:

2.1 A plan and elevation view of the wall showing all existing and proposed design features associated with the project and including existing and future utilities, sound walls, sign structures, landscaping, irrigation systems, barriers, existing and proposed drainage structures, adjacent bridges etc.

2.2 A preliminary geotechnical report completed in accordance with the requirements of Section 3.3 Geotechnical.

2.3 Where applicable, approval of the preliminary wall submittal shall be subject to the approval of an H&HA study and scour analysis.

3. Where retaining walls are located at bridge abutments, retaining wall plans, including preliminary plans shall be included in a bridge plan submittal.

3.14.4 Sound Barriers

A. Sound 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.

B. Sound wall posts shall not be spliced to soldier piles of retaining wall posts unless connection details are approved by the Department.

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 sound walls.

3.14.5 Traffic Structures

A. General

1. Draft VDOT Structure and Bridge Division’s S&B-IIM-90.1 Memorandum in accordance with Attachment 1.5 shall be used in lieu of S&B-IIM-90.

2. Lane Use Management Signs (LUMS) shall be treated in the same manner as overhead sign structures that support variable message signs.

3. Signs on bridge structures may be installed using brackets attached to bridge parapets and deck slabs. Signs shall not be attached to bridge or structure rails. Sign panel faces shall clear parapets or rails by a minimum of 12 inches.
4. Overhead sign structures (span type only, no cantilevers) shall be supported on bridge deck blisters. The main bridge beam 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.

B. Toll Gantries

1. The design of structures, toll gantries, and supports used for the violation enforcement, TMS, and tolling system roadside equipment shall be standardized.

2. The design for toll gantries will accommodate the following:

   2.1 Dead loads, wind loads and ice loads for toll and enforcement equipment, including equipment cabling.

   2.2 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 toll gantry columns and beams shall be fabricated of galvanized steel.

C. Existing Traffic Structures

1. The Developer may reuse an existing traffic structure for proposed signs and ITS devices upon the submittal of documents which shall include a condition assessment based on field inspection, a listing of repair items required to address existing defects, and certification that the structure meets all current sign structure design criteria and is fully compliant with the Technical Information and Requirements and Special Provisions listed in Attachment 1.5 for this Project. For structures that do not support variable message signs, the AASHTO Standard Specifications for Structural Supports for Highway Sign, Luminaires, and Traffic Signals, 1994 may also be an acceptable alternative for verifying the design. Any existing structure that the Developer proposes to reuse must also be certified for the identified loads, including a statement sealed by a Professional Engineer by the Commonwealth of Virginia that the reused structure is fully compliant with the Technical Information and Requirements and Special Provisions listed in Attachment 1.5 for this Project, including roadway. The Department Structure ID for any sign and ITS structure to be modified for reuse or to be removed shall be clearly shown on the plans. The Department Structure ID for any
existing sign may be obtained by contacting the Department Northern Virginia District Structure and Bridge Section. The Department Northern Virginia District Structure and Bridge Section shall be notified prior to the removal or relocation of any existing traffic structure. Removed existing lighting poles shall not be relocated (new lighting poles shall be required).

2. Removal and Disposal of Existing Bridge-Mounted Sign Structures

All bridge-mounted sign structure located within project limits shall be removed and if necessary replaced with new signs mounted on independent sign structures. Bridge mounted signs shall be completely removed, including frames, sign panels, hardware, and incidentals. Removed materials shall become the property of the Developer 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 before the structure can be accepted.

2. The initial inspection shall be performed by the Department. The Developer shall provide the Department with 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.
4. The Developer shall ensure that all structural elements are accessible for inspection of all structures. This requirement may dictate that the Developer 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, the Department shall submit an inspection report to the Developer within 10 days of the inspection either recommending acceptance of the structure or identifying deficiencies, including incomplete work, which must be rectified before the structure can be accepted. If a structure is not accepted, the Developer shall rectify the deficiencies and notify the Department in writing, certifying the deficiencies have been corrected. Within 5 days of receipt of such certification, the Department may require that a follow-up inspection be performed to verify that the deficiencies have been corrected or recommend in writing to the Developer that the structure is acceptable without a further inspection.

6. The final acceptance of sign/ITS structures will occur when the initial inspection is completed and any necessary follow-up (verification) inspections are performed. The initial inspection may be scheduled as more than one inspection as long as it is coordinated with the Department.

3.14.6 WMATA Pedestrian Bridges

WMATA pedestrian bridges shall be in accordance with the requirements of Section 3.21 Transit Facility Design and the following:

A. The Developer shall also protect abutments and piers of both new and existing WMATA pedestrian bridges in accordance with the requirements of Article 3.6.5 of the AASHTO LRFD Bridge Design Specifications.

B. In addition to WMATA vertical and horizontal clearance requirements, all clearances under WMATA pedestrian bridges shall meet minimum project requirements for vertical and horizontal clearances, including the requirements of the Manual of the Structure and Bridge Division for minimum vertical clearance of pedestrian bridge over a roadway.

3.14.7 Architectural Treatment

Architectural treatment shall be in accordance with Section 3.10 Aesthetics.
3.14.8 Miscellaneous Requirements

A. The parapet and barrier walls on structures may be constructed using slip forming after the Department review and approval of the trial section.

B. The proposed structures shall utilize low permeability concrete in accordance with the Special Provision for Low Permeability Concretes for Design-Build Projects.

C. All temporary shoring and erection elements shall be dismantled and removed in their entirety following construction, unless otherwise approved by the Department.

D. The following utilities shall be designed, furnished, and installed:

   1. Lighting on the bridge
   2. Underbridge lighting (if required)
   3. Standpipe Fire Hydrant and Water Supply fire protection system shall comply with the requirements of NFPA 502 Section 6.6. Prior to fire protection acceptance, the Developer shall test the hose and standpipe systems for compliance with NFPA 25 and provide the Department with a letter from the Fire-Marshall confirming such test results as a condition of Project Completion.

E. The Developer 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 to the Department within ninety (90) days of the Department’s approval of the construction plan submittal.

F. In addition to the guidelines outlined for the use of fencing in The Manual of Structure and Bridge Division Volume V Part 2 Chapter 30, pedestrian fencing shall be used on all overpass and ramp structures over freeways (interstate) regardless of whether the overpass structure provides pedestrian access (sidewalk, bikeway, etc.). The following structures may be excluded from this requirement:

   1. Overpass structures carrying Mainline 66 Express and general purpose lanes traffic.
   2. Ramp structures carrying traffic between I-66 and I-495, except if the bridge is over the WMATA facility.
   3. Third level ramp structures at the Route 28 interchange.
4. Other locations when determined by the District Bridge Engineer that installation of fencing may interfere with access to perform bridge safety inspections.

G. Draft VDOT Structure and Bridge Division’s S&B-IIM-81.6 Memorandum in accordance with Attachment 1.5 shall be used in lieu of S&B-IIM-81.5.

H. Several VDOT Structure and Bridge Division S&B-IIMs include a reference to an advertisement date upon which an S&B-IIM becomes effective. For the purpose of this project, any advertisement date listed in an IIM shall be replaced by the issue date for that IIM.

3.15 Electronic Toll and Traffic Management System

3.15.1 General

The Developer shall be responsible for the planning, design and installation of an ETTM system comprising separate Electronic Toll Collection (ETC) and Traffic Management Systems (TMS) in accordance with the Agreement.

A. The Developer shall be responsible for developing a concept of operations, using the I-66 Operations Concept Technical Report as a guide. The Developer’s concept of operations shall include stakeholder involvement with the Department, Transit, Public Safety and Counties, Cities, and Towns within the Project limits. The Developer shall perform necessary Work for the Project’s ITS Architecture and System Engineering in compliance with FHWA Rule 940.

B. The existing fiber backbone and power distribution duct bank is located on the eastbound shoulder of I-66. The fiber backbone is a shared resource for servicing the Department, WMATA, and other agencies. The Developer shall not impact existing communication and power system currently used by Northern Region and partner agencies. Furthermore, the Developer shall maintain the existing fiber backbone and power distribution duct bank until newly installed system is fully operational. At all times the fiber backbone and power distribution duct bank for Northern Region and partner agencies shall remain operational, unless approved by the Department.

C. The Developer shall maintain the existing communication network and keep it operational at all times for the duration of construction, unless otherwise approved by the Department. Additions, modifications and adjustments to the communication network and interfaces shall seamlessly reside and be fully interoperable with legacy networks and the Department ATMS software during and after construction.

D. The Developer shall be responsible for providing design, installation, and maintenance, final acceptance, integration, testing, training, documentations,
and final submission of As-Built plans for the infrastructure (device and network components) being installed for the Department and partner agencies to use for software integration.

E. The final placement of all ITS devices on the roadside (i.e. not on overhead structures) shall be such that routine maintenance activities can be performed on the device without requiring the closure of a vehicle travel lane or over the WMATA facility.

F. The Developer shall record all new ITS devices in the Asset Identification Table. The information in the Asset Identification Table will be used to populate the NRO inventory database for central software, integration, monitoring and asset management.

G. The design of all toll collection facilities shall incorporate the principles of Crime Prevention Through Environmental Design (“CPTED”). The Developer shall confirm that a member of the Project design team has completed training regarding CPTED principles. The Developer shall arrange for a review and approval of its toll facilities by the Virginia State Police Crime Prevention Unit.

H. The Department Assets Specific Requirement. The Developer shall provide the Department with a sample unit of all ITS devices requiring integration with the Department’s ATMS software. This includes but not limited to CCTV, DMS, Vehicle Detection, Lane Control Signals and Video Monitoring System. The Developer shall furnish such equipment to the Department within sixty (60) calendar days of plans being approved for construction so that the Department can begin integration and testing with the Department’s ATMS software.

3.15.2 Connected Vehicles Equipment

A. The Department has Roadside Units (RSUs) for Connected Vehicles research installed on I-66 between US 123 and Gainesville which shall remain operational during and after construction.

B. The Developer shall maintain power and communication to existing units during construction and operations. During construction, downtime shall be limited to one instance for each unit lasting no longer than 48 hours.

C. The Developer shall install any relocated RSU at a comparable location as approved by the Department.

3.15.3 Business and Toll Operating Model

A. The business and toll operating model implemented by the Developer shall comply with the requirements of the Agreement.
B. The Developer shall be responsible for providing a facility to support administration, traffic management, incident response, maintenance and tolling operations including but not limited to handling of services directly related to the operation and maintenance of the Express Lanes.

C. The Project must provide the capability to read Transponders that are interoperable with the E-ZPass network (or any successor to E-ZPass used on other State Highways) and issued by either the Department or by another member of the E-ZPass Interagency Group or other entity with which the Department has established reciprocity for the purpose of charging via transponder reads.

D. Transponder readers installed for the Project must be interoperable with the E-ZPass network (or any successor to E-ZPass used on other State Highways) and issued by either the Department or by another member of the E-ZPass Group or other entity with which the Department has established reciprocity for the purpose of charging via transponder reads.

E. Equipment shall be installed with roadway and pricing information to be communicated to travelers with sufficient notice to allow decision on whether to use that roadway section.

F. Transponder reader equipment shall be able to read the mode (HOV vs. Toll) of E-ZPass Flex transponders or other similar approved devices used to indicate the occupancy of the vehicle.

G. Reader equipment shall be able to provide E-ZPass transponders with customer feedback messages in accordance with E-ZPass specifications or other specifications agreed with the Department.

H. Enforcement equipment shall be installed on the roadside to capture vehicle information that can be used for toll enforcement and payment collection for vehicles that do not have prior arrangements to use the 66 Express Lanes, including but not limited to a valid transponder. Violation enforcement shall follow practices in compliance with legislation and shall be subject to approval by the Department. Enforcement by the Developer shall include, but not be limited to, video enforcement, image review, customer service, and payment collection services. Processes, policies and business rules shall be subject to review and approval by the Department at least sixty (60) days prior to implementation or change unless written agreement is provided by the Department to waive this period of review. All unpaid tolls shall be validated against customer account information and posted to such accounts according to business rules and processes defined by the Department. The Department may offer central clearing services to support the collection of unpaid toll which the Developer may utilize through separate agreement.
I. An enforcement area shall be provided at or near each tolling point in a safe location as agreed by the Developer for law enforcement vehicles per the standards and specifications set forth in Attachment 1.5.

J. Vehicles shall be classified on the roadside in order to differentiate toll rates, create exemptions and apply restrictions for use of the 66 Express Lanes.

K. All ETTM equipment and systems shall be monitored for health and alert failures automatically to maintenance staff to meet agreed response and repair times.

L. The back office shall process transactions for automated clearing with E-ZPass accounts held by the Department and reciprocity agencies.

M. Transactions shall be built into trips and rated according to the dynamically calculated toll rates for the time of travel.

N. Rates shall be calculated dynamically based on real-time roadway conditions for volume, occupancy and speed.

O. Customers shall be able to access a website and customer service representatives by phone for roadway inquiries, account information and violation payments.

P. Where customer accounts cannot be found, the system shall create violation notices to be sent to registered vehicle owners to collect payment for the toll plus a fine.

3.15.4 Systems Integration and Protocols

A. The Developer shall implement and document a system engineering approach, consistent with FHWA 23CFR 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 verification
7. system testing
8. system integration
9. configuration management

B. The 66 Express Lanes TMS shall be required to interface to the Department’s ATMS at the McConnell Public Safety and Transportation Operations Center (MPSTOC) consistent with the Department ATMS External Interface Control Document (ICD) including any mutually agreed revisions during the Operating Period.

C. The Developer shall develop and maintain a project-level ITS architecture that is coordinated with the Department’s ITS architecture and the National Capital Region ITS Architecture. The project-level ITS architecture shall document all interconnects and information flows between the 66 Express Lanes operations facility and the Department ATMS.

D. The Developer shall prepare and submit to the Department, the Department ITS Projects – Systems Engineering and Architecture Compliance (Rule 940) Checklist. The Checklist shall demonstrate that the Project is in compliance with Federal Rule 940.

E. The Department shall provide two single mode fiber optic cable strands beyond the project limits for the Developer’s use in building a redundant communications network architecture for the 66 Express Lanes.

F. The Department Assets Specific Requirement. The Developer shall establish weekly coordination meetings with the Department’s networking staff throughout the duration of network design, installation, integration, testing, and configuration efforts. The Developer shall be responsible for designing, deploying, configuring, testing, and commissioning the network including network management and monitoring capability as approved by the Department. Prior to commencing work, the Developer shall develop a Requirements Definition Document (RDD) that will form the basis for the overall network architecture and design. The Developer shall work closely with the Department and ensure compatibility and interoperability with existing network the document shall contain:

1. Complete description of the proposed implementation of the access, distribution, and core layers for the Ethernet network;
2. Development of an IP Design Scheme with ranges assigned to each node to be integrated by the Developer;
3. Proposed IP subnet definition and addressing including any and all masks;
4. Proposed IP multicast configuration including multicast routing (i.e., protocol independent multicast (PIM) sparse or dense) and Rendezvous Point (RP) designation as necessary;

5. Proposed Recommendations for failover and redundancy including network device power, supervisor cards, and network ports;

6. Proposed configuration and guidelines for Virtual LAN assignments including management VLANs, device VLANs, and routing VLANs;

7. Proposed configuration and guidelines for an IP gateway redundancy protocol such as VRRP, HSRP or GLBP shall be used to provide a redundant IP gateway in the event of primary gateway failures throughout the network.

8. Proposed configuration and guidelines for specific port assignments on each of the Layer 2 and 3 devices; and

9. Proposed interface and integration points with the existing ITS network.

G. **The Department Assets Specific Requirement.** The Department will provide the Developer with an IP address range or ranges to use for developing the IP address scheme. The RDD shall be prepared by a networking professional and approved by the Department. The networking professional shall be present during the installation and testing of the local area network as well as during system testing.

H. **The Department Assets Specific Requirement.** The Developer shall develop the Department Ethernet network consisting of Field Hubs (a.k.a. Nodes) located throughout the region connected via a fiber optic trunk. Field devices shall be connected to the Node sites via distribution fiber in a ring topology. Field devices shall be connected to the Layer 2 edge switch at each cabinet. A Layer 2 hardened switch at each Node facility shall act as the Ring Master.

I. **The Department Assets Specific Requirement.** The Developer shall install and secure the networking equipment in the field equipment cabinets and the MPSTOC as defined on the plans and in this document. Standards CAT 5E and optical fiber cables shall be used for each connection, as required.

J. **The Department Assets Specific Requirement.** Patch cables shall be defined as cables connecting a device to a patch panel, wall outlet, or another device. The patch panel provides a connection to permanently installed cabling generally.

K. **The Department Assets Specific Requirement.** The current Department Ethernet network consists of Field Hubs located throughout the region
connected via a fiber optic trunk. Field devices are connected to the Hub site via distribution fiber in a ring topology. In the event any HUB sites are impacted by the Developer, the Developer shall be required to replace and relocate the impacted HUB sites subject to the Department approval of a plan that ensures continuity of operation.

L. **The Department Assets Specific Requirement.** The Developer shall design, furnish, and install a central terminus test system at the MPSTOC. The test system shall meet all the Department networking and security standards.

3.15.5 ETTM System Design Documentation

The following ETTM system design documentation shall be prepared and submitted to the Department by the Developer:

A. Functional requirements shall be documented to comply with the provisions of the I-66 Operations Concept Technical Report (Attachment 3.15) and shall include characteristics of the ETTM 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 ETTM systems and the operational interaction with the Department ATMS and other Stakeholders.

B. Technical specifications shall be a document or documents that specify the technical design of the subsystems, integrated systems and system architecture that will comprise the ETTM System and its interfaces.

C. The ICD shall be prepared to document all required interfaces between the ETTM system and other systems describing the physical and logical architecture of system interface between the systems, messaging protocols, file transfers, operations, redundancy, reporting and other aspects. Process definition deliverable or other agreed document shall set out the business processes relating to the ETTM System (subject to intellectual property regulations, and the requirements of the Agreement) and the processes for interacting with the appropriate Department system or other systems as required.

D. Testing and Integration Strategy shall establish the principles of, and the Developer’s approach to, the testing and integration of the ETTM system and related interfaces, including the integration phases, test stages, test processes, conditions for moving from one test stage to the next and user acceptance testing by the Department.

E. Security Plan – shall be a document (or part of another document) that sets out how the security and privacy of the ETTM System shall meet the relevant requirements for enforcement evidence and that data are held securely and only accessible to authorized personnel.
3.15.6 Design of the Electronic Tolling System

A. The Electronic Tolling Collection (ETC) System component of the ETTM shall collect information from vehicles on the roadway to charge, collect and enforce payment of tolls in accordance with the Agreement.

B. The ETC roadside system is comprised of at least the following in accordance with the Agreement:

1. Transponder readers and antennas

   1.1 The ETC system shall have a transponder read performance of at least 99.99% under normal operation, for properly fitted and operating transponders, excluding signal attenuation due to metallic wind screen or other similar conditions beyond the reasonable control of the Developer;

   1.2 The ETC system shall not assess a toll to vehicles, whether transponder equipped or not, traveling adjacent to any toll point in a lane (such as the general purpose lanes) that is not subject to a toll. Equipment (such as guard lane antennas), algorithms and manual review processes as necessary shall be implemented to ensure tolls are not charged to express-lane adjacent vehicles at least 99.99% of the time;

   1.3 Transponders shall be associated with the correct vehicle 99.95% of the time; and

   1.4 Transponder read processing shall be 4,000 per lane per hour.

   1.5 The reader shall have the capability of buffering up to 4 million transponder reads in the event of a transaction processor failure.

2. Cameras to capture front and rear license plates

   2.1 Cameras shall include infrared flash to create black and white images;

   2.2 Cameras shall capture front and rear images from each vehicle at least 99.9% of the time;
2.3 License plate images shall be human readable 99% of the time; and

2.4 Image processing shall be 2,500 per lane per hour.

3. Optical Character Recognition (OCR) system

3.1 The OCR shall read license plates from Virginia, Maryland, District of Columbia, West Virginia, North Carolina, and Pennsylvania;

3.2 The OCR shall automatically read the license plate characters and state jurisdiction at least 95% of the time from the states listed above; and

3.3 The OCR shall be used to automate image processing.

4. Vehicle detection and classification equipment

4.1 The vehicle classification shall distinguish between motorcycles, 2-axle vehicles and large vehicles with 3 or more axles;

4.2 The vehicle classification shall accurately classify vehicles 98% of the time; and

4.3 The detection system shall have the ability to accurately detect each individual vehicle passing through a tolling point at least 99.9% of the time.

5. Violation enforcement lights or other alerting system

5.1 Violation enforcement lights shall alert of vehicles on enforcement lists, such as frequent violators; and

5.2 Violation enforcement lights shall indicate transponders set in HOV mode.

6. Roadside data collection system and transaction processor

6.1 Transactional data shall be collected for vehicles travelling between 0 mph and 120 mph;

6.2 The roadside transaction processing system shall correctly correlate transponders and images to the correct vehicle 99.9% of the time;

6.3 The roadside transaction processor shall buffer transaction for at least thirty (30) days at the roadside in the event of network failure; and redundancy shall be provided in the event of transaction processor failure;
7. Related hardware, software and firmware to control the roadside ETC equipment

7.1 Switch and network components that connect the roadside ETC equipment to the wide area network and transfers data to the back office system (BOS); and

7.2 The network shall transfer transaction data to the back office in near-real time.

C. Access to the ETC system overhead and roadside equipment shall be provided such that it does not jeopardize the safety of the technician and travelling public and comply with the standards and specifications set forth in Attachment 1.5.

D. In the event of a need to temporarily suspend tolls for any toll section, there shall be a means to suspend toll collection on a section by section basis, and the system shall continue to record transaction data while tolls are suspended.

E. The ETC roadside equipment shall have an In-service Availability (ISA) of at least 99.5%, excluding the effect of any condition beyond the reasonable control of the Developer.

F. The Developer shall establish and execute a process to determine vehicle occupancy and undertake related enforcement.

G. The Developer shall develop and update, as needed, any additional interface file format and transfer protocols for the transmission of ETC data and related information in cooperation with the Department and in accordance with the ETC Agreement over the term of the Agreement.

H. Communication between the ETC system roadside equipment and the operations facility shall be via a fully redundant network.

3.15.7 Design of the Technical Shelters

A. The Developer shall provide suitable technical shelters housing electrical cabinets for the relevant ETTM Equipment as needed to meet the requirements of the Agreement.

B. The technical shelters shall be equipped with the following provisions:

1. HVAC systems as required to installed equipment;

2. Fire detection;

3. Intrusion detection;
4. Electrical power; and

5. Communications.

C. Each service panel for the Project technical shelters shall be capable of monitoring and reporting alarms for the main power and each branch circuit, the current flow and any tripped breakers.

D. Each technical shelter shall be powered by an uninterruptible power source to enable any telemetry to communicate for the first 4 hours after a power failure.

E. Service panels feeding technical shelters shall be equipped with a backup generator sized to accommodate the attached electrical load and any other roadside equipment, including DMS, connected to the service panel until power is restored.

F. The technical shelter structural design, including floor, shall be designed and constructed giving consideration to its life cycle. Allowable design bearing capacities shall be established to minimize shelter foundation settlements and associated settlement cracking. These capacities shall be field verified by the Engineer prior to construction. Consideration will be given to making the floor slab integral with the wall foundation system.

G. Access to technical shelters shall be provided such that it does not jeopardize the safety of the technician and travelling public and comply with the standards and specifications set forth in Attachment 1.5.

3.15.8 Express Lanes Traffic and Toll Operations Centers

A. The Developer shall provide a Traffic Operations Center to accommodate equipment and personnel for the traffic management operation of the Project. The Developer shall obtain building permits and other approvals as required by Law, for the construction and occupancy of the Traffic Operations Center as required.

B. The Traffic Operations Center shall be the minimum required to monitor traffic, respond to incidents, and perform all other duties as required under the Agreement.

C. The Traffic Operations Center shall be located in Northern Virginia.

D. The Developer shall provide a Toll Operations Center, which may be the same facility as the Traffic Operations Center, where staff responsible for reviewing license plates, handling customer service, and all other duties required for the tolling operations will be located.
E. The Toll Operations Center shall be located in the Commonwealth of Virginia, but it need not be located in Northern Virginia.

F. Both the Traffic and Toll Operations Centers shall comply with the Department’s physical security requirements.

3.15.9 Closed-Circuit Television (CCTV) Cameras

A. Dedicated CCTV cameras shall be provided for the following functions:

1. Surveillance of the 66 Express Lanes including, approaches and interchanges

2. AID on the 66 Express Lanes

B. CCTV video coverage must be provided by PTZ CCTV cameras mounted on poles to enable the Department and Developer operators (under agreed circumstances in accordance with the Agreement) to observe traffic within the limits of the 66 Express Lanes at all hours of the day and in all weather conditions normally encountered in Virginia, consistent with reported visibility restriction (i.e., during snow storms, fog, etc.). The AID video must be stable, jitter-free, and suitable for video-based AID.

C. Dedicated cameras shall be provided for surveillance of the 66 Express Lanes or to enable video-based AID under the Developer’s control.

D. CCTV line-of-sight distances shall provide full CCTV coverage without image degradation.

E. All cameras installed by the Developer shall meet the requirements of VDOT Special Provision for CCTV Video Equipment and CCTV General Requirements, as included in Attachment 1.5.

F. The video surveillance system must enable the identification of the number and vehicle types involved in an incident at all locations within the surveillance area.

G. The video provided must be stable at all zoom settings when viewing objects up to one mile away.

H. The Department Assets Specific Requirement. Furnish and install High Definition (HD) closed circuit television (CCTV) color cameras to replace existing VDOT units and provide full overlapping surveillance of general purpose lanes. The CCTV cameras shall produce clear, detailed, and usable video images of the areas, objects, and other subjects visible from a roadside CCTV field site. The video produced by the camera shall be true, accurate, distortion free, and free from transfer smear, over-saturation, and any other
image defect that negatively impacts image quality under all lighting and weather conditions in both color and monochrome modes. The camera enclosure shall minimize glare and provide overexposure protection for the camera when pointed directly at the sun.

I. **The Department Assets Specific Requirement.** The camera shall provide tilting, masking, presets, and privacy zones capable of being superimposed on video image/stream and stored in non-volatile memory.

J. **The Department Assets Specific Requirement.** The CCTV camera shall include an integrated pan, tilt, and zoom mechanisms capable of providing 360 degree continuous pan, presets, programmable tours, and blackout privacy zones.

### 3.15.10 Vehicle Detection

A. The Developer shall furnish the department vehicular traffic data consisting of travel time, volume, speed and occupancy between interchanges and at all on and off ramps to general purpose lane. The traffic data shall be delivered live every minute to VDOT ATMS and will be used from traffic management, studies and archived for sharing with others at the Department discretion.

B. The Developer shall deliver live traffic management data from the 66 Express Lanes to the VDOT ATMS at MPSTOC to be used for traffic management, studies and archived for sharing with others at the Department discretion.

C. The Developer shall measure and furnish quantitative traffic flow data to the Department for both the 66 Express Lanes and the general purpose lanes. This shall consist of average vehicular speed, traffic volume, sensor occupancy, and travel time.

D. Developer has an option of installing sensors on the general purpose lanes for the Department to operate and maintain.

1. All detectors installed on the general purpose lanes shall meet or exceed the Department standard specifications.

2. The detectors shall cover all general purpose ramps and lanes including all shoulders.

E. The Developer has an option to provide the Department a real-time data feed for the general purpose lanes from sensors installed on the 66 Express Lanes, for which the Developer is responsible for operation and maintenance.
1. Under this option, all data and performance requirements in the Department’s detector specification shall apply. The data will be subject to annual testing for the Term.

2. Data shall be provided for all general purpose ramps and lanes including all shoulders.

3. The real-time feed shall be accessible to VDOT ATMS via a non-proprietary, published, open API.

4. All data will be archived and shared with others by the Department.

5. The Developer shall furnish an Interface Control Document defining the real-time and archived data interfaces, which shall be subject to the Department review and approval.

F. The Developer may recommend other options to provide the Department a real-time data feed (at a maximum of one minute intervals) for the GP Lanes subject to Department approval.

G. The Developer shall provide the Department a real-time data feed of traffic flow data on the 66 Express Lanes.

1. All data and performance requirements in the Department’s specification for vehicle detection and data collection shall apply. The data will be subject to annual testing for the Term.

2. Data shall be provided for all 66 Express Lanes ramps and lanes including all shoulders.

3. The real-time feed shall be accessible to the Department’s central software via a non-proprietary, published, open Application Program Interface (API).

4. All data will be archived and shared with others by the Department.

5. The Developer shall furnish an Interface Control Document defining the real-time and archived data interfaces, which shall be subject to the Department review and approval.

3.15.11 Dynamic Message Sign (DMS)

A. Two (2) toll and driver information (T&DI) DMS for the 66 Express Lanes shall be located prior to each entry to the 66 Express Lanes and will display information to allow drivers to make decisions on whether to use the 66 Express Lanes. The information to be displayed shall indicate:
1. Toll rates for up to three major destination points for each point of entry; and

2. Roadway information such as accident locations or weather alerts.

The second sign shall be dedicated to pricing information.

B. Three (3) DMS shall be installed at suitable distances from the 66 Express Lanes main entry points at each end of the corridor to support motorist decision making and orderly movement of traffic.

1. The two DMS shall consist of an advance and confirmation pricing sign; and

2. The advance pricing sign shall give the first notice of the toll rates for the roadway and the confirmation sign shall give confirmation of the toll rates.

The second and third signs shall be dedicated to pricing information.

C. The Developer shall coordinate the location of DMS with the Department to avoid over-populating signs and to seek co-gantry opportunities. The Project Roll Plan will identify over-population and potential co-gantry opportunities. The Developer shall incorporate agreed upon recommendations in the final Design Documentation.

D. The T&DI DMS shall have the following minimum features:

1. Full graphics monochrome LED display;

2. Capability to display congestion levels on 66 Express Lanes on each tolling section;

3. Capability to display toll price for destination points;

4. Capability to display travel-time information for 66 Express Lanes;

5. Capability to display traffic management information, including warning and recommended diversions;

6. Fault detection and reporting; and

7. Conformance to the National Transportation Communications for ITS Protocol (NTCIP) communications protocol.

E. If communication with the Developer’s Traffic Operations Center is lost and the T&DI DMS has no reported errors, the T&DI DMS shall display a user-defined graphic/message.
F. The traffic management DMS shall be installed on the 66 Express Lanes before every exit point to provide traffic management information and travel time to motorists.

G. The traffic management DMS shall have the following minimum features:

1. Full graphics monochrome LED display;
2. Capability to display traffic management information, including travel time, warning and recommended diversions;
3. Fault detection and reporting; and
4. Conformance to the NTCIP communications protocol.

H. The DMS must not display erroneous information due to a fault with the sign or the loss of pixels.

I. The Department Assets Specific Requirement. Two types of DMS units shall be utilized for the general purpose lanes. Type 1 DMS shall consist of both walk-in and front-access sign assemblies, and Type 2 DMS shall consist only of front-access sign assemblies. Walk-in Type 1 DMS units shall only be installed on span structures and front-access Types 1 and 2 DMS units shall be installed on either span or butterfly structures.

J. The Department Assets Specific Requirement. Displays shall be full color matrix with evenly spaced pixels, both vertically and horizontally providing for an 18 inch high character for Type 1 and for 12 inch high character Type 2 DMS units. Each sign shall be capable of displaying a message composed of any combination, upper and lower case letters A through Z, decimal digits 0 through 9, blank or space, punctuation marks, special characters, special graphics shapes editable by the user.

K. The Department Assets Specific Requirement. The DMS controller and circuit breaker shall be installed on the ground in the equipment cabinet, not overhead within the DMS assembly. The DMS controller software shall support NTCIP V2.35 and shall be backward compatible with the Department’s current version 1 of the NTCIP communication protocol and the functions and features contained within the VDOT ATMS.

L. The Department Assets Specific Requirement. DMS shall be installed at the following minimum locations:

1. Type 1 walk-in sign between interchanges;
2. Type 2 sign prior to decision point to 66 Express Lanes; and
3. Type 2 sign for P&R lots.

3.15.12 Lane Control Signals

A. The Developer shall install Lane Control Signals (LCS) on general purpose lanes for junction, lane and shoulder control traffic management. LCS shall be a minimum 4 feet square front-access assembly, full color, full matrix with evenly spaced pixels capable of displaying alpha numeric characters, special graphics and shapes editable by the user, MUTCD compliant signs, symbols and lane control designations, including green down arrow, red “X”, and yellow diagonal arrow.

B. LCS shall have an individual controller and circuit breaker that shall be installed on the ground in the equipment cabinet. The LCS controller software shall meet current NTCIP and shall be backward compatible with the Department’s communication protocols.

3.15.13 Cabinets

A. The Department Assets Specific Requirement. The work shall consist of furnishing and installing field equipment cabinets consisting of cabinet enclosure and associated ancillary items. All cabinet installations shall be ground-mounted on concrete foundations in accordance with VDOT Road and Bridge Standards CF-3.

B. The Department Assets Specific Requirement. For testing, maintenance, and repair purposes, all equipment cabinets shall be installed within 100 feet of all messaging devices. Power components include transformer distribution and disconnect panels may be located outside the cabinet. Field equipment cabinet are used for housing ITS equipment, and network devices including, but not limited to, Ethernet switches, device and terminal servers, digital video encoders, CCTV interface panels, DMS controllers, vehicle detector interface assemblies, transient voltage surge suppressors, uninterruptible power supply system, solar power controller and charging equipment, and fiber optic cable termination and patch panels.

C. The Department Assets Specific Requirement. The Developer shall furnish and install grounding system and primary transient voltage surge suppression (TVSS) to protect all equipment from lightning, transient voltage surges, and induced current including service entrance or main disconnect in accordance with Department Standards, Specifications and Special Provisions set forth in Attachment 1.5.

D. The Department Assets Specific Requirement. Access to field equipment cabinets shall be provided such that it does not jeopardize the safety of the technician and travelling public and comply with the standards and specifications set forth in Attachment 1.5.
### 3.15.14 Power

A. The Developer shall furnish and install a dedicated power distribution network for the 66 Express Lanes tolling system, which shall be physically separate from the Department’s power distribution network.

B. The Developer’s power distribution network shall consist of dedicated conduits, handholes, conductors and power service meters.

C. Power for traffic management devices may be shared with the Department subject to a mutually agreed upon sharing formula.

### 3.15.15 Back-Up Power System

A. All tolling points shall have an uninterruptible power supply (UPS) that supports the equipment in the event of a power outage for at least 1 hour.

B. All tolling points should have a generator that supports the equipment in the event the UPS back-up mode is activated.

C. Generators shall be placed in a location where service and refueling vehicles can access the generators easily.

D. UPS assembly shall provide complete non-interruptible power protection, voltage regulation, and surge and spike protection for all ITS devices and communications equipment powered by it. The UPS shall instantly transfer the cabinet to the battery back-up mode in the event the main AC power source goes offline. The UPS shall be a commercially available package containing all wiring connectors, software, mounting brackets, and cables. The UPS assembly shall consist of a UPS with batteries, surge suppression, LED status indicators for “On-line,” “Battery On,” “Replace Battery,” and “Overload,” customizable output relays and input contacts, and network management cards (IP addressable).

E. The UPS shall include remote monitoring and control functions with a software and firmware package that is web-based and, at a minimum, provides the ability to determine in real time the status of the commercial power (on-off), backup power (on-off), the duration of available UPS backup battery time at the rated UPS load (hours and minutes), and any errors.

F. The UPS shall be of sufficient design to fully operate all ITS devices and communications equipment it powers for a minimum of 1 hour. Additionally, the Developer shall be responsible for providing a portable generator hookup where power demand and cabinet constraints outweigh minimum four 1-hour battery runtime capacity subject to Department approval.
3.15.16 Communication and Power Infrastructure

A. The Developer shall install a power and communication conduit system, with conduits allocated for the 66 Express Lanes system and the Department’s system.

1. The duct bank shall consist of six 4-inch underground conduits exclusively for VDOT, two for power and four for communications cable.

2. The Developer’s conduit shall consist of, at a minimum, four 4-inch conduits, two for power and two for communications cable.

3. The Department backbone and power crossings shall consist of two 4-inch underground conduits midway between interchanges and two additional 4-inch conduits at every new bridge crossing I-66 within the project limits.

4. The Developer shall be responsible for testing and verifying that vacant conduits are unblocked prior to project acceptance.

B. The existing communications infrastructure shall remain continuously operational during construction or temporarily replaced unless written approval is provided by the Department.

C. Communication between the ETTM Equipment and the ETTM facilities shall be via a fully redundant fiber optic network to ensure no single points of failure and reliability subject to Department approval.

D. The Developer’s fiber optic network infrastructure shall consist of

1. Minimum 48 count fiber for distribution cable

2. Minimum 36 count fiber for trunk cable

E. The Developer shall provide fiber optic network connectivity to provide communication between the Operations Center and the following facilities:

1. The McConnell Public Safety and Transportation Operations Center (MPSTOC)

2. The Department’s backup ATMS located at the Traffic Operations Building on Mason King Court, Manassas, VA.

F. Under the Department’s auspices as a part to the multi-agency agreement between the Department and WMATA, the Developer will have access to the fiber optic network as detailed in this Agreement.
G. The Developer shall construct the replacement duct-bank between the edge of pavement and the edge of the right-of-way so that all junction boxes are accessible without blocking travel lanes.

H. All backbone duct-bank conduits shall be placed a minimum of 36 inches from the edge of the pavement, incased in concrete with 6-inch cover all around at a minimum depth of 36 inches below finish grade.

I. The backbone duct-bank shall have separate access points for fiber and power every 2,000 feet typical. All duct-bank including vacant conduits shall include tracer wire.

J. Fiber communications, network and power infrastructure shall have rodent prevention measures in place to eliminate access to fiber cables, electrical cables, junction boxes, service panels, cabinets and technical shelters.

K. **The Department Assets Specific Requirement.** The communications network on I-66 has service devices on that corridor and is also part of a redundant ring providing fault tolerance for all of the Department’s ITS freeway management system assets on Interstates in the region. It is vitally important that this network be preserved at all times during construction and that it be enhanced as part of the project. All conduit, fiber optic cable, handholes, and networking equipment shall meet or exceed the Department specifications.

L. **The Department Assets Specific Requirement.** The Developer shall preserve the integrity and functionality of the Department’s fiber optic cable, conduit and junction boxes during all phases of construction.

M. **The Department Assets Specific Requirement.** All Developer and Department duct banks shall include Utility RFID Marker Balls and Pegs, subject to Department standard provisions.

N. **The Department Assets Specific Requirement.** The Developer shall install minimum 96 backbone and 36 distribution fiber exclusively for the Department. In addition the Developer shall replace in-kind existing fiber for WMATA, Army Corp, and other entities in the existing Department’s duct-bank.

O. **The Department Assets Specific Requirement.** It is intended that the Department and its partner agencies have separate conduit for their respective fiber networks. The Developer shall coordinate the conduit distribution during the design for the Department approval.

P. **The Department Assets Specific Requirement.** Aerial and or direct buried fiber shall not be permitted. Fiber optic cable shall be installed separately and shall never intermingle with power conductors in pull boxes, manholes,
junction boxes, vaults, or conduit. Fiber optic cable shall only be terminated at cabinet termination and patch panels and devices with no splicing permitted in either pull boxes or vaults.

Q. **The Department Assets Specific Requirement.** The 96 strand fiber backbone cables shall have full splices at the intervals no less than 15,000 feet and no greater than 25,000 feet or as approved by the Department.

R. **The Department Assets Specific Requirement.** Switchover to the new fiber optic network shall be performed with minimal disruption to the network. No disruption shall exceed 6 hours, require at least 48 hours of notice and preapproval from the Department. Disruption is defined as a loss of connectivity in any cable strand at any location in the project area.

S. **The Department Assets Specific Requirement.** All field cabinets must be directly connected to the fiber optic network. No other last-mile communications media may be used (e.g., wireless, copper). This applies to devices on both general purpose lanes and 66 Express Lanes.

T. **The Department Assets Specific Requirement.** Fiber drop cables to field cabinets shall be factory pre-terminated (non-mechanical splices) with a pigtail for fusion splicing into the closest splice enclosure.

U. **The Department Assets Specific Requirement.** All fiber splices shall be fusion (mechanical will not be allowed) and shall be located inside waterproof splice enclosures that accommodate a minimum of 6 cables.

### 3.15.17 Design of Back Office System

A. The back office shall perform the following functions:

1. Transaction processing of roadside data to be filtered into transponder-based, image-based and unknown transaction types;

2. Trip building of transactions related to single vehicles travelling in one direction for consecutive toll points in a reasonable timeframe;

3. Trip rating based on dynamically calculated rates associated with look-back times to ensure customers are charged the rates they see on the sign;

4. Image processing by automated means based on OCR performance levels;

5. Image review for images with no known license plate read or an OCR with low confidence threshold; and
6. Violation processing of trips that are not associated with known E-ZPass accounts.

B. The violation processing system shall interface with a mailhouse, collections agency and courts in project jurisdiction.

C. The back office shall interface with banks for payment receipt.

D. The back office shall interface with the VDOT CSC for interagency transaction clearing.

E. The back office shall interface with the DMV for registered owner information look-up.

F. The Developer shall ensure that the ETTM System has sufficient data processing capacity.

G. Databases shall be scalable for additional capacity to be added in the future.

H. The system shall maintain online near-real-time access to transactions and images for at least 12 months or as otherwise defined by the ETC Agreement.

I. Violation data and images shall be maintained according to legal statute of limitations, Code of Virginia Purge requirements and to ensure detailed information on the violation including transaction, customer communication and relevant images is available for research for 18 months unless subject to any legal requirements in conflict with this requirement.

J. The customer service module shall allow customer service representatives to access the system for account management and violations payment processing.

K. The BOS shall allow remote access to the system by an offsite customer service center and offsite image review center.

L. The BOS shall have a website for customers to view roadway information, manage transponder accounts, make violation payments and communicate with customer service representatives.

M. The back office shall have a reporting system that generates automated reports and allows for ad-hoc queries of the system.

N. Automated reports shall include, but not be limited to, transactions per hour/day/month, revenue for a selected timeframes, list of transponders and license plates, system health and performance and system access logs.

O. The dynamic pricing system shall:
1. Receive data gathered from vehicle sensors on the roadway reporting traffic volumes, lane occupancy, and speed data at all detection points;

2. Change toll prices according to a defined pricing algorithm;

3. Send toll rates to the TMS for display on DMS;

4. Have the ability to change toll rates in increments (with a configurable minimum interval of 3 minutes); and

5. Adjust toll prices in order to maintain free-flow traffic condition in accordance with the Operating Speed Performance Standard (OSPS) and FHWA regulations as defined in the Agreement.

P. The Developer shall conform to business rules, operate the ETTM system, receive and process status files and communicate toll charge transaction information in compliance with the current version of the following:

1. Discount Plan Interface: Virginia Toll Facilities Group – VDOT CSC Specifications;


4. Transponder – Account Number File Interface: Virginia Toll Facilities Group – VDOT CSC Specifications;

5. Virginia Department of Transportation E-ZPass Service Center (Black Box) Interface Specifications; and


3.15.18 Interface with the VDOT ATMS

A. The interface with the VDOT ATMS shall comply with the requirements of the ICD NTCIP C2C Standards, the Traffic Management Data Dictionary (TMDD).

B. The 66 Express Lanes TMS shall not affect any change to the VDOT ATMS or the procedures for the operation and maintenance of the VDOT ATMS unless otherwise required by the provisions of the Technical Requirements and the ICD.
C. The ETC and TMS shall not cause any unscheduled interruption or adverse effect to the continued functioning of the VDOT ATMS or the operations supporting it.

D. The VDOT ATMS shall not cause any unscheduled interruption or adverse effect to the continued functioning of the ETC and TMS or the operations supporting it.

E. The ETC and TMS shall be capable of being electrically (and, where relevant, optically) and mechanically isolated from the VDOT ATMS.

F. The Developer shall:

1. Provide external electronic interfaces between the ETC and TMS and the VDOT ATMS in accordance with the ICD;

2. Work with the Department and its subcontractors to construct, test, and operate all specified interfaces; and

3. Prepare and document the designs as outlined in the Agreement, which may include but not be limited to the following:

   3.1 The content of the data to be exchanged;

   3.2 The format of the data to be exchanged;

   3.3 The static data which are required to decipher the meaning of the data exchanged;

   3.4 The bearer protocols to be used;

   3.5 Any sequencing constraints or assumptions;

   3.6 Error handling measures;

   3.7 Measures to ensure data integrity;

   3.8 The nature of testing and the associated test data to be used; and

   3.9 Any other information necessary for the interface to operate correctly.

G. The TMS shall have a mechanism to control the rate of transmission of messages/file to the VDOT ATMS, with such mechanism being mutually agreed to and in accordance with the ICD.

H. If the interface to the VDOT ATMS is unavailable, the TMS System shall be able to store relevant records for an agreed period of up to five (5) days on
secure media and transmit them to the VDOT ATMS once the interface is restored.

3.15.19 Data Processing Capacity

The Developer shall ensure that the ETTM System has sufficient data processing capacity. The system shall maintain online real-time access to transponder transactions and corresponding images for at least 12 months or as otherwise defined by the ETC Agreement. Violation data and images shall be maintained according to legal statute of limitations, Code of Virginia Purge requirements and to ensure detailed information on the violation including transaction, customer communication and relevant images is available for research for 18 months unless subject to any legal requirements in conflict with this requirement.

3.15.20 Alarm Reporting

The ETTM System shall have the capability to monitor and document the status of all relevant components and to raise alarms in the event of component failure, performance degradation, or any other potential issues that might adversely affect the operation or performance of the ETTM Equipment. Where such alarms relate to equipment that is critical to the accuracy of toll charges or violation enforcement actions, such alarms shall be used to determine period of questionable toll activity so that manual accuracy can be verified or appropriate transactions discounted or written off.

3.15.21 Data Security for Operation Center

A. The Developer shall prepare and submit no later than six months prior to Project Completion to the Department a security plan for the 66 Express Lanes operations.

B. The Security Plan shall embody the following key principles for the protection of data:

1. Integrity: Data shall be protected from being corrupted by unauthorized changes, whether by system error, human error, or intentional alteration. Data shall only be modified by authorized users according to defined privileges and procedures. However, no data shall be deleted from the system in this process.

2. Confidentiality: Data shall be protected from unauthorized disclosure. Access to systems shall be restricted to authorized users with privileges appropriate to the confidentiality of the data. E-ZPass customer data shall be subject to at least the same privacy and confidentiality requirements as established by the Department for its E-ZPass customers.
3. Availability: Data shall be prevented from being lost or becoming inaccessible. Authorized users shall be able to gain access to information to which they are privileged whenever they are authorized to do so.

C. System access rights by operators shall be maintained in logs.

D. Passwords shall be changed by end-users every 3 months.

E. The system shall conform to PCI standards.

F. Remote access to the system shall be limited to users that maintain critical functions of the system.

3.15.22 Disaster Recovery

A. The Developer shall prepare and submit no later than six months prior to Project Completion to the Department a disaster recovery plan for the 66 Express Lanes operations, which shall, at a minimum, include the following:

1. Mitigating any adverse impact on the Tolling System and its operation and TMS, in any circumstances where the ability of the Developer to provide the operation of the Tolling System would otherwise be impaired; and

2. Making provisions for action to be taken by the Developer in the event of the unavailability of its premises.

B. The Disaster Recovery Plan shall identify the measures to be taken in the event of:

1. Operations Center site loss;

2. Roadside equipment site loss;

3. System data loss or corruption;

4. Systems failure;

5. Failure of the communications link with the VDOT ATMS;

6. Failure of the communication links between the roadside equipment and the Operations Center;

7. Loss of power in the locality; and

8. Inability of staff to gain access to, or work effectively at, the Operations Center.
C. The disaster recovery shall include recovery and re-build procedures

D. The disaster recovery plan shall indicate the location of equipment manuals and recovery procedures

E. The disaster recovery plan shall indicate the location of all system design and architecture documents as well as as-builts

F. Disaster recovery shall be demonstrated at 1-year intervals

3.15.23 Incident Management

A. The Developer shall design and construct CCTV cameras at a quantity and spacing necessary to achieve full visual coverage of all general purpose lanes. This shall be defined as follows:

1. The CCTV surveillance system shall offer an uninterrupted view of the roadway with sufficiently high resolution to enable the identification of a vehicle’s color, make and model (make and model to be identifiable by the shape of the vehicle performed by a person familiar with such characteristics) at any point on the roadway (assuming sufficient or daytime lighting levels).

2. The above does not imply that the entire road network must be viewable at the same time. For example, the use of PTZ cameras that can be used to zoom into specific portions of the road, and thereby causing other portions not to be viewable at the same moment in time, is acceptable in terms of this requirement.

B. Continuity of operations is critical during construction. To that end, the Developer shall maintain CCTV cameras continuously operational unless a replacement portable CCTV camera is provided.

3.15.24 Testing

A. The Developer shall submit to the Department a test strategy for the 66 Express Lanes that shall include as a minimum:

1. The scope, requirements and objectives of testing;

2. An overall high-level plan for testing the ETC and TMS, including the test stages and processes and the scheduling of all tests prior to the Project Completion Date; and

3. The roles and responsibilities of all those involved with the testing program and any dependencies on third parties, including Department 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 will 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 shall demonstrate 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; and

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:

   4.1 Test specifications for each of the test cycles

   4.2 Detailed requirements traceability matrix linking each of the test series to relevant requirement(s)

   4.3 Detailed test script(s) for each of the test series, including input/process/output at each of the steps so that conformance can be monitored.

5. The testing strategy for the 66 Express Lanes will provide the level of detail to ensure compliance with the overall testing requirements. This testing strategy shall include:

   5.1 System design and integration overview

   5.2 User Acceptance Testing – to 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 (30) days before service commencement of the ETTM. The Department will approve successful completion of the UAT for service commencement.

   5.3 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
5.4 Site Acceptance Testing – tests to be conducted at the point of installation (tolling point and Traffic Operations Center) to confirm the factory acceptance testing results, plus any omissions or errors noted during the factory testing.

5.5 Integration Acceptance Testing – a test conducted to ensure that the complete ETC and TMS meets the end-to-end system-level functional and performance requirements for normal and exception operating conditions.

C. **The Department Assets Specific Requirement.** Inspection, integration, and testing involve a three-tier sequential process that consists of Stand Alone functionality, System Operation, User Acceptance Testing and System Burn-In Test.

D. **The Department Assets Specific Requirement.** Stand Alone Testing requires field acceptance at device and cabinet level. System Operational testing requires acceptance at communication hub and Traffic Management Center (TMC) levels. User Acceptance Testing shall successfully demonstrate that users at the TMC can fully control all aspects of the Intelligent Transportation System. System Burn-In Test requires continuous operation of the system without major or catastrophic failure for thirty (30) consecutive days. The Developer shall make arrangements for the witnessing of tests by the Department staff or representatives by sending notification seven (7) days prior to scheduled test.

E. **The Department Assets Specific Requirement.** The Developer shall be responsible for establishing and executing a plan for inspecting, integrating, and testing of all infrastructure and device components furnished and installed by the Project. The QAM shall be responsible for ensuring that the inspection, integration, and testing plan established by the Developer and approved by the Department is properly executed, variances are reported and corrective actions are made.

F. **The Department Assets Specific Requirement.** The Developer shall supply written test procedures for the Department approval a minimum of thirty (30) days before testing can be started. The Developer shall submit reports for all testing levels to verify procedures followed, results recorded, timetable, and action required. The testing report shall include relevant information such as calibration data of all test equipment, charts, graphs, evidence, photographs, failure analysis, corrective action, traceability and audit trail, with certification signature of QAM.

G. **The Department Assets Specific Requirement.** The Developer shall submit a schedule for System Burn-in test that shall be performed over a thirty (30) consecutive day period under real-world operation conditions without system
failure. The system shall not lockup, fail, or crash due to use, operator entry of data, or equipment malfunction during the thirty (30) days. Operators will record any deficiency as it occurs and the Department may employ a third-party to inspect the system and record any deficiencies. Any failure of Developer supplied equipment or discovery of deficiency that causes a system failure shall be cause to halt and repeat System Burn-in test in its entirety for another full 30-day period after correction of problem.

H. **The Department Assets Specific Requirement.** During System Burn-in Testing, the Developer shall respond to any issues within 4 hours of notification from the Department. All repairs shall be completed within 48 hours, with the exception of communication failures that shall be completed within 24 hours.

I. **The Department Assets Specific Requirement.** The Developer shall provide manufacturer’s warranties on all furnished equipment for material and workmanship that are customarily issued by the equipment manufacturer. The warranty period shall commence from successful completion of the User Acceptance testing.

J. **The Department Assets Specific Requirement.** Upon the completion of device integration, the Developer shall demonstrate full functionality of all required features for all installed field devices using vendor supplied software. The testing shall take place at the PSTOC on the Department network for devices on the general purpose lanes. The Department shall review and approve the device configuration settings for compatibility with its VDOT ATMS prior to the commencement of testing.

K. **The Department Assets Specific Requirement.** The Developer shall coordinate and support the Department’s TMC contractor to integrate the devices with its VDOT ATMS and updating any configurations as necessary.

### 3.15.25 Training

The Developer shall develop and conduct separate information sessions for the Department in the operations and maintenance of the 66 Express Lanes ET TM and assets installed for the Department.

A. The target audience for one information session shall be the Department’s management staff and duty officers. The session shall include an overview of the capabilities and procedures used to operate the 66 Express Lanes.

B. The target audience for one information session shall be the Department’s TOC operators and controllers and shall include detailed daily procedures used by the 66 Express Lanes TMS in interface with the NRO MPSTOC and management of incidents.
C. The Developer shall also conduct a minimum 1-day training on the operation and maintenance of all assets installed for the Department’s field staff which may include contract personnel.

D. Training shall be held for all operations staff on their relevant modules to the extent the operator is tested and is competent and understands the system before operations.

E. Maintenance staff shall be trained on all devices including recovery and rebuild procedures and disaster recovery.

F. Maintenance staff shall be trained to diagnose basic issues and faults in the system.

G. Refresher training shall be held once per year on new facets of the system modules.

3.15.26 Integrated Corridor Management

The Developer shall provide real time 66 Express Lanes travel time, pricing, and incidents information via Center to Center interface to the Department for development and use in Integrated Corridor Management.

3.15.27 Active Traffic Management

The Developer shall install an Active Traffic Management (ATM) system within the project limits. All logic and algorithms have been developed separately so this project will be limited to field device installation and integration testing, similarly to any other ITS field device. It shall include the field components described in this section.

Reference Attachment 3.15, I-66 Operations Concept Technical Report, for the concept of operations for the ATM system. Overhead signs will be used for lane control on the Mainline. Side-mount variable speed limits signs will be used for back-of-queue warnings and speed harmonization.

The Developer may repurpose any part of the existing ATM system. The District will provide relevant maintenance records upon request, but gives no warranty on any existing equipment.

A. Overhead gantries spanning all general purpose lanes.

B. Lane Control Signals (LCS) shall be installed on new gantry structures in multiples with one for each travel lane. Each LCS shall be a minimum 4 feet square front-access assembly.

C. No two successive LCS gantries shall be spaced more than ½-mile apart, unless otherwise approved by the Department.
D. Install large dynamic message signs (DMS) to inform motorists of traffic and road conditions. DMS shall be installed on overhead gantries a minimum of ½-mile apart and maximum of two miles before each of the following exits in each direction, subject to review and approval by the Department (from East to West):

1. I-495
2. Nutley Street
3. VA 123
4. US 50
5. Fairfax County Parkway
6. Route 28
7. US 29 Centreville
8. Route 234 Business
9. Route 234 Bypass
10. US 29/Exit 43 in Gainesville

3.16 Maintenance During Construction

3.16.1 General

A. The Developer shall maintain all existing Department’s ATMS devices in the General Purpose Lanes and HOV Lanes operational during construction unless otherwise approved by the Department. These existing Department’s ATMS devices include, but are not limited to: closed-circuit television (CCTV) cameras; dynamic message signs (DMS); detection; the reversible gate system; weather stations; Lane Control Signals (LCS); Shoulder Lane Monitoring System (SLMS); and associated cabinets and infrastructure.

