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Attachment 1.3:	Project Development Plans
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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 (PDPs), as described in the 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 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 satisfactorily discharge its review and approval obligations.
- 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 7 days 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 field inspection and right of way;
  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 reviewed 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.
- 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 by the Developer to the Department. 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 and/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 and 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 and/or with the Developer's representative. The purpose of such meetings would be to address Project concerns, technical issues, and requests for information (RFIs), and to facilitate 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/or 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, 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 implementation of 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. 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 two 12-foot x 12-foot walled offices;
  3. Minimum of ten 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 (desk sized 60 inches x 34 inches, chairs with rolling casters, rolling pad, stapler, and tape dispenser);
  5. One 4-drawer metal fire protection file cabinet per person;
  6. One 4-shelf bookcase per office/cubicle;
  7. One dry erase board with eraser and markers;
  8. One computer or laptop connection per person/workstation (IT to provide minimum specifications);
  9. Networking and internet capabilities for all computer connections and copying equipment;
  10. Infrastructure and access capabilities to the internet;
  11. One black and white printer (IT to provide minimum specifications);
  12. One color printer (IT to provide minimum specifications);
  13. One microwave oven with a minimum 1,000 watts;
  14. One full-size refrigerator;
  15. One wastebasket per person;
  16. First Aid kit 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. One 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 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 12-foot x 20-foot conference room with conference table and conference chairs to seat 15 people. Conference room to be supplied with a phone suitable for conducting conference calls; plus 1 dry erase board, wall mounted, minimum 25 square feet, with eraser and markers;
25. Plan rack 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 and have a robust HVAC system to maintain a temperature of 72 degrees Fahrenheit in all areas of the office throughout all seasonal effects;
30. Adequate lavatory facilities to account for 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. An 8-foot x 10-foot kitchen area with a sink and one lunch-style table and chairs to seat a total of 6 people;
33. A 10-foot x 10-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 architectural standards. 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 20 spare keys that shall be provided to the Department;
37. One paper shredder;

- 38. Weekday janitorial services; and
- 39. Exterior way finding and project office identification signage.
- C. The field office shall be available and operational from 60 days after the latter of Financial Close or Design Work Notice to Proceed to 120 days after Final Acceptance. Furnishings and equipment specified shall be in sound and functional condition throughout the duration of the Project.
- 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 aw.
- 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 Closing 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 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.

- C. The Developer shall hold monthly progress meetings with the Department. During such meetings, progress during the prior month, Work to be undertaken during the next month, and encountered or anticipated issues shall be reviewed, and the Developer shall collect 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 Final Acceptance. 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. As part of, and in conjunction with, the monthly meetings required by the Agreement, the Developer shall provide the Department with any proposed update of the Baseline Schedule for the Department's review and approval, and 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, work calendars, constraints, delays experienced and any pending Time Impact Analysis (TIA), any float consumption and the reasons for such consumption, documentation of any logic changes, duration changes, resource changes, or other relevant changes. The monthly progress narrative shall also include the following:
  - 1. Comparisons of actual and planned progress, including: (1) illustrating schedule variance graphically by plotting the budgeted cost of work performed (BCWP) and the budgeted cost of work scheduled (BCWS); and (2) reporting the schedule performance index (SPI), defined as the ratio of BCWP divided by BCWS;
  - 2. A statement by the Developer that the Baseline Schedule is the schedule being executed to perform the Work;
  - 3. Details of any aspects of the Work that may jeopardize the completion in accordance with the Agreement; and
  - 4. Measures being (or to be) adopted to overcome such aspects and a list of approvals needed to adopt such measures.
- E. 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 complies 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. The Project Schedule shall consist of the Initial Baseline Schedule, the Baseline Schedule, the monthly updates to the Project Schedule, and the As-Built Schedule.
  4. 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.
  5. The Department shall review submittals of the Project Schedule 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/or 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 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, Interim Milestone Dates if any; and Substantial, Service Commencement, and Guaranteed Substantial Completion Dates;
  7. Show phasing of the Work as detailed in the plans, subcontractor work, procurement, fabrication, delivery, installation, testing of materials and equipment, commissioning of systems, and any long-lead time orders for major or significant materials and equipment;
  8. Allocate an estimated cost/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 required and the dates by which such approvals 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 Substantial 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 the latest version of 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 Guaranteed Substantial 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 Guaranteed Substantial 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 The Baseline Schedule**

- A. Within 60 days of the Financial Closing Date, 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 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 Closing Date until Substantial 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/or 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 Contract includes a specified “start-no-earlier than” milestone, then the Contract milestone activity shall be constrained with a “Start On or After” constraint, with a date equal to the date specified in the Contract. If the Contract includes a specified Interim Milestone or Substantial Completion Milestone, then the Contract interim completion milestone activity or substantial 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 Baseline Schedule shall be cost-loaded and shall be the basis for monthly progress payments and for assessing progress. Each activity associated with a pay item for which the Developer expects to receive payment shall be cost-loaded, using the scheduling software “Material” resource type and according to the following:
1. A material resource shall be defined for each pay item shown or as approved by the Department. Pay item ID codes shall be congruent to the extent possible with the VDOT five-digit standard and non-standard pay item numbers (for example: 00100 – Mobilization).

2. Each proposed pay item material resource shall indicate the Resource ID, Resource Name, Unit of Measure, and Price/Unit as shown in the Schedule of Items. The pay item material resource ID shall be unique and shall be defined using the Contract ID as a prefix followed by the pay item number (i.e., C00012345DB12.00100).
  3. The “Auto Compute Actuals” and “Calculate costs from units” boxes for each pay item material resource shall be marked.
  4. The budgeted units and cost for each assigned pay item resource shall be defined to indicate the quantity and dollar value of work that the activity represents.
  5. The aggregate budgeted units and costs for all activities associated with a pay item shall equal the total quantity and value of the proposed pay item.
  6. The aggregate budgeted costs for all activities shall equal the current total Contract Price. Current total Contract Price will be considered to mean the current Contract amount including the original Contract Price and any approved adjustments for authorized changes to the Work. Anticipated payments or payments for adjustments such as asphalt, fuel, steel, retainage, incentives, disincentives, etc., shall not be included.
- K. 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.
- L. 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.

#### **1.4.3 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 and/or TIAs, and float. With each submission of the Project Schedule, the Developer also shall include:
    - 1.1 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.
    - 1.2 A narrative progress report of the Project Schedule that describes, at a minimum, the Developer’s plan of operation for meeting the interim milestones and the Guaranteed Substantial 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 TIA, float consumption, documentation of any logic changes, duration changes, resource changes or other relevant changes.

- 1.3 Time-scaled logic diagram indicating the critical path, early start and early finish dates, and total float, sorted and grouped by the WBS.
- 1.4 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/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)/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. The Monthly Progress Report shall describe the work performed since the previous update as well as the Developer's plan for accomplishing the remaining Work. It shall describe the current status of the Project and any deviations from scheduled performance as well as the causes and effects of the deviations. It shall also describe any progress deficiencies or schedule slippages as well as any actions taken or proposed to avoid or mitigate the progress deficiencies or schedule slippages.
- D. Monthly Progress Reports shall have a reporting period ending on the last day of each calendar month and shall be submitted on or before the 15<sup>th</sup> of the month following the reporting period.
- E. 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 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 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.
- F. 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 2 weeks.

#### **1.4.4 Revisions to Baseline Schedule**

- A. If the Department requests the Baseline Schedule needs a specific revision either in logic, activity duration, WBS, manpower, or cost, 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 Guaranteed Substantial 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.

#### **1.4.5 Project Recovery Schedule**

- A. Pursuant to the Agreement, whenever the Monthly Progress Report shows the Guaranteed Substantial Completion Date has 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.

#### **1.4.6 Time Impact Analysis for Proposed Extensions of Time**

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:

- A. The TIA shall be based on the date on which the implementation of such change is proposed to be commenced.
- B. 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.
- C. 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 and/or activity revisions, logic relationships, and resource changes that are proposed to be added to the existing schedule to demonstrate the influence of impacts to the schedule. The 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 Guaranteed Substantial Completion Date with each TIA.
- D. 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 Guaranteed Substantial Completion Date.



- E. 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.
- F. 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.”
- G. 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.

#### **1.4.7 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 1.5a, 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 1.5a 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/or 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 1.5a. 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 1.5a 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 1.5a
  - 6. Reference documents listed in Attachment 1.5a
  - 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 1.5a, 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. 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 and/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.

- B. 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).
- C. 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.
- D. The Department will also issue a Notice to Commence Construction to the Developer once the property has been acquired.
- E. The Department will perform a RW300/301 plan review and approval for all parcels prior to the issuance of a Notice to Commence Acquisitions. Any revisions to the Project's acquisition of fee ROW and/or permanent, temporary, and utility easements subsequent to the RW300/301 approval shall be submitted to the Department for review and approval.

- F. 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/>.
- G. 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.
- H. 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.
- I. If the Developer and/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 and/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.
- J. 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 displaces 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.
- K. 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 dated January 1, 2011.

- L. 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.
- M. A Department Representative will be available to make timely 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.
- N. 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.
- O. The Developer shall provide a current title examination (no older than 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 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.
- P. 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.

- Q. 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.
- R. 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 the 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.
- S. 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.
- T. When the Department determines that it is appropriate, the Developer shall be responsible for continuing further negotiations for a maximum of 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.