B. Existing Department ATMS in the Project limits shall remain continuously operational or temporarily replaced during construction unless written approval is provided by the Department. Replacement systems shall be installed, operational and integrated before removal of existing devices. The Developer shall be responsible for relocating and replacing existing ATMS devices.

C. Once the Existing ATMS devices are impacted, the Developer shall be responsible for maintaining those devices until their final acceptance.
D. The Developer shall be responsible for any impact to the existing ITS infrastructure within the construction limits. Prompt response is required to any damage caused by the Developer and in the event the repair isn’t completed 2 hours prior to the next traffic peak, the Department will use its maintenance Contractor to restore critical systems and charge the Developer accordingly. The cost of repair work performed, plus 25% for supervisory and administrative personnel, will be deducted from monies due to the Developer for the Project.

E. The Developer shall maintain existing ATMS devices or temporary replace with portable unit to provide similar functionality and coverage for the duration of construction as approved by the Department.

1. Portable CCTV shall provide uninterrupted view of the roadway with overlapping coverage.

2. Portable DMS placement and spacing shall provide adequate coverage to convey messages to motorist.

3. Both portable CCTV and DMS shall be integrated into the Department operation center for similar functionality and coverage.

F. The existing drainage system will be maintained by the Department until the Developer starts impacting the drainage system, at which time all drainage assets within the impacted drainage system will become the Developer’s responsibility.

G. The Department shall maintain all existing lighting within the Project until the Developer begins impacting these assets, at which time impacted lighting will become the Developer’s responsibility. At no time shall the lights within the Project be put out of service, unless otherwise approved by the Department.

H. The existing ATMS devices will be maintained by the Department until the Developer begins impacting these assets, at which time impacted ATMS assets within the Project limits will become the Developer’s responsibility.

I. The Department will perform snow and ice removal on all travel ways, during construction. No lane closures will be permitted, during snow mobilization of Level 2 or above.

J. The Developer shall be responsible for maintaining the proposed SWM BMP’s once all connections have been completed, and shall certify that the SWM BMP’s have been maintained as per the Department, DEQ, and manufacturer’s (for proprietary products) maintenance guidelines prior to transfer to the Department.
K. The Developer shall be responsible for performing construction maintenance during detours, suspension of work situations, flagging operations, grading operations, patching operations, and on all haul routes.

3.17 As-Built Documents

3.17.1 General

As a condition to Project Completion, the Developer shall provide to the Department, Record (As-Built) Plans of the Project in accordance with the standards and specifications set forth in Attachment 1.5, which shall consist of two hard-copy sets, one electronic file of each plan in *.pdf format, one electronic file of each plan in *.tif format, and one electronic file in MicroStation *.dgn format of the final construction plans. The As-Built Plans shall be prepared, signed and sealed by a Professional Engineer licensed in Virginia, and submitted to the Department with the final application for payment. These plans will show all adjustments and revisions to the Construction Plans made during construction and serve as a permanent record of the actual location of all constructed elements. The as-built plans shall be in the same format as the construction plans.

3.17.2 Tolling and Traffic Management System

A. The As-built plans shall have Global Positioning System (GPS) location data of all installed TTMS field devices, including but not limited to; junction boxes (electrical and communication), splice cabinets, CCTV camera, Dynamic Message Sign (DMS), Vehicle Detection, Lane Control Sign (LCS), pole and ground mounted cabinets, roadway lighting and electrical service panel.

B. Provide fiber optic splicing diagrams detailing all cable splices, terminations, equipment port assignments, and optical circuits within the communication network. 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.

C. Provide splicing details for all existing Department cabinets that have had splicing altered. Splicing details shall include specific fiber numbers.

D. Provide a complete set of as-built 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 Department feature (mast arm foundation, manhole inlet cover, head wall, etc.). Plans must be same scale in black ink on white paper, of the same size and weight as the Construction
Specific as-built plans content requirements include but may not be limited to the following:

1. The Contract plan view shows the center line location of each facility installed, or installed and placed out of service, to an accuracy of 1 inch at the ends and other points physically observed in accordance with the bore path report.

2. As directed by the Engineer, 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 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 Contract profile or cross-section sheets, use a 10 to 1 vertical exaggeration.

3. If, during boring, an obstruction is encountered which 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.

4. 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.

5. Include bore notes on each plan stating the final bore path diameter, product diameter, drilling fluid composition, 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.

E. The as-built drawings and documents shall be certified by the Developer to reflect the actual condition of Project at the end of the Work period and organized and indexed to facilitate easy retrieval of information.
F. The as-built plans shall show field verified cabinet numbers, service panel numbers and roadway lighting pole electrical identification numbers.

3.17.3 Drainage

A. Upon completion of the installation of any major drainage structure, the Developer shall prepare a final as-built survey of the major drainage structure and related upstream and downstream appurtenances and provide such survey to the Developer’s hydraulic designer/engineer. 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 to the Department 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 Developer shall be responsible for mitigating the adverse impacts of the post construction condition at no additional cost to the Department.

B. The Developer 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 Record (As-Built) Plans.

C. The Developer 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 Record (As-Built) Plans.

D. The As-Built Record Plans shall include the following information:

1. Discharge structures – structure identification number, type, locations, dimensions and elevations of all weirs, bleeders, orifices, gates, pumps, pipes, and oil and grease skimmers;

2. 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;

3. 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;
4. 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);

5. Conveyance – dimensions, elevations, contours, final grades or cross-sections of systems utilized to divert off-site runoff around or through the new system;

6. Water levels – existing water elevation(s) and the date determined;

7. Benchmark(s) – location and description (minimum of one per major water control structure); and

8. 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.

E. If Developer prefers to abandon in place any existing drainage structures or Culverts, approval must first be obtained from the Department. All abandoned drainage structures and Culverts shall be depicted on the As-Built Record Plans.

F. The Developer shall provide As-Built Record Plans of all stormwater management facilities. The As-Built Record Plans shall show the actual finished ground contours, outlet structure dimensions and elevations, etc…as they exist at the completion of the project. These drawings shall be signed and sealed by the Licensed Professional Engineer or Land Surveyor registered in the Commonwealth of Virginia.

G. The Developer 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.

3.17.4 Utilities

The Developer shall accurately show the final location of all utilities on the as-built drawings for the Project. The Developer will ensure the utility companies submit as-built drawings upon completion of their relocation or adjustments. The Department shall issue an as-built permit to the utility companies after receipt of permit application and as-built drawings.
3.18 Survey

The Developer is advised that the field survey and utility data provided is not represented to be up to date and complete for purposes of design and construction of the Project. The Developer’s scope of work shall include verifying and updating all surveying and utility designation that is necessary to design and construct the Project in accordance with the VDOT 2014 Survey Manual. Due to the length of the overall corridor and various construction projects underway at the time of the 2014-2015 survey, not all areas throughout the corridor were surveyed at the time of the most recent survey. The most recent effort began May 2014 and was completed May 2015 using the VDOT 2014 Survey Manual and Microstation SS3. For those areas under construction at the time of the most recent survey, previously existing survey data has been provided. This data has been moved to the I66 project coordinates and provided in separate files along with the completion date of the work.

Field survey and utility data has been obtained for this Project. The survey was conducted using conventional survey and fixed wing mapping methods; air flight and data was collected within the tolerances defined in the VDOT Survey Manual and the Virginia Map Accuracy Standards. Low level, high accuracy flight was not performed as part of the survey effort for this project.

All surveying work throughout the term of the Agreement shall be performed by the Developer in accordance with the Department’s Survey Manual.

The Developer shall be fully responsible for examination and verification of any data made available by the Department.

3.18.1 Scope and Area

The fixed wing mapping and subsequent DTM surface includes the I-66 Corridor from Catharpin Road on the western end to approximately 1200’ west of the Barbour Road overpass on the eastern end. The mapping extends +/-700’ to both sides of the central corridor. Additional mapping extends approximately 7000 linear feet in each direction at each interchange.

The ground survey, property line, and ROW data limits is along the central corridor and 3,500 LF in either direction at the interchanges. All property lines and easements, as well as the ground truthing effort, have been performed for the central corridor and the area within 50 feet of the ROW and are included in the survey drawings.

The ground survey effort includes, but is not limited to the following:

A. Notification of property owners – all notifications are currently expired and will need to be resubmitted prior to entering properties.*

B. Vertical control (Based on NAVD88 Geoid 2012A)
C. Horizontal control (Based on NAD83-2011) - project scale factor 1.000060206 Survey baseline, one each, east and west bound lanes of I-66 and a single baseline at all interchanges

D. Field data verified and updated

E. Planimetric locations

F. Property data and ROW

G. Location of easements uncovered during deed research

H. Utilities - Location of above ground utilities.

I. Digital Terrain Model – complete in areas of fixed wing mapping, except for those areas shown as obscured in the CAD files.

J. Modified bridge surveys – to include clearances only

K. Sound wall locations and heights

L. Wetland locations

M. Clearances for all overhead lines, signs, and bridges across the I-66 Corridor

*The Virginia Code 33.1-94 requires that Notice of Intent letter “shall be sent to the owner at the address recorded in the tax records, not less than fifteen (15) days prior to the first date of the proposed entry. Notice of intent to enter shall be deemed made on the date of mailing.” “The notice shall include the anticipated date/dates such entry is proposed to be made and the purpose of such entry” not to exceed ninety (90) days. Advance notification of property owners is required for all data collection efforts related to the development of highway plans. Copies of the letters and address labels shall be provided to the Department project manager for forwarding to the District Survey Manager as soon as they become available for the Department approval.

The preliminary field survey and utility data provided in the RFP Information Package contains the general depiction of existing conditions which the Developer is obligated to verify and finalize through survey before completing final design of the Project. The special accuracy of the preliminary survey is at a map scale of 1:600 and 1’ contours, is .5’, with a vertical Class 1 limiting error of 0.0833. The Developer shall be responsible for obtaining any survey data, including all right-of-entry and land use permits, locating and designating underground utilities, digital terrain model (DTM), utility test holes, and obtaining other related data necessary for the design, ROW acquisition, limited access revisions, and construction of the Project. Additionally, the Developer will be responsible for any update (property owner changes, subdivisions, etc.) that
may occur; updates need to be reflected on the plans in order to acquire ROW and complete the final design. Any survey changes shall be verified and certified, and submitted in final documentation.

The Developer shall preserve all survey control monuments established by the Department and will notify the Department as soon as it is known that a monument is in a position that will interfere with new construction or with Developer activities. The Developer will be responsible for resetting or relocating 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 LD-200 information and supporting computations submitted to the project manager.

The Developer shall 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. Construction benchmarks that are disturbed during construction operations shall be reestablished by the Developer.

The Developer shall also be responsible for the production of VDOT ROW sheets for any land transactions, which would include, but not be limited to the following: Fee Acquisitions, the establishment of temporary or permanent project related easements, total takes, and any land exchanges that may be negotiated by any entity.

All ROW sheets shall conform to the current standards set forth by the VDOT Survey Manual and the VDOT Survey Cadd Standards. All sheets shall be signed and sealed by a Virginia Licensed Land Surveyor and at a minimum comply with the State’s APELSCIDLA Board Rules and Regulations.

Prior to Project completion, the Developer shall provide and set final VDOT RM-1 or RM-2 ROW monuments within the Project Limits. The Developer shall depict the monuments on the ROW Plans in accordance with the Department’s Survey Manual.

Immediately after or within 7 calendar days from receiving the Department’s request notice, provided the information exists, the Developer shall make available to the Department hard copy and electronic files of all survey data, for existing and new conditions and infrastructure.

### 3.18.2 Survey Control Data

A. Digital Terrain Model (DTM) and Construction Cross-Sections: Compatible to the Department’s current DTM format.

B. Borrow Pits: All borrow pit DTM’s or cross-sections, originals and finals.
C. Horizontal and Vertical Control for Bridges: Certified plats, field notes, coordinates, and computations shall be furnished by the Developer prior to the Developer beginning work on these structures.

D. 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 and outlet control, catch basins and manhole and other related infrastructure.

E. Road ROW: Existing, newly constructed and 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 ROW, and for areas where connecting roads and infrastructure are impacted by the Works. The survey interval shall not be farther than 100-foot intervals. The data prepared by the Developer shall include coordinates, type, size, material and references.

The Project ROW shall be staked by the Developer in areas where Work shall occur between the general purpose (GP) lanes and the limits of the Project ROW if no limited access fence is present prior to the start of the Work. ROW stakes shall be placed at a minimum of 100-foot intervals on each side of the roadway or as directed by the Department and the stakes shall be marked with both the station and offset back to centerline. All final boundary stakeouts shall be performed by the Developer.

Additional surveying work and supplemental layout work shall be performed by the Developer as needed to successfully complete the work. All drawings, field notes, and computations from such survey work performed by the Developer shall be submitted to the Department as defined and approved in the Developer’s Project Development Plans.

3.19 Security

3.19.1 General Requirements

A. Subject to the requirements of the Agreement, the Developer shall adhere to the Department policy on critical infrastructure information and sensitive security information (CII/SSI) to the extent such information is directly related to the Developer’s performance of its obligations in accordance with Attachment 3.19. The Developer shall ensure that relevant CII/SSI is protected and not disclosed to unauthorized persons.

B. The Developer shall review with the Department any information that should be designated as CII/SSI as specific design details become available. Any additional requirements for security reviews or other inspections will be agreed to with the Department.
C. The Developer shall be required to undergo criminal history records checks in accordance with Attachment 3.19.

3.19.2 Developer’s Responsibility During Suspension of Construction

In case of suspension of construction work, the Developer shall take such precautions as may be necessary to prevent damage to the Work, provide for erosion control and drainage, 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 Developer shall properly and continuously maintain in acceptable growing condition all living material in newly established plantings, seeding, and sod furnished under the Agreement and shall take adequate precautions to protect new tree growth and other important vegetation against damage. Work pursuant to the Landscaping section of the Agreement is covered and limited by the landscaping allowance.

3.20 Railroad Design

3.20.1 The Developer shall incorporate the appropriate railroad design requirements for railroad crossings and any roadway that may parallel or encroach on Norfolk-Southern (“NS”) or other railroad property interest, such as a frontage road. Designs impacting on NS or other railway property interest shall meet or exceed the applicable requirements or criteria, as provided by the railroads. Railroad requirements on Department-led projects are included in the Standard Documents in Attachment 1.5.

3.20.2 The Developer shall coordinate directly with the railroads impacted by the Project. The Developer shall coordinate with the Norfolk-Southern Chief Engineer – Bridges and Structures during the Work period of the Project. The Chief Engineer – Bridges and Structures can be reached at the following address:

Norfolk Southern Corporation
1200 Peachtree Street
Atlanta, GA 30309

3.21 Transit Facility Design

3.21.1 The Developer shall incorporate the appropriate transit facility design requirements for any WMATA transit facilities impacted or relocated by the Project. Designs impacting WMATA facilities or property interests shall meet or exceed the applicable requirements or criteria, as provided by WMATA. Requirements as provided by WMATA on Department-led projects are included in the Standard Documents in Attachment 1.5.

3.21.2 The Developer shall coordinate directly with WMATA on transit facilities impacted by the Project. The Developer shall coordinate with WMATA during
the Work period of the Project. The WMATA Primary Project Liaison can be reached at the following address:

Washington Metropolitan Area Transit Authority
600 5th Street, N.W. Washington, D.C. 20001

3.21.3 The Developer shall relocate or reconstruct any WMATA transit facilities required to construct the Project Work including impacts caused by Maintenance of Traffic on I-66 or other roadways impacted by the Project Work. Developer must keep un-interrupted access to WMATA traction power and tie breaker station facilities for maintenance and operations unless approved by WMATA. The Developer shall allow WMATA reasonable and timely access for normal and emergency maintenance and operations of the track guideway, stations, barrier wall, systems, and support facilities.

3.21.4 The Department shall provide the Developer a traction power simulation study approved by WMATA based on WMATA’s criteria and standards that includes the characteristics and locations of the relocated Orange line transit facilities including traction power substations and tie breaker stations. If the Developer changes the characteristics and location of the location of these facilities contained in the simulation and designs already coordinated with WMATA, the Developer will be required to submit an update of the traction power simulation for WMATA approval. Based on preliminary evaluation by the Department, it is anticipated that these relocated facilities could include, but not be limited to, the following:

A. Traction Power Substation (TPSS) – at Dunn Loring Station(Gallows Road)

1. It is anticipated that the Developer shall be required to relocate the traction power substations (TPSS) at the WMATA Dunn Loring Station (known to WMATA as the Gallows Road TPSS) due to the roadway widening included in the Project Work, unless an alternative design proposed by the Developer can avoid impacting this TPSS including obtaining WMATA approval for any vertical clearance requirements for Project Work.

2. The Department has identified a site for the relocation of the TPSS as included in the simulation, and has advanced the design to coordinate with WMATA on seeking their approvals but it shall be the Developer’s responsibility to confirm this location meets all design requirements of WMATA.

3. The new location of this TPSS shall be constructed, approved and accepted by WMATA for operations prior to the existing TPSS and TBS being taken off-line (de-energized) and then demolished to allow for the roadway widening. It should be assumed that none of the current equipment at the existing TPSS or TBS can be reused in the new facility.
4. The layout of the traction power substation shall meet all WMATA criteria, including but not limited to accessibility for maintenance vehicles that require WB-50 Access.

5. The Department will coordinate with and obtain Fairfax County Special Exception/2232 land-use approvals for TPSS and TBS facilities.

6. If modular (pre-fabricated) TPSS units are approved by use from WMATA, they will require enclosures and screening to meet Fairfax County Land-Use Permit (Special Exception/2232) requirements.

7. The Developer shall prepare final design site plans based on design plans provided by the Department for the TPSS site that will require civil, site and utility work including but not limited to access road paving, drainage, stormwater management, utilities, fencing and landscaping.

8. The Developer is required to obtain all required permits and regulatory approvals for the relocated TPSS facilities that are not provided by the Department.

B. Traction Power Substations (TPSS) – at Cedar Lane and Barbour Road

1. It is currently anticipated that no impacts to the TPSS building off Cedar Lane will require relocation of the TPSS due to Project Work.

2. The Developer may be required to, but not limited to, revise the entrance from Cedar Lane and upgrade some of the interior equipment including transformer units for power requirements to the TPSS facilities at Cedar Lane and Barbour Road due to Project Work based on the results of the simulation. Developer must keep un-interrupted access to TPSS for WMATA maintenance and operations including for vehicles unless approved by WMATA.

C. Tie-Breaker Stations (TBS) – at Yeonas Drive and Prosperity Drive

1. It is anticipated that the roadway widening work may impact the tie breaker stations (TBS) at Yeonas Drive and Prosperity Drive. Based on the preliminary simulation, the Developer may not be required to replace these impacted facilities. The Developer shall be required to follow all WMATA requirements for de-energizing and taking these TBSs off-line prior to demolition.

D. DVP Power Conduits

1. The Developer shall be required to coordinate with Dominion Virginia Power (DVP) on the relocation of the existing 34.5 kV traction power feeder lines and construction of new 34.5 kV feeder lines and meter
locations that will provide power to the relocated traction power substations.

2. WMATA is currently anticipated to be the owner of the relocated 34.5 kV feeder lines so will also review and approve the feeder line design and manhole size and locations for operations and maintenance.

3. The Developer shall coordinate and determine any impacts required by the traction power feeder construction on sidewalks, drainage, lighting, retaining walls, other utilities, etc.

4. Any additional upgrades requested by Dominion to service commercial customers other than WMATA shall be viewed as a betterment and will not be funded by the Department.

E. Other Utilities

1. The Developer shall be responsible for the relocation of other utilities required by the Project Work, including but not limited to the following:

   • Communication – Fiber Optic lines

2. Power, Gas and water to the station and pedestrian bridges

3. Other utilities that provide service to WMATA, including the communication ductbank that is integrated into the roadside barriers in median

4. Any utility service to WMATA shall not be suspended without the approval of WMATA

F. Tailtrack Impacts

The Developer shall coordinate with and seek any required approvals for impacts to the tailtrack storage west of the Vienna Station. Any impacts to WMATA’s tailtrack storage shall be minimized during peak storage periods (i.e. overnight period).

G. Pedestrian Bridges - Dunn Loring Station and Vienna Station

Due to potential impacts of the roadway widening as part of the Project Work to the pedestrian bridges from the Dunn Loring Station (to the south) and Vienna Stations (to the north) over I-66, the Developer may be required to reconstruct the bridges to accommodate longer spans over I-66. The Developer may be required to provide temporary bridges to provide access from the Dunn Loring and Vienna station platforms while the permanent pedestrian bridges are being constructed. The Developer’s design shall not
preclude WMATA’s future replacement of any additional pedestrian bridges in the vicinity of the Project.

H. Track Overpasses (Bridges)

1. The Project Work is anticipated to include new and reconstructed roadway bridges over WMATA operational tracks and transit facilities. These include but are not limited to the following roadway bridges:
   - Capital Beltway Ramps
   - Gallows Road
   - Cedar Lane
   - Nutley Street
   - Vaden Drive

2. For each roadway bridge crossing over WMATA tracks or facilities, the Developer shall coordinate the design, construction and obtain all required approvals from WMATA. This should include the evaluation of the transit Clearance Envelope for construction over the WMATA operating track, as well as any maintenance of traffic for roadway or transit facilities.

I. Parking Garages - Dunn Loring Station and Vienna Station

The Developer shall conduct the Project Work to avoid or minimize any potential impacts to the Vienna and Dunn Loring parking garages. Work that impacts the entrances to these garages shall be limited to times the garages are not open during revenue hours unless approved by WMATA.

J. Roadway Access to Metro Stations

1. The Developer shall conduct the Work to avoid or minimize any potential impacts to the following roads that provide access to the Vienna and Dunn Loring Stations:
   - Prosperity Drive
   - Saintsbury Drive
   - Virginia Center Blvd.

2. The Developer shall develop and submit for review and approval from the Department and coordinate with WMATA maintenance of traffic
K. Signs and Active Traffic Management (ATM) Systems

1. The Developer shall also be responsible for any impacts to and coordination and relocation or new facilities (if required) of the following facilities:
   - Metro station guide and wayfinding signs
   - ATM infrastructure related to WMATA
   - Sign structure piers

3.22 Park-and-Ride Facilities

3.22.1 The Developer shall provide Park-and-Ride (P&R) facilities that provide commuter parking spaces and accommodation for bus transit, kiss-and-ride, carpooling, vanpooling, local shuttles, and private buses pursuant to the Table 3.22 and the Agreement. The Developer shall incorporate intersections and other access in its design and construction. The P&R facilities design shall take into consideration 2040 expansion needs and parking space requirements per Table 3.22.

3.22.2 Design of P&R facilities shall be in accordance with the most-recently published AASHTO Roadside Design Guide, Department of Justice ADA Standards for Accessible Design, and other standards and specifications as set forth in Attachment 1.5. All roadway and parking lot pavement designs shall be in accordance with the provided minimum pavement design set forth in Attachment 3.7.

3.22.3 The P&R facilities shall be located according to the following:
   
   A. Facilities shall be located in land parcels identified as proposed in the concept plans.

   B. Facilities shall provide the number of spaces as shown in Table 3.22 to meet the transit service, carpool, and vanpool demand for 2025.

   C. The Developer shall have the responsibility for locating P&R facilities to meet transit service and carpool and vanpool demand at locations specified in the Conceptual Plan OR at alternative locations that meet ALL of the following criteria:

      1. The Project P&R facilities shall be adjacent to I-66.
2. The Project P&R facilities shall meet the travel shed P&R facility demand and transit service demand (e.g., bus bays) as articulated in Table 3.22.

3. Direct access is provided from the Project P&R facilities to the 66 Express Lanes in the same manner as demonstrated in the RFP conceptual plan.

4. Project P&R facilities locations, if altered from the RFP conceptual plan, are subject to approval by the Department and the Virginia Department of Rail and Public Transport (DRPT).

D. In the case that the location of the P&R facility is not one of the RFP conceptual plan locations, the Developer shall be responsible for any additional analysis of new locations including but not limited to environmental and traffic assessments.

3.22.4 The P&R facilities shall, at a minimum, include the following:

A. Bus bays and bus loop pavement areas, as well as carpool and vanpool pick-up and drop-off areas, constructed with concrete pavement in accordance with the standards and specification set forth in Attachment 1.5;

B. Interconnected, but separate accommodations for bus facilities and circulation, kiss-and-ride facilities and circulation, parking areas and circulation, carpooling and vanpooling circulation, and general vehicular and pedestrian site circulation;

C. Two points of entry and egress to the arterial network, at least one of which will provide full access to all turning movements in and out of the site;

D. Parking lots with internal walkways, lighting, circulation, and circulation roadways;

E. Crosswalks connecting parking to waiting area shelter with transit stop(s);

F. Sidewalks connecting crosswalks, accessible parking, bicycle parking, kiss-and-ride, and transit and carpool and vanpool waiting areas;

G. Sidewalks (and shared use path facilities, as noted below) connecting the P&R facilities (at the P&R facility property line) to adjacent land uses and pedestrian facilities where they exist within 500 feet from edge of P&R facility property line;

H. Shared use paths within P&R facilities and connecting to adjacent (at the P&R facility property line) land uses and bicycle facilities where they exist.
within 500 feet from edge of P&R facility property line or to adjacent road limits, as approved by the Department;

I. Traffic control devices at access points (intersections and driveways) as warranted in accordance with latest edition (as of the start of construction) of the Manual on Uniform Traffic Control Devices (MUTCD) and applicable VDOT standards;

J. On-site and off-site vehicle and pedestrian signage (including external facility and internal routing and wayfinding, transit route and service information and signage, and regulatory and information signage pertaining to facility operations) in accordance with the latest edition of the MUTCD and the Department standards and local ordinances according to Attachment 1.5;

K. Pavement markings consistent with the latest edition of the MUTCD and the Department standards according to Attachment 1.5;

L. Lighting (vehicular and pedestrian areas) throughout the P&R facilities (including parking, bicycle racks, kiss-and-ride, and transit and carpool and vanpool waiting and pick-up and drop-off areas);

M. Covered bicycles racks to accommodate a minimum of 75 bicycles in each P&R facility near the waiting area shelters with appropriate lighting and signage;

N. Trash receptacles throughout each facility (at least one receptacle per waiting area shelter);

O. Bus stop and carpool and vanpool waiting area signage (and associated poles or other mounting accommodations);

P. Static transit information display cases of sufficient size to accommodate large route maps and other transit service information for passengers (display cases to be installed throughout P&R facility bus areas, one per bus waiting area);

Q. Real-time parking availability information and support infrastructure including but not limited to connections to the Department’s fiber optic facilities, vehicle detection equipment to count entering and exiting vehicles, and CCTV camera surveillance covering all parking spaces;

R. Real-time transit schedule and bus arrival information and support infrastructure including but not limited to connections to the Department’s fiber optic facilities and on-site real-time display stanchions at each bus bay;

S. Bus bays, bus circulation roadways (exclusive from other P&R facility circulation), passenger waiting areas (with platforms 6 inches above vehicle
pavement), walkways, security cameras, lighting, benches, transit service information, and covered passenger waiting area located in an area connected directly to, but separate from, general parking areas; covered passenger waiting areas shall be designed to comfortably accommodate a minimum of 60 standing passengers per bus bay; kiss-and-ride area for passenger and carpool and vanpool pick-up and drop-off with adequate waiting space (platforms a minimum of 12 feet wide for the entire length of the pick-up area) for passengers (platforms) and vehicles, benches, and pedestrian connections to other parts of the P&R facility;

T. Designated carpool and vanpool pick-up and drop-off area with covered passenger waiting area (platform 6 inches above vehicle pavement) that can comfortably accommodate a minimum of 60 people standing (this structure is to be separate from transit facility waiting area structures), walkways, security cameras, lighting, benches, signage, pedestrian connections to other parts of the P&R facility, vehicular pick-up and drop-off accommodations for six vehicles per each P&R facility; and

U. Landscaping in accordance with local regulations and adhering to the principles of Crime Prevention through Environmental Design (CPTED) as outlined by the National Crime Prevention Institute.

3.22.5 All site plans shall be designed in accordance with local jurisdictions’ regulations for elements including but not limited to setbacks, landscaping, erosion and sediment control and grading. All site plans are subject to local jurisdictions’ approval.

3.22.6 The Developer shall provide at least two P&R facility conceptual layouts (inclusive of all facility elements) at each location for consideration and review by the Department prior to commencing final design. P&R facility concepts previously developed by the Department are for conveying the design intent of each facility and are provided to the Developer for information only;

3.22.7 Architectural features shall be complementary to the surrounding land use(s) and adjacent and nearby facilities and are subject to approval by the Department and local Governmental Authorities.

3.22.8 Based on final design approved by the Department and the local jurisdiction, the Developer shall construct and make available, for public use, the number of P&R facility parking spaces by facility as indicated in Table 3.22 (opening year requirement). As used in this Section, “make available” shall mean that the parking spaces are in a condition to be utilized for their intended purpose. Parking spaces shall be paved, marked, connected with internal vehicular systems, served with adequate stormwater management facilities, connected by pedestrian facilities, and lighted according to project requirements. The Developer shall construct the P&R facilities according to the following:
A. The Developer shall grade each site, by or before the opening year, to accommodate the future 2040 requirement for number of spaces as shown in Table 3.22; and

B. The number of bus bays by facility, as indicated in Table 3.22, shall be constructed by or before opening year to meet the future (2040) demand; and

C. Kiss-and-ride spaces shall also be made available by the Project Completion Date. The minimum number of kiss-and-ride spaces shall be 2% of the total parking spaces identified to meet the 2040 demand shown in Table 3.22.

3.22.9 At the Fairfax Center (Monument Drive) location in Fairfax County, P&R facility spaces required to meet opening year requirements are assumed to be provided by reconfiguring existing parking facilities, including but not limited to the Fairfax County Government Center and the parking lot to the northwest of the Fairfax Corner development. On-site amenities described above shall be provided at these locations in a manner to be approved by the Department, DRPT, and Fairfax County.

<table>
<thead>
<tr>
<th>P&amp;R Facility Preferred Alternative Location</th>
<th>Minimum Bus Bays Required</th>
<th>Minimum Commuter Parking Spaces Required (Opening Year)¹</th>
<th>Future Commuter Parking Spaces Required (2040)¹</th>
<th>Minimum Acres Required²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gainesville (University Boulevard)</td>
<td>4</td>
<td>1,920</td>
<td>2,370</td>
<td>47.3</td>
</tr>
<tr>
<td>Gainesville (Cushing Road/Route 234)</td>
<td>No Work Required</td>
<td>No Work Required</td>
<td>1,090¹</td>
<td>N/A</td>
</tr>
<tr>
<td>Manassas (Balls Ford Road)</td>
<td>3</td>
<td>1,300</td>
<td>1,620</td>
<td>32.4</td>
</tr>
<tr>
<td>Fairfax Center (Monument Drive)³</td>
<td>2</td>
<td>630⁴</td>
<td>820</td>
<td>Use existing surface lots⁴</td>
</tr>
</tbody>
</table>

Note: Direct access is assumed to be constructed at the Cushing Road Park-and-Ride prior to 2040.

1. P&R spaces required do not include spaces required for kiss-and-ride area, as described in 3.22.8 C
2. Acres required indicative of acquiring enough right-of-way by opening year to meet 2040 P&R facility demand (at University Boulevard and Balls Ford Road) and is intended to accommodate pick-up and drop-off areas; all waiting areas, kiss-and-ride, circulating roadways, sidewalks, access roadways, sidewalks, and multiuse paths; and stormwater management facilities.
3. Represents total space (including existing space) needed to meet future demand; no work required.
4. For opening year requirements, spaces at Fairfax Center (Monument Drive) are assumed to be provided by reconfiguring the existing commuter parking lot at the Fairfax County Government Center in coordination with and subject to the approval of the Department, DRPT, and Fairfax County.
3.23 Transit Services and Travel Demand Management (TDM) Strategies

3.23.1 Transform 66 Outside the Beltway is a multimodal project that includes the introduction of new transit service and travel demand management (TDM) strategies which will be planned and procured by the Virginia Department of Rail and Public Transportation (DRPT) and by local transit and TDM agencies. The current I-66 Transit/TDM Preferred Alternative (Transit/TDM Technical Report), relies on the access locations to and from the Express Lanes, as well as the locations of the P&R facilities, as proposed in the NEPA Tier 2 documents.

3.23.2 Any changes in the 66 Express Lanes access locations or P&R facility locations will necessitate a reexamination of the Transit/TDM Preferred Alternative. Proposed transit service and TDM strategies, as stated in the Tier 2 NEPA documents, shall not be negatively impacted by proposed changes in the 66 Express Lanes access or P&R locations by the Developer.

3.23.3 Should access locations to and from the 66 Express Lanes or locations of P&R facilities deviate from those cited in the NEPA Tier 2 documents, the Developer shall examine impacts on proposed transit service and TDM strategies and shall propose appropriate modifications to the Transit/TDM Preferred Alternative to maintain the proposed transit routes and frequency of bus service. The Developer shall perform this examination in close coordination with the Department and DRPT.
4 Operations, Maintenance, and Tolling For the 66 Express Lanes

4.1 General Requirements

4.1.1 The Developer shall operate and maintain the Project assets including the ETTM System and ETTM Facilities for the duration of the Operating Period in a manner consistent with the Agreement.

4.1.2 The Developer shall implement an effective operations management framework which should include but not be limited to: traffic management, monitoring, control and enforcement, facility management and administration, and tolling administration, operations, enforcement, and collection.

4.1.3 The Developer shall implement an effective Maintenance Management System which should be capable of recording inventories, failures, repairs, maintenance activities, inspections performed, and defects.

4.1.4 The Developer shall meet all operations, maintenance, and tolling Performance Requirements in accordance with the Agreement.

4.1.5 The Developer shall record defects in accordance with the Performance Requirements within its system as described in this section.

4.2 Inspection Requirements

4.2.1 General Requirements

A. The Developer shall engage or employ or cause the O&M Contractor to engage or employ trained and competent personnel to plan and implement a program of inspections of the Project. This program shall achieve the following:

1. Provide for the continuing safety of the Project for users;

2. Prioritize defects requiring immediate and urgent attention because they are likely to create a hazard or serious inconvenience to users;

3. Identify other defects to be included for repair within the Developer’s annually recurring maintenance and repair program (e.g., Life Cycle Maintenance Plan);

4. Responsiveness to reports or complaints received from stakeholders;

5. Take account of incidents and emergencies affecting the 66 Express Lanes;
6. Monitor the effects of extreme weather conditions; and

7. Collate data to monitor performance of the 66 Express Lanes and to establish priorities for future maintenance operations.

B. The Developer shall require personnel performing inspections of road pavements to be certified as inspectors in accordance with standards and specifications set forth in Attachment 1.5.

C. All shared and Department bridges and structures shall be inspected by the Department. For structures of the type listed in Section 3.14.1 of the Technical Requirements that are maintained by the Developer it shall be the responsibility of the Developer to perform all safety inspections for these structures required by the Structure and Bridge Division’s Instructional and Informational Memorandum S&B-IIM-27 Bridge Safety Inspections and S&B-IIM-82 Traffic Structures.

D. Defects that are subject to the Performance Requirements and the Timeliness Requirements require prompt attention.

4.2.2 Inspection Frequency

A. The Developer shall establish inspection procedures and carry out inspections so that:

1. All defects that present a hazard are identified, documented, and repaired such that the hazard is mitigated within the time periods set out in the Performance Requirements;

2. All defects that present a hazard are identified, documented and remedied within the time periods set out in the Performance Requirements; and

3. All other defects are identified, documented, and repaired within the time periods set out in the Performance Requirements.

B. The periods stated in Attachment 4.5 shall be deemed to be periods from the time the relevant defect was first identified by or brought to the attention of the Developer.

C. The Developer shall investigate reports and complaints on the condition of the 66 Express Lanes received from all sources. The Developer shall record these as O&M records, together with details of all relevant inspections and actions taken in respect of defects, including temporary protective measures and repairs. These reports shall be made available to the Department upon request.
4.2.3 Inspection Standards

In performing inspections to identify defects, the Developer shall at a minimum conform to the inspection standards set forth in Attachment 1.5.

4.2.4 Safety Inspections

The record of a safety inspection shall include details of the weather conditions, road surface condition, and any unusual features related to the method of inspection.

4.2.5 General Inspections

The Developer shall perform general inspections in accordance with the O&M Plan so that the repairs of all defects are included in planned programs of Work.

O&M Records in respect of general inspections shall include details of the manner of inspection (e.g. center lane closure or shoulder), the weather conditions and any other unusual features of the inspection.

4.2.6 MOT During Operation for Routine Maintenance, Major Rehabilitation Maintenance Work, Maintenance Project and Construction Projects

The Developer shall follow Department Policy for Lane Closures in the Northern Virginia District as updated at the time of actual lane closure.

4.3 Maintenance Requirements

4.3.1 General Obligations

A. The Developer shall maintain the 66 Express Lanes and shall take all necessary action to perform the following:

1. Maintain the 66 Express Lanes pursuant to the Agreement;

2. Minimize traffic delay to drivers;

3. Respond to all incidents and defects in accordance with the Agreement and mitigate adverse effects;

4. Provide users with adequate information and forewarning of any events on, or any matters affecting, the smooth operation of the 66 Express Lanes as will enable them to minimize any associated adverse consequences;

5. Protect the safety of users, workers, or other persons on the 66 Express Lanes or other portions of the Project ROW used for 66 Express Lanes operations;
6. Protect the environment by minimizing the risk of adverse effects on the environment and on the amenities enjoyed by the owners and occupiers of land near the Project ROW;

7. Minimize the risk of damage or disturbance to or destruction of third-party property;

8. Enable the Department and others with statutory duties or functions in relation to the 66 Express Lanes to perform those duties and functions through agreed protocols; and

9. Perform inspections in accordance with the Agreement.

B. The Developer shall maintain the bridges identified in accordance with the Agreement and Attachment 4.3.

C. The Department shall maintain the GP Lanes (including structures and overpasses that carry only general purpose traffic and related infrastructure) as outlined in Attachment 4.3.

D. The Developer shall maintain 66 Express Lanes slip ramps that carry traffic to or from the 66 Express Lanes to the GP Lanes and flyover ramps that carry traffic to or from the 66 Express Lanes.

E. The Developer shall maintain 66 Express Lanes (including structures and overpasses that carry only 66 Express traffic and related infrastructure) as outlined in Attachment 4.3.

F. In accordance with the Agreement, the Department and Developer shall maintain Shared Assets as outlined in Attachment 4.3.

G. Subject to Department approval, the Developer shall be responsible for mowing operations within the median areas between the Express Lanes and general purpose lanes of I-66.

H. All EZ Pass logos and purple pavement markings shall be maintained by 66 Express. 66 Express shall visually inspect the logos and pavement markings for deficiencies, including illegibility or other imperfections, and document these inspections to the Department through photos accompanying an inspection report every six (6) months.

4.3.2 O&M Data Management

A. Prior to Project Completion, the Developer shall implement a computer-based Maintenance Management System (MMS), capable of recording inventories, failures, repairs, maintenance activities, inspections performance, communications, and notifications of incidents and defects. The Developer
shall enter all of the assets into the MMS with Asset identifications (IDs) as determined by the Developer and consistent with those descriptions and units of measure used in the Roadway Network System and PONTIS (or equivalent system) for structures and bridges, which are used by the Department. The inventory shall, where appropriate, include separate records for subcomponents of each Asset. All information shall be recorded in a consistent manner and shall be searchable by individual attributes.

B. The MMS shall include relevant condition information with respect to each Asset, which should include but not be limited to location, equipment nomenclature, serial number, name, date of installation, technician, type of failure, date and time of failure, date and time of response to the site and date and time returned to service, preventive maintenance work, schedule work, work repair code, failure and repair history, Asset Residual Life, and statistical data on mean time between failure (MTBF) and Mean Time to Repair (MTTR). Residual Life means the calculated duration that any Asset of the Project, subject to the type of routine maintenance of the Asset which is normally included as an annually recurring cost in highway maintenance and repair budgets, will continue to comply with any applicable Performance Requirement or standard after the end of the Term, before Major Maintenance is required, determined through the application of Residual Life methodology and residual life inspections. The MMS shall be able to report work by work repair code, asset (or subcomponent), location and unit of measure.

C. Defects and responses to defects shall be recorded on the MMS within two days of them coming to the attention of the Developer or action being taken. All other recording requirements shall be recorded on the MMS within 7 days of completion or occurrence of the relevant activity.

D. The Developer shall ensure that the MMS is capable of generating the information required to demonstrate achievement of the Performance Requirements for each asset.

E. In accordance with the Agreement, the Developer shall provide the Department access to the MMS at all times for the purposes of auditing the accuracy of the Developer’s O&M records. Such access shall require reasonable advance notice and access shall not be delayed or hindered, nor shall such access impact any operational or maintenance activities.

F. The MMS shall be kept updated and operational throughout the Operating Period.
4.4 Operations Requirements

4.4.1 General Obligations

A. The Developer shall be responsible for the following, among other things:

1. Employment and training of competent personnel to carry out all operations aspects of the O&M Plan
2. Coordination of activities of third parties with interests within the 66 Express Lanes
3. Monitoring the condition and operational performance of the 66 Express Lanes
4. Incident response, management and reporting
5. Traffic operations restrictions, including periods of lane closure restrictions;
6. Standard operating and communication procedures for Emergency preparation, response, and recovery
7. Planning and coordination with all relevant Governmental Authorities, including emergency services
8. Operate the Electronic Toll and Traffic Management (ETTM) System
9. Liaison with MPSTOC
10. Analysis of vehicular accident patterns to identify safety issues
11. Investigation of reports or complaints received from all sources
12. Toll enforcement and coordination with law enforcement for the 66 Express Lanes

B. The Developer shall monitor and observe weather and weather forecasts and deploy resources to minimize delays and safety hazards due to severe weather events, to the extent practical. The Department shall coordinate with the Developer and deploy resources to minimize delays and safety hazards due to snow or ice events, in accordance with the Agreement.

C. Where contact details of customers have been provided, the Developer shall respond to customer inquiries and complaints about the 66 Express Lanes within a reasonable time under the circumstances.
D. In emergency situations where the Department must take managerial control of the 66 Express Lanes per the Agreement, Developer’s staff will continue to operate the facility from the Express Operations Center under managerial control from the Department.

4.4.2 Data Collection

A. A process of data collection shall be established that includes, but is not limited to: traffic data in each direction, traffic volume, lane occupancy, and speed data.

B. The data collection process shall be continuous (not periodic). Notwithstanding the requirements to collect and provide data for the facility the parties recognize that from time-to-time, and in the normal course of business, data for specific locations may not be available due to technical issues, or other issues outside of the Developer’s control. In such instances the Developer will endeavor to remedy the issue in accordance with normal business practices.

C. The Developer shall store all data and make the data accessible to the Department in accordance with the Agreement.

D. The Developer shall maintain a fully documented application programming interface (API) for traffic and incident data on the 66 Express Lanes, which shall be available 99.0% of the time.

E. There shall not be any restrictions on the Department regarding use of the data or on its distribution to third parties, such as the Regional Integrated Transportation Information System (RITIS) and other agencies such as the District of Columbia of Transportation (DDOT) and the Maryland State Highway Administration (MdSHA).

4.4.3 Data Compiling and Reporting

A. The Developer shall archive all collected traffic data and make the data available for the generation of reports and for audits of data by any persons permitted by the Department for this purpose, in accordance with the Agreement.

B. The Developer shall commence delivery of the report to the Department after the second full month following the Service Commencement Date. Thereafter, reporting shall occur on a calendar monthly basis.

C. Data shall be compiled between the northern and southern termini of the Project, based on the Reporting Segments in accordance with the Agreement, or as amended by the Agreement.
D. Data compilation will include Peak Periods traffic volumes and traffic speeds on 66 Express Lanes at each Mainline sensor station by lane and hour within the morning and evening weekday time period over a consecutive 180 day period. The time range of the Peak Periods may be adjusted by the Department from time to time to reflect change in travel conditions in accordance with the Agreement.

E. The report shall include, at a minimum:

1. Degradation section indicating Percent Degradation (as defined in these Technical Requirements) on the Mainline of the 66 Express Lanes for each Reporting Segment for the period under review;

2. Speed exception section showing Substandard Stations, days, and time periods where the Percent Degradation fell below the defined threshold; and

3. Documentation of any periods that were impacted by incidents or activities outside of the control of the Developer where the Percent Degradation fell below the defined threshold.

4.4.4 Degradation Assessment

A. For the purpose of determining degradation, volume and speed data that is useable and non-corrupt will be analyzed for each 66 Express Lanes Mainline sensor Station. The Operating Speed Performance Standard (OSPS) shall be 55 mph.

B. Each Station whose weighted average speed over the Peak Period falls below the defined minimum average operating speed for each of the OSPS, as applicable, will be identified as Substandard Station for the applicable calculation.

C. The speed degradation percentage will be calculated for morning Peak Period and evening Peak Period separately. The percentage of degradation for Peak Periods is given by the following formula applied to weekdays:

\[
Percent \ Degradation = \frac{\sum_{i=1}^{180} Substandard \ Stations \times 100}{(Stations \times 180 \ Days)}
\]

(a) The numerator equals the summation of all Substandard Stations within the consecutive 180 day period for weekdays only.

(b) The denominator equals the total number of Stations upon which the calculations is based multiplied by the number of weekdays within the consecutive 180 day period.
(c) For the avoidance of doubt, the degradation assessment will result in at least eight different values being calculated for each reporting cycle for the whole 66 Express Lanes facility. Each value is based on the Reporting Segments in accordance with the Agreement. This is made up of at least four different values (i.e., two AM NB, two PM SB) and at least four different values for OSPS (i.e., two AM NB, two PM SB).

4.4.5 Degraded Facility

A. Degradation Standard

1. Per Title 23, United States Code (USC) Section 166. (d) (2), a degraded facility for the purpose of determining which classes of vehicles are permitted to use the HOV lanes, is defined below. For the avoidance of doubt, the Developer shall comply with the provisions of any amendment or supplement to, or replacement or substitution of, the provisions governing "Degraded Facility" as defined by federal law:

(2) Degraded Facility.--

(A) DEFINITION OF MINIMUM OPERATING SPEED.--In this paragraph, the term “minimum average operating speed” means

(i) 45 miles per hour, in the case of a HOV facility with a speed limit of 50 miles per hour or greater; and

(ii) not more than 10 miles per hour below the speed limit, in the case of a HOV facility with a speed limit of less than 50 miles per hour.

(B) STANDARD FOR DETERMINING DEGRADED FACILITY. – For purposes of paragraph (1), the operation of a HOV facility shall be considered to be degraded if vehicles operating on the facility are failing to maintain a minimum average operating speed 90 percent of the time over a consecutive 180-day period during morning or evening weekday peak hour periods (or both).

2. Per Title 23, United States Code (USC) Section 166. (d) (2), the facility is considered degraded when compliance is less than or equal to 90 percent, where:

- The minimum average operating speed is less than 45 mph.
- Compliance means: 100 Percent – Percent Degradation is greater than or equal to 90 percent.
Percent Degradation will be calculated for weekday Peak Periods for the Mainline 66 Express Lanes Reporting Segments.

4.4.6 Operating Speed Performance Standard

A. The Developer shall meet or exceed the Operating Speed Performance Standard (OSPS). The OSPS is in addition to the federal requirement that the 66 Express Lanes are not a degraded facility.

B. The Developer shall provide a minimum average operating speed of 55 mph on the Mainline 66 Express Lanes.

C. For purposes of determining whether or not the facility is degraded, data from time periods corresponding to the following events shall be excluded from the calculations:

1. All periods identified in the Agreement, including periods of toll suspension; when the Department assumes control of the 66 Express Lanes under the terms of the Agreement; data during incident conditions as described in the Agreement; and during Major Maintenance periods, when working to agreed programs.

2. Police, military, STRAHNET, and other related activities.

3. Backups due to conditions outside of the control of the Developer.

4. Force Majeure Events.

D. The facility is considered degraded by the OSPS Standard when Compliance is less than or equal to 90 percent, where:

1. The minimum average operating speed is more than 10 mph below the posted speed limit.

2. Compliance means: 100 percent – Percent Degradation is greater than or equal to 90 percent.

3. Percent Degradation will be calculated for weekday Peak Periods for the Mainline 66 Express Lanes Reporting Segments.

E. The impact of the Developer’s failure to meet the OSPS in any calendar month shall be governed by the Agreement.

F. The continued application of the OSPS will be in accordance with the Agreement.
4.4.7 Incident Management

A. The Developer shall provide equipment and personnel to support incident and emergency management operations on the 66 Express Lanes in accordance with the Operations and Maintenance Plan. The Developer shall take necessary action using appropriate resources to handle any and all traffic control needs to ensure the safety of the incident scene and traveling public and to minimize the potential for pollution of watercourses or groundwater.

B. In the event of an Incident, the Developer shall provide traffic management, real time traffic information and video feeds to the Department, as appropriate, depending on the nature of the Incident in accordance with the Interface Control Document and protocols developed.

C. The Developer shall coordinate and confer with the Department’s NRO TOCs and other first responder community stakeholders in developing the incident management plans and when carrying out incident management operations.

D. Where structural damage to a 66 Express Lanes structure, which poses an imminent risk to the traveling public, is suspected, the extent of damage and condition of the structure shall be evaluated, documented, and reported by a bridge and structural engineer with the following qualifications:

1. Is a professional engineer, licensed in the Commonwealth of Virginia;

2. Meets the qualifications to be a “Team Leader” in accordance with the requirements of Article 650.309 of the National Bridge Inspection Standards, 23 CFR 650.3; and

3. Has extensive experience with in-service bridge inspection, emergency bridge inspection, maintenance, repair and rehabilitation of bridges, structural evaluations, and load ratings.

E. The Developer shall not reopen any area of the 66 Express Lanes which has been closed, until all appropriate safety and traffic management measures have been completed and any issues related to Hazardous Substances have been mitigated to a safe level.

F. The Developer shall ensure that procedures are in place for public and agency notifications, incident management, ensuring the safety of motorists, handling of hazardous waste, and coordination with the Department, police and other emergency personnel with respect to emergency incidents and occurrences.

G. The Developer shall identify a management-level, on-call “duty officer” consistent with the Department’s duty-officer policy.
4.4.8 Traffic Management – Detection of Incidents

A. In locations as outlined in the Agreement, an appropriate system shall be deployed that is capable of automatic video-based or equivalent, detection of incidents within 5 minutes of occurrence, 95% of the time within areas monitored under normal conditions (“AID system”).

B. Incident information (including the character and severity of the incident) shall be entered into VA Traffic, the Department’s incident information system, within five (5) minutes. Such information shall include:

1. The location of the incident (identified by mile marker and nearest interchange)
2. The lane(s) impacted
3. The severity of the incident
4. The number of vehicles involved
5. The number of disabled vehicles
6. Whether there are any injuries
7. Whether hazardous materials are involved
8. The estimated time for response to the incident
9. The estimated duration of the incident
10. Updates regarding the status of the incident

4.4.9 Driver Information (Express Lanes)

A. The Developer shall utilize the TMS, including the DMS, to provide road users with relevant information in accordance with the Operations and Maintenance Plan, including the use of DMS to impart information on behalf of the Virginia Department of Emergency Management (VDEM).

B. Traffic management messages that contribute to the safety of motorists and road workers shall be applied within five (5) minutes of the detection and classification of an incident or the identification of deteriorated road conditions, in accordance with the Operations and Maintenance Plan.

C. The ISA for T&DI for DMS (each sign) shall be at least 99.9% excluding the effects of any condition beyond the reasonable control of the Developer. The ISA for traffic management DMS shall be at least 99.9% excluding the effects of any condition beyond the reasonable control of the Developer.
4.4.10 Emergency Evacuation

A. The Project is designated as an emergency evacuation route for the Washington Metropolitan Area. The Developer shall control access to the Project throughout the corridor under the direction of the Department should an evacuation be directed pursuant to a Governor declared emergency. These requirements will apply during all Governor-declared emergencies.

B. The Developer shall develop and implement an evacuation plan in coordination and consistent with plans, programs, and requirements of the Commonwealth of Virginia, to include the Department, the Virginia Evacuation Coordination Team for Operational Response (VECTOR), Virginia State Police (VSP), and the VDEM. The plan shall include a plan for lane reversal, and standard operating procedures that identify all required tasks to be performed, the party that will perform these tasks, and how these tasks will be accomplished. The plan shall include the performance and documentation of one annual drill for evacuation and emergency procedures, where such drill is deemed necessary and undertaken as part of the review of evacuation plans associated with a Governor declared emergency, on similar highways in the State.

C. The Developer shall provide for the effective implementation of the evacuation plan and the lane reversal plan, in coordination with the Department in a Governor-declared emergency. This implementation shall include:

1. Facilitation of large scale traffic movements during evacuations and re-entry;
2. Implementation and provision of traffic information and advisories using various traveler information media and systems;
3. Providing manpower, equipment, and materials as needed to control traffic during evacuation and lane reversals;
4. Monitoring traffic conditions and providing timely incident response and management during evacuations;
5. Providing local access from reversed lanes as applicable; and
6. Providing procedures for effective termination of lane reversal at the conclusion of the declared emergency.

D. The Developer shall participate in the development and update of future state, regional, and local emergency evacuation plans with other stakeholders including the Department, VSP, VDEM, and others agencies and organizations. The Developer shall send a representative to participate
throughout the Operating Period in any annual statewide coordination meetings for evacuation and emergency services held during the year.

4.4.11 Waste Disposal and Use of Hazardous Substances

The Developer shall be responsible for the management, treatment, handling, storage, monitoring, remediation, removal, transport, and disposal of any Hazardous Substances that are discovered on, in, under or emanating from the Project ROW during the Term, in each case in accordance with applicable regulatory requirements, the Agreement and the Environmental Management Plan in Attachment 1.3.

4.5 Performance Requirements

4.5.1 Within the Technical Requirements, reference to the Performance Requirements means the Asset Condition Performance Requirements, Ordinary Maintenance Performance Requirements, and the latest approved version of the Northern Virginia TAMS Performance Requirements.

4.5.2 The baseline service levels for routine maintenance will be equal to or greater than that of other similar highways in the Commonwealth of Virginia. The Baseline Level of Service requirements are set out in Attachment 4.5.

4.5.3 The Asset Condition Performance Requirements are set out in Table 4.5a in Attachment 4.5.

4.5.4 The Ordinary Maintenance Performance Requirements shall be in accordance with Table 4.5b in Attachment 4.5 and the most current Northern Virginia TAMS Performance Requirements in effect during the maintenance period.

4.5.5 The Developer shall use the program of inspections supplemented by the Maintenance Management System to demonstrate compliance with the Performance Requirements at all times and shall report for each Asset, its performance in meeting all applicable criteria and Timeliness Requirements in the quarterly O&M report in a format to be agreed between the Developer and the Department prior to Project Completion. Performance also shall be summarized in an end-of-year report, as outlined in the Agreement.

4.5.6 The Developer shall set forth as part of the O&M Plan, reviewed and updated as necessary, a document describing the means by which it intends to demonstrate achievement of the Performance Requirements.

4.5.7 Where the Developer fails to meet the Performance Requirements, Non-Compliance Points may be assessed pursuant to the Agreement.

4.5.8 The Developer shall update the Ordinary Maintenance Performance Requirements ninety (90) days before Project Completion to reflect current industry standards
and changes, consistent with the Northern Virginia TAMS criteria in place on similar highways in Northern Virginia. The Department shall approve the updated tables thirty (30) days before the Project Completion Date and then thirty (30) days before every subsequent update.

4.5.9 Updates shall include improvements to inspection and measurement methods, measurement records, performance minimums, tolerances, and criteria as are necessary to comply with the current Northern Virginia TAMS criteria in place on similar highways in Northern Virginia.

4.5.10 The Project shall be subject to the Department’s Maintenance Rating Program (MRP), or subsequent updated or replacement program. The Developer shall use the MRP to verify performance of each Asset against the criteria set out in the Performance Requirements. The Developer shall include in the end of year report outlined in the Agreement, a summary of the results of annual assessments in a format to be agreed between the Developer and the Department.

4.6 Maintenance and Handback Requirements

4.6.1 Maintenance and Life Cycle Maintenance Plan

A. The Developer shall perform maintenance in accordance with Attachment 4.6 Maintenance Responsibility Matrix so that all assets are capable of meeting the appropriate Performance Requirements when subject to ordinary maintenance and so that any defects which affect the long-term performance of the Project are repaired in good time to prevent undue deterioration of any asset.

B. In order to properly identify and plan for Major Maintenance for pavement throughout the Term, the Agreement describes the requirements for a Life Cycle Maintenance Plan to include a description of all Major Maintenance for pavement to be undertaken. The major maintenance, repair, reconstruction, rehabilitation, restoration, renewal and replacement activities listed in the Life Cycle Maintenance Plan shall meet the Performance Requirements set forth in the Technical Requirements and other standards and requirements set forth in the Agreement.

C. The Life Cycle Maintenance Plan updates during the last five (5) years of the Term will be subject to additional oversight by the Department in accordance with the Agreement.

4.6.2 Transition Plan

A. The purpose of the Transition Plan is to provide the Department with a clear understanding of the Developer's approach to the management, operations and maintenance of the facility so that the Department can ensure a smooth
transition from Developer to the Department at the end of the Operating Period.

B. The Transition Plan shall include a checklist of relevant activities in sufficient detail for a smooth transition from Developer operations to Department operations.

C. The Transition Plan shall be delivered to the Department in draft form no more than 365 days before the end of the Operating Period. The Department will review the Transition Plan and request any changes within a period of thirty (30) days. The Developer shall submit the final Transition Plan to the Department no more than thirty (30) days after receiving the Department's comments.

D. In the last 180 days of the Operating Period the Developer shall meet with the Department at least monthly to share information on the management, operations and maintenance of the facility in a good faith effort to ensure smooth transition from Developer to Department. The Developer shall endeavor to answer Department questions on any items included in the Transition Plan and any additional questions that may arise.

4.6.3 Handback Requirements

At the completion of the Operating Period, the Developer will handback to the Department a functional system with all asset condition having a remaining life of 5 years or more, within its normal lifecycle. The functional system shall include all roadside and back office elements (e.g., cameras, readers, IAG antennas, vehicle detectors, communications network, etc.) of the traffic management system and tolling system. The Developer will document annual inspections based on the Life Cycle Maintenance Plan, and also demonstrate through final inspections and analysis that the Handback Requirements are met.

For Bridges and Bridge Class Culverts, the Handback Requirements shall be as follows:

The general condition rating for Decks (Item 58), Superstructures (Item 59), Substructures (Item 60), Channels and Channel Protections (Item 61), and Bridge Class Culverts (Item 62) at a level of 6 (“Satisfactory Condition”) or better, as defined in the FHWA Recording and Coding Guide for Structure Inventory and Appraisal of the Nation’s Bridges.

4.7 Tolling Requirements

4.7.1 General

A. The Electronic Toll Collection (ETC) system shall be operated and maintained by the Developer to fulfill its obligations under the Agreement
and in a manner such that ensures ETC Performance Requirements, as set out below, are met. Upon the Developer receiving notice of a problem with the dynamic tolling mechanism, the Developer shall submit to the Department, for its approval, a rectification plan.

B. The ETC system shall be operated and maintained by the Developer to fulfill its obligations under the ETC Agreement.

C. Reference Attachment 4.7 that identifies conceptual tolling zones and points consistent with the I-66 Operations Concept Technical Report and Tolling and Revenue Study.

4.7.2 ETC Performance Requirements

A. Roadside equipment shall have an ISA of at least 99.9%. This shall exclude scheduled downtime and loss of power or any other condition beyond the Developer’s control.

B. The ETC system shall have an ISA of at least 99.9%, excluding scheduled downtime and loss of power.

C. At least 99.8% of transponder records shall be correct; i.e., the data supplied are complete and relate correctly to the transponder detected for properly fitted and operating transponders, and excluding non-normal operation due to signal attenuation from a metallic wind screen or other similar condition beyond the control of the Developer.

D. At least 99.5% of payment claim records shall be correct; i.e., the data supplied are complete and relate correctly to the payment due for the trip, the displayed prices, and the transponder to which it relates, excluding the effects of other conditions beyond the reasonable control of the Developer.

E. Records of transponder transactions shall be transmitted to the Department according to the current interface specification, or as otherwise agreed between the Department and the Developer within five (5) business days unless written agreement has been obtained from the Department.

F. Records of transactions for which the transponder was not valid or where a transponder was not read may be submitted for attempted posting (VToll) according to the VToll interface and business rules in effect at the time.

G. Any transactions that include the read of a valid transponder at the time of the transaction that are not submitted within sixty (60) days shall be written off.

H. Tag status files are to be loaded and distributed through the system and utilized for each transaction to ensure images are recorded for the correct vehicles. This should be completed such that transactions with an entry date
and time within one (1) hour of receipt from the Department, (in accordance with the ETC Agreement) shall be processed according to the status in that file 99% of the time, subject to receipt of a confirmed accurate tag status file from the Department, excluding the effects of other conditions beyond the reasonable control of the Developer.

I. The tag number captured from a tag shall be recorded without error at least 99.99999% of the time (no more than one error in 10 million). In addition, no more than one such error in 100 million shall result in the wrong tag number becoming associated with the capture. This is subject to the transponder supplier performance requirements.

J. In the event the Department receives two or more representations from customers in a calendar month claiming to have been charged a 66 Express Lane toll from the same toll point while using the GP Lanes, the Developer shall present to the Department a management plan to investigate system performance. The Department and Developer agree that the customer confidence in the tolling system is essential and that misreads from the GP Lanes must be addressed as a matter of urgency.

K. Accuracy for correctly assigning the transponder to the correct vehicle and therefore license plate, to be 99.5% for properly fitted and operating transponders, and excluding non-normal operation due to signal attenuation from a metallic wind screen or other similar condition beyond the control of the Developer.

4.7.3 Transactions

A. The Department (in accordance with the Electronic Toll Collection Agreement) will supply tag status information, which should be loaded and distributed through the system and used for each transaction to ensure images are recorded for the correct vehicles. The Department reserves the right to reject duplicate transactions based upon accepted E-ZPass business rules.

B. The Developer shall use commercially reasonable efforts to ensure that requests for payment are made only from accounts on the list of current active tags transmitted by the Department.

C. Upon notification that the Developer has requested payment from an account that the Department has previously informed the Developer is invalid or no longer in good standing, the Developer must reconcile or audit the data transmission within three (3) business days to identify all other instances that may have occurred.

D. The Developer shall use commercially reasonable efforts to ensure that no duplicate transactions or incorrect toll amounts are transmitted to the customer service center.
E. Statements, invoices, and notices for transactions not paid by transponder shall accurately display the registered vehicle owner (or other party legally responsible for the tolls) name and address as received from the appropriate legal party (e.g. DMV), the date, time, and location of individual trips with associated tolls and fees, totals for the customer 99.99% of the time. Such notices or invoices shall be issued within sixty (60) calendar days of transaction unless held-up by customer look-up delays by third parties not under the control of the Developer and the Developer requested lookup data in a timely fashion (within ten (10) days of entry or correction of license plate data.) Transactions not issued within sixty (60) calendar days by the Developer due to system or operational issues within the control of the Developer shall be written off.

F. Upon notification of a duplicate transaction or an incorrect toll amount on a per transmission basis, the Developer must reconcile or audit the data transmission within three (3) business days to identify any and all other duplicate transactions or incorrect toll charges that may have occurred and shall transmit correction files or requests for toll corrections to the customer service center for action.

G. Within 5 business days of identification, the Developer shall transmit the information in accordance with the ETC Agreement.

H. Following receipt of two or more complaints within thirty (30) calendar days of transponder reads from vehicles traveling in the GP Lanes emanating from a single toll point the Developer shall investigate the complaints. In the event that a cross-read occurred or reasonable doubt exists as to whether a cross-read occurred, the Developer shall, within fifteen (15) calendar days of receipt of such second complaint within a thirty (30) calendar day period, prepare correspondence that can be sent to all customers who have made such a complaint regarding the erroneous GP reads. The Developer shall provide information to the public outlining the issue with reads from tags in the GP Lanes within fifteen (15) calendar days of the receipt of such second complaint within a thirty (30) calendar day period.

I. Within seven (7) calendar days of receiving notice that an incorrect toll amount has been charged (and provided that customer information has been provided) and that the incorrect charge has been validated, the Developer shall provide the customer service center with correspondence to be sent to the customer informing the customer that his or her account will be credited.

J. Within three (3) calendar days of discovery or notice from the Department that an incorrect toll has been charged, the Developer shall submit a plan to the Department for approval to rectify the billing problem.
K. The Developer shall ensure that, at all times, dynamic message signs along the Express Lanes display accurate information about toll rates and other travel information. Upon notification of the display of an incorrect toll amount, the Developer shall reconcile or audit the data transmission within one (1) business day to identify any and all other customer accounts that may have been impacted by the incorrect signage (to be determined on a per transmission basis).

L. The Developer shall comply with standards applicable to the retention of and use of customer records pursuant to Law, including § 33.2-504 of the Code of Virginia.

4.7.4 Roadside ETC Support and Maintenance

The Developer shall support and maintain all roadside ETC equipment and infrastructure installed related to 66 Express Lanes operations.

4.7.5 Information Technology Support and Maintenance

The Developer shall carry out information technology service management in accordance with the Agreement, including generally accepted VDOT Northern Virginia District practice.

4.7.6 Anti-Virus Scanning and Protection

A. The Developer shall maintain an updated anti-virus and protection procedure to protect the ETTM System from viruses and other destructive devices, and to manage the impact of virus attacks including transmission to the NRO ATMS or other Department or third-party systems.

B. The Developer shall immediately notify the Department of any viral outbreak or similar destructive outbreak upon identification.

4.7.7 Interfaces

The Developer shall continuously monitor all interfaces for the ETC system. The monitoring should include availability, throughput, performance, buffer usage, queue lengths, hardware status, system alarms and warnings, and any other diagnostic data provided by the Developer’s implementation of the interfaces. Reports on monitoring statistics shall be available to the Department upon request within five (5) business days. Any delays in processing and transmitting transactions in excess of two (2) business days shall be communicated to the Department along with an action plan for addressing the delays.
4.7.8 System Back-up and Recovery

A. The Developer shall provide data security for the ETTM System. Data security may include the following:

1. Backup of all software and configuration following each release of, or change to, the system, including any disaster recovery site;

2. Daily back-up of all new and changed data held on the tolling system;

3. Provision of the means for the daily back-up to be maintained at a secure offsite location within 24 hours (or other agreed timeframe); and

4. Storage of one (1) month of the data back-ups in a secure offsite location.

B. Backups shall not affect the ETC system’s ability to capture, store or process detection data.

4.7.9 System Failure

A. The Developer shall notify the Department without delay on becoming aware of any event or the likely event of any system failure that results in a critical element of the ETTM System not functioning, or that results in or is likely to result in a catastrophic impact on the public, the Department, or a third party.

B. The Department will notify the Developer without delay on becoming aware of any event or the likely event of any system failure that results in a critical element of the NRO ATMS or the Department’s customer service center not functioning, or that results in or is likely to result in a catastrophic impact on the public, the Developer, or a third party.

C. Where the relevant system failure affects or may affect a third party, the Department, or its agents, the Developer shall provide the Department with all necessary available assistance in resolving the relevant system failure by cooperating fully and expeditiously with the third party, the Department, or its agents, as appropriate.

D. Where the relevant system failure was caused by the Department or its agents, the Department will provide the Developer with all necessary assistance co-operation in resolving the relevant system failure, by cooperating fully and expeditiously with the third party or Developer, as appropriate.
4.8 Reporting During Operating Period

The Developer shall report on the performance achieved against each of the Performance Requirements in each reporting period, in accordance with the Agreement.

4.8.1 The Developer shall prepare and provide to the Department regular reports during the Construction Period and the Operations Period (as more fully described below). All reports prepared by Developer shall include, at a minimum, those items shown below in a format approved by the Department and sufficient to allow the Department to meet its regulatory reporting responsibilities.

4.8.2 During the Construction Period, the Developer’s weekly report shall include the following:

A. Specific construction schedule activities, including location for the week concluding and the upcoming week;

B. Rolling 3-week forward-looking inspection notice, which shall include the fabrication schedule and planned construction activities;

C. MOT weekly update, regarding any scheduled lane closures and identification of work areas for the ensuing 2 weeks; and

D. Managed lane and tolling activities.

4.8.3 During the Construction Period, the Developer’s monthly report shall include the following:

A. Document control certification sheet (verification that all field documentation is being maintained);

B. Specific construction activities and deliverables occurring during the previous month (reporting period);

C. Specific construction activities and deliverables planned for the next two reporting periods;

D. A 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 SIAs, float compensation;

E. 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;
F. Identification of activities requiring Department and FHWA input or assistance;

G. Action items and outstanding issues;

H. A work breakdown structure Level 1 or Level 2 design and construction schedule;

I. Project cost summary;

J. Quality management reporting, as defined within the Developer’s QMSP, including quality inspection reports and daily inspection reports;

K. A statement by the Developer that this is the Baseline Schedule is the only schedule being executed to perform the Work;

L. NCR and resolution reports;

M. ROW acquisition activities;

N. Environmental compliance activities;

O. DBE and SWaM quarterly usage;

P. Safety activities;

Q. Managed lane and tolling activities

R. Digital photographs of the progress of the Project; and

S. A summary of any outstanding issues, any Delay Events, or Compensation Events that have occurred or are anticipated and the measures adopted (or to be adopted) to overcome such issues.

4.8.4 During the Operations Period, the Developer’s quarterly O&M report shall be reviewed and approved by the Department and may include the following:

A. Planning and implementation of operations, including work plans for the future periods;

B. Roadway operations;

C. Incident response times;

D. Routine maintenance activities;

E. Customer service log, detailing complaints or requests, and their disposition;
F. Managed lane average daily traffic volumes;
G. Average daily ANPR transactions;
H. Average daily E-ZPass transactions;
I. Average daily HOV volumes;
J. Average daily toll revenue
K. O&M inspections;
L. Long-term participation SWaM goal;
M. A summary of issues related to Performance Points during the reporting period;
N. Quality management activities; and
O. Performance timeliness.

4.8.5 During the Operations Period, the Developer’s annual report shall include the following:

A. Summary of quarterly issues and trends as required for the Department’s reporting to FHWA;
B. Annual budget(s), as required by the Agreement;
C. A report of O&M Overhead of the O&M Contractor or its Affiliates; and
D. ETTM data, traffic data, and other data generated from operation of the Project or any ETTM System.

4.8.6 The Developer Management Plan shall describe the proposed formats, means of distribution, and recipients of the reports.

4.8.7 The Developer shall maintain at all times, at its office, a minimum of one hard-copy complete set of all reports shown above for the previous six (6) months only. All reports shall be available to the Department 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).
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 1.1
Acronym Table and Definitions
# ACRONYM TABLE AND DEFINITIONS

## ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>AACE</td>
<td>Association for the Advancement of Cost Engineering</td>
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<td>AFC</td>
<td>Approved for Construction</td>
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<td>BCWP</td>
<td>Budgeted Cost of Work Performed</td>
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<tr>
<td>BCWS</td>
<td>Budgeted Cost of Work Scheduled</td>
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<tr>
<td>CADD</td>
<td>Computer Aided Drafting and Design</td>
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<td>CTA</td>
<td>Cement Treated Aggregate</td>
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<td>DBE</td>
<td>Disadvantaged Business Enterprise</td>
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<td>DE</td>
<td>Design Exception</td>
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<td>Interface Control Document</td>
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<td>Asset Identification</td>
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<td>Live Load</td>
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<td>LRFD</td>
<td>Load and Resistance Factor Design</td>
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<td>McConnell Public Safety and Transportation Operations Center</td>
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<td>MRP</td>
<td>Maintenance Rating Program</td>
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<td>MSE</td>
<td>Mechanically Stabilized Earth</td>
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<td>MUA</td>
<td>Master Utility Agreement</td>
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<td>NADR</td>
<td>Noise Abatement Design Report</td>
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<td>NCR</td>
<td>Non-Conformance Report</td>
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<td>NDC</td>
<td>Notice of Design Change</td>
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<td>NRO</td>
<td>Northern Regional Operations</td>
</tr>
<tr>
<td>NTCIP</td>
<td>National Transportation Communications for ITS Protocol</td>
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<tr>
<td>O&amp;M</td>
<td>Operations and Maintenance</td>
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<tr>
<td>OCR</td>
<td>Optical Character Recognition</td>
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<td>OSPS</td>
<td>Operating Speed Performance Standard</td>
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<tr>
<td>PDM</td>
<td>Precedence Diagram Method</td>
</tr>
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<td>PE</td>
<td>Professional Engineer</td>
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<tr>
<td>PS&amp;E</td>
<td>Plans, Specifications, and Estimate</td>
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<tr>
<td>SPI</td>
<td>Schedule Performance Index</td>
</tr>
<tr>
<td>SWaM</td>
<td>Small, Women- and Minority-owned Business Enterprise</td>
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<tr>
<td>T&amp;D</td>
<td>Toll and Driver Information</td>
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<tr>
<td>TAMS</td>
<td>Turnkey Asset Maintenance Services</td>
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<tr>
<td>TCP</td>
<td>Traffic Control Plan</td>
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### Acronym Table and Definitions

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>TOC</td>
<td>Traffic Operations Center</td>
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<tr>
<td>VDEM</td>
<td>Virginia Department of Emergency Management</td>
</tr>
<tr>
<td>VECTOR</td>
<td>Virginia Evacuation Coordination Team for Operational Response</td>
</tr>
<tr>
<td>WBS</td>
<td>Work Breakdown Structure</td>
</tr>
<tr>
<td>WMATA</td>
<td>Washington Metropolitan Area Transit Authority</td>
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</table>

**DEFINITIONS**

Capitalized terms used but not otherwise defined in this Exhibit have the respective meanings set forth in the Agreement. In addition, the following terms have the meanings specified below:

**Bridge Class Culvert** is as defined in Section 3 of the Technical Requirements.

**Design Exception** is defined as a document required when deviations from VDOT’s design criteria occur. When design criteria meet or exceed AASHTO minimal design but fall short of VDOT’s minimal design, a Design Waiver shall be required. Design Waivers will be applicable to all projects regardless of functional classification and funding and shall be documented and approved in accordance with the Design Waiver Request form LD-448. This Design Waiver Policy is applicable to VDOT owned and maintained roadways only.

**Design Waiver** is defined as a document required where it is neither impractical nor economical to obtain the AASHTO minimum design criteria as shown in the Geometric Design Tables. In such a case, an exception shall be secured from the State Location and Design Engineer and FHWA (if applicable).

**Disaster Recovery Plan** is as defined in Section 3 of the Technical Requirements.

**Degradation Standard** is as defined in Section 4 of the Technical Requirements.

**Hold Point** is defined in VDOT’s Minimum Requirements for Quality Assurance & Quality Control on Design-Build & Public-Private Transportation Act Projects.

**In-service Availability** means a percentage of time equivalent to (hours available) / (hours in service) x 100%; in service time excludes scheduled down time and loss of power outside Developer control.

**Major Rehabilitation** is as defined in Section 3 of the Technical Requirements.

**Mainline** is the primary roadway in which the traffic sensors for speed and other traffic data operate excluding auxiliary lanes, collector-distributor roads or ramps.

**Monthly Progress Earning Schedule** is as defined in Section 1 of the Technical Requirements.

**Notification Center** is as defined in Section 56.265.15.of the Code of Virginia.
Peak Period is the period from 5:30 a.m. – 9:00 a.m. or 4:00 p.m. – 7:00 p.m., Monday through Friday, excluding holidays.

Percent Degradation is defined in Section 4 of the Technical Requirements.

Potomac Formation [silts/clays] are silts/clays defined as such in the Geologic Map of Virginia published by the Virginia Division of Mineral Resources.

Project Roll Plan is a scaled signage plan or plans showing proposed, existing, or relocated DMS and static signs on the 66 Express Lanes and connecting roadways.

Quality Assurance Manager means the person reporting to the Quality Manager responsible for the independent process of determining conformance of work by examining the quality control data.

Residual Life means the calculated duration that any Asset of the Project, subject to the type of routine maintenance of the Asset which is normally included as an annually recurring cost in highway maintenance and repair budgets, will continue to comply with any applicable Performance Requirement or standard after the end of the Term, before Major Maintenance is required, determined through the application of Residual Life methodology and residual life inspections.

Secondary Settlement is as defined in AASHTO LRFD Bridge Design Specifications Section 10.6.2.4.

Security Plan is as defined in Section 3.15 of the Technical Requirements.

Standard Documents means the standards, special provisions and specifications listed in Attachment 1.5 – Standards and Specifications of the Technical Requirements.

Station is one or more traffic monitoring sensors at a single location used to collect traffic volume, lane occupancy, and speed data on the Express Lanes.

Substandard Station is a Station whose weighted average speed over the a.m. or p.m. Peak Period falls below the minimum average operating speed defined for each degradation standard.

Timeliness Requirements are as defined in Attachment 4.5 of the Technical Requirements.

Toll Operations Center is defined in Section 3.15.8 of the Technical Requirements.

Traffic Operations Center is defined in Section 3.15.8 of the Technical Requirements.

Trail Blazer Roll Plan is a scaled signage plan or plans showing proposed, existing, or relocated static signs on highways, feeder roads, and other roadways notifying motorists of the access to the HOT Lanes.
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 1.3
Project Development Plans
Project Development Plans

General
A. The general requirements for Project Development Plans (PDPs) are noted in Section 1.3 of the Technical Requirements.


C. The PDPs shall comply with the requirements of the Agreement including the Technical Requirements, and shall ensure that when implemented, the Work covered by the Plans will comply with such requirements.

1.1 Developer Management Plan
A. The purpose of the Developer Management Plan is to provide the Department with a clear view of Project management approach undertaken by the Developer for all aspects and tiers of the Project. It shall clearly identify responsibilities and procedures for each Project management activity and demonstrate a thorough understanding of the Agreement and Project requirements.

B. The Developer Management Plan shall reference and consider all other PDPs and link their relevance to each other and to the management approach.

C. The Developer Management Plan is an umbrella document that describes the Developer’s managerial approach, strategy, and quality procedures to design, build, operate and maintain the Project and achieve all requirements of the Agreement. The Developer Management Plan shall include an organization chart outlining the basic structure of the Developer’s Project organization including well defined roles for the design, construction, operations and maintenance; sub-organizations (such as consulting, subcontractors, suppliers) and a description of the roles; relationship with the Department the Lender’s Independent Engineer, and third parties; organizational chart with responsibilities, professional qualifications, and Work to be accomplished by each member of the management team and each sub-organization, including identified subcontractors and suppliers.

D. The Developer Management Plan shall describe how all PDPs fit within the overall quality management system, responsibilities for developing and maintaining the plans and the schedule for implementation.

E. The Developer Management Plan shall address the Developer’s schedule and procedures for preparation of amendments and submission of amendments to any part of the PDP.

F. The Concession Management Plan shall be linked to the QMSP.
1.2 Document Management Plan
A. The Document Management Plan will define the document management approach for all Project documentation and will address:
   1) The document management system;
   2) Document management procedures;
   3) Requirements for records retention;
   4) Electronic and hardcopy data transmission, storage and sharing;
   5) A logical, auditable and Project-compatible tracking system of all Project correspondence and documents for all phases of the Project.
B. The Document Management Plan shall clearly define document management applicable to all aspects of the Project-management structure, tracking, updates, originator/recipient, document approvals tracking, searchable database, links amongst various documents, hard-copy and electronic filing.
C. The Document Management Plan shall be appropriately structured to consider roles and participation by the Department, the Lender’s Independent Engineer, Developer, and third parties participating and having input regarding the Project.
D. The Plan shall also provide for electronic data management and storage, and electronic access to project documents remotely, with the required electronic security procedures.
E. The Document Management Plan shall be linked to the QMSP.

1.3 Quality Management System Plan
A. The Quality Management System Plan (Q MSP) will define the quality management systems during the design, construction and operations and maintenance. The Developer shall or shall cause to be completed all quality assurance and quality control activities required to manage its own processes as well as those of its Contractors, and suppliers of any tier. The QMSP shall:
   1) Be fully compliant with the Department’s Minimum Requirements for Quality Assurance & Quality Control on Design-Build & Public-Private Transportation Act Projects – January 2012;
   2) Be developed consistent with ISO 9001 principles and clearly demonstrate how it will lead to continuing improvement;
   3) Define the Quality Management System roles and auditing responsibilities and procedures (internal and external);
   4) Establish quality objectives that are measurable and quantifiable;
   5) Provide an organizational chart with roles, responsibilities and professional qualifications applicable to all stages of the project;
   6) Describe how the relevant requirements of the contract will be met;
7) Integrate the services of the Lender’s Independent Engineer for selected portions of the Work;

8) Require any Contractor, or supplier employed by the Developer for design, construction, maintenance or operation activities to develop, implement and maintain a quality management system compatible with the requirements of the Agreement;

9) Be able to provide reports on quality with a tracking system, which at a minimum, includes:
   a) searchable data
   b) summary of inspection and quality control activities
   c) internal and external quality audits performed
   d) non-conformances and their status, such as quality item description; date opened; date closed; status (open, closed, pending, follow-up required); disposition (repair, reject, rework); status; corrective actions
   e) how the non-conformity has been accepted by the Department, if applicable
   f) updates the QMSP

10) Provide a means and procedure for “escalating” quality concerns of the Department or the Developer;

11) Provide a linkage amongst relevant Project Development Plans and address all quality-related items in those plans;

12) Provide a document management system;

13) Be updated regularly and produce a track-able record and reports of quality control, assurance and audits;

14) Explain the corrective action process for workmanship related quality issues in order to minimize the recurrence of such errors and quality problems.

1.4 Design Quality Management Plan

A. The Design Quality Management Plan (DQMP) shall provide the organization, relationship and procedures that define clear lines of responsibility and well defined approach for meeting Project requirements and innovation in design approach.

B. The Design Quality Management Plan shall be linked to the QMSP.

C. The Design Quality Management Plan shall define the design approach, flow charts and activities for the design of the Project and will address:
   1) The design organization, responsibilities and professional certification;
   2) A drawing tier indicating organization and hierarchy of the Developer’s drawings;
   3) The design basis (e.g. design criteria, design standards and specifications);
4) Design validation, ensuring that the intended design meets its intended use;

5) Stages where design reviews are conducted and design work is certified by appropriate design professionals, including Professional Engineers registered in the State;

6) Work zone and worker safety review during design;

7) Quality assurance and control;

8) The breakdown of the Project design into design packages;

9) The process the engineering consultants and subconsultants will use to design and seal each design package;

10) The system engineering process for the design of the systems components;

11) The proposed strategy for integrating the facilities and systems component into the design process; design deliverables;

12) Design control-design input reviews, output reviews and verifications (design checks and professional review and seals) to ensure requirements have been met;

13) Design changes;

14) Internal and external audits;

15) Document management;

16) Provide regularly updated quality records and a tracking record of all quality control, quality assurance and audit records and a log of items and how they have been addressed, such as conformance, non-conformance, corrective actions and preventative actions;

17) The process by which the Developer’s team, the Lender’s Independent Engineer, and the Department will be involved in the design review process;

18) Reporting and documentation mechanism;

19) Linkage to other relevant PDPs and the QMSP.

1.5 Construction Quality Management Plan

A. The Construction Quality Management Plan will define the construction approach and activities for the construction of the Project and will address:

1) The construction organization and responsibilities – including the contractors and subcontractors;

2) Roles and professional qualifications of persons responsible for various aspects of the project;

3) Outline of procedures and schedules;

4) Sequence of construction activities;

5) Project permitting and coordination with the Department and external agencies;
6) Safety during construction;
7) Site security and access;
8) Environmental management;
9) Quality as outlined in the QMSP, specific to the construction phase;
10) The breakdown of the Project construction into construction areas/segments;
11) The general construction sequence;
12) Site temporary facilities and storage areas;
13) Field equipment and materials management;
14) Coordination with other projects, stakeholders, and impact of permitting;
15) Compliance with the Agreement;
16) Reporting and documenting changes;
17) Industrial relation;
18) As-built documents;
19) Reporting and documentation mechanism;
20) The process for conducting all activities related to achieving Substantial Completion including the representative inspection and documentation verification steps of all parties;
21) Linkage to other relevant PDPs and the QMSP.

1.6 Environmental Management Plan

A. The Developer shall develop and implement a thorough approach to environmental management. The Developer shall or shall cause to be maintained and updated an Environmental Management Plan that shall include:

1) Procedures and a contingency plan (emergency response plan) for reporting, immediate actions, and Remedial Actions to be taken in the event of a potential environmental permit violation, dump, discharge, or spill of Hazardous Substances, including, as required by Law, the development and implementation of a Spill Prevention, Control and Countermeasures (SPCC) plan(s);

2) Plans for investigation, handling, monitoring, discharge, release, storage, removal, remediation transportation, tracking, reporting, and other disposition of any Hazardous Substance encountered or used on the Project, whether or not the presence of such Hazardous Substances constitutes a Hazardous Environmental Condition;

3) Plans for initiating Remedial Actions in respect of any Hazardous Substances encountered on or used on the Project that constitute or could reasonably be expected to constitute a Hazardous Environmental Condition;
4) Procedures for coordination with the Department and other emergency response-related agencies and organizations; and

5) Procedures for submission of “incident” reports for releases of Hazardous Substances.

B. The Environmental Management Plan shall include the procedure and the party responsible for obtaining the required Governmental Approvals, interface with Governmental Authorities, and identifying and controlling the permit conditions to assure environmental compliance.

C. The Environmental Management Plan shall define the environmental activities required during the design and construction of the Project and shall address:

1) Compliance (monitoring, control, follow-up and audits) with the environmental requirements and regulations;

2) Erosion and sediment control plans, including monitoring and approach to erosion and sediment control,

3) Stormwater management plans;

4) Stormwater pollution prevention plans;

5) Environmental impact avoidance, minimalization, and mitigation measures;

6) Identify environmental monitoring and recording requirements;

7) On-going monitoring and compliance records tracking system;

8) Compatible with ISO 19011:2004 Guidelines for Quality and/or Environmental Management Systems Auditing; and ISO 14001:2004 Environmental Management Systems- Specifications with Guidance for Use; and

9) Linkage to other relevant PDPs, including the QMSP.

1.7 ROW Acquisition and Relocation Plan

A. The ROW Acquisition and Relocation Plan will define the approach to acquisition of the Project ROW and will address:

1) The roles and responsibilities of the Developer and the Department for ROW acquisition;

2) The ROW acquisition process and procedures;

3) Applicable guidelines and Laws;

4) The ROW acquisition services;

5) Coordination with the Department and property owners;

6) ROW acquisition costs management;

7) The use of RUMS;

8) The utility acquisition and relocation schedule;
9) Environmental concerns;
10) Document management; and
11) Linkage with other relevant PDPs and the QMSP.

1.8 Utilities Plan

A. The Utilities Plan will define the utility coordination, adjustment, and relocation activities during the design and construction of the Project and will address:

1) The roles and responsibilities of the Developer, the Department, and Utility companies/owners;
2) Utility agency coordination plans and process;
3) The Utility Relocation and adjustment process;
4) Applicable guidelines, laws and regulation;
5) The application of prior rights and cost allocations;
6) The utility easement acquisition process;
7) Utility agreements including the Department Master Utility Agreement (“MUA”) and/or the development of Project specific utility relocation agreements;
8) Relocations and adjustments of utility facilities included in the Developer’s Contract;
9) Relocations and adjustments of utility facilities performed by the utility company or their contractor;
10) The coordination with the Developer, the Department, Utilities, Utilities’ designers, and contractors;
11) The identification and resolution of utility conflicts and interdisciplinary coordination;
12) The development and maintenance of a Utility tracking report;
13) The process for revising utility plan and estimates;
14) The process of payment of utility company progress and final billings.
15) The process for close out of utility relocations and processing as-built land use permit applications
16) Identify monitoring and recording requirements;
17) On-going monitoring and compliance records tracking system;
18) The roles and responsibilities related to Developer provided MOT services for utilities and/or their contractors.
19) Regularly updated impact on project schedule;
20) Reporting and documentation mechanism;
21) Linkage to other relevant PDPs and the QMSP.
1.9 Maintenance of Traffic (MOT) Plan

A. The Developer shall develop a MOT Plan pursuant to Section 1.9 of the Technical Requirements. The MOT Plan will consider the impact of construction activities on the access and egress of traffic to the I-66 Corridor within the immediate construction zone and provide for a proactive approach to address the impact of such activities on the traveling public and transit providers.

B. The MOT Plan shall be consistent with, and included as part of, the TMP for the Construction Period.

C. The MOT Plan shall include:
   1) Construction phasing plans (including diagrams and narratives) plans shall include temporary drainage design to minimize travel lane flooding and preventing damage to adjacent property during construction; erosion and sediment control plans;
   2) Detours and timeline schedules;
   3) Emergency access plans for first responders and facilities such as hospitals, police stations, and fire stations;
   4) Incident management coordination with the Department;
   5) A description of the Developer’s proposed approach for the development of detailed traffic control plans;
   6) Coordination with the Communications, Consultation, Public Outreach, and Community Engagement Plan for the dissemination of construction-related communications;
   7) A description of the process to be used for ongoing reviews of active work zones;
   8) A description of the process to ensure all persons responsible for design, implementation, and inspection of work zone traffic controls are trained adequately; and
   9) Coordination with other relevant PDP.

1.10 Communications Plan

A. The Developer is expected to develop and maintain an effective Communications Plan throughout the Project, including during the Operating Period. The Developer will deliver an integrated Communications, Consultation, Public Outreach, and Community Engagement Plan that at a minimum does the following:
   1) Provides an effective framework for communication between the Developer and stakeholders;
   2) Effectively engages the community in the design, construction and operation of the Project to minimize negative impacts, and maximize positive outcomes;
   3) Builds a strong and enduring relationship with stakeholders and the community within the I-66 Corridor over the life of the Project;
4) Identifies and manages risks associated with the Project;
5) Develops a strong and enduring brand relationship among the communities, I-66 Corridor drivers and the owners and operators of the Project;
6) Maximizes public awareness of features and benefits of the 66 Express Lanes;
7) Ensures the public understands how best to use the 66 Express Lanes, and the requirements for travel on the system;
8) Will be consistent with the goals for the Project;
9) Provides a detailed outline of communication tools and strategies to be employed during each phase of the Project development, delivery and operation, including:
   a) project branding
   b) market research and analysis
   c) media outreach
   d) stakeholder outreach and information
   e) department interface and liaison
   f) project communication team
   g) design-build phase—public information and involvement
   h) pre-operations phase—public education and awareness
10) Develop a Crisis Communications Plan and Procedures, addressing coordination with the Department and responsiveness to the media
11) Reporting and documentation mechanisms;
12) Linkage to other PDPs and the QMSP.

B. The Developer shall or shall cause to be developed a Public Information Plan (PIP) for the Work period as part of its overall Communication Plan.

C. The PIP will fit within the context of the broader Communication, Consultation, Public Outreach, and Community Engagement Plan and will address:

1) The identification of stakeholders and the outreach tactics that will be used to engage them
2) Training of relevant Project personnel in crisis communications, media relations and community outreach techniques
3) Development of a Community Engagement Program, outlining the approach to consulting with the community about design and construction matters, including:
   a) mechanism to engage and communicate applicable design and construction activities to the community
   b) communicate mitigation measures to directly impacted properties (dust, noise, access constraints, utility impacts, etc.)
c) hosting community information meetings to provide updated Project information as required

d) education and awareness related to public safety surrounding the work zone

4) The approach to communication with the public about construction activities, including:

a) notification of forthcoming construction activity to surrounding homes and businesses

b) commitment of key Project staff to participate in community outreach activities such as public meetings and media interviews

c) commit to provide information to assist VDOT in responding to inquiries received through VDOT’s various hotlines

d) facilitation and maintenance of Project signage, including information to pedestrians and cyclists, and Project branding and information

e) planning for and communicating project activities impacting the public, such as changes to traffic patterns and pedestrian or bicycle access.

5) Provision of information to motorists and stakeholders to facilitate the Maintenance of Traffic (MOT) during construction. This will include:

a) packaging of all MOT information, such as anticipated delays and lane closures, for provision to the Project Communication Team on a regular basis, to facilitate communication to the media, stakeholders and the broader community

b) communication with direct impact area property owners

c) communication with elected officials and other key stakeholders

d) coordination with local agencies

e) notification program to inform motorists and the broader community including bicyclists and pedestrians about expected traffic changes/delays (such as on-road signage, SMS and email alerts)

f) information to stakeholders about events in the area that may be affected by construction activities

6) Coordination of construction-related information for inclusion on all Project communication material as developed under the Communication, Marketing and Public Outreach Plan (including web, bulletins, etc.)

7) Management of construction site tours, including stakeholder events

8) Recording of Project progress through photography

9) Packaging and timely delivery to the Department of information on expected, major traffic changes for inclusion in the Department public advertising, online communications and media outreach programs. The Department will manage and
execute all advertising related specifically to construction-related lane closures and anticipated delays

10) Reporting and documentation mechanism

11) Linkage to other relevant PDPs and the QMSP.

1.11 DBE/SWaM Plan

A. The DBE/SWaM Plan will define the approach to meet the DBE/SWaM participation goal and will address:

1) The proposed method to achieve the DBE/SWaM participation goal or demonstrate a good faith effort to meet the goal;

2) A proactive DBE/SWaM outreach program for DBE/SWaM participation;

3) The reporting requirements to the Department regarding DBE/SWaM participation;

4) Regular updates on the progress in meeting DBE/SWaM requirements;

5) On-going tracking of efforts and corrective actions required and how they have been met;

6) Reporting and documentation mechanism; and

7) Linkage to the other PDPs and the QMSP.

1.12 Health, Safety and Security Plan

A. The Health, Safety and Security Plan will define the health, safety and security activities required during the design and construction of the Project and will address:

1) The health and safety policy for the Project;

2) The health and safety goals for the Project;

3) The organization and responsibilities of the various positions related to health, safety and security;

4) Construction occupational health and safety;

5) The Project health and safety rules and regulations;

6) Site security;

7) Documented procedures on meeting the health and safety requirements for the Developer and its Contractors and suppliers;

8) On-going tracking of efforts and corrective actions required and how they have been met;

9) Reporting and documentation mechanism;

10) Linkage to other relevant PDPs and the QMSP.
1.13 Operations and Maintenance Plan

A. The Operations and Maintenance Plan will identify the methods, systems and procedures whereby the Developer will comply with the operation and maintenance requirements of the Agreement.

B. It is intended to address routine and seasonal operation and maintenance planning and activities.

C. The Operations and Maintenance Plan shall be consistent with or include as its components, and address the following areas, consistent with the approach noted earlier for the PDPs during the design and construction phase:

1) Developer Management Plan
2) Document Management Plan
3) Quality Management System Plan
4) Life Cycle Maintenance Plan
5) Communication, Consultation, Public Outreach, and Community Engagement Plan (which includes Public Information Plan)
6) Environmental Management Plan
7) Transportation Management Plan
8) DBE/SWaM Plan
9) Health, Safety and Security Plan
10) Tolling operations and maintenance shall be addressed as a separate component of the Operations and Maintenance Plan

D. The Operations and Maintenance Plan shall address the following:

1) Organization structure including key operations and maintenance personnel and their responsibilities and level of authority;
2) Key suppliers and subcontractors;
3) Service delivery and operating procedures;
4) Incident management;
5) Inspection methods and inspection schedule;
6) Identification and scheduling of routine maintenance;
7) Stakeholder communication program;
8) Environmental complaince;
9) Site safety;
10) Emergency response;
11) Tolling operations and maintenance plan;
12) Documentation and reporting procedures;
13) An internal audit program and recording of findings, conformance, non-conformances, corrective actions and preventative actions;
14) Making available documentation for external audits;
15) Submission of quarterly reports indicating all activities and requirements as noted in Section 1.10-B of the Technical Requirements;
16) Submission of annual operations and maintenance report addressing the requirements in Section 1.10 B of the Technical Requirements.
17) Reporting and documentation mechanism;
18) Coordination with other projects; and
19) Linkage to other relevant PDPs and the QMSP.

1.14 Life Cycle Maintenance Plan (operations phase)
A. The Life Cycle Maintenance Plan shall address the following:
   1) The Life Cycle Maintenance Plan will be developed in accordance with Section 9.04 of the Agreement.
   2) The Life Cycle Maintenance Plan shall provide the procedures in place for successful management of maintenance, operation and handover of the assets to the Department
   3) The Life Cycle Maintenance Plan is intended to focus on non-routine maintenance, such as annual or seasonal maintenance, and provide a status of the assets under the control of the Developer.
B. The Life Cycle Maintenance Plan shall be updated annually and submitted to the Department for review and approval.
C. The Life Cycle Maintenance Plan shall clearly identify the life cycle maintenance activities planned, organization, implementation, and quality management measures.

1.15 Joint Operation and Maintenance Protocol (JOMP)
A. The JOMP will define the protocols for the operation and maintenance of 66 Express Lanes, consistent with all the requirements of the Agreement which shall include but not limited to the following:
   1) Operation and Maintenance Responsibility Matrix- Develop an Operations and Maintenance Responsibility Matrix in an excel spreadsheet format to include columns for responsible department; governing document / section; citation of governing document; oversight description, whether routine or extraordinary; whether a recurring task; frequency; responsible party; task of responsible party.
   2) Operation and Maintenance Plan
   3) Life Cycle Maintenance Plan
   4) Department and Developer key personnel contact list
5) Current Department’s Lane Closure Policy
6) Current copy of Performance Requirements of NOVA TAMS Contract
7) Emergency Access Protocol for Maintenance
8) Snow and Ice Removal Plans
9) Express Lanes Operational Responsibility Calendar- Create a monthly-based excel table/calendar from the Operation and Maintenance Responsibility Matrix and update when necessary, but at a minimum on an annual basis. Include in the monthly cells: the governing document; description of responsibility; and frequency throughout the year.

B. If any provision of this JOMP should be in conflict with any provision of the Agreement or any exhibits to the Agreement, then the Agreement or any such exhibit shall govern.

1.16 Service Commencement Plan

A. The Developer shall develop and submit a Service Commencement plan for Department review and approval. This plan shall include detail procedures and protocols to be followed by Developer for the conversion of the HOV lanes to Express Lanes. The Service Commencement Plan shall include but not limited to:

1) Opening Day Plan that outlines the detailed sequence of operations for service commencement. The changing operational rules from a completely free roadway system to a tolled roadway system require a sensitive opening process to minimize traveler frustration and confusion.

2) Sign Unveiling Plan that provides a detailed procedure for the unveiling of every type of sign including the dates on which these signs can be unveiled. This plan shall include plan sheets detailing signs to be unveiled, timeline and resources available for sign unveiling

3) Public Outreach and Marketing Plan that introduces drivers to new and changing signage. The plan shall include a plan for deployment of On-road signs to provide concise, simple messages about the Express Lanes’ opening to the public
Submission Timetable

Project Development Plans are to be developed to implementation status and updated in accordance with the following table, or earlier if required by the Project Agreements.

<table>
<thead>
<tr>
<th>Project Development Plan</th>
<th>PDP submission date for review by VDOT</th>
<th>Updates *</th>
<th>VDOT Review Input</th>
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<td>Developer Management Plan</td>
<td>TBD</td>
<td>Annually (during the Term)</td>
<td>Review and approve</td>
</tr>
<tr>
<td>Document Management Plan</td>
<td>TBD</td>
<td>Quarterly, if required (during the Construction Period)</td>
<td>Review and approve</td>
</tr>
<tr>
<td>Quality Management System Plan</td>
<td>TBD</td>
<td>Monthly reporting &amp; quarterly updates, if required (during the Construction Period)</td>
<td>Review and approve</td>
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<td>Design Quality Management Plan</td>
<td>Needs to be approved prior to first design package submittal</td>
<td>Quarterly, if required (during the Construction Period)</td>
<td>Review and approve</td>
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<td>Construction Quality Management Plan</td>
<td>TBD</td>
<td>Quarterly, if required (during the Construction Period)</td>
<td>Review and approve</td>
</tr>
<tr>
<td>Environmental Management Plan</td>
<td>TBD</td>
<td>Quarterly, if required (during the Construction Project); Annually, if required (during the remainder of the Term)</td>
<td>Review and approve</td>
</tr>
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<td>ROW Acquisition and Relocation Plan</td>
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<td>Review and approve</td>
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<td>Utilities Plan</td>
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<tr>
<td>Maintenance of Traffic Plan</td>
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<td>Communications, Consultation, Public Outreach and Community Education Plan</td>
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<td>Annually, if required (during the Term)</td>
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<tr>
<td>DBE/SWaM Plan</td>
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<td>Health, Safety and Security Plan</td>
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<td>Quarterly, if required (during the Construction Period); Annually, if required (during the remainder of the Term)</td>
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<tr>
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<td>Quarterly: Operations and Maintenance status and update</td>
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Plan reports. Annually: Operations and Maintenance Plan update and report on previous year activities

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<th>Plan</th>
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<td>Life Cycle Maintenance Plan (operations phase)</td>
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</tr>
<tr>
<td>JOMP</td>
<td>At Service Commencement</td>
<td>Annually Review</td>
</tr>
</tbody>
</table>

* Plans, records and logs shall be available for review by the Department on an ongoing basis in accordance with the Agreement. Changes as required will be in accordance with these Technical Requirements. The term “updates” in this column means updates to the already-approved PDPs.
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 1.5
Standards and Specifications
The standards, special provisions and reference guides applicable for the Construction Period shall be the version of those documents as noted herein below or those in effect as of final issuance of RFP, including all supplements, errata, revisions and interims. Following the Work period, all subsequent design and construction must meet the standards current at the time the Work is performed. Groupings of standards are for ease of reference only and certain reference documents have been included. It is the responsibility of the Developer to ensure that all relevant standards and specifications have been applied.

The Developer must verify and use the latest version of the documents listed herein. The Developer shall meet or exceed the minimum design standards and criteria.

1. Standards and References Documents

General

2. VDOT Materials Approved Lists
4. VDOT Post Construction Manual (August 2014)
5. VDOT Construction Inspection Manual (January 2015)
11. VDOT Land Use Permit Regulations 24 VAC 30-151 (3/17/2010)
13. VDOT Instructional & Information Memorandums (IIM) – All Divisions (as of date of RFP)
14. Draft VDOT Structure and Bridge Division’s Instructional and Informational Memorandum S&B-IIM-90.1 VDOT Modifications to AASHTO Standard Specifications for Structural supports for Highway Signs, Luminaires, and Traffic Signals (to be used in lieu of S&B-IIM-90)
15. Draft VDOT Structure and Bridge Division’s Instructional and Informational Memorandum S&B-IIM-81.6 Corrosion Resistant Reinforcing Steels (CRR) (to be
used in lieu of S&B-IIM-81.5) VDOT Traffic Engineering Division Memoranda, as of RFP Issued Date

16. VDOT Road and Bridge Standards, Vol. 1 and Vol. 2 (2008), including all revisions
17. VDOT Road and Bridge Specifications (2016)
19. 2010 ADA Standards for Accessible Design
22. VDOT Policy for Integrating Bicycle and Pedestrian Accommodations, adopted March 18, 2004 by the CTB
24. VDOT Manual of Instruction for Material Division (Revised November 2015) to include all associated memorandum
25. VDOT CADD Manual 2012 (Revised June 2015)
26. Revisions to VDOT CADD Manual
27. VDOT State Noise Abatement Policy (July 13, 2011)
31. Uniform Relocation Assistance and Real Property Act of 1970, as amended
32. 1950 Code of Virginia, Titles 25.1 and 33.1, as amended

Roadway Design
1. VDOT State Bicycling Policy Plan (September 2011)
2. VDOT Road Design Manual (all revisions as of July 2015)

Geotechnical and Pavement Design

1. VDOT Soil Design Parameters for Sound Barrier Walls, Retaining Walls and Non-Critical Slopes – April 14, 2011
2. VDOT Requirements for Geotechnical Investigation, Geotechnical Design and Minimum Pavement Sections for the I-66 Outside the Beltway Corridor Improvements Project, December 14, 2015.
6. VDOT Manual of Instruction for Material Division
8. FHWA 23CFR626 - Part 626 Pavement Policy

Structures

1. VDOT Manual of Structure and Bridge Division, Vol. V Series
3. AASHTO LRFD Bridge Design Specifications, 7th Edition, 2014; and VDOT Modifications
11. FHWA Guidelines for the Installation, Inspection, Maintenance and Repair of Structural Supports for Highway Signs, Luminaires, and Traffic Signals (March 2005), FHWA NHI 05-036
12. FHWA Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation’s Bridges, December 1995, including Errata sheets and Revisions
13. 23CFR625 - Design Standards for Highways
14. 23CFR630 Subpart B – Plans, Specifications, and Estimates
15. 23CFR650 - Subpart C – National Bridge Inspection Standards (“NBIS”)
16. Stage I - Plan Review Check List – August 2011 Draft
17. VDOT Structure and Bridge Stage I Report Summary Form
18. Virginia Department of Transportation Structure and Bridge Division Stage I - Report Template – January 7, 2004 Draft
19. Stage II - Plan Review Check List – July 1, 2011 Draft
20. AASHTO LRFD Guide Specifications for Pedestrian Bridges, 2nd Edition with 2015 Interim Revisions; and VDOT Modifications
22. AASHTO Guide for Protective Screening of Overpass Structures, 1990
28. AASHTO/NSBA Steel Bridge Collaboration Shop Detail Drawing Presentation Guidelines, G1.3 - 2002
31. gINT Manual
33. AASHTO Manual for Assessing Safety Hardware, 1st Edition
34. AASHTO/FHWA Joint Implementation Plan for the AASHTO Manual for Assessing Safety Hardware, 2009
39. VDOT Memorandum – Asbestos Containing Materials on Bridges – October 23, 2009
40. Virginia Department of Transportation Asbestos Inspection Procedures, dated May 4, 2004
41. Virginia Department of Transportation Asbestos Monitoring Procedures, dated May 4, 2004

Drainage
1. VDOT 2002 Drainage Manual (including current Errata Sheets) and revisions (Revised 7/2014)
4. 2013 BMP Standards and Specifications
7. FHWA Hydraulic Design Series Number 6 (HDS-6), River Engineering for Highway Encroachments, 2001
8. FHWA Hydraulic Engineering Circular Number 9 (HEC-9), Debris Control Structures – Evaluation and Counter Measures, 2005
10. FHWA Hydraulic Engineering Circular Number 14 (HEC-14), Hydraulic Design of Energy Dissipaters for Culverts and Channels, 2006
11. FHWA Hydraulic Engineering Circular Number 17 (HEC-17), The Design of Encroachments on Flood Plains Using Risk Analysis, 1981
17. FHWA Culvert Design for Aquatic Organism Passage, 2010
18. FHWA Culvert Inspection Manual, 1986
19. US Army COE, Hydrologic Modeling System (HEC HMS) Version 4.0
21. FEMA National Flood Insurance Program Regulations
22. US Army COE, River Analysis System (HEC RAS), Version 4.1
23. The Virginia SWM Law dated 2015 (as listed in the Code of Virginia)
24. The Virginia SWM Regulations dated 2015 (as listed in the Virginia Administrative Code)

Traffic Control Devices and Lighting
1. USDOT FHWA Standard Highway Signs
2. 2009 Manual of Uniform Traffic Control Devices (MUTCD), Revisions 1 and 2 (May 2012) and 2011 Virginia Supplement to MUTCD, Revision 1 (September 2013)
4. ANSI/IESNA RP-8-00 Roadway Lighting
6. Virginia Standard Highway Signs, Revision 1, January 2015

Miscellaneous
1. VDOT Survey Manual 2010 Edition
2. VDOT Guardrail Installation Training Manual (GRIT), Revised October 2010

ITS
1. Institute of Electrical and Electronics Engineer (IEEE) 802.3 Local and Metropolitan Area Networks
2. National Electric Manufacturers Association (NEMA) TS-4 Hardware Standards for Dynamic Message Signs (DMS) with NTCIP Requirements
4. National Transportation Communications for ITS Protocol (NTCIP)
5. VDOT Northern Region Operations ITS Architecture

2. Special Provision Copied Notes, Special Provisions, and Supplemental Sections

2. SU421000ASpecial Provision for Elastic Inclusion – June 24, 2003a
5. Virginia Department of Transportation Special Provision for Lightweight Aggregate – May 16, 2011
8. Virginia Department of Transportation Special Provision for Hydraulic Cement Concrete Operations for Massive Construction – March 3, 2010
9. Virginia Department of Transportation Special Provision for Asbestos Removal for Road Construction Demolition Projects – March 18, 2009
11. Virginia Department of Transportation Special Provision for Density Control of Embankments and Backfill, Revised – November 26, 2006
13. Virginia Department of Transportation Special Provision for Design-Build Tracking (DBT) Numbers – February 8, 2008
14. Virginia Department of Transportation Special Provision for Reflection Cracking Retardant Material (English Units) – March 22, 2010
15. Virginia Department of Transportation Special Provision for Sealing Cracks in Asphalt Concrete Pavement or Hydraulic Cement Concrete Pavements (Prior to Overlay) – October 19, 2014
17. S404G01-0412 Special Provision for Filling and Sealing Pattern Cracks in Concrete Decks and Overlays
18. Virginia Department of Transportation Special Provision for Shotcrete and Permanent Concrete Facing – June 6, 2011
19. Virginia Department of Transportation Special Provision for Secant Pile or Tangent Pile (Drilled Shaft) Walls – June 8, 2011
20. Virginia Department of Transportation Special Provision for Permanent Soil Nails – June 7, 2011
21. Virginia Department of Transportation Special Provision for Low Density Cementitious Fill – June 24, 2011
22. Virginia Department of Transportation Special Provisions for Mechanically Stabilized Earth Walls With Low Density Cementitious Fill (LDCF) – June 24, 2011
23. Virginia Department of Transportation Special Provision for Densified Aggregate Piers for Foundation Reinforcement – June 24, 2011
24. Virginia Department of Transportation Project-Specific Special Provision for Densified Cement-Treated/Grouted Aggregate Piers for Foundation Reinforcement – June 10, 2011
25. Special provision for Crushed Hydraulic Cement Concrete (CHCC) as Subbase and Aggregate base Material, October 1, 2015
26. Special provision for Needle-Punched, Non-Woven Geotextile Stabilization Fabric, October 1, 2015
29. Virginia Department of Transportation Special Provision for Wave Equation Analysis for LRFD for Design-Build and PPTA Contracts – December 10, 2009
30. c504c00-0708 Exposed Aggregate Finish
31. Special Provision for Architectural Finish, Concrete Form Liners And Color Stain Coating
32. Special Provision for Architectural Treatment, February 27, 2012
33. Special Provision for Mechanically Stabilized Earth Walls (Segmental Block Facing) for Design Build and PPTA Projects, December 17, 2012
34. Special Provision for Mechanically Stabilized Earth Walls (Concrete Panel Facing) for Design Build and PPTA Projects, December 17, 2012
35. Special Provision for Micropiles for Design Build and PPTA Projects, January 20, 2010
36. Special Provision for MSE Walls (Modular Cantilever Facing), December 10, 2009
37. Special Provision for Sound Barrier Walls, December 09, 2015
40. Special Provision for Removal of Asbestos from Bridge Structures, March 18, 2009
41. Special Provision for Asbestos-Containing Soil, February 2, 2000
42. S404B00-0708 Special Provision for Concrete Surface Color Coating
43. S407D00-0708 Special Provision for Metallization of Ferrous Metal Structures
44. Special Provision for Asbestos Removal And Neshap-Related Demolition Requirements For Structures On Design-Build Projects, June 22, 2009
45. SPCN for Waterproofing Coating, October 28, 2014
46. Special Provision for Inspection of Structures For Asbestos Containing Materials (ACM) On Design-Build Projects, June 22, 2009
47. Special Provision for Low Cracking Bridge Concrete, August 4, 2015
48. S303J00-0708 Special Provision for Turbidity Curtain
49. SS500A00-0708 Special Provision for Removal or Connection of Asbestos Pipe
50. c413d00-1214 Dismantling and Removing Existing Structures or Removing Portion of Existing Structures
1. Virginia Department of Transportation Special Provision for Use of Domestic Material –July 26, 2013 (S102CF2)
2. Predetermined Wage Rates (SF001AF)
3. Required Contract Provisions, Federal-Aid Construction Contracts (SF010DF)
4. Virginia Department of Transportation Special Provision Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity(Executive Order 11246)
5. Virginia Department of Transportation Special Provision Copied Notes c103i01 – Section 103- Award and Execution of Contracts
6. Virginia Department of Transportation Special Provision for Section 105.06 – Subcontracting (SU105001A)
7. Virginia Department of Transportation Special Provision Volatile Organic Compound (VOC) Emissions Control Areas (S107E03)
8. Virginia Department of Transportation Special Provision for Section 107.15 (S107HF1)
10. Virginia Department of Transportation Special Provision for CPM Progress Schedule for Category IV Projects (S108D00)
11. Virginia Department of Transportation Special Provision for Price Adjustment for Steel (S109D02)
12. Virginia Department of Transportation Special Provision for Optional Adjustment for Fuel (S109F01)
13. Virginia Department of Transportation Special Provision for Asphalt Material Price Adjustment S109G07
14. Virginia Department of Transportation Special Provision for Local and Veteran Hiring program for Design-Build Projects (S107K00 is for DBB and will need to be modified for DB projects. Don Silies of CD mentioned that this should be used on the I-66 project)