- U. The Developer shall be responsible for all contact with landowners for ROW or construction items.
- V. The Developer shall be responsible for all contact with the displaced for relocation assistance.
- W. The Developer shall maintain access at all times to properties during construction.
- X. 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 3 calendar days. The Developer shall not proceed with acquiring such property until written notification is received from the Department.
- Y. During the acquisition process and for a period of 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/or 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.
- Z. Prior to Project completion, the Developer shall provide and set the Department RW-2 ROW monuments within the Project limits.
- AA. Any existing 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 the Department's standard FE-CL.
- BB. The Developer shall notify the Department of any and all encroachments (temporary or permanent) within the ROW prior to final acceptance.
- CC. 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.

## **1.7 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 1.5a. 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/or 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 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 CA) 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. 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 VDOT ROW. 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.
- U. 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.
- V. The Developer shall be responsible for ensuring the appropriate abandonment or removal of all abandoned utilities within the Project ROW.
- W. At the time that the Developer notifies the Department that the Developer deems the Project to have reached Final Acceptance, 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.
- X. 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 and/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 and/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/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/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 and/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**

<b>INTERSTATE 66</b>					
<b>WEEKDAY</b>		<b>Eastbound</b>			
		<b>Single-Lane Closures or Shoulder</b>	<b>Two-Lane Closures</b>	<b>Multiple-Lane Closures</b>	<b>Complete Road Closure (a)</b>
<b>Segment 1</b>	<b>West of Route 15 to Route 29 (at Exit 43)</b>	10:00 AM to 3:30 PM	9:00 PM to 5:00 AM	10:00 PM to 5:00 AM	12:00 AM to 4:00 AM
		8:00 PM to 5:30 AM			
<b>Segment 2</b>	<b>Route 29 (at Exit 43) to Route 29 (at Exit 52)</b>	10:00 AM to 3:30 PM	9:00 PM to 5:00 AM	10:00 PM to 4:00 AM	12:00 AM to 4:00 AM
		8:00 PM to 5:00 AM			
<b>Segment 3</b>	<b>Route 29 (at Exit 52) to Route 50</b>	11:00 AM to 3:30 PM	9:30 PM to 5:00 AM	11:00 PM to 4:00 AM	12:00 AM to 4:00 AM
		8:00 PM to 5:00 AM			
<b>Segment 4</b>	<b>Route 50 to East of Beltway (b)</b>	11:00 AM to 3:30 PM (e)	10:00 PM to 5:00 AM	11:00 PM to 4:00 AM	12:00 AM to 4:00 AM
		9:00 PM to 5:00 AM			
<b>WEEKDAY</b>		<b>Westbound</b>			
		<b>Single-Lane Closures or Shoulder</b>	<b>Two-Lane Closures</b>	<b>Multiple-Lane Closures</b>	<b>Complete Road Closure (a)</b>
<b>Segment 1</b>	<b>West of Route 15 to Route 29 (at Exit 43)</b>	9:00 AM to 2:30 PM	N/A	N/A	12:00 AM to 4:00 AM
		9:00 PM to 6:00 AM			
<b>Segment 2</b>	<b>Route 29 (at Exit 43) to Route 29 (at Exit 52)</b>	9:00 AM to 2:30 PM	9:30 PM to 6:00 AM	10:30 PM to 5:00 AM	12:00 AM to 4:00 AM
		9:00 PM to 6:00 AM			
<b>Segment 3</b>	<b>Route 29 (at Exit 52) to Route 50</b>	9:00 AM to 2:30 PM	10:00 PM to 5:00 AM	11:00 PM to 5:00 AM	12:00 AM to 4:00 AM
		9:30 PM to 6:00 AM			
<b>Segment 4</b>	<b>Route 50 to East of Beltway (b)</b>	9:00 AM to 2:30 PM (e)	10:00 PM to 5:00 AM	11:00 PM to 5:00 AM	12:00 AM to 4:00 AM
		9:30 PM to 5:00 AM			
<b>All lanes open at 12:00 noon on Friday</b>					
<b>** Consider opening shoulder lane, where Applicable</b>					

<b>WEEKEND</b>	<b>Eastbound/Westbound</b>		
<b>All Segments</b>	<b>Single-Lane Closures or Shoulder</b>	<b>Multiple-Lane Closures</b>	<b>Complete Road Closure (a)</b>
Friday to Saturday	9:00 PM to 9:00 AM	10:00 PM to 6:00 AM	12:00 AM to 5:00 AM
Saturday to Sunday	9:00 PM to 9:00 AM	10:00 PM to 6:00 AM	12:00 AM to 5:00 AM
Sunday to Monday	8:00 PM to 5:00 AM	9:00 PM to 4:00 AM	12:00 AM to 4:00 AM

### Single-Lane Closures\* or Shoulder

ARTERIAL	WEEKDAY		WEEKEND		
	Monday to Thursday	Friday	Friday to Saturday	Saturday to Sunday	Sunday to Monday
Limited Access Highway (c)	10:00 AM to 3:00 PM	9:30 AM to Noon	10:00 PM to 9:00 AM	10:00 PM to 8:00 AM	10:00 PM to 5:00 AM
	10:00 PM to 5:00 AM				
Major Arterials (d)	9:00 AM to 3:00 PM	9:00 AM to Noon	10:00 PM to 9:00 AM	10:00 PM to 9:00 AM	10:00 PM to 5:00 AM
	9:30 PM to 5:00 AM				
All Other Roadways	9:00 AM to 3:30 PM	9:00 AM to Noon	10:00 PM to 9:00 AM	9:00 PM to 9:00 AM	10:00 PM to 5:00 AM
	9:00 PM to 5:00 AM				

### Multiple-Lane Closures

ARTERIAL	WEEKDAY		WEEKEND		
	Monday to Thursday	Friday	Friday to Saturday	Saturday to Sunday	Sunday to Monday
Limited Access Highway (c)	10:00 PM to 5:00 AM	Not allowed until 11:00 PM	11:00 PM to 5:00 AM	11:00 PM to 6:00 AM	11:00 PM to 5:00 AM
Major Arterials (d)	10:00 PM to 5:00 AM	Not allowed until 10:00 PM	11:00 PM to 5:00 AM	11:00 PM to 6:00 AM	11:00 PM to 5:00 AM
All Other Roadways	9:00 PM to 5:00 AM	Not allowed until 10:00 PM	10:00 PM to 6:00 AM	10:00 PM to 6:00 AM	10:00 PM to 5:00 AM

### INTERSTATE 495 (BELTWAY)

WEEKDAY		Inner Loop			
		Single-Lane Closures or Shoulder	Two-Lane Closures	Multiple-Lane Closures	Complete Road Closure
Segment 1	A. L. Bridge to Springfield Interchange	10:00 AM to 3:00 PM	10:00 PM to 5:00 AM	11:00 PM to 5:00 AM	12:00 AM to 5:00 AM
		9:30 PM to 5:00 AM			
Segment 2	Springfield Interchange to W.W. Bridge	10:00 AM to 3:00 PM	10:00 PM to 5:00 AM	11:00 PM to 5:00 AM	12:00 AM to 5:00 AM
		9:30 PM to 5:00 AM			

All lanes open at 12:00 noon on Friday



## INTERSTATE 495 (BELTWAY)

WEEKDAY		Outer Loop			
		Single-Lane Closures or Shoulder	Two-Lane Closures	Multiple-Lane Closures	Complete Road Closure
Segment 1	A. L. Bridge to Springfield Interchange	9:30 AM to 2:30 PM	10:00 PM to 5:00 AM	11:00 PM to 5:00 AM	12:00 AM to 5:00 AM
		9:30 PM to 5:00 AM			
Segment 2	Springfield Interchange to W.W. Bridge	10:00 AM to 3:00 PM	10:00 PM to 5:00 AM	11:00 PM to 5:00 AM	12:00 AM to 5:00 AM
		9:30 PM to 5:00 AM			

All lanes open at 12:00 noon on Friday

WEEKEND	Inner/Outer Loop		
	Single-Lane Closures or Shoulder	Multiple-Lane Closures	Complete Road Closure
Friday to Saturday	10:00 PM to 8:00 AM	11:00 PM to 7:00 AM	12:00 AM to 5:00 AM
Saturday to Sunday	10:00 PM to 9:00 AM	11:00 PM to 8:00 AM	12:00 AM to 5:00 AM
Sunday to Monday	9:30 PM to 5:00 AM	11:00 PM to 5:00 AM	12:00 AM to 5:00 AM

- (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 Rt.15, Rt.29, Rt. 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 Route 15 or East of Beltway
  - Long-term closures of the shoulders adjacent to the GP 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 and/or Developer Request for Additional Lane Closures.

<b>Table 1.8b Reversible Ramp Hours of Operations at Stringfellow Road and Monument Drive</b>	
<b>Monday – Thursday and Friday (until 7:00 p.m.)</b>	
7:00 p.m. – 5:00 a.m.	Open to all Traffic – Westbound
5:30 a.m. – 9:30 a.m.	Open to HOV-2 Only – Eastbound
10:00 a.m. – 3:00 p.m.	Open to all Traffic – Westbound
3:00 p.m. – 7:00 p.m.	Open to HOV-2 Only – Westbound
<b>Friday Evening – Saturday – Sunday</b>	
7:00 p.m. Fri – 5:00 a.m. Mon	Open to all Traffic – Westbound

All gate operations and/or 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 Damages will be assessed beginning at 5:01 a.m. as stipulated in Table 1.8e.

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 four-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 1.8d lists the advance notices required for each type of lane closure or independent pedestrian bridge closure.

<b>Table 1.8d Roadway Lane and Shoulder Closures</b>		
<b>Type</b>	<b>Minimum Advance Notice (days)</b>	<b>Maximum Advance Notice (days)</b>
1	10	21
2	5	14
3	3	14

- 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 Design-Builder, the fabricator, the shipper, the erector, and the Design-Builder’s safety officer 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 and/or 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 bears a liquidated damage charge. The liquidated damage charges 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 liquidated damage charges for failure to restore all lanes to traffic by the designated times are defined in Table 1.8e.