300

1. Virginia Department of Transportation Special Provision for Flowable Backfill – March 11, 2010 (S302G01)
2. Virginia Department of Transportation Special Provision for Rideability – October 1, 2015
3. Virginia Department of Transportation Special Provision Copied Notes c302h00 – Section 302.03(b) Precast Drainage Structures
4. Virginia Department of Transportation Special Provision for Pipe Rehabilitation (SU302001D)

5. Virginia Department of Transportation Special Provision for Pipe Replacement (SU302002A)

6. Virginia Department of Transportation Special Provision for Hot Mix Asphalt Patches (SU315003A)

7. Virginia Department of Transportation Special Provision for Sawing and Sealing Joints In Asphalt Overlays Over Jointed Concrete Pavement (SU315001A)

700


2. Preformed Thermoplastic Pavement Markings 11-29-11b

3. **Additional Reference Documents**
   1. FHWA Geotechnical Engineering Circular No. 2 - Earth Retaining Systems, FHWA-SA-96-038, 1996
   2. FHWA Geotechnical Engineering Circular No. 4 - Ground Anchors and Anchored Systems, FHWA-IF-99-015, 1999
   3. FHWA Geotechnical Engineering Circular No. 7 - Soil Nail Walls, FHWA-IF-03-017, 2003
   6. FHWA Geotechnical Engineering Circular No. 6, Shallow Foundations, September 2002, FHWA-SA-02-054
   8. FHWA Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Volumes I & II, November 2009, FHWA-NHI-10-024
   9. FHWA Drilled Shafts Construction Procedures and LRFD Design Methods, May 2010, FHWA NHI-10-016
   12. FHWA The Osterberg Cell for Load Testing Drilled Shafts And Driven Piles, FHWA-SA-94-035, 1994
13. Load and Resistance Factor Design (LRFD) For Highway Bridge Superstructures (April 2007), FHWA-NHI-08-048
14. Load and Resistance Factor Design (LRFD) for Highway Bridge Substructures (April 2007), FHWA-NHI-08-036
15. Load and Resistance Factor Design (LRFD) For Highway Bridge Superstructures - Examples (April 2007), FHWA-NHI-08-049
16. LRFD for Highway Bridge Substructures and Earth Retaining Structures (Jan 2007), FHWA-NHI-05-095
19. Earth Retaining Structures (RM), FHWA-NHI-07-071
21. Mechanically Stabilized Earth Walls And Reinforced Soil Slopes - Design And Construction Guidelines (March 2001), FHWA-NHI-00-043
22. VDOT NRO Change and Clearance Interval Data Collection Processing Best Practices (07-17-15)
23. VDOT NRO TEP – Clearance Intervals (02-28-13)
24. VDOT Preliminary Sub Example
25. VDOT NRO TEP – Pedestrian Timing at Traffic Signals (12-8-11)
28. VDOT Detector Placement (01-13-05)
29. VDOT NRO TEP – Pavement Marking at Intersections (July 20, 2012)
30. VDOT NRO TEP – Hatch Marks on Non-Limited-Access Roadways (April 17, 2015)
31. VDOT NRO TEP – Yellow Change and Red Clearance Intervals (July 24, 2015)
32. VDOT NRO – 2015 Bicycle Marking Reference Guide
33. American Water Works Association Standards
34. FHWA Hydrology Design Series No. 2, Highway Hydrology, 2002
35. FHWA Hydraulic Design Series No. 3, Design Charts for Open Channel Flow, 1961
36. FHWA Hydraulic Design Series No. 4, Introduction to Highway Hydraulics, 2008
37. FHWA Hydraulic Design Series No. 5, Hydraulic Design of Highway Culverts 2005
38. FHWA Hydraulic Engineering Circular No. 11, Design of Riprap Revetment, 1989
39. USDA, NRCS, Urban Hydrology for Small Watersheds, TR-55, June 1986
40. FHWA - A Guide for HOT Lane Development, March 2003
41. ITE TMDD - Traffic Management Data Dictionary and Message Sets for External TMC Communication (TMDD and MS/ETMCC)
42. VDOT DBE Program, March 15, 2007
43. Virginia Department of Transportation CII/SSI Policy Guide For Employees, Vendors, Contractor or other Persons Accessing VDOT’s CII/SSI – March, 2006 (Interim Revision November, 2009)
44. DMS Upgrade and Expansion Program Concept of Operations, February 25, 2008
45. VDOT NRO Vehicle Detector Master Plan, June 13, 2008
46. VDOT NRO CCTV Master Plan, May 2008
47. VDOT NRO CCTV Concept of Operations, May 2008
50. VDOT ITS Projects – Systems Engineering and Architecture Compliance (Rule 940) Checklist
51. Virginia Megaprojects Program Lane Closure Policy and Procedures, April 23, 2012

WMATA
1. WMATA Adjacent Construction Project Manual - September 16, 2013
3. WMATA – Standard Specifications - Release 9, Revision 3a - 2014
5. WMATA - Traction Power Substation – Updated Information – Standard Drawings for Supervisory Control and Data Acquisition (SCADA) – March, 2015
7. WMATA - Communications – Updated information – Design Criteria and Specifications, Rev 01.01 dated October 1, 2014
9. WMATA - K (Orange) -Line Traction Power Contact Rail Schematic Diagram and emergency Trip Stations, October 1989
10. WMATA - K (Orange) – Line Traction Power Feeder Cable Inventory, May, 2015
11. WMATA – K (Orange) – Line Track Charts, October 2000
12. WMATA – K99 (Orange) – WFC Line Track Charts, November 2000
13. WMATA 7000 Series Rail Cars Technical Specification - December 17, 2009

Norfolk-Southern
2. Norfolk-Southern Operating Guidelines for Contractors - effective April 19, 2010
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 1.8
Lane Closure Guidelines for Northern Virginia and Lane Closure Policy
attachment 1.8 lane closure guidelines for northern virginia and lane closure policy
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Attachments  
Attachment 1: Virginia I-66 Program Lane/Shoulder Closure Request Form  
Attachment 2: Roadway Lane and Shoulder Closures – I-66 Program  
Attachment 3: District Administrator Lane Closure Guidance Document
SECTION 1

1. Overview of Virginia I-66 Program Lane Closure Policy

1.1 Overview

This policy standardizes the lane closure management process for identifying the location, date, and time of all lane closures, shoulder closures, and work zones on all interstate, primary, and certain secondary roads within the Virginia I-66 Program construction zones.

It provides contact information for the appropriate public safety organizations; local, county, and state agencies; and project staff and media partners to notify them of the lane closures and work zones’ effective time restrictions and to facilitate community outreach within the MegaProjects corridors to avoid undue impacts to motorists.

Attachment 1 provides work hours and hours for roadway lane and shoulder closures for the Virginia I-66 Program.

1.2 Process

Contractors for the Virginia I-66 Program construction projects will use the Virginia I-66 Program Lane Closure Request Form (Attachment 1) to request either a lane or shoulder closure and submit it electronically to the Virginia I-66 Program Lane Closure Management Team and the respective VDOT Project Manager for approval. The work hours for these closures will comply with the contract agreements and the hours shown in Attachment 1 for the various types of closures. This process will facilitate the coordination between projects and identify lane/shoulder closing conflicts that may occur during the various project activities.

Normally, short term lane closures do not require Maintenance of Traffic (MOT) or Temporary Traffic Control Plans (TTCP). However, short term closures for bridge erection, major traffic shifts, detours or other significant or complex activity will require MOT or TTCP plans. When required, the Contractor will submit additional Maintenance of Traffic (MOT) information and/or approved traffic control plans (TCPs) (not applicable to the DCMP) in advance of submitting its lane closure requests. For the DCMP, VDOT shall review the TCPs and provide comments to the Contractor within 21 days of receipt of the project or 15 business days.

All requests will include sufficient information to support the local and regional public information programs describing the location, dates and times, nature of work, lanes to close, ramp closures, field point of contact, and detours (if any). The advance notification requirements for the type of lane closure requested are defined to support the coordination efforts within each project contract agreement.

The lane closure requests shall be submitted to the Traffic Operations Manager (Section 6 – Contact List) and the VDOT Project Manager by noon each Wednesday of the week before the lane closure is required. This allows the Lane Closure Management Team to review the request for time of work requirements and conflicting closures within the Virginia I-66 Program Program as well as to validate traffic operations and incident management impact(s) before submitting it to the VDOT Project Manager for a technical review. Once reviewed, the
Traffic Information Coordinator will input the lane closure information into the Lane Closure Advisory Management System (LCAMS). The Traffic Operations Manager will furnish the necessary information to the various outreach programs and Virginia I-66 Program staff as appropriate.

The Traffic Operations Manager will submit the request to the VDOT Project Manager for approval or disapproval. The respective VDOT representative(s) will review the Virginia I-66 Traffic Operations Manager’s recommendations and will either approve the request or return it to the Contractor for resubmission through the MegaProjects Traffic Operations Manager.

If conflicting lane closures are identified, the Lane Closure Management Team will notify the respective VDOT Project Manager to facilitate the resolution of conflicts between projects. Once the conflict is resolved, the VDOT Project Manager must notify the Traffic Operations Manager of the resolution and have the Contractor resubmit the lane closure request.

Lane closure approval/disapproval will be made within three (3) calendar days of receipt of the request from the Virginia I-66 Traffic Operations Manager. The Construction Project Management Schedule shall provide a rolling 2- or 3-week plan of the MOT project requirements.

Once approved, the Virginia I-66 Lane Closure Management Team will use LCAMS to convey approved lane closures to the VDOT Northern Region Operations Traffic Operations Center (NROTOC) for internal management and to the Virginia I-66 Program public affairs personnel for appropriate outreach to external parties, such as media, businesses, trucking associations, traffic reporting agencies, and community service agencies.
SECTION 2
2. Virginia I-66 Program Lane Closure Process

2.1 Lane Closure Types
Lane closures are classified into three types, in descending order of impact:

**Type 1**– A lane closure that would have a significant impact on traffic, such as stopping traffic completely, closing two or more lanes, 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.

**Type 2** – A lane closure that would have minor or no impacts on the flow of traffic, such as closing one lane on a four-lane freeway during off-peak hours or closing the service roads adjacent to Routes 7 or 123.

**Type 3** – A lane closure that would close a shoulder (right or left) on a freeway or ramp.

2.2 Advance Notification Requirements
Minimum/maximum advance notice requirements for closures within the contract approved lane closures hours are listed below:

<table>
<thead>
<tr>
<th>Lane Closure Type</th>
<th>Minimum Advance Notice</th>
<th>Maximum Advance Notice (Calendar Days)</th>
</tr>
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<tr>
<td>1</td>
<td>10 Days</td>
<td>21 Days</td>
</tr>
<tr>
<td>2</td>
<td>5 Days</td>
<td>14 Days</td>
</tr>
<tr>
<td>3</td>
<td>3 Days</td>
<td>14 Days</td>
</tr>
</tbody>
</table>

2.3 Advance Notification Limits
The Contractor’s working CPM schedule shall identify the activities that require lane and roadway closures. The Construction Managers and MOT team will review the schedule to ensure that the closure requested meets the objective of the project and will minimize traffic disruptions.

Lane closures or work that restricts traffic flow will not be permitted during the daytime hours on holidays from noon on the day before the holiday until noon the day after the holiday, unless approved by the VDOT Project Manager.

Failure to restore full traffic capacity within the time specified will result in a disincentive charge being assessed on the Contractor’s next month’s pay estimate, in conformance with the rates set in the I-66 Program Comprehensive Agreement. Restoration of traffic capacity shall mean the completion of all construction work, the removal of all traffic control devices...
and signs, and the removal of all workers, materials and equipment from the roadway, lane and/or shoulder.

The VDOT Project Manager has the right to direct the Contractor to modify, adjust or remove lane closures based on traffic or weather conditions.

2.4 State/County Police Support

The Contractor will be required to provide a uniformed, off-duty law enforcement officer with a marked law enforcement vehicle equipped with a blue flashing light for all nighttime work that is performed within the travel lanes. Provision of this service will be the responsibility of the Contractor for the I-66 project only.

When requesting police assistance from the Fairfax County Police Department, the Contractor shall coordinate all requests through the Fairfax County Police Department.

2.5 Lane Closure Request

The Contractor will submit a Virginia I-66 Program Lane Closure Request Form to the VDOT Project Manager and Virginia I-66 Program Traffic Operations Manager.

The request for a lane closure will be submitted in accordance with each project contract requirements which include Comprehensive Agreement project advance notification requirements for the type of the lane closure requested (Exhibit 1: Lane Closure Approval and Notification Process).

The Contractor shall submit the lane/shoulder closure requests electronically on the attached form or an approved alternate form (Attachment 1: Review and Approval of Lane Closure Request).

The VDOT Project Manager and Traffic Operations Manager will review all lane closure requests (Exhibit 1). The Traffic Operations Manager will review each request for conflicting closures or special events that may occur during the same time or location and for impacts to traffic operations and incident management. The Traffic Information Coordinator will verify work hours and compliance with any contract requirements. The Traffic Operations Manager will review the proposed closure to verify compliance against contract MOT plans and approved TCP, and to coordinate proposed closures with Virginia I-66 Program personnel.

If the contractor deviates from the contract approved lane closures hours, the contractor shall prepare a traffic analysis to assess the traffic impacts in advance of the lane closure requests being submitted. Traffic analysis and modeling shall also be required for all construction activities requiring a detour, requiring closure of multiple lanes, or deviating in any way from Approved Final Construction MOT phasing. The contractor shall provide adequate justification for the deviation of approved hours or MOT phasing is required which should include but not limited to the following information:

1. Justification to determine if this option is the only practical option.
2. Provide list of other options that have been considered.
3. What mitigation and backup plans will be in place?
4. Develop detour plan.
5. Public outreach plan to start a month prior to closure.

6. Plan for coordination with localities a month prior to closure.

7. Provide evidence of how implementing this option will minimize the duration of construction activities and lane closures.

Once the revised lane closures hours of operations have been approved, the project and contractor traffic operations staff must implement the coordination and outreach plan at a minimum 3 weeks in advance of the implementation of major closures.

2.6 Notification of Lane Closures

The Traffic Information Coordinator will provide the following stakeholders current information regarding approved lane closures planned within the project limits. The names, phone numbers and email addresses are in Section 6.

**Departments of Transportation**
- VDOT District Office
- VDOT- NROTOC
- Maryland State Highway Administration’s Coordinated Highway Action Response Team (CHART)
- District of Columbia DOT

**Virginia I-66 Program Communications Team - City, County, State and other agencies**
- Police Agencies
- City of Alexandria
- City of Fairfax
- Fairfax County
- National Park Service (U.S. Dept. of Interior)
- Maryland
- Washington Metropolitan Area Transit Authority
- Fire and Rescue Departments
- Arlington County Public Works
- Fairfax County Public Works
- Schools
- I-95 Corridor Coalition
- Traffic reporting agencies
- Trucking associations
- Adjacent construction projects
- Prince William County
- Fauquier County
- Loudoun County
- Transit
- Town of Haymarket
- Metropolitan Area Transportation Operations Coordination (MATOC)
Exhibit 1 - Lane Closure Approval and Notification Process

Requests for lane closures provided by contractor in accordance with the contract advance notification requirements to the VDOT project manager and the I-66 GEC Traffic Operations Manager.

- **Submit Request**
  - VDOT Project Manager
  - Response approval or disapproval

- **Recommend for approval or disapproval**

- **Return for resubmission if disapproved**

- **Lane Closures Management Team** will input LCR information into LCAMS.

**Notification**

- Public Affairs Information
- Virginia I-66 GEC Staff
- VDOT TOC

**Local Governments:**
- Fairfax County
- Fairfax City
- Town of Vienna
- Arlington County
- Prince William City
- Town of Haymarket
- DDOT
- City of Alexandria

**Other Stakeholders**

- Media Outreach
- Traffic reporting agencies
- Trucking Assoc.
- Community service agencies

- Law Enforcement
  - VSP
  - Local Police
SECTION 3
3. Virginia I-66 Program Lane Closure Restrictions

3.1 General Restrictions
Lane closure requests will be submitted to comply with the work hour restrictions specified in Attachment 1 (I-66 Program). Requests shall include any pertinent information or TCPs if required.

Lane closures or traffic restrictions will not be permitted during the daytime hours from noon the day before a holiday until noon the day after the holiday, unless otherwise stated in the contract documents or approved by the VDOT Project Manager.

When a holiday falls on a Friday, lane closures are not permitted from noon Thursday to noon Monday. The Annual holiday schedule is presented in Section 4 and will be updated annually.

When a holiday falls on a Monday, lane closures are not permitted from noon Friday to noon Tuesday.

When a holiday falls on a Sunday, lane closures are not permitted from noon Friday to Noon on Monday.

VDOT reserves the right to monitor traffic conditions affected by the work and to implement additional restrictions as necessary (for example, terminate a lane closure early). Additional restrictions for other holidays or special local events may be necessary.

In case of an emergency or accidents, the construction access lanes on the shoulder within the project or lane closure limits should be available when feasible for emergency vehicles.

A shoulder cutout area—nominally 10 feet by 200 feet—should be deployed for every continuous 2,000 feet of shoulder closure to provide a place for disabled vehicles.

The Contractor shall notify the VDOT NROTOC at the starts of lane closure set up and once the the closure is completely removed at (703) 877-3450.

The VDOT Project Manager has the right to modify, adjust or remove lane closures based on traffic and weather conditions.

The Virginia I-66 Program Traffic Information Coordinator shall notify the Traffic Operations Manager and representatives from Virginia State Police, VDOT NROTOC, and MD SHA State Operation Center of a lane closure cancellations or delays.

3.2 Inclement Weather Restrictions
VDOT may restrict the implementation of lanes closures as result inclement weather that may include heavy rains, icy road conditions and heavy snow events. These restriction are necessary for the safety of the traveling public and workers treating the roadways. The following table are the lane closure restrictions during winter inclement weather events.
Exhibit 2 – Lane Closure Weather Restrictions

<table>
<thead>
<tr>
<th>Weather Forecast</th>
<th>Mob. Level</th>
<th>VDOT Response Plan</th>
<th>I-66 Program Restrictions</th>
</tr>
</thead>
</table>
| **Precipitation:** 20% or Greater  
**Accumulation:** Ice/Snow Possible  
**Ambient or Pavement Temp:** 30-36 | Anti-Ice | Springfield Interchange, Spot Treatment of Other Critical Structures & Locations | Lane closures permitted but must allow VDOT to treat the roads |
| **Precipitation:** 20-49% or greater  
**Accumulation:** Snow Possible  
**Ambient or Pavement Temp:** 30-36 | Skeleton Crews | Spot Treatment of Critical Structures & Locations  
Respond to Icy Conditions As needed | Lane closures permitted but must allow VDOT to treat the roads |
| **Precipitation:** 20-49% or greater  
**Accumulation:** Snow Possible  
**Ambient or Pavement Temp:** 30-36 | 1 | Springfield Interchange, Spot Treatment of Other Critical Structures & Locations | Lane closures are permitted on case by case basis with prior approval |
| **Precipitation:** 50-100% Chance  
**Accumulation:** Up to 1 inch of snow  
**Ambient or Pavement Temp:** 25-29 | 2 | Light Salting Operation; Limited Work in Subdivisions. Includes Cold Spot Treatment in Subdivisions & Gravel Roads | No lane closures permitted on major roadways. |
| **Precipitation:** 50-100% chance  
**Accumulation:** Up to 2 inches of snow or up to 1/10 inch of ice  
**Ambient or Pavement Temp:** 20-24 | 3 | Salting Operation; Potential for Plowing; Includes Cold Spot Treatment in Subdivisions & Gravel Roads | No lane closures permitted on any roadways. |
| **Precipitation:** 50-100% chance  
**Accumulation:** Up to 6 inches of snow or up to 1/4 inch of ice  
**Ambient or Pavement Temp:** 15-19 | 4 | Salting/Plow Operation; Includes Plowing Subdivisions & Sanding as Necessary | No lane closures permitted on any roadways. |
| **Precipitation:** 50-100% chance  
**Accumulation:** More than 6 inches of snow or more than 1/4 inch of ice  
**Ambient or Pavement Temp:** 10-14 | 5 | Salting/Heavy Plow Operation; Includes Plowing Subdivisions & Sanding as Necessary. **ALL RESOURCES ARE DEPLOYED!** | No lane closures permitted on any roadways. |

The contractor requesting lane closures during the period the restriction are in place must submit the LCR to the Traffic Information Coordinator for consideration for approval one day in advance.
SECTION 4

4. Virginia I-66 Program Lane Closure Holidays

2016 HOLIDAY SCHEDULE

<table>
<thead>
<tr>
<th>HOLIDAY</th>
<th>DATE</th>
<th>DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Year’s Day</td>
<td>January 1, 2016</td>
<td>Friday</td>
</tr>
<tr>
<td>Martin Luther King Day</td>
<td>January 18, 2016</td>
<td>Monday</td>
</tr>
<tr>
<td>President’s Day</td>
<td>February 15, 2016</td>
<td>Monday</td>
</tr>
<tr>
<td>Easter Sunday (Weekend)</td>
<td>March 25-27, 2016</td>
<td>Sunday</td>
</tr>
<tr>
<td>Memorial Day</td>
<td>May 30, 2016</td>
<td>Monday</td>
</tr>
<tr>
<td>Independence Day</td>
<td>July 4, 2016</td>
<td>Monday</td>
</tr>
<tr>
<td>Labor Day</td>
<td>September 5, 2016</td>
<td>Monday</td>
</tr>
<tr>
<td>Columbus Day</td>
<td>October 10, 2016</td>
<td>Monday</td>
</tr>
<tr>
<td>Veterans Day</td>
<td>November 11, 2016</td>
<td>Friday</td>
</tr>
<tr>
<td>Thanksgiving Day</td>
<td>November 24, 2016</td>
<td>Thursday</td>
</tr>
<tr>
<td>Day after Thanksgiving</td>
<td>November 25, 2016</td>
<td>Friday</td>
</tr>
<tr>
<td>Christmas Day</td>
<td>December 25/26, 2016</td>
<td>Sunday/Monday</td>
</tr>
</tbody>
</table>

When a holiday falls on a Friday, lane closures are not permitted from noon on Thursday to noon on Monday. When a holiday falls on Monday, lane closures are not permitted from noon on Friday to noon on Tuesday. Further, as the Thanksgiving Day holiday occurs on a Thursday, work will not be permitted from noon on Wednesday until 9:30 am on the following Monday.

VDOT may adjust lane closure times to accommodate shopping seasons associated with the aforementioned holidays.
SECTION 5
5. Virginia I-66 Program Lane Closure Information

The following information is required when submitting a lane closure request for approval (Attachment 1):

1. Highway: Highway number designation
2. Project Number: (If applicable)
3. Direction: West/East or North/South
4. Lane closure type: 1, 2 or 3 (see Section 2)
5. Date(s) Scheduled: Date/time from/to
6. Nature of work: boring, milling or asphalt overlay, etc. (use plain English for description)
7. Limits: location of beginning and end points
8. Number of lanes on roadway
9. Lanes/shoulders to be closed: (specify left, right, middle, left middle, right middle or shoulder)
10. Ramp location to be closed
11. Point of contact (POC): (Field Inspector Name)
12. POC telephone number
13. Type of Typical Traffic Control: TTC from Virginia Work Area Protection Manual
14. Traffic Control Plan required: (Any TCP deviating from TTC from the VAWAPM) Yes or No
15. TCP Approved - Yes or No and Approved TCP number
16. Any detours required: Provide details of detour route
17. Notes: Any other pertinent information that may be needed to facilitate closures
18. Police request: Yes or No; number of troopers/officers requested
19. Traffic Operations Manager review: Signature
20. Traffic Operations Manager recommendation: Approved or disapproved
21. VDOT Project Manager Approval: Signature
The coordination of all work zones related to the Virginia I-66 Program requires an extensive effort to coordinate and notify major stakeholders such as local, county and state agencies project staff and media partners. The following is the contact information for these groups:

**VDOT NRO Transportation Operations Center**
Candice Gibson  
Office: 571-350-2060  
Email: Candice.Gibson@VDOT.Virginia.gov

Transportation Operations Center  
Office: 703-877-3450  
Email: NROSTC@VDOT.Virginia.Gov

**Maryland SHA District 3**
TOC-3  
Office: 301-345-7130  
Fax: 301-735-1693

**Maryland Traffic Operations Center-CHART**
TOC  
Office: 410-582-5605  
Fax: 410-582-9853

**Media and Public Affairs**
Michelle Holland  
Office: 571-483-2591  
Email: michelle.holland@vdot.virginia.gov

**State and Local Fire and Police Departments**

**Fairfax County**
Richard McEachin  
Office: 703-280-0558  
Cell: 571-238-2972  
Email: Richard.mceachin@fairfaxcounty.gov

Battalion Chief John Price  
Office: 703-573-6409  
Email: John.Price@fairfaxcounty.gov

**Prince William County**
Sgt HC Oyler  
Office: 703-792-5086  
Email: hoyler@pwcgov.org

**Fairfax County Fire & Rescue**
Capt. Brian Edmonston  
Email: Brian.Edmonston@fairfaxcounty.gov

**Prince William County Fire & Rescue**
Shawn Crispin  
Office: 703-792-4724  
Email: scrispin@pwcgov.org

**Virginia State Police**
Contact: Capt. James DeFord  
Office: 703-803-2617  
Email: James.Deford@vsp.virginia.gov

Contact: 1st Sgt. Neil Johnson  
Office: 703-323-4524  
Email: Neil.Johnson@vsp.virginia.gov

**Maryland State Police**
Contact: Duty Officer  
Office: 301-568-8101  
Fax: 301-735-1693

**Others (Need to verify contact info)**

**Virginia Trucking Association**
Contact: Dale Bennett  
Phone 804-355-5371  
Fax: 804-358-1374  
Email: dbennett@vatrucking.org

**Maryland Motor Truck Association**
Contract: Anne Ferro  
Phone 410-644-2537  
Fax: 410-644-2537  
Email: aferro@mmtanet.com

**American Trucking Association**
Contact: Clayton Boyce  
Phone 703-838-7935 ext. 1895  
Fax: 703-684-4326  
Email: cboyce@trucking.org
Traffic Reporting Agencies
(Need to verify contact info)

Rachel Crowson
Metronetworks News Director
Office: 301-628-2712
Email: rachel_crowson@metronetworks.com

Ron Balcerek
Clear Channel Communications
Email: RonBalcerek@clearchannel.com

Virginia I-66 Program Lane Closure Management
Traffic Information Coordinator
TBD
Phone: TBD
Email: TBD

I-66 Project Manager
TBD (Approving Authority)
Phone: TBD
Email: TBD

Virginia I-66 Program VDOT Program Management
VDOT Regional Transportation Program Director
Susan Shaw
Phone: 703-259-1995
Email: Susan.Shaw@vdot.virginia.gov

GEC Program Management
TBD, Program Manager
Phone: TBD
Email: TBD

I-66 Project Manager
TBD (Approving Authority)
Phone: TBD
Email: TBD
Attachment 1: Virginia I-66 Program Lane/Shoulder Closure Request Form

Date of Request:__________

Highway: _______________________________ Project No: _______________________________

Direction: _______________________________ Lane Closure Type: _______________________________

Date(s) Scheduled: _______________ Time: From: _______________ _______________

Nature Of Work: _________________________________________________________

Limits: ________________________________________________________________

Existing Lanes: _______________________________ Lanes/Shoulder Closed: _______________________________

Ramps Closed: __________________________________________________________

Point of Contact: _______________________________________________________

POC Telephone number: ________________________________________________

Type of TTC: __________________________________________________________

TCP Required: ☐ Yes ☐ No TCP No: _______________________________

TCP Approved: ☐ Yes ☐ No _______________________________________________

Detour: ______________________________________________________________

Notes: _________________________________________________________________

___________________________________________________________

Police Present: ☐ Yes ☐ No No. Of Troopers/officers: _______

Traffic Operations Manager Review: __________________________________________

Traffic Operations Manager Recommends: ☐ Approval ☐ Disapproval of Request

VDOT Approval: ________________________________________________________

13
<table>
<thead>
<tr>
<th>Lane Closure</th>
<th>Minimum</th>
<th>Maximum Advance Notice</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10 Days</td>
<td>21 Days</td>
</tr>
<tr>
<td>2</td>
<td>5 Days</td>
<td>14 Days</td>
</tr>
<tr>
<td>3</td>
<td>3 Days</td>
<td>14 Days</td>
</tr>
</tbody>
</table>
**Temporary Roadway Closures**: To facilitate construction and minimize inconvenience to the public, the Contractor/concessionaire is advised of the following closure limitations:

### Table 1.8a: Roadway Lane and Shoulder Closures

<table>
<thead>
<tr>
<th>WEEKDAY</th>
<th>Eastbound</th>
<th>Westbound</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTERSTATE 66</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Single-Lane Closures or Shoulder</strong></td>
<td><strong>Two-Lane Closures</strong></td>
<td><strong>Multiple-Lane Closures</strong></td>
</tr>
<tr>
<td><strong>Segment 1</strong></td>
<td>West of US 15 to US 29 (at Exit 43)</td>
<td>10:00 AM to 3:30 PM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8:00 PM to 5:30 AM</td>
</tr>
<tr>
<td><strong>Segment 2</strong></td>
<td>US 29 (at Exit 43) to US 29 (at Exit 52)</td>
<td>10:00 AM to 3:30 PM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8:00 PM to 5:00 AM</td>
</tr>
<tr>
<td><strong>Segment 3</strong></td>
<td>US 29 (at Exit 52) to US 50</td>
<td>11:00 AM to 3:30 PM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8:00 PM to 5:00 AM</td>
</tr>
<tr>
<td><strong>Segment 4</strong></td>
<td>US 50 to East of Beltway (b)</td>
<td>11:00 AM to 3:30 PM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(c)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9:00 PM to 5:00 AM</td>
</tr>
</tbody>
</table>

**Consider opening shoulder lane, where Applicable**

---

**All lanes open at 12:00 noon on Friday**
<table>
<thead>
<tr>
<th>WEEKEND</th>
<th>Eastbound/Westbound</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Segments</strong></td>
<td>Single-Lane Closures or Shoulder</td>
</tr>
<tr>
<td>Friday to Saturday</td>
<td>9:00 PM to 9:00 AM</td>
</tr>
<tr>
<td>Saturday to Sunday</td>
<td>9:00 PM to 9:00 AM</td>
</tr>
<tr>
<td>Sunday to Monday</td>
<td>8:00 PM to 5:00 AM</td>
</tr>
</tbody>
</table>

**Single-Lane Closures** or Shoulder

<table>
<thead>
<tr>
<th>ARTERIAL</th>
<th>WEEKDAY</th>
<th>WEEKEND</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LIMITED ACCESS HIGHWAY (c)</strong></td>
<td>Monday to Thursday</td>
<td>Friday</td>
</tr>
<tr>
<td></td>
<td>10:00 AM to 3:00 PM</td>
<td>9:30 AM to Noon</td>
</tr>
<tr>
<td></td>
<td>10:00 PM to 5:00 AM</td>
<td>10:00 PM to 9:00 AM</td>
</tr>
<tr>
<td></td>
<td>10:00 PM to 6:00 AM</td>
<td>10:00 PM to 8:00 AM</td>
</tr>
<tr>
<td></td>
<td>10:00 PM to 5:00 AM</td>
<td>10:00 PM to 5:00 AM</td>
</tr>
<tr>
<td><strong>MAJOR ARTERIALS (d)</strong></td>
<td>Monday to Thursday</td>
<td>Friday</td>
</tr>
<tr>
<td></td>
<td>9:00 AM to 3:00 PM</td>
<td>9:00 AM to Noon</td>
</tr>
<tr>
<td></td>
<td>9:30 PM to 5:00 AM</td>
<td>9:00 PM to 9:00 AM</td>
</tr>
<tr>
<td></td>
<td>10:00 PM to 5:00 AM</td>
<td>10:00 PM to 5:00 AM</td>
</tr>
<tr>
<td></td>
<td>10:00 PM to 6:00 AM</td>
<td>10:00 PM to 6:00 AM</td>
</tr>
<tr>
<td></td>
<td>10:00 PM to 5:00 AM</td>
<td>10:00 PM to 5:00 AM</td>
</tr>
<tr>
<td><strong>ALL OTHER ROADWAYS</strong></td>
<td>Monday to Thursday</td>
<td>Friday</td>
</tr>
<tr>
<td></td>
<td>9:00 AM to 3:00 PM</td>
<td>9:00 AM to Noon</td>
</tr>
<tr>
<td></td>
<td>9:00 PM to 5:00 AM</td>
<td>9:00 PM to 9:00 AM</td>
</tr>
</tbody>
</table>

**Multiple-Lane Closures**

<table>
<thead>
<tr>
<th>ARTERIAL</th>
<th>WEEKDAY</th>
<th>WEEKEND</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LIMITED ACCESS HIGHWAY (c)</strong></td>
<td>Monday to Thursday</td>
<td>Friday</td>
</tr>
<tr>
<td></td>
<td>10:00 PM to 5:00 AM</td>
<td>Not allowed until 11:00 PM</td>
</tr>
<tr>
<td></td>
<td>11:00 PM to 5:00 AM</td>
<td>11:00 PM to 5:00 AM</td>
</tr>
<tr>
<td></td>
<td>11:00 PM to 6:00 AM</td>
<td>11:00 PM to 5:00 AM</td>
</tr>
<tr>
<td></td>
<td>10:00 PM to 6:00 AM</td>
<td>10:00 PM to 5:00 AM</td>
</tr>
<tr>
<td><strong>MAJOR ARTERIALS (d)</strong></td>
<td>Monday to Thursday</td>
<td>Friday</td>
</tr>
<tr>
<td></td>
<td>10:00 PM to 5:00 AM</td>
<td>Not allowed until 10:00 PM</td>
</tr>
<tr>
<td></td>
<td>11:00 PM to 5:00 AM</td>
<td>11:00 PM to 5:00 AM</td>
</tr>
<tr>
<td></td>
<td>11:00 PM to 6:00 AM</td>
<td>11:00 PM to 5:00 AM</td>
</tr>
<tr>
<td></td>
<td>10:00 PM to 6:00 AM</td>
<td>10:00 PM to 5:00 AM</td>
</tr>
<tr>
<td><strong>ALL OTHER ROADWAYS</strong></td>
<td>Monday to Thursday</td>
<td>Friday</td>
</tr>
<tr>
<td></td>
<td>9:00 PM to 5:00 AM</td>
<td>Not allowed until 10:00 PM</td>
</tr>
<tr>
<td></td>
<td>10:00 PM to 6:00 AM</td>
<td>10:00 PM to 5:00 AM</td>
</tr>
</tbody>
</table>
### INTERSTATE 495 (BELTWAY)

#### WEEKDAY

<table>
<thead>
<tr>
<th>Segment 1</th>
<th>A. L. Bridge to Springfield Interchange</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner Loop</td>
<td>Single-Lane Closures or Shoulder</td>
</tr>
<tr>
<td></td>
<td>10:00 AM to 3:00 PM</td>
</tr>
<tr>
<td></td>
<td>9:30 PM to 5:00 AM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Segment 2</th>
<th>Springfield Interchange to W.W. Bridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner Loop</td>
<td>Single-Lane Closures or Shoulder</td>
</tr>
<tr>
<td></td>
<td>10:00 AM to 3:00 PM</td>
</tr>
<tr>
<td></td>
<td>9:30 PM to 5:00 AM</td>
</tr>
</tbody>
</table>

All lanes open at 12:00 noon on Friday

### INTERSTATE 495 (BELTWAY)

#### WEEKDAY

<table>
<thead>
<tr>
<th>Segment 1</th>
<th>A. L. Bridge to Springfield Interchange</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer Loop</td>
<td>Single-Lane Closures or Shoulder</td>
</tr>
<tr>
<td></td>
<td>9:30 AM to 2:30 PM</td>
</tr>
<tr>
<td></td>
<td>9:30 PM to 5:00 AM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Segment 2</th>
<th>Springfield Interchange to W.W. Bridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer Loop</td>
<td>Single-Lane Closures or Shoulder</td>
</tr>
<tr>
<td></td>
<td>10:00 AM to 3:00 PM</td>
</tr>
<tr>
<td></td>
<td>9:30 PM to 5:00 AM</td>
</tr>
</tbody>
</table>

All lanes open at 12:00 noon on Friday

### WEEKEND

<table>
<thead>
<tr>
<th>Inner/Outer Loop</th>
<th>Single-Lane Closures or Shoulder</th>
<th>Multiple-Lane Closures</th>
<th>Complete Road Closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friday to Saturday</td>
<td>10:00 PM to 8:00 AM</td>
<td>11:00 PM to 7:00 AM</td>
<td>12:00 AM to 5:00 AM</td>
</tr>
<tr>
<td>Saturday to Sunday</td>
<td>10:00 PM to 9:00 AM</td>
<td>11:00 PM to 8:00 AM</td>
<td>12:00 AM to 5:00 AM</td>
</tr>
<tr>
<td>Sunday to Monday</td>
<td>9:30 PM to 5:00 AM</td>
<td>11:00 PM to 5:00 AM</td>
<td>12:00 AM to 5:00 AM</td>
</tr>
</tbody>
</table>

### EXPRESS LANES

<table>
<thead>
<tr>
<th>Single-Lane Closures or Shoulder</th>
<th>Complete Road Closure **</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEEKDAY</td>
<td>9:30PM (Sunday to Thursday) to 4:00AM (Monday to Friday)</td>
</tr>
<tr>
<td>WEEKEND</td>
<td>11:00PM (Friday to Saturday) to 9:00AM</td>
</tr>
</tbody>
</table>
**  Complete Road Closure on 66 Express Lanes for 30 minutes or less

(a) Complete Road Closures: 20 minutes maximum or a time frame approved by the Department 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

(b) Multiple lane closures shall utilize the Auxiliary travel (shoulder) Lane, as approved by the Department, per the lane closure approval process. The Auxiliary travel (shoulder) Lane shall be treated as a travel lane only.

(c) Limited Access Highways are defined as high speed high volume roadways with limited access, such as Rt. 234 Bypass, Rt. 286, and Rt. 28.

(d) Major Arterials are defined as Primary Roads, high volume Secondary Roads, and all other routes that connect directly to Interstates, such as US.15, US.29, US 50, Rt.123, Rt.234, Rt. 243, Gallows Road, Stringfellow Road.

(e) The Developers must maintain three lanes of traffic during daytime hours as permitted per Table 1.8a,
   • Single-lane closures are only permitted for multiple-lane roadways
   • Two lanes and multiple lanes closure shall not be permitted West of US 15 or East of Beltway
   • Long-term closures of the shoulders adjacent to the general purpose lanes are allowable pursuant to the Agreement.

Some roadway closures will require coordination and permit with the agency having jurisdiction over the roadway.
Attachment 3: **District Administrator Lane Closure Guidance**
MEMORANDUM

Date: March 23, 2012
To: Assistant District Administrators
Section Heads
Subject: Lane Closures

Our staff has worked hard through the personnel changes of the last few years to focus on and ensure successful outcomes with a full design, construction, and maintenance workload. However, I believe because of the higher personnel turnover we have lost some of our base of corporate knowledge during this time.

One basic area needing reemphasis is lane closure management. In the past nine months, we have had a number of cases where a lane has been closed during peak or near peak travel times. These cases have at times involved most if not all of the functional areas from design through construction or maintenance. Please review and emphasize the following guidelines with your sections, our consultants, maintenance contractors, and permittees:

1. Taking a lane during or near the peak period is an absolute last resort. It is a last resort because we don’t want the “cure” to be worse than the disease. It is even less desirable when the closure is on an Interstate/Primary/High Volume Secondary, in the dominant direction, lasts longer than a few days, and there hasn’t been a media blitz starting a minimum of 10 to 14 days in advance of the planned closure.

2. Additionally, unless it is an emergency, the recommendation to do a closure during peak period needs to be presented to the Assistant District Administrator responsible for the action well prior to the contract being submitted or the closure being planned.

The recommendation to the Assistant District Administrator needs to include:

- How this is the only practical option.
- Other options that have been considered.
- What mitigation and backup plans will be put in place?
- The detour plan.
- The media plan to start a month prior to closure.
- Plan for coordination with the localities a month prior to closure.
- How the duration of the closure will be minimized.
- The use of incentive disincentive payments to encourage for early completion.

VirginiaDot.org
WE KEEP VIRGINIA MOVING
Our Regional Operations Director, Hari Srivasthi, will be coming out with additional guidance on maintenance of traffic and District wide limitations on lane closure time frames. Success here will help us in avoiding the additional rework necessary when we have to recover from a bad traffic situation. Please distribute this memorandum throughout your work units. Thank you for your help in refreshing and reemphasizing this fundamental of our business with our employees and contractors.

Assistant District Administrators keep Public Affairs and the District Administrator aware of high visibility closings. All supervisors keep a copy of this memorandum in your desktop procedures/turnover folder.

Garrett Moore, P.E.
NOVA District Administrator
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 1.11

Construction Emergency Operations Communications Plan
Construction Emergency Operations Communications Plan

4975 Alliance Drive
Fairfax, VA

Date Issued: _______
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3. Incident Management Team ....................................... - 4 -
4. Notification Process ................................................ - 5 -
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Attachments

Acknowledgement of Receipt
66 Express Lanes – Contract Incident Flow Chart
Incident Management Team Information Card
Contractors Contact Information
Inspector’s Emergency Contact Information Card
1. Overview

This Construction Emergency Operations Communications Plan outlines the notification protocol to be followed in the event of a major incident occurring within the Virginia 66 Express Lanes (the Program) limits, to ensure that all appropriate Program and agency personnel are notified of the incident. This Plan also provides the Program’s definition of major incidents that require a timely and coordinated response by Program personnel to address any Program-related issues. The Plan also identifies the appropriate Task Managers to be notified and provides contact information for each team member on the Incident Management Team.

2. Incident Definition

The 66 Express Lanes definition of a major incident is: An incident within an active work zone that may endanger the safety of traveling motorists and/or Virginia 66 Express Lanes’ and contractor’s staff. The following are examples of the incidents that fall under this definition:

- Traffic accident resulting in property damage to any devices or structures installed by any 66 Express Lanes contractors.
- Traffic accident resulting in a fatality.
- Any incident resulting from inclement weather, such as flooding or heavy snow.
- Any lane closure unable to be demobilized before the required time limit per the contract requirement.
- Any incident involving a contractor’s equipment that causes property damage or injuries to workers or the public.
- Traffic accident resulting in a hazard material spill that will cause environmental concerns.
- Unsafe work operations that present potential imminent danger.
- Any incident occurring within the project limits that may result in any public scrutiny.
3. Incident Management Team

The Incident Management Team is responsible for notifying individuals within their respective agencies which is determined based on the level of crisis of the incident. The team shall take the following actions:

1) Assess the situation either in person or by conference call, with the individuals listed in Table 1: Program Staff Contact Information.

2) Identify and prioritize key audiences, coordinate and implement incident response or verbal response as appropriate. Identify a plan for effectively communicating the “who, what, where, when and what we’re doing about it” to designated key audiences. The priority ranking of the project’s various constituents may shift depending on the incident’s nature and severity, as will the methods of reaching the key audiences. Information is disseminated to key audiences in order of the greatest need to know. Key audiences include:
   - Transportation Operations Center (TOC)
   - Construction Contractor
   - Local authorities/emergency responders (medical, fire, law)
   - News media
   - Local, state, and federal elected and appointed officials
   - Neighbors and community leaders
   - General public and motorists in the metropolitan area

Incident Management Team members have responsibilities specific to their disciplines. After initial activities and contacts are complete, team members engage in incident recovery as it relates to their job duties.

3) Contact designated individuals and agencies as appropriate. Table 2: Incident Management Team Contact Information is provided for this purpose. The degree and timing of notification should be determined and could range from an immediate contact to a subsequent wrap-up contact.

The Incident Management Team consists of the following Program Staff:

- VDOT Regional Transportation Program Director – Susan Shaw
- GEC Program Manager – TBD
- GEC Incident Manager – TBD
- VDOT Regional Transportation Program Communications Director – Hari Sripathi
- VDOT PIO Manager – Michelle Holland
- GEC 66 Express Lanes PIO Manager - TBD
- GEC 66 Express Lanes Safety & Health Manager - TBD
- VDOT 66 Express Lanes – Project Manager – TBD
- GEC I 66 Express Lanes – Construction Manager – TBD
- VDOT Transportation Operations Manager - Jim Turner
- VDOT PSTOC Operations Manager – Candice Gibson
4. Notification Process

When an incident occurs, Program personnel must follow the notification process shown in Exhibit 1: Construction Emergency Operations Communications Plan Flow Diagram to ensure that all appropriate project personnel are notified:

a) The field staff will be the first line of defense in the event of an incident. Field staff members should report the incident to members of the Virginia 66 Express Lanes Management team who will:
   - Assess the severity of the incident using the “severity test.” A severe incident includes:
     - Incident that creates a dangerous condition;
     - Crash involving hazardous materials;
     - Personal injury requiring evacuation via ambulance.
     - Full closure of interstate or major roadway for more than 1 hour.
     - Significant damage to work, material (including spill) or equipment
   - Take needed immediate action (unless completed by reporting person) such as:
     Call 911; Contact contractor on site;
     - Mitigate/control the incident.
   - Determine who is contacted next, based on severity.
     If severe, contact the Incident Manager;
     Otherwise send an incident report to the Safety Health Manager before the close of the next business day.
   - Complete an Incident Report and deliver to the Safety Health Manager.

b) The Incident Manager, when contacted, shall do the following:
   - Call the NRO TOC
   - Contacts team members as appropriate.
   - Determines whether the Incident Management Team needs to be:
     - Briefed only
     - Communicated with via conference call or Incident Management Team conference call:
       o Phone Number: TBD
       o Incident Manager (Host) Access Code: TBD
       o Incident Management Team Access Code: TBD
     - Meet in person

The Incident Manager or his designee will provide email updates to the Incident Management Team as to the status of the incident.

The Incident Manager will conduct a debriefing if necessary with the Incident Management Team, contractor’s management staff and include the TOC Manager or designee, following
the incident to discuss lessons learned. Key individuals directly involved with the project who have not yet been informed of the incident should be notified for the debriefing.

Documentation should be continued through the debriefing. The Incident Manager ensures that the incident is documented, including how it was resolved and the ultimate outcome. Documentation can take the form of an email/memo or Incident Report Form. No field staff will communicate with the media unless authorized by the VDOT or GEC PIO Manager.

5. Holiday and Inclement Weather Events

During extended holidays and anticipated inclement weather events, Program Management team members and individual Task Managers will identify an on-call staff member. This person must be available to respond to any inquiries or complaints received that require a response. When an inclement weather event is anticipated, the Incident Manager will conduct a coordination meeting with VDOT area offices, VDOT TOC, and I-66 Program contractors to develop an action plan in preparedness for the inclement weather.

Contact information for VDOT’s area offices and NRO TOC personnel who will need to be part of the coordination efforts is presented below: *(To be updated as new projects are executed)*

**Interstate Administration**
703-366-1961/ FAX 703-335-2208

**Interstate 495 Area Headquarters**
703-313-8066 (Main Number)
Gayla Hill 571-220-5322 (Cell)

**Interstate 395 & 95 Area Headquarters**
703- 494-7575 (Main Number)
Doug Holsapple 703- 749-8050 (Cell) 571-722-5322

**Van Dorn Area Headquarters**
703-921-5091 (Main Number)
Tommy Selvage 703- 921-5093(Office) / 571- 749-8050 or 301-873-9183 (Cell)
Gary Carpenter 703-921-5091 (Office) /703-296-2141 (Cell)

**Newington Area 7 Headquarters**
703-339-1444 (Main Number)
Howard Akers 703- 339-1444 (Office) / 571- 749-8061 (Cell)
Shane White 703-346-0941 (Office) / 703-656-1520 (Cell)
Table 1: Program Staff Contact Information

<table>
<thead>
<tr>
<th>Contract</th>
<th>VDOT Project Staff</th>
<th>GEC Project Staff</th>
<th>Contractor</th>
</tr>
</thead>
<tbody>
<tr>
<td>66 Program</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>
Construction Emergency Communications Plan

Table 2: Incident Management Team Contact Information
(Example Flow Chart, Construction Emergency Communications Plan, would be updated prior to NTP with project specific information)
Attachment 1.11 Construction Emergency Operations Communications Plan

Exhibit 1: Construction Emergency Communications Plan Flow Diagram Operations

(The Department and Developer will develop Construction Emergency Communications Plan prior to NTP with project specific information)

Mission of Incident Management Team
- Immediate communication of an incident to appropriate project leadership, sponsoring agency and task personnel.
- Activation of existing incident management and safety/environmental systems within state agencies.
- Formulation and execution of a public message.

Stages for Response to an Incident
1. If an incident should be reported to 911 first and then the Incident Manager who will take the necessary immediate action. A medical injury should be reported to the Safety Manager. He will determine severity, make initial contact with Construction Management based on severity and take the appropriate action.
2) The Incident Manager determines whether team needs to be informed only, communicate by conference call, or meet in person. Also, contact team members as appropriate. Incident Management Team Conference Call:
   - Phone Number: 999-273-5620
   - Host Access Code: 1270502
   - Team Access Code: 2850
3) The Incident Management Team will identify and prioritize key audiences and communicate and implement appropriate incident response and verbal response.
4) The Incident Management Team members contact designated individuals and agencies as appropriate (see Table 2).
5) The incident manager will conduct a debrief following an incident.

Sample Only
Attachments
Attachment 1:

Acknowledgement of Receipt

I, _______________________________ have received a copy of the Virginia 66 Express Lanes Construction Emergency Operations Communications Plan.

__________________________________________
Employee Name (Please print)  Date

__________________________________________
Employee Signature  Date
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 3.1
Summary of Design Exceptions and Waivers
<table>
<thead>
<tr>
<th>DE or DW</th>
<th>No.</th>
<th>Item</th>
<th>Location</th>
<th>Design Feature</th>
<th>Proposed Design</th>
<th>Min AADT (to DE) and VDOT (for DW) Standards Required</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>DE</td>
<td>1</td>
<td>No shoulder width on left of GP lanes, right of Express lanes due to 4' Buffer with Pylons</td>
<td>Entire Corridor</td>
<td>Shoulder Width</td>
<td>No Shoulder</td>
<td>12' Shoulder for GP Lanes (10' Shoulder for Express Lanes) 4' buffer with pylons to separate General Purpose Lanes from Express Lanes</td>
<td>Additional 225 pavement widening requires recreation of all existing interchanges, bridges, adjacent structures, and realignment of local streets, resulting in larger project footprint and right-of-way impact. Major impact to the existing creeks, park, school and residential/commercial properties. The two metro stations at Dunn Loring and Vienna will have to be relocated. Estimated $40 Million additional cost.</td>
</tr>
<tr>
<td>DE</td>
<td>2</td>
<td>Express Lane and GP Lane Shoulder Width Reduction due to Sign, Lighting, Traffic Management System (TMS), Toll Structures, and Bridge Piers.</td>
<td>Entire Corridor</td>
<td>Shoulder Width</td>
<td>Varies (6' to 8') 12' ft Shoulder</td>
<td>This design exception is for the local reduction in shoulder width due to existing barriers to accommodate sign, lighting, TMS, toll structures, and bridge piers near existing WMATA Metrorail.</td>
<td>Additional existing structures change and bridge piers - no major impact to the design, but the impact to the alignment.</td>
</tr>
<tr>
<td>DE</td>
<td>3</td>
<td>General Purpose Lanes Outside Shoulder Reduced Width</td>
<td>Entire Corridor</td>
<td>Shoulder Width</td>
<td>Varies (2' to 8') 12' ft Shoulder</td>
<td>This design exception is for the local reduction in shoulder width due to new proximity to Manassas National Battlefield Park, Historic District Areas, Bull Run Regional Park and Izzak Walton Park. Avoidance Alternatives are required by section 4(f).</td>
<td>Additional existing structures change and bridge piers - no major impact to the design, but the impact to the alignment.</td>
</tr>
<tr>
<td>VDOT GS-R</td>
<td>5246-00 to 5249-00 (Westbound)</td>
<td>Shoulder Width</td>
<td>Varies (6' to 8') 12' Shoulder</td>
<td>3</td>
<td>Shoulder Width</td>
<td>3</td>
<td>Shoulder Width</td>
</tr>
<tr>
<td>VDOT GS-R</td>
<td>5991-00 (Eastbound)</td>
<td>Shoulder Width</td>
<td>Varies (2' to 8') 12' Shoulder</td>
<td>3</td>
<td>Shoulder Width</td>
<td>3</td>
<td>Shoulder Width</td>
</tr>
<tr>
<td>VDOT GS-R</td>
<td>6587-00 (Westbound)</td>
<td>Shoulder Width</td>
<td>Varies (2' to 8') 12' Shoulder</td>
<td>3</td>
<td>Shoulder Width</td>
<td>3</td>
<td>Shoulder Width</td>
</tr>
<tr>
<td>VDOT GS-R</td>
<td>6592-00 (Eastbound)</td>
<td>Shoulder Width</td>
<td>Varies (2' to 8') 12' Shoulder</td>
<td>3</td>
<td>Shoulder Width</td>
<td>3</td>
<td>Shoulder Width</td>
</tr>
<tr>
<td>Vienna Metro Station</td>
<td>Shoulder Width</td>
<td>Varies (6' to 11') 12' Shoulder</td>
<td>3</td>
<td>Shoulder Width</td>
<td>3</td>
<td>Shoulder Width</td>
<td>Required for Standard to be Fully Met</td>
</tr>
<tr>
<td>VA</td>
<td>1</td>
<td>Relocate existing concrete barriers and bridge piers. Also, includes, but not limited to, the relocation of all existing bridges, realignment of EB/NB GP lanes and associated ramps; realignment of road structure and retaining walls; right-of-way acquisition; larger project footprint; impact on drainage system.</td>
<td>Entire Corridor</td>
<td>Shoulder Width</td>
<td>Varies (6' to 8') 12' Shoulder</td>
<td>This design exception is for the local reduction in shoulder width due to existing barriers to accommodate sign, lighting, TMS, toll structures, and bridge piers near existing WMATA Metrorail.</td>
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</table>

### Summary of Waivers

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<td></td>
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<td>DE</td>
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<td></td>
<td></td>
<td>General Purpose Lanes Outside Shoulder Reduced Width</td>
<td>Additional existing structures change and bridge piers - no major impact to the design, but the impact to the alignment.</td>
</tr>
</tbody>
</table>

### Vertical Alignment & K Value

- **Route 28**
  - Horizontal Alignment (Ramp): 216' Radius K=19
  - Vertical Alignment (K Value): 324' Radius K=37
  - Vertical Alignment (K Value): 2000' Radius K=49
  - Vertical Alignment (K Value): 2008' Radius K=49
- **Route 28**
  - Horizontal Alignment (Ramp): 316' Minimum K=29
  - Vertical Alignment (K Value): 316' Minimum K=29
  - Vertical Alignment (K Value): 316' Minimum K=29
  - Vertical Alignment (K Value): 316' Minimum K=29
- **Route 50**
  - Horizontal Alignment (Ramp): 155' Radius
  - Vertical Alignment (K Value): 316' Minimum

### Shoulder Width

- **DE 1**
  - Shoulder Width: No Shoulder
- **DE 2**
  - Shoulder Width: Varies (6' to 8') 12' Shoulder
- **DE 3**
  - Shoulder Width: Varies (2' to 8') 12' Shoulder
- **DE 4**
  - Shoulder Width: Varies (6' to 8') 12' Shoulder
- **DE 5**
  - Shoulder Width: Varies (4' Min.) on the Left 12' Shoulders
- **DE 6**
  - Shoulder Width: Varies (2' Min') 12' Shoulder

### Additional Notes

- The summary of waivers includes the following requirements:
  - Shoulder widths vary from 2' to 8'.
  - Additional costs are noted where applicable. (Estimated $xx.xx Million additional cost)
  - WAIs and ROW changes are required for standard to be fully met.
  - VDOT guidelines are met for both horizontal and vertical alignments.

### References

- VDOT guidelines for horizontal and vertical alignments are met in the design.
- WAIs and ROW changes are required for standard to be fully met.
- VDOT guidelines for horizontal and vertical alignments are met in the design.
- WAIs and ROW changes are required for standard to be fully met.
- VDOT guidelines for horizontal and vertical alignments are met in the design.
- WAIs and ROW changes are required for standard to be fully met.

### Specific Examples

- **Route 28**:
  - Horizontal Alignment (Ramp): 216' Radius K=19
  - Vertical Alignment (K Value): 324' Radius K=37
  - Vertical Alignment (K Value): 2000' Radius K=49
  - Vertical Alignment (K Value): 2008' Radius K=49

- **Route 50**:
  - Horizontal Alignment (Ramp): 155' Radius
  - Vertical Alignment (K Value): 316' Minimum

### Property Impacts

- Property impacts to adjacent neighborhoods
- Take homes from Home Properties, LLC
- Take property from Church Park

### Additional Notes

- WAIs and ROW changes are required for standard to be fully met.
- VDOT guidelines for horizontal and vertical alignments are met in the design.
- WAIs and ROW changes are required for standard to be fully met.
- VDOT guidelines for horizontal and vertical alignments are met in the design.
- WAIs and ROW changes are required for standard to be fully met.

### Additional Costs

- Estimated $xx.xx Million additional cost
- Estimated $xx.xx Million additional cost
- Estimated $xx.xx Million additional cost
- Estimated $xx.xx Million additional cost
- Estimated $xx.xx Million additional cost

### Additional Details

- Additional details for horizontal and vertical alignments are provided in the design.
- WAIs and ROW changes are required for standard to be fully met.
- VDOT guidelines for horizontal and vertical alignments are met in the design.
- WAIs and ROW changes are required for standard to be fully met.
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## Summary of Design Exceptions and Waivers

### DE or DW

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>Location</th>
<th>Design Feature</th>
<th>Proposed Design</th>
<th>Min AASHTO (for DE) and VDOT (for DW) Standards Required</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>DE 6</td>
<td>Express Lane Ramp Shoulder Reduced Width (BRIDGE)</td>
<td>I-66 Flyover from EB GP to EB Express Lanes</td>
<td>Shoulder Width</td>
<td>2' Min.</td>
<td>4' Min.</td>
<td>2' Min provided on one side while providing 10' on the other side to meet SSD requirements. Add length ramp with additional structural costs and right of way impacts.</td>
</tr>
<tr>
<td>DE 7</td>
<td>Substandard shoulder Cross Slopes</td>
<td>RTE. 50 to RTE. 495</td>
<td>Shoulder Width</td>
<td>&gt;6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DE 8</td>
<td>Principal Arterial Road Reduced Shoulder Width</td>
<td>Route 28</td>
<td>4' Outside Shoulder</td>
<td>8' Outside Shoulder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DE 9</td>
<td>Existing Vertical Clearance Roadway (PHASE 1 Req’d)</td>
<td>Rt. 29 Centreville (B682, B683)</td>
<td>Maintain Existing Clearance (14'-7&quot;)</td>
<td>VDOT 16'-8&quot; AASHTO 16'-0&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DW 1</td>
<td>Reduced Ramp Recovery Areas</td>
<td>Rt. 234 Business (B626, B622)</td>
<td>Maintain Existing Clearance (14'-10&quot;, B626 14'-10&quot;)</td>
<td>VDOT 16'-8&quot; AASHTO 16'-0&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes:
- DE or DW: Design or Design/Construction Waiver
- No: Project number
- Item: Exception Item
- Location: Location where the Exception Item occurs
- Design Feature: Design Feature (e.g., Shoulder Width)
- Proposed Design: Proposed Dimensions
- Min AASHTO (for DE) and VDOT (for DW) Standards Required: Minimum AASHTO standards and VDOT requirements for the proposed design
- Remarks: Additional notes or requirements for the proposed design
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 3.3
Settlement of Structures
Unless approved by the State Structure and Bridge Engineer, the Developer shall design all structures to meet the design requirements listed below:

1. Foundation settlements shall be investigated using all applicable loads in Service I Load Combination (AASHTO 7th Edition, Section 10.5.2.2).

2. As measured from the bottom of the bridge bearing, or top of pier cap, the settlement limits are defined as follows:
   
a. Total settlement of the substructure unit over its entire design life ($S_{TOT}$) shall be limited to 2 inches with $S_{TOT}$ defined as:
      
      $$S_{TOT} = \text{Elastic Settlement} + \text{Consolidation Settlement} + \text{Secondary Settlement}.$$ 
      
      Elastic Settlement includes both that for the soil/rock plus the elastic shortening of the deep foundation element and the pier column.
   
b. Total settlement to occur after completion of the bridge to the end of its design life ($S_{POST}$) shall be limited to 1 inch.

3. Plans shall incorporate the following “General Note” populated with the actual settlement values used in the design of the structure:
   
   “This structure has been analyzed and designed to accommodate settlement as noted below: Total Settlement of (__)” has been accommodated. The total settlement ($S_{TOT}$) is defined as the arithmetic sum: $S_{TOT} (__) = \text{Elastic Settlement (__) } + \text{Consolidation Settlement (__) } + \text{Secondary Settlement (__) }$. In addition, Differential Settlement of (__) radians, as measured center to center between adjacent columns or footings, has been accommodated.”

4. During construction and after all settlements have occurred the bridge structure (consisting of the superstructure, substructure and associated elements in the load path) must meet all structural capacity requirements for all loading combinations requiring such analysis. In addition, the structure must meet all structural capacity requirements for all load combinations for the listed differential settlement (AASHTO LRFD 7th Edition Section 3.12.6).

5. The bearings and substructure shall be designed and detailed to accommodate increases or decreases in loads due to total or differential settlement shown on the plans. The superstructure shall be designed and detailed to accommodate changes in loads, locations of inflection points or fatigue stress ranges. (AASHTO LRFD 7th Edition Sections 3.1, 3.4.1, 3.12.6, 5.7.3.6.1).
6. Creep and/or shrinkage may only be used to offset settlement effects when it occurs CONCURRENTLY with settlement, and the designer is responsible for determining time rate of settlement and creep. [For instance, if all settlement is elastic (instantaneous), creep cannot be used to offset loads imposed].

7. Joint rotations and bearing rotations due to settlement shall be considered in addition to all tolerances for rotations due to live load (LL) effects or for constructability (AASHTO LRFD 5th Edition Section 5.7.3.6.1).

8. Settlements which change super elevation shall not reduce super elevation below the minimum specified by AASHTO for the roadway design speed and roadway type, nor shall they negatively impact the performance of the deck or approach paving.

9. Settlements which change profile grade shall not:
   a. Increase spread of drainage beyond limits specified in AASHTO.
   b. Change performance or maintainability of utilities.
   c. Introduce a low or flat spot on the bridge or reduce the minimum grade specified in the roadway drainage manual.
   d. Negatively impact rideability.

10. Coordinate predicted/expected settlement of the approach embankments and bridge structure to comply with contract rideability requirements.

11. The structure must be capable of carrying a future wearing surface equal to the magnitude of the total anticipated settlement placed uniformly from curb to curb and abutment to abutment. The total future wearing surface loads, inclusive of any additional loads needed to mitigate for anticipated settlement, shall not exceed 15 psf. All parapets and railings shall accommodate the additional layer of surfacing with no modification or reduction in crash test level after construction.

12. Jacking and shimming shall not be allowed to correct differential settlement, unless approved by the Department.

13. Settlements shall be treated as a load condition with $\gamma_{SE} = 1.0$ for all AASHTO indicated groups. Load combinations which include settlement shall also be applied without settlement (AASHTO LRFD 7th Edition Section 3.4.1).

14. Differential settlement at a single substructure unit shall be limited to a vertical value which does not exceed a slope from the horizontal of 0.001 radians as measured center to center between adjacent columns or footings within the same substructure unit.
15. When differential settlement at a single substructure unit is anticipated, both the superstructure and substructure shall be analyzed and detailed to account for the changes resulting from differential deflection.

16. Under no condition shall settlement be used to justify use of simple span configurations instead of continuous span configurations.
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 3.5
Nutrient Credit Assignment Agreement
NUTRIENT CREDIT ASSIGNMENT AGREEMENT

INSTRUCTIONS

There are times when someone other than VDOT (e.g., Design Build contractor, locality, etc.) purchases nutrient credits to satisfy water quality requirements on projects involving VDOT owned or operated roadways/facilities (existing or future). The Assignment Agreement is to be used for the transfer of the ownership of such nutrient credits from the purchaser to VDOT. The Assignment Agreement is to be completed with the appropriate project specific information and a copy of the bill of sale between the Nutrient Credit Bank and the purchaser is to be attached as Exhibit A. The Chief Engineer’s office has delegated signatory authority to the District Administrator or his designee.

A copy of the executed agreement is to be included with the BMP information submitted either 1) with the VPDES Construction Permit Termination form LD-445D (where VDOT is the permittee) or 2) when the project is completed and the roadway/facility is turned over to VDOT for maintenance and operation (when VDOT is not the permittee).
ASSIGNMENT AGREEMENT

This Assignment Agreement (this “Agreement”), dated as of the [____] day of [______], 201_, is between [____________________] (“Assignor”) and the Virginia Department of Transportation, an agency of the Commonwealth of Virginia (“Assignee”).

RECITALS

WHEREAS, on [DATE] the Assignor purchased nonpoint source phosphorus from [GENERATOR/SELLER]; and

WHEREAS, Assignor purchased [__] pounds of phosphorus credits and retired [__] pounds of nitrogen credits associated with such phosphorus credits;

WHEREAS, such phosphorus credits were generated at [FACILITY NAME] located in [COUNTY/CITY], Virginia; and

WHEREAS, Assignor has received a Bill of Sale from [GENERATOR/SELLER] dated [_______] and evidencing the purchase and attached hereto as Exhibit A; and

WHEREAS, the purchase of such phosphorus credits is associated with [PROJECT/PERMIT]; and

WHEREAS, Assignor desires to assign its rights and obligations under the Bill of Sale to Assignee and Assignee desires to assume the same.

AGREEMENT

NOW, THEREFORE, in consideration of the mutual covenants and agreements set forth below and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. Recitals. The foregoing recitals are hereby incorporated by reference herein and made a substantive part hereof.

2. Assignment. Assignor hereby transfers, assigns, and conveys to Assignee all of Assignor’s right, title and interest in the phosphorus credits and associated nitrogen credits that are the subject of the Bill of Sale attached hereto as Exhibit A.

3. Assumption. Assignee hereby accepts all of Assignor’s right, title and interest in the phosphorus credits and associated nitrogen credits that are the subject of the Bill of Sale attached hereto as Exhibit A.
4. **Countersparts.** This Agreement may be executed in counterparts (including by means of telecopied signature pages), any one of which need not contain the signatures of more than one party, but all such counterparts taken together shall constitute one and the same instrument.

5. **Governing Law.** All matters relating to the interpretation, construction, validity and enforcement of this Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Virginia, including all matters of construction, validity and performance.

6. **Severability.** Whenever possible, each provision of this Agreement shall be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this Agreement is held to be prohibited by or invalid under applicable law, such provision shall be ineffective only to the extent of such prohibition or invalidity, without invalidating the remainder of such provision or the remaining provisions of this Agreement.

7. **Amendment.** Any provision of this Agreement may be amended or waived only in a writing signed by the Assignor and Assignee.

This space intentionally left blank
IN WITNESS WHEREOF, the Assignor and Assignee have caused their duly authorized representative to execute this Agreement as of the date first above written.

ASSIGNOR:

By: __________________________________________
Name: _________________________________________
Title: __________________________________________

ASSIGNEE:

VIRGINIA DEPARTMENT OF TRANSPORTATION

By: __________________________________________
Name: _________________________________________
Title: __________________________________________
CBAY-VA LLC - MIDLAND

AFFIDAVIT OF PHOSPHORUS CREDIT SALE

CBAY-VA LLC, a Virginia limited liability company (the "Company"), hereby certifies the following:

1. Pursuant to that certain Contract #43961 ("Contract") and Purchase Order #50100-0001125257 ("Purchase Order"), between the Company (as Seller) and The Commonwealth of Virginia, Department of Transportation ("Purchaser"), the Company, for the benefit of the Purchaser, agrees to sell 102.30 pounds of nonpoint source phosphorus Credits to Purchaser and retire the associated ratio of nonpoint source nitrogen Credits at the credit generating facility in the amount of 1,367.75 pounds of nitrogen Credits;

2. The Company and the Purchaser will close the transaction contemplated by the Agreement on September 1, 2015 (the "Closing Date") and, as of the date hereof, the Company shall reserve for Purchaser the phosphorus Credits.

WITNESS the following signature:

CBAY-VA LLC,
a Virginia limited liability company

By: ________________________________
Manager

Date: September 1, 2015

Sworn to and subscribed before me this 1st day of September, 2015, by David Joyce, Manager, on behalf of CBAY-VA LLC, a Virginia limited liability company.

My commission expires: 5/11/18

State of Texas
County of Harris

Notary Public

Permit #: Peading
Permittee: The Commonwealth of Virginia, Department of Transportation
Phosphorus Credits: 102.30 pounds
Associated Nitrogen Credits: 1,367.75 pounds
VDOT UPC#: 105590
VDOT Project #: Route 66; 0066-96A-297, P101
District: Fairfax County, Prince William County, Town of Vienna, Town of Fairfax, Town of Manassas - NOVA

CBAY-VA LLC
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 3.7
Minimum Pavement Sections
Draft Technical Requirements
Attachment 3.7: Minimum Pavement Sections

The minimum pavement sections detailed herein shall be used for all construction, reconstruction or widening on this project. The Developer shall validate the adequacy of the minimum pavement sections and notify the Department of its findings prior to submitting the price proposal. If the Developer’s findings require a deviation from the RFP requirements, the Developer shall notify the Department and submit the proposed revised pavement typical sections with supporting calculations for review at least 10 days prior to submission of the price proposal. Any proposed changes shall be included in the price proposal. Acceptable changes to the minimum pavement sections are limited to increasing the specified thickness of the base or subbase layers. Any changes to the specified minimum pavement sections and/or location of the pavement sections shown on the RFP Conceptual Plans require approval by the Department. The Developer shall be responsible for the final design and construction of the pavements for this project in accordance with the Contract Documents.

The general intent of this project is to salvage the existing mainline pavement and full strength shoulders where they exist between the western limits of the project and Route 29 in Centreville by widening and building up the existing pavement. Between Route 29 in Centreville and the Capital Beltway, the intent is to remove the existing concrete and composite pavements to expose the existing subbase and/or stabilized subgrade layers. The native soils shall not be exposed where existing pavement layers are being salvaged. Any exposure of the existing subgrade soils (excluding cement stabilized subgrade) will require additional SWM treatment at the Developer’s risk/expense. The Developer shall take particular care not to damage the existing cement stabilized base and/or cement stabilized subgrade during removal of the existing concrete pavements. Therefore, removal means and methods shall be limited to non-impact/non-vibratory means such as saw-cutting and lifting of existing slabs.

Any pavement sections requiring replacement or reconstruction outside of those listed above shall be designed in accordance with the 1993 AASHTO Guide for the Design of Pavement Structures (1993 edition) as modified by VDOT Materials Division’s Manual of Instructions and submitted to VDOT for review. All interstate mainline pavements shall be constructed/reconstructed with full strength paved shoulders.

All widening of the existing pavements shall be accomplished in accordance with Standard WP-2 so that the proposed widening pavement layers match the existing pavement layers in types and thicknesses) prior to building up and/or placing the surface course except as noted in Tables 3.8.1 and 3.8.2 below. All existing pavement shall be saw-cut to a smooth vertical face a minimum of one foot inside the existing edge of full strength pavement in all widening areas. Widening of existing pavement shall provide for lateral drainage of the existing pavement layers by providing a free-draining aggregate (such as 21B) on the low side of the pavement cross-slope connected to a standard UD-4 edgedrain placed beneath the outside edge of the paved shoulder. An impervious base/subbase (such as CTA) shall be provided for widening on the high side of existing pavement cross-slopes. The following note shall be added to the construction plans: The VDOT District materials Engineer shall be notified as soon as the pavement saw-cuts are complete but no less than 48 hours prior to subbase/base placement in the widening areas”. All
Existing pavement shall be milled to a depth of 2” and resurfaced up to the nearest longitudinal lane divide wherever pavement markings will be eradicated or snow plowable raised pavement markers are removed.

### Table 3.7.1 – Mainline I-66, EB and WB

<table>
<thead>
<tr>
<th>Roadway</th>
<th>Limits¹</th>
<th>Build-Up</th>
<th>Widening</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-66, EB &amp; WB</td>
<td>Fr.: 1.18 Miles W. of Route 15 To: 0.02 Miles E. of Catharpin Road</td>
<td>Mill 2” 1.5” SMA-9.5 (76-22)³ 2” IM-19.0D (Min. grade increase = 1.5”)</td>
<td>1.5” SMA-9.5 (76-22)³ 2” IM-19.0D 12.5” BM-25.0A 10” 21B³,6</td>
</tr>
<tr>
<td>I-66, EB &amp; WB</td>
<td>Fr.: 0.02 Miles E. of Catharpin Road To: 0.16 Miles E. of Business Route 234</td>
<td>Mill 1.5” 1.5” SMA-9.5 (76-22)³ 2” IM-19.0D 1.5” SMA-9.5 (76-22)³ 2” IM-19.0D</td>
<td>14” BM-25.0A 10” 21B³,6</td>
</tr>
<tr>
<td>I-66, EB &amp; WB</td>
<td>Fr.: 0.16 Miles E. of Business Route 234 To: 1.75 Miles E. of Business Route 234</td>
<td>Mill 2” 1.5” SMA-9.5 (76-22)³ 3” IM-19.0D (Min. grade increase = 2.5”)</td>
<td>1.5” SMA-9.5 (76-22)³ 3” IM-19.0D 11.5” BM-25.0A</td>
</tr>
<tr>
<td>I-66, EB &amp; WB</td>
<td>Fr.: 1.75 Miles E. of Business Route 234 To: 0.48 Miles E. of Route 29</td>
<td>Mill 2” 1.5” SMA-9.5 (76-22)³ 3” IM-19.0D (Min. grade increase = 2.5”)</td>
<td>1.5” SMA-9.5 (76-22)³ 3” IM-19.0D 12.5” BM-25.0A</td>
</tr>
<tr>
<td>I-66, EB &amp; WB</td>
<td>Fr.: To: 0.48 Miles E. of Route 29 To: Route 50</td>
<td>Remove Ex. 11” PCC and 3” OGDL to expose CTA 1.5” SMA-9.5 (76-22)³ 2” SMA-12.5 (76-22) 13.5” BM-25.0A 3” OGDL (grade increase = 6”)</td>
<td>1.5” SMA-9.5 (76-22)³ 2” SMA-12.5 (76-22) 13.5” BM-25.0A 6” CTA³ 6” soil cement³</td>
</tr>
<tr>
<td>I-66, EB &amp; WB</td>
<td>Fr.: Route 50 To: I-495 (outside the limits of the existing Nutley Street Interchange C-D Road)</td>
<td>Remove Ex. 4” AC, 9”-11” PCC and 3” OGDL/5” 21A to expose soil cement or CTA 1.5” SMA-9.5 (76-22)³ 2” SMA-12.5 (76-22) 16” BM-25.0A 3” OGDL (grade increase = 4.5”)</td>
<td>1.5” SMA-9.5 (76-22)³ 2” SMA-12.5 (76-22) 16” BM-25.0A 6” CTA³ 6” soil cement³</td>
</tr>
<tr>
<td>I-66, EB &amp; WB</td>
<td>Fr.: Route 50 To: I-495 (within the limits of the existing Nutley Street Interchange C-D Road)</td>
<td>Remove Ex. 4”-21” AC, 9”-11” PCC and 5” 21A to expose soil cement or 21A aggregate 1.5” SMA-9.5 (76-22)³ 2” SMA-12.5 (76-22) 16.5” BM-25.0A 3” OGDL (grade increase = 4”)</td>
<td>1.5” SMA-9.5 (76-22)³ 2” SMA-12.5 (76-22) 16.5” BM-25.0A 0.5” 21B 12” #2/3 aggregate wrapped in needle punch non-woven geotextile fabric</td>
</tr>
<tr>
<td>I-66 WB, E. of I-495 (Widening)</td>
<td>Fr.: Eastern limits of project To: I-495</td>
<td>Mill 1.5” 1.5” SMA-9.5 (76-22)³</td>
<td>1.5” SMA-9.5 (76-22)³ 2” IM-19.0D 12.5” BM-25.0A 10” 21B³,6 4” CBR 30³</td>
</tr>
<tr>
<td>I-66 &amp; I-495 I/C Ramps and Loops⁹</td>
<td>N/A</td>
<td>Mill 1.5” 1.5” SMA-9.5 (76-22)³</td>
<td>1.5” SMA-9.5 (76-22)³ 2” IM-19.0D 10.5” BM-25.0A 10” 21B³,6 4” CBR 30³</td>
</tr>
<tr>
<td>All Other Interchange Ramps/Loops/C-D Roads and Express Access Ramps not identified in Table 3.8.2⁹</td>
<td>N/A</td>
<td>Mill 1.5” 1.5” SMA-9.5 (76-22)³</td>
<td>1.5” SMA-9.5 (76-22)³ 2” IM-19.0D 12” BM-25.0A 6” 21B³,6 4” CBR 30³</td>
</tr>
</tbody>
</table>

Notes:
1. The Developer shall determine exact limits based upon archive plans and field verification of in-situ pavement sections.
2. Thicknesses of existing pavement materials are approximate; Developer should expect some variability in these thicknesses; no impact methods to be used for removal (must saw cut and lift existing PCC slabs).
3. Final surface shall be placed in a continuous operation across the full pavement width after all previous layers have been completed in the salvage and widening sections.
4. CTA = Agg. Base Material, Type I, Size No. 21A pugmill mixed with 4% hydraulic cement by weight.
5. Connected to a standard UD-4 edgetrain.
6. Replace 21B with CTA for widening on the high side of existing pavement cross-slopes.
7. CBR 30 = Select Material, Type I, Min. CBR 30.
8. Soil cement = subgrade soil mixed with min. 12% hydraulic cement by volume.
9. All paved shoulders on interstate including ramps and loops shall have the same pavement section as the mainline lanes.
10. Mainline pavement includes all acceleration/deceleration lanes and auxiliary lanes.
11. 12” Continuously Reinforced Concrete Pavement (CRCP), Standard PR-8 with Class I corrosion resistant reinforcing steel (IIM S&B-81.5) and A4 paving concrete (SPCN) may be substituted for BM-25.0A.

### Table 3.7.2 – Connecting Roadways (Layers are listed top to bottom except as noted)

<table>
<thead>
<tr>
<th>Roadway</th>
<th>SM-9.5</th>
<th>IM-19.0A</th>
<th>BM-25.0A</th>
<th>OGDL</th>
<th>CTA</th>
<th>21B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antioch Road – Widening/New Construction</td>
<td>1.5”</td>
<td>2”</td>
<td>4”</td>
<td>--</td>
<td>--</td>
<td>6”</td>
</tr>
<tr>
<td>Heathcote Boulevard – Extension/New Construction</td>
<td>1.5”</td>
<td>2”</td>
<td>6”</td>
<td>--</td>
<td>--</td>
<td>6”</td>
</tr>
<tr>
<td>Route 29 – Widening (North of I-66)</td>
<td>1.5”</td>
<td>2”</td>
<td>9.5”</td>
<td>--</td>
<td>--</td>
<td>8”</td>
</tr>
<tr>
<td>Route 29 – Widening (South of I-66)</td>
<td>1.5”</td>
<td>2”</td>
<td>12”</td>
<td>--</td>
<td>--</td>
<td>14</td>
</tr>
<tr>
<td>University Boulevard – Widening</td>
<td>1.5”</td>
<td>2”</td>
<td>8”</td>
<td>3”</td>
<td>6”</td>
<td>--</td>
</tr>
<tr>
<td>Route 234 By-Pass – Widening of ex. Ramps/Loops</td>
<td>1.5”</td>
<td>2”</td>
<td>6”</td>
<td>3”</td>
<td>6”</td>
<td>6”</td>
</tr>
<tr>
<td>Pageland Lane &amp; Vandor Lane - Realignment</td>
<td>1.5”</td>
<td>2”</td>
<td>3”</td>
<td>--</td>
<td>--</td>
<td>6”</td>
</tr>
<tr>
<td>Cushing Road P&amp;R Lot Access Road</td>
<td>1.5”</td>
<td>2”</td>
<td>6”</td>
<td>--</td>
<td>--</td>
<td>6”</td>
</tr>
<tr>
<td>Balls Ford Road – East (near Rest Area)</td>
<td>1.5”</td>
<td>2”</td>
<td>3”</td>
<td>--</td>
<td>--</td>
<td>6”</td>
</tr>
<tr>
<td>Balls Ford Road – West (near Groveton Rd)</td>
<td>1.5”</td>
<td>2”</td>
<td>6”</td>
<td>--</td>
<td>--</td>
<td>10”</td>
</tr>
<tr>
<td>Bull Run Drive – Widening/New Construction</td>
<td>1.5”</td>
<td>2”</td>
<td>4”</td>
<td>--</td>
<td>--</td>
<td>6”</td>
</tr>
<tr>
<td>Notes Dr Ext./Bull Run P&amp;R Lot Access Road</td>
<td>1.5”</td>
<td>2”</td>
<td>6”</td>
<td>--</td>
<td>--</td>
<td>6”</td>
</tr>
<tr>
<td>Route 28 – New Construction</td>
<td>1.5”</td>
<td>2”</td>
<td>8”</td>
<td>3”</td>
<td>6”</td>
<td>--</td>
</tr>
<tr>
<td>Route 28 – Widening</td>
<td>1.5”</td>
<td>2”</td>
<td>8.5”</td>
<td>--</td>
<td>8”</td>
<td>4”</td>
</tr>
<tr>
<td>Braddock Road – Widening/New Construction</td>
<td>1.5”</td>
<td>2”</td>
<td>7”</td>
<td>--</td>
<td>--</td>
<td>6”</td>
</tr>
<tr>
<td>Walney Road – Widening/New Construction</td>
<td>1.5”</td>
<td>2”</td>
<td>7”</td>
<td>--</td>
<td>--</td>
<td>6”</td>
</tr>
<tr>
<td>Stonecroft Blvd/Poplar Tree Road – New Construction</td>
<td>1.5”</td>
<td>2”</td>
<td>4”</td>
<td>--</td>
<td>6”</td>
<td>--</td>
</tr>
<tr>
<td>EC Lawrence Park Access Road – New Construction</td>
<td>1.5”</td>
<td>2”</td>
<td>3”</td>
<td>--</td>
<td>6”</td>
<td>--</td>
</tr>
<tr>
<td>Stringfellow Road - Widening</td>
<td>1.5”</td>
<td>2”</td>
<td>8”</td>
<td>--</td>
<td>--</td>
<td>8”</td>
</tr>
<tr>
<td>Stringfellow Road Access Ramp</td>
<td>1.5”</td>
<td>2”</td>
<td>12”</td>
<td>--</td>
<td>--</td>
<td>10”</td>
</tr>
<tr>
<td>Fairfax County Parkway – Widening/New Construction</td>
<td>1.5”</td>
<td>2”</td>
<td>8”</td>
<td>3”</td>
<td>12”</td>
<td>--</td>
</tr>
<tr>
<td>West Ox Road – Widening/New Construction</td>
<td>1.5”</td>
<td>2”</td>
<td>6”</td>
<td>--</td>
<td>12”</td>
<td>--</td>
</tr>
<tr>
<td>Monument Drive – Widening/New Construction</td>
<td>1.5”</td>
<td>2”</td>
<td>7”</td>
<td>--</td>
<td>--</td>
<td>10”</td>
</tr>
<tr>
<td>Route 50 – Widening/New Construction</td>
<td>1.5”</td>
<td>2”</td>
<td>12”</td>
<td>--</td>
<td>--</td>
<td>6”</td>
</tr>
<tr>
<td>Waples Mill Road – Widening/New Construction</td>
<td>1.5”</td>
<td>2”</td>
<td>7”</td>
<td>--</td>
<td>--</td>
<td>6”</td>
</tr>
<tr>
<td>Jermantown Road – North Widening/New Construction</td>
<td>1.5”</td>
<td>2”</td>
<td>7”</td>
<td>3”</td>
<td>7”</td>
<td>--</td>
</tr>
<tr>
<td>Jermantown Road – South Widening only</td>
<td>1.5”</td>
<td>2”</td>
<td>8”</td>
<td>--</td>
<td>--</td>
<td>10”</td>
</tr>
<tr>
<td>Route 123 – New Construction</td>
<td>1.5”</td>
<td>2”</td>
<td>10”</td>
<td>--</td>
<td>6”</td>
<td>6”</td>
</tr>
<tr>
<td>Route 123 - Widening</td>
<td>1.5”</td>
<td>2”</td>
<td>6”</td>
<td>--</td>
<td>6”</td>
<td>21B</td>
</tr>
<tr>
<td>Vaden Drive – Widening/New Construction</td>
<td>1.5”</td>
<td>2”</td>
<td>6”</td>
<td>--</td>
<td>8”</td>
<td>CTA</td>
</tr>
</tbody>
</table>
Nutley Street – Widening/New Construction 1.5” 2” 10” -- 6” 6”
Nutley Street – Widening of ex. Ramps/Loops9 1.5” 2” 4” -- 6” 6”
Cedar Lane – Widening/New Construction 1.5” 2” 6” -- -- 8”
Gallows Road 1.5” 2” 10” -- -- 8”

Notes:
1. All widened pavements shall be milled full width for at least the thickness of the proposed surface and within the limits of eradication of existing pavement markings
2. The final surface course shall be placed in a continuous operation across the full pavement width after all previous layers have been completed in the salvage and widening sections
3. For existing ADT < 10,000 vpd, use SM-9.5A; for ADT > 10,000 vpd, use SM-9.5D; for ADT >50,000 vpd, use SM-9.5E
4. OGD = asphalt stabilized open graded drainage layer
5. CTA = Aggregate Base Material, Type I, Size No. 21A pugmill mixed with 4% hydraulic cement by weight
6. Connected to a standard UD-4 edgerdrain
7. Replace 21B with CTA for widening on the high side of existing pavement cross slopes
8. All widened pavement shall use the layers identified above or match the existing pavement layer thicknesses, whichever is greater
9. Mill 2” on existing pavement and then build-up with 3” IM-19.0A and 1.5” SM-9.5D
10. Mill 2” on existing pavement and then build-up with 3” BM-25.0A, 2” IM-19.0A and 1.5” SM-9.5D

Park and Ride Lots, Aisles and Entrance/Exit Roads (excluding bus transfer bays):

Surface – 1.5” Asphalt Concrete, Type SM-9.5A estimated at 175 lbs/sq.yd.
Base – 6” Asphalt Concrete, Type BM-25.0A
Subbase – 7” Aggregate Base Material, Type I, Size No. 21B extended 1 foot behind the curb and gutter and connected to an edgerdrain, in accordance with UD-4 standard details.

If the number of parking spaces exceeds 2,000 or the subgrade soil CBR value is less than 5, the Developer shall increase the thicknesses of the above layers, as necessary to meet AASHTO design requirements in accordance with Chapter III of the Materials Division’s Manual of Instructions.

Bus Loops and Transfer Bays:

Surface – 9” Hydraulic Cement Concrete Pavement in accordance with standard PR-2 with 15 foot transverse joint spacing.
Base – 6” Aggregate Base Material, Type I, Size No. 21B extended 1 foot behind the curb and gutter and connected to an edgerdrain, in accordance with UD-4 standard details.

A joint layout plan shall be included in the final plans for construction. An expansion joint shall be placed between all concrete pavement and curb/gutter. If the number of bus trips exceeds 150/day or the subgrade soil CBR value is less than 5, the Developer shall increase the thicknesses of the above layers, as necessary to meet AASHTO design requirements in accordance with Chapter III of the Materials Division’s Manual of Instructions.

Sidewalk and Shared Use Paths

Sidewalk
Surface - 4” Hydraulic Cement Concrete, Class A3
Base - 4” Aggregate base material Type I, Size No. 21A or No. 21B extended 4” on either side of the surface.
**Shared Use Paths**
Surface - 2" Asphalt Concrete, Type SM-9.0A estimated at 242 lbs/yd^2
Base (only for areas subject to utility truck usage) – 3” Asphalt Concrete, Type IM-19.0A estimated at 345 lbs/yd^2
Base - 6" Plain Aggregate, Type I, Size No. 21B extended 6” on either side of the surface.

**Temporary Pavement**

The Developer shall be responsible for any temporary pavement design. Temporary pavements shall be designed in accordance with the AASHTO Guide for the Design of Pavement Structures (1993 edition) and the VDOT Materials Division’s Manual of Instructions. All temporary pavement designs shall be submitted to the Department for review. All temporary pavement shall be completely removed once it is no longer in service. All temporary pavement designs for mainline or ramp pavements shall have a minimum 6 inches of asphalt concrete and shall meet the following minimum design criteria.

- Design Life – 6 months minimum, or required service life, whichever is greater
- Reliability – 85% minimum
- Initial Serviceability – 4.2 minimum
- Terminal Serviceability – 2.8 minimum
- Standard Deviation – 0.49 minimum
- CBR value for subgrade soils determined by laboratory tests

Note: Existing paved shoulders shall not be used for maintenance of traffic in their present condition unless approved by the Department.
**Typical Mainline Sections for I-66**

**1.18 Mi. W. of Route 15 to 0.02 Mi. E. of Catharpin Road**

1.5” BUILD-UP

<table>
<thead>
<tr>
<th>2” Mill: 2” IM-19.0D</th>
<th>2” IM-19.0D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex. AC 14.5”</td>
<td>12.5” BM-25.0A</td>
</tr>
<tr>
<td>Ex. AGG 10” 21B</td>
<td>10” 21B*</td>
</tr>
</tbody>
</table>

*10” CTA for widening on high side of pavement cross slope

UD-4

New Widening

Existing Pavement

Saw cut 1’ from edge of ex. shldr.
0.02 Mi. E. of Catharpin Road to 0.16 Mi. E. of Bus. Route 234

1.5" Mill; 1.5" SMA-9.5 (76-22)  1.5" SMA-9.5 (76-22)

Ex. AC 17.5"
Ex. AGG 10" 21B

2" IM-19.0D
14" BM-25.0A
10" 21B*

UD-4

*10" CTA for widening on high side of pavement cross slope

New Widening

Exist. Pavement

saw cut 1' from edge of ex. shldr.
0.16 Mi. E. of Bus. Route 234 to 1.75 Mi. E. of Bus. Route 234

2.5” BUILD-UP

2” Mill; 3” IM-19.0D

1.5” SMA-9.5 (76-22)

3” IM-19.0D

11.5” BM-25.0A

14” 21B*

Ex. 8” 21B

Ex. AC 13.5”

Ex. 3” OGL

*10” CTA for widening on high side of pavement cross slope

UD-4

New Widening

Exsit. Pavement

saw cut 1’ from edge of ex. shldr.
1.75 Mi. E. of Bus. Route 234 to 0.48 Mi. E. of Route 29

2.5" BUILD-UP

2" Mill; 3" IM-19.0D

1.5" SMA-9.5 (76-22)

Ex. AC 14.5"

Ex. 3" OGD

Ex. 8" 21B

3" IM-19.0D

12.5" BM-25.0A

14" 21B*

UD-4

*10" CTA for widening on high side of pavement cross slope

New Widening

Exist. Pavement

saw cut 1' from edge of ex. shldr.
0.48 Mi. E. of Route 29 to Route 50 – Flexible Pavement Option

Remove ex. 11” PCC and 3” Ex. OGDL

6” BUILD-UP

<table>
<thead>
<tr>
<th>1.5” SMA-9.5 (76-22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2” SMA-12.5 (76-22)</td>
</tr>
<tr>
<td>13.5” BM-25.0A</td>
</tr>
<tr>
<td>New 3” OGDL</td>
</tr>
<tr>
<td>Ex. 6” CTA</td>
</tr>
<tr>
<td>Ex. 6” Soil Cement</td>
</tr>
<tr>
<td>New 6” CTA</td>
</tr>
<tr>
<td>New 6” Soil Cement</td>
</tr>
<tr>
<td>New Widening</td>
</tr>
<tr>
<td>Exist. PCC</td>
</tr>
</tbody>
</table>

UD-4

saw cut 1’ from edge of ex. shldr.

0.48 Mi. E. of Route 29 to Route 50 – Rigid Pavement Option

Remove ex. 11” PCC and 3” Ex. OGDL

4.5” BUILD-UP

<table>
<thead>
<tr>
<th>1.5” SMA-9.5 (76-22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2” SMA-12.5 (76-22)</td>
</tr>
<tr>
<td>12” CRCP, Standard PR-8</td>
</tr>
<tr>
<td>(Class I corrosion resistant steel, A4 concrete)</td>
</tr>
<tr>
<td>New 3” OGDL</td>
</tr>
<tr>
<td>Ex. 6” CTA</td>
</tr>
<tr>
<td>Ex. 6” Soil Cement</td>
</tr>
<tr>
<td>New 6” CTA</td>
</tr>
<tr>
<td>New 6” Soil Cement</td>
</tr>
<tr>
<td>New Widening</td>
</tr>
<tr>
<td>Exist. PCC</td>
</tr>
</tbody>
</table>

UD-4

saw cut 1’ from edge of ex. shldr.
Route 50 to I-495 (outside limits of Ex. Nutley Street C-D Road)
Flexible Pavement Option

Remove Ex. 4’ AC, 9”-11” PCC and 3” Ex. OGD/5” 21A

4.5” BUILD-UP

1.5” SMA-9.5 (76-22)
2” SMA-12.5 (76-22)

16” BM-25.0A

New 3” OGD

New 12” #2/#3 Agg*

needle punch geotextile

New Widening

Ex. 6” Soil Cement

Ex. 6” CTA

UD-4

Exist. PCC

→ saw cut 1’ from edge of ex. shldr.

*Reverse slope subgrade for widening on high side of pavement cross slope
Route 50 to I-495 (outside limits of Ex. Nutley Street C-D Road)
Rigid Pavement Option

Remove Ex. 4" AC, 9"-11" PCC and 3" Ex. OGDL/5" 21A

<table>
<thead>
<tr>
<th>0.5&quot; BUILD-UP</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5&quot;</td>
</tr>
<tr>
<td>25&quot;</td>
</tr>
<tr>
<td>25&quot;</td>
</tr>
<tr>
<td>1&quot; Ex. Agg. 21A</td>
</tr>
<tr>
<td>New 1&quot; Agg. 21B</td>
</tr>
<tr>
<td>New 3&quot; OGDL</td>
</tr>
<tr>
<td>12&quot; CRCP, Standard PR-8</td>
</tr>
<tr>
<td>(Class I corrosion resistant steel; A4 concrete)</td>
</tr>
<tr>
<td>needle punch geotextile</td>
</tr>
<tr>
<td>Ex. 6&quot; Soil Cement</td>
</tr>
<tr>
<td>Ex. 6&quot; CTA</td>
</tr>
<tr>
<td>New 12&quot; #2/#3 Agg*</td>
</tr>
<tr>
<td>New Widening</td>
</tr>
<tr>
<td>Exist. PCC</td>
</tr>
</tbody>
</table>

*reverse slope subgrade for widening on high side of pavement cross slope

saw cut 1' from edge of ex. shldr.
Route 50 to I-495 (within limits of Ex. Nutley Street - C-D Road)
Flexible Pavement Option

Remove Ex. 4” AC, 9”-11” PCC and 3” Ex. OGDL/5”21A

5” BUILD-UP

<table>
<thead>
<tr>
<th>5’</th>
<th>25’</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5” SMA-3.5@76-22</td>
<td>16.5” BM-25.0A</td>
</tr>
<tr>
<td>2” SMA-12.5 (76-22)</td>
<td></td>
</tr>
</tbody>
</table>

Ex. 6” Soil Cement
Ex. 6” 21A

1” Ex. Agg. 21A

3” New OGDl

New 0.5” Agg. 21B

New Widening

New 12” #2/#3 Agg*

needle punch geotextile

UD-4

Cut 1’ from edge of ex. shldr.

*reverse slope subgrade for widening on high side of pavement cross slope
Route 50 to I-495 (within limits of Ex. Nutley Street C-D Road)  
Rigid Pavement Option

Remove Ex. 4" AC, 9"-11" PCC and 3" Ex. OGDL/5"21A

0.5" BUILD-UP

1.5" SMA-9.5 (76-22)
2" SMA-12.5 (76-22)

12" CRCP, Standard PR-8  
(Class I corrosion resistant steel; A4 concrete)

needle punch geotextile

1" Ex. Agg. 21A  
3" New OGD

New 0.5" Agg. 21B

Ex. 6" Soil Cement  
Ex. 6" 21A

New 12" #2/#3 Arg

New Widening

Exist. PCC

UD-4

cut 1' from edge of ex. shldr.

*reverse slope subgrade for widening on high side of pavement cross slope
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 3.10
Aesthetic Treatments for Bridges
The aesthetic treatments of bridges shall be as outlined in Section 3.10 - Aesthetics, of the Technical Requirements. The following bridge pier aesthetic details are provided to supplement the requirements listed in the section above.

Architectural Treatment on Pier Columns

1.1 Straddle Bent Piers with Round Columns
1.2 Hammerhead Piers with Rectangular Column

ELEVATION
1.3 Multi Column Pier with Square Columns
1.4 Detail of Architectural Treatment

Note: Repeating pattern of treatment similar for round columns.
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 3.14a
Bridge Replacements Table
**Attachment 14a: Bridge Replacements Table**

*Transverse Sections shall be in accordance with Manual of the Structure and Bridge Division Volume V - Part 2 Chapter 6 unless noted below.*

<table>
<thead>
<tr>
<th>Facility Carried</th>
<th>Main Feature Intersected</th>
<th>Existing Federal ID / VA Struct. No.</th>
<th>FACILITIES INTERSECTED</th>
<th>LANE / SHOULDER WIDTHS FOR FACILITIES INTERSECTED</th>
<th>REPLACEMENT BRIDGE - TYPICAL SECTION</th>
<th>Bridge Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bull Run Drive Route 2548</td>
<td>I-66</td>
<td>6959 0296213</td>
<td>I-66 GP and Aux Lanes, Shldrs; I-66 Exp Lanes, Shldrs and future Metro facility</td>
<td>See attached</td>
<td>See attached</td>
<td></td>
</tr>
<tr>
<td>Sully Road Route 28</td>
<td>I-66</td>
<td>6260 0291029</td>
<td>I-66 GP and Aux Lanes, Shldrs; I-66 XP Lanes, Shldrs, Bike Trail and future Metro facility.</td>
<td>See attached</td>
<td>See attached</td>
<td></td>
</tr>
<tr>
<td>Lee Jackson Memorial Highway EBL Route 50</td>
<td>I-66</td>
<td>6299 0291121</td>
<td>I-66 GP, Aux and CD Lanes, Shldrs; I-66 XP Lanes, Shldrs, Bike Trail and future Metro facility.</td>
<td>See attached</td>
<td>See attached</td>
<td></td>
</tr>
<tr>
<td>Lee Jackson Memorial Highway WBL Route 50</td>
<td>I-66</td>
<td>6297 0291120</td>
<td>I-66 GP, Aux and CD Lanes, Shldrs; I-66 XP Lanes, Shldrs, Bike Trail and future Metro facility.</td>
<td>See attached</td>
<td>See attached</td>
<td></td>
</tr>
</tbody>
</table>
**Attachment 14a: Bridge Replacements Table**

*Transverse Sections shall be in accordance with Manual of the Structure and Bridge Division Volume V - Part 2 Chapter 6 unless noted below.*

<table>
<thead>
<tr>
<th>Facility Carried</th>
<th>Main Feature Intersected</th>
<th>Existing Federal ID / VA Struct. No.</th>
<th>FACILITIES INTERSECTED</th>
<th>LANE / SHOULDER WIDTHS FOR FACILITIES INTERSECTED</th>
<th>REPLACEMENT BRIDGE - TYPICAL SECTION</th>
<th>Bridge Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lee Jackson Memorial Highway WBL Route 50</td>
<td>Ramp B (to I-66 EB)</td>
<td>6301 0292080</td>
<td>Rte. 50 EB Ramp Lane</td>
<td>See attached</td>
<td>See attached</td>
<td></td>
</tr>
<tr>
<td>Waples Mill Road Route 665</td>
<td>I-66</td>
<td>6817 0296228</td>
<td>I-66 GP and Aux Lanes, Shldrs; I-66 XP and Ramp Lanes, Shldrs, Bike Trail and future Metro facility.</td>
<td>See attached</td>
<td>See attached</td>
<td></td>
</tr>
<tr>
<td>Jermantown Road Route 655</td>
<td>I-66</td>
<td>6798 0296223</td>
<td>I-66 GP and Aux Lanes, Shldrs; I-66 XP Lanes, Shldrs, Bike Trail and future Metro facility.</td>
<td>See attached</td>
<td>See attached</td>
<td></td>
</tr>
<tr>
<td>Chain Bridge Road SBL and NBL Route 123</td>
<td>I-66</td>
<td>6455 0291108</td>
<td>I-66 GP and Aux Lanes, Shldrs; I-66 XP Lanes, Shldrs and future Metro facility.</td>
<td>See attached</td>
<td>See attached</td>
<td></td>
</tr>
</tbody>
</table>
**Transverse Sections shall be in accordance with Manual of the Structure and Bridge Division Volume V - Part 2 Chapter 6 unless noted below.**

<table>
<thead>
<tr>
<th>Facility Carried</th>
<th>Main Feature Intersected</th>
<th>Existing Federal ID / VA Struct. No.</th>
<th>FACILITIES INTERSECTED</th>
<th>LANE / SHOULDER WIDTHS FOR FACILITIES INTERSECTED</th>
<th>REPLACEMENT BRIDGE - TYPICAL SECTION</th>
<th>Bridge Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaden Drive</td>
<td>I-66 &amp; Metro</td>
<td>6198 0292262</td>
<td>I-66 GP, Aux and CD Lanes; I-66 XP and Ramp Lanes, Shldrs, Pedestrian Sidewalk and existing Metro facility</td>
<td>See attached</td>
<td>See attached</td>
<td></td>
</tr>
<tr>
<td>Route 243 Nutley Street</td>
<td>I-66 &amp; Metro</td>
<td>6492 0291163</td>
<td>I-66 GP and CD Lanes, Shldrs; I-66 XP Lanes, Shldrs and existing Metro facility.</td>
<td>See attached</td>
<td>See attached</td>
<td></td>
</tr>
<tr>
<td>Cedar Lane</td>
<td>I-66 &amp; Metro</td>
<td>6865 0296220</td>
<td>I-66 GP and Aux Lanes, Shldrs; I-66 XP Lanes, Shldrs, Bike Trail and existing Metro facility.</td>
<td>See attached</td>
<td>See attached</td>
<td></td>
</tr>
</tbody>
</table>
**Attachment 14a: Bridge Replacements Table**

*Transverse Sections shall be in accordance with Manual of the Structure and Bridge Division Volume V - Part 2 Chapter 6 unless noted below.*

<table>
<thead>
<tr>
<th>Facility Carried</th>
<th>Main Feature Intersected</th>
<th>Existing Federal ID / VA Struct. No.</th>
<th>FACILITIES INTERSECTED</th>
<th>LANE / SHOULDER WIDTHS FOR FACILITIES INTERSECTED</th>
<th>REPLACEMENT BRIDGE - TYPICAL SECTION</th>
<th>Bridge Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gallows Road</td>
<td>I-66 &amp; Metro</td>
<td>6783 0296219</td>
<td>I-66 GP and Aux Lanes, Shldrs; I-66 XP Lanes, Shldrs, Bike Trail and existing Metro facility.</td>
<td>See attached</td>
<td>See attached</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Reference DE's and DW's as necessary
2. Piers outside current tracks (west of Vienna Metro) to be centered in median area
3. Replacement Bridge Typical Sections represent minimum bridge width requirements. Bridge width may need to be increased to meet project purpose and need.
4. Facilities Intersected listed in table above represent minimum requirements and may need to be modified to meet project purpose and need.
66 Express lanes

Attachment 3.14a

Typical Section - Bull Run Drive (Rte. 2548) over I-66
Proposed Facilities Under Bull Run Drive (Rte.2548) over I-66

66 Express lanes

TO BE DETERMINED BY FINAL DESIGN

Attachment 3.14a Bridge
Replacements Table
66 Express Lanes

Attachment 3.14a

Typical Section - Sully Road (Rte. 28) Southbound over I-66

Typical Section - Sully Road (Rte. 28) Northbound over I-66
Typical Section - U.S. Rte. 50 EB over I-66 & Metro

Typical Section - U.S. Rte. 50 WB over I-66 & Metro
66 Express Lanes

Attachment 3.14a

Typical Section - U.S. Rte. 50 Over I-66 EB Ramp B (STA. 6032+00)

Typical Section - Wapes Mill Road (Rte. 665) over I-66 & Metro
66 Express Lanes

Attachment 3.14a

Proposed Facilities under Sully Road (Rte. 28) SB over I-66 (STA. 5771+00)

Proposed Facilities under Sully Road (Rte. 28) NB over I-66 (STA. 5772+00)
66 Express Lanes

Attachment 3.14a

Proposed Facilities under U.S. Route 50 EB over I-66 (STA. 6020+00)

Proposed Facilities under U.S. Route 50 WB over I-66 (STA. 6028+00)
66 Express Lanes

Attachment 3.14a

Existing Facilities under U.S. Rte 50 WB over I-66 Ramp B (STA. 6032+00)

In Future Design
To Be Determined

Proposed Facilities under Waples Mill Road (Rte. 665) over I-66 (STA. 6051+00)

In Future Design
To Be Determined

Edge of Shoulder to Edge of Shoulder
66 Express Lanes

Attachment 3.14a

Proposed Facilities Under Jermantown Road (Rte. 655) over I-66 & Metro (Sta. 6093+00)

Proposed Facilities Under Chain Bridge Road (Rte. 123) over I-66 & Metro (Sta. 6131+50)
66 Express Lanes

Attachment 3.14a

Proposed Facilities Under Vaden Drive Bridge over I-66 & Metro (Sta. 6233+50)

Proposed Facilities Under Nutley Street (Rt. 243) over I-66 & Metro (Sta. 6256+00)
66 Express Lanes

Attachment 3.14a

Proposed Facilities Under Cedar Lane (Rte. 698) over I-66 & Metro (Sta. 6314+00)

Proposed Facilities Under Gallows Road (Rte. 650) over I-66 & Metro (Sta. 6370+00)
66 Express Lanes

Attachment 3.14a

Typical Section - Jermantown Road (Rte. 655) over I-66 & Metro (As Per Current Plan)

Typical Section - Jermantown Road (Rte. 655) over I-66 & Metro (Preliminary Future 4-Lane Bridge Widening)
66 Express Lanes

Attachment 3.14a

Typical Section - Chain Bridge Road (Rte. 123) over I-66 & Metro

Typical Section - Vaden Drive over I-66 & Metro
66 Express Lanes

Attachment 3.14a

Typical Section - Nutley Street (Rte. 243) over I-66 & Metro

Note:
- Provide 2' Min. or width necessary to meet Sight Stopping Distance on the ramps.

Typical Section - Cedar Lane (Rte. 698) over I-66 & Metro
66 Express Lanes

Attachment 3.14a

Typical Section - Gallows Road (Rte. 650) over I-66 & Metro
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 3.14b

Proposed Facilities at Proposed Express Lanes Access
Ramp Structure at Vaden Drive
Attachment 3.14b

Proposed Facilities at Proposed Express Lanes Access Ramp Structure at Vaden Drive
Attachment 3.14b

**Proposed Facilities at Proposed Express Lanes Access Ramp Structure at Vaden Drive**

**Figure 1 - Trough Detail**

1. **CPRR Steel Class III shall be used for all reinforcing steel in concrete trough.**
2. **Two layers of steel shall be used in trough walls and base (3" min. cover on trough side).**
3. **The trough shall be connected to a closed drainage system such that no runoff (including water used for flushing the trough) shall be permitted to discharge at ends of trough.**
Attachment 3.14b

Proposed Facilities at Proposed Express Lanes Access Ramp Structure at Vaden Drive

NOTES:

1. ONLY STEEL H-GIRDERS OR Prestressed Bulb-T Girders will be permitted as main supporting members in bridge superstructure.

2. REGARDLESS OF THE ORIENTATION OF THE MAIN SUPPORTING GIRDERs, THE TRANSVERSE DIRECTION IS DEFINED AS THAT DIRECTION GENERALLY ORIENTED PERPENDICULAR TO METRO TRACKS AND THE LONGITUDINAL DIRECTION IS THAT DIRECTION GENERALLY ORIENTED PARALLEL TO METRO TRACKS.