<b>Table 1.8e</b>			
<b>Lane User Fees for Lane Closures</b>			
<b>Liquidated damage (\$ per minute)</b>			
<b>Elapsed Time (min)</b>	<b>I-66, I-495, RT. 50, RT. 28, and all ramps</b>	<b>Route 234 Bus.</b>	<b>All other roads</b>
1-5, or any portion thereof	\$0	\$0	\$0
Every additional minute or any portion thereof after initial 5 minutes stated above	\$8,000 plus \$1,500 per additional minutes	\$2,500 plus \$500 per additional minutes	

The liquidated damage charges are set forth in the table 1.8 e. If a Non-Permitted Closure occurs, the Department will notify the Developer thereof and of the amount of associated Lane Closure Damages in writing within 48 hours of the Non-Permitted Closure. If there are no additional Non-Permitted Closures occurring within 90 days, the Department shall refrain charging of the Lane Closure Damages for the prior Non-Permitted Closures. Otherwise, the Developer shall pay all Lane Closure Damages to the Department Developer for violating having two (2) or more Non-Permitted Closure occurrences within 90 days. Once there is a clean period of 90 days without a Non-Permitted Closure occurrence, the new 90 days period will start for future Lane Closure Damages.

Non-Permitted Closure is any lane closure outside the Technical Requirements 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 User Fees for failure to restore traffic lanes, and depending upon the severity (15-minute delayed opening and/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 and/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 and/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:
  - 1.1 Presidential motorcades traveling through project limits;
  - 1.2 Special events with regional impacts;
  - 1.3 Special sport events with regional impacts;
  - 1.4 Major accidents/incidents with regional impacts;
  - 1.5 Holiday and/or seasonal traffic patterns;
  - 1.6 Natural or other disasters requiring regional evacuations; and
  - 1.7 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/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 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 10<sup>th</sup> of each month, the Department and Developer will reconsolidate and agree on the resultant amount of hours allowed/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. 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 and/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 Service Commencement Date. As such, any amount paid by the Developer through Service Commencement Date to the law enforcement agencies will be reimbursed to the Developer at cost, without any markup.

### **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/community outreach staff and the Department;
  4. Implement traffic management strategies; and
  5. Be continuously available during construction until Final Acceptance of the Project 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 MOT design and implementation experience in managing MOT design and implementation 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/deterministic (HCM-based) or traffic simulation/optimization tools for the analyses. Traffic analyses and modeling shall also be required for all construction activities requiring a detour, 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 a 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 Final Acceptance 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. Restrictions on lane closures are defined in the Agreement.
- M. 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.
- N. 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.
- O. 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.
- P. 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/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.

- Q. 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.
- R. 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 three feet from the edge of the paved surface.
- S. 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.
- T. 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.
- U. 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.
- V. 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.

- W. 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.
- X. 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.
- Y. All MOT plans affecting and adjacent to WMATA facilities are subject to review and approval by WMATA.
- Z. 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 Design-Builder throughout the duration of the Project.

## **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 contractually 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 are/will be working on. These contractors are/will be working on other improvement projects such as, but not limited to, the following:
  - 1. I-66 Widening from Route 15 in Haymarket to Route 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 Route 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 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.

### **1.11.2 Emergencies and Extraordinary Circumstances**

- A. Subject to the Agreement, the Developer's response to emergencies and extraordinary circumstances 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 66 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 66 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 and/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 and/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 and/or incident management coordinator assistance if needed. The Department may request the Developer's Safety Service Patrol and/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 and/or prompter response.

## **1.12 Safety**

### **1.12.1 General Requirements**

- A. 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 safety officer for the term. The Project safety officer will ensure that designated Project personnel can be contacted by 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 1.5a, 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 & 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, 2<sup>nd</sup> tier or 3<sup>rd</sup> 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/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/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 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 plant inspections if a non-conforming condition causes the need for a Department 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 Contract 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. 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/SWaM records;
  8. Warranties;
  9. As-built drawings; and
  10. Special tools.

## **1.14 Alternative Technical Concepts**

### **1.14.1 General Requirements**

- A. All innovative aspects shall be identified separately as such in the Technical Proposal. An innovative aspect does not include revisions to specifications, standards or established Department Policies, except for currently identified Design Exceptions and Design Waivers. Innovation should be limited to Developer's means and methods, roadway alignments, approach to Project, etc.
- B. The ATC process allows innovation, flexibility, time and cost savings on the design and construction of Design-Build Projects while providing the best value for the public. The alternative technical concept shall provide an approach that is equal to or better than what is required by the Request for Proposal (RFP), as determined by the Department. Concepts which reduce scope, quality, performance, or reliability should not be proposed. A proposed concept is not an ATC if it is contemplated by the RFP.
- C. An ATC manual will be provided with the issuance of the draft RFP that will outline the procedure for submission and consideration of ATC's that would include One-on-One ATC discussion meetings and submission requirements.
- D. The following requirements described by these Technical Requirements shall not be modified by the Developer:

1. Design speeds;
2. Typical sections;
3. Project commitments;
4. Pavement design;
5. Fullest operations use of both General Purpose lanes and managed lanes is a requirement, not to be diminished by friction points or traffic weave in the Developer's design. Current plans have been designed to minimize these. Innovative designs by the successful Developer shall improve on these designs to further reduce friction points and weave.
6. Minimization and preferably full elimination of entrance and exit from the General Purpose lanes back and forth to the managed lanes to eliminate friction that does not allow full operational capacity. Exit and Entrance to the managed lanes will be by separate ramp, interchange, or other means achieving this end. Addition of friction points and weaving by the Developer will be non-compliant.

## **1.15 Early Works**

### **1.15.1 General Requirements**

- A. Once the scope of the early work is approved by the Department, the Developer shall prepare and submit for approval, the following.
  1. Project Development Plans (PDPs), including all components required under Attachment 1.3 of the Technical Requirements, to the extent necessary to support the early works;
  2. Project Baseline Schedule as required by the Technical Requirements;
  3. Schedule of Values for all activities as required by the Technical Requirements;
  4. Progress Reports as required by the Technical Requirements;
  5. Conceptual Traffic Management Plan as required by the Technical Provisions;
  6. Investigations, surveys, ROW Acquisition Services, Utility Work Plan, Utility Assembly, coordination activities associated with Utility Adjustment Work, railroad coordination activities, and permitting activities, to the extent necessary to support the Early Works, including preliminary Design Work associated with Utility Adjustment Work and railroad coordination;
  7. Design Work associated with the relocation and reconstruction of WMATA assets and facilities; and

8. Design Work necessary to advance the design for the purposes of a Design Public Hearing, and associated support activities to hold a Design Public Hearing.
9. Other items identified by the Developer and approved by the Department, with a demonstrated benefit to meet or exceed the Contract Milestone dates.



## **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 Transform 66 website, which will serve as the sole site for Project information through Final Acceptance.
- 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 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 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 Express Lanes;
  - 5. Education about driver information systems in use on the 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**

- 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 Industry Practice and submit to the Department for review and approval prior to inclusion in the Contract Documents.
- 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/or addenda thereof. 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 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 I&IM 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 include in the RFP package.

- 3.1.7** The table of outstanding design exceptions and design waivers related to the Department's conceptual plans are included in Attachment 3.7. Substandard design features in the conceptual plans for which improvements can and shall be made to eliminate the need for design exceptions and design waivers are listed in Attachment 3.7 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 3.7 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 and/or monitoring and the Developer shall make the results to the Department before commencing any Work that may affect the property.
- 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 uninterrupted removal of rubbish, scrap material, and debris. Work sites shall have a neat, safe and orderly appearance at all times. Upon Final Acceptance, 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 Right of Way 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 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)/Revised Environmental Assessment (EA) dated [Month Day, Year] 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 at their cost. 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 at its sole expense and no additional cost and/or time delays to the Project.
- D. The Developer is solely responsible for any costs or schedule delays related to the permit acquisition, permit modifications, and NEPA document re-evaluations associated with Developer's design changes and no time extensions will be granted. All costs associated with complying with these requirements shall be included in the Developer's price proposal.

### **3.2.2 Cultural Resources**

#### If No Adverse Effect

- A. On [Month Day, Year], the VA SHPO determined the Project would have No Adverse Effect on historic properties in the Area of Potential Effects (APE). 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 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 park- and-ride lots

also are within the AP. Copies of relevant VDOT/VA SHPO correspondence and RFP Conceptual plans showing the location of historic properties are included in the RFP Information Package. There are nine historic properties in the Project’s APE, as shown below.

<b>Town, City, or County</b>	<b>DHR No.</b>	<b>Resource Name</b>
Fauquier County, Prince William County	030-1016	Thoroughfare Gap Battlefield
Prince William (Gainesville, Haymarket)	030-5152	Buckland Mills Battlefield
Prince William	076-5381	Gainesville District School, 14550 John Marshall Highway
Prince William; Fairfax	076-0271	Manassas National Battlefield Park (also part of Manassas Battlefield Historic District)
Prince William; Fairfax	076-0271	Manassas Battlefield Historic District
Fairfax County (Centreville)	029-0428	Centreville Historic District
Fairfax (County) – portion in project area	053-0276	Washington and Old Dominion Railroad Historic District
Fairfax (County)	44FX1552	Prehistoric Camp/Lithic Scatter, archaeological site
Fairfax (County)	44FX1834	Civil War winter camp, archaeological site

B. The Developer should 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/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 and/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 Final Section 4(f) Evaluation dated [Month Day, Year] was prepared for the Project and it was determined that the proposed alignment would use one Section 4(f) resource:

<u>Section 4(f) Resource</u>	<u>Use</u>
Random Hills Park	[0.03] acres[— <i>de minimis</i> ]



- B. Based on the Final Section 4(f) Evaluation, FHWA has concluded that there is no feasible and prudent alternative to the use of land from Section 4(f) resources, and that the Project as currently designed includes all possible planning to minimize harm resulting from the use of these resources. The Developer shall ensure that their final design incorporates the specified minimization and mitigation measures, and is consistent with the conclusions reached in the Final Section 4(f) Evaluation. A copy of the Final Section 4(f) Evaluation and RFP Conceptual Plans showing the location of 4(f) resources are included in the RFP Information Package.
- C. 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/disposal, and temporary or permanent easements.
- D. 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 and re-evaluation of the 4(f) evaluation document. 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 and/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.
- B. The Department completed a preliminary Permit Determination, dated [Month Day, Year], concluding that water quality permits are required for this Project based on the RFP Conceptual Plans. The Developer should note that the preliminary Permit Determination and 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/federal water quality permits will be required during coordination with the Developer.
- C. 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.

- D. 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 and/or scope may render the permit determination invalid and will require additional consideration.
- E. If the Developer determines that wetlands and/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.
- F. 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/or associated costs.
- G. 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.
- H. 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.
- I. 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.
- J. 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.

- K. 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.
- L. The Developer shall allow environmental compliance inspections by the Department, and/or regulatory agencies as required by permits and/or to facilitate any interim compliance reviews/assessments.
- M. 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.
- N. The Developer shall carry out any additional permit conditions/commitments that result from change in footprint and/or scope (assuming it is approved by the Department) at its sole expense and no additional cost to the Project; additionally the Developer shall be responsible for any schedule delays and associated costs.
- O. All permitted construction activities shall be identified as hold points in the Developer's CPM Schedule.

#### If No Water Quality Permits Are Required

- A. The Developer shall be responsible for obtaining all water quality permits required to construct the Project (including utility relocations by the Developer). The Developer will be the Permittee. Should the Developer propose design changes acceptable to the Department, permitting requirements may also change; the Developer remains responsible for obtaining any and all necessary water quality permits and permit modifications required by the regulatory agencies.
- B. The Department's preliminary Permit Determination dated [Month Day, Year] is included in the RFP Information Package. No permits are required for the proposed project. The Developer should note that the Department's preliminary Permit Determination and 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 which state/federal water quality permits will be required during coordination with the Developer.

#### **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*). A copy of the Department’s preliminary Fish, Plant, and Wildlife Resources Form dated [Month Day, Year] is included in the RFP Information Package.

- 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 and/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 following contract special provisions and guidance documents:

<input type="checkbox"/>	VIRGINIA DEPARTMENT OF TRANSPORTATION SPECIAL PROVISION FOR PHASE I AND PHASE II ENVIRONMENTAL SITE ASSESSMENTS FOR DESIGN-BUILD PROJECTS – June 25, 2013
<input type="checkbox"/>	VIRGINIA DEPARTMENT OF TRANSPORTATION SPECIAL PROVISION FOR INSPECTION OF STRUCTURES FOR ASBESTOS CONTAINING MATERIALS (ACM) ON DESIGN-BUILD PROJECTS - June 22, 2009
<input type="checkbox"/>	VIRGINIA DEPARTMENT OF TRANSPORTATION <a href="#">Special Provision Copied Note- Demolition Notification for Structures not Requiring Asbestos Removal</a>
<input type="checkbox"/>	VIRGINIA DEPARTMENT OF TRANSPORTATION SPECIAL PROVISION FOR ASBESTOS REMOVAL AND NESHAP-RELATED DEMOLITION REQUIREMENTS FOR STRUCTURES ON DESIGN-BUILD PROJECTS - June 22, 2009
<input type="checkbox"/>	VDOT ASBESTOS PROJECT MONITORING AND CLEARANCE AIR MONITORING PROCEDURES
<input type="checkbox"/>	VIRGINIA DEPARTMENT OF TRANSPORTATION, Location and Design Division Instructional and Informational Memorandum: Guidelines for the Discharge of Storm Water at Sinkholes August 15, 2002
<input type="checkbox"/>	VIRGINIA DEPARTMENT OF TRANSPORTATION SPECIAL PROVISION FOR ASBESTOS-CONTAINING SOIL - February 2, 2000

<input type="checkbox"/>	VIRGINIA DEPARTMENT OF TRANSPORTATION SPECIAL PROVISION FOR REMOVAL OR CONNECTION OF ASBESTOS CEMENT PIPE - November 7, 2005
<input type="checkbox"/>	VIRGINIA DEPARTMENT OF TRANSPORTATION Asbestos Inspection Procedures

- 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 and state 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/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) and/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 include in its price proposal all costs associated with complying with the above listed requirements).
- I. 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<sub>2.5</sub>) 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 (NO<sub>x</sub>) emission control area. As such, all reasonable precautions should be taken to limit the emissions of VOC, NO<sub>x</sub>, 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.
- C. Construction activities will be performed in accordance with the VDOT Road and Bridge Specifications. The specifications conform to the State Implementation Plan and require compliance with all applicable local, state, and federal regulations.

### **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/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. 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 1.5a. 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.”
- P. The Developer is responsible for obtaining local noise ordinance variances prior to scheduling of night time operations pursuant to the Agreement.
- Q. 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.
- R. The Developer shall begin construction of new sound barrier walls within 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 and/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.
- S. 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 and/or shut downs associated with non-compliance. Any monetary fines associated with violations and/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/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 1.5a.
- C. The Developer shall collect appropriate data for geotechnical evaluation of embankments, soil and rock cuts, culverts, pavements, bridge and wall structures, sound walls, storm water 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. Preliminary and final/design geotechnical investigations shall be performed to meet the minimum requirements set forth in Attachment 1.5a. 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 1.5a 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 1.5a and 3.8.
- 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/or 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 3.4. In summary, Attachment 3.4 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 3.4.

### 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, and/or where slopes are supporting on, or are supported by, retaining structures. The factors of safety listed in Table 3.4 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 3.4 is not applicable for rock cut slopes.

<b>Table 3.4 Minimum Factors of Safety for Soil Cut/Fill Slopes</b>		
<b>Basis of Soil Slope Analysis Parameters</b>	<b>Factor of Safety</b>	
	<b>Involves Structure or Critical Slope</b>	<b>Non-Critical Slope</b>
In-situ or lab tests and measurements <sup>2,3</sup>	1.5	1.3
No site specific tests	N/A <sup>3</sup>	1.5
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/slits shall be analyzed using residual strength parameters for problem soils wherever they are encountered.

### **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 (Route 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 Contract Documents 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 and/or loose or very soft coarse- and fine-grained soils that exhibit excessive pumping, weaving or rutting under the weight of construction equipment are also considered unsuitable unless they can be moisture conditioned through either mechanical or chemical means to an acceptable moisture content that allows adequate compaction to meet project specifications, and classification testing indicates they are not otherwise unsuitable. Topsoil, peat, coal and carbonaceous shale shall also be considered unsuitable material. All unsuitable material shall be disposed of and/or treated as discussed in 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.

### **3.3.3 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 and/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 applicable the Department's 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 VDOT's 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 VDOT Manual of the Structure and Bridge Division, Volume V – Part 11 “Geotechnical Manual for Structures” and applicable special provisions listed in Attachment 1.5a. Where undercutting and material replacement is required to reduce settlement or improve bearing capacity/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 1.5a. 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 three acres flows across a disturbed area. Sediment basins are required if the runoff from a watershed area of three acres or more flows across a disturbed area. The Developer shall certify that the sediment

trap or basin design is in compliance with the standards and specifications set forth in Attachment 1.5a. Once a sediment trap or basin is constructed, the dam and all outfall areas shall be immediately stabilized.

- C. Disposal areas shall be cleared but need not be grubbed. The clearing work shall not damage grass, shrubs, or vegetation outside the limits of the approved area and haul roads thereto. After the material has been deposited, the area shall be shaped to minimize erosion and siltation of nearby streams and landscaped in accordance with the approved plan for such work or shall be used as approved 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 1.5a and the VDOT Erosion and Sediment Control and Stormwater Management Programs. The Developer shall provide the Department 2 paper and 2 electronic copies on compact disc (CD) 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 an electronic copy 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/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 Project Corridor for use in preparing the drainage design. The Developer shall perform a hydrologic analysis of the Project Corridor and all offsite areas that drain through or impact the Project Corridor.
- D. All existing drainage facilities within the Project 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, and/or live loading the Developer shall upgrade the facility at Developer's cost. If an existing facility is structurally adequate in existing conditions, then the Department will determine whether to rehabilitate or replace the drainage system to ensure a continued service life of 70 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 1.5a.
- 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 final acceptance. 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 1.5a. 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 1.5a) 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 1.5a.
- J. See Structures and Bridge Section for bridge deck drainage requirements.
- K. For all impacted permanent structures, the bridge, hydrology, hydraulics, and scour requirements shall be in accordance with the requirements set forth in Attachment 1.5a, 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 and/or bridge-crossing locations where the 100-year discharge is 500 cfs or more, and/or floodplain studies have been published by federal agencies. The outline for the comprehensive design analysis will be in accordance with the standards and specifications set forth in Attachment 1.5a. 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 1.5a 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 1.5a.
- 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/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 1.5a 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 VDOT's Approved ESC and SWM Standards and Specifications. Before implementing any ESC or post construction SWM measures not included in VDOT's 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  $\geq$  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 and/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/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 Grandfathering 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 1.5a including the Virginia Stormwater Management Program Law and Regulations, and shall comply with the minimum geotechnical requirements contained therein. 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 Developer shall be responsible for the design and construction of SWM facilities as required for the Project in accordance with the Part II C Grandfathering 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 1.5a including the Virginia Stormwater Management Program Law and Regulations, and shall comply with the minimum geotechnical requirements contained therein. 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.