3. NO LONGITUDINAL JOINTS WILL BE PERMITTED.

4. IF ORIENTATION OF MAIN SUPPORTING GIRDERs IS LONGITUDINAL, THEN THE FOLLOWING REQUIREMENTS SHALL APPLY:

   i. EXCLUSIVE OF THE JOINTS AT THE WEST AND EAST ENDS OF THE BRIDGE, NO MORE THAN FIVE (5) INTERMEDIATE TRANSVERSE OPEN / EXPANSION TRANSVERSE JOINTS SHALL BE PERMITTED.

   ii. THE CONCRETE TROUGH DETAIL SHOWN IN FIG.1 SHALL BE USED AT EACH INTERMEDIATE JOINT LOCATION.

5. IF THE ORIENTATION OF THE MAIN SUPPORTING GIRDERs IS TRANSVERSE, THEN THE FOLLOWING REQUIREMENTS SHALL APPLY:

   i. EXCLUSIVE OF THE JOINTS AT THE WEST AND EAST ENDS OF THE BRIDGE, NO MORE THAN NINE (9) INTERMEDIATE TRANSVERSE OPEN/EXPANSION JOINTS SHALL BE PERMITTED.

   ii. THE CONCRETE TROUGH DETAIL SHOWN IN FIG.1 SHALL BE USED AT EACH INTERMEDIATE JOINT LOCATION.

   iii. ALL GIRDER ENDS SHALL BE FULLY ENCAPSULATED BY A CURTAIN WALL. CURTAIN WALLS SHALL BE CONNECTED TO ENDS OF GIRDERs IN A MANNER SIMILAR TO THAT USED FOR SEMI-INTEGRAL BACKWALLS, AS ShOWN IN THE DETAILS INCLUDED IN CHAPTER 17, VOLUME 5, PART 2 OF THE STRUCTURE AND BRIDGE MANUALs.

6. WITH THE USE OF ALTERNATE VIRGINIA ABUTMENT AT THE WEST END OF BRIDGE AND SPECIAL CONCRETE TROUGH DETAIL SHOWN IN FIG.1 OF THIS ATTACHMENT AT ALL JOINTs, THIS RAMP BRIDGE STRUCTURE MAY BE CONSIDERED TO BE IN COMPLIANCE WITH THE JOINTLESS DESIGN CONCEPT FOR THE PURPOSE OF DETERMINING LIMITS OF STRUCTURAL STEEL PAINTING.
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 3.14c

Existing Bridges and Culverts Information Table
<table>
<thead>
<tr>
<th>Facility Carried</th>
<th>Feature Intersection</th>
<th>Federal ID / VA Struct. No.</th>
<th>Bridge Plan Number</th>
<th>Potential Asbestos</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Blvd.</td>
<td>I-66 &amp; Norfolk Southern Railroad</td>
<td>26694 0766188</td>
<td>285-18</td>
<td>Yes</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14d Bridge Widenings and Repairs</td>
</tr>
<tr>
<td>Ramp A of PWP Rte.</td>
<td>Tributary of Catharpin Run</td>
<td>25234 0761042</td>
<td>--</td>
<td>--</td>
<td>Meet project purpose and need. *Double Box Culvert 6'W x 4'H x 47'</td>
</tr>
<tr>
<td></td>
<td>Culvert</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I-66 &amp; Pageland</td>
<td>Tributary of Young's Branch</td>
<td>24862 0762029</td>
<td>--</td>
<td>--</td>
<td>Meet project purpose and need. *Triple Box Culvert 6'W x 5'H x 288' (Total length = 24.9')</td>
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<td>Lane</td>
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<td>Prince William</td>
<td>I-66</td>
<td>24787 0761052</td>
<td>271-72</td>
<td>No</td>
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<td>Parkway EBL Route</td>
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<td>Prince William</td>
<td>I-66</td>
<td>24788 0761053</td>
<td>271-72</td>
<td>No</td>
<td>Meet project purpose and need</td>
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<tr>
<td>Parkway WBL Route</td>
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<td>I-66</td>
<td>Tributary of Young's Branch</td>
<td>14209 0762047</td>
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<td>Groveton Road</td>
<td>I-66</td>
<td>25960 0766082</td>
<td>280-04</td>
<td>No</td>
<td>Meet project purpose and need</td>
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<td>I-66</td>
<td>Tributary of Holkums Branch</td>
<td>28465 0762033</td>
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<td>Meet project purpose and need. *Double Box Culvert 5' x 5' x 270'</td>
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<td>Facility Carried</td>
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<td>Federal ID / VA Struct. No.</td>
<td>Bridge Plan Number</td>
<td>Potential Asbestos</td>
<td>Scope</td>
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<tr>
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<td>Sudley Road Route 234</td>
<td>14202 0762000</td>
<td>136-21, A, B, C</td>
<td>No</td>
<td>Meet project purpose and need.</td>
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<td>I-66 EBL</td>
<td>Sudley Road Route 234</td>
<td>28305 0762001</td>
<td>136-21, A, B, C, D</td>
<td>Yes</td>
<td>Meet project purpose and need.</td>
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<td>I-66</td>
<td>Holkums Branch (Culvert)</td>
<td>14208 0762046</td>
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<td>Meet project purpose and need.</td>
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<td>I-66 WBL</td>
<td>Bull Run</td>
<td>6380 0292900</td>
<td>136-22, A, B, C</td>
<td>No</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14d Bridge widenings and Repairs</td>
</tr>
<tr>
<td>I-66 EBL</td>
<td>Bull Run</td>
<td>6381 0292901</td>
<td>136-22, A, B, C</td>
<td>No</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14d Bridge widenings and Repairs</td>
</tr>
<tr>
<td>Bull Run Drive Route 2548</td>
<td>I-66</td>
<td>6959 0296213</td>
<td>136-16, A</td>
<td>No</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14a Bridge replacements.</td>
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<tr>
<td>I-66 WBL</td>
<td>Cub Run</td>
<td>24993 0292010</td>
<td>272-29</td>
<td>No</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14d Bridge widenings and Repairs</td>
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<td>Facility Carried</td>
<td>Feature Intersection</td>
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<td>Bridge Plan Number</td>
<td>Potential Asbestos</td>
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<tr>
<td>I-66 EBL</td>
<td>Cub Run</td>
<td>24994 0292011</td>
<td>272-29</td>
<td>No</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14d Bridge Widening and Repairs</td>
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<td>I-66 EBL</td>
<td>Compton Road Route 658</td>
<td>6311 0292012</td>
<td>136-19, A, B, C</td>
<td>Yes</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14d Bridge Widening and Repairs</td>
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<tr>
<td>I-66 EBL</td>
<td>Compton Road Route 658</td>
<td>6313 0292013</td>
<td>136-19, A, B, C</td>
<td>Yes</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14d Bridge Widening and Repairs</td>
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<td>I-66</td>
<td>Branch of Big Rocky Run (Culvert)</td>
<td>6328 0292123</td>
<td>–</td>
<td>–</td>
<td>Meet project purpose and need. Double Box Culvert 6' x 6' x 465'</td>
</tr>
<tr>
<td>I-66 WBL</td>
<td>Lee Highway Route 29 (Centreville)</td>
<td>6315 0292019</td>
<td>148-07, A, B, C, D, E, F</td>
<td>Yes</td>
<td>Meet project purpose and need.</td>
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<tr>
<td>I-66 EBL</td>
<td>Lee Highway Route 29 (Centreville)</td>
<td>6317 0292020</td>
<td>148-07, A, B, C, D, E, F</td>
<td>Yes</td>
<td>Meet project purpose and need.</td>
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<td>I-66</td>
<td>Branch of Big Rocky Run (Culvert)</td>
<td>6319 0292057</td>
<td>–</td>
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<td>Meet project purpose and need. *Triple Box Culvert 5' x 5' x 321'</td>
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<tr>
<td>Sully Road Route 28</td>
<td>I-66</td>
<td>6260 0291029</td>
<td>260-31, A, B</td>
<td>Yes</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14a Bridge Replacements.</td>
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<td>Facility Carried</td>
<td>Feature Intersection</td>
<td>Federal ID / VA Struct. No.</td>
<td>Bridge Plan Number</td>
<td>Potential Asbestos</td>
<td>Scope</td>
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<tr>
<td>I-66 WBL</td>
<td>Stringfellow Road Route 645</td>
<td>6320 0292059</td>
<td>271-09</td>
<td>No</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14d Bridge Widenings and Repairs</td>
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<tr>
<td>I-66 EBL</td>
<td>Stringfellow Road Route 645</td>
<td>6322 0292060</td>
<td>271-09</td>
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<td>Meet project purpose and need and the requirements of Attachment 3.14d Bridge Widenings and Repairs</td>
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<tr>
<td>I-66 WB CD Road</td>
<td>Fairfax County Parkway Route 286</td>
<td>24090 0292091</td>
<td>269-55</td>
<td>Yes</td>
<td>Meet project purpose and need.</td>
</tr>
<tr>
<td>I-66 WBL</td>
<td>Fairfax County Parkway Route 286</td>
<td>6376 0292266</td>
<td>268-21, A</td>
<td>Yes</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14d Bridge Widenings and Repairs</td>
</tr>
<tr>
<td>I-66 EBL</td>
<td>Fairfax County Parkway Route 286</td>
<td>6378 0292267</td>
<td>268-21, A</td>
<td>Yes</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14d Bridge Widenings and Repairs</td>
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<tr>
<td>I-66 EB CD Road</td>
<td>Fairfax County Parkway Route 286</td>
<td>24089 0292099</td>
<td>269-56</td>
<td>Yes</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14d Bridge Widenings and Repairs</td>
</tr>
<tr>
<td>I-66</td>
<td>Tributary of Big Rocky Run (Culvert)</td>
<td>6330 0292126</td>
<td>–</td>
<td>–</td>
<td>Meet project purpose and need.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>*Double Box Culvert 4' x 6' x 166'</td>
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<tr>
<td>West Ox Road Route 608</td>
<td>I-66</td>
<td>6667 0296229</td>
<td>268-25</td>
<td>No</td>
<td>Meet project purpose and need.</td>
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<tr>
<td>Facility Carried</td>
<td>Feature Intersection</td>
<td>Federal ID / VA Struct. No.</td>
<td>Bridge Plan Number</td>
<td>Potential Asbestos</td>
<td>Scope</td>
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<tr>
<td>Monument Drive Route 7969</td>
<td>I-66 &amp; Route 656</td>
<td>7076 0296023</td>
<td>268-18, A</td>
<td>No</td>
<td>Bridge modifications necessary to meet project purpose and need and the requirements of attachment 3.14d Bridge Widenings and Repairs.</td>
</tr>
<tr>
<td>Lee Jackson Memorial Highway EBL</td>
<td>I-66</td>
<td>6299 0291121</td>
<td>148-09, A</td>
<td>Yes</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14a Bridge Replacements.</td>
</tr>
<tr>
<td>Lee Jackson Memorial Highway WBL</td>
<td>I-66</td>
<td>6297 0291120</td>
<td>148-10, A</td>
<td>No</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14a Bridge Replacements.</td>
</tr>
<tr>
<td>Lee Jackson Memorial Highway WBL</td>
<td>I-66 EB Ramp B</td>
<td>6301 0291122</td>
<td>148-11</td>
<td>No</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14a Bridge Replacements.</td>
</tr>
<tr>
<td>I-66 Ramp A (Rte. 50 Interchange)</td>
<td>Difficult Run (Culvert)</td>
<td>6331 0292133</td>
<td>–</td>
<td>–</td>
<td>Meet project purpose and need. *Triple Box Culvert 6' x 8' x 903'</td>
</tr>
<tr>
<td>Ramp F (Rte. 50 Interchange)</td>
<td>Tributary of Difficult Run (Culvert)</td>
<td>6345 0292172</td>
<td>–</td>
<td>–</td>
<td>Meet project purpose and need. *Triple Box Culvert 6' x 8' x 335'</td>
</tr>
<tr>
<td>Ramp E (Rte. 50 Interchange)</td>
<td>Tributary of Difficult Run (Culvert)</td>
<td>6344 0292171</td>
<td>–</td>
<td>–</td>
<td>Meet project purpose and need. *Double Box Culvert 5' x 6' x 253'</td>
</tr>
<tr>
<td>I-66</td>
<td>Tributary of Difficult Run (Culvert)</td>
<td>6332 0292134</td>
<td>–</td>
<td>–</td>
<td>Meet project purpose and need. *Double Box Culvert 5' x 6' x 287'</td>
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<tr>
<td>Facility Carried</td>
<td>Feature Intersection</td>
<td>Federal ID / VA Struct. No.</td>
<td>Bridge Plan Number</td>
<td>Potential Asbestos</td>
<td>Scope</td>
</tr>
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<tr>
<td>Ramps B and H (Rte. 50 Interchange)</td>
<td>Tributary of Difficult Run (Culvert)</td>
<td>6343 0292169</td>
<td>-</td>
<td>-</td>
<td>Meet project purpose and need. *Double Box Culvert 5' x 6' x 174'</td>
</tr>
<tr>
<td>Waples Mill Road Route 665</td>
<td>I-66</td>
<td>6817 0296228</td>
<td>148-14, A</td>
<td>Yes</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14a Bridge Replacements.</td>
</tr>
<tr>
<td>I-66</td>
<td>Tributary of Difficult Run (Culvert)</td>
<td>6333 0292135</td>
<td>-</td>
<td>-</td>
<td>Meet project purpose and need. *Double Box Culvert 4' x 6' x 305'</td>
</tr>
</tbody>
</table>

**Segment 3**

<table>
<thead>
<tr>
<th>Jermantown Road Route 655</th>
<th>I-66</th>
<th>6798 0296223</th>
<th>148-05, A</th>
<th>Yes</th>
<th>Meet project purpose and need and the requirements of Attachment 3.14a Bridge Replacements.</th>
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</thead>
<tbody>
<tr>
<td>I-66</td>
<td>Tributary of Accotink Creek (Culvert)</td>
<td>6334 0292136</td>
<td>-</td>
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<td>Meet project purpose and need. *Double Box Culvert 4' x 6' x 30'</td>
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<td>Rte. 123 Ramp to I-66 WB</td>
<td>Tributary of Accotink Creek (Culvert)</td>
<td>6353 0292196</td>
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<td>Meet project purpose and need. *Double Box Culvert 4' x 6' x 30'</td>
</tr>
<tr>
<td>Ramp A of I-66</td>
<td>Tributary of Accotink Creek (Culvert)</td>
<td>6347 0292174</td>
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<td>Meet project purpose and need. *Double Box Culvert 5' x 6' x 258'</td>
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<tr>
<td>Ramp A of I-66</td>
<td>I-66</td>
<td>6326 0292080</td>
<td>148-12, A</td>
<td>Yes</td>
<td>Meet project purpose and need.</td>
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<td>Facility Carried</td>
<td>Feature Intersection</td>
<td>Federal ID / VA Struct. No.</td>
<td>Bridge Plan Number</td>
<td>Potential Asbestos</td>
<td>Scope</td>
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<td>Rte. 123 Ramp to I-66 EB</td>
<td>Tributary of Daniels Run (Culvert)</td>
<td>6351 0292194</td>
<td>-</td>
<td>-</td>
<td>Meet project purpose and need. *Double Box Culvert 5' x 6' x 276'</td>
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<tr>
<td>Chain Bridge Road SBL Route 123</td>
<td>Ramp A</td>
<td>6459 0291110</td>
<td>148-13, A, B</td>
<td>Yes</td>
<td>Meet project purpose and need.</td>
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<tr>
<td>Chain Bridge Road NBL Route 123</td>
<td>Ramp A</td>
<td>6461 0291111</td>
<td>148-13, A, B</td>
<td>No</td>
<td>Meet project purpose and need.</td>
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<tr>
<td>Chain Bridge Road SBL Route 123</td>
<td>I-66</td>
<td>6455 0291108</td>
<td>148-06 A, B, C</td>
<td>Yes</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14a Bridge Replacements.</td>
</tr>
<tr>
<td>Chain Bridge Road NBL Route 123</td>
<td>I-66</td>
<td>6457 0291109</td>
<td>148-06, A, B, C</td>
<td>No</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14a Bridge Replacements.</td>
</tr>
<tr>
<td>Rte. 123 Ramp to I-66 EB</td>
<td>Tributary of Accotink Creek (Culvert)</td>
<td>6352 0292195</td>
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<td>-</td>
<td>Meet project purpose and need. *Double Box Culvert 4' x 5' x 82'</td>
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<td>I-66 Ramp to Rte. 123 NB</td>
<td>Tributary of Accotink Creek (Culvert)</td>
<td>6346 0292173</td>
<td>-</td>
<td>-</td>
<td>Meet project purpose and need. *Double Box Culvert 4' x 4' x 64'</td>
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<tr>
<td>I-66</td>
<td>Tributary of Accotink Creek (Culvert)</td>
<td>6335 0292137</td>
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<td>Meet project purpose and need. *Double Box Culvert 4' x 5' x 190'</td>
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<tr>
<td>I-66</td>
<td>Tributary of Accotink Creek (Culvert)</td>
<td>6336 0292138</td>
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<td>-</td>
<td>Meet project purpose and need. *Triple Box Culvert 5' x 5' x 247'</td>
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<tr>
<td>Facility Carried</td>
<td>Feature Intersection</td>
<td>Federal ID / VA Struct. No.</td>
<td>Bridge Plan Number</td>
<td>Potential Asbestos</td>
<td>Scope</td>
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<tr>
<td>I-66</td>
<td>Tributary of Accotink Creek (Culvert)</td>
<td>6337 0292139</td>
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<td>Meet project purpose and need. *Single Box Culvert 6' x 6' x 251'</td>
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<td>Tributary of Accotink Creek (Culvert)</td>
<td>6338 0292140</td>
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<td>Meet project purpose and need.</td>
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<td>Blake Lane Route 655</td>
<td>I-66</td>
<td>6796 0296218</td>
<td>264-16</td>
<td>Yes</td>
<td>Meet project purpose and need</td>
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<tr>
<td>I-66</td>
<td>Tributary of Accotink Creek (Culvert)</td>
<td>6339 0292141</td>
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<td>–</td>
<td>Meet project purpose and need. *Double Box Culvert 5' x 6' x 413', Double 4' x 4' BC adjoins into this BC at middle and ends at same. Outlet shows a</td>
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<tr>
<td>Vaden Drive</td>
<td>I-66 &amp; Metro</td>
<td>6198 0292262</td>
<td>260-81, A</td>
<td>Yes</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14a Bridge Replacements and Attachment 3.14b Vaden Ramp.</td>
</tr>
<tr>
<td>WMATA Pedestrian Bridge</td>
<td>I-66 WBL</td>
<td>6384 Not avail.</td>
<td>–</td>
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<td>Meet project purpose and need.</td>
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<tr>
<td>WMATA Pedestrian Bridge</td>
<td>I-66 EBL</td>
<td>6385 Not avail.</td>
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<td>Meet project purpose and need.</td>
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<tr>
<td>I-66</td>
<td>Tributary of Accotink Creek (Culvert)</td>
<td>6340 0292142</td>
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<td>Meet project purpose and need. *Double Box Culvert 10' x 12' x 1700'</td>
</tr>
<tr>
<td>Nutley Street Route 243</td>
<td>I-66 &amp; Metro</td>
<td>6492 0291163</td>
<td>258-42, A, B</td>
<td>Yes</td>
<td>Meet project purpose and need and the requirements of Attachment 3.14a Bridge Replacements.</td>
</tr>
<tr>
<td>Facility Carried</td>
<td>Feature Intersection</td>
<td>Federal ID / VA Struct. No.</td>
<td>Bridge Plan Number</td>
<td>Potential Asbestos</td>
<td>Scope</td>
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</tr>
<tr>
<td>I-66 &amp; Metrorail</td>
<td>Bear Branch (Culvert)</td>
<td>6341 0292143</td>
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<td>Meet project purpose and need. *Double Box Culvert 10' x 10' x 288'</td>
</tr>
<tr>
<td>Cedar Lane Route 698</td>
<td>I-66 &amp; Metro</td>
<td>6865 0296220</td>
<td>162-03, A</td>
<td>Yes</td>
<td>Meet project purpose and need and the requirements of attachment 3.14a Bridge Replacements.</td>
</tr>
<tr>
<td>WMATA Pedestrian Bridge</td>
<td>I-66 EBL</td>
<td>6383 Not avail.</td>
<td>–</td>
<td>–</td>
<td>Meet project purpose and need.</td>
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<tr>
<td>Gallows Road Route 650</td>
<td>I-66 &amp; Metro</td>
<td>6783 0296219</td>
<td>162-04A</td>
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<td>Tributary of Holmes Run (Culvert)</td>
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* Based on latest Safety Inspection Report and provided for information only. Developer to verify as needed.
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 3.14d
Bridge Widening and Repairs Table
# Attachment 3.14d Bridge Widening and Repairs Table

<table>
<thead>
<tr>
<th>Facility Carried</th>
<th>Feature Intersected</th>
<th>Federal ID / VA Struct. No.</th>
<th>MODIFIED BRIDGE - TYPICAL SECTION</th>
<th>ADDITIONAL REQUIREMENT / RESTRICTIONS / NOTES</th>
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<tr>
<td>University Blvd. Route 840</td>
<td>I-66 &amp; Norfolk Southern Railroad</td>
<td>26694 0766188</td>
<td>Meet project purpose and need.</td>
<td>See Attachment 3.14e Bridge Repair Quantities Table. See attached Overpass and Underpass Typical Sections</td>
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<td>6311 0292012</td>
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**Attachment 3.14d**

**Typical Section - University Blvd. (Rte. 840) over I-66**

![Diagram of University Blvd. over I-66](image)

**Proposed Facilities Under University Blvd. (Rte. 840) over I-66**

![Diagram of Proposed Facilities](image)
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 3.14e
Bridge Repair Quantities Table
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See Notes and Figures attached.
Bridge Repair Quantities Table Notes

The cost of preparing plan for the repairs listed in Repair Quantity Table, including any necessary engineering calculations required for the preparation of repair details shall not be measured for separate payment and shall be included in the cost of the repair items.

**Replace Bearing** shall consist of removing existing bridge bearings and replace with new bearings. This work shall be performed in accordance with Sections 408 and 413, and the following:

This work shall consist of removing existing welds, removing and disposing of existing bearing components and anchor bolts, furnishing, painting and installing new bearing assemblies (including sole plate, anchor bolts, washers and nuts), placing and inspecting new welds, cleaning and applying paint to new bearings and any disturbed areas, and providing environmental, worker and safety protection, and disposal of material.

The existing structure is designated a Type B structure in accordance with Section 411 of the Specifications.

A plan for installing new anchor bolts shall be submitted to the Department for review and approval.

Beams shall be jacked a minimum distance as specified on the plans in order to relieve the load on the bearings. The cost of jacking and supporting beams shall be paid for under the pay item Jacking and Blocking.

Remove fillet weld between beam flange and sole plate, and remove the existing bearing assembly. Remove a portion of existing anchor bolts in accordance with the details.

Grind bottom of bottom flange to remove burrs. Clean bottom of flange in accordance with Specifications Section 411.04(a) Method 5.

Place the new bearing assembly.

Install new anchor bolts, nuts and washers.

Fillet weld sole plate to beam flange. New welds shall be inspected by magnetic particle testing to be performed by the Contractor.

The bearing assemblies shall be painted in the shop with the system specified on the plans. The new welds and all disturbed areas shall be cleaned and coated using the Coating System specified in the plans. Sole plate shall not be painted on the surface in contact with the elastomeric bearing.

Materials and Fabrication shall be in accordance with the applicable requirements of Section 408 of the Specifications. Steel in sole plates and other steel components of the bearings, except as
Bridge Repair Quantities Table Notes

noted on the details, shall be ASTM A709 Grade 36. Grout and adhesive material for anchor bolts shall be from the VDOT approved list.

Contractor shall verify heights of existing bearing assemblies prior to preparing shop drawings.

Immediately before casting the new anchor bolts in VDOT approved high-strength grout and mortar, the holes shall be thoroughly cleaned to the satisfaction of the Engineer.

**Reset Bearings** shall consist of resetting bearings to comply with the design parameters. A plan for resetting bearings shall be submitted to the Department for review prior to performing the work.

Each of the girders shall be jacked enough to relieve pressure from bearing, by an amount specified on the plans. The cost of jacking and supporting beams shall be paid for under the pay item Jacking and Blocking.

All new welds and areas where existing coating is disturbed shall be cleaned and re-coated using the Coating System specified on the plans.

**Remove and Replace Preformed Elastomeric Joint Sealer** shall consist of removing and disposing of existing joint material and replacing with new Class I joint system in accordance with Section 420 of the Road and Bridge Specifications.

Prior to placement of new sealer, existing joints shall be cleaned by abrasive blasting followed by brushing and or oil free compressed air so that it is free from dust, oil grease, or other foreign material.

Spalls greater than ¼” from vertical face of joint shall be repaired in accordance with the details shown in Figure 1.

**Expansion Joint Reconstruction (Very High Early Strength)** shall be performed in accordance with Section 412 of the Road and Bridge Specifications and the following:

Expansion Joint Reconstruction shall consist of removing and disposing of existing concrete and any existing joint armor, repairing and replacing reinforcing steel, as may be required by the Department, preparing the contact surfaces, and furnishing and placing new concrete and reinforcing steel, in accordance with the details shown in Figure 2. Concrete used in Expansion Joint Reconstruction shall be Very-Early-Strength Latex Modified Concrete in accordance with Section 425 of the specifications

The cost of elastomeric expansion dam shall be paid for under the pay item Elastomeric Expansion Dam.

**Deck Slab Closure** shall be in accordance with Section 412 of the Road and Bridge Specifications and the following:
Bridge Repair Quantities Table Notes

Deck Slab Closure shall consist of repairing bridge decks for link slabs at piers in accordance with the details shown in the Manual of the Structure and Bridge Division Volume V Part 2 File No. 10.02-2 and including parapet concrete as required by the Department.

Unless otherwise approved by the Department, concrete for the deck slab closure shall be Class A4, or Early-Strength / Very-Early-Strength Latex Modified Concrete in accordance with Section 425 of the specifications.

Concrete Superstructure Surface Repair shall be performed in accordance with the requirements of Section 412 of the Road and Bridge Specifications. The use of shotcrete will not be permitted.

Type A Milling (1”), Type A Hydro-demolition (1/2”), Furnish Latex Modified Concrete (Very High Early Strength) (1 1/2”-2”) and Place Latex Modified Concrete shall be completed in accordance with the requirements of Section 425 of the Specifications and the following:

The depths of milling and hydro-demolition noted above were established on the basis of 2 ½” concrete deck cover shown on the as built plans. The Developer shall verify actual concrete deck cover using industry accepted sampling methods prior to commencement of milling operations. Milling of deck to within ¾” of the top of top mat of reinforcing steel shall not be permitted.

Zone Coating of Existing Structures (Str. No's 2059) shall include zone coating of the entire 2 feet of beam ends including bearings and diaphragms.

Zone Coating of Existing Structures (Str. No's 2060) shall include zone coating of the entire 2 feet of beam ends including bearings and diaphragms.

Clean and Paint Bearings at Abutments shall be completed in accordance with the requirements of Section 411 of the Road and Bridge Specifications for Zone Coating of Existing Structures.

Concrete Substructure Surface Repair shall be performed in accordance with the requirements of Section 412 of the Road and Bridge Specifications. The use of shotcrete will not be permitted.

Crack Repair Type B (Pier or Abutment) shall be completed in accordance with the requirements of Section 412 of the Specifications.

Erosion Control Riprap shall be in accordance with the requirements of Section 414 of the Road and Bridge Specifications for Dry Riprap. Unless otherwise approved by the Department, size of the dry riprap shall be in close conformity with the size of existing riprap.

Clean and Wash Abutments and Piers shall consist of the removal of debris from abutments and piers followed by pressure washing of all exposed faces of abutments and piers to remove dust and contaminants. Worker protection and collection and discharge of debris and water...
Bridge Repair Quantities Table Notes

generated from cleaning shall be in accordance with the contract requirements and shall be included in the cost of Clean and Wash Abutments and Piers.

Remove Vegetation shall consist of removing and disposing of trees, shrubs and vegetation noted in the most recent National Bridge Inspection Standards bridge inspection report for the structure. Debris shall be disposed of in accordance with the contract requirements.

Repair of Embankment Erosion shall consist of preparing and backfilling holes, gullies and other embankment erosion as noted in the most recent National Bridge Inspection Standards bridge inspection report for the structure. Backfilling to original lines and grades shall be completed in accordance with the requirements of Section 303.04(f) and 303.04(g) of the Road and Bridge Specifications.

Repair Gaps Between Back Walls and MSE Panels/Wing Walls shall consist of evaluation and if necessary repair of gaps noted in the most recent National Bridge Inspection Standards bridge inspection report for the structure. Noted gaps shall be evaluated by the Design Consultant to determine if repairs are necessary to avoid further loss of functionality for the remaining life of the structure, as defined by Contract handback requirements. Details for the repair shall be developed by the Design Consultant with review and approval by the Department.

Unclog Deck Drains shall consist of unclogging, cleaning and removal of debris from bridge drainage system. Worker protection and the collection and discharge of debris and water generated from cleaning shall be in accordance with contract requirements and shall be included in the cost of Unclog Deck Drains.
Attachment 3.14e Bridge Repair Quantities Table Notes

NOTES:
1. RECONSTRUCTION LIMITS SHOWN ARE FOR ELASTOMERIC CONCRETE SYSTEM.

FIGURE 1 - SECTION THROUGH SLEEPER PADS AND APPROACH SLABS
66 Express Lanes

Attachment 3.14e

Bridge Repair Quantities Table Notes

- Remove existing concrete and existing preformed expansion joint sealer. Reconstruct with Class A4 concrete and elastomeric expansion dam.

- Type I expansion dam shown. Type F2 equally acceptable.

- Top of deck:
  - 1" depth saw cut, don't cut exist. bars

- Back of backwall:
  - Edge of exist. deck slab

- Approach slab:

NOTES:
1. Existing reinforcing steel to be cleaned and incorporated into new concrete.

Figure 2 - Section at abutments A & B
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 3.14f
New Bridges – Additional Requirements
Notes:

1. All abutment elements, including piling, walls (MSE, Soil Nail, etc.) shall be located behind this line (i.e. outside clearance box).
2. Bridge piers may be located within clearance box provided that such piers locations are coordinated with roadway designer to provide required horizontal clearance to edge of existing / future roadways, other facilities including any existing or proposed paths.
3. Location of clearance box in reference to centerline/baseline of facility intersected shall be coordinated with and approved by the Department to maximize flexibility for expansion of facilities intersected.

Proposed Bridges:

1. Proposed I-66 WBL CD over Route 234 (Sudley Road): \( D = 190 \) ft.
2. Proposed I-66 EBL CD over Route 645 (Stringfellow Road): \( D = 121.33 \) ft.
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 3.15
I-66 Operations Concept Technical Report
(December 2015)
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CHAPTER 1 PURPOSE OF DOCUMENT

The purpose of this document is to describe the rationale for the expected operations of the I-66 corridor, outside the Beltway, during and after the construction of improvements that will include Express Lanes in both directions. The extent of construction along this corridor will require all existing technology-related infrastructure to be updated. These technology updates will support incident management, traveler information, active traffic management (ATM), integrated corridor management (ICM), and connected vehicles research. This operations concept report document is the result of the Virginia Department of Transportation (VDOT) and stakeholder input regarding how the corridor will operate so the right technology improvements can be included in the project.

CHAPTER 2 OVERVIEW OF TOLLING AND TRAFFIC OPERATIONS

2.1 Tolling

The two Express Lanes in each direction of I-66 within the study area would operate as managed lanes 24 hours a day. Section 1121 (codified at 23 USC 166) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy For Users (SAFETEA-LU) allows for tolling of HOV facilities. In accordance with the legislation, buses, carpools (HOV-3), motorcycles, and emergency vehicles would have free access to the new Express Lanes. Drivers of vehicles, including small and medium trucks, with fewer than three occupants could choose to pay a toll to access the Express Lanes. Tractor-trailer trucks would be prohibited.

Tolls for the Express Lanes would vary according to traffic conditions to regulate demand and keep them operating at an acceptable level of service at all times of the day. As managed lane traffic volumes increase, tolls would increase to temper demand for the lanes. Likewise, as traffic volumes decrease, tolls would decrease to make the lanes more attractive.

Fully electronic tolling would require customers to pay tolls with E-ZPass. There would be no toll booths. Electronic signs would display toll rates to help drivers decide whether to access the Express Lanes. Drivers would lock in their toll rate for the specific toll segment when they enter the Express Lanes. Under provisions of 23 USC 166(d), annual certification must be made that operational performance monitoring programs and enforcement programs are in place to ensure that the performance of the facility is not degraded and that the facility is operated in accordance with the restrictions and requirements of 23 USC 166.

2.2 Traffic Operations/Intelligent Transportation Systems

Currently, VDOT uses technology to manage traffic on the I-66 corridor. From the McConnell Public Safety Transportation Operation Center (MPSTOC) in Fairfax, VDOT monitors traffic conditions through surveillance cameras, dispatches Safety Service Patrol (SSP) vehicles, and provides incident, construction and congestion information to the public through the 511 phone service and co-branded website and mobile app.

This project necessitates reconstruction of all the roadside technology components. The following components are currently in place and will be affected by the project.
Active Traffic Management (ATM) System. VDOT currently operates an Active Traffic Management (ATM) system from the Washington, DC line to US 15 in Haymarket. This system includes:

- full span gantries with lane-by-lane overhead dynamic message signs to alert drivers of closed lanes ahead, including the status of the shoulder lane which opens to traffic during peak periods, and variable speed limits to warn drivers to slow down when approaching congestion
- Cameras with video analytics to monitor for stopped traffic on the shoulder lane
- Adaptive ramp metering (inside the beltway only), where on-ramp metering rates adjust in response to current traffic flow rates and ramp queues

Under this project, new gantries will be located throughout the corridor to provide back-of-queue warnings, speed harmonization and lane control indications. The algorithms and logic have already been developed so this project only includes replacement of the field elements. Actual locations will be determined based on project requirements and design considerations.

Other ITS Devices. The corridor is instrumented with devices common to the rest of the freeway network, which includes 54 surveillance cameras, 42 dynamic message signs and 193 vehicle detectors (a combination of in-pavement inductive loops and pole-mount side-fire radar detectors)

These devices will be replaced though specific locations and spacing will be determined based on project requirements and design considerations.

Connected Vehicle Roadside Units. As cars become better equipped with communications technologies for mobility and safety applications, DOTs are researching ways to leverage that information to better manage traffic and improve safety. VDOT has an active research project in the I-66 corridor with 48 roadside units (RSUs) installed on camera poles with radios that can communicate with equipped vehicles.

These devices will remain operational during construction and relocated to new structures as necessary.

Fiber Optic Communications Backbone. VDOT has a fiber optic communications backbone in a redundant ring over I-66, I-395, I-95 and VA-234 that transmits data to and from all field devices back to the MPSTOC. If any part of that is cut, data traffic is re-routed in the opposite direction. The I-66 portion of that backbone has 96 strands and three shelters with aggregation points. In line with industry trends, the demand for communications bandwidth is expected to increase substantially in the future.

The backbone will be kept intact during construction and replaced with new conduits and communications cable per project requirements.

CHAPTER 3 OPERATIONAL NEEDS AND GOALS
During the project development phase, the following overall system deployment goals were identified that have been incorporated in the project scope:
- The users of the system should get real-time information to make informed decisions.
- Operations of the I-66 corridor, regardless of the managed lanes or general purpose lanes, should be seamless to users.
- Effective response to crashes and incident management will help reduce congestion; therefore, CCTV cameras and detectors should be provided throughout the corridor.
- The combination of ATM and ICM is necessary to fully manage the operations of the corridor.
- Lane Control Signs (LCS) and DMS should be used to warn motorists of incidents ahead.
- Information should be freely shared across agencies for successful ICM.
- ATM deployment should use the current lower investment costs similar to the deployment along the I-95 corridor.
- VDOT must be able to maintain operations at all times during construction.
- VDOT will need to take full advantage of the ATM system to augment MOT during construction.
- ICM should include parking and multimodal travel information at park-and-ride lots, transit information, and enhanced arterial operations during major freeway events.
- VTRC is using a portion of I-66 for a CV test bed and will need those devices to remain operational for research purposes.
- CV technologies are being researched on I-66, but traditional ITS devices will be needed for the foreseeable future.
- Though technology evolves rapidly, it is widely agreed that the need for communications bandwidth will only increase. Therefore a solid communications backbone with room for growth will be provided in this project to support future ITS, CV, and AV deployments.
- This project needs to have the ability to provide performance measures required by MAP-21.

CHAPTER 4  CONCEPT FOR THE PROPOSED SYSTEM AND ALTERNATIVES

4.1 Overarching Considerations

With respect to technology life cycle, connected and autonomous vehicles, the role of the private sector, and managing system performance, the following overarching statements will guide VDOT’s operations concept for the corridor:

4.1.1 Technology Life Cycle

As the rate of changing technology continues to increase, it is anticipated that many current technologies will be obsolete in about 10 years. To mitigate this risk, VDOT must consider technology solutions that allow for this probability of obsolescence.

The level of detail should consider the rate of technology change and adoption of new legislation related to connected vehicles during the time between the request for proposals (RFP) (anticipated to be December 2015) and construction (2017 through 2020). Therefore, the corridor operations vision should be functional and outcomes-based, using performance metrics (or matrices).

Fiber optic communications is as close to a future-proof technology as exists at this time. Demand for communication bandwidth will only increase with in-vehicle technologies. Therefore, VDOT will invest in a high-capacity, redundant fiber optic backbone.
4.1.2 Connected and Autonomous Vehicles

Connected and autonomous vehicles are the future. Roadside infrastructure and applications are still in research and development and therefore rapidly evolving. VDOT should plan to invest and re-invest in roadside infrastructure to stay at the forefront of this rapidly emerging technology.

VDOT will still need "traditional" ITS technologies and operations paradigms while connected vehicle technologies mature to the point where they can start to replace those technologies, including enough vehicle penetration with on-board equipment to take full advantage of the technology.

4.1.3 Role of the Private Sector

The private sector is leading the way in terms of the end-user experience. VDOT should therefore focus less on heavy ITS infrastructure and more on the acquisition of data and making that data available to third parties to incorporate into third-party applications and services.

Recognizing that the private sector is inclined to be creative with respect to the revenue-generating portion of the project (i.e., managed lanes), the operations concept is more descriptive of its intentions for the general purpose lanes than the Express Lanes.

4.1.4 Managing Performance

Through MAP-21, The United States Department of Transportation (USDOT) is providing national leadership in system performance management. Given USDOT requirements, VDOT will measure volumes and travel times to support the calculation of congestion performance measures such as vehicle-hours of delay and travel time reliability.

VDOT Northern Virginia District's Public Safety and Traffic Operations Center (PSTOC) will continue to manage operations for the overall I-66 corridor.

4.2 Incident Management Systems

Crashes account for a significant share of overall vehicle hours of delay; therefore, effective surveillance, rapid response, and efficient scene management will be needed to reduce the impact of incidents. The PSTOC, as the entity responsible for incident management on the I-66 corridor, must have accurate real-time data to efficiently respond to highway incidents on general purpose lanes. The Developer would be responsible for incident management on managed lanes. However, the corridor should be managed cooperatively so that the experience is seamless to the road user.

4.2.1 General Purpose Lanes

4.2.1.1 Full Visual Coverage at PSTOC

Closed-circuit television (CCTV) cameras are the best means of surveillance of the corridor, and provide visual confirmation of incidents. When the PSTOC can remotely see exactly the severity and type of incident, the dispatcher can effectively put together a team of required personnel to clear the incident and quickly improve traffic flow. This visual information can only currently be provided by a full fleet of CCTV cameras along the entire length of the corridor. Thus, the suggested minimal infrastructure need is Pan-Tilt-Zoom (PTZ) cameras at 1-mile spacing.
In times of low visibility, such as night-time or foggy or stormy conditions, video images become unusable. To eradicate the problem of low lighting, lighting should be installed along the entire length of the corridor. I-66 currently has sufficient lighting, but lighting fixtures should be replaced after tear-down during the construction process. The Developer must replace lighting in-kind at a minimum, or may install upgraded lighting.

Automatic incident detection is possible with video analytics technology; however, this technology performs in outdoor environments and where traffic routinely slows due to recurring congestion. As a result, it produces many false alarms. For this reason, video analytics will not be used on the general purpose lanes, and will only be used on managed lanes if desired by the Developer.

4.2.1.2 Traveler Information

En-route and pre-trip traveler information allow motorists to make informed travel choices when incidents occur. DMS and lane control signs are VDOT’s primary means of disseminating en-route traveler information. The lane control signs can alert drivers of blocked lanes ahead and can post lower advisory speeds to slow traffic approaching the end of congestion to improve safety. Pre-trip traveler information empowers road users to make informed choices about their paths of travel. VDOT has developed a robust 511 traveler information app and website to allow users to make informed choices.

Through the I-95 Corridor Coalition, VDOT has access to probe vehicle data, which provides speeds across the state without any infrastructure deployment. This data is accurate enough for most applications; however, this type of service relies heavily on smartphone positional data, which is currently not accurate enough to differentiate between drivers travelling in general purpose lanes and managed lanes. Often, travel in managed lanes is faster than general purpose lanes, and mixing the two data sets misrepresents both conditions. But, this may be a temporary shortcoming. Smartphone GPS technology is limited by the form factor and battery life of the phone. Other types of portable GPS units (e.g., running or biking watches) are more accurate. Therefore, as GPS, smartphone, and battery technology improves over time, probe vehicle data may become accurate enough to differentiate a driver’s position by lane. Cars also are adding more advanced technologies each year and these types of connected vehicle technologies could introduce greater levels of positional accuracy as well.

Another potential source of traveler information is Waze. Waze is a smartphone app that uses crowdsourcing to gather incident and travel delay information. More than 10 public agencies in the United States and Europe have entered formal partnerships with Waze to exchange information. Florida DOT, in particular, is both receiving and sharing real-time incident information with Waze so that users of FDOT’s 511 and Waze receive the same information. VDOT could consider this type of partnership to supplement its own surveillance.

4.2.1.3 Weather Information

Currently, VDOT has no ESS in the corridor. A minimum of three ESS should be installed within the corridor to collect pavement temperature, wind speed, and accumulation, at a minimum—one at each end and one near the midpoint of the corridor.

4.2.1.4 Support for CAD Dispatch of Safety Service Patrol

VDOT will continue to dispatch SSP on the general purpose lanes as currently.
4.2.2 Managed Lanes

It is envisioned that the Developer will manage incidents on the I-66 Express Lanes. Though details would be determined after contract award, VDOT will require the Developer to maintain systems and infrastructure required to support incident management.

4.2.2.1 Incident Response

On managed lanes, the Developer can choose their incident detection and response method in order to meet the contract requirements. The Developer will be required to respond to incidents within the time duration specified in the contract.

4.2.2.2 Full Visual Coverage at Traffic Operations Center (TOC)

To maintain daily operations and respond to incidents in managed lanes, the Developer should staff a TOC to monitor conditions on the Express Lanes via CCTV cameras. This TOC should be of minimal size and expense—only what is necessary to meet contract requirements.

4.2.2.3 Traveler Information

The Developer will collect traffic speed, traffic volume, and real-time toll rate data on the managed lanes. The Developer will need to provide a real-time feed with this data to VDOT. VDOT must have free and open access to the data the Developer collects on the managed lanes, and VDOT shall not be restricted from freely sharing this data with the public or any third party.

4.2.2.4 Weather Information

Pavement temperature information is required on the managed lanes. A real-time feed with this data must be provided to VDOT, with no restrictions on use or redistribution.

4.2.2.5 Support for CAD Dispatch of Safety Service Patrol

The Developer's incident management will need a radio system that is compatible with the State Police's Statewide Agencies Radio System (STARS). Towing of disabled vehicles on managed lanes should be provided by a list of providers with a fixed contract price. Emergency situations on the managed lanes should have emergency response vehicles at the scene in the shortest possible timeframe.

4.3 Connected Vehicles

A portion of I-66 is being used as a test bed for connected vehicle systems and there are plans to expand the limits of the testing area. The Virginia Transportation Research Council (VTRC) is currently conducting research on connected vehicles (CV) on I-66. Existing roadside units with dedicated short-range communications (DSRC) radios for Vehicle to Infrastructure technologies must be kept operational during construction. These units are installed along I-66 and parallel arterials between Gainesville and I-495, with plans to extend to Route 15 in Haymarket. This equipment is currently located on existing CCTV poles, drawing power from roadside ITS cabinets. VDOT will accept a short-term downtime for a limited number of existing CV equipment (i.e., less than 48 hours).

With CV infrastructure on this corridor, the research focus will be on work zone management, incident management, dynamic merge assist, and signal operations enhancements. Although the National Highway Traffic Safety Administration's (NHTSA) may issue a rule requiring vehicles include CV technology, in the meantime equipped vehicles will generally have aftermarket units on board and
participation will be on an opt-in basis. It is estimated that a minimum suite of CV technologies will be on all vehicles between 2025 and 2040.

4.4 ICM Systems

The goal of an ICM system is to make effective use of all travel modes and parallel routes in the corridor to effectively move people and goods. This is done through infrastructure investment, but also through ensuring the free sharing of information between operating agencies and private sector applications and services. This allows VDOT to leverage the innovation capabilities of the private sector to develop traveler information applications. VDOT does not anticipate any ICM field equipment being deployed as part of this project. Rather, the focus will be on making any information collected on the corridor freely available to third parties. For this reason, the Developer must make collected data available to VDOT to share without restrictions.

Any data collected on park-and-ride lots, transit, bike share, parallel arterials, and managed lanes should be disseminated to private application providers, existing ATMS, and existing advance traveler information system (ATIS) applications.

A concept of what ICM could include in the corridor is shown in Figure 4-1. This is shown for illustrative purposes only, and is included to give some context to the discussion. By providing information—in this example travel times—on multiple modes, travelers can make informed choices and the corridor capacity can be better utilized.

![Figure 4-1. ICM Concept (for illustrative purposes only)](image)

4.4.2 Park-and-Ride Lots

VDOT will be performing a pilot project that collects parking availability data from park-and-ride lots on I-95 in Dale City and pushes the information to 511 and interstate signage. After implementation and review, VDOT will release a Draft Report of Findings, and will include this in the enhanced 511 system. The goal of this project will be to provide information regarding available spaces on 511 and DMS on the interstate, which will allow lot users to make informed decisions on which park-and-ride lot to use along I-95. VDOT also will be relying on parking information apps from the private sector.

Park-and-ride lots are to be included in the I-66 Corridor Improvements Project and will have information systems for bus arrivals and parking availability. Each park-and-ride located along the corridor should have a shelter installed with an equipment cabinet and access to power and fiber communications to enable dissemination of real-time information to the users.
4.4.3 Transit

Arrival and departure information in real-time for bus transit and Metrorail transit also will be integrated. If collected, seat availability on each of these transit vehicles will also be shared with the public. Accurate and real-time information about transit vehicle service along the I-66 corridor will be beneficial to road users, giving them a choice about which park-and-ride location to use and efficiently catch the next bus or train.

4.4.4 Bike Share

Similar to transit, if the Developer and/or VDOT agree to provide bike share availability at locations near the corridor (e.g., at park-and-ride lots), as well as bike rack space availability on buses, this information should be shared freely.

4.4.5 Parallel Arterials

Parallel arterial travel time information may be collected by existing and future count stations on parallel arterials. This information also may be available through smartphone applications using GPS location services. By making count station information available to mobile applications and in-vehicle computers, a traveler along the I-66 corridor may choose to avoid congestion on the freeway and take a parallel arterial, saving time without paying for the Express Lanes. This information will also be detrimental to the Developer's cost model, and should be provided by VDOT, if VDOT so chooses.

4.4.6 Managed Lanes

The managed lanes are part of an integrated corridor. In addition to the information on parking, transit, bike sharing, arterials, and the general purpose lanes, the provision of travel times and toll rates on the managed lanes will be an important part of enabling travelers to make their best travel choices.

4.5 Data Collection and Monitoring Systems/Performance Management

As part of upcoming MAP-21 performance measure requirements related to congestion reduction and system reliability, VDOT has developed a process for calculating and reporting system performance statewide. Currently, VDOT is reporting on:

- Vehicle-hours of delay
- Incident duration
- HOV lane performance

The contractor will be required to report on these measures for the managed lanes. Under provisions of 23 USC 166(d), annual certification must be made that operational performance monitoring programs and enforcement programs are in place to ensure that the performance of the facility is not degraded and that the facility is operated in accordance with the restrictions and requirements of 23 USC 166. In addition, the corridor will be required to operate with the performance criterion established by the contract.

VDOT needs speed and volume to calculate vehicle-hours of delay. This data currently comes from a combination of INRIX and vehicle counts stations. As part of this project, it is assumed that speed data can come from INRIX or another third party probe vehicle data provider, but it will be incumbent on the Developer to determine the best source of data to meet VDOT’s needs. Volume data must come from
count stations along the corridor, but as long as the data is provided, the Developer may use any available technology or service.

On managed lanes, speed monitoring should be a priority for the Developer. The definition of minimum operating speed based on the Federal Degradation Standard on managed lanes should be 45 mph on an HOV facility with a speed limit of 50 mph or greater, and not more than 10 mph below the speed limit if the HOV facility has a speed limit less than 50 mph. To avoid degrading the facility, the vehicles must maintain a minimum average operating speed 90 percent of the time during a consecutive 180-day period during morning or evening weekday peak hour periods. However, VDOT recommends a minimum average operating speed of 55 mph on the managed lanes, and will consider 55 mph as the performance target for maintained free flow speed.

To enable private companies to develop reliable traveler information, the data collected must be shared to VDOT and available to the public, with no restrictions on use. The travel time data collected on the general purpose lanes will be displayed in real time on DMS along the corridor, while the travel time on managed lanes will not be required to be displayed.

4.6 Communications

I-66 requires a highly reliable, secure, and available communications network serving both general purpose and managed lanes. The Developer will be expected to build the fiber optic backbone to support communication needs for up to 30 years in the future. A new duct bank will be constructed for this project with sufficient capacity for future growth.

4.7 ATM

The ATM system currently being constructed on I-66 will need to be removed based on the proposed footprint, and the corridor will need to accommodate a different ATM system. The ATM system currently allows VDOT to dynamically open HOV and shoulder lanes in response to traffic, incidents, and special events. Under the new project, there are no HOV or dynamic shoulder lanes. The ATM system constructed under the new project will be focused on mainline lane controls, back-of-queue warnings and speed harmonization.

A concept of the lane indications rendered on top of the existing roadway is shown in Figure 4-2. Note that static or dynamic signs could be places on the structure over the lane control signs.
Figure 4-2. Concept of lane control signs and indications

VDOT is considering a scenario that will allow hard shoulder running at ramp junctions where there are no auxiliary lanes under the new project. However, unlike the current ATM system, this would only be done in under incident conditions. This concept will not be implemented initially, but will be subject to further study of traffic and safety impacts.

Making the shoulder lane available would create four general purpose lanes on I-66. The benefits of this would include:

- Opening the shoulder lane where there are no auxiliary lanes will preserve the number of lanes for general purpose users.
- General purpose lanes will experience less congestion.

The challenge would be to ensure safe operations in the merge areas.

Providing shoulder lane usage would be limited to incident scenarios only, where traffic demand far exceeds available capacity and Express Lanes demand is minimally affected. The control at the ramp junctions would need to be designed carefully in these cases. It should also be noted that this scenario should only be considered with an incident blocking the left lane(s). If the crash is on the right side of the roadway, the right shoulder will be used for emergency vehicles. If the incident is in the center lanes, emergency crews will generally block the right lanes for access.
4.8 Infrastructure Maintenance During Construction

A Transportation Management Plan (TMP) is needed for the construction and post-construction periods. A formal TMP will be fully fleshed out between the Developer and VDOT after the RFP is awarded. The TMP will include:

- Maintenance of traffic (MOT) that is examined early in the project development process.
- Options for TDM during construction that include implementing HOV-3 during construction, possibly for 24 hours a day.
- A plan for using the shoulder lane as a general purpose lane.
- Emphasis of work zones for increased safety and capacity for both managed lanes and general purpose lanes.

Technical requirements will be developed for the maintaining of assets during each construction phase with the goal of keeping the assets functional for the longest duration of time possible. Technical requirements will include:

- A possible advance project depending on the details of the I-66 project, including the elements that will be constructed and during which construction phases.
- Installation of temporary fiber lines during construction at the edge of the right-of-way, which may require temporary overhead installation.
- Power distribution relocations.
- Other ITS/communications relocations.
- Developer to coordinate with Serco team who are involved with the TOC and ATMS.
- Maintenance of tolling signs for advance warning during construction prior to I-495.
- Operational requirements for the Developer during construction and post-construction.
- Cost analysis of relocating existing cameras after construction instead of replacing them with new devices.
- Requirements for maintenance of existing infrastructure during the construction of new infrastructure.
- Requirements for replacing lighting in-kind.

Operational strategies for infrastructure maintenance during construction include:

- Data Management
  - Collection and integration of construction information and data
  - Dissemination of construction information and data
  - Integration of construction information with ATMS and CV data dissemination components

- Operational
  - Shoulder operating all the time during construction
  - Consider shoulder as travel lane

- VDOT will require all ITS components be up during peak periods. Therefore, devices may be taken down in the off-peak and overnight during construction hours, but unless given express approval by VDOT they must be back up for the peak.
Currently, VDOT does not have a single consolidated set of as-built data for the ITS underground infrastructure. As such, as-built level of data will need to be confirmed prior to the development of technical requirements.

Lessons learned from the ATM project currently under construction include knowledge of:

- ATM elements that were re-used during the construction phases and after construction.
- Impacts of the ATM elements from the construction phases.
- Benefits from re-using ATM elements during the construction phases.

4.9 Tolling Systems

The I-66 toll system must use a transponder that is supported by tolling systems operated by other agencies/Developers, and that provides a seamless experience to the user. These other toll systems include I-95, I-495, I-66 inside the Beltway, the Dulles Toll Road, and the Dulles Greenway.

The portion of I-66 inside the Beltway will be Express Lanes only during peak hours, and will be HOV-2 until 2020, when all toll lanes will convert to HOV-3, per the region's CLRP. VDOT will operate the tolling inside the Beltway, Transurban will operate the tolling on I-495, and a third Developer may operate I-66 outside the Beltway. So that no interface between systems is needed, vehicles must be identified at the entry and exit points to the adjacent tolling systems so each system can maintain its own tolling back office systems.

The Developer will be responsible for operating and maintaining the Electronic Toll Collection (ETC) system on managed lanes.

CHAPTER 5 SYSTEM RECOMMENDATION

This chapter presents an overview of the proposed ITS system to be developed. It describes the goals and objectives of the system and the scope of the project for each project element, including the general requirements, the users of the system, the planned capabilities, the system architecture, and interfaces to the system. It provides a structure for describing the operations in terms of where they will be carried out, and the lines of communication.

5.1 Scope of the Project and Subsystems

The I-66 project would include seven major ITS subsystems as described in detail in the following sections:

1. Data Collection and Monitoring (DCM) subsystem
2. Incident Management subsystem
3. ATM subsystem
4. ICM subsystem
5. Tolling subsystem
6. CV subsystem
7. Communications subsystem
5.1.1 Data Collection and Monitoring Systems

The data collection and monitoring subsystem will include system elements that are required to collect real-time information about the corridor, the status of the corridor including the general purpose lanes and managed lanes, and monitoring capabilities for incident and system management. The following are the requirements for the general purpose and managed lanes. Data collection requirements for other agencies are included in the ICM subsystem.