Preliminary calculations prepared by the Department indicating the potential stormwater management facility locations and supporting analyses are presented in the Stormwater Management Report included in the RFP Information Package. 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.

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 shall incorporate the required water quality requirements into the proposed post development stormwater management plan to the maximum extent practicable as defined in IIM-LD-195.

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 relative to their unique design, 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 compensatory mitigation, 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 3.6, 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 as Exhibit A. A copy of the executed agreement is to be included with the BMP information submitted with the VDPES 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 the final acceptance of the Project.
- 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 Contract Documents.

### **3.5.9 Pipe Installation Methods**

Culverts or utility pipes shall be installed by either conventional methods in accordance with VDOT's Road and Bridge Specifications, or Jack and Bore and/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 2007 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 VDOT's Road and Bridge Specifications and the Special Provisions for jack and bore and/or micro-tunneling, as applicable.

### **3.5.10 Hydraulics**

The Developer shall provide and/or 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 1.5a.

### **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 I&IMs.



- 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 this 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 and/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 1.5a. Functional classifications for roadways and specific design criteria on the Project are to be developed per the standards and specifications set forth in Attachment 1.5a unless a design exception or design waiver is approved.

- A. The Project design speed shall meet the I-66 Corridor Improvements Project – Interchange Justification Report (IJR).
- B. The 66 Express Lanes and shoulders shall meet the Department’s criteria for freeways, as described in the standards and specifications set forth in Attachment 1.5a.
- C. Developer will have the flexibility to propose revised designs that produce time and cost benefits to the Department and/or the Developer without impairing the essential functions and characteristics of the design, including safety, enforcement, traffic operations, desired

appearance, maintainability, environmental protection, drainage, and the constraints of any Regulatory Approvals. In accordance with the Agreement and the Technical Requirements, the Department will have the right to accept or reject such revised design criteria or designs at its sole discretion.

- D. All new and existing ramps will be designed with a parallel design. Acceleration and deceleration lengths will be designed to meet the operational characteristics of the ramp and AASHTO desirable lengths unless constraints prohibit this desirable length and the reduction justification is approved by the Department.
- E. 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 The Developer Responsibility**

The Developer agrees that it has full responsibility for the design of the Project and that the Developer will furnish the design of the Project, regardless of the fact that the Conceptual Plan has been provided to the Developer as a preliminary basis for Developer's design. The Developer specifically acknowledge and agrees that:

- A. Developer is not entitled to rely on 1) the Conceptual Plan, 2) the Reference Documents, or 3) any other documents or information provided by the Department, except specially permitted in the CA.
- B. Developer is responsible for correcting any errors in the Conceptual Plan through the design and/or 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 Conceptual Plan.
- D. Developer is responsible for verifying all calculations and quantity takeoffs contained in the Conceptual Plan or otherwise provided by the Department.

### **3.6.3 Conceptual Design**

Developer acknowledge and agrees that if Developer wishes to deviate from the Conceptual ROW contained in the Conceptual Plans, it must specifically 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 Conceptual Plans 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 CA and in the

Governmental Approvals, as well as site conditions, will impact Developer's ability to revise the concepts contained in the Conceptual Plans, in addition to the requirement to obtain approval.

### **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-Related Entity by reason of any use of any information contained in the 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 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 Conceptual Plans; 3) the existence or need for retaining walls; 4) retaining wall heights, lengths, or sizes depicted in the Conceptual Plans; or 5) any failure or omission to depict any of the foregoing in the Conceptual Plans—or that such information is in conformity with the requirements of the Department provided approvals or other CA. 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/66 Express Lanes design as presented in the Design Public Hearing that require an amendment to the I-66 HOV/66 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 3.8 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 and/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 Contract Documents. 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 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 design-builder's risk/expense. The design-builder 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.
- 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 and/or placing the surface course except as modified by Attachment 3.8. 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. VDOT guidelines specify that edgedrains/underdrains be provided for pavement with daily traffic volumes in excess of 1,000 vehicles per day. Therefore, edgedrains/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 Route 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 1.5a, specifically the Special provision for Rideability.
- F. Approach slabs for all bridges shall be full width – from face to face of barrier/parapet (including extending under sidewalks and shared use paths).
- G. Wherever applicable, the design of rumble strips in the paved shoulders shall be consistent with the Standard Documents set forth in Attachment 1.5a.
- H. 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.
- I. 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.
- J. The Developer shall submit to the Department for its review, 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 1.5a.
- B. All traffic control devices shall be designed and installed to comply with the standards and specifications set forth in Attachment 1.5a 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 1.5a, including but not limited to, markings required for Managed 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 1.5a. 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 66 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 Final Acceptance. 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.
- 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 and and/or sign can be modified as proposed. If it is determined that modifications to the existing sign structure and/or signs are not structurally acceptable, the Developer shall provide new signs and structures, in accordance with Attachment 1.5a, 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/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, VDOT's Road and Bridge Standards, VDOT Road and Bridge Specifications, and the MUTCD. All conductor/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-VA 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 1.5a.

#### **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 1.5a.
- 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. 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.
  - F. 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.
  - G. 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.
  - H. The Developer shall install and connect power service for temporary and permanent traffic signals for the Project.
  - I. Conductor/communication cables shall be placed in buried conduit, embedded conduit, and structure and bridge-mounted conduit.
  - J. 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 1.5a.
- C. The Developer shall install permanent roadway lighting system for the entire roadway including interchanges

- 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 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 *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 1.5c, 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

I&IM 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 from the GP 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 1.5a.

## **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 1.5a.

### **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 one 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 \$100,000 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 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 all existing and planned pedestrian, bicycle and equestrian facilities within the Project limits, as described in Conceptual Plan.
- B. All existing pedestrian and bicycle access on facilities shall be maintained throughout construction as per the MUTCD and the Virginia Work Area Protection Manual until permanent facilities can be fully opened. Any temporary pedestrian or bicycle facility closure request shall be submitted in writing to the Department for review and approval. Advance notification of closures should be provided to the public similar to scheduled roadway closures.
- C. All new facilities and modifications to existing facilities shall be designed in accordance with the standards and specifications set forth in Attachment 1.5a. Where a box culvert is replaced along a proposed or existing trail, the replacement shall have sufficient width and vertical clearance to accommodate a shared-use path and handrail adjacent to the stream. The walking surface of the path shall be located above the five-year storm water level. Where the path also serves as an equestrian trail, the vertical clearances should be increased accordingly.
- D. The Developer shall conduct coordination meetings with all local jurisdictions and the Department to ensure all 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. Existing bridge length shall not be reduced when widening roadway overpasses having slope protection on the end spans.
- E. The Developer shall coordinate with the Department's District Bicycle Pedestrian Coordinator and local jurisdictions on the design, maintenance of traffic and construction staging of the bicycle and pedestrian facilities within the project limits.
- F. All pedestrian signal 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 accordance with Standards and Specifications listed in Attachment 1.5a. Fully Accessible Pedestrian Signals (APS) shall be included where requested by a citizen or the County and approved by the Department.

- G. Concrete and asphalt pavement designs for sidewalks and shared use paths shall be in accordance with Attachment 3.8. 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 reviewed by the Department.
- H. The Developer shall design and provide drainage for any new independent pedestrian or shared-use path bridge. Drainage scupper grates on the bridge shall be located within the 2-foot shoulder of the path unless otherwise approved by the Department.

## **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 contract requirements, as well as the requirements of Attachment 3.15b 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 and/or Design Waiver (DE/DW) is listed in Attachment 1.5c.

5. Each bridge parapet or rail shall include a bridge conduit system.
6. The Developer shall use Low Cracking Bridge Concrete, in accordance with Attachment 1.5a, for all bridge decks, bridge parapets and abutment backwalls above the bearing area.
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.

## **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 will 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 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/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. Segmental construction of any kind (post-tensioned box beams, segmental precast and/or balanced cantilever construction) is prohibited. Post-tensioning of concrete is not allowed.
8. A sleeper pad will be required when the bridge abutment is either integral or semi-integral.
9. The use of asphalt overlays on concrete bridge decks shall not be permitted.
10. 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).
11. 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 made 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 3.11 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.

#### **E. Vaden Drive Direct Access to I-66 Express Lanes**

See Attachment 3.15e Supplemental Design Requirements for the Vaden Drive Direct Access to I-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 3.15a, Existing Bridge and Culvert Information.
  - 1.3 For a list of existing bridges which may contain asbestos, see Attachment 3.15a, Existing Bridge Information.
  - 1.4 The Developer is required to submit plans for the modification of an existing structure that are consistent with Attachment 1.5a, Standards and Specifications. Plan sets are also required to show all changes, including but not limited to vertical

and horizontal clearances, lane configurations 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/ 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/or 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).

## 2. Scope of Work for Bridges to Remain in Place

- 2.1 The scope of work for bridges to remain in place and/or widened shall include the following:
  - Bridge specific requirements listed in Attachment 3.15c Bridge Widening and Repairs and associated repair quantities in Attachment 3.15d 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 1.5a.
- 2.3 Substructure cracks shall be repaired in accordance with the Epoxy Injection Pressure Crack Sealing Special Provision included in Attachment 1.5a.
- 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 will have the option to replace entire portions of the bridge or the entire bridge.

### 3. Additional Requirements

- 3.1 Mechanical bearings shall not be used on 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 3.15c Bridge Widening and Repairs and Attachment 3.15d Bridge Repair Quantities.
- 3.6 Existing bridge foundations shall be evaluated to determine effects of bridge widening, superstructure replacement, joint closures and/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 foundations. 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, 16<sup>th</sup> Edition, may be used for the evaluation of the existing foundations.
- 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.

### 4. Dismantling and Removing Existing Structures or Removing Portions of Existing Structures

Any demolition and temporary support plan over or adjacent to live traffic 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 the procedures for using the loaded equipment without exceeding the structure's design capacity. The plan 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 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 VDOT's Road & Bridge Standards, Vol. I & II. Should any standard for culverts not be in accordance with AASHTO LRFD, then the Developer shall verify design and/or 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 that extension and/or modifications.
- 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 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.
  - 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.

### **I. Load Ratings for Bridges and Culverts**

1. The following structure load ratings shall be required and shall be performed in accordance with the requirements of IIM-S&B-86 – *Load Rating and Posting of Structures (Bridges and Culverts)*:
  - 1.1 A load rating is required when a newly constructed structure or phased portion of the new structure 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/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/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/inventory inspection by the Department will serve as the initial inspection of the structure. Data gathered will include location, date completed, alignment, description, horizontal/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 Final 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 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 will submit a Stage I (Preliminary Plan) submission for each new bridge, bridge replacement, and bridge widening/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 3.4 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 requirements, and preliminary plan requirements indicated in the standards and specifications as set forth in Attachment 1.5a.
- 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/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 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 ID and plan number for each new bridge in the contract

2.3 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 VDOT's Road & 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/or implement a modified version of the requirement such that it is in compliance with AASHTO LRFD.
  - 2.1 Retaining walls shall have a design life of 75 years. Retaining walls supporting structures and/or at bridge abutments shall have a design 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 a 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. Where a post extends behind a retaining wall, the ditch shall be located adjacent to the post. The area between the edge of the ditch and the back of the retaining wall 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 Section 3.15 General Requirements.
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 will 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 3.4 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 & 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. Lane Use Management Signs (LUMS) shall be treated in the same manner as overhead sign structures that support variable message signs.

2. Signs on bridge structures may be installed by 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.

3. Overhead sign structures (span type only, no cantilevers) shall be supported on bridge deck blisters. The main bridge beam/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 for the structures, toll gantries, and supports for the violation enforcement, TMS, and tolling system roadside equipment will be standardized.

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

- 2.1 Toll and enforcement equipment dead loads and performance requirements; and
- 2.2 Natural frequency requirements.

For the purpose of IIM-S&B-90 *VDOT Modifications to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, toll gantries shall be treated in the same manner as overhead sign structures that support variable message signs.

3. The vertical deflection of the toll gantry will not exceed the equipment manufacturer's desirable design specification.
4. The toll gantry columns and beams will be fabricated of galvanized steel.

### **C. Existing Traffic Structures**

1. The Developer may reuse an existing traffic structure for proposed signs/ITS devices after inspection, repair of any 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 1.5a for this Project. Any existing structure that the Developer proposes to reuse must 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 1.5a for this Project, including roadway. The Department Structure ID for any sign/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. Existing lighting poles that are relocated shall not be reused.
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 sign 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 410.02 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/ITS Structures will require a safety initial 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/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 Architectural Treatment**

Architectural treatment shall be in accordance with Section 3.11 Aesthetics.



### **3.14.7 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 following construction.
- 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 Final Acceptance.
- 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 VDOT's Annual Bridge Construction Unit Cost Report which is provided to FHWA. This data shall be submitted to the Department within 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 I-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 Rte. 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.

## **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 completing and documenting the Concept of Operations including stakeholder's involvement with the Department, Transit, Public Safety and Counties, Cities and Towns within the project limit. Also perform necessary work for 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 until 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 and/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.

### **The Department Asset Specific Requirements**

- H. 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 or new 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 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 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. Toll pricing shall be in accordance with the Agreement with rates appropriate to the traffic flow conditions on the road.
- I. 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 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 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.
- J. 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 1.5a.
- K. Vehicles shall be classified on the roadside in order to different toll rates, create exemptions and apply restrictions for use of the Express Lanes.
- L. All ETTM equipment and systems shall be monitored for health and alert failures automatically to maintenance staff to meet agreed response and repair times.
- M. The back office shall process transactions for automated clearing with E-ZPass accounts held by the Department and reciprocity agencies.
- N. Transactions shall be built into trips and rated according to the dynamically calculated toll rates for the time of travel.
- O. Rates shall be calculated dynamically based on real-time roadway conditions for volume, occupancy and speed.
- P. Customers shall be able to access a website and customer service representatives by phone for roadway inquiries, account information and violation payments.

- Q. 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. For DBFOM and DBOM:
1. The 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.
  2. 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.
  3. 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.

4. 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 I-66 Express Lanes.

C. For DB:

1. The Department's ATMS shall serve as the TMS for the Express Lanes.
2. 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.
3. 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.

**The Department Assets Specific Requirement**

- D. 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/integration points with the existing ITS network.
- E. 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.
  - F. 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.
  - G. 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.
  - H. 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.
  - I. The current the 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/relocate the impacted HUB sites subject to the Department approval of a plan that ensures continuity of operation.
  - J. 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 in the Concept of Operations (Attachment 4.1) 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 electronic toll

collection and traffic management 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. Interface Control Documents (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 and/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.
- F. Disaster Recovery Plan – shall be a document that sets out the system design requirements and maintenance and operations procedures to be followed in the event of failure of the ETTM System. The Disaster Recovery Plan shall include redundant systems and equipment, recovery and rebuild procedures and business continuity attributes of the system such as remote access.

### **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 99.99% of the time; and
- 1.4 Transponder read processing shall be 4,000 per lane per hour.
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 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, Washington DC, North Carolina and Pennsylvania;
  - 3.2 The OCR shall automatically read the license plate characters and state jurisdiction at least 95% of the time;
  - 3.3 The OCR accuracy shall be at least 90% of human readable images from the states listed above; and
  - 3.4 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 15 days at the roadside in the event of network failure; and
  - 6.4 Adjacent transaction processors at toll locations at the roadside shall process transaction data for the adjacent location in the event of a process 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 1.5a.
- 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 99.9%, 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.
- 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 1.5a.

### **3.15.8 Express Lanes Traffic and Toll Operations Centers**

A. For DBFOM and DBOM:

1. The Developer shall provide a Traffic Operations Center that complies with the Agreement to accommodate equipment and personnel for the traffic management operation of the Project. The Developer shall obtain building permits and other Regulatory Approvals required for the construction and occupancy of the Operations Center as required.
2. 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.
3. The Traffic Operations Center shall be located in Northern Virginia.
4. 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.
5. The Toll Operations Center need not be located in Northern Virginia.
6. Both the Traffic and Toll Operations Centers shall comply with the Department's physical security requirements.

B. For DB:

1. Under a Design-Build procurement scenario, the Department will provide space at the PSTOC for traffic operations on the Express Lanes.
2. Under a Design-Build procurement scenario, the Developer shall provide a Toll Operations Center, where staff responsible for reviewing license plates, handling customer service, and all other duties required for the tolling operations will be located.
3. The Toll Operations Center 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 Express Lanes including, approaches and interchanges
2. AID on the Express Lanes

B. CCTV video coverage must be provided by PTZ CCTV cameras mounted on poles to enable 66 Express Lanes-OC operators and Department 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 Developer 66 Express Lanes-OC operator 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 1.5a.
- 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.

#### **The Department Assets Specific Requirement**

- H. 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 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 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 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 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 managed 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.
  - 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 for the general purpose lanes subject to Department approval.
- G. The Developer shall provide the Department a real-time data feed of traffic flow data on the Express Lanes.
  - 1. All data and performance requirements in the Department's specification for vehicle detection and data collection shall apply.
  - 2. Data shall be provided for all 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 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. The 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.
- B. Two DMS shall be installed at suitable distances from the 66 Express Lanes entry points 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.
- 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 66 Express Lanes-OC 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 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.

**The Department Assets Specific Requirement**

- A. 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.
- B. 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/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.
- C. 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.
- D. 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 Express Lanes; and
  - 3. Type 2 sign for Park and Ride 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/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**

#### **The Department Assets Specific Requirement**

- A. 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. 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/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/charging equipment, and fiber optic cable termination/patch panels.
- C. 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 1.5a.
- D. 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 1.5a.

### **3.15.14 Power**

A. For DBFOM and DBOM:

1. The Developer shall furnish and install a dedicated power distribution network for the Express Lanes tolling and traffic management system, which shall be physically separate from the Department's power distribution network.
2. The Developer's power distribution network shall consist of dedicated conduits, handholes, conductors and power service meters.

B. For DB:

1. The Developer shall upgrade the existing power distribution network for demands of the Express Lanes tolling and traffic management system.

### **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 4 hours.
- B. All tolling points should have a generator that supports the equipment in the event the UPS 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/firmware package that is Microsoft 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/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 4 hours. Additionally, the Developer shall be responsible for providing a portable generator hookup where power demand and cabinet constraints outweigh minimum four 4-hour battery runtime capacity subject to Department approval.

### **3.15.16 Communication and Power Infrastructure**

- A. The Developer shall install two separate power and communication conduit systems, one for the general purpose lanes and another for the Express Lanes.
  - 1. The Department duct-bank shall consist of six 4-inch conduits for backbone and power along I-66 within the project limits.
  - 2. 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.
  - 3. 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.

### **The Department Assets Specific Requirement**

- K. The communications network on I-66 has served 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 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 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.
- N. 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.
- O. 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/patch panels and devices with no splicing permitted in either pull boxes or vaults.
- P. 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.
- Q. 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.