5.1.1.1 General Purpose Lanes

Information about the status of the general purpose lanes should be collected throughout the corridor to measure speed, occupancy, and volume as described below:

<table>
<thead>
<tr>
<th>Element</th>
<th>Requirement(s)</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Vehicle-Hours of delay</td>
<td>Full speed detection coverage of the corridor (multiple sources for redundancy)</td>
<td>Utilize third-party probe data</td>
</tr>
<tr>
<td>Average travel time for general purpose lanes</td>
<td>Real-time speed, occupancy, volume between interchanges</td>
<td>Install detection between each interchange.</td>
</tr>
<tr>
<td></td>
<td>Developer will get and store data on general purpose lanes and share with VDOT and the public.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Develop models/algorithms to support performance measurement.</td>
<td></td>
</tr>
</tbody>
</table>

5.1.1.2 Managed Lanes

The Developer should collect information about the conditions of the managed lanes as required for their business case as described below:

<table>
<thead>
<tr>
<th>Element</th>
<th>Requirement(s)</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free flow speeds must be maintained on the managed lanes.</td>
<td>Maintain 55 mph at all times through the corridor.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contractor will have to report on the performance of the managed lanes per the requirements in MAP 21.</td>
<td></td>
</tr>
</tbody>
</table>

5.1.2 Incident Management

Incident Management is one of the primary goals of VDOT. Incidents account for a high percentage of delays along the project corridor. Both VDOT and the Developer have responsibilities toward incident management for the general purpose lanes and the managed lanes, respectively. To provide a viable incident management system, the following are required:

- Full visual coverage at PSTOC
- En-route traveler information
- Pre-trip traveler information
- Weather information
- Support for computer-aided dispatch (CAD) of SSP
- ATM system

The following are the elements that would create the required incident management components for general purpose and managed lanes.

### 5.1.2.1 General Purpose Lanes

<table>
<thead>
<tr>
<th>Element</th>
<th>Requirement(s)</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full visual coverage at PSTOC</td>
<td>Full visual coverage of the corridor via CCTV, Replace lighting in-kind on entire length of corridor, VDOT must have full control of camera</td>
<td>Cameras at approximately 1-mile spacing, Lighting replaced in-kind</td>
</tr>
<tr>
<td>En-route traveler information</td>
<td>Provision of en-route traveler information on advisory DMS, Provision of pricing information.</td>
<td>Traffic advisory DMS between every interchange, 2 toll and driver information DMS prior to access points, the second dedicated to pricing information and one that can be used for travel advisories, 3 toll and driver information DMS prior to access points, two dedicated to pricing information and one that can be used for travel advisories.</td>
</tr>
<tr>
<td>Pre-trip traveler information</td>
<td>Provision of pre-trip traveler information via the Internet, mobile applications, and in-vehicle displays, <em>Store 7-days’ worth of data; will not lose data in event of loss of communications.</em></td>
<td>511 + commercial systems</td>
</tr>
<tr>
<td>Provide weather information</td>
<td>Install pavement temperature probes</td>
<td>Install a minimum of 3 ESS within the corridor—one at each end and one near the midpoint of the corridor. All ESS should capture pavement temperature, wind speed, visibility, and accumulation.</td>
</tr>
<tr>
<td>Support for CAD dispatch of SSP</td>
<td>No project requirements – central systems integration only</td>
<td>No field infrastructure for CAD</td>
</tr>
<tr>
<td>ATM system</td>
<td>Lane control signs over each lane and variable speed limit signs mounted to the side pole of each gantry</td>
<td>LCS Gantries at ¼-mile spacing. Signs to have 5x7 LED modules VSL Signs at each gantry.</td>
</tr>
</tbody>
</table>
5.1.2.2 Managed Lanes

The Developer is required to coordinate with VDOT and the State Police for IM. The Developer will be required to provide a 10-minute response time and collect and disseminate information to VDOT and the State Police for incident management coordination. The following are the general requirements for the managed lanes.

<table>
<thead>
<tr>
<th>Element</th>
<th>Requirement(s)</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developer is responsible for incident management on Express Lanes</td>
<td>Make pavement temperature information available to VDOT</td>
<td>Install ESS a minimum of two ESS within the corridor. All ESS should capture pavement temperature, wind speed, visibility, and accumulation.</td>
</tr>
<tr>
<td></td>
<td>VDOT is responsible for snow clearance, and wants the data (currently collecting ambient and pavement temperatures)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>State Police-compatible systems (STARS radio)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Currently using State Police for towing. Include fixed contract prices with providers listed</td>
<td></td>
</tr>
</tbody>
</table>

5.1.3 ATM

ATM will allow both VDOT and the Developer to operate the I-66 corridor in real-time conditions and with changing of traffic patterns to respond to incidents and provide incident management. In addition, it would provide ability to dynamically manage lanes by closing lanes due to incidents, construction-related activities, planned events, or lane-reversible operations. If available, shoulder lanes can be opened or closed through lane control signs.

5.1.3.1 General Purpose Lanes ATM Requirements

VDOT will manage the ATM system along the general purpose lanes. Speeds and volumes are continuously monitored and, when required, speed limit signs will dynamically change to alert the drivers of the changing conditions. In advance of queuing or incidents, speed limit signs will change dynamically to alert the drivers of the changing conditions. A speed harmonization algorithm will be required to automatically activate the speed harmonization regime.

In addition to changing of the speed limit signs, the lane control signs can be changed from a green arrow (open) to red X (closed) conditions. These lane control signs will allow VDOT to actively manage lanes by closing lanes in advance of incidents or for construction-related or other planned activities.

DMS will notify travelers of changed conditions and provide other traveler information, such as alternate route information (if available) or incident location. DMS will only be installed prior to major decision points or approximately every 3 miles.

The ATM gantries will be lower-cost frame structure, similar to the I-95 system, and will span the entire directional segment of the corridor, along the same cross section as the managed lanes.

The ATM for the I-66 will be a lower infrastructure investment with smaller LCS signs and DMS signs, similar to the I-95 corridor. The following are the requirements for the general lanes ATM subsystem:
<table>
<thead>
<tr>
<th>Element</th>
<th>Requirement(s)</th>
<th>Infrastructure</th>
</tr>
</thead>
</table>
| Lane controls                 | Provide indications of lane closures ahead                                                                               | Full span gantries at specific ramp junctions.  
Red X or green arrow over each lane |
| Shoulder lane usage           | N/A                                                                                                                       | N/A                                                                            |
| Variable Speed Limit (VSL) signs | All speed limit signs should be variable. During normal conditions they will show the normal speed limit. At other times, they may be lowered to improve safety. | Use variable speed limit signs (static sign with dynamic speed limit inset) to allow for variable speed limits at any point in the future. These are installed on the gantry post. |

5.1.3.2 Managed Lanes ATM Requirements

The Developer also needs an ATM system due to the lack of shoulder on the outside lane. It will show a red X over blocked lanes and green arrows to indicate which lanes are open. Speed limit signs also will change, depending on the roadway conditions and operational conditions deemed appropriate and safe by the Developer. The DMS signs ahead of the entry points show the toll cost as well as the entry point designated. The intermediate DMS signs will identify any pricing addition for subsequent segments if applicable.

<table>
<thead>
<tr>
<th>Element</th>
<th>Requirement(s)</th>
<th>Infrastructure</th>
</tr>
</thead>
</table>
| Lane controls                 | Provide indications of lane closures ahead                                                                               | Full span gantries every ½-mile  
Red X or green arrow over each lane  
Simpler, lower-cost LCS signs |
| Speed Limit                   | Provide appropriate speed limit information                                                                            | On each gantries every ½-mile  
Cut-out DMS inside static speed limit sign |
| DMS                            | Provide toll pricing information                                                                                         | Prior to the entrance to the managed lanes and prior to any other locations where additional tolls are to be charged. |

5.1.3.3 ICM Subsystem Requirements

VDOT will be responsible for collection and dissemination of all multimodal system elements in the corridor. Information from the I-66 corridor will be shared with the partner agencies and relevant transit
and parking information will be displayed on DMS signs on the freeway. In addition, transit and parking information will be available at the parking facilities. The ICM subsystem requirements include the following elements:

<table>
<thead>
<tr>
<th>Element</th>
<th>Requirement(s)</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data collection and integration with parallel systems</td>
<td>Share available parking availability at park-and-ride lots.</td>
<td>Equipment shelter at each park-and-ride lot.</td>
</tr>
<tr>
<td></td>
<td>Share available real-time RBS, bus transit, and Metrorail arrival/departure information as well as seat availability.</td>
<td>Connection to VDOT’s fiber optic communications network.</td>
</tr>
<tr>
<td></td>
<td>Share bike share availability at locations near the corridor as well as bike rack space availability on buses.</td>
<td>Power connection.</td>
</tr>
<tr>
<td></td>
<td>Bike locker availability in real-time may be considered.</td>
<td>In-and-out counter system at access and egress points to parking areas.</td>
</tr>
<tr>
<td></td>
<td>Share available parallel arterial travel time information.</td>
<td>CCTV cameras in sufficient number and locations to enable remote viewing of all parking spaces.</td>
</tr>
<tr>
<td></td>
<td>Share available managed lane travel time and toll rate information.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disseminate data via CV application, private application providers, and existing ATMS/ATIS applications.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elements will not have to be all available on day 1 of the managed lanes operating.</td>
<td></td>
</tr>
</tbody>
</table>

### 5.1.4 Tolling Subsystem

The tolling subsystem will be the responsibility of the Developer. The tolling equipment must be compatible with other managed lane facilities in Virginia, including I-495 and I-95. The tolling system must allow the system to be switched off for the HOV-3 users of the system. It must also include enforcement provisions to allow the State Police to enforce the following violations. There is flexibility in the tolling technology to allow the Developers to apply innovative concepts for the managed lanes in support of their business case.

#### 5.1.4.1 Tolling Subsystem Requirements

The following are the minimum tolling requirements:
5.1.5 Connected Vehicles Subsystem

VDOT is currently operating CV technologies in the corridor. In addition, the VTRC is planning an expansion of existing infrastructure along the I-66 corridor through a future grant application. In any event, the CV technology is expected to grow in the future. VTRC is conducting research in the corridor and their devices should be kept operational during construction and relocated in consultation with the Department.

5.1.5.1 Connected Vehicle Subsystem Requirements

Since a number of initiatives and standards are in the process of being adopted, all requirements for CV are not yet available. Given this, the following are the minimum requirements for the CV subsystem that should be incorporated in the system:

<table>
<thead>
<tr>
<th>Element</th>
<th>Requirement(s)</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>V2I Communications Infrastructure for managed and general purpose lanes</td>
<td>Contractor should be aware that they need to maintain power and communication and relocated as needed.</td>
<td>Maintain availability of existing DSRC Radios (at approximately ¼ mile spacing) between US 123 and I-495. Relocate existing devices to similar locations in coordination with the Department.</td>
</tr>
<tr>
<td>Integration with ATMS for en-route traveler information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integration with managed lane systems for en-route traveler information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordination with TMP/MOT scheme</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of near-term cellular solution</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.1.6 Communications Subsystem

The communication system is the backbone for data and video transmission for the corridor. There is currently a fiber optic communication system available for the entire corridor; however, there is a need for redundant communication to provide additional reliability for the system operations. The need for data and video communication will increase in the future, so adequate capacity should be accommodated for the future growth requirements.

5.1.6.1 Communications Subsystem Requirements

The following are the minimum communication subsystem requirements:

<table>
<thead>
<tr>
<th>Element</th>
<th>Requirement(s)</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seamless integration with other toll roads in the region</td>
<td>Users shall not need a new type of transponder to use the Express Lanes that is not compatible with other toll roads in the region.</td>
<td></td>
</tr>
</tbody>
</table>
Highly reliable and available communications network
Highly secure communications network
Overbuild the fiber optic backbone to support communications needs for up to 30 years into the future.

Maintain full redundancy in the communications network during all phases of construction.
Provide advanced redundancy for full build-out.
Provide 100% spare fiber throughout the fiber optic backbone.
Provide 100% spare bandwidth availability within utilized communications channels.
Utilize Gigabit communications to the edge, and 10 Gigabit communications at the distribution level.
Deploy layer 3 network routing at the distribution level.
All toll signs must be connected to fiber (no wireless last mile)

Install a duct bank outside the travel way
Install separate fiber optic cables for the managed lanes system and the general purpose lanes system in separate conduits
Install 100% spare fiber.
Develop advanced network architecture, using secure communications hubs throughout the system.
Use fiber infrastructure only to support security, bandwidth, and redundancy requirements.

5.2 Infrastructure Maintenance During Construction

The Developer is required to maintain the existing ITS equipment along the I-66 corridor during construction. In addition, the current ATM system that is being constructed must support MOT-related activities. The gantries must be moved, if required, to accommodate the widening, but the infrastructure must be maintained throughout the construction duration. In addition, the current CV infrastructure must be remain in place and remain functional.

The following requirements must be met by the Developer for the existing equipment along the I-66 corridor:

<table>
<thead>
<tr>
<th>Element</th>
<th>Requirement(s)</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uptime requirements for each infrastructure component</td>
<td>Outages are permitted during allowable hours of construction per VDOT approval.</td>
<td>Data collection and integration with existing and future dissemination components.</td>
</tr>
<tr>
<td>Collection, integration, and dissemination of construction information and data.</td>
<td>Integration of construction information with ATMS.</td>
<td></td>
</tr>
<tr>
<td>Operations of shoulder all the time during construction. Consider shoulder as travel lane (currently unresolved)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.3 Integration and Testing

<table>
<thead>
<tr>
<th>Element</th>
<th>Requirement(s)</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managed Lanes</td>
<td>Managed lanes system shall be integrated with the Developer TOC and VDOT MPSTOC</td>
<td>Through the fiber optic backbone with required network interconnectivity</td>
</tr>
<tr>
<td>GP Lanes</td>
<td>GP Lanes infrastructure shall be integrated with the VDOT MPSTOC ATMS system</td>
<td>Through the fiber optic backbone with required network interconnectivity</td>
</tr>
<tr>
<td>ICM Sub-System</td>
<td>Traffic and incident data should be non-proprietary and open for sharing to enable integration of systems for ICM.</td>
<td>Through wireless connectivity as required</td>
</tr>
<tr>
<td>Connected Vehicles</td>
<td>Testing to ensure proper functioning and communication of existing devices with coordination with VDOT.</td>
<td>Through wireless network as required</td>
</tr>
<tr>
<td>Software Integration</td>
<td>Developer shall prove all system functionality using vendor software at PSTOC.</td>
<td>Test workstations, test software.</td>
</tr>
<tr>
<td></td>
<td>Accepting testing will be a multi-step process and will include a factory acceptance test, system acceptance test and a trial operations test period.</td>
<td></td>
</tr>
</tbody>
</table>

CHAPTER 6 OPERATIONAL SCENARIOS

This section provides a detailed description of the operational concepts anticipated after the completion of the I-66 Corridor Improvements Project construction. It describes the roles and responsibilities of VDOT, stakeholders, and the Developer. Each scenario describes a sequence of events that consists of activities carried out by the user, the system, and the environment. It specifies which triggers the sequence, who or what performs each step, when communications occur and to whom or what, and what information is being communicated. The scenarios will cover some examples of normal conditions, stress conditions, failure events, maintenance, and anomalies and exceptions. It also shows what expected stakeholder roles will be during project construction.

6.1 Normal Operations

Normal operation is when there are no planned events, incidents, software or system failures, disasters, special events, or other unusual conditions. It can be described as normal recurring conditions, with or without congestion.
The I-66 corridor will be a joint operation between the Developer, who will be responsible for the managed lanes, and VDOT, which will be responsible for the general purpose lanes. Information collected by the Developer will be transmitted to VDOT, which, in turn, will display the information to the public and/or transmit the information to other stakeholders (e.g., cities, counties, WMATA, etc.) and third-party ISPs for their use.

During normal conditions, the Developer will set the pricing for the managed lanes operation, control the dynamic lane control signs and message signs to direct the traffic to the appropriate use of the lanes, and monitor traffic conditions along the managed lanes—all based on pre-defined and set protocols. In a similar manner, VDOT will monitor the general purpose lanes, set the appropriate message signs on the DMS, and control the lane-use signals for the ATM system application. VDOT will adjust the VSL signs in response to downstream congestion to slow traffic approaching the back of queue. When there is no congestion, the normal speed limit will be posted on all VSL.

Information transmitted to VDOT by the Developer may be shared with third-parties. VDOT also disseminates traveler information via its 511 system and website. Table 6-1 shows the roles and responsibilities for normal operations among the major system operators: VDOT, the Developer, State Police, WMATA, emergency responders, other stakeholders (cities and counties), and ISPs.

Table 6-1 – Normal Operations System Control/Application

<table>
<thead>
<tr>
<th>Agency</th>
<th>Lanes</th>
<th>Device/System Control</th>
<th>Application/Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VDOT</strong></td>
<td><strong>General purpose lanes</strong></td>
<td><strong>CCTV</strong></td>
<td>Monitor conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>DMS</strong></td>
<td>Set messages (travel times/advisory messages)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post park-and-ride and parking space availability (if available)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>LCS</strong></td>
<td>All green arrows</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>VSL signs</strong></td>
<td>Display normal speed limit</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Vehicle Detection System (VDS)</strong></td>
<td>Collect and share speed, volume, and travel times</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>511 System</strong></td>
<td>Post speeds and road conditions on the website</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Provide telephone roadway conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>SSP</strong></td>
<td>Dispatch SSPs for roadside assistance when needed</td>
</tr>
<tr>
<td><strong>Developer</strong></td>
<td><strong>Managed lanes</strong></td>
<td><strong>CCTV</strong></td>
<td>Monitor conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>DMS</strong></td>
<td>Provide information regarding managed lanes use (open/close)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Toll Rates</strong></td>
<td>Set pricing based on requirements</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>VDS</strong></td>
<td>Transmit speed, volume, and travel times to VDOT</td>
</tr>
</tbody>
</table>
### 6.2 Incident Conditions

Incident conditions are defined as periods when traffic abnormalities occur. Incidents include non-recurring events that cause a reduction of roadway capacity or an abnormal increase in demand. Events such as traffic crashes, disabled vehicles, and spilled cargo are classified as incidents. By this definition, incidents are non-planned events. Planned events (e.g., highway maintenance and reconstruction projects) and special non-emergency events (e.g., ball games, concerts, or any other event that significantly affects roadway operations) are described later in the Planned Events Conditions section.

During incident conditions, either in the managed lanes or general purpose lanes, incident management is the responsibility of both VDOT for the general purpose lanes and the Developer for the managed lanes. Incident information, collected by the Developer, will be transmitted to VDOT, which in turn will transmit it to the public via the roadside DMS signs, 511 system, and website. Furthermore, VDOT will transmit the information to other stakeholders (e.g., cities, counties, WMATA) and third-party ISPs for their use and dissemination.

Prior to the onset of incidents, both VDOT and the Developer will be monitoring the roadway conditions via CCTV. Abnormal drops in roadway speeds will trigger alarms at the ATM system to alert the operators to verify conditions using nearby CCTVs. Information received by the State Police or 911 system will be transmitted by VDOT to the Developer electronically as well as manually, if appropriate, to allow operators to verify incident type and location.

Once an incident is detected, either VDOT or the Developer will execute an appropriate incident response plan, depending on the nature of the incident. Either the SSP will be dispatched for assistance with minor incidents, or emergency response teams will be notified and dispatched depending on the nature of the incident. State Police will respond to incidents as appropriate for both the managed lanes and general purpose lanes. Incident clearance will be the responsibility of the Developer along the managed lanes,
and VDOT for the general purpose lanes. Both VDOT and the Developer must have a responsible Incident Manager Supervisor at their respective operations center to coordinate activities at all times. An Incident Response supervisor is required on a 24x7 basis for VDOT and during managed lanes operational periods for the Developer. The incident response team leaders will in in contact during the incident response period.

During the incident response period for the managed lanes, the Developer will need to change the overhead lane control signs to the appropriate symbol (green arrow or red X to indicate open or closed) and the speed limit signs will be changed to alert the drivers about the roadway conditions ahead. Advance DMS signs will display incident information and, if appropriate, alternate route or guidance information will be provided. The shoulder within the managed lane section may be opened as a travel lane to preserve the available capacity.

In conjunction with the managed lanes closure, VDOT would post appropriate information on advance DMS to notify the highway users of the incident conditions and, if appropriate, provide alternate routes or other traveler information. VDOT will also utilize the LCS to either close or open lanes, as appropriate, based on the incident conditions and management procedures. Variable speed limit signs will be changed automatically to alert the drivers of the changed conditions based on the speed harmonization algorithm. Moreover, incident information received by the Developer will be transmitted by VDOT to the other stakeholders and to ISPs automatically.

During the incident response period for the general purpose lanes, VDOT would post appropriate information on advance DMS to notify the highway users of the incident conditions and, if available, provide alternate routes or other traveler information. VDOT also will utilize LCS to either close or open lanes, as appropriate, based on the incident conditions and management procedures. Speed limit signs will be changed automatically to alert the drivers of the changed conditions, based on the speed harmonization algorithm. Furthermore, incident information will be transmitted by VDOT to the other stakeholders and to the ISPs automatically.

**Table 6-2** shows the roles and responsibilities during incident operations for the major system operators: VDOT, the Developer, State Police, WMATA, emergency responders, other stakeholders (cities and counties), and ISPs.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Lanes</th>
<th>Device/System Control</th>
<th>Application/Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDOT</td>
<td>General purpose lanes</td>
<td>CCTV</td>
<td>Verify incidents/monitor conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DMS</td>
<td>Display incident information in advance of incident</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Provide alternate routes, if applicable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LCS</td>
<td>Warn traffic of blocked lane(s) ahead with Red X and yellow arrows per Standard Operating Procedures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VSL Signs</td>
<td>Lower speed limit to traffic approaching the back of the incident-induced queue to reduce likelihood of secondary crashes</td>
</tr>
</tbody>
</table>

Table 6-2 – Incident Conditions Control/Application

<table>
<thead>
<tr>
<th>Agency</th>
<th>Lanes</th>
<th>Device/System Control</th>
<th>Application/Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDS</td>
<td></td>
<td>Collect and share speed, volume, and travel times</td>
<td></td>
</tr>
<tr>
<td>511 System</td>
<td></td>
<td>Post speeds and road conditions on the website</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provide telephone roadway conditions</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post incident notification</td>
<td></td>
</tr>
<tr>
<td>SSP</td>
<td></td>
<td>Dispatch SSPs for roadside assistance</td>
<td></td>
</tr>
<tr>
<td>CCTV</td>
<td></td>
<td>Verify incidents/monitor conditions</td>
<td></td>
</tr>
<tr>
<td>DMS</td>
<td></td>
<td>Provide information regarding managed lanes use</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Display incident information when required</td>
<td></td>
</tr>
<tr>
<td>Toll rates</td>
<td></td>
<td>Set pricing based on requirements</td>
<td></td>
</tr>
<tr>
<td>VDS</td>
<td></td>
<td>Transmit speed, volume, and travel times to VDOT</td>
<td></td>
</tr>
<tr>
<td>SSP</td>
<td></td>
<td>Dispatch SSPs for roadside assistance</td>
<td></td>
</tr>
<tr>
<td>Developer Managed lanes</td>
<td></td>
<td>CCTV</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DMS</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Toll rates</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>VDS</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SSP</td>
<td></td>
</tr>
<tr>
<td>State Police</td>
<td>Both</td>
<td>Respond to incidents</td>
<td></td>
</tr>
<tr>
<td>Emergency responders</td>
<td>Both</td>
<td>Respond to incidents</td>
<td></td>
</tr>
<tr>
<td>Other stakeholders</td>
<td>N/A</td>
<td>Information dissemination</td>
<td></td>
</tr>
<tr>
<td>(cities/counties)</td>
<td></td>
<td>Post incident information on website</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post freeway travel times and incident information at park-and-ride facilities</td>
<td></td>
</tr>
<tr>
<td>WMATA</td>
<td>N/A</td>
<td>Information dissemination</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post information on website</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post freeway travel times at transit stations</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transmit parking availability to VDOT, if available</td>
<td></td>
</tr>
<tr>
<td>ISPs</td>
<td>N/A</td>
<td>Information dissemination</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disseminate incident information via third-party apps and web services</td>
<td></td>
</tr>
</tbody>
</table>

### 6.3 Planned Events, Work Zone, or Maintenance Activities

Planned events, work zone, or maintenance activities are planned events that include non-recurring events that cause a reduction of roadway capacity or an abnormal increase in demand. Planned events include highway maintenance and reconstruction projects, special non-emergency events (e.g., ball games, concerts, or any other event that significantly affects roadway operations), or similar activities.

Planned-event notification should be transmitted by either party in advance of the event for planning purposes. Longer advance notice should be issued for major events to allow a coordinated planning and
execution of the event management strategies. Event management strategies should be developed in advance in accordance with the required traffic management strategies, in coordination with the State Police. VDOT will be responsible for notifying the public and transmitting the information to other stakeholders (e.g., cities, counties, WMATA, etc.), third-party ISPs, and the 511 system in advance of the event. During a planned event, traffic management is the responsibility of VDOT for the general purpose lanes and the Developer for the managed lanes.

The planned event scenario has many similarities to an incident management; however, the necessary actions and steps are pre-planned and coordinated in advance. In many situations, the State Police is heavily involved in the planning, including the work zone management and maintenance activities. Event managers should be on-duty during these periods for both VDOT and the Developer.

During the event management for the managed lanes, the Developer will execute the pre-planned strategies, change the overhead lane control signs to appropriate symbol (green arrow or red X for open or closed), and change the speed limit signs to alert the drivers about the roadway conditions ahead. Advance DMS signs will display event information and, if available, alternate route or guidance information will be provided.

During the event management period, the general purpose lanes will be managed in conjunction with the managed lanes closure. VDOT would post appropriate information on advance DMS to notify the highway users of the event conditions and, if available, provide alternate routes or other traveler information. VDOT also will utilize the LCS to either close or open lanes, as appropriate, based on the event conditions and management procedures. Variable speed limit signs will be changed manually to alert drivers of the changed conditions.

If a non-planned incident occurs during an event, the normal incident management procedures will be followed in addition to the ongoing event management.

Table 6-3 shows the role and responsibilities during event management operations for the major system operators: VDOT, the Developer, State Police, WMATA, emergency responders, other stakeholders (cities and counties), and ISPs.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Lanes</th>
<th>Device/System Control</th>
<th>Application/Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDOT</td>
<td>General purpose lanes</td>
<td>CCTV</td>
<td>Monitors conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DMS</td>
<td>Display event information in advance of segment/location</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Provide alternate routes, if applicable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LCS</td>
<td>No change</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VSL Signs</td>
<td>Reduce speed limits, if applicable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VDS</td>
<td>Collect and share speed, volume, and travel times</td>
</tr>
<tr>
<td>Agency</td>
<td>Lanes</td>
<td>Device/System Control</td>
<td>Application/Usage</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------</td>
<td>-----------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Developer</strong></td>
<td><strong>Managed Lanes</strong></td>
<td>511 system</td>
<td>Post speeds and road conditions on the website</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Provide telephone roadway conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SSP</td>
<td>Dispatch SSPs for roadside assistance when needed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CCTV</td>
<td>Monitor conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DMS</td>
<td>Provide information regarding managed lanes use</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Toll rates</td>
<td>Set pricing based on requirements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VDS</td>
<td>Transmit speed, volume, and travel times to VDOT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SSP</td>
<td>Dispatch SSPs for roadside assistance when needed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Planned incident</td>
<td>Transmit information to 511 directly and to VDOT</td>
</tr>
<tr>
<td><strong>State Police</strong></td>
<td>Both</td>
<td>Event management</td>
<td>Event management</td>
</tr>
<tr>
<td><strong>Emergency responders</strong></td>
<td>Both</td>
<td>Upon notification</td>
<td>Incident management, if needed</td>
</tr>
<tr>
<td><strong>Other stakeholders (cities/counties)</strong></td>
<td>N/A</td>
<td>Information dissemination</td>
<td>Post event information on website</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post event information at park-and-ride facilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Transmit park-and-ride space availability to VDOT, if available</td>
</tr>
<tr>
<td><strong>WMATA</strong></td>
<td>N/A</td>
<td>Information dissemination</td>
<td>Post event information on website</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post event information at transit stations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Transmit parking availability to VDOT, if available</td>
</tr>
<tr>
<td><strong>ISPs</strong></td>
<td>N/A</td>
<td>Information dissemination</td>
<td>Post event information via third party apps and web services</td>
</tr>
</tbody>
</table>

### 6.4 Failure Conditions

Failure conditions are non-planned events when partial or complete system failures occur. A partial system failure may include software failure or system shut-down, and a complete system failure may occur due to major catastrophes or disruption of service that would affect multiple systems, software, or physical roadway systems. In the event of a major disaster, VDOT will follow its standard emergency
management procedures, where system operation may be delegated to its backup TOC in Gainesville, if operational. In the case of partial system occurs, there needs to be an assessment by VDOT and Developer operations managers to evaluate if there are any impacts to the I-66 corridor operations. If there are no impacts to the I-66 operations, then normal operations will follow as appropriate.

In the event of partial systems failure, VDOT may choose to shut-down the ATM operations for the general purpose lanes. Both VDOT and the Developer will be responsible for notifying the public and transmitting the information to other stakeholders (e.g., cities, counties, WMATA, etc.), third-party ISPs, and the 511 system in the event of managed lanes closure or other incident conditions.

Table 6-4 shows the roles and responsibilities during an event management operation among system failure for the major system operators: VDOT, the Developer, State Police, WMATA, emergency responders, other stakeholders (cities and counties), and ISPs.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Lanes</th>
<th>Device/System Control</th>
<th>Application/Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDOT</td>
<td>General purpose lanes</td>
<td>CCTV</td>
<td>Monitors conditions, if operational</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DMS</td>
<td>If operational, display event information in advance of segment/location. Provide alternate routes if applicable If non-operational, will leave blank</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LCS</td>
<td>If non-operational, leave blank</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VSL Signs</td>
<td>If operational, show active speed limits If communications are lost, default to normal speed limit. If non-operational, blank sign</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VDS</td>
<td>Collect and share speed, volume, and travel times, if operational</td>
</tr>
<tr>
<td></td>
<td></td>
<td>511 system</td>
<td>If operational, post speeds and road conditions on the website. Provide telephone roadway conditions. Post event notification</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SSP</td>
<td>Dispatch SSPs for roadside assistance when needed</td>
</tr>
<tr>
<td>Developer</td>
<td>Managed Lanes</td>
<td>CCTV</td>
<td>Monitor conditions, if operational</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DMS</td>
<td>If operational, provide information regarding managed lanes use. Display event information</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LCS</td>
<td>If operational, set/change lane usage directional control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VSL</td>
<td>If operational, change speed limits as appropriate</td>
</tr>
</tbody>
</table>
### Agency

<table>
<thead>
<tr>
<th>Agency</th>
<th>Lanes</th>
<th>Device/System Control</th>
<th>Application/Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toll rates</td>
<td></td>
<td>Set pricing based on requirements (May be non-operational)</td>
<td></td>
</tr>
<tr>
<td>VDS</td>
<td></td>
<td>Transmit speed, volume, and travel times to VDOT, if operational</td>
<td></td>
</tr>
<tr>
<td>SSP</td>
<td></td>
<td>Dispatch SSPs for roadside assistance when needed</td>
<td></td>
</tr>
<tr>
<td>State Police</td>
<td>Both</td>
<td>Event management</td>
<td>On high alert</td>
</tr>
<tr>
<td>Emergency Responders</td>
<td>Both</td>
<td>On notification</td>
<td>Incident management on high alert</td>
</tr>
<tr>
<td>Other stakeholders (cities/counties)</td>
<td>N/A</td>
<td>Information dissemination</td>
<td>If available, post event information on website Post event information at park-and-ride facilities Transmit park-and-ride space availability to VDOT, if available</td>
</tr>
<tr>
<td>WMATA</td>
<td>N/A</td>
<td>Information dissemination</td>
<td>If available, post event information on website Post event information at transit stations Transmit parking availability to VDOT, if available</td>
</tr>
<tr>
<td>ISPs</td>
<td>N/A</td>
<td>Information dissemination</td>
<td>If available, post event information via third-party apps and web services</td>
</tr>
</tbody>
</table>

### 6.5 During Project Construction Phase

During project construction, the operation of the corridor will be a coordinated effort between VDOT and the Developer, and standard work zone management will be in effect based on pre-approved MOT plans approved by VDOT. It is expected that the MOT plans developed by the Developer will integrate the existing ATM system already in place along portions of the corridor to manage the construction activities. The Developer will be required to keep the ATM system and CV equipment operational. The Developer must not disrupt the operations and maintain system operations, as prescribed elsewhere in the document.

Work zone management strategies would be developed in advance in coordination with the State Police and VDOT and in accordance with the required MOT plans. VDOT will be responsible for notifying the public and transmitting the information to other stakeholders (e.g., cities, counties, WMATA, etc.), third-party ISPs, and the 511 system in advance of the construction activities. Work zone management will have many similarities to incident management; however, the necessary actions and steps will be defined in the MOT plans and coordinated in advance. The State Police will be heavily involved in the planning, including the work zone management and maintenance activities. Event managers should be on-duty during these periods for both VDOT and the Developer.

During the construction period, VDOT would implement the ATM components of the MOT plans from the PSTOC as prescribed and in response to the Developer arriving on site. VDOT would post appropriate
information on advance DMS to notify the highway users of the event conditions and, if appropriate, provide alternate routes or other traveler information. VDOT also will use the LCS to either close or open lanes, as appropriate, based on the event conditions and management procedures. Variable speed limit signs will be changed manually to alert the drivers of the changed conditions. If available, shoulder lanes will be opened using overhead lane control signs to allow the temporary use of shoulders to provide additional capacity. If a non-planned incident occurs during an event, the normal incident management procedures will be followed in addition to the ongoing event management.

Table 6-5 shows the roles and responsibilities during the construction phase work zone operations among the major system operators: VDOT, the Developer, State Police, WMATA, emergency responders, other stakeholders (cities and counties), and ISPs.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Lanes</th>
<th>Device/System Control</th>
<th>Application/Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDOT</td>
<td>All lanes</td>
<td>CCTV</td>
<td>Monitors conditions</td>
</tr>
<tr>
<td></td>
<td>All lanes</td>
<td>DMS</td>
<td>Display construction information in advance of segment/location</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Provide alternate routes, if applicable</td>
</tr>
<tr>
<td></td>
<td>All lanes</td>
<td>LCS</td>
<td>Display Red X over closed lanes, direct traffic away from closed lanes with yellow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VSL Signs</td>
<td>Reduce speed limits to improve safety through work zones.</td>
</tr>
<tr>
<td></td>
<td>All lanes</td>
<td>VDS</td>
<td>Collect and share speed, volume, and travel times</td>
</tr>
<tr>
<td></td>
<td>All lanes</td>
<td>511 system</td>
<td>Post speeds and road conditions on the website</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Provide telephone roadway conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SSP</td>
<td>Dispatch SSPs for roadside assistance when needed</td>
</tr>
<tr>
<td>Contractor/Developer</td>
<td>All lanes</td>
<td>Work zone management</td>
<td>Monitor conditions. Maintain traffic and public safety. Furnish MOT plans to VDOT</td>
</tr>
<tr>
<td>State Police</td>
<td>All lanes</td>
<td>Event management</td>
<td>Event management</td>
</tr>
<tr>
<td>Emergency responders</td>
<td>All lanes</td>
<td>On notification</td>
<td>Incident management if needed</td>
</tr>
<tr>
<td>Other stakeholders</td>
<td>N/A</td>
<td>Information dissemination</td>
<td>Post construction information on website</td>
</tr>
<tr>
<td>(cities/counties)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### CHAPTER 7 REFERENCED DOCUMENTS

The following documents were used as references in the development of this report.

- Tier 1 Environmental Impact Statement and Tier 1 Record of Decision for Interstate 66 from US 15 in Prince William County to Interstate 495 in Fairfax County, VDOT, Virginia DRPT, FHWA, November 2013
- VDOT Business Plan for Fiscal Year 2015
- I-95 HOV/HOT Lanes Project DRAFT Technical Requirements REV-7, March 2012
- VDOT NRO ITS Architecture
- I-66 ATDM High Level Concept Plan, July 2011

The following studies and documents will support the overall I-66 Corridor Improvements Project:

- **Tier 2 Environmental Assessment, VDOT.** This study will develop the scope/specífics of the improvements to meet the needs of the study corridor and document impacts of proposed modifications to I-66 as a part of the I-66 Corridor Improvements Project.
- **Corridor Study and Systemwide IJR, VDOT.** The IJR will request approval for new and modified interstate access associated with corridor improvements related to general purpose lanes, Express Lanes, and transit facilities.
- **Transit/Transportation Demand Management (TDM) Implementation Plan, DRPT and VDOT.** This study will document transit demand and facility and service needs as inputs to the I-66 Corridor Improvements Project.
- **Preliminary Engineering of I-66 Corridor Improvements, VDOT.** This study will prepare preliminary engineering plans of infrastructure and facility modifications to support defined corridor needs.
- **Traffic and Revenue Study, VAP3.** This study will document traffic and revenue forecasts associated with express lane operations along I-66 in coordination with the I-66 Corridor Improvements Project.
- **I-66 HOT Lanes Study.** This study is currently under preparation by VDOT, and will determine the feasibility of implementing variably priced, high occupancy toll (HOT) lanes inside the Capital Beltway. For the purposes of the I-66 Corridor Improvements Project, the following assumptions are being used regarding the I-66 HOT Lanes Study:
  - Assume opening year of 2025 for the third lane phase of the I-66 HOT lanes project.
  - The I-66 HOT lanes project will be documented under an Environmental Assessment.
− Project termini will extend eastward from the Capital Beltway. The study will evaluate the current HOV terminus at Route 29 and consider an eastern terminus at the DC line, if the study shows that a DC terminus captures additional HOT traffic.
− Toll operations will be contracted out by VDOT to a private party, which is to be determined by others outside of the I-66 HOT Lanes study.

• I-66/Route 28 Project, VDOT was developing a project to improve access for Route 28 at I-66 and within the corridor north of I-66; this project is now incorporated into the I-66 Corridor Improvements Project and includes a new Poplar Tree Road/Stonecroft Boulevard Overpass and EC Lawrence Park Entrance, removal of the ECL Park entrance traffic signal along Route 28, the extension of Poplar Tree Road from its existing terminus east of Route 28 to Stonecroft Boulevard, and associated improvements at the Westfields Boulevard interchange.

Other data including current and forecasted traffic volumes, transit service options, and crash analyses can be found in these and other referenced documents.
APPENDIX A. ITS ARCHITECTURE REQUIREMENTS

ITS Architecture Requirements

The USDOT also requires that any ITS project funded through the Highway Trust Fund must conform to the National ITS Architecture and applicable standards. These requirements are codified in the Code of Federal Regulation (CFR) Title 23-Highways, Part 940-Intelligent Transportation Systems Architecture and Standards. ITS projects are defined as any project that in whole or in part funds the acquisition of technologies or systems of technologies that provide or significantly contribute to the provision of one or more ITS user services as defined in the National ITS Architecture. Conformance to the National ITS Architecture includes the use of the National ITS Architecture to develop a statewide or regional ITS architecture and the subsequent adherence of the project to that statewide or regional ITS architecture. This project is not federally-funded; however, compliance with the National ITS Architecture and VDOT ITS Architecture will ensure compliance with the statewide requirements and information integration with other systems in operation today.

ITS Architecture Process

To ensure that ITS deployments are coordinated and integration opportunities are maximized, the USDOT requires the development of an ITS architecture. The ITS architecture helps to identify opportunities for interagency communication to better coordinate deployment efforts and to support integration activities of multimodal transportation services. ITS architecture typically includes the following components:

- Subsystems
- Equipment Packages
- Service Packages
- Interconnects
- Information flows

Subsystems represent the various ITS management centers (at TOCs), field infrastructure (DMS, CCTV, LCS, and other equipment), and communication system. Equipment Packages represent discrete functional capabilities of each subsystem. Equipment Packages produce, receive, or process information that supports transportation services, which are known as Service Packages. Service Packages are comprised of multiple Equipment Packages and subsystems that interact to provide traffic management and other ITS services.

Interfaces to the Systems

Project Interfaces will include connections identified for information sharing between all the project stakeholders, which would include:

- VDOT
- Future Developer
- I-95 and I-495 concessionaire (Transurban)
- Fairfax County
- Prince William County
- WMATA
- DPRT
- NVTA
In January 2014, VDOT completed an update of the Northern Region ITS Architecture. The geographic boundaries of VDOT’s Northern Region include all of the transit agencies and local agencies along the I-66 corridor as stakeholders. Stakeholders developed the Regional ITS Architecture based on a 20-year vision of how they wanted to implement and operate ITS in Northern Virginia. The Regional ITS Architecture was based on Version 7.0 of the National ITS Architecture, and an accompanying Turbo Architecture database also was developed using Version 7.0 of the Turbo Architecture. This version adds several features to support transportation planning through project development. Also, Version 7 was updated to align with new focuses and direction to include additional service packages for ATM strategies and CV technologies. The Regional ITS Architecture and Turbo Architecture database files can be found on the Commonwealth of Virginia Statewide and Regional ITS Architecture project website, currently maintained by VDOT’s consultant at the following website:


As part of the systems engineering process and federal regulations regarding federally-funded ITS projects, the I-66 Corridor Improvements Project should align with the associated regional ITS architectures. The I-66 corridor is included within the Northern Virginia (NV) Regional ITS Architecture.

Table B-1 Error! Reference source not found. summarizes the project-specific Service Packages and their conformance or applicability. Based on the February 2011 version, the identified I-66 Service Packages are in conformance and as well as those that require additional updates.

<table>
<thead>
<tr>
<th>Service Package</th>
<th>Service Package</th>
<th>Included in Architecture?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Surveillance</td>
<td>ATMS01</td>
<td>✓</td>
</tr>
<tr>
<td>Traffic Probe Surveillance</td>
<td>ATMS02</td>
<td>X</td>
</tr>
<tr>
<td>HOV Lane Management</td>
<td>ATMS05</td>
<td>✓</td>
</tr>
<tr>
<td>Traffic Information Dissemination</td>
<td>ATMS06</td>
<td>✓</td>
</tr>
<tr>
<td>Regional Traffic Management</td>
<td>ATMS07</td>
<td>✓</td>
</tr>
<tr>
<td>Traffic Incident Management System</td>
<td>ATMS08</td>
<td>✓</td>
</tr>
<tr>
<td>Traffic Decision Support and Demand Management</td>
<td>ATMS09</td>
<td>✓</td>
</tr>
<tr>
<td>Service Provision</td>
<td>Code</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------</td>
<td>--------</td>
</tr>
<tr>
<td>Electronic Toll Collection</td>
<td>ATMS10</td>
<td>✓</td>
</tr>
<tr>
<td>VSL</td>
<td>ATMS22</td>
<td>X</td>
</tr>
<tr>
<td>Dynamic Lane Management and Shoulder Use</td>
<td>ATMS23</td>
<td>X</td>
</tr>
<tr>
<td>VMT Road User Payment</td>
<td>ATMS25</td>
<td>X</td>
</tr>
<tr>
<td>Emergency Call –Taking and Dispatch</td>
<td>EM01</td>
<td>✓</td>
</tr>
<tr>
<td>Emergency Routing</td>
<td>EM02</td>
<td>✓</td>
</tr>
<tr>
<td>Roadway Service Patrols</td>
<td>EM04</td>
<td>✓</td>
</tr>
<tr>
<td>Road Weather Data Collection</td>
<td>MC03</td>
<td>✓</td>
</tr>
<tr>
<td>Weather Information Processing and Distribution</td>
<td>MC04</td>
<td>✓</td>
</tr>
<tr>
<td>Winter Maintenance</td>
<td>MC06</td>
<td>✓</td>
</tr>
<tr>
<td>Roadway Maintenance and Construction</td>
<td>MC07</td>
<td>✓</td>
</tr>
<tr>
<td>Work Zone Management</td>
<td>MC08</td>
<td>✓</td>
</tr>
<tr>
<td>Transit Fixed-Route Operations</td>
<td>APTS2</td>
<td>✓</td>
</tr>
<tr>
<td>Multimodal Coordination</td>
<td>APTS7</td>
<td>✓</td>
</tr>
<tr>
<td>Broadcast Traveler Information</td>
<td>ATIS01</td>
<td>✓</td>
</tr>
<tr>
<td>Interactive Traveler Information</td>
<td>ATIS02</td>
<td>✓</td>
</tr>
<tr>
<td>ITS Data Mart</td>
<td>AD01</td>
<td>✓</td>
</tr>
<tr>
<td>ITS Virtual Data Warehouse</td>
<td>AD03</td>
<td>✓</td>
</tr>
<tr>
<td>Vehicle Safety Monitoring</td>
<td>AVSS01</td>
<td>X</td>
</tr>
<tr>
<td>Driver Safety Monitoring</td>
<td>AVSS02</td>
<td>X</td>
</tr>
<tr>
<td>Longitudinal Safety Monitoring</td>
<td>AVSS03</td>
<td>X</td>
</tr>
<tr>
<td>Lateral Safety Warning</td>
<td>AVSS04</td>
<td>X</td>
</tr>
<tr>
<td>Intersection Safety Warning</td>
<td>AVSS05</td>
<td>X</td>
</tr>
<tr>
<td>Pre-Crash Restraint Deployment</td>
<td>AVSS06</td>
<td>X</td>
</tr>
<tr>
<td>Driver Visibility Improvement</td>
<td>AVSS07</td>
<td>X</td>
</tr>
<tr>
<td>Advanced Vehicle Longitudinal Control</td>
<td>AVSS08</td>
<td>X</td>
</tr>
<tr>
<td>Advanced Vehicle Lateral Control</td>
<td>AVSS09</td>
<td>X</td>
</tr>
<tr>
<td>Intersection Collision Avoidance</td>
<td>AVSS10</td>
<td>X</td>
</tr>
<tr>
<td>AV Operations</td>
<td>AVSS11</td>
<td>X</td>
</tr>
<tr>
<td>Cooperative Vehicle Safety Systems</td>
<td>AVSS12</td>
<td>X</td>
</tr>
</tbody>
</table>

*Note - ✓ denotes the SP aligns with the architecture; X denotes the SP requires updating/adding to the current
Compliance with VDOT Northern Region ITS Architecture

Within the regional architecture, the Developer will communicate directly with VDOT, and VDOT in turn will communicate with the transit and local agencies. It is important to note that the Regional ITS Architecture is considered a living document. As the I-66 Corridor Improvements Project is finalized, it will be necessary to modify the ITS Service Package to reflect how the system will be deployed and operated. The VDOT Northern Region ITS Architecture describes the process that should be used for documenting changes to the regional architecture to account for ITS deployments that differ from the Regional ITS Architecture. The most important component of these changes is that all impacted stakeholders are in agreement on the changes and have an understanding, and, if necessary, an agreement in place, for future maintenance and operations of the system.

Relevant ITS Architecture Service Packages

Table B-2 – All Relevant ITS Architecture Service Packages

<table>
<thead>
<tr>
<th>Service Package</th>
<th>Service Package Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATMS01</td>
<td>Network Surveillance</td>
<td>Collects and transmits data to a traffic management center from devices such as traffic detectors, closed-circuit television (CCTV) cameras, and other surveillance equipment.</td>
</tr>
<tr>
<td>ATMS02</td>
<td>Traffic Probe Surveillance</td>
<td>Provides road network conditions such as average speed and congestion conditions using position and speed information from probe vehicles.</td>
</tr>
<tr>
<td>ATMS03</td>
<td>Traffic Signal Control</td>
<td>Provides the control and monitoring, communications, and signal control equipment to support local street and/or arterial traffic management. Consistent with urban traffic signal control systems.</td>
</tr>
<tr>
<td>ATMS04</td>
<td>Traffic Metering</td>
<td>Provides the control and monitoring, communications, and field equipment to support metering of traffic. Such strategies include ramp, interchange, and mainline metering. It also incorporates instrumentation from ATMS01 to support traffic monitoring so responsive and adaptive strategies can be implemented.</td>
</tr>
<tr>
<td>ATMS05</td>
<td>HOV Lane Management</td>
<td>Manages high-occupancy vehicle (HOV) lanes by coordinating freeway ramp meters and connector signals with HOV lane usage signals.</td>
</tr>
<tr>
<td>ATMS06</td>
<td>Traffic Information Dissemination</td>
<td>Provides drivers with traffic information using roadway equipment; most frequently dynamic message signs (DMS) or highway advisory radio. Information can include road conditions, closures, detour information, incident information, emergency alerts, and advisories.</td>
</tr>
<tr>
<td>ATMS07</td>
<td>Regional Traffic Management</td>
<td>Shares traffic information and control among traffic management centers. Examples include: coordinated signal operations across jurisdictional boundaries; coordination between freeway operations and arterial signal control; and sharing of congestion or incident information.</td>
</tr>
<tr>
<td>Service Package</td>
<td>Service Package Name</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ATMS08</td>
<td>Traffic Incident Management System</td>
<td>Manages both unexpected incidents and planned events by coordinating with other agencies to support traffic operations personnel in developing an appropriate response to minimize the impact to the transportation network and traveler safety. Includes coordination with emergency management and roadway maintenance agencies to support a coordinated response.</td>
</tr>
<tr>
<td>ATMS09</td>
<td>Traffic Decision Support and Demand Management</td>
<td>Recommends courses of action based on an assessment of the current and forecasted road network performance as well as information on special events, parking, or transit operations if applicable. Example responses include predefined incident response plans, transit strategies, and congestion management strategies.</td>
</tr>
<tr>
<td>ATMS10</td>
<td>Electronic Toll Collection</td>
<td>Provides the ability to collect tolls electronically and detect and process violations. Toll tags and roadside readers also can be used to collect road use statistics for highway authorities.</td>
</tr>
<tr>
<td>ATMS11</td>
<td>Emissions Monitoring and Management</td>
<td>Collects and monitors air quality data collected by wide area or point emissions monitoring sensors.</td>
</tr>
<tr>
<td>ATMS12</td>
<td>Roadside Lighting System Control</td>
<td>Monitors operational conditions along the roadway to vary the amount of light that is provided along the roadside.</td>
</tr>
<tr>
<td>ATMS13</td>
<td>Standard Railroad Grade Crossing</td>
<td>Manages highway traffic at highway-rail intersections (HRIs) where operational requirements do not dictate more advanced features (typically where rail operational speeds are less than 80 mph).</td>
</tr>
<tr>
<td>ATMS14</td>
<td>Advanced Railroad Grade Crossing</td>
<td>Manages highway traffic at HRIs where operational requirements demand advanced features (typically where rail operational speeds are greater than 80 mph).</td>
</tr>
<tr>
<td>ATMS15</td>
<td>Railroad Operations Coordination</td>
<td>Provides an additional level of strategic coordination between freight rail operations and traffic management centers. Could include train schedules, maintenance schedules or any other anticipated HRI closures.</td>
</tr>
<tr>
<td>ATMS16</td>
<td>Parking Facility Management</td>
<td>Provides enhanced monitoring and management of parking facilities. Service package assists in the management of parking operations, coordinates with transportation authorities, and supports electronic collection of parking fees.</td>
</tr>
<tr>
<td>ATMS17</td>
<td>Regional Parking Management</td>
<td>Supports communication and coordination between parking facilities as well as coordination between parking facilities and traffic and transit management systems.</td>
</tr>
<tr>
<td>ATMS18</td>
<td>Reversible Lane Management</td>
<td>Provides the management of reversible lane facilities. Includes the field equipment, lane access controls, and associated electronics.</td>
</tr>
<tr>
<td>Service Package</td>
<td>Service Package Name</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>----------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ATMS19</td>
<td>Speed Warning and Enforcement</td>
<td>Monitors the speeds of vehicles traveling through a roadway system and warns the driver when their speed is excessive. This service can also support notifications to an enforcement agency to enforce the speed limit and roadside safe speed advisories based on current roadway conditions.</td>
</tr>
<tr>
<td>ATMS20</td>
<td>Drawbridge Management</td>
<td>Supports systems that manage drawbridges at rivers and canals and other multimodal crossings. Includes control devices as well as traveler information systems.</td>
</tr>
<tr>
<td>ATMS21</td>
<td>Roadway Closure Management</td>
<td>Closes roadways to vehicular traffic automatically or using remote activation when driving conditions are unsafe, maintenance must be performed, or in other situations where access must be prohibited. Includes gates or barriers to control access, control and monitoring systems, and field devices.</td>
</tr>
<tr>
<td>ATMS22</td>
<td>Variable Speed Limits</td>
<td>Sets variable speed limits (VSL) along a roadway to create more uniformed speeds, promote safer driving during adverse conditions, and reduce air pollution. This service monitors traffic and environmental conditions along the roadway to then calculate and set suitable speed limits. Can be monitored and controlled by a management center or autonomous.</td>
</tr>
<tr>
<td>ATMS23</td>
<td>Dynamic Lane Management and Shoulder Use</td>
<td>Provides lane configuration changes on the roadway according to traffic demands and lane destination along a section. Can be used to allow temporary or interim use of shoulders as travel lanes. Lanes can be designated for use by special vehicles (buses), HOV, or special event, etc.</td>
</tr>
<tr>
<td>ATMS24</td>
<td>Dynamic Roadway Warning</td>
<td>Provides warning to drivers of approaching hazards on the roadway dynamically. Warnings can be warning signs, flashing lights, in-vehicle messages, etc. This service does not include speed warnings considered by roadway geometry limitations – see ATMS19.</td>
</tr>
<tr>
<td>ATMS25</td>
<td>VMT Road User Payment</td>
<td>Supports charging fees to vehicle owners traveling on a specific roadway with potentially different rates based on a number of considerations – time of day, roadway used, class of vehicles, etc. Owners register with a single payment entity and pay according to the policy set in place.</td>
</tr>
<tr>
<td>ATMS26</td>
<td>Mixed Use Warning Systems</td>
<td>Supports the sensing and warning systems used to interact with pedestrians, bicyclists, and other vehicles that operate on the main vehicle roadway, or those that intersect with the main roadway. These systems are either automated warnings or active protection for the user.</td>
</tr>
<tr>
<td>EM01</td>
<td>Emergency Call – Taking and Dispatch</td>
<td>Provides basic emergency call-taking and dispatch services. Includes emergency vehicle equipment, dispatch centers, communications, and coordination between emergency management agencies.</td>
</tr>
</tbody>
</table>