- R. 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 Express Lanes.
- S. 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.
- T. 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 defined rating tables;
  - 3. Send toll rates to the TMS for display on DMS;
  - 4. Have the ability to change toll rates in 15 minute increments; and
  - 5. Adjust toll prices in order to maintain free-flow traffic conditions 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;
  - 2. Toll Corrections File Interface: Virginia Toll Facilities Group – VDOT CSC Specifications;

3. Toll Reconciliation Response File 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
6. VTOLL Interface: Virginia Toll Facilities Group – VDOT CSC Specifications.

### **3.15.18 Interface with the VDOT ATMS**

- A. The interface with the VDOT ATMS shall comply with the requirements of the ICD.
- B. The Express Lanes TMS shall not effect 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 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 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 Substantial Completion to the Department a security plan for the 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.
  - 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 Substantial Completion to the Department a disaster recovery plan for the Express Lanes operations, which shall, at a minimum, include the following:
  - 1. Mitigating any adverse impact on the Tolling System and its operation and/or 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
- G. Golden images of all servers shall be kept in a secure location

### **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 Substantial 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:
    - 1.1 Test specifications for each of the test cycles
    - 1.2 Detailed requirements traceability matrix linking each of the test series to relevant requirement(s)
    - 1.3 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:
    - 1.1 System design and integration overview
    - 1.2 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
    - 1.3 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

- 1.4 Site Acceptance Testing – tests to be conducted at the point of installation (tolling point and 66 Express Lanes-OC) to confirm the factory acceptance testing results, plus any omissions and/or errors noted during the factory testing
- 1.5 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 in normal operating conditions.

### **The Department Assets Specific Requirement**

- C. 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. 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 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 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 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 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 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. 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 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. 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 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 Express Lanes TMS 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 re-build 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 managed 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 reinstall the existing Active Traffic Management (ATM) System during construction and shall provide a replacement ATM between I-495 and Route 50. It shall include the field components described in this section.

- 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. Route 50
  - 5. Fairfax County Parkway
  - 6. Route 28
  - 7. US 29 Centreville
  - 8. VA 234 Business
  - 9. VA 234 Bypass
  - 10. Route 29/Exit 43 in Gainesville
  - 11. US 15

## **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. Once the Existing ATMS devices are relocated/replaced, the responsibilities will be handled per the Turnover Plan (Attachment 4.6b).
- C. The Department will operate the gates and maintain assets (components) necessary to operate gates for the existing HOV facility for the duration of the Construction Project. Once the gates are impacted, relocated/replaced, the gate maintenance responsibilities will be handled per the Turnover Plan (Attachment 4.6b).
- D. Once the Existing ATMS devices are impacted, relocated/replaced, the Developer shall be responsible for maintaining those devices until its Final Acceptance (see Attachment 4.6b for more Turnover Plan responsibilities).
- E. 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. 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.
- F. 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.

- G. The existing drainage system will be maintained by the Department until the Developer start impacting the drainage system, at which time all drainage assets within the impacted drainage system will become the Developer's responsibility.
- H. 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.
- I. 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.
- J. 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.
- K. 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.

### **3.17 As-Built Documents**

#### **3.17.1 General**

As a condition to Final Acceptance of the Project, 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 1.5a, 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/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 Contract Plans 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 Contract Plans. 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 Contract Plans. On the profile plans for the bore paths paralleling the roadway, show the Contract Plans 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 Contract work.

- 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 and/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 and/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 VDOT's 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 VDOT's 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 I66 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 I66 and a single baseline at all interchanges
- D. Field data verified and updated

- E. Planimetric locations
- F. Property data and R/W
- 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 central I-66 corridor

Utilities (Level D sub-surface utility investigation) “Big Ticket” items only (see attachment for list of Big Ticket items).

\*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 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 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/or 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 R/W 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 R/W 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**

**Digital Terrain Model (DTM) and Construction Cross-Sections:** Compatible to the Department's current DTM format.

**Borrow Pits:** All borrow pit DTM's or cross-sections, originals and finals.

**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.

**Pipes, Culverts, Ditches and Related Appurtenances:** Existing, newly installed control and as-built survey data for existing and new pipes, culverts and ditches which at a minimum include horizontal and vertical controls, type, size, materials and inlet/outlet control, catch basins and manhole and other related infrastructure.

**Road ROW:** Existing, newly constructed/installed control and as-built survey data for right-of-way cross section showing roads, lane configuration, shoulders, access and egress ramps and connections, embankments, utilities, drainage and all infrastructure within the road 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 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 1.10. 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 1.10.

#### **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 soddings 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 1.5a.
- 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 Work. 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 1.5a.
- 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  
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. Developer must keep un-interrupted access to WMATA traction power and tie breaker station facilities for maintenance and operations unless approved by WMATA.
- 3.21.4** The new location of the Traction Power Substation (TPSS) and Tie-Breaker Station (TBS) 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 TBS locations can be reused in the new facility.



**3.21.5** The Department will 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/Prosperity Avenue**

1. It is anticipated that the Developer shall be required to relocate the traction power substations (TPSS) at the WMATA Dunn Loring Station due to the roadway widening included in the 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, which is to replace the Prosperity Avenue Tie Breaker Station (TBS) with a 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-60 Access.
5. The Department will coordinate with and obtain Fairfax County Special Exception/2232 land-use approvals for TPSS and TBS facilities.
6. The use of modular (pre-fabricated) TPSS units 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**

1. It is currently anticipated that no impacts to the TPSS building off Cedar Lane will require relocation due to Project Work.

2. The Developer may be required to, but not limited to, revise the entrance from Cedar Lane to the TPSS facility due to Project Work. 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

1. It is anticipated that the Developer shall be required to relocate the tie breaker stations (TBS) at Yeonas Drive due to the roadway widening included in the Project Work.
2. The Department has advanced the design to coordinate with WMATA for seeking their approval and identified potential sites for the relocation of the TBS as included in the traction power simulation, but it shall be the Developer's responsibility to confirm the locations meet all design requirements of WMATA.
3. The layout of the TBS shall meet all WMATA criteria, including but not limited to accessibility for maintenance vehicles that require access.
4. The Department will coordinate with and obtain Fairfax County Special Exception/2232 land-use approvals for the TBS facilities.
5. The use of modular (or pre-fabricated) TBS units will require enclosures and screening to meet Fairfax County Land-Use Permit (Special Exception/2232) requirements.
6. The Developer shall prepare final design site plans based on the design plans provided by the Department for the TBS site that will require civil, site and utility work including but not limited to access road paving, drainage, stormwater management, utilities, fencing and landscaping.
7. The Developer is required to obtain all required permits and regulatory approvals for the relocated TBS facilities that are not provided by the Department.

D. DVP Power Conduits

1. The Developer shall be required to coordinate with Dominion Virginia Power on the relocation of the existing 34.5 kV traction power feeder lines and/or construction of new 34.5 KV feeder lines will that provide power to the relocated traction power substations.
2. The Developer shall coordinate and determine any impacts required by the traction power feeder construction on sidewalks, drainage, lighting, retaining walls, other utilities, etc.
3. 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 serving required by the Project Work, including but not limited to the following:
  - 1.1 Communication – Fiber Optic lines
2. Power, Gas and water to the station and pedestrian bridges
3. Other utilities that provide service to WMATA
4. Any utility service to WMATA shall not be suspended without the approval of WMATA

F. Trail Track 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.

H. Track Overpasses (Bridges)

1. The Project Work is anticipated to include new and/or reconstructed roadway bridges over WMATA operational tracks and transit facilities. These include but are not limited to the following roadway bridges:
  - 1.1 Beltway Ramps
  - 1.2 Gallows Road
  - 1.3 Cedar Lane
  - 1.4 Nutley Street
  - 1.5 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 Project Work to avoid or minimize any potential impacts to the following roads that provide access to the Vienna and Dunn Loring Stations:

1.1 I-66

1.2 Prosperity Drive

1.3 Saintsbury Drive

1.4 Virginia Center Blvd.

2. The Developer shall develop and submit for review and approval from VDOT and coordinate with WMATA maintenance of traffic (MOT) plans showing how impacts on these roadways can be maintained, specifically during peak commuter periods.

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:

1.1 Metro station guide and wayfinding signs

1.2 ATM infrastructure related to WMATA

1.3 Sign structure piers

### **3.22 Park-and-Ride Facilities**

**3.22.1** The Developer shall provide Park-and-Ride 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 3.17 and the Agreement. The Developer shall incorporate intersections and other access in its design and construction. The Park-and-Ride Facilities design shall take into consideration 2040 expansion needs and parking space requirements per Table 3.17.

**3.22.2** Design of Park-and-Ride 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 1.5a. All roadway and parking lot pavement designs shall be in accordance with the provided minimum pavement design set forth in Attachment 3.8.