**Emergency Management Service Area**
<table>
<thead>
<tr>
<th>Service Package</th>
<th>Service Package Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM02</td>
<td>Emergency Routing</td>
<td>Provides special priority and other specific emergency traffic control strategies to help improve the response of a vehicles en-route as well as coordination between emergency management agencies. Includes traffic information, road conditions, and signal preemption.</td>
</tr>
<tr>
<td>EM03</td>
<td>Mayday and Alarms Support</td>
<td>Supports user request for emergency assistance. The assistance includes gathering information about the location and incident, and then determining the appropriate response.</td>
</tr>
<tr>
<td>EM04</td>
<td>Roadway Service Patrols</td>
<td>Provides roadway services to vehicles for minor incidents, such as flat tires, cars that run out of gas, etc. Incident information is collected and shared with traveler information systems, traffic management, and maintenance and construction.</td>
</tr>
<tr>
<td>EM05</td>
<td>Transportation Infrastructure Protection</td>
<td>Supports monitoring of transportation infrastructure such as bridges, tunnels, and transportation management centers (TMCs) for potential threats and provides safeguards against them or strategies to minimize the impact if one should occur.</td>
</tr>
<tr>
<td>EM06</td>
<td>Wide-Area Alert</td>
<td>Provides information about alerts to the public in emergency situations such as child abductions, severe weather, or other life-threatening situations.</td>
</tr>
<tr>
<td>EM07</td>
<td>Early Warning System</td>
<td>Monitors and detects potential or actual natural or man-made disaster and notifies appropriate responding agencies.</td>
</tr>
<tr>
<td>EM08</td>
<td>Disaster Response and Recovery</td>
<td>Supports the coordination of emergency response plans to address natural or man-made disasters. It identifies key points of integration between agencies and their basic responses to address the transportation system and maintain awareness.</td>
</tr>
<tr>
<td>EM09</td>
<td>Evacuation and Reentry Management</td>
<td>Supports coordination of evacuation plans of the general public for all types of disasters. Information is shared amongst all agencies involved to implement specific strategies to effectively implement resources at the right time and right place.</td>
</tr>
<tr>
<td>EM10</td>
<td>Disaster Traveler Information</td>
<td>Provides disaster-related information to the public during a disaster. It is used to assist the public by providing evacuation route information, emergency instructions, roadway conditions, and other traveler information.</td>
</tr>
<tr>
<td>MC01</td>
<td>Maintenance and Construction Vehicle and Equipment Tracking</td>
<td>Tracks the location of maintenance and construction vehicles and other equipment to ascertain the progress of their activities.</td>
</tr>
<tr>
<td>MC02</td>
<td>Maintenance and Construction Vehicle Maintenance</td>
<td>Performs routine and corrective vehicle maintenance scheduling using on-board sensors that automatically perform diagnostics on the vehicles.</td>
</tr>
<tr>
<td>Service Package</td>
<td>Service Package Name</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>MC03</td>
<td>Road Weather Data Collection</td>
<td>Collects current road and weather conditions from sensors placed alongside the roadway. Data may also be requested or received from other meteorological systems (i.e., National Weather Service)</td>
</tr>
<tr>
<td>MC04</td>
<td>Weather Information Processing and Distribution</td>
<td>Uses the environmental data collected to help detect hazards, such as icy roads, high winds, or dense fog. The data can be used to help make decisions and keep operators updated on current condition information.</td>
</tr>
<tr>
<td>MC05</td>
<td>Roadway Automated Treatment</td>
<td>Automatically treats a section of road based on conditions detected by environmental sensors. Treatment options could include anti-icing chemicals or fog-dispersion techniques, among others.</td>
</tr>
<tr>
<td>MC06</td>
<td>Winter Maintenance</td>
<td>Supports winter road maintenance. Monitors environmental conditions and weather forecasts and uses the information to schedule winter maintenance activities.</td>
</tr>
<tr>
<td>MC07</td>
<td>Roadway Maintenance and Construction</td>
<td>Supports management of scheduled and unscheduled maintenance and construction services on the roadway.</td>
</tr>
<tr>
<td>MC08</td>
<td>Work Zone Management</td>
<td>Manages work zones by monitoring traffic conditions, coordinating with other agencies, and providing speed and delay information to the public prior to the work zone.</td>
</tr>
<tr>
<td>MC09</td>
<td>Work Zone Safety Monitoring</td>
<td>Detects intrusions in the work zone and warns workers of the potential hazards. Crews are monitored to warn those who leave the designated safety zone. Supports both mobile and stationary work zones.</td>
</tr>
<tr>
<td>MC10</td>
<td>Maintenance and Construction Activity Coordination</td>
<td>Supports the dissemination of maintenance and construction activity to centers that can utilize it as part of their operations. (e.g., traffic management, transit, emergency management, etc.)</td>
</tr>
<tr>
<td>MC11</td>
<td>Environmental Probe Surveillance</td>
<td>Collects real-time data from on-board vehicle systems about environmental conditions on the roadway.</td>
</tr>
<tr>
<td>MC12</td>
<td>Infrastructure Monitoring</td>
<td>Monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure using fixed and vehicle-based monitoring sensors.</td>
</tr>
</tbody>
</table>

**Public Transportation Service Area**

<table>
<thead>
<tr>
<th>Public Transportation Service Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>APTS1</td>
<td>Transit Vehicle Tracking</td>
</tr>
<tr>
<td>APTS2</td>
<td>Transit Fixed-Route Operations</td>
</tr>
<tr>
<td>APTS3</td>
<td>Demand Response Transit Operations</td>
</tr>
<tr>
<td>Service Package</td>
<td>Service Package Name</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------------------------</td>
</tr>
<tr>
<td>APTS4</td>
<td>Transit Fare Collection Management</td>
</tr>
<tr>
<td>APTS5</td>
<td>Transit Security</td>
</tr>
<tr>
<td>APTS6</td>
<td>Transit Fleet Management</td>
</tr>
<tr>
<td>APTS7</td>
<td>Multimodal Coordination</td>
</tr>
<tr>
<td>APTS8</td>
<td>Transit Traveler Information</td>
</tr>
<tr>
<td>APTS9</td>
<td>Transit Signal Priority (TSP)</td>
</tr>
<tr>
<td>APTS10</td>
<td>Transit Passenger Counting</td>
</tr>
<tr>
<td>APTS11</td>
<td>Multimodal Connection Protection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Commercial Vehicle Operations Service Area</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CVO01 Carrier Operations and Fleet Management</td>
<td>Provides the capabilities to manage a fleet of commercial vehicles. Vehicle routing and tracking as well as notification of emergency management of any troublesome route deviations (such as a HAZMAT vehicle) are part of this service package.</td>
</tr>
<tr>
<td>CVO02 Freight Administration</td>
<td>Tracks the movement of cargo and monitors the cargo condition.</td>
</tr>
<tr>
<td>CVO03 Electronic Clearance</td>
<td>Provides for automatic clearance at roadside check facilities. Allows a good driver/vehicle/carrier to pass roadside facilities at highway speeds using transponders and dedicated short range communications to the roadside.</td>
</tr>
<tr>
<td>CVO04 CV Administrative Processes</td>
<td>Provides for electronic application, processing, fee collection, issuance and distribution of CVO credentials, and tax filing.</td>
</tr>
<tr>
<td>Service Package</td>
<td>Service Package Name</td>
</tr>
<tr>
<td>-----------------</td>
<td>----------------------------------------------------</td>
</tr>
<tr>
<td>CVO05</td>
<td>International Border Electronic Clearance</td>
</tr>
<tr>
<td>CVO06</td>
<td>Weigh-In-Motion</td>
</tr>
<tr>
<td>CVO07</td>
<td>Roadside CVO Safety</td>
</tr>
<tr>
<td>CVO08</td>
<td>On-board CVO Safety</td>
</tr>
<tr>
<td>CVO09</td>
<td>CVO Fleet Maintenance</td>
</tr>
<tr>
<td>CVO10</td>
<td>HAZMAT Management</td>
</tr>
<tr>
<td>CVO11</td>
<td>Roadside HAZMAT Security Detection and Mitigation</td>
</tr>
<tr>
<td>CVO12</td>
<td>CV Driver Security Authentication</td>
</tr>
<tr>
<td>CVO13</td>
<td>Freight Assignment Tracking</td>
</tr>
<tr>
<td>ATIS01</td>
<td>Broadcast Traveler Information</td>
</tr>
<tr>
<td>ATIS02</td>
<td>Interactive Traveler Information</td>
</tr>
<tr>
<td>Service Package</td>
<td>Service Package Name</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>ATIS03</td>
<td>Autonomous Route Guidance</td>
</tr>
<tr>
<td>ATIS04</td>
<td>Dynamic Route Guidance</td>
</tr>
<tr>
<td>ATIS05</td>
<td>ISP-Based Trip Planning and Route Guidance</td>
</tr>
<tr>
<td>ATIS06</td>
<td>Transportation Operations Data Sharing</td>
</tr>
<tr>
<td>ATIS07</td>
<td>Travel Services Information and Reservation</td>
</tr>
<tr>
<td>ATIS08</td>
<td>Dynamic Ridesharing</td>
</tr>
<tr>
<td>ATIS09</td>
<td>In-Vehicle Signing</td>
</tr>
<tr>
<td>ATIS10</td>
<td>Vehicle Infrastructure Integration (VII)</td>
</tr>
</tbody>
</table>

**Archived Data Management Service Area**

| AD01 | ITS Data Mart | Houses archived data from a single agency/organization. Data is typically focused on a single transportation mode or one jurisdiction. |
| AD02 | ITS Data Warehouse | Includes all data collection and management of ITS Data Mart, but includes data from multiple agencies/organizations across modal and jurisdictional boundaries. |
| AD03 | ITS Virtual Data Warehouse | Includes all data collection and management of ITS Data Warehouse, but supports access between several archives in different physical locations. |

**Advanced Vehicle Safety**

<p>| AVSS01 | Vehicle Safety Monitoring | Monitors the vehicle’s condition, performance, on-board safety data, and display information using on-board sensors. |
| AVSS02 | Driver Safety Monitoring | Monitors the driver’s condition, performance, on-board safety data, and display information using on-board sensors. |
| AVSS03 | Longitudinal Safety Monitoring | Utilizes safety and collision sensors to monitor in front of and behind the vehicle to warn the driver of potential hazards. |</p>
<table>
<thead>
<tr>
<th>Service Package</th>
<th>Service Package Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVSS04</td>
<td>Lateral Safety Warning</td>
<td>Utilizes safety and collision sensors to monitor the sides of the vehicle to warn the driver of potential hazards.</td>
</tr>
<tr>
<td>AVSS05</td>
<td>Intersection Safety Warning</td>
<td>Monitors potential conflicts between approaching vehicles to an intersection and provides a warning to those vehicles involved using short range communications and/or signs/signals in the intersection.</td>
</tr>
<tr>
<td>AVSS06</td>
<td>Pre-Crash Restraint Deployment</td>
<td>Monitors the vehicle’s local environment using in-vehicle sensors and on-board communications to determine collision probability. If needed it will deploy a pre-crash safety system.</td>
</tr>
<tr>
<td>AVSS07</td>
<td>Driver Visibility Improvement</td>
<td>Enhances the driver’s visibility using an enhanced vision system. On-board display hardware is needed.</td>
</tr>
<tr>
<td>AVSS08</td>
<td>Advanced Vehicle Longitudinal Control</td>
<td>Utilizes safety and collision sensors to measure longitudinal gaps and a processor for controlling the vehicle speed and throttle.</td>
</tr>
<tr>
<td>AVSS09</td>
<td>Advanced Vehicle Lateral Control</td>
<td>Utilizes safety and collision sensors to measure the vehicle’s lane position and lateral deviations and a processor for controlling the vehicle steering.</td>
</tr>
<tr>
<td>AVSS10</td>
<td>Intersection Collision Avoidance</td>
<td>Utilizes roadway sensors and communications equipment to assess vehicle locations and speeds near an intersection to determine the probability of a collision. Timely warnings are provided and avoidance actions are taken.</td>
</tr>
<tr>
<td>AVSS11</td>
<td>Automated Vehicle Operations</td>
<td>Enables communications between vehicles and between vehicles and supporting infrastructure for check-in and check-out from the automated highway system.</td>
</tr>
<tr>
<td>AVSS12</td>
<td>Cooperative Vehicle Safety Systems</td>
<td>Enhances stand-alone warning systems by exchanging messages with surrounding vehicles and roadside equipment. Special messages from approaching emergency vehicles also may be received and processed.</td>
</tr>
</tbody>
</table>
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 3.19

Security Requirements for Developer Operated Critical Infrastructure Facilities and Structures
Security Requirements for Developer Operated Critical Infrastructure Facilities and Structures

The Department and the Developer will mutually agree during the Construction Period to the requirements of the Security Management Systems (SMS) and protocols which may include requirements and/or protocols listed below. All costs and funding associated with these requirements and protocols will be mutually agreed between the Department and the Developer.

Definitions

1. “SMS” - Throughout this document the term Security Management Systems (“SMS”) is intended to include all systems and equipment that directly and indirectly relate to the physical security of the facility, structure or compound the facility or structure is located on. Examples include but are not limited to Physical Access Control Systems (PACS), Cipher locks, security surveillance systems (CCTV), intrusion detection, security lighting, security related fiber optic and wireless communications systems and all associated hardware, security fencing, gates, gate operators, intercommunications, bollards and other forms of security systems and technology. SMS does not include standard door and/or office door knob locks and keys.

Documents

The Developer shall adhere to the below listed policies, procedures, or laws pertaining to Criminal History Records Checks, Critical Infrastructure Information / Sensitive Security Information (CII/SSI), Freedom of Information Act requests and Records Retention pertaining to security.

1. The Department’s Criminal History Records Check Policy (DPM 1-25)
2. The Department’s Freedom of Information Act Policy (DPM 1-5)
3. The Department’s CII/SSI Policy and Guide
4. Commonwealth of Virginia Records Retention Schedule(s) 108 and/or other applicable

Construction Period

1. The Department shall review and approve of all plans containing SMS components to determine the extent and type of needed SMS systems and potentially specific placement of components of the SMS. The Department shall review the technical specifications and/or equipment to be used in order to ensure compatibility, interoperability, and integration with current systems utilized by the Developer and the Department.
2. In general, through layered security, the following types (not all inclusive) of SMS will need to be incorporated into the facility or structure to mitigate common security vulnerabilities:
   a. Perimeter intrusion detection
   b. Vehicular and pedestrian access control (exterior)
   c. Access control (interior)
   d. Security camera system (exterior & interior)
   e. Security Lighting
   f. Security Network
   g. Interoperability with existing Department Security systems
   h. Other as determined necessary

3. The Developer shall be responsible for any and all onsite security and security planning.

**Operations Period**

1. The Department shall have compliance oversight authority in order to ensure all SMS equipment, components and related security protocols are maintained at the Express Operations Center.

2. The Developer shall allow the Department remote viewing and monitoring access to all security surveillance camera systems (CCTV) and shall allow the Department to extend this remote viewing capability to Department security consultants or local, state and Federal security partners who perform Homeland Security initiatives such as DHS, JTTF, USCG, VSP, etc.

3. The Developer shall ensure all security surveillance camera systems (CCTV) operating platforms remain interoperable with security surveillance camera systems (CCTV) operating platforms utilized by the Department.

4. The Developer shall be responsible for maintaining all SMS in accordance with manufacturer’s recommendations and industry best practices, and will ensure all SMS is maintained in a functional and operational capacity.

5. The Developer shall maintain a SMS preventative and corrective maintenance program, to include records documentation of all preventative and corrective maintenance activities.

6. The Developer shall maintain and be responsible for all SMS monitoring and all associated SMS administrative functions.

7. The Developer shall provide the Department a detailed inventory of all SMS installed to include location, SMS equipment documentation, including but not limited to as-builts, installation manuals, user manuals, programming manuals, training manuals, warranty documentation, etc.
8. The Developer shall not remove, relocate, change, alter, disconnect or impede any piece of SMS equipment without the Department’s prior review and approval, unless it’s a direct replace in kind or upgrade.

9. The Developer shall utilize, operate and incorporate all SMS into Developer’s daily operational protocols and procedures.

10. The Developer shall ensure all staff is adequately trained in the use and operations of SMS equipment and protocols.

11. The Developer shall designate an employee to serve as an onsite security representative. This representative shall be the Point of Contact (POC) with the Department responsible for coordinating security initiatives and programs with the Department.

12. The Developer shall notify the Department of all security requests (i.e. requests for security information, assessments, and tours, to include foreign visitor’s tour requests, etc).

13. All foreign visitor tour/site visit requests will be forward to the Department for processing in accordance with FHWA’s Office of International Programs protocols.

14. The Developer shall not release any security related information to include SMS information without the consent of the Department. FOIA requests for security information will be handled in accordance with the Department’s FOIA policy and procedures; additionally the Developer shall notify the Department of all security related FOIA requests.

15. The Developer will notify the appropriate VDOT Traffic Operations Center of all suspicious activity, or criminal activity in addition to reporting to local authorities having jurisdiction.

16. The Developer shall provide the Department, Department consultants or Federal security partners access to Developer operated Operations Center(s), SMS equipment, components, systems and SMS maintenance records for the purpose of completing SMS compliance reviews to ensure SMS is being maintained in a functional and operational capacity. Adequate notice shall be given to Developer, prior to any compliance review visit.

17. The Developer shall support local, state and federal security initiatives involving the Express Operations Center and will allow deployment of equipment which supports security and or anti-terrorism operations, on the Express Operations Center at the discretion of the Department.

18. The Developer in accordance with the Department’s Criminal History Records Check Policy (DPM 1-25) shall ensure all persons to include the Department, contractor(s) and or subcontractor personnel working at, or having unrestricted access to the Express Operations Center, or having access to designated CII/SSI information have been vetted through the Department’s Criminal History Records Check process.
19. The Department reserves the right to require the Department’s Criminal History Records Check on any Department, contractor and or subcontractor personnel.

20. The Developer shall ensure all documents which are exempt from the FOIA under COV §2.2-3705.2., are marked in accordance with the Department’s CII/SSI policy. Developer shall consult the Department for any CII/SSI marking or handling guidance.

21. The Developer shall develop and incorporate business continuity, resiliency, and emergency action planning as an element of their planning and operations at the Express Operations Center and 66 Express Lanes Project. It is the Developer’s responsibility, during the Construction Period and Operations Period to plan, develop, maintain and test these plans in accordance with Commonwealth of Virginia and federal requirements. The Department will have compliance oversight authority to verify that these elements do in fact exist, that they are maintained and tested according to industry best practices and that the level of preparedness will reasonably assure rapid recovery at minimum and continuous operation at best.

22. The Developer shall ensure that all voice communications systems meet FCC requirements and are of such nature that will foster effective interoperability.

23. The Developer shall ensure and document all employees, to include contractors working in an employee position, have completed the State’s Terrorism and Security Awareness Orientation training or state equivalent versions. The Developer shall initiate and maintain the same level of NIMS competency as equivalent Department staff positions.

24. The Developer shall work directly with the Department to implement and maintain all security, NIMS, Emergency Response, Incident Management, programs, policies and procedures which may not have been addressed in all other associated contractual documents pertaining to the Express Operations Center and 66 Express Lanes Project, in order to maintain the same level of security, NIMS, and Emergency Response, Incident Management which the Department maintains.

25. The Department’s Criminal History Records Check Policy (DPM 1-25) shall be followed, which may require background checks for those entities placing equipment on designated Critical Infrastructure facilities and structures or the right of way thereof, and therefore needing access to said equipment.
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 4.3
Bridge Maintenance Responsibilities
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Phases 1</td>
<td>University Blvd (Rte. 840) over I-66 &amp; NSRR</td>
<td>TBD</td>
<td>26904 076-6188</td>
<td>285-18</td>
<td>Shared Facility</td>
<td>Existing bridge widening (with direct access ramps)</td>
<td></td>
</tr>
<tr>
<td>1 Phases 1</td>
<td>Prince William Parkway EBL (Rte. 234 Bypass) over I-66</td>
<td>TBD</td>
<td>24787 076-1052</td>
<td>271-72</td>
<td>VDOT</td>
<td>Existing bridge to remain</td>
<td></td>
</tr>
<tr>
<td>1 Phases 1</td>
<td>Prince William Parkway WBL (Rte. 234 Bypass) over I-66</td>
<td>TBD</td>
<td>24788 076-1053</td>
<td>271-72</td>
<td>VDOT</td>
<td>Existing bridge to remain</td>
<td></td>
</tr>
<tr>
<td>1 Phases 1</td>
<td>Groveton Road over I-66</td>
<td>TBD</td>
<td>25960 076-4082</td>
<td>280-04</td>
<td>VDOT</td>
<td>Existing bridge to remain</td>
<td></td>
</tr>
<tr>
<td>1 Phases 1</td>
<td>Park and Ride Lot (Bulls Ford Road) Direct Access Bridge over I-66 EBL</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>66 Express</td>
<td>Proposed new bridge (with direct access ramps)</td>
<td></td>
</tr>
<tr>
<td>1 Phases 1</td>
<td>1-66 GP CD WBL over Sudley Road (Rte. 234 Business)</td>
<td>TBD</td>
<td>14202 076-2000</td>
<td>136-21, A-D</td>
<td>Shared Facility</td>
<td>Existing bridge to remain</td>
<td></td>
</tr>
<tr>
<td>1 Phases 1</td>
<td>1-66 GP and Express WBL over Sudley Road (Rte. 234 Business)</td>
<td>TBD</td>
<td>28305 076-2001</td>
<td>136-21, A-D</td>
<td>Shared Facility</td>
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<td></td>
</tr>
<tr>
<td>1 Phases 1</td>
<td>1-66 GP and Express EBL over Ball Run</td>
<td>TBD</td>
<td>6380 029-2900</td>
<td>136-22, A-C</td>
<td>Shared Facility</td>
<td>Existing mainline bridge widening</td>
<td></td>
</tr>
<tr>
<td>1 Phases 1</td>
<td>1-66 GP and Express EBL over Ball Run</td>
<td>TBD</td>
<td>6381 029-2901</td>
<td>136-22, A-C</td>
<td>Shared Facility</td>
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</tr>
<tr>
<td>1 Phases 1</td>
<td>Bull Run Drive (Rte. 235B) over I-66</td>
<td>TBD</td>
<td>6059 029-6233</td>
<td>136-16, A</td>
<td>VDOT</td>
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</tr>
<tr>
<td>1 Phases 1</td>
<td>1-66 GP and Express WBL over Cub Run</td>
<td>TBD</td>
<td>24993 029-2010</td>
<td>272-29</td>
<td>Shared Facility</td>
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<td>1-66 GP and Express EBL over Cub Run</td>
<td>TBD</td>
<td>24994 029-2011</td>
<td>272-29</td>
<td>Shared Facility</td>
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<tr>
<td>1 Phases 1</td>
<td>1-66 GP and Express WBL over Compton Road</td>
<td>TBD</td>
<td>6311 029-2012</td>
<td>136-19, A-C</td>
<td>Shared Facility</td>
<td>Existing mainline bridge widening</td>
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<tr>
<td>1 Phases 1</td>
<td>1-66 GP and Express EBL over Compton Road</td>
<td>TBD</td>
<td>6313 029-2013</td>
<td>136-19, A-C</td>
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<td>Existing mainline bridge widening</td>
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<tr>
<td>1 Phases 2</td>
<td>1-66 GP and Express WBL over Lee Highway (Rte. 29) - Centreville</td>
<td>TBD</td>
<td>6315 029-2019</td>
<td>148-07, A-F</td>
<td>Shared Facility</td>
<td>Existing bridge to remain</td>
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<tr>
<td>1 Phases 2</td>
<td>1-66 GP and Express EBL over Lee Highway (Rte. 29) - Centreville</td>
<td>TBD</td>
<td>6317 029-2020</td>
<td>148-07, A-F</td>
<td>Shared Facility</td>
<td>Existing bridge to remain</td>
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<tr>
<td>1 Phases 2</td>
<td>Route 28 EB Lamps Flyover to I-66 Express Lanes WBL</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>66 Express</td>
<td>Proposed new bridge</td>
<td></td>
</tr>
<tr>
<td>1 Phases 2</td>
<td>Braddock Rd (Rte. 620) / Walney Rd (Rte. 657) over Sully Rd (Rte. 28) with access to Rte. 28</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>VDOT</td>
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<td></td>
</tr>
<tr>
<td>1 Phases 2</td>
<td>Sully Road (Rte. 28) GP SB over I-66</td>
<td>TBD</td>
<td>TBD</td>
<td>029-1029</td>
<td>TBD</td>
<td>VDOT</td>
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</tr>
<tr>
<td>1 Phases 2</td>
<td>Sully Road (Rte. 28) GP SB Direct Access Flyover to I-66 Express Lanes EBL</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>66 Express</td>
<td>Proposed new bridge</td>
<td></td>
</tr>
<tr>
<td>1 Phases 2</td>
<td>Sully Road (Rte. 28) GP NB over I-66</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>VDOT</td>
<td>Existing bridge replaced</td>
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<td>1 Phases 2</td>
<td>1-66 Express EBL Direct Access Flyover to Sully Road (Rte. 28) GP NB</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>66 Express</td>
<td>Proposed new bridge</td>
<td></td>
</tr>
<tr>
<td>1 Phases 2</td>
<td>1-66 Express WBL Direct Access Flyover to Sully Road (Rte. 645)</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>66 Express</td>
<td>Proposed new bridge</td>
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<tr>
<td>1 Phases 2</td>
<td>Sully Road (Rte. 28) NB GP Direct Access Flyover to I-66 Express Lanes EBL</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>66 Express</td>
<td>Proposed new bridge</td>
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</tr>
<tr>
<td>1 Phases 2</td>
<td>Poplar Tree Road over Sully Road (Rte. 28)</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>VDOT</td>
<td>Proposed new bridge</td>
<td></td>
</tr>
<tr>
<td>1 Phases 2</td>
<td>1-66 Express WBL Flyover to I-66 GP WBL (to Sully Road - Rte. 28)</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>66 Express</td>
<td>Proposed new bridge</td>
<td></td>
</tr>
<tr>
<td>1 Phases 2</td>
<td>1-66 Express EBL Flyover to I-66 GP EBL (to Fairfax County Parkway - Rte. 286)</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>66 Express</td>
<td>Proposed new bridge</td>
<td></td>
</tr>
<tr>
<td>1 Phases 2</td>
<td>1-66 GP and Express WBL over Stringfellow Road (Rte. 645)</td>
<td>TBD</td>
<td>6320 029-2059</td>
<td>271-09</td>
<td>Shared Facility</td>
<td>Existing mainline bridge widening</td>
<td></td>
</tr>
<tr>
<td>1 Phases 2</td>
<td>1-66 GP and Express EBL over Stringfellow Road (Rte. 645)</td>
<td>TBD</td>
<td>6322 029-2060</td>
<td>271-09</td>
<td>Shared Facility</td>
<td>Existing mainline bridge widening</td>
<td></td>
</tr>
<tr>
<td>1 Phases 2</td>
<td>1-66 GP and Express CD Road over Stringfellow Road (Rte. 645)</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>Shared Facility</td>
<td>Proposed new bridge</td>
<td></td>
</tr>
<tr>
<td>1 Phases 2</td>
<td>1-66 Express WBL Flyover to Stringfellow Road Ramp</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>66 Express</td>
<td>Proposed new bridge</td>
<td></td>
</tr>
<tr>
<td>1 Phases 2</td>
<td>1-66 CD Road WBL over Fairfax County Parkway (Rte. 286)</td>
<td>TBD</td>
<td>24900 292091</td>
<td>269-25</td>
<td>VDOT</td>
<td>Existing bridge to remain</td>
<td></td>
</tr>
<tr>
<td>1 Phases 2</td>
<td>1-66 GP and Express WBL over Fairfax County Parkway (Rte. 286)</td>
<td>TBD</td>
<td>6376 029-2266</td>
<td>268-21, A</td>
<td>Shared Facility</td>
<td>Existing mainline bridge widening</td>
<td></td>
</tr>
<tr>
<td>1 Phases 2</td>
<td>1-66 GP and Express EBL over Fairfax County Parkway (Rte. 286)</td>
<td>TBD</td>
<td>6378 029-2267</td>
<td>268-21, A</td>
<td>Shared Facility</td>
<td>Existing mainline bridge widening</td>
<td></td>
</tr>
<tr>
<td>1 Phases 2</td>
<td>1-66 CD Road EBL over Fairfax County Parkway (Rte. 286)</td>
<td>TBD</td>
<td>24089 292099</td>
<td>269-56</td>
<td>VDOT</td>
<td>CD road bridge widening</td>
<td></td>
</tr>
<tr>
<td>1 Phases 2</td>
<td>West Ox Road (Rte. 608) over I-66</td>
<td>TBD</td>
<td>6667 029-6239</td>
<td>268-25</td>
<td>VDOT</td>
<td>Existing bridge to remain</td>
<td></td>
</tr>
<tr>
<td>1 Phases 2</td>
<td>Monument Drive over I-66</td>
<td>TBD</td>
<td>7076 029-6023</td>
<td>268-18, A</td>
<td>VDOT</td>
<td>Existing bridge widening (mod. for direct access ramps)</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------</td>
<td>--------------------------------</td>
<td>--------------------------</td>
<td>-----------------</td>
<td>---------------------------</td>
<td>--------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>2</td>
<td>Phase 1</td>
<td>Lee Jackson Memorial Highway (Rte. 50) EBL over I-66 with Direct Access to I-66 Express EBL</td>
<td>6299</td>
<td>029-1121</td>
<td>148-09, A</td>
<td>Shared Facility</td>
<td>Existing bridge replaced</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>Lee Jackson Memorial Highway (Rte. 50) WBL over I-66 EB Ramp B</td>
<td>6301</td>
<td>029-2080</td>
<td>148-11</td>
<td>VDOT</td>
<td>Existing bridge replaced</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>Lee Jackson Memorial Highway (Rte. 50) WBL over I-66 with Direct Access from I-66 Express WBL</td>
<td>6297</td>
<td>029-1120</td>
<td>148-10, A</td>
<td>Shared Facility</td>
<td>Existing bridge replaced</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>Lee Jackson Memorial Highway (Rte. 50) WBL Ramp over Rte. 50 EBL to I-66 GP WBL</td>
<td>TBD</td>
<td>TBD</td>
<td>NA</td>
<td>VDOT</td>
<td>Proposed new bridge</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>Lee Jackson Memorial Highway (Rte. 50) WBL Flyover Rte. 50 EBL and Ramp to Fair Oaks Mall</td>
<td>6176</td>
<td>029-1124</td>
<td>259-73</td>
<td>Fair Oaks Mall</td>
<td>Bridge to remain</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>Waples Mill Road (Rte. 665) over I-66</td>
<td>6817</td>
<td>029-6228</td>
<td>148-14, A</td>
<td>VDOT</td>
<td>Existing bridge replaced</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>Jeramantown Road (Rte. 655) over I-66</td>
<td>6798</td>
<td>029-6223</td>
<td>148-05, A</td>
<td>VDOT</td>
<td>Existing bridge to remain</td>
</tr>
<tr>
<td>Phase 1</td>
<td>Chain Bridge Road (Rte. 123) SBL over Ramp A</td>
<td>6459</td>
<td>029-1110</td>
<td>148-13, A, B</td>
<td>VDOT</td>
<td>Existing bridge to remain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chain Bridge Road (Rte. 123) NBL over Ramp A</td>
<td>6461</td>
<td>029-1111</td>
<td>148-13, A, B</td>
<td>VDOT</td>
<td>Existing bridge to remain</td>
<td></td>
</tr>
<tr>
<td>Phase 1</td>
<td>Chain Bridge Road (Rte. 123) over I-66 with Direct Access to Express Lanes</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>Shared Facility</td>
<td>Existing bridge replaced [with direct access ramps]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>Wake Lane (Rte. 655) over I-66 &amp; Metro Facility</td>
<td>6796</td>
<td>029-6218</td>
<td>206-02</td>
<td>VDOT</td>
<td>Bridge to exist</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>Vaden Drive over I-66 &amp; Metro Facility with Direct Access to I-66 Express Lanes</td>
<td>6198</td>
<td>029-2262</td>
<td>260-81, A</td>
<td>Shared Facility</td>
<td>Existing bridge replaced</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>Vaden Drive Direct Access Express Lanes Ramp Structure</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>66 Express</td>
<td>Proposed new bridge</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>Metro Pedestrian Bridge To Vienna Station North</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>WMATA</td>
<td>Existing bridge replaced</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>Metro Pedestrian Bridge To Vienna Station South</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>WMATA</td>
<td>Existing bridge to remain</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>Nutley Street (Rte.243) SBL over I-66 &amp; Metro Facility</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>VDOT</td>
<td>Existing bridge replaced</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>Nutley Street (Rte.243) NBL over I-66 &amp; Metro Facility</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>VDOT</td>
<td>Existing bridge replaced</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>Cedar Lane (Rte. 698) over I-66 &amp; Metro Facility</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>WMATA</td>
<td>Existing bridge replaced</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>66 GP WBL Flyover to I-66 Express EBL</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>66 Express</td>
<td>Proposed new bridge</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>Metro Pedestrian Bridge To Dunn Loring Station</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>WMATA</td>
<td>Existing bridge replaced</td>
</tr>
<tr>
<td>3</td>
<td>Phase 1</td>
<td>Gallows Road (Rte. 650) over I-66 &amp; Metro Facility</td>
<td>6783</td>
<td>029-6219</td>
<td>162-04A</td>
<td>VDOT</td>
<td>Existing bridge replaced</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>66 GP and Express WBL over I-495 GP and Express SBL</td>
<td>28665</td>
<td>029-2279</td>
<td>287-72</td>
<td>Shared Facility</td>
<td>Existing mainline bridge widening</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>66 GP and Express WBL over I-495 GP and Express NBL</td>
<td>28666</td>
<td>029-2280</td>
<td>287-71</td>
<td>Shared Facility</td>
<td>Existing mainline bridge widening</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>495 Express SBL over Ramp to I-495 GP and Express WBL</td>
<td>28676</td>
<td>029-2386</td>
<td>287-70</td>
<td>66 Express</td>
<td>Existing ramp bridge widening</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>495 Express SBL Ramp Flyover I-495 WBL to I-66 Express WBL</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>66 Express</td>
<td>Proposed new bridge</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>495 Express NBL Flyover I-495 Express and GP NBL to Flyover Ramp to I-66 GP WBL</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>66 Express</td>
<td>Proposed new bridge</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>495 GP and Express NBL Flyover I-495 and Metro Facility to I-66 GP WBL</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>Shared Facility</td>
<td>Proposed new bridge</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>495 Express NBL Flyover I-495 GP and Express SBL to I-66 Express WBL</td>
<td>28675</td>
<td>029-2285</td>
<td>287-77</td>
<td>66 Express</td>
<td>Existing bridge to remain</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>495 Express NBL Flyover I-66 GP, Express and Metro Facility EBL to I-66 Express WBL</td>
<td>6598</td>
<td>029-2065</td>
<td>162-09A, B, C</td>
<td>66 Express</td>
<td>Existing bridge to remain</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>495 GP NBL Ramp Flyover I-495 GP WBL and Express I-495 GP WBL</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>66 Express</td>
<td>Proposed new bridge</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>495 GP NBL Flyover I-495 GP to I-495 GP NBL</td>
<td>28662</td>
<td>029-2276</td>
<td>287-75</td>
<td>VDOT</td>
<td>Existing bridge to remain</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>495 GP and Express EBL over I-495 GP and Express SBL</td>
<td>28663</td>
<td>029-2277</td>
<td>287-74</td>
<td>Shared Facility</td>
<td>Existing bridge to remain</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>495 GP and Express EBL over I-495 GP and Express NBL</td>
<td>28664</td>
<td>029-2278</td>
<td>287-73</td>
<td>Shared Facility</td>
<td>Existing bridge to remain</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>66 Express EBL Flyover I-495 WBL to Ramp to I-495 GP SBL</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>66 Express</td>
<td>Proposed new bridge</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>66 GP WBL and I-66 Express EBL Ramp Flyover I-495 to I-495 GP SBL</td>
<td>28667</td>
<td>029-2281</td>
<td>287-68</td>
<td>VDOT</td>
<td>Existing bridge to remain</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>66 GP WBL Ramp Flyover I-495 GP and Express NBL to I-495 Express SBL</td>
<td>28677</td>
<td>029-2287</td>
<td>287-69</td>
<td>VDOT</td>
<td>Existing bridge to remain</td>
</tr>
</tbody>
</table>

Total - VDOT Maintained: 27
Total - Shared Facility Maintained: 25
Total - Bridge widenings (including DAR modifications): 16
Total - 66 Express Maintained: 18
Total - WMATA Maintained: 3
Total - Private Owner: 1
Total Bridges: 74
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 4.5
Performance Requirements Baseline Tables
The Performance Requirements are stated in the Performance Requirements Baseline Tables.

An Asset meets a Performance Requirement provided that, where applicable:

- the requirement(s) stated in Table 4.5a under Performance Requirement are fulfilled;
- the Asset fulfils the “Asset Condition Criteria” set forth in the third column of Table 4.5a to the extent required in the fourth column of Table 4.5a (entitled “Target”) as a percentage of the total measurements performed with respect to each criterion; and
- the requirements(s) stated in Table 4.5b under Outcome (second column) are fulfilled;
- the Asset fulfils the “Ordinary Maintenance Criteria” set forth in the fourth column of Table 4.5b to the extent required in the third column of Table 4.5b (entitled “Minimum”) as a percentage of the total measurements performed with respect to each criterion; and
- the Concessionaire meets the “Timeliness Requirements” set forth in the fourth column of Table 4.5b of the Technical Requirements, subject to environmental conditions and ability to perform maintenance or as mutually agreed in the Life Cycle Maintenance Plan.

The Performance Baseline Tables are reviewed and updated following Substantial Completion as described in Section 4.5 of the Technical Requirements.
1 Asset Condition Performance Requirements

Table 4.5a: Asset Condition Performance Requirements Baseline Table

<table>
<thead>
<tr>
<th>Asset</th>
<th>Performance Requirement</th>
<th>Asset Condition Criteria and Timeliness Requirements</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavement</td>
<td>Roadways have a smooth and quiet surface course with adequate skid resistance and free from defects.</td>
<td>The methodology of data collection, quality assurance of data, derivation of condition measures, and the use of pavement condition data to assess pavement deficiencies, and develop the 5-year period maintenance plan shall be consistent with the latest VDOT roadway condition assessment and maintenance practice guidelines(1). The condition data shall be compatible with VDOT Pavement Manager System database. (1) The latest practice guidelines and related standards can be found in the “State of the Pavement” - an annual statewide pavement condition report issued by VDOT Maintenance Division.</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>All measurement methods and application for the HOT lanes based on the asset condition reports and a full 5-year period maintenance plan prepared will be considered in determination of performance requirements for Pavement.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rut depth</td>
<td>Maximum ¾”.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Timeliness Requirement</strong></td>
<td>Pavement rut depth is brought below maximum within 3 months of the measurement of failure to meet the target.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>International Roughness Index Rating (IRI)</strong></td>
<td>IRI measurements applicable to each 0.01-mile section for each designated lane. IRI is brought below Target within 3 months of the measurement of failure to meet the target.</td>
<td>170 or less</td>
</tr>
<tr>
<td></td>
<td><strong>Timeliness Requirement</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 4.5a: Asset Condition Performance Requirements Baseline Table

<table>
<thead>
<tr>
<th>Asset</th>
<th>Performance Requirement</th>
<th>Asset Condition Criteria and Timeliness Requirements</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Asset Condition Criteria</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Critical Condition Index (CCI) (1) CCI is calculated as the lower of Load Rated Distress Rating (LDR) and Non Load Rated Distress Rating (NDR)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Timeliness Requirement</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CCI is brought above minimum within 6 months of measurement of failure to meet target.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Asset Condition Criteria</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skid resistance, measured using standard test method (ASTM E-274) compared to mean skid resistance of the I 66 GP lanes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Timeliness Requirement</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skid resistance is brought above minimum within 3 months of measurement of failure to meet target,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exceeds Mean</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Condition assessment of the paved shoulder will be subjective, simply for safety, convenience and efficiency.</td>
<td></td>
</tr>
<tr>
<td>Bridges and Bridge Class Culverts</td>
<td>Bridges and Bridge Class Culverts are safe, fully functional, and structurally sound.</td>
<td><strong>Asset Condition Criteria</strong></td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maintain a general condition rating for Decks (Item 58), Superstructures (Item 59), Substructures (Item 60), Channels and Channel Protections (Item 61), and Bridge Class Culverts (Item 62) at a level of 5/“Fair Condition” or better, as defined in the FHWA Recording and Coding Guide for Structure Inventory and Appraisal of the Nation’s Bridges.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maintain the following bridge element state condition as defined in the VDOT Element Data</td>
<td></td>
</tr>
</tbody>
</table>
### Table 4.5a: Asset Condition Performance Requirements Baseline Table

<table>
<thead>
<tr>
<th>Asset</th>
<th>Performance Requirement</th>
<th>Asset Condition Criteria and Timeliness Requirements</th>
<th>Target</th>
</tr>
</thead>
</table>
| Traffic Control Device Structures | Traffic Control Device Structures are safe, fully functional, and structurally sound. | Collection Manual for:  
  1. Coated Steel/Metal Elements (Paint) at a condition state 2 or higher.  
  2. Expansion Joints at a condition state of 1.  
  3. Bearings at a condition state of 2 or higher.  
Perform inspections and assessment in accordance with the requirements of federal National Bridge Inspection Standards (NBIS) of the Code of Federal Regulations, 23CFR650 Subpart C - National Bridge Inspection Standards and IIM-S&B 27-Bridge Safety Inspections and IIM-S&B-86 -Load Rating and Posting of Structures (Bridges and Culverts). All inspection reports and load ratings shall be submitted to the Department.  
Bridge deck ride quality shall conform to “Localized Roughness” criteria for pavement (i.e., Continuous IRI ≤300 in/mi per 0.01-mile segment length).  
There are no Structurally Deficient Bridges\(^{(2)}\) or Bridge Class Culverts.  
There are no weight restricted bridges\(^{(3)}\) or Bridge Class Culverts.  
**Timeliness Requirements**  
Structure condition ratings are brought above minimum performance levels within 6 months of measurement of failure to meet minimum.  
Localized roughness is brought below maximum within 6 months of measurement of failure to meet minimum. | 100% |
<table>
<thead>
<tr>
<th>Asset</th>
<th>Performance Requirement</th>
<th>Asset Condition Criteria and Timeliness Requirements</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage</td>
<td>Drainage system is effective at ensuring travel way is free from water such that the water does not present a hazard by virtue of its location, size and depth.</td>
<td>Condition” or better (the term “Satisfactory” shall be a condition similar to that as described in Items 58 through 62 in the FHWA Recording and Coding Guide for Structure Inventory and Appraisal of the Nation’s Bridges). Traffic control device structures include: Overhead sign structures, cantilever sign structures, butterfly sign structures, toll gantries, high mast lighting poles, offset lighting poles, conventional lighting poles, camera poles and traffic signal structures. Perform inspections and assessment in accordance with the requirements IIM-S&amp;B-82-Traffic Structures. <strong>Timeliness Requirements</strong> Structure condition ratings are brought above minimum performance levels within 6 months of measurement of failure to meet minimum.</td>
<td>90%</td>
</tr>
</tbody>
</table>
| Electrical supply   | Electrical supply, feeder pillars, cabinets, switches and fittings are electronically, mechanically and structurally sound and functioning | **Asset Condition Criteria**  
Length of roadway with visual inspection confirming no hazardous free standing water  
**Timeliness Requirements**  
Conditions giving rise to hazardous free standing water are rectified within 3 months of discovery. | 90%    |
Table 4.5a: Asset Condition Performance Requirements Baseline Table

<table>
<thead>
<tr>
<th>Asset</th>
<th>Performance Requirement</th>
<th>Asset Condition Criteria and Timeliness Requirements</th>
<th>Target</th>
</tr>
</thead>
</table>
| Hazardous materials / spillage | Control of hazardous materials shall be in accordance with Chapter 13, NFPA 502          | **Asset Condition Criteria**  
Incident reports showing compliance  
**Timeliness Requirements**  
Failures to comply with Chapter 13, NFPA 502 are investigated and revised procedures put in place within 1 month of completion of investigation. | 100%   |
| Structural assessment        | Evaluate structural damage to structures and liaise with emergency services to ensure safe working in clearing incidents | **Asset Condition Criteria**  
Inspections and surveys as required by incident that are correctly reported.  
**Timeliness Requirement**  
Failures to evaluate damage to structures and to assist emergency services with clearing of incidents are investigated and revised procedures put in place within 1 month of completion of investigation. | 100%   |

(1) The latest practice guidelines and related standards can be found in the “State of the Pavement” – an annual renewable pavement condition report issued by the VDOT Maintenance Division.

I-66 will utilize the prevailing methods of pavement assessment the Department employs at a given time in the future. The year 2015 Department condition assessment method for the pavement utilizes a continuous digital imaging and automated crack detection technology. The surface condition of only one travel lane in each direction along the 66 Express Lanes will be inspected annually. The assessment data will then be processed and characterized into a series of rating indices to represent the overall condition of the pavement and the basis for the maintenance and rehabilitation schedules.

Where existing pavement remains as part of the 66 Express Lanes, the Department’s maintenance history and assumptions in regards to conditions, including the information documented in the will be the basis for the I-66 reporting in the future.

(2) Structurally Deficient: A bridge or a bridge class culvert is deemed structurally deficient if any of its NBI general condition rating (deck, superstructure, substructure, or culvert) is 4 or less, or one of two appraisal ratings (structural condition or waterway adequacy) is 2 or less.

(3) Weight Restricted: When the load carrying capacity of a structure as a result of a structural evaluation is determined to be less than Virginia’s legal loads, the bridge is then posted in accordance with VDOT’s policies. All structures are to be analyzed and load rated in accordance with the National Bridge Inspection Standards, AASHTO Bridge Evaluation Manual, and the latest VDOT Structure and Bridge Division’s IIM-S&B-86-Load Rating and Posting of Structures (Bridges and Culverts), and memorandum dealing with load ratings.
2 Ordinary Maintenance Performance Requirements

The Project shall be subject to the Department’s Maintenance Rating Program (MRP), or subsequent update or replacement program. The Concessionaire shall use the MRP to verify performance of each Asset against the criteria set out in the Performance Requirements Baseline Tables. The Concessionaire shall include in the end of year report outlined in Section 1.10 of the Technical Requirements, a summary of the results of annual assessments in a format to be agreed between the Concessionaire and the Department.

The Concessionaire shall achieve and maintain an MRP rating of 90% or above for all Assets in accordance with the most current Northern Virginia TAMS performance requirements in effect on other similar highways within Northern Virginia, unless otherwise noted in Table 4.5b below. The Concessionaire shall achieve the criteria in TAMS or Table 4.5b and shall cause the level of maintenance attained to be uniform and consistent at all times. All Asset Groups shall achieve a minimum rating of 90% unless otherwise noted herein.

<table>
<thead>
<tr>
<th>Asset</th>
<th>Outcome</th>
<th>Minimum (%)</th>
<th>Ordinary Maintenance Criteria and Timeliness Requirements</th>
<th>UOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROADSIDE ASSET GROUP</td>
<td>In accordance with the most current VDOT TAMS requirements in place in Northern Virginia on other similar highways.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DRAINAGE ASSET GROUP</td>
<td>In accordance with the most current VDOT TAMS requirements in place in Northern Virginia on other similar highways.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRAFFIC ASSET GROUP</td>
<td>In accordance with the most current VDOT TAMS requirements in place in Northern Virginia on other similar highways or as specified below.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable Locating: Electric, Fiber, Communications</td>
<td>Maintain Cable Facilities</td>
<td>90</td>
<td>Ordinary Maintenance Criteria</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- No errors per cable markings.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- &lt;2 linear ft. tolerance from actual cable plant.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Must maintain any and all cable infrastructure as as-built drawings.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Excavators are not to begin until all underground utilities have been marked including those that might be maintained by Miss Utility.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Concessionaire will mark all VDOT cables, Concessionaire responsible</td>
<td></td>
</tr>
</tbody>
</table>
Table 4.5b – Ordinary Maintenance Performance Requirements Baseline Table

<table>
<thead>
<tr>
<th>Asset</th>
<th>Outcome</th>
<th>Minimum (%)</th>
<th>Ordinary Maintenance Criteria and Timeliness Requirements</th>
<th>UOM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>for Miss Utility for work done under the contract</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Timeliness Requirement:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• All cable marking requests must be logged and accomplished within 72 hrs of request or as otherwise agreed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• All emergency cable marking requests must be accomplished within 4 hrs, unless agreed otherwise, or emergency cable marking preclude access. Emergency situations are defined as “a sudden or unexpected occurrence involving a clear and immediate danger, demanding immediate action to prevent or mitigate loss of, or damage to life, health, property or essential public services.”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Damaged facilities due to mis-marked cables must be repaired or replaced within 8 hrs, or as otherwise agreed.</td>
<td></td>
</tr>
<tr>
<td>Junction Boxes</td>
<td>Maintain Junction Boxes</td>
<td>90</td>
<td><strong>Ordinary Maintenance Criteria</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• All junction or pull boxes shall be free from damage or missing parts.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Boxes, frames, and covers shall be watertight except for approved weep holes.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Must maintain any and all junction boxes infrastructure as as-built drawings.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Covers shall be fitted with gaskets and secured with approved securing screws.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Timeliness Requirement:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• All damaged cable junction boxes and or pull boxes must be repaired within 7 days of discovery or notification if hazardous conditions exist, or within 30 day otherwise.</td>
<td></td>
</tr>
</tbody>
</table>

ROADWAY & SHOULDER ASSET GROUP – In accordance with the most current VDOT TAMS requirements in place in Northern Virginia on other similar highways.

BRIDGE ASSET GROUP – In accordance with the most current VDOT TAMS requirements in place in Northern Virginia on other similar highways.
### Table 4.5b – Ordinary Maintenance Performance Requirements Baseline Table

<table>
<thead>
<tr>
<th>Asset</th>
<th>Outcome</th>
<th>Minimum (%)</th>
<th>Ordinary Maintenance Criteria and Timeliness Requirements</th>
<th>UOM</th>
</tr>
</thead>
</table>
| SERVICES GROUP – In accordance with the most current VDOT TAMS requirements in place in Northern Virginia on other similar highways, or as specified below | Clean and Fully Operational                    | 100         | **Timeliness Requirements:**  
  - Quarterly operations check and inspection (or as needed) due to maintenance monitoring alert  
  - Quarterly cleaning or as needed | Each |
| TRAFFIC MANAGEMENT SERVICE – In accordance with the most current VDOT TAMS requirements in place in Northern Virginia on other similar highways, or as specified below | Buildings structurally sound and serviceable | 90          | **Ordinary Maintenance Criteria**  
  - structural integrity of all buildings is maintained at all times  
  - Electrical systems, HVAC systems, and communication lines, fully functioning  
  - No material paint blistering or peeling, mildew, or mold, rusted metal fittings.  
**Timeliness Requirements**  
  - General maintenance issues of a material nature to be addressed within 7 days of notification or discovery.  
  - Issues affecting public safety to be addressed immediately | Annual Report |
### Attachment 4.6: Maintenance Responsibility Matrix

<table>
<thead>
<tr>
<th>MAINTENANCE ITEM</th>
<th>INSPECTIONS (I)</th>
<th>ROUTINE (R)</th>
<th>MAJOR (M)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pavement</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Mainline for Express Lanes</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>(2) Mainline Striping for Express Lanes</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>(3) Ramps to and from the Express Lanes</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Bollards</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td><strong>Structures - HOT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Signs</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>(2) Walls</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>(3) Bridges</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td><strong>Structures - Shared</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Signs</td>
<td>Shared</td>
<td>D</td>
<td>Shared</td>
</tr>
<tr>
<td>(2) Walls</td>
<td>Shared</td>
<td>D</td>
<td>Shared</td>
</tr>
<tr>
<td>(3) Bridges</td>
<td>VDOT</td>
<td>D</td>
<td>Shared</td>
</tr>
<tr>
<td>Duct Bank (Power &amp; Communications) - Shared</td>
<td>Shared</td>
<td>Shared</td>
<td>Shared</td>
</tr>
<tr>
<td><strong>Sign Panel - VDOT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signs</td>
<td>VDOT</td>
<td>VDOT</td>
<td>VDOT</td>
</tr>
<tr>
<td><strong>Sign Panel - HOT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signs</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Drainage - Inlets (within Express Lanes)</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Drainage - Inlets &amp; Pipes (within footprint of Express)</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Drainage - Systems</td>
<td>VDOT</td>
<td>VDOT</td>
<td>VDOT</td>
</tr>
</tbody>
</table>
## Attachment 4.6: Maintenance Responsibility Matrix

<table>
<thead>
<tr>
<th>MAINTENANCE ITEM</th>
<th>INSPECTIONS (I)</th>
<th>ROUTINE (R)</th>
<th>MAJOR (M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormwater Management Ponds &amp; BMP's (outside of)</td>
<td>VDOT</td>
<td>VDOT</td>
<td>VDOT</td>
</tr>
<tr>
<td>Stormwater Management Ponds &amp; BMP's (inside)</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Snow &amp; Ice Removal</td>
<td>VDOT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITS - Managed Lanes</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

### TTMS - HOT

| (1) Equipment | D | D | D |
| (2) Toll Gantries | D | D | D |
| (3) ITS Poles | D | D | D |
| (4) ITS Poles - Shared | D | D | D |
| Median Mowing & Median Maintenance | D | D | D |
| Lighting - HOT Ramps | D | D | D |
| Lighting - Mainline | VDOT | VDOT | VDOT |
| Lighting - Median | D | D | D |
| Utility Marking - HOT & GP | D | | |
| Roadside Safety Treatment - HOT | D | D | D |
| Roadside Safety Treatment - Shared | Shared | Shared | Shared |
| Roadside Safety Treatment - VDOT | VDOT | VDOT | VDOT |
| Sound Walls - HOT Ramps | D | D | D |
| Sound Walls - GP | VDOT | | |
| Maintenance Yard | D | | |
## Attachment 4.6: Maintenance Responsibility Matrix

<table>
<thead>
<tr>
<th>OPERATIONS</th>
<th>66 Express Lanes Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Service Patrol</td>
<td>D</td>
</tr>
<tr>
<td>Ops Center</td>
<td>D</td>
</tr>
<tr>
<td>Incident Management</td>
<td>D</td>
</tr>
<tr>
<td>Traffic Management</td>
<td>D</td>
</tr>
<tr>
<td>Traffic Signals</td>
<td>VDOT</td>
</tr>
<tr>
<td>Back Office Support</td>
<td>D</td>
</tr>
<tr>
<td>Center-to-Center Connectivity</td>
<td>Shared</td>
</tr>
<tr>
<td>Redundancy Ring</td>
<td>D</td>
</tr>
<tr>
<td>Emergency Evacuation - Managed</td>
<td>VDOT</td>
</tr>
<tr>
<td>Emergency Evacuation - Operations</td>
<td>D</td>
</tr>
<tr>
<td>Enhancement</td>
<td>D</td>
</tr>
<tr>
<td>Operating Speed Performance Standard (OSPS)</td>
<td>D (65/45)</td>
</tr>
<tr>
<td>GP Lane Management - Operating Shoulder Lane</td>
<td>VDOT</td>
</tr>
<tr>
<td>Tolling System Requirements</td>
<td>D</td>
</tr>
<tr>
<td>Express Lanes Enforcement by VSP</td>
<td>D</td>
</tr>
<tr>
<td>Express Lanes Incident Management by VSP</td>
<td>D</td>
</tr>
<tr>
<td>Park &amp; Ride Lots (O&amp;M)</td>
<td>VDOT</td>
</tr>
<tr>
<td>E-Zpass Logo &amp; Purple Pavement Marking</td>
<td>D</td>
</tr>
</tbody>
</table>

**HOT OPS**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Service</td>
<td>D</td>
</tr>
<tr>
<td>Future Enhancements</td>
<td>D</td>
</tr>
</tbody>
</table>

*D - Developer*
66 Express Lanes
Exhibit C

Draft Technical Requirements
Attachment 4.7
Conceptual Tolling Zones and Points
VDOT I-66 Managed Lanes Configuration

Build Scenario Access Points - Sept 21, 2015

Preferred Alternative - PHASE 1

66 Express Lanes Attachment 4.7 Conceptual Tolling Zones and Points - DRAFT

No direct access

DIVERGING DIAMOND
INTERCHANGE

US29
Gainesville

VA286
Fairfax County Pkwy

US15
James Madison Hwy

I-66 Express Lanes

66 Express Lanes Attachment 4.7 Conceptual Tolling Zones and Points - DRAFT

No direct access

DIVERGING DIAMOND
INTERCHANGE

US29
Gainesville

VA286
Fairfax County Pkwy

US15
James Madison Hwy

I-66 Express Lanes

No direct access

DIVERGING DIAMOND
INTERCHANGE

US29
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James Madison Hwy

I-66 Express Lanes

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