**3.22.3** The Park-and-Ride 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 3.17 to meet the transit service, carpool, and vanpool demand for 2025.
- C. The Developer shall have the responsibility for locating Park-and-Ride Facilities to meet transit service and carpool/vanpool demand at locations specified in the Conceptual Plan OR at alternative locations that meet ALL of the following criteria;
  1. The project Park-and-Ride Facilities shall be adjacent to I-66.
  2. The project Park-and-Ride Facilities shall meet the travel shed Park-and-Ride Facility demand and transit service demand (e.g., bus bays) as articulated in Table 3.17
  3. Direct access is provided from the project Park-and-Ride Facilities to the Express Lanes in the same manner as demonstrated in the Conceptual Plan
  4. Project Park-and-Ride Facilities locations, if altered from the Conceptual Plan, are subject to approval by the Department and DRPT
- D. In the case that the location of the Park-and-Ride Facility is not one of the 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 Park-and-Ride Facilities shall, at a minimum, include the following:

- A. Bus bays and bus loop pavement areas, as well as carpool/vanpool pick-up/drop-off areas, constructed with concrete pavement in accordance with the standards and specification set forth in Attachment 1.5a;
- B. Interconnected, but separate accommodations for bus facilities and circulation, kiss-and-ride facilities and circulation, parking areas and circulation, carpooling/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, kiss-and-ride, and transit and carpool/vanpool waiting areas;
- G. Sidewalks (and/or shared use path facilities, as noted below) connecting the Park-and-Ride Facilities (at the Park-and-Ride Facility property line) to adjacent land uses and pedestrian facilities where they exist within 500 feet from edge of Park-and-Ride Facility property line;
- H. Shared use paths within Park-and-Ride Facilities and connecting to adjacent (at the Park-and-Ride Facility property line) land uses and bicycle facilities where they exist within 500 feet from edge of Park-and-Ride Facility property line or to adjacent road limits, as approved by the Department;
- I. Traffic control devices at access points (intersections/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/wayfinding, transit route and service information/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 1.5a;
- K. Pavement markings consistent with the latest edition of the MUTCD and the Department standards according to Attachment 1.5a;
- L. Lighting (vehicular and pedestrian areas) throughout the Park-and-Ride Facilities (including parking, kiss-and-ride, and transit and carpool/vanpool waiting and pick-up/drop-off areas);
- M. Covered bicycles racks to accommodate a minimum of 75 bicycles in each Park-and-Ride Facility near the pick-up/drop-off areas with appropriate lighting and signage;
- N. Trash receptacles throughout each facility (at least one receptacle per waiting area shelter);
- O. Bus stop and carpool/vanpool waiting area signage (and associated poles and/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 Park-and-Ride 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 park-and-ride 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/vanpool pick-up/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 park-and-ride facility;
  - T. Designated carpool/vanpool pick-up/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 Park-and-Ride Facility, vehicular pick-up/drop-off accommodations for six vehicles per each Park-and-Ride 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 Park-and-Ride Facility conceptual layouts (inclusive of all facility elements) at each location for consideration and review by the Department prior to commencing final design. Park-and-Ride 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/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 Park-and-Ride Facility parking spaces by facility as indicated in Table 3.17 (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 Park-and-Ride 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 3.17; and
- B. The number of bus bays by facility, as indicated in Table 3.17, 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 substantial completion date. The number of minimum of kiss-and-ride spaces shall be 2% of the total parking spaces identified to meet the 2040 demand shown in Table 3.17.

**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 3.17: Park-and-Ride Facility, Bus Bay and Parking Space Requirements**

<b>P&amp;R Facility Preferred Alternative Location</b>	<b>Minimum Bus Bays Required</b>	<b>Minimum Commuter Parking Spaces Required (Opening Year)<sup>1</sup></b>	<b>Future Commuter Parking Spaces Required (2040)<sup>1</sup></b>	<b>Minimum Acres Required<sup>2</sup></b>
<b><i>Opening Year Requirement</i></b>				
Haymarket	2	230	600	4.6
Gainesville (University Boulevard)	4	1,920	2,370	47.3
Gainesville (Cushing Road/Route 234)	No Work Required	No Work Required	1,090 <sup>3</sup>	N/A
Manassas (Balls Ford Road)	3	1,300	1,620	32.4
Fairfax Center (Monument Drive) <sup>4</sup>	2	630 <sup>4</sup>	820	Use existing surface lots <sup>4</sup>

Note: Direct access is assumed to be constructed at the Cushing Road Park-and-Ride prior to 2040.

1. Park-and-ride spaces required do not include spaces required for kiss-and-ride area, as described in 3.22.g.iii
2. Acres required indicative of acquiring enough right-of-way by opening year to meet 2040 park-and-ride facility demand (at University Boulevard and Balls Ford Road) and is intended to accommodate pick-up/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.



## **4 Operations, Maintenance, and Tolling For the 66 Express Lanes [Applies to DBFOM and DBOM]**

### **4.1 General**

- 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**

- U. 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.
- V. 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 1.5a.
- W. All shared and Department bridges and structures shall be inspected by the Department. All Developer's bridges and structures shall be inspected by the Developer. Bridges shall be inspected in accordance with the National Bridge Inspection Standards (NBIS) of the Code of Federal Regulations, 23 Highways – Part 650 and Department requirements.
- X. 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 1.5a.

#### **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**

**Lane and Shoulder Closures.** The Developer shall follow Department Policy for Lane Closures in NoVA District as updated at the time of actual lane closure limitations for the requirements for lane closures of the Managed Lanes and the GP Lanes to facilitate the work activities related to Department's future maintenance and construction projects.

### **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 months.

#### **4.3.2 O&M Data Management**

- A. Prior to Substantial 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.
- Y. 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 and/or maintenance activities.
- Z. 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 the Department's Traffic Operations Center

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 and/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 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 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.
- B. Each Station whose weighted average speed over the Peak Period falls below the defined minimum average operating speed for each of the Operating Speed Performance Standard (OSPS) and the Federal Degradation Standard, 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:

$$\underline{\text{Percent Degradation}} = \frac{\sum_i^{180} \text{Substandard Stations} \times 100}{(\text{Stations} \times 180 \text{ Days})}$$

- (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 for the Federal Degradation Standard (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 Federal Degradation Standard

##### 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 EXECUTION*

*(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. The facility is considered degraded by the Federal Degradation Standard when compliance is less than or equal to 90 percent, where:
  - The minimum average operating speed for the Federal Degradation Standard 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/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/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.

- AA. 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 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 (66 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 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/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 Substantial 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 90 days before Substantial Completion to reflect current industry practices and changes, consistent with the Northern Virginia TAMS criteria in place on similar highways in Northern Virginia. The Department shall approve the updated tables 30 days before the Substantial Completion Date and then 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 Attachments 4.6a Maintenance Responsibility Matrix and Attachment 4.6b Maintenance Responsibility Plans and when necessary 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 as shown in Attachment 4.6c. 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 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 180 days before the end of the Operating Period. The Department will review the Transition Plan and request any changes within a period of 30 days. The Developer shall submit the final

Transition Plan to the Department no more than 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 Obligations**

Upon the end of the Term, the Developer shall hand-back the 66 Express Lanes Project to the Department, at no charge to the Department, with asset condition having a remaining life of the greater of: 5 years, life within its normal lifecycle (collectively referred to as the “Handback Requirements”), and have a minimum Critical Condition Index (CCI) value of 85.

### **4.7 Tolling Requirements**

#### **4.7.1 General**

- A. The Electronic Toll (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.

#### **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 99.8% 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 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 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/time within one 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 10 (one 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 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 99.9% 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 and/or no longer in good standing, the Developer must reconcile or audit the data transmission within three 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 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 10 days of entry or correction of license plate data.) Transactions not issued within 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 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.
- I. Following receipt of two or more complaints within 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 15 calendar days of receipt of such second complaint within a 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 15 calendar days of the receipt of such second complaint within a 30 calendar day period.
- J. Within 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.

- K. Within 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.
- L. 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 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).
- M. 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 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 NOVA VDOT 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 business days. Any delays in processing, transmitting, or otherwise actioning transactions in excess of 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/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 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.

- A. 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.
  
- B. During the Construction Period, the Developer's weekly report 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;
  - 3. MOT weekly update, regarding any scheduled lane closures and identification of work areas for the ensuing 2 weeks; and
  - 4. Managed lane and tolling activities.
  
- C. During the Construction Period, the Developer's monthly 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. 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 TIAs, float compensation;
  - 5. A comparison of actual and planned progress including (1) illustrating schedule variance graphically by plotting and budgeted cost of work performed (BCWP) and the budgeted cost of work scheduled (BCWS), and (2) reporting the scheduled performance index (SPI), defined as the ratio of BCWP divided by BCWS;
  - 6. Identification of activities requiring Department/FHWA input or assistance;
  - 7. Action items/outstanding issues;
  - 8. A work breakdown structure Level 1 or Level 2 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 this is the Baseline Schedule is the only schedule being executed to perform the Work;
  12. NCR and resolution reports;
  13. ROW acquisition activities;
  14. Environmental compliance activities;
  15. DBE/SWaM quarterly usage;
  16. Safety activities;
  17. Managed lane and tolling activities
  18. Digital photographs of the progress of the Project; and
  19. 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.
- D. During the Operations Period, the Developer's quarterly O&M report shall be reviewed and approved by the Department and may include the following:
1. Planning and implementation of operations, including work plans for the future periods;
  2. Roadway operations;
  3. Incident response times;
  4. Routine maintenance activities;
  5. Customer service log, detailing complaints or requests, and their disposition;
  6. Managed lane average daily traffic volumes;
  7. Average daily ANPR transactions;
  8. Average daily E-ZPass transactions;
  9. Average daily HOV volumes;
  10. Average daily toll revenue
  11. O&M inspections;
  12. Long-term participation SWaM goal;
  13. A summary of issues related to Performance Points during the reporting period;

14. Quality management activities; and
  15. Performance timeliness.
- E. During the Operations Period, the Developer's annual report shall include the following:
1. Summary of quarterly issues and trends as required for the Department's reporting to FHWA;
  2. Annual budget(s), as required by the Agreement;
  3. A report of O&M Overhead of the O&M Contractor or its Affiliates; and
  4. ETTM data, traffic data, and other data generated from operation of the Project or any ETTM System.
- F. The Developer Management Plan shall describe the proposed formats, means of distribution, and recipients of the reports.
- G. 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 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